

## Lecture 5: Exchange Rate Systems

### I. INTRODUCTION

- In the last lecture, we discussed how transactions that take place in the foreign exchange market affect spot rates, forward rates and future spot rates.
- In particular we looked at two relationships: Uncovered Interest Rate Parity and Covered Interest Rate Parity. Uncovered Interest Rate parity says that expected returns from investing in assets in two countries are identical. Covered interest rate parity says that the guaranteed returns from investing in the Home country must equal the guaranteed returns from investing in the foreign economy.
- In all of this analysis, we assumed that the currency was freely traded on the spot and forward markets and that its value was free to adjust. However, this is not true for currencies in many countries of the world. Only relatively few countries have currencies that adjust freely in response to supply and demand.
- In today's lecture we examine the different types of exchange rate regimes adopted by countries in the world today and examine the basic features of each type of regime.

### II. EXCHANGE RATE SYSTEMS.

- We can roughly categorize countries as falling into three main categories of exchange rate regimes.
  1. Flexible exchange rate systems (also known as floating exchange rate systems.)
  2. Managed floating rate systems.
  3. Fixed exchange rate systems (also known as pegged exchange rate systems).

#### Flexible Exchange Rate Systems

- In a flexible exchange rate system, the value of the currency is determined by the market, i.e. by the interactions of thousands of banks, firms and other institutions seeking to buy and sell currency for purposes of transactions clearing, hedging, arbitrage and speculation.
- So higher demand for a currency, all else equal, would lead to an appreciation of the currency. Lower demand, all else equal, would lead to a depreciation of the currency. An increase in the supply of a currency, all else equal, will lead to a depreciation of that currency while a decrease in supply, all else equal, will lead to an appreciation.
- Essentially, we can characterize the equilibrium exchange rate under a flexible exchange rate system as the value that is consistent with covered and uncovered interest rate parity given values for the expected future spot rate and the forward exchange rate.

- Since 1971, economies have been moving towards flexible exchange rate systems although only relatively few currencies are classifiable as truly floating exchange rates.
- Most OECD countries have flexible exchange rate systems: the U.S., Canada, Australia, Britain, and the European Monetary Union.

### **Managed Floating Rate Systems**

- A managed floating rate system is a hybrid of a fixed exchange rate and a flexible exchange rate system. In a country with a managed floating exchange rate system, the central bank becomes a key participant in the foreign exchange market.
- Unlike in a fixed exchange rate regime, the central bank does not have an explicit set value for the currency; however, unlike in a flexible exchange rate regime, it doesn't allow the market to freely determine the value of the currency.
- Instead, the central bank has either an implicit target value or an explicit range of target values for their currency: it intervenes in the foreign exchange market by buying and selling domestic and foreign currency to keep the exchange rate close to this desired implicit value or within the desired target values.
- Example: Suppose that Thailand had a managed floating rate system and that the Thai central bank wants to keep the value of the Baht close to 25 Baht/\$. In a managed floating regime, the Thai central bank is willing to tolerate small fluctuations in the exchange rate (say from 24.75 to 25.25) without getting involved in the market.
- If, however, there is excess demand for Baht in the rest of the market causing appreciation below the 24.75 level the Central Bank increases the supply of Baht by selling Baht for dollars and acquiring holdings of U.S dollars. Similarly if there is excess supply of Baht causing depreciation above the 25.25 level, the Central Bank increases the demand for Baht by exchanging dollars for Baht and running down its holdings of U.S dollars.
- So under a managed floating regime, the central bank holds stocks of foreign currency: these holdings are known as foreign exchange reserves. It is important to realize that a managed float can only work when the implicit target is close to the equilibrium rate that would prevail in the absence of central bank intervention. Otherwise, the central bank will deplete its foreign exchange reserves and the country will be in a flexible exchange rate system because they can no longer intervene.
- Some managed floating regimes use an explicit range of target values instead of using an implicit range of values. For example, in the early 1990s, many European countries participated in an arrangement called the "Exchange Rate Mechanism" (ERM) in which they set a range of values (a band that was 2.25 percentage points wide on either side of a central value) in which their currencies were free to move in but agreed to intervene to prevent currencies from moving outside that range.
- Suppose the central rate was 0.5 British pounds/German mark. Then the pound-mark exchange rate would be allowed to fluctuate in the range 0.48875 Pounds/DM and 0.51125 Pounds/DM. However, if the pound depreciated and the exchange rate approached 0.51125 Pounds/DM or if the pound appreciated and the exchange rate approached 0.48875 Pounds/DM,

the Bank of England would intervene to make sure that the exchange rate never went outside the range.

### **Fixed (Pegged) Exchange Rate Systems**

- Prior to the 1970's most countries operated under a fixed exchange rate system known as the Bretton-Woods system. We will discuss Bretton-Woods in more detail later, for now think of it as a system whereby the exchange rates of the member countries were fixed against the U.S. dollar, with the dollar in turn worth a fixed amount of gold.
- Even though this system broke down, many countries still have an exchange rate system where the central bank announces a fixed exchange rate for the currency and then agrees to buy and sell the domestic currency at this value.
- The basic motivation for keeping exchange rates fixed is the belief that a stable exchange rate will help facilitate trade and investment flows between countries by reducing fluctuations in relative prices and by reducing uncertainty.
- However, it is important to note that financial markets have developed sophisticated derivatives that allow firms to hedge future exchange rate fluctuation risks. Regardless, fixed exchange rates are still fairly common.
- It is important to realize that demand and supply for currency still exist as in the case of floating exchange rates. However, changes in demand and supply theoretically no longer affect the price of the currency, which is fixed. However, as we will soon see, the price of the currency may only remain fixed in the short run; there may be substantial long run changes in the exchange rate.
- One could almost argue that the key distinction between fixed and floating rates is a tradeoff of continuous, small changes in the exchange rate for discrete, larger changes. However, before we explore the long run determination of the exchange rate in a fixed exchange rate system let's examine the basic structure.
- In a fixed exchange rate system, the Central Bank stands ready to exchange local currency and foreign currency at a pre-announced rate.
- One important concept to keep in mind is the market equilibrium exchange rate, the rate at which supply and demand will be equal, i.e. markets will clear. In a flexible exchange rate system, this is the spot rate. In a fixed exchange rate system, the pre-announced rate may not coincide with the market equilibrium exchange rate.
- In any market, there will be situations of excess demand and excess supply. Under a flexible exchange rate system, these changes cause appreciation or depreciation of the currency respectively. Under a fixed exchange rate system the Central Bank remains prepared to absorb the excess demand or supply.
- In order to do this exchange the Central Bank must hold stocks of both foreign and domestic currency. Since the central bank prints domestic currency, holding stocks of domestic currency poses no problems. The difficulty comes in holding an adequate stock of foreign currency known as foreign exchange reserves.

- The quantity of reserves has to be adequate to sustain the fixed exchange rate system (i.e. be large enough to accommodate all transactions of foreign currency for domestic currency that arise). Some fixed exchange rate systems, known as currency boards, require the central bank to back ALL domestic currency with foreign currency reserves, i.e. hold enough reserves to convert every unit of domestic currency to foreign currency.
- Although reserves could theoretically be held in the form of any currency, typically, most foreign exchange reserves are held in terms of dollars or occasionally in the form of another major currency like the Euro or the yen.
- The role of foreign exchange reserves can be best understood by a simple example. Suppose that the Thai central bank wants to fix the value of the Baht at 25 Baht/\$. Suppose that the equilibrium exchange rate (the rate that would equate supply and demand) was 24 Baht/\$.
- At a rate of 25 Baht/\$ there is an excess supply of dollars; people who have dollars prefer to exchange them at the central bank since each dollar buys 25 Baht when it is really worth only 24 Baht. The Central Bank absorbs the excess supply of dollars by selling Baht in exchange for dollars. In the process it acquires reserves of U.S dollars.
- Now suppose that the economic climate changes so that the equilibrium exchange rate becomes 26 Baht/\$. At the fixed rate of 25 Baht/\$ there is now an excess demand for dollars; people want to buy dollars from the central bank because it only costs them 25 Baht rather than the 26 Baht that each dollar is worth. In order to maintain the price of the Baht at 25 Baht/\$ the Central Bank absorbs the excess demand for dollars by exchanging dollars for Baht and runs down its foreign exchange reserves.
- Note however that this can only be done if the gap between the equilibrium rate and the fixed rate are small; if the equilibrium rate climbed to 35 Baht/\$, for example, the Central Bank does not have sufficient reserves to keep the exchange rate at 25 Baht/\$. If it tried to do so, the substantial excess demand for dollars would quickly deplete their f/x reserves.
- When the Thai Central Bank starts running out of reserves, it must reduce the excess demand for foreign currency, i.e. narrow the gap between the equilibrium and fixed rates. This can be done by making the Baht less valuable vis--vis the dollar. This is known as a devaluation: a reduction in the fixed value of the Baht.
- Think of devaluation as an analogy to depreciation in the flexible exchange rate case. The flip side of devaluation is revaluation; if the Thai Central Bank starts accumulating too many reserves, it reduces the excess supply of dollars by making the Baht more valuable vis--vis the dollar. This is analogous to an appreciation in the flexible exchange rate.
- Why would a country set a fixed rate that makes its currency artificially more valuable? Often done to make imports cheaper. Conversely, some countries choose to set a fixed rate that makes its currency seem less valuable. This is done for the opposite reason, namely to encourage foreigners to buy your exports. We will discuss this in more detail later.
- This type of system, where the central bank fixes the value of the currency, but has the ability to change the value of the currency when it so desires is known as an **adjustable pegged exchange rate system**
- There are other variants of fixed exchange rate systems. Some countries (like Brazil at various points in its history) have adapted a system known as a **crawling peg exchange rate**

**system.** This is just a fixed exchange rate system like the one described above except that the fixed rate changes in a pre-determined manner instead of in an arbitrary way. In other words, the Brazilian government would announce a fixed exchange rate of 10,000 cruzeiros to the dollar and also state that the rate would devalue by 10% each year.

- In the cases of an adjustable peg, a crawling peg or even a managed float, the central bank may not be able to sustain the exchange rate they desire if they don't have enough reserves. Faced with a serious loss of reserves they have to either let their currency float or devalue their currency. As we will see in this class, many financial crises seem to occur when the central bank runs out of reserves. One way to avoid running out of reserves (at least in theory) is to adopt a system known as a **currency board**. The most famous currency board was the one in Argentina, but Hong Kong has also had a long-standing currency board.
- A currency board is a fixed exchange rate regime where *there are enough foreign currency reserves to convert all domestic money into foreign currency*. In Argentina's currency board, which was 1 peso to 1 dollar, the Argentinean Central Bank could only issue as many pesos as it had dollar reserves. In Hong Kong's currency board which was 7.28 HK dollars to the U.S. dollar the monetary authority in Hong Kong could only issue 7.28 times as many HK dollars as they have U.S. dollars in reserve. Thus a currency board should never run out of reserves and be forced to devalue.
- Some countries are able to sustain unrealistic exchange rates by combining a fixed exchange rate system with restrictions on who has access to acquire foreign currency from the Central Bank. These are countries with **exchange controls**
- For example during 1991 in Kenya the black-market KSH/\$ exchange rate was 120 at one point but the official rate was 65KSH/\$. This leads to a substantial excess demand for dollars. Under a pure fixed exchange rate system the Central Bank would quickly run out of dollars, as everyone would swap KSH for dollars at the cheap rate. Instead, the Central imposed currency restrictions; ordinary people were not allowed to freely convert KSH to dollars. By restricting access to dollars, the Kenyan Central Bank is able to maintain an unrealistic exchange rate. Only the privileged are allowed to buy dollars at this cheap rate and use for their own benefit.