TURKISH AVIATION ACADEMY

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Aviation Economics & Finance

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OUTLINE

Money, interest Rates and exchange Rates

- Money supply and interest rates
- Foreign exchange rate market
- Open market operations under fixed and flexible exchange rates
- Joint determination of exchange rates and interest rates
- Exchange rate markets under flexible exchange rates
- Economic shocks on exchange rates when they are fixed

Money Supply and Interest Rates.

- People (investors) decide what proportion of their portfolio to hold in cash and how much in bonds
  - Money – no interest return but liquid (use for transactions)
  - Bonds – earn interest but not liquid
- Money demand (MD) function of transactions (+), for GDP, Y but negatively on interest rate (opportunity cost of holding money)

Asset	**Real Return**	**Nominal Return**
Cash	-p (inflation)	0
T-bill	r	i = r + p
Difference	i = r + p	i = r + p

- MD = f[P(+), *i*(-), Y(+)] where P is prices

MD = F[P(+), *I*(-), Y(+)] WHERE P ARE PRICES

- There are three main determinants of the nominal demand for money:
  - 1. **Interest rates.** An increase in the interest rate will lead to a reduction in the demand for money because higher interest rates will lead investors to put less of their portfolio in money (that has a zero interest rate return) and more of their portfolio in interest rate bearing assets.
  - 2. **Real income**. An increase in the income of the investor will lead to an increase in the demand for money. If income is higher consumer will need to hold more cash balances to make transactions (buy goods and services).
  - 3. **The price level**. An increase in the price level P will lead to a proportional increase in the nominal demand for money: in fact, if prices of all goods double, we need twice as much money to make the same amount of real transactions.
    - Since the nominal money demand is proportional to the price level, we can write the real demand for money as the ratio between MD and the price level P. Then, the real demand for money depends only on the level of transactions Y and the opportunity cost of money (the nominal interest rate):

$$MD/P = L(Y, i^*)$$

Money Market Equilibrium

- Nominal supply of money is determined by the Central Bank that decides how much money should be in circulation. See M1, M2, M3
- Supply of money by the Central Bank is defined as MS; the real value of this money supply is the nominal supply divided by the price level P, or MS/P.
  - MS/P = L(i, Y)
  - So real money supply = real money demand
  - Given the supply of money MS (and a given price level P), the real money supply (MS/P) is exogenous.
  - Given the demand for money, there is only one interest rate (i*) at which the money demand is equal to the money supply.

ADJUSTMENT MECHANISMS IN MONEY MARKET

- Demand for money ⬇ with an ⬆ *I* but demand for bonds just the opposite
- Supply of bonds determined by Central bank (and private markets)
- If $i > i^*$, people ⬆ demand for bonds bidding price up and yield (i) down. As yield ⬇, demand for bonds declines and demand for cash increases, relatively.
- Central Banks assets: reserves (T-bills), and foreign exchange reserves (for foreign exchange intervention)
- Central Bank Liabilities: the total amount of currency in circulation

ADJUSTMENT MECHANISMS IN MONEY MARKET

- If MS increases (through open market operations), the MS ⬆ but supply of bonds ⬇ (the open market purchase of bonds leads to an increase in the money supply and a reduction in the supply of T-bills available to the private sector)
- ⬆ in MS means MS > MD at given i^*, but also DB > BS, therefore, the DB will ⬆ as excess cash will bid up price bonds which in turn results in ⬇ in yield (or i).
- The ⬇ in yield (or i), ⬇ excess MS and excess BD, this continues until MD = MS and BD = BS.
- *Therefore, an increase in the money supply through an open market purchase of T-bills leads to a reduction in [the equilibrium] interest rate.*

FOREIGN EXCHANGE MARKET

- Consider next the determination of the exchange rate in the foreign exchange market and the difference between a regime **of fixed exchange rates** and a regime of **flexible exchange rates**.
- Demand for $ (Lira) by foreigners buying (importing) domestic goods, domestic exporters exchanging foreign currency for domestic currency, and foreign investors buying domestic currency (and selling their currency) to purchase domestic assets.
- As exchange rate of Lira to $ (Lira per $), depreciates the DD for $s ⬇; as Lira depreciates foreign goods become more expensive so demand ⬇
- Since imports of $ goods have to be paid $s, a depreciation of the Lira reduces the demand for $s as the reduced imports by Turkey of $ goods leads to a reduced demand for $s

Foreign Exchange Market

- On the other side of the exchange rate markets there are agents who are selling (supplying) $s in exchange of Lira
  - exporters of $ goods who have been paid $s and need to convert them in Lira, importers of Turkish goods who need Lira if they need to pay in Lira for their imports; and investors who are buying Lira in order to buy Turkish securities
- As the exchange rate of Lira (Lira per $) depreciates the supply of $s is increased
  - if the Lira depreciates, Turkish goods become cheaper in international markets and Turkish exports to $ goods are increased; since Turkish exporters are paid in $s, a depreciation of the Lira increases the supply of $s as the greater exports of Turkish goods lead to larger $ receipts that need to be converted into Lira.
- Consider the equilibrium in the exchange rate market: there is going to be an exchange rate S (Lira per $) at which the demand for $s (supply of Lira) is equal to the supply of $s (demand for Lira): this equilibrium exchange rate is S if the Lira/D$ exchange rate is depreciated (i.e. S' > S*), the supply of $s > the demand for $s and this will tend to appreciate the Lira relative to the $. The reverse will happen if the initial S is below (appreciated relative to) the equilibrium one.

Foreign Exchange Markets and Exchange Rates

- Under "**flexible exchange rates**", it will allow the demand and supply of foreign currency in the exchange rate market to determine the equilibrium value of the exchange rate.
- Under "**fixed exchange rates**", "peg" the value of the foreign exchange rate to a fixed parity, a certain amount of Lira per $.
  - to maintain a fixed exchange rate, a country cannot just announce a fixed parity: it must also commit to defend that parity by being willing to buy (sell) foreign reserves whenever the DD for foreign currency is greater (smaller) than the SS of foreign currency.
  - a country can defend a fixed exchange rate parity that differs from the equilibrium exchange rate (that would hold under flexible rates) only as long as it has a sufficient amount of foreign exchange reserves to satisfy the market excess demand
  - What happens to MS? It is reduced (why?)

Effects of Open Market Operations Under Flexible and Fixed Exchange Rates

- Have seen open market operations are the standard way a central bank controls the MS and *i* rates
- In open economy, open market operations have very different effects under **flexible** and **fixed** exchange rate regimes
- Flexible Regime: an open market purchase of domestic bonds will lead to an ⬆ in MS . In turn, this ⬆ in the MS will cause a reduction of domestic *i*. Therefore, exchange rate depreciates – the domestic currency depreciates since foreign bonds are more attractive than domestic bonds, therefore sell domestic bonds and buy foreign bonds
- The effects of the open market purchase of bonds on the MS under flexible exchange rate will be identical to the one obtained in a closed economy: the money supply will increase and interest rates will fall.

Effects of Open Market Operations Under Flexible and Fixed Exchange Rates

- Fixed Exchange Rates: under a regime of fixed exchange rates, any attempt by the central bank to increase the money supply via an open market operation is not going to be successful: the central bank is not going to be able to
  - The reason is that, if the exchange rate is fixed, the equilibrium level of the money supply is determined endogenously and cannot be affected by exogenous central bank open market operations change the money supply.
  - under fixed exchange rate, the exchange rate is not allowed to change: therefore the expected depreciation of the domestic currency must be, by definition, equal to zero.
  - Also, under fixed exchange rate, the nominal interest rate of a small open economy must always be equal to the world interest rate
  - If the central bank tries to increase the money supply through an open market operation, this will fail under fixed rates because any attempt to increase the money supply through an open market operation in domestic bonds will cause a loss of foreign exchange reserves that will bring back the money supply to its original level.

JOINT DETERMINATION OF THE INTEREST RATE AND EXCHANGE RATE IN THE MONEY AND EXCHANGE RATE MARKETS UNDER FLEXIBLE EXCHANGE RATES

- Consider money market and foreign exchange markets together.
- Money market MD=MS or $MS/P = L(Y, i)$ (1)
- Exchange rate Market: $i = i^* + \{[E_t(S_{t+1})/ S_t]-1\}$ (2)
  - Equation (2) implies that the return on domestic bonds must be equal to the total return on holding foreign bonds; in turn, the latter is the sum of the return on foreign bonds plus the expected percentage rate of depreciation (appreciation) of the domestic currency.
  - Equation (2) also tells us that if we know the value of the domestic and foreign interest rates and the value of the expected future exchange rate, we can derive the equilibrium current period spot exchange rate.
- Consider Monetary Policy (an increase in MS): if MS > MD, requires a fall in domestic *i*, return on domestic assets < on foreign assets, ensuing capital outflow causes value of domestic currency to decrease. In summary, a monetary expansion that leads to a reduction in domestic interest rates causes a depreciation of the domestic currency.

  Affect on exchange rate – suppose expect value of domestic currency to decrease, the change in expectations leads to an immediate depreciation of the domestic currency. Because expected return on foreign assets is higher, therefore DD for domestic currency and assets decreases, capital outflow reduces value of domestic currency.

Economic Shocks on the Exchange Rate Under Fixed Exchange Rate Regimes

- Have just seen under a regime of flexible exchange rates economic shocks such as a change in foreign interest rates or an exogenous change in expectations about future exchange rates lead to a devaluation of the domestic currency.
- What will be the effect of such shocks in a regime of fixed exchange rates? Suppose foreign *i* rates increase:
  - The domestic interest rate will also increase and this will lead to a reduction of money demand. To restore the equilibrium the money supply must also fall. How?
  - When the foreign *i* rate goes up, the domestic *i* rate is initially unchanged: agents try to sell domestic bonds and buy foreign currency in order to buy the higher yielding foreign bonds. To prevent the currency depreciation that this capital outflow would cause under flex rates, the central bank intervenes and sells foreign currency, this intervention reduces MS and leads to an increase in the domestic interest rate up to the new higher world interest rate.

Why Countries Fix the Exchange Rate and Why Fixed Exchange Rates Collapse

- It is often quite hard to permanently fix exchange rates and that fixed exchange rate regime often collapse with a big devaluation.
- Fixed exchange rates aren't fixed forever. They simply substitute infrequent large movements for more frequent smaller movements
- Why fix rates?
  - Under flexible exchange rates, the exchange rate might be affected by speculative factors that have little to do with fundamentals.
  - Flexible exchange rate leads to "beggar thy neighbour" policies where countries try to gain competitive advantage for their exports through policies of devaluation of the domestic currency.
  - Flexible exchange rates may be a cause of high inflation (p) and fixed exchange rates allow a country to converge very fast to low levels of international inflation.

END OF MODULE 17