Chapter One

1. Exchange Rate and the Foreign Exchange Market

1.1. Foreign exchange market

Each country has a currency in which the prices of goods and services are quoted—the dollar in the United States, the euro in Germany, the pound sterling in Britain, the yen in Japan, Birr in ethiopia, shelling in Kenya, and the peso in Mexico, to name just a few. Exchange rates play a central role in international trade because they allow us to compare the prices of goods and services produced in different countries. A consumer deciding which of two American cars to buy must compare their dollar prices, for example, $**39,000** (for a Lincoln Continental) or $**19,000** (for a Ford Taurus). However, how is the same consumer to compare either of these prices with the 3,000,000 yen (¥3,000,000) it costs to import a Subaru from Japan? To make this comparison, he or she must know the relative price of dollars and yen. (**To compare the money value of the products produced in different countries)**

Thus, exchange rate is the price of one country's currency in terms of another country's currency or the amount of domestic/ foreign currency that is needed to obtain a unit of foreign/domestic currency.

Notice that an exchange rate can be quoted in two ways: as the price of the foreign currency in terms of dollars; for example, $0.008139 per yen or as the price of dollars in terms of the foreign currency (for example, ¥ 122.87 per dollar). The first of these exchange rate quotations (dollars per foreign currency unit) is said to be in direct (or "American") terms, the second (foreign currency units per dollar) in indirect (or "European") terms.

It allows you to compare the cost of imports to that of domestic goods in common terms. There was a period when Americans were going to Germany to buy Mercedes and bring them home, rather than buying them in the U.S. Example: Consider the Mercedes: suppose the going price is 60 thousand euros in Germany and 60 thousand dollars in the US.

Would people flock to Germany? Depends on the exchange rate - comparing $ and euro is like comparing apples and oranges. Suppose the $/euro exchange rate is 1.28. So the cost in Germany reported in dollar units is: 60 thousand euros * (1.28 $/euro) = $76,800

What is foreign exchange market?

The foreign exchange market is the "place" where currencies are traded/ it is a market in which individuals, firms, and banks buy and sell foreign currencies or foreign exchange.

The need for demand and supply of foreign currency:

The demand for foreign currencies arises if:

- Tourists visit another country
- A domestic firm wants to import from other nations
- An individual wants to invest abroad

The supply of a nation's foreign currency arises from if:

- Foreign tourist expenditures in the nation
- Export earning
- Foreign investment

Just as other prices in the economy are determined by the interaction of buyers and sellers, exchange rates are determined by the interaction of the households, firms, and financial institutions that buy and sell foreign currencies to make international payments.

The Actors

The major participants in the foreign exchange market are commercial banks, corporations that engage in international trade, nonbank financial institutions such as asset-management firms and insurance companies, and central banks. Individuals may also participate in the foreign exchange market—for example, the tourist who buys foreign currency at a hotel's front desk—but such cash transactions are an insignificant fraction of total foreign exchange trading.

Commercial banks

Commercial banks are at the center of the foreign exchange market because almost every sizable international transaction involves the debiting and crediting of accounts at commercial banks in various financial centers. Thus, the vast majority of foreign exchange transactions involve the exchange of bank deposits denominated in different currencies.

Corporations

Corporations with operations in several countries frequently make or receive payments in currencies other than that of the country in which they are headquartered. To pay workers at a plant in Mexico, for example, IBM may need Mexican pesos. If IBM has only dollars earned by selling computers in the United States, it can acquire the pesos it needs by buying them with its dollars in the foreign exchange market.

Nonbank financial institutions

Over the years, deregulation of financial markets in the United States, Japan, and other countries has encouraged nonbank financial institutions to offer their customers a broader range of services, many of them indistinguishable from those offered by banks. Among these have been services involving foreign exchange transactions. Institutional investors, such as pension funds, often trade foreign currencies.

Central banks

Governments sometimes intervene in the foreign exchange market to increase or decrease the supply of their currency or purposefully affect the exchange rate in the market. Some countries intervene to hold the value of the currency fixed at a desirable level (fixed exchange rate).

Characteristics of foreign exchange market:

Volume is enormous: over a trillion dollars a day. Banks dealing in e-market tend to be concentrated in certain key financial cities: know which biggest. London largest, but also NY, Tokyo, Frankfurt and Singapore.

Highly integrated globally: when one major market is closed usually another is open, so people can trade around the clock, moving from one center to another.Integration means exchange rate quotes in different centers must be the same. It is guaranteed by arbitrage, which is defined as making a riskless profit on a financial trade. Suppose that $E^{NY}_{\$/euro} < E^{frunkfurt}_{\$/euro}$: NY offer more euros for a $ (lower price of euros, higher price of $, E$/euro is low) than Frankfurt, then people will take their $, sell inNY for bunch of euros, then sell these in Frankfurt for dollars again and end upwith more dollars than they started.Possibility for you to make riskless profit? No because short-lived due to arbitrage.

The increased demand for euros in NY would drive up the price of euros in terms of$ - this is an exchange rate depreciation for the $.

There are computers monitoring such openings and ready to take advantage of them.So gaps close up very quickly.

Vehicle currency:A vehicle currency is one that is widely used to denominate international contracts made by parties who do not reside in the country that issues the vehicle currency. Most foreign exchange transactions are between banks and take placein $, even if want to change Swedish kroner for Polish zloty, not dollars.Easier to change kroner first to $ and then $ to zlotys. Since US is so important inworld economy, there are many people willing to trade dollars for kroner and zlotyfor dollars, to take the opposite sides of your trade, rather than the

opposite sideof a direct kroner for zloty trade.Euro and Yen are also used as vehicles, but less so at current time.Note that arbitrage over three currencies requires:

$$E_{\text{pound/euro}} = (E_{\$/\text{euro}})\,(E_{\text{pound}/\$})$$

Functions of the Foreign Exchange Market

The foreign exchange market is the mechanism by which a person / firm transfers purchasing power from one country to another, obtains or provides credit for international trade transactions, and minimizes exposure to foreign exchange risk.

- **Transfer of Purchasing Power:** Transfer of purchasing power is necessary because international transactions normally involve parties in countries with different national currencies. Each party usually wants to deal in its own currency, but the transaction can be invoiced in only one currency.
- **Provision of Credit:** Because the movement of goods between countries takes time, inventory in transit must be financed.
- **Minimizing Foreign Exchange Risk:** The foreign exchange market provides "hedging" facilities for transferring foreign exchange risk to someone else.

1.2. Different concepts of the exchange rate and Exchange rate regimes

i. Arbitrage:

The purchase of a currency in the monetary center where it is cheaper, for immediate resale in the monetary center where it is more expensive, in order to make a profit is called **arbitrage.**

Example, if dollarprices of pound in New York and London are ($1.99/1 £) and ($2.10/1 £) then the arbitrage takes place. In NY arbitrage will increase the demand for pounds by applying pressure an upward pressure on the dollar price of pounds. In London, the sale of dollars will increase pressure on downward movement of exchange rate. Eventually, there will be elimination of the profitability of further arbitrage.

Arbitrage is the practice of taking advantage of a state of imbalance between two or more markets. A person who engages in arbitrage is called an **arbitrageur**. The arbitrageur exploits the imbalance that is present in the market by making a couple of matching deals in different markets, with the profit being the difference between the market prices.

Triangular Arbitrage

Triangular arbitrage is the act of exploiting an arbitrage opportunity resulting from a pricing discrepancy among three different currencies in the foreign exchange market.

A typical triangular arbitrage strategy involves three trades:

1. Exchanging the initial currency for a second
2. Trading second currency for a third
3. and the third currency for the initial

Example - Arbitrage Currency Trading

Suppose the current exchange rates of currency pairs are as follows:

EUR/$: 1.1837EUR/£: 0.7231£/$: 1.6388

In such a scenario, a foreign exchange trader could perform a triangular arbitrage by adopting thefollowing steps:

1. Buy 10,000 Euros for $11,837 USD.
2. Sell the 10,000 Euros, for 7,231 British pounds (GBP).
3. The 7,231 GBP in turn could then be sold for $11,850 USD.

This would yield a profit of $11,850 - $11,837 = $13 per trade for the trader

1.3. Exchange rate regimes

i. Spot Rates and Forward Rates

Two parties agree to an exchange of bank deposits and execute the deal immediately. Exchange rates governing such "on-the-spot" trading are called **spot exchange rates,** and the deal is called a **spot transaction**. The exchange rate in foreign exchange transactions that calls for the payment and receipt of the foreign exchange within two business days from the date when the transaction is agreed upon.

The two-day period gives adequate time for the parties to send instructions to debit and credit the appropriate bank accounts at home and abroad.

Participants in the spot market:

1. Commercial banks
2. Brokers
3. Customers of commercial and central banks

Foreign exchange deals sometimes specify a value date farther away than two days— 30 days, 90 days, 180 days, or even several years. The exchange rates quoted in such transactions are called forward **exchange rates. In** a 30-day forward transaction, for example, two parties may agree on April 1 to a spot exchange of £100,000 for $155,000 on May 1. The 30-day forward exchange rate is therefore $1.55 per pound, and it is generally different from the spot rate and from the forward rates applied to different value dates. When you agree to sell pounds for

dollars on a future date at a forward rate agreed on today, you have "sold pounds forward" and "bought dollars forward."

The exchange rate in foreign exchange transactions involves an agreement today to buy or sell a specified amount of foreign currency at a specified future date at a rate agreed upon today.

- A forward contract on an asset is an agreement between the buyer and seller to exchange cash for the asset at a predetermined price (the forward price) at a predetermined date (the settlement date).
- The buyer of the forward contract agrees today to buy the asset on the settlement date at the forward price. The seller agrees today to sell the asset at that price on that date
- A forward contract is not an option. The buyer must go through with the contract, even if the spot rate at maturity is worse than agreed upon.

Participants in the Forward Market

1. Arbitrageurs
2. Traders
3. Hedgers
4. Speculators

An example shows why parties may wish to engage in forward exchange transactions. Suppose an American who imports radios from Japan knows that in 30 days, he must pay yen to a Japanese supplier for a shipment arriving then. The importer can sell each radio for $100 and must pay his supplier ¥9,000 per radio; so his profit depends on the dollar/yen exchange rate. At the current spot exchange rate of $0.0105 per yen, the importer would pay ($0.0105 per yen) X (¥9,000 per radio) = $94.50 per radio and would therefore make $5.50 on each radio imported. But the importer will not have the funds to pay the supplier until the radios arrive and are sold. If over the next 30 days the dollar unexpectedly depreciates to $0.0115 per yen, the importer will have to pay ($0.0115 per yen) X (¥9,000 per radio) = $103.50 per radio and so will take a $3.50 loss on each.

To avoid this risk, the importer can make a 30-day forward exchange deal with his bank. If the bank agrees to sell yen to the importer in 30 days at a rate of $0.0107, the importer is assured of paying exactly ($0.0107 per yen) X (¥9,000 per radio) = $96.30 per radio to the supplier. By buying yen and selling dollars forward, the importer is guaranteed a profit of $3.70 per radio

and is insured against the possibility that a sudden exchange rate change will turn a profitable importing deal into a loss.

Forward discount and forward premium:

If the forward rate is below the spot rate, the foreign currency is said to be at a forward discount with respect to the domestic currency. If the forward rate is above the spot rate, the foreign currency is said to be at a forward premium with respect to the domestic currency.

$$\text{Theforwardpremium/discount} = \frac{F - S}{S} * \frac{12}{n} * 100$$

Where, F = the forward rate of exchange

S = the spot rate of exchange

n = the number of months in theforward contract

ii. Option rate:

A foreign exchange option gives its owner the right to buy or sell a specified amount offoreign currency at a specified price at any time up to a specified expiration date. It offers the right to buy an amount of currency at a specified rate any time before a specified date.

iii. **Exchange rate swap:**

It is an agreement to trade currencies at one date and reverse the trade at a later trade (i.e. a spot sale, then arrange a repurchase in the future at a set rate).Why do this? Say our electronics store sold some computers in Japan and got yen, now we will need them again in a month to buy Sony TVs, but not want to hang on the money in yen over the month, want to hold it in dollars for domestic expenses.

A swap transaction involves the simultaneous purchase and sale of a given amount of foreign exchange for two different value dates. The most common type of swap is a spot against forward, where the dealer buys a currency in the spot market and simultaneously sells the same amount back to the same back in the forward market. Since this agreement is executed as a single transaction, the dealer incurs no unexpected foreign exchange risk.

1.4. *Foreign exchange risk, Hedging and speculation*

i. ***Foreign exchange risk:***

In the course of time, a nation's demand and supply curves for foreign exchange shifts causing the spot and the forward rate to fluctuate frequently. A nations demand and supply curves for foreign exchange shifts over time as a result of changes in tastes for domestic and foreign

products in the nation and abroad, different growth and inflation rates in different nations, changes in relative interest rates, expectations, and so on.

Forexample: If US taste for British products increase, the US demand for pounds increases (the demand curve shifts up), leading to a rise in the exchange rate (a **depreciationofthedollar**).

On the other hand, a lower rate of inflation in the US than in the UK leads to US products becoming cheaper for UK residents. This tends to increase the US supply of pounds (the supply curve shifts to the right) and causes a decline in the exchange rate (**an appreciation** of dollar).

The expectation of a strong dollar in PP may lead to an appreciation of the dollar. In a dynamic and changing world, exchange rates frequently vary, reflecting the constant change in the numerous economic forces simultaneously working.

Foreign exchangerisk arises out of three types of exposures:

1) The transaction exposure: Risk from a transaction involving future payments and receipts in a foreign currency.
2) The translation or accounting exposure: A need to value inventories and assets held abroad in terms of domestic currency for inclusion in the firms' consolidation balance sheet.
3) The economic exposure: Estimating domestic currency value of future profitability of the firm.

ii. ***Hedging:***

Hedging refers to the avoidance of a foreign exchange risk or the covering of an open position.

How it would be save the participants?

Case I: importers

Importers could borrow£100,000 at the SR=$2/£1 and leave this money on a three-month term deposits (to earn interest) in a bank. NY doing so the importer avoids the risk of future depreciation of the dollar, in this case they would have to pay more than $200,000. The cost of insuring against the foreign exchange in this way is the positive difference between the interest rate that the importer has to pay on the loan of £100,000 and the interest rate they earns on the term deposit of £100,000.

Case II: exporter

Also acts in the similar fashion by borrowing $200,000 at today SR and deposit the money in a bank to earn interest. After three months, the exporter would repay the loan of $200,000 with the payment of £100,000 they receives.

The cost of avoiding the foreign exchange risk in this manner is equal to the positive difference between the borrowing and deposit rates of interest. This kind of covering has a very serious disadvantage. The importer/exporter must borrow and tie up his /her funds for three months. To avoid this, hedging usually takes place in the forward market, where no tying up of funds is required.

Hedging in the forward market:

The importer could buy pounds forward for payment in three months at today's three-month forward rate. If the pound is at a three-month forward premium of 4% per year, the importer will have to pay $202,000 in three months for the £100,000 needed to pay for the imports. Therefore, the hedging cost will be $2,000 (1% of $200,000 for the three months).

Similarly, the exporter could sell pounds forward for payment in three months at today's three-month forward rate, in anticipation of receiving the payment of £100,000 for the exports. If the pound is at 4% three-month forward discount per year, the exporter will get only $1980,000 for £100,000 he/she sells in three-months. On the other hand, if the pound is at a 4% forward premium, the exporter will receive $202,000 in three-months with certainly by hedging. Similarly, foreign exchange risk can also be hedging in the futures and options market.

Convenience of hedging: the ability of traders and investors to hedge greatly facilitates the international flow of trade and investments. Without hedging there would be smaller, international capital flows, less trade and specialization in production, and smaller benefits from trade. Most importantly, a multinational corporation that has to make and receive a large number of payments in the future need only hedge its net open position.

iii. Speculation:

It is opposite of hedging. Where a hedger seeks to cover a foreign exchange risk, a speculator accepts and even seeks out a foreign exchange risk, in the hope of making a profit. If the speculator correctly anticipates future changes in spot rates, he /she makes a profit; otherwise incurs a loss. As in the case of hedging, speculation can take place in the spot, forward, futures or option market-most frequently in the forward market.

1. Speculation in spot market: If a speculator believes that the spot rate of a particular currency will rise, he/she could purchase the currency now and hold it on deposit in a bank for resale later. If he/she is correct, spot rate rises and he/she makes profit on each unit of the foreign currency equal to the difference between the previous lower spot rate at which he/she

purchase it and the subsequent higher rate at which he/she resells. On the contrary, if the speculator is wrong he/she incurs loss.If speculator believes that the spot rate of particular currency will fall, he/she acts in reverse way. In both cases, the speculator who operates in the spot market had to tie up his funds to speculate. To avoid this shortcoming, speculation usually takes place in the forward market.

2. Speculation in forward market: If the speculator believes that the spot rate of a certain foreign currency will be higher in three months than its present three month forward rate, the speculator purchases a specified amount of the foreign currency for delivery in three months. After three months if speculator is correct, he/she receives delivery of the foreign currency at the lower agreed forward rate and immediately resells it at the higher spot rate, realizing profit. If the speculator is wrong, and the spot rate in three months is lower than the agreed forward rate, he/she incurs loss. In any event, no currency changes hands until the three months are over (except nominal 10% security margin that speculators required paying at the time he/she signs the forward contract).

Effect of speculation:

Stabilizing effect: The purchase of a foreign currency when the domestic price of the foreign currency (exchange rate) falls or is low, in the expectation that it will soon rise, thus leading to a profit. Alternatively, it refers to the sale of foreign currency when the exchange rate rises, in the expectation that it will soon fall. Stabilizing speculation moderate fluctuations in exchange rates over time and performs a useful function.

***Destabilizing effect*:** The sale of a foreign currency when the exchange rate falls or is low, in the expectation that will fall even lower in the future, or the purchase of a foreign currency when the exchange rate is rising or is high, in the expectation that it will rise even higher in the future. This type of destabilizing speculation magnifies exchange rate fluctuation over time and can prove every disruptive to the international flow of trade and investments.

iv. *Interest arbitrage and efficiency of foreign exchange market*

Interest arbitrage refers to the international flow of short-term liquid capital to earn higher returns abroad. We will discuss international arbitrage as covered or uncovered. Finally, we try to understand the efficiency of foreign exchange markets.

Uncovered interest arbitrage:

The transfer of funds abroad have to take advantage of higher interest rates in foreign monetary centers involves the conversion of the domestic to the foreign currency to make investment, and thesubsequent reconversion of the funds (plus interest earned abroad) from the foreign currency to the domestic currency at the time of maturity. In such transactions, a foreign exchange risk is involved due to the possible depreciation of the foreign currency during the period of investment. If such a foreign exchange risk is covered, we have covered interest arbitrage; otherwise, we have uncovered interest arbitrage.

Example, suppose that the interest rate on three-month treasury bill is 6% an annual basis in NY and 8% in London. It may then pay for a U.S investor to exchange dollars for pounds at the current spot rate and purchase British treasury bills to earn extra 2% interest at an annual basis. When the British treasury bills mature, the U.S investor may want to exchange the pounds invested plus the interest earned back into dollars. But, by that time, the pound may have depreciated so that the investor would get back fewer dollars per pound than they paid.

If the pound depreciates by 1% at an annual basis during the three-months of the investment, the U.S investor nets only about 1% from this foreign investment (the extra 2% interest earned minus the 1% lost from the depreciation of the pound) at an annual basis (1/4 of 1 percent for the three-months or quarter of the investment). If the pound depreciates by 2% at an annual basis during the three-months, the U.S investor gains nothing. If the pound depreciates by more than 2 percent, the U.S investor loses. If the pound appreciates, the U.S investor gains both from the extra interest earned and from the appreciation of the pound.

Covered interest arbitrage:

Investors of short-term funds abroad generally want to avoid the foreign exchange risk; therefore, interest arbitrage is usually covered. Covered interest arbitrage refers to the spot purchase of the foreign currency to make the investment and the balancing with simultaneous forward sale (swap) of the foreign currency to cover the foreign exchange risk. When the treasury bills mature, the investor can then get the domestic currency equivalent of the foreign investment plus, the interest earned without a foreign exchange risk.

First, the investor exchanges the domestic for the foreign currency at the current spot rate in order to purchase the foreign treasury bills, and the same time the investor sells forward the amount of the foreign currency he/she is investing plus the interest he/she will earn to coincide with the maturity of the foreign investment. Since the currency with the higher interest rate is

usually at a forward discount, the net return on the investment is approximately equal to the interest differential in favor of the foreign monetary center minus the forward discount on the foreign currency. This reduction in earnings can be viewed as the cost of insurance against the foreign exchange risk.

Example:

The interest rate on three-month treasury bills is 6% per year in NY and 8% in London, and assumes that the pound is at a forward discount of 1% per year. To engage in covered interest arbitrage, the U.S investor exchanges dollars for pounds at the current exchange rate (to purchase the British treasury bills) and at the same time sells forward a quantity of pounds equal to the amount invested plus the interest he/she will earn at the prevailing forward rate. Since the pound is a forward discount of 1 percent per year, the U.S investor loses 1 percent on an annual basis on the foreign exchange transaction to cover the foreign exchange risk.

The net gain is thus the extra 2% interest earned minus the 1% lost on the foreign exchange transaction, or 1% on an annual basis (1/4 of 1 percent for the three-months or quarter of the investment).

Note that we express both the interest differential and the forward discount at an annual basis and then divided by four to get gain for the three-months or quarter of the investment.

v. Foreign exchange rate determination

For simplicity let us assume there are only two nations, United States (considered as home country) and United Kingdome (considered as foreign country), US dollar ($) and UK Pound Sterling (£) as respective currencies. The exchange rate between the dollar and the pound (R) is equal to the number of dollars needed to purchase one pound.

For example, R = $/£ = 2, this means that two dollars are required to purchase one pound.On the same line, if the exchange rate between Birr and Dollar is equal to Br 20.5/$1, this is to mean that Br 20.5 is required to get $1.

Under the flexible exchange rate system, the dollar price of the pound is determined, just like the price of any commodity, by the intersection of the market demand and supply curves for pounds. This is shown in the following figure.

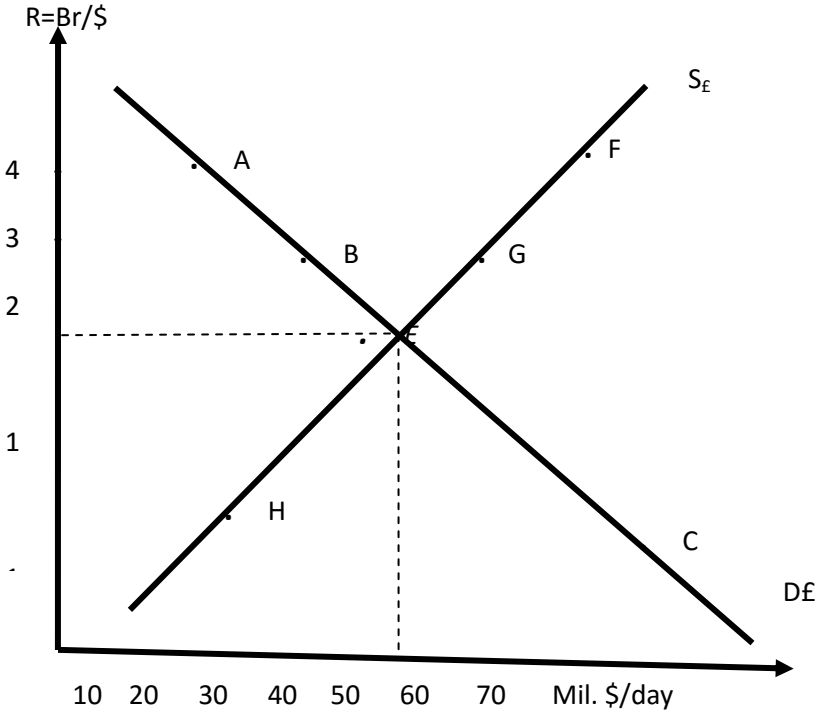
The vertical axis measures the dollar price of the pound (R=$/£) and the horizontal axis measures the quantity of pounds. With a flexible exchange rate system, the equilibrium exchange rate is R = 2, at which the quantity of pounds demanded and the quantity supplied

are equal at £40 million per day. This is given by the intersection at point ***E*** of the US demand and supply curves for pounds.

At a higher exchange rate, a surplus of pounds would result that would tend to lower the exchange rate toward the equilibrium rate. At an exchange rate lower than R = 2, a shortage of pounds would result that would drive the exchange rate up toward the equilibrium level.

The US demand for pounds is negatively inclined, indicating that the lower the exchange rate (R), the greater quantity of pounds demanded by the US.

The reason is that the lower the exchange rate (few dollars required to purchase one pound), the cheaper it is for US to import from and to invest in the UK, and thus the greater the quantity of pounds demanded by US residents.



US supply of pounds usually positively inclined, indicating that the higher the exchange rate (R), the greater the quantity of pounds earned by or supplied to the US.

The reason is that the higher exchange rate, UK residents receive more dollars for each of their pounds. As a result, UK will find US, thus supplying more pounds to US.

If the exchange rate (R), increases from $2 to $3 per each pound. It refers to **DEPRECIATION** (increase) in the domestic currency price of foreign currency. On the contrary, if (R), becomes less than $2 for each pound, then it refers to **APPRECIATION** or decline in the domestic price of foreign currency.

- An appreciation of the domestic currency means depreciation in the foreign currency and a depreciation of the domestic currency means an appreciation in the foreign currency.

The exchange rate could also be defined, as the foreign currency price of unit of the domestic currency, i.e., pound price of the dollar is 1/R = ½ or it takes half a pound to purchase one dollar.

Finally, in reality there are numerous exchange rates, one between any pair of currencies. Once the exchange rate between each pair of currencies with respect to dollar is established, the exchange rate between any two currencies can easily be determined. It is called **cross exchange rate.** In other words, exchange rate between currency A and currency B, given the exchange rate of A & B with respect to C.

For example, if R between $ and £ is 2 and between $ and DM (German Mark) is 2, then the exchange rate between the pound and German Mark is

$R = \frac{DM}{£} = \frac{Dollar\ Value\ of\ £}{Dollar\ Value\ of\ DM} = \frac{2}{0.5} =$ 4(i.e.,DM4required to purchase 1£).

1.5. The interaction between foreign exchange rate and financial market

Demand for foreign currency assets:

The demand for a foreign currency bank deposit is influenced by the same considerationsthat influence the demand for any other asset. Chief among these considerations is our view ofwhat the deposit will be worth in the future. A foreign currency deposit's future value depends in turn on two factors:

- ✓ **The interest rate** it offers and the **expected change in the currency'sexchange rate** against other currencies.
- ✓ **Assets and Asset Returns:** As you will recall, people can hold wealth in many forms—stocks, bonds, cash, real estate, diamonds, and so on. The object of acquiring wealth—of saving—is to transfer purchasing power into the future.

Asset Returns: Because the objective of saving is to provide for future consumption,we judge the desirability of an asset largely based on its rate of return, thatis, the percentage increase in value it offers over some time period.

For example, supposethat at the beginning of 2003 you pay $100 for a share of stock issued by Financial Soothsayers,Inc. If the stock pays you a dividend of $1 at the beginning of 2004, and if thestock's price rises from $100 to $109 per share over the year, then you have earned a rate ofreturn

of 10 percent on the stock over 2003—that is, your initial $100 investment hasgrown in value to $110, the sum of the $1 dividend and the $109 you could get by sellingyour share. Had Financial Soothsayers stock-still paid out its $1 dividend but dropped inprice to $89 per share, your $100 investment would be worth only $90 by year's end,giving a rate of return of negative 10 percent.

You often cannot know with certainty the return that an asset will actually pay after you buy it. Both the dividend paid by a share of stock and the share's resale price, for example, may be hard to predict. Your decision therefore must be based on an *expected* rate of return. To calculate an expected rate of return over some time period, you make your best forecast of the asset's total value at the period's end. The percentage difference between that expected future value and the price you pay for the asset today equals the asset's expected rate of return over the time period.

When we measure an asset's rate of return, we compare how an investment in the asset changes in total value between two dates. In the previous example, we compared how the value of an investment in Financial Soothsayers stock changed between 2003 ($100) and 2004 ($110) to conclude that the rate of return on the stock was 10 percent per year. We call this a *dollar* rate of return because the two values we compare are expressed in terms of dollars. It is also possible, however, to compute different rates of return by expressing the two values in terms of a foreign currency or a commodity such as gold.

The Real Rate of Return: The expected rate of return that savers consider in deciding which assets to hold is the expected **real rate of return,** that is, the rate of return computed by measuring asset values in terms of some broad representative basket of products that savers regularly purchase. It is the expected real return that matters because the ultimate goal of saving is future consumption, and only the *real* return measures the goods and services a saver can buy in the future in return for giving up some consumption (that is, saving) today.

To continue our example, suppose the dollar value of an investment in Financial Soothsayers stock increases by 10 percent between 2003 and 2004 but that the dollar prices of all goods and services also increase by 10 percent. Then in terms of output—that is, in real terms—the investment would

be worth no more in 2003 than in 2004. With a real rate of return of zero, Financial Fortune-tellers stock would not be a very desirable asset.

Although savers care about expected real rates of return, rates of return expressed in terms of a currency can still be used to *compare* real returns on *different* assets. Even if all dollar prices rise by 10 percent between 2003 and 2004, a rare bottle of wine whose dollar price rises by 25 percent is still a better investment than a bond whose dollar value rises by 20 percent. The real rate of return offered by the wine is 15 percent (=25 percent — 10 percent) while that offered by the bond is only 10 percent (= 20 percent— 10 percent). Notice that the difference between the dollar returns of the two assets (25 percent — 20 percent) must equal the difference between their real returns (15 percent — 10 percent). The reason for this equality is that, given the two assets' dollar returns, a change in the rate at which the dollar prices of goods are rising changes both assets' real returns by the same amount.

The distinction between real rates of return and dollar rates of return illustrates an important concept in studying how savers evaluate different assets: The returns on two assets cannot be compared unless they are measured in the *same* units. For example, it makes no sense to compare directly the real return on the bottle of wine (15 percent in our example) with the dollar return on the bond (20 percent) or to compare the dollar return on old paintings with the euro return on gold. Only after the returns are expressed in terms of a common unit of measure—for example, all in terms of dollars—can we tell which asset offers the highest expected real rate of return.

Interest Rates

As in other asset markets, participants in the foreign exchange market base their demands for deposits of different currencies on a comparison of these assets' expected rates of return. To compare returns on different deposits, market participants need two pieces of information. First, they need to know how the money values of the deposits will change.

Second, they need to know how exchange rates will change so that they can translate rates of return measured in different currencies into comparable terms.

The first piece of information needed to compute the rate of return on a deposit of a particular currency is the currency's **interest rate,** the amount of that currency an individual can earn by lending a unit of the currency for a year. At a dollar interest rate of 0.10 (quoted as 10 percent per year), the lender of $ 1 receives $ 1.10 at the end of the year, $ 1 of which is principal and 10 cents of which is interest. Looked at from the other side of the transaction the interest rate on dollars is also the amount that must be paid to borrow $1 for a year. When you buy a U.S. Treasury bill, you earn the interest rate on dollars because you are lending dollars to the U.S. government.

Interest rates play an important role in the foreign exchange market because the large deposits traded there pays interest, each at a rate reflecting its currency of denomination. For example, when the interest rate on dollars is 10 percent per year, a $100,000 deposit is worth $110,000 after a year; when the interest rate on euros is 5 percent per year, a €100,000 deposit is worth €105,000 after a year. Deposits pay interest because they are really loans from the depositor to the bank. When a corporation or a financial institution deposits a currency in a bank, it is lending that currency to the bank rather than using it for some current expenditure. In other words, the depositor is acquiring an asset denominated in the currency it deposits.

The dollar interest rate is simply the dollar rate of return on dollar deposits. You "buy" the deposit by lending a bank $100,000, and when you are paid back with 10 percent interest at the end of the year, your asset is worth $110,000. This gives a rate of return of (110,000 — 100,000)7100, 000 = 0.10, or 10 percent per year. Similarly, a foreign currency's interest rate measures the foreign currency return on deposits of that currency.

These interest rates are not measured in comparable terms, so there is no reason for them to be close to each other or to move in similar ways over time.

Exchange Rates and Asset Returns

The interest rates offered by a dollar and a euro deposit tell us how their dollar and euro values will change over a year. The other piece of information we need to compare the rates of return offered by dollar and euro deposits is the expected change in the dollar/euro

exchange rate over the year. To see which deposit, euro or dollar, offers a higher expected rate of return, you must ask the question: If I use dollars to buy a euro deposit, how many dollars will I get back after a year? When you answer this question, you are calculating the *dollar* rate of return on a euro deposit because you are comparing its *dollar* price today with its *dollar* value a year from today.

To see how to approach this type of calculation, let's look at the following situation: Suppose that today's exchange rate (quoted in American terms) is $1.10 per euro, but that you expect the rate to be $1,165 per euro in a year (perhaps because you expect unfavorable developments in the U.S. economy). Suppose also that the dollar interest rate is 10 percent per year while the euro interest rate is 5 percent per year. This means a deposit of $1.00 pays **$1.10** after a year while a deposit of € 1 pays € 1.05 after a year. Which of these deposits offers the higher return? The answer can be found in five steps:

Step 1. Use today's dollar/euro exchange rate to figure out the dollar price of a euro deposit of, say, €1. If the exchange rate today is $1.10 per euro, the dollar price of a €1 deposit is just $1.10.

Step 2. Use the euro interest rate to find the amount of euro you will have a year from now if you purchase a €1 deposit today. You know that the interest rate on euro deposits is 5 percent per year. So at the end of a year, your €1 deposit will be worth €1.05.

Step 3. Use the exchange rate you expect to prevail a year from today to calculate the expected dollar value of the euro amount determined in Step 2. Since you expect the dollar to depreciate against the euro over the coming year so that the exchange rate 12 months from today is $1,165 per euro, then you expect the dollar value of your euro deposit after a year to be $ 1.165 per euro X €1.05 = $ **1**.223.

Step 4. Now that you know the dollar price of a € 1 deposit today ($1.10) and can forecast its value in a year ($1,223), you can calculate the expected *dollar* rate of return on a euro deposit as (1.223 - 1.10)/1.10 = 0.11, or 11 percent per year.

Step 5. Since the dollar rate of return on dollar deposits (the dollar interest rate) is only 10 percent per year, you expect to do better by holding your wealth in the form of euro deposits. Despite the fact that the dollar interest rate exceeds the euro interest rate by 5

percent per year, the euro's expected appreciation against the dollar gives euro holders a prospective capital gain that is large enough to make euro deposits the higher-yield asset.

A Simple Rule

There is a simple rule that shortens this calculation. First, define the **rate of depreciation** of the dollar against the euro as the percentage increase in the dollar/euro exchange rate over a year. In the last example, the dollar's expected depreciation rate is (1.165 − 1.10)/1.10 = 0.059, or roughly 6 percent per year. Once you have calculated the rate of depreciation of the dollar against the euro, our rule is this: *The dollar rate of return on euro deposits isapproximately the euro interest rate plus the rate of depreciation of the dollar against theeuro.* In other words, to translate the euro return on euro deposits into dollar terms, you need to add the rate at which the euro's dollar price rises over a year to the euro interest rate.

In our example, the sum of the euro interest rate (5 percent) and the expected depreciation rate of the dollar (roughly 6 percent) is about 11 percent, which is what we found to be the expected dollar return on euro deposits in our first calculation.

We summarize our discussion by introducing some notation:

$R_€$=Today's interest rate on one-year euro deposits,

$E_{\$/€}$= today's dollar/euro exchange rate (number of dollars per euro),

$E^e_{\$/€}$= dollar/euro exchange rate (number of dollars per euro) expected to prevail a year from today.

(The superscript ''e''attached to this last exchange rate indicates that it is a forecast of thefuture exchange rate based on what people know today.)

Using these symbols, we write the expected rate of return on a euro deposit, measured interms of dollars, as the sum of (1) the euro interest rate and (2) the expected rate of dollardepreciation against the euro:

$$R_€ + \frac{E^e_{\frac{\$}{€}} - E_{\frac{\$}{€}}}{E_{\frac{\$}{€}}}$$

This expected return is what must be compared with the interest rate on one-year dollar deposits, *R$,* in deciding whether dollar or euro deposits offer the higher expected rate of return. The expected rate of return difference between dollar and euro deposits is therefore equal to *R$* less the above expression:

$$R_s - \left[R_€ + \frac{E^e_{\frac{\$}{€}} - E_{\frac{\$}{€}}}{E_{\frac{\$}{€}}}\right] = R\$ - R€ - \frac{E^e_{\frac{\$}{€}} - E_{\frac{\$}{€}}}{E_{\frac{\$}{€}}}$$

When the difference above is positive, dollar deposits yield the higher expected rate of return; when it is negative, euro deposits yield the higher expected rate of return.

Example:

Case	Dollar Interest Rate ($R_{\$}$)	Euro Interest Rate ($R_€$)	Expected Rate of Dollar Depreciation Against Euro $(E^e_{\$/€} - E_{\$/€})/E_{\$/€}$	Rate of Return Difference between Dollar and Euro Deposits $= R\$ - R€ - \frac{E^e_{\frac{\$}{€}} - E_{\frac{\$}{€}}}{E_{\frac{\$}{€}}}$
1	0.10	0.06	0.00	0.04
2	0.10	0.06	0.04	0.00
3	0.10	0.06	0.08	-0.04
4	0.10	0.12	-0.04	0.02

In case 1: the interest difference in favor of dollar deposits is 4 percent per year *(R$ − R€* = 0.10 — 0.06 = 0.04), and no change in the exchange rate is expected *[($E^e_{\$/€}$ − E$/£)/E$/£* = 0.00]. This means that the expected annual real rate of return on dollar deposits is 4 percent higher than that on euro, so that, other things equal, you would prefer to hold your wealth as dollar rather than euro deposits.

In case 2: the interest difference is the same (4 percent), but it is just offset by an expected depreciation rate of the dollar of 4 percent. The two assets therefore have the same expected rate of return.

Case 3: it is similar to the one discussed earlier: A 4 percent interest difference in favor of dollar deposits is more than offset by an 8 percent expected depreciation of the dollar, so euro deposits are preferred by market participants.

In case 4: there is a 2 percent interest difference in favor of euro deposits, but the dollar is expected to *appreciate* against the euro by 4 percent over the year. The expected rate of return on dollar deposits is therefore 2 percent per year higher than that on euro.

Equilibrium in the Foreign Exchange Market

The foreign exchange market is in equilibrium when deposits of all currencies offer the same expected rate of return.

The condition that the expected returns on deposits of any two currencies are equal when measured in the same currency is called the **interest parity condition.** It implies that potential holders of foreign currency deposits view them all as equally desirable assets.

Let's see why the foreign exchange market is in equilibrium only when the interest **paritycondition** holds. Suppose the dollar interest rate is 10 percent and the euro interest rate is 6 percent, but that the dollar is expected to depreciate against the euro at an 8 percent rate over a year. (This is case 3 in Table 13-3.) In the circumstances described, the rate of return on euro deposits would be 4 percent per year higher than that on dollar deposits. We assumed at the end of the last section that individuals always prefer to hold deposits of currencies offering the highest expected return. This means that if the expected return on euro deposits is 4 percent greater than that on dollar deposits, no one will be willing to continue holding dollar deposits, and holders of dollar deposits will be trying to sell them for euro deposits. There will therefore be an excess supply of dollar deposits and an excess demand for euro deposits in the foreign exchange market.

As a contrasting example, suppose that dollar deposits again offer a 10 percent interest rate but euro deposits offer a 12 percent rate and the dollar is expected to *appreciate* against the euro by 4 percent over the coming year. (This is case 4 in the above table).Now the return on dollar deposits is 2 percent higher. In this case, no one would demand euro deposits, so they would be in excess supply and dollar deposits would be in excess demand.

When, however, the dollar interest rate is 10 percent, the euro interest rate is 6 percent, and the dollar's expected depreciation rate against the euro is 4 percent, dollar and euro deposits offer the same rate of return and participants in the foreign exchange market are willing to hold either. (This is case 2 in the above table).

Only when all expected rates of return are equal—that is, when the interest parity condition holds—is there no excess supply of some type of deposit and no excess demand for another. The foreign exchange market is in equilibrium when no type of deposit is in excess demand or excess supply. We can therefore say that the foreign exchange market is in equilibrium when the interest parity condition holds.

How Changes in the Current Exchange Rate Affect Expected Returns?

As a first step in understanding how the foreign exchange market finds its equilibrium, we examine how changes in today's exchange rate affect the expected return on a foreign currency deposit when interest rates and expectations about the future exchange rate do not change. Our analysis will show that, other things equal, depreciation of a country's currency today *lowers* the expected domestic currency return on foreign currency deposits. Conversely, appreciation of the domestic currency today, all else equal, *raises* the domestic currency return expected of foreign currency deposits.

It is easiest to see why these relationships hold by looking at an example: How does a change in today's dollar/euro exchange rate, all else held constant, change the expected return, measured in terms of dollars, on euro deposits? Suppose that today's dollar/euro rate is $1.00 per euro and the exchange rate you expect for this day next year is $1.05 per euro.

Then the expected rate of dollar depreciation against the euro is (1.05 — 1.00)/1.00 = 0.05, or 5 percent per year. This means that when you buy a euro deposit, you not only earn the interest $R€$ but also get a 5 percent "bonus" in terms of dollars. Now suppose that today's exchange rate suddenly jumps up to $ 1.03 per euro (a depreciation of the dollar and an appreciation of the euro) but the expected future rate is *still* $1.05 per euro. What has happened to the "bonus" you expected to get from the euro's increase in value in terms of dollars? The expected rate of dollar depreciation is now only (1.05 —

l.O3)/l.O3 = 0.019, or 1.9 percent instead of 5 percent. Since *R€* has not changed, the dollar return on euro deposits, which is the sum of *R€* and the expected rate of dollar depreciation, *has fallen* by 3.1 percentage points per year (5 percent − 1.9 percent).

In Table 1.2 we work out the dollar return on euro deposits for various levels of today's dollar/euro exchange rate *E$/€*, always assuming the expected/w/were exchange rate remains fixed at $ 1.05 per euro and the euro interest rate is 5 percent per year. As you can see, a rise in today's dollar/euro exchange rate (a depreciation of the dollar against the euro) always *lowers* the expected dollar return on euro deposits (as in our example), while a fall in today's dollar/euro rate (an appreciation of the dollar against the euro) always *raises* this return.

Table: 1.2

Today's Dollar/Euro Exchange Rate and the Expected Dollar Return on Euro Deposits When ($\boldsymbol{E^e_{\$/€}}$= $1.05 per Euro

Today's Dollar/Euro Exchange Rate $\boldsymbol{E}_{\$/€}$	Interest Rate on Euro Deposits $R_€$	Expected Dollar Depreciation Rate against Euro $\frac{1.05 - E_{\$/€}}{E_{\$/€}}$	Expected Dollar Return on Euro Deposits $R_€ + \frac{1.05 - E_{\$/€}}{E_{\$/€}}$
1.07	0.05	-0.019	0.031
1.05	0.05	0.00	0.05
1.03	0.05	0.019	0.069
1.02	0.05	0.029	0.079
1.00	0.05	0.05	0.10

It may run counter to your intuition that a depreciation of the dollar against the euro makes euro deposits less attractive relative to dollar deposits (by lowering the expected dollar return on euro deposits) while an appreciation of the dollar makes euro deposits more attractive. This result will seem less surprising if you remember we have assumed that the expected future dollar/euro rate and interest rates do not change. A dollar depreciation today, for example, means the dollar now needs to depreciate by a *smaller* amount to reach any given expected future level. If the expected future dollar/euro exchange rate does not change when the dollar depreciates today, the dollar's expected future depreciation against the euro therefore falls, or, alternatively, the dollar's expected future appreciation rises.

Since interest rates also are unchanged, today's dollar depreciation thus makes euro deposits less attractive compared with dollar deposits.

Put another way, a current dollar depreciation that affects neither exchange rate expectations nor interest rates leaves the expected future dollar payoff of a euro deposits the same but raises the deposit's current dollar cost. This change naturally makes euro deposits less attractive relative to dollars.

It may also run counter to your intuition that *today's* exchange rate can change while the exchange rate expected for the *future* does not. We will indeed study cases later in this book when both of these rates do change at once. We nonetheless hold the expected future exchange rate constant in the present discussion because that is the clearest way to illustrate the effect of today's exchange rate on expected returns. If it helps, you can imagine we are looking at the impact of a *temporary* change so brief that it has no effect on the exchange rate expected for next year.

The Equilibrium Exchange Rate

The exchange rates always adjust to maintain interest parity. We continue to assume that the dollar interest rate *R$*, the euro interest rate *R€*, and the expected future dollar/euro exchange rate $E^e_{\$/€}$, are all *given*.

In the figure below, the vertical schedule in the graph indicates the given level of *R$*, the return on dollar deposits measured in terms of dollars. The downward-sloping schedule shows how the expected return on euro deposits measured in terms of dollars depends on the current dollar/euro exchange rate.

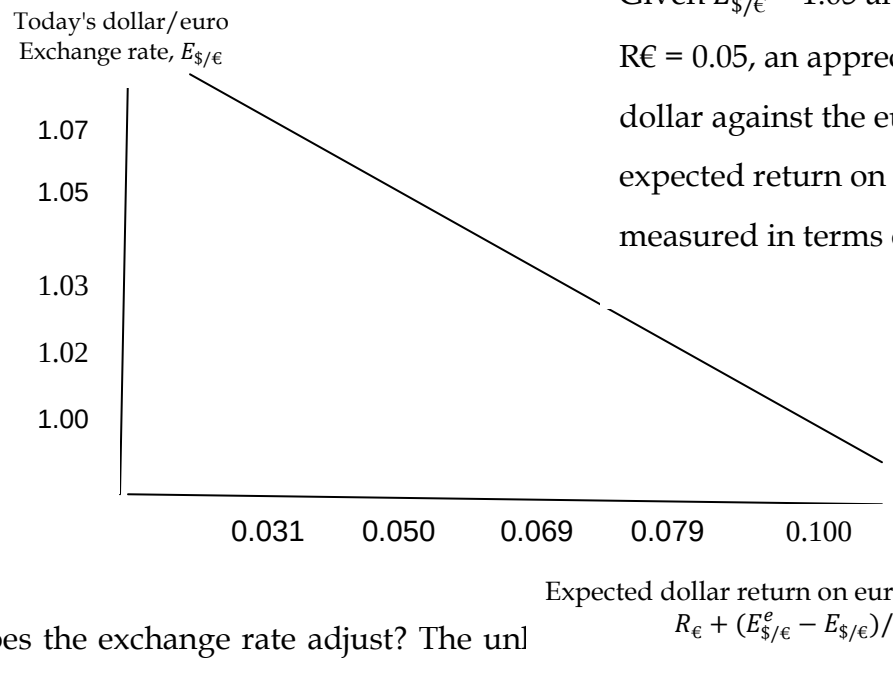
The equilibrium dollar/euro rate is the one indicated by the intersection of the two schedules at point 1, $E^1_{\$/€}$. At this exchange rate, the returns on dollar and euro deposits are equal, so that the interest parity condition is satisfied as follows:

$$Rs = R_€ + \frac{E^e_{\frac{\$}{€}} - E^1_{\frac{\$}{€}}}{E^1_{\frac{\$}{€}}}$$

Let's see why the exchange rate will tend to settle at point 1 in Figure 1 if it is initially at a point such as 2 or 3. Suppose first that we are at point 2, with the exchange rate equal

to$E^2_{\$/€}$. The downward-sloping schedule measuring the expected dollar returns on euro deposits tells us that at the exchange rate $E^2_{\$/€}$, the rate of return on euro deposits is less than the rate of return on dollar deposits, *R$.* In this situation, anyone holding euro deposits wishes to sell them for the more lucrative dollar deposits: The foreign exchange market is out of equilibrium because participants are *unwilling* to hold euro deposits. Regimes

Figure 1: the relation between the Current Dollar/Euro Exchange Rate and the Expected Dollar Return on Euro Deposits.



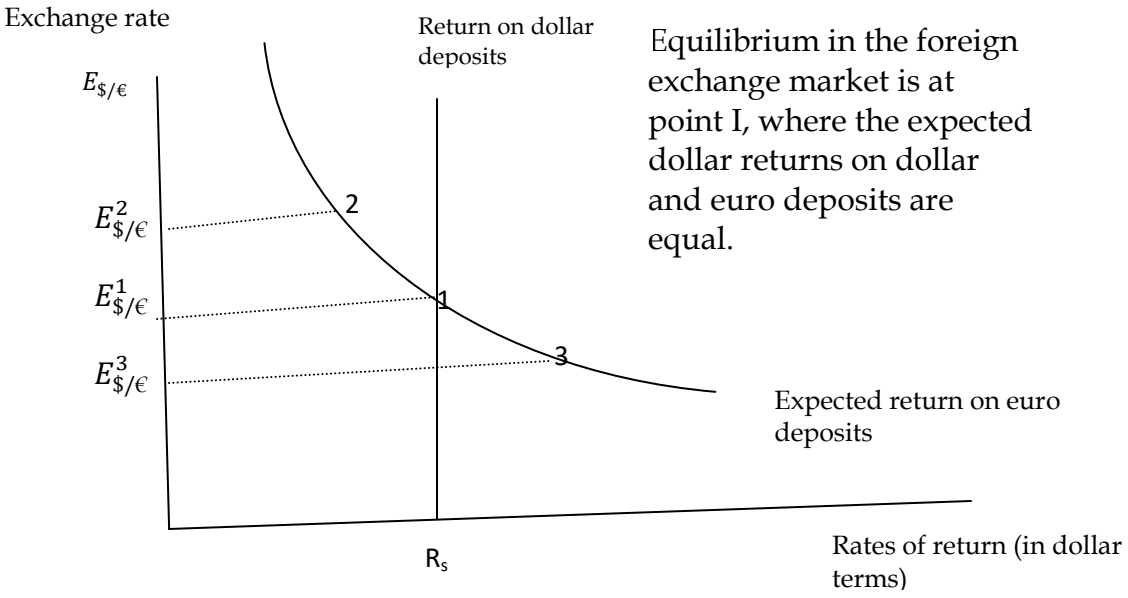
Given $E^e_{\$/€}$ = 1.05 and R€ = 0.05, an appreciation of the dollar against the euro raises the expected return on euro deposits, measured in terms of dollars.

How does the exchange rate adjust? The unl : to sell them for dollar deposits, but because the return on dollar deposits is higher than that on euro deposits at the exchange rate $E^2_{\$/€}$, no holder of a dollar deposit is willing to sell it for euro at that rate. As euro holders try to entice dollar holders to trade by offering them a better price for dollars, the dollar/euro exchange rate falls toward $E^1_{\$/€}$; that is, euros become cheaper in terms of dollars. Once the exchange rate reaches $E^1_{\$/€}$, euro and dollar deposits offer equal returns and holders of euro deposits no longer have an incentive to try to sell them for dollars. The foreign exchange market is therefore in equilibrium. In falling from $E^2_{\$/€}toE^1_{\$/€}$, the exchange rate equalizes the

expected returns on the types of deposit by increasing the rate at which the dollar is expected to depreciate in the future, thereby making euro deposits more attractive.

The same process works in reverse if we are initially at point 3 with an exchange rate of $E^3_{\$/€}$. At point 3, the return on euro deposits exceeds that on dollar deposits, so there is now an excess supply of the latter. As unwilling holders of dollar deposits bid for the more attractive euro deposits, the price of euros in terms of dollars tends to rise; that is, the dollar tends to depreciate against the euro. When the exchange rate has moved to $E^1_{\$/€}$, rates of return are equalized across currencies and the market is in equilibrium. The depreciation of the dollar from $E^3_{\$/€}$to $E^1_{\$/€}$makes euro deposits less attractive relative to dollar deposits by reducing the rate at which the dollar is expected to depreciate in the future.

Figure 2: Determination of the Equilibrium Dollar/Euro Exchange Rate



Chapter 2
Money, Interest Rates, and Exchange Rates

Aggregate money demand

Our discussion of how individual households and firms determine their demands for money can now be applied to derive the determinants of **aggregate money demand,** the total demand for money by all households and firms in the economy. Aggregate money demand is just the sum of all the economy's individual money demands.

Three main factors determine aggregate money demand:

1. *The interest rate:* A rise in the interest rate causes each individual in the economy to reduce her demand for money. All else equal, aggregate money demand therefore falls when the interest rate rises.
2. *The price level:* The economy's **price level** is the price of a broad reference basket of goods and services in terms of currency. If the price level rises, individual households and firms must spend more money than before to purchase their usual weekly baskets of goods and services. To maintain the same level of liquidity as before the price level increase, they will therefore have to hold more money.
3. *Real national income:* When real national income (GNP) rises, more goods and services are being sold in the economy. This increase in the real value of transactions raises the demand for money, given the price level.

If P is the price level, R is the interest rate, and Y is real GNP, the aggregate demand for money, M^d, can be expressed as $M^d = P * L\{R, Y\}$,

Where the value of $L(R, Y)$ falls when R rises, and rises when Y rises. To see why we have specified that aggregate money demand is *proportional* to the price level, imagine that all prices doubled but the interest rate and everyone's *real* incomes remained unchanged. The money value of each individual's average daily transactions would then simply double, as would the amount of money each wished to hold.

The above aggregate money demand rewritten as follows in the equivalent form:

$$\frac{M^d}{P} = L\{R, Y\}$$

is called $L(R, Y)$ aggregate *real* money demand.

This way of expressing money demand shows that the aggregate demand for liquidity, *L(R, Y),* is not a demand for a certain number of currency units but is instead a demand to hold a certain amount of purchasing power in liquid form. The ratio $\frac{M^d}{P}$—that is, desired money holdings measured in terms of a typical reference basket of commodities—equals the amount of purchasing power people would like to hold in liquid form. For example, if people wished to hold $1000 in cash at a price level of $100 per commodity basket, their real money holdings would be equivalent to $1000/($100 per basket) = 10 baskets. If the price level doubled (to $200 per basket), the purchasing power of their $ 1000 in cash would be halved, since it would now be worth only 5 baskets.

Figure 2.1 shows how aggregate real money demand is affected by the interest rate for a fixed level of real income, K The aggregate real money demand schedule *L{R, Y)* slopes downward because a fall in the interest rate raises the desired real money holdings of each household and firm in the economy.

For a given level of real GNP, changes in interest rates cause movements *along* the *L(R, Y)* schedule. Changes in real GNP, however, cause the schedule itself to shift.

Figure 2.2 shows how a rise in real GNP from Y^1 to Y^2 affects the position of the aggregate real money demand schedule. Because a rise in real GNP raises aggregate real money demand for a given interest rate, the schedule $L(R, Y^2)$ lies to the right of $L(R, Y^1)$ when Y^2 is greater than Y^1.

Money supply:

An economy's money supply is controlled by its central bank. The central bank directly regulates the amount of currency in existence and also has indirect control over the amount of checking deposits issued by private banks. The procedures through which the central bank controls the money supply are complex, and we assume for now that the central bank simply sets the size of the money supply at the level it desires.

The Equilibrium Interest Rate:
The Interaction of Money Supply and Demand

The money market is in equilibrium when the money supply set by the central bank equals aggregate money demand.

In this section we see how the interest rate is determined by money market equilibrium, given the price level and output, both of which are temporarily assumed to be unaffected by monetary changes.

Equilibrium in the Money Market

If M^S is the money supply, the condition for equilibrium in the money market is

$$M^S = M^d$$

After dividing both sides of this equality by the price level, we can express the money market equilibrium condition in terms of aggregate real money demand as

$$\boldsymbol{M^S/P = L(R,Y)}$$

Figure 2.1: ***aggregate money demand & R***
The downward-sloping real money demand schedule shows that for a given real income level, Y, real money demand rises as the interest rate falls.

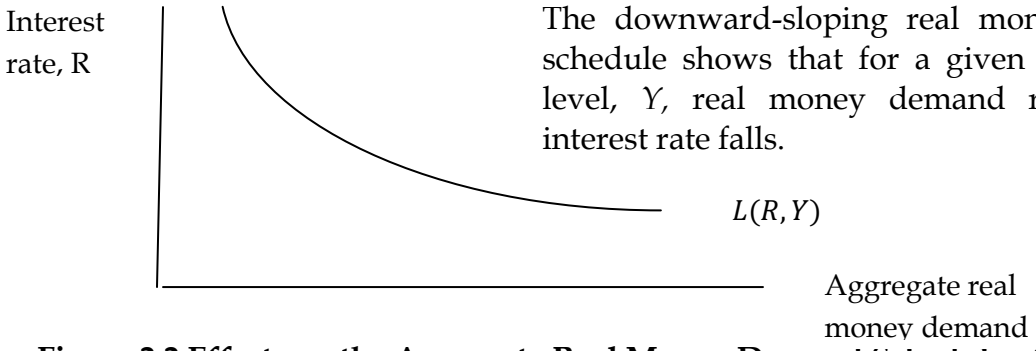
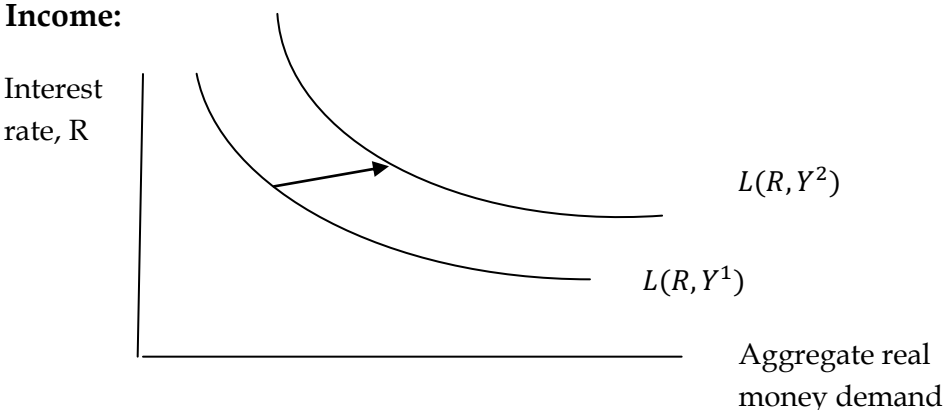


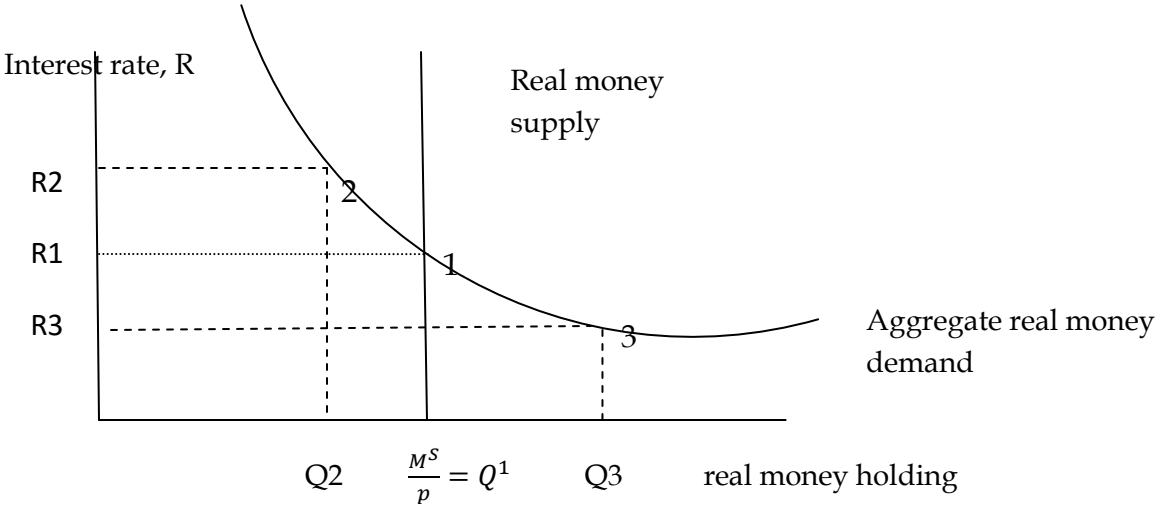
Figure 2.2 Effects on the Aggregate Real Money Demand Schedule of a Rise in Real Income:



An increase in real income from Y^1 to Y^2 raises the demand for real money balances at every level of the interest rate and causes the whole demand schedule to shift upward.

Figure 2.3 Determination of the Equilibrium Interest Rate:

With **P** and Y given and a real money supply of M^S/P, money market equilibrium is at point I. At this point aggregate real money demand and the real money supply are equal and the equilibrium interest rate is R1.



Given the price level, *P*, and output, *Y* the equilibrium interest rate is the one at which aggregate real money demand equals the real money supply.

In Figure 2.3, the aggregate real money demand schedule intersects the real money supply schedule at point 1 to give an equilibrium interest rate of R^1. The money supply schedule is vertical at M^S/P because $M^S$is set by the central bank while *P* is taken as given. Let's see why the interest rate tends to settle at its equilibrium level by considering what happens if the market is initially at point 2, with an interest rate, R^2, that is above R^1.

At point 2 the demand for real money holdings falls short of the supply by $Q] - Q2$, so there is an excess supply of money. If individuals are holding more money than they desire given the interest rate of R^2, they will attempt to reduce their liquidity by using some money to purchase interest-bearing assets. In other words, individuals will attempt to get rid of their excess money by lending it to others. Since there is an aggregate excess supply of money at R^2, however, not everyone can succeed in doing this: there are more people who would like to lend money to reduce their liquidity than there are people who would like to borrow it to increase theirs. Those who cannot unload their extra money try to tempt potential borrowers by lowering the interest rate

they charge for loans below R^2. The downward pressure on the interest rate continues until the rate reaches R^1. At this interest rate anyone wishing to lend money can do so because the aggregate excess supply of money has disappeared; that is, supply once again equals demand. Once the market reaches point 1, there is therefore no further tendency for the interest rate to drop.

Similarly, if the interest rate is initially at a level R^3 below R^s, it will tend to rise. As Figure 2.3 shows, there is excess demand for money equal to $Q_2 - Q_1$ at point 3. Individuals therefore attempt to sell interest-bearing assets such as bonds to increase their money holdings (that is, they sell bonds for cash). At point 3, however, not everyone can succeed in selling enough interest-bearing assets to satisfy his or her demand for money.

Thus, people bid for money by offering to borrow at progressively higher interest rates and push the interest rate upward toward R^1. Only when the market has reached point 1 and the excess demand for money has been eliminated does the interest rate stop rising.

We can summarize our findings as follows: The market always moves toward an interest rate at which the real money supply equals aggregate real money demand. If there is initially an excess supply of money, the interest rate falls, and if there is initially an excess demand, it rises.

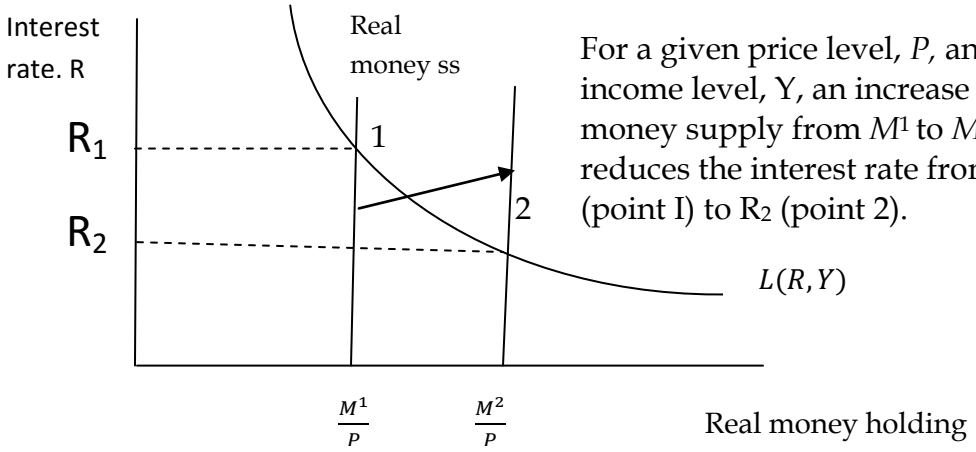
Interest Rates and the Money Supply

The effect of increasing the money supply at a given price level is illustrated in Figure 2.4 Initially the money market is in equilibrium at point 1, with a money supply M^l and an interest rate M^1. Since we are holding P constant, a rise in the money supply to M^2 increases the real money supply from M^1/P to M^2/P. With a real money supply of $\frac{M^2}{P}$, point 2 is the new equilibrium and $R2$ is the new, lower interest rate that induces people to hold the increased available real money supply.

The process through which the interest rate falls is by now familiar. After $M^S$is increased by the central bank, there is initially an excess real supply of money at the old equilibrium interest rate, R^1, which previously balanced the market. Since people are

holding more money than they desire, they use their surplus funds to bid for assets that pay interest. The economy as a whole cannot reduce its money holdings, so interest rates are driven down as unwilling money holders compete to lend their excess cash balances. At point 2 in Figure 2.4, the interest rate has fallen sufficiently to induce an increase in real money demand equal to the increase in the real money supply.

By running the above policy experiment in reverse, we can see how a reduction of the money supply forces interest rates upward. A fall in M^Scauses an excess demand for money at the interest rate that previously balanced supply and demand. People attempt to sell interest-bearing assets—that is, to borrow—to rebuild their depleted real money holdings. Since they cannot all be successful when there is excess money demand, the interest rate is pushed upward until everyone is content to hold the smaller real money stock. We conclude that *an increase in the money supply lowers the interest rate, while a fall in the money supply raises the interest rate, given the price level and output.*



For a given price level, *P*, and real income level, Y, an increase in the money supply from M^1 to M^2 reduces the interest rate from R1 (point I) to R_2 (point 2).

Output and the Interest Rate

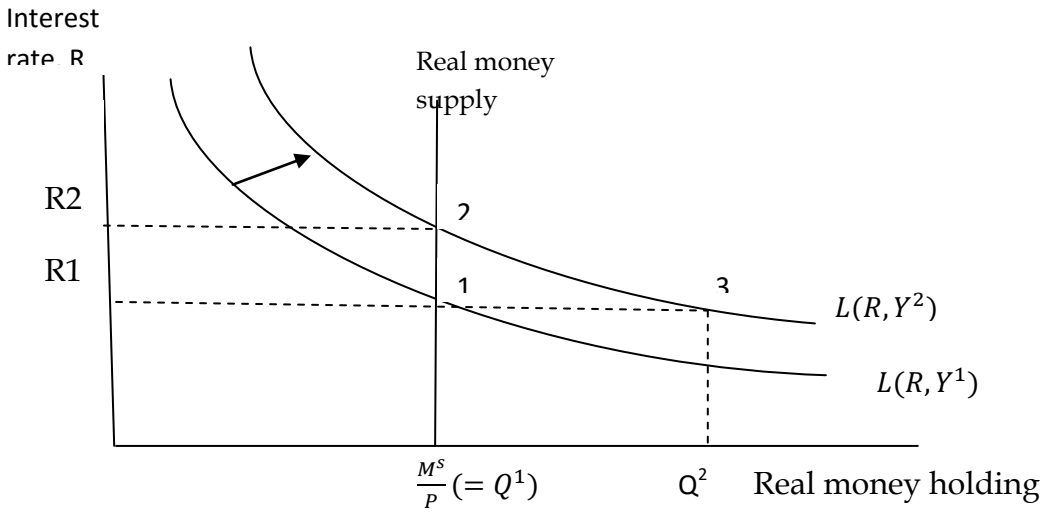
Figure 2.5 shows the effect on the interest rate of a rise in the level of output from Y^1 to Y^2, given the money supply and the price level. As we saw earlier, an increase in output causes the entire aggregate real money demand schedule to shift to the right, moving the equilibrium away from point 1. At the old equilibrium interest rate, R^1, there is an excess demand for money equal to $Q^2 - Q^1\}$ (point 1'). Since the real money supply is given, the interest rate is bid up until it reaches the higher new equilibrium level R^2

(point 2). A fall in output has opposite effects, causing the aggregate real money demand schedule to shift to the left, causing the equilibrium interest rate to fall.

We conclude that an increase in real output raises the interest rate; while a fall in real output lowers the interest rate, given the price level and the money supply.

Figure 2.5 effects on the interest rate of a rise in real income:

Given the real money supply, $M^S/P(= Q^1)$, arise in real income from Y^1 to Y^2 raises the interest rate from R^1 (point I) to R^2 (point 2).



The Money Supply and the Exchange Rate in the Short Run

To analyze the relation between money and the exchange rate in the short run in Figure 2.6, we combine two diagrams that we have already studied separately. Let's assume once again that we are looking at the dollar/euro exchange rate, that is, the price of euros in terms of dollars.

The first diagram (introduced as Figure 2-4) shows equilibrium in the foreign exchange market and how it is determined given interest rates and expectations about future exchange rates. This diagram appears as the top part of Figure 2.6. The dollar interest rate, $R^1_{\$}$., which is determined in the money market, defines the vertical schedule.

As you will remember from Chapter 1, the downward-sloping expected euro return schedule shows the expected return on euro deposits, measured in dollars. The schedule slopes downward because of the effect of current exchange rate changes on expectations of future depreciation: A strengthening of the dollar today (a fall in $E_{\$/€}$)

relative to its *given* expected future level makes euro deposits more attractive by leading people to anticipate a sharper dollar depreciation in the future.

At the intersection of the two schedules (point 1'), the expected rates of return on dollar and euro deposits are equal, and therefore interest parity holds. $E^1_{\$/€}$ is the equilibrium exchange rate.

Money market equilibrium is shown at point 1, where the dollar interest rate $R^1_\$$ induces people to demand real balances equal to the U.S. real money supply, M^S_{US}/P_{US}.

Figure 2.6 Simultaneous Equilibrium in the U.S. Money Market and the Foreign-Exchange Market:

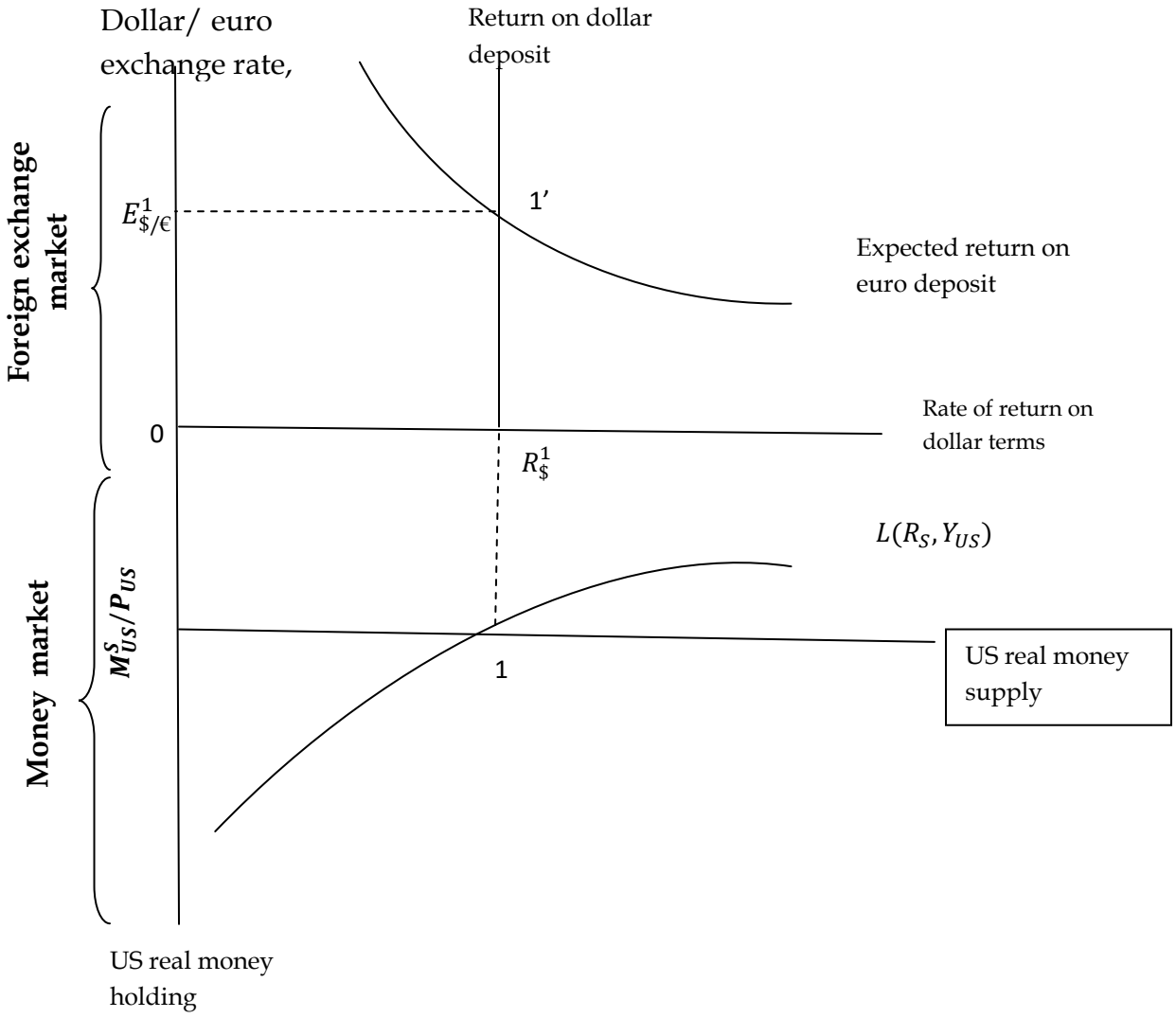


Figure 2-6 emphasizes the link between the U.S. money market (bottom) and the foreign exchange market (top)—the U.S. money market determines the dollar interest rate,

which in turn affects the exchange rate that maintains interest parity. (Of course, there is a similar link between the European money market and the foreign exchange market that operates through changes in the euro interest rate.)

Change in Money Supply and the Exchange Rate:

We now use our model of asset market linkages (the links between the money and foreign exchange markets) to ask how the dollar/euro exchange rate changes when the Federal Reserve changes the U.S. money supply M_{US}^{S}. (figure 2.7)

At the initial money supply M_{US}^{1}, the money market is in equilibrium at point 1 with an interest rate $R_{\$}^{1}$.Given the euro interest rate and the expected future exchange rate, a dollar interest rate of $R_{\$}^{1}$ implies that foreign exchange market equilibrium occurs at point 1', with an exchange rate equal to $E_{\$/€}^{1}$. What happens when the Federal Reserve raises the U.S. money supply from M_{US}^{1} to M_{US}^{2}?. This increase sets in train the following sequence of events: **(1)** At the initial interest rate $R_{\$}^{1}$ there is an excess supply of money in the U.S. money market, so the dollar interest rate falls to $R_{\$}^{2}$ as the money market reaches its new equilibrium position (point 2). **(2)** Given the initial exchange rate $E_{\$/€}^{1}$ and the new, lower interest rate on dollars, $R_{\$}^{2}$, the expected return on euro deposits is greater than that on dollar deposits. Holders of dollar deposits therefore try to sell them for euro deposits, which are momentarily more attractive.

(3) The dollar depreciates to $E_{\$/€}^{2}$, as holders of dollar deposits bid for euro deposits. The foreign exchange market is once again in equilibrium at point 2' because the exchange rate's move to $E_{\$/€}^{2}$ causes a fall in the dollar's expected future depreciation rate sufficient to offset the fall in the dollar interest rate.

Given P_{US} and Y_{US}, when the us, money supply rises from M_{US}^{1} to M_{US}^{2},the dollar interest rate declines (as money-market equilibrium is reestablished at point 2) and the dollar depreciates against the euro (as foreign exchange market equilibrium is reestablished at point 2').

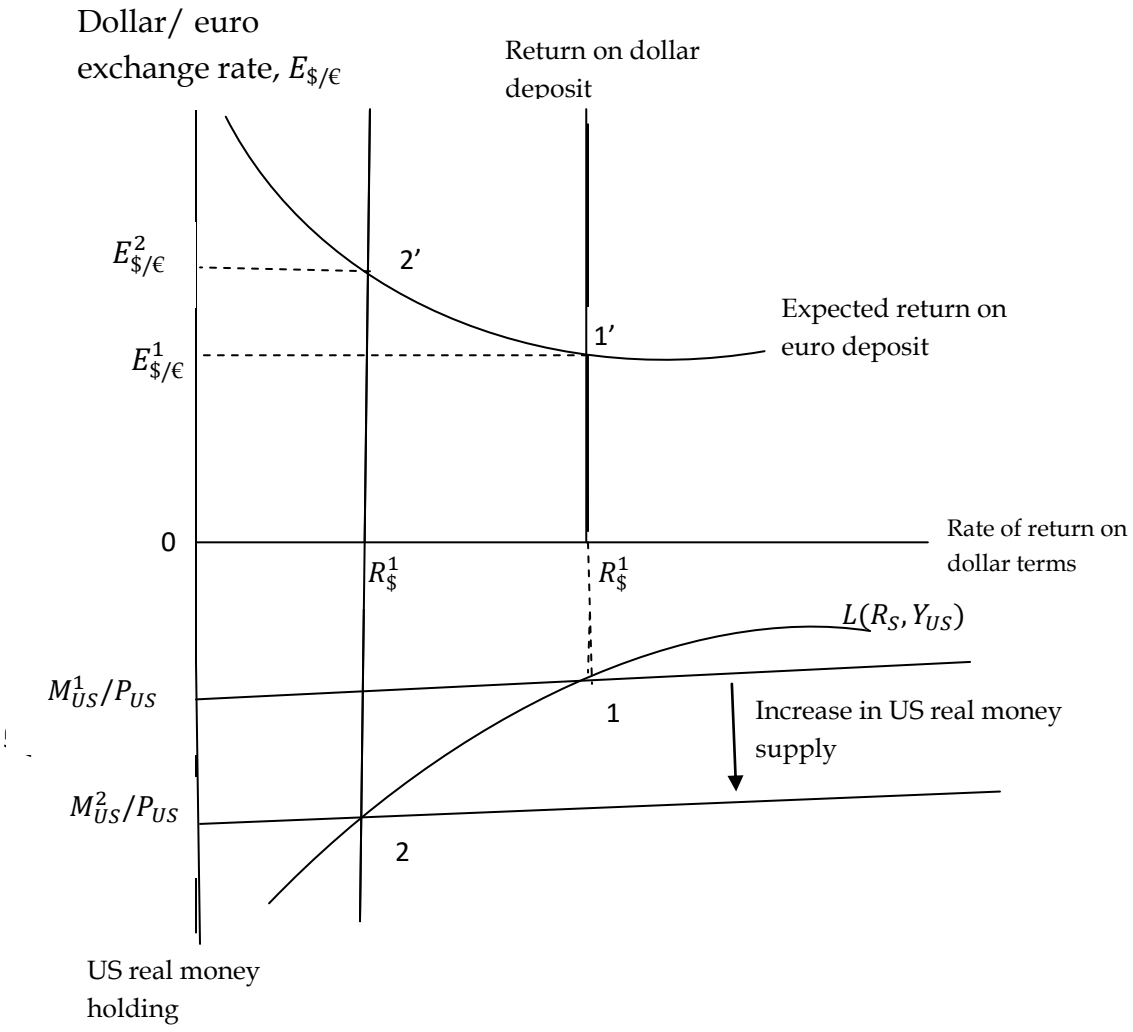


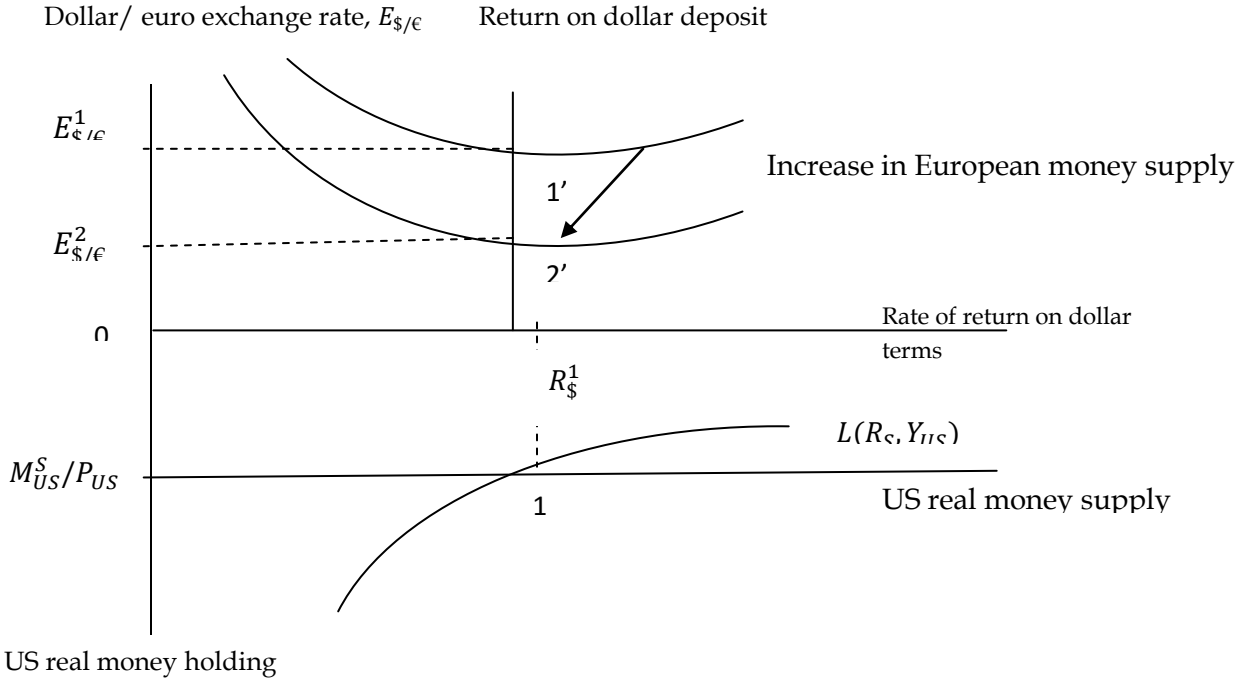
Figure 2.7 Effect of an increase in the European Money Supply on the Dollar/Euro Exchange Rate:

An increase in M_E^S causes a depreciation of the euro (that is, an appreciation of the dollar, or a fall in $E_{\$/€}$), while a reduction in M_E^S causes an appreciation of the euro (that is, a depreciation of the dollar, or a rise in $E_{\$/€}$).

The result of an increase in the European money supply is shown in Figure 2.8. Initially the U.S. money market is in equilibrium at point 1 and the foreign exchange market is in equilibrium at point 1', with an exchange rate $E^1_{\$/€}$. An increase in Europe's money supply lowers R€ and therefore shifts to the left the schedule linking the expected return on euro deposits to the exchange rate. Foreign exchange market equilibrium is restored at point 2', with an exchange rate of $E^{\$}_{\$/€}$. We see that the increase in European money

causes the euro to depreciate against the dollar (that is, causes a fall in the dollar price of euros). Similarly, a fall in Europe's money supply would cause the euro to appreciate against the dollar *($E_{\$/€}$* would rise). The change in the European money supply does not disturb the U.S. money market equilibrium, which remains at point 1.

- By lowering the dollar return on euro deposits (shown as a leftward shift in the expected euro return curve), an increase in Europe's money supply causes the dollar to appreciate against the euro. Equilibrium in the foreign exchange market shifts from point I' to point 2', but equilibrium in the U.S. money market remains at point I.



Money, the Price Level, and Exchange Rate in the Long-Run

An economy's **long-run equilibrium** is the position it would eventually reach if no new economic shocks occurred during the adjustment to full employment. You can think of long run equilibrium as the equilibrium that would be maintained after all wages and prices had had enough time to adjust to their market-clearing levels. An equivalent way of thinking of it is as the equilibrium that would occur if prices were perfectly flexible and always adjusted immediately to preserve full employment.

In studying how monetary changes work themselves out over the long run, we will examine how such changes shift the economy's long-run equilibrium. Our main tool is once again the theory of aggregate money demand.

Money and Money Prices

If the price level and output are fixed in the short run, the condition of money market equilibrium, $\boldsymbol{M^S/P = L(R,Y)}$ determines the domestic interest rate, *R*. The money market always moves to equilibrium, however, even if we drop our "short-run" assumption and think of periods over which *P* and *Y* as well as *R*, can vary. The above equilibrium condition can therefore be rearranged to give $P = \boldsymbol{M^S}/ L\{R,Y)$, which shows how the price level depends on the interest rate, real output, and the domestic money supply.

The *long-run equilibrium price level* is just the value of *P* that satisfies condition when the interest rate and output are at their long-run levels, that is, at levels consistent with full employment. When the money market is in equilibrium and all factors of production are fully employed, the price level will remain steady if the money supply, the aggregate money demand function, and the long-run values of R and *Y* remain steady.

One of the most important predictions of the above equation for *P* concerns the relationship between a country's price level and its money supply, M^S*: All else equal, an increase in a country's money supply causes a proportional increase in its price level.* If, for example, the money supply doubles (to $2M^S$) but output and the interest rate don't change, the price level must also double (to $2P$) to maintain equilibrium in money market.

The economic reasoning behind this very precise prediction follows from our observation above that the demand for money is a demand for *real* money holdings: Real money demand is not altered by an increase in M^S: that leaves *R* and *Y* (and thus aggregate real money demand *L(R, Y))* unchanged. If aggregate real money demand does not change, however, the money market will remain in equilibrium only if the real money supply also stays the same. To keep the real money supply M^S/P constant, *P* must rise in proportion to M^S.

The Long-Run Effects of Money Supply Changes

Our theory of how the money supply affects the price level *given* the interest rate and output is not yet a theory of how money supply changes affect the price level in the long run. To develop such a theory, we still have to determine the long-run effects of a money supply change on the interest rate and output. This is easier than you might think. As we now argue, *a change in the supply of money has no effect on the long-run values of the interest rate or real output.6*

The best way to understand the long-run effects of money supply on the interest rate and output is to think first about a *currency reform,* in which a country's government redefines the national currency unit. For example, the government of France reformed its currency on January 1, 1960, simply by issuing "new" French francs, each equal to 100 "old" French francs. The effect of this reform was to lower the number of currency units in circulation, and all franc prices, to 1/100 of their old franc values. But the redefinition of the monetary unit had no effect on real output, the interest rate, or the relative prices of goods: All that occurred was a one-shot change in all values measured in francs. A decision to measure distance in half-miles rather than miles would have as little effect on real economic variables as the

French government's decision to chop two zeros off the end of every magnitude measured in terms of money.

An increase in the supply of a country's currency has the same effect in the long-run as a currency reform. A doubling of the money supply, for example, has the same long-run effect as a currency reform in which each unit of currency is replaced by two units of "new" currency.

If the economy is initially fully employed, every money price in the economy eventually doubles, but real GNP, the interest rate, and all relative prices return to their long-run or full-employment levels.

Why is a money supply change just like a currency reform in its effects on the economy's long-run equilibrium? The full-employment output level is determined by the economy's endowments of labor and capital, so in the long-run real output does not depend on the money supply. Similarly, the interest rate is independent of the money

supply in the long-run. If the money supply and all prices double permanently, there is no reason why people previously willing to exchange $1 today for $1.10 a year from now should not be willing afterward to exchange $2 today for $2.20 a year from now, so the interest rate will remain at 10 percent per annum. Relative prices also remain the same if all money prices double, since relative prices are just ratios of money prices. Thus, money supply changes do not change the long-run allocation of resources. Only the absolute level of money prices changes.

When studying the effect of an increase in the money supply over long time periods, we are therefore justified in assuming that the long-run values of *R* and Y will not be changed by a change in the supply of money. Thus, we can draw the following conclusion from the long run money supply and price equation:

- *A permanent increase in the money supply causes a proportional increase in the price level's long-run value. In particular, if the economy is initially at full employment, a permanent increase in the money supply eventually will be followed by a proportional increase in the price level.*

Money and the Exchange Rate in the Long Run

The domestic currency price of foreign currency is one of the many prices in the economy that rise in the long run after a permanent increase in the money supply. If you think again about the effects of a currency reform, you will see how the exchange rate moves in the long-run. Suppose, for example, that the U.S. government replaced every pair of "old" dollars with one "new" dollar. Then if the dollar/euro exchange rate had been 1.20 *old* dollars per euro before the reform, it would change to 0.60 *new* dollars per euro immediately after the reform. In much the same way, a halving of the U.S. money supply would eventually lead the dollar to appreciate from an exchange rate of 1.20 dollars/euro to one of 0.60 dollars/euro. Since the dollar prices of all U.S. goods and services would also decrease by half, this 50 percent appreciation of the dollar leaves the *relative* prices of all U.S. and foreign goods and services unchanged.

- We conclude that, all else equal, *a permanent increase in a country's money supply causes a proportional long-run depreciation of its currency against foreign currencies.*

Similarly, a permanent decrease in a country's money supply causes a proportional long run appreciation of its currency against foreign currencies.

The law of one price:

The law of one price states that in competitive markets free of transportation costs and official barriers to trade (such as tariffs), identical goods sold in different countries must sell for the same price when their prices are expressed in terms of the same currency. For example, if the dollar/pound exchange rate is $1.50 per pound, a sweater that sells for $45 in New York must sell for £30 in London. The dollar price of the sweater when sold in London is then ($1.50 per pound) X (£30 per sweater) = $45 per sweater, the same as its price in New York.

Let's continue with this example to see why the law of one price must hold when trade is free and no transport costs or other trade barriers. If the dollar/pound exchange rate were $1.45 per pound, you could buy a sweater in London by converting $43.50 (= $1.45 per pound X £30) into £30 in the foreign exchange market. Thus, the dollar price of a sweater in London would be only $43.50. If the same sweater were selling for $45 in New York, U.S. importers and British exporters would have an incentive to buy sweaters in London and ship them to New York, pushing the London price up and the New York price down until prices were equal in the two locations. Similarly, at an exchange rate of $ 1.55 per pound, the dollar price of sweaters in London would be $46.50 (= $1.55 per pound X £30), $1.50 more than in New York. Sweaters would be shipped from west to east until a single price prevailed in the two markets.

When trade is open and costless, identical goods must trade at the same relative prices regardless of where they are sold. We can state the law of one price formally as follows: Let P_{US}^{i} be the dollar price of good i when sold in the U.S., P_{E}^{i} the corresponding euro price in Europe. Then the law of one price implies that the dollar price of good i is the same wherever it is sold, $P_{US}^{i} = \left(E_{\$/€}\right) X \left(P_{E}^{i}\right)$. Equivalently, the dollar/euro exchange rate is the ratio of good /'s U.S. and European money prices $\boldsymbol{E_{\$/€} = \frac{P_{US}^{i}}{P_{E}^{i}}}$.

Purchasing Power Parity:

The theory of purchasing power parity states that the exchange rate between two countries' currencies equals the ratio of the countries' price levels.

Absolute purchasing power parity:

The absolute purchasing power parity theory postulates that the equilibrium exchange rate between two currencies is equal to the ratio of price levels in the two nations. Specifically; $R = P/p^*$ where, R= the exchange rate or the spot rate, P=the general price level in the home nation and p^*= the general price level in the foreign country.

For example, if the price of one unit of wheat is $2 in the United states and £1 in the United Kingdom, then the exchange rate between the dollar and pound should be R= $2/£1=2. i.e. according to the low of one price, a given commodity should have the same price (so that the purchasing power of two currencies is at parity) in both countries when expressed in terms of the same currency.

If the price of one unit of wheat in terms of dollars were $1 in the United States and $3 in the United Kingdom, firms would purchase wheat in the United States and resell it in Britain at a profit. This commodity arbitrage would cause the price of wheat to fall in Britain and rise in the United States until the prices were equal, say $2 per unit, in both countries. Commodity arbitrage operates just as does currency arbitrage in equalizing commodity prices throughout the market.

Three Reasons for APPT version being misleading:

- First, APPT appears to give the exchange rate that balances trade in goods and services while completely neglecting the capital account.
- Second, this version of the PPP theory will not even give the exchange rate that balances trade in goods and services because of the existence of many non-traded goods and services.
- Finally, International trade tends to equalize the prices of traded goods and services among nations but not the prices of non-traded goods and services.

Relative Purchasing—Power Parity Theory

The more refined relative purchasing-power parity theory postulates that the change in the exchange rate over a period of time should be proportional to the relative change in the price levels in the two nations over the same time period.

Specifically, if we let the subscript 0 refer to the base period and 1 to a subsequent period, the relative PPP theory postulates that: $R_1 = \frac{P_1 P_0}{P_1^* P_0^*} R_0$

Where R_1 = the exchange rates in period 1 and R_o = the exchange rates in base period

For example, if the general price level does not change in the foreign nation from the base period to period 1 (i.e., $p_1^*/p^*_o = 1$), while the general price level in the home nation increases by 50 percent, the relative PPP theory postulates that the exchange rate (defined as the home-currency price of a unit of the foreign nations currency) should be 50 percent higher (i.e., the home nations currency should depreciate by 50 percent) in period 1 as compared with the base period.

Note that if the absolute PPP held, the relative PPP would also hold, but when the relative PPP holds, the absolute PPP need not hold. For example, while the very existence of capital flows, transportation costs, other obstructions to the free flow of international trade, and government intervention policies leads to the rejection of the absolute PPP, only a change in these would lead the relative PPP theory in to difficulties.

Problems with Relative Purchasing Power Parity Theory:

Since the general price index includes the prices of both traded and non-traded goods and services, and prices of the non-traded goods and services are not equalized by international trade but are relatively higher in developed nations, the relative PPP theory will tend to predict overvalued exchange rates for developed nations and undervalued exchange rates for developing nations, with distortions being greater the greater the differences in the levels of development.

Significant structural changes like liquidation of foreign funds also lead to problems with the relative PPP theory.

Chapter Three

3. Balance of Payments and National Income Accounting.

3.1. National Income accounting for an open economy:

In an open economy (an economy that engages in international trade), residents spend some income on foreign goods (imports, IM) and firms sell domestically produced goods to foreign residents (exports, EX). The national income of an open economy is therefore the sum of domestic and foreign expenditure on the goods and services produced by domestic factors of production. Thus, the national income identity for an open economy is*:*

$$\mathbf{Y = C + I + G + EX - IM}$$

Where,

- C - Total household consumption of produced goods and services = $C^d + C^f$
- I - Investment purchases by firms of goods and services = $I^d + I^f$
- G - Government purchases of goods and services = $G^d + G^f$.
- IM - Imports of goods and services produced abroad = $C^f + I^f + G^f$.

NB, the subscript **d-indicates** the domestically produced goods and services and **f-indicates** the goods and services produced abroad.

***Current Account*:**

The CA shows the difference between **exports** and **imports** of goods and services (and net unilateral transfers). Note: the trade balance (TB=NX without unilateral transfers).

Goods account

It includes the value of merchandise exports and the value of merchandise imports. These items of foreign exchange earnings and spending are called "visible" items in the balance of payment. If the receipt from exports of goods happens to be equal to the payments for the import of goods, then the situation is called as '**Zero goods balance'**.

Otherwise, there would be either a positive or a negative goods balance depending on whether we have receipts exceeding payments (positive) or payments exceeding receipts (negative). Positive goods balance is regarded as '**favorable'** for a country and negative goods balance is '**unfavorable**' for a country.

Service account

The service account records all the service exported and imported by a country in a year. Unlike goods which are tangible or feasible, services are intangible. Accordingly, service transactions are

termed as "invisible" items in the BoP. They are invisible in the sense that service receipts and payments are not recorded at the port of entry or exit as is the case with the merchandise imports and export receipts.

Except for this, there is no meaningful difference between goods and service receipts and payments. Both constitute earnings and spending of foreign currency. Goods and service accounts together constitute the largest and economically the most significant components in the BoP of any country.

The service transactions take various forms: they are basically include;

- Transportation, banking and insurance receipts & payments from and to foreign countries,
- Tourism, travel service and tourist purchases of goods and services received from foreign visitors to home country and paid in the foreign countries by home country citizens,
- Expense of students studying abroad and receipts from foreign students studying in the home country,
- Expenses of diplomatic and military personnel stationed overseas as well as the receipts from similar personnel from overseas who are stationed in the home country, and
- Interest, profits, dividends and royalties received from foreign countries and paid out to the foreign countries. These items are generally termed as investment income or expenditure or receipts and payments arising out of "capital services".

For some countries which have large investments in their countries or for countries like USA, UK, France and Germany, which have huge investment operations overseas, the investment income payments and receipts constitute a very substantial loss or gain in terms of foreign exchange out flow and inflow.

"Service balance" is the sum of all invisible service receipts and payments, in which the sum could be positive, negative or zero. A positive sum is regarded as favorable to a country and a negative sum is considered as unfavorable for a country.

Favorable goods and service balance is therefore something to attempt, to achieve and maintain for and unfavorable goods or service balance is something avoidable.

Unilateral transfer account

This account includes all gifts, grants and reparation receipts and payments to foreign countries. They are of two types:

A. **Government transfer**: it consists of foreign economic and military aid received by home country residents. For example, the U.S foreign aid to Ethiopia is a government transfer constituting a credit item in Ethiopia BOP.

B. **Private transfer**: these are funds received from or remitted to foreign countries on person to person basis. Example: an Ethiopian settle in the US remitting $100 a month to his aged parents in Ethiopia, is a unilateral transfer in flow item in Ethiopian BOP

Countries which provide economic assistance on a massive scale can expect huge deficits in their unilateral transfer account. Unilateral transfer payments are called "unrequited transfers" because the flow is only on direction without automatic reverse flow in the other direction. There is no repayment obligation attached to these transfers because they are not borrowings and lending but gifts and grants exchanged between government and people in one country with the government and peoples in the rest of the world.

The Current Account and Foreign Indebtedness

In reality a country's foreign trade is exactly balanced only rarely. The difference between exports of goods and services and imports of goods and services is known as the **current account balance** (or current account). If we denote the current account by *CA*, we can express this definition in symbols as;

$$CA = EX - IM$$

A country's CA balance equals the change in a country's foreign net wealth, why?

- A country with a CA surplus shows that it is earning more from EX than IM.
- A country with a CA deficit shows that it is earning less from EX than IM.

The current account is also important because it measures the size and direction of international borrowing. When a country imports more than it exports, it is buying more from foreigners than it sells to them and must somehow finance this current account deficit.

How does it pay for additional imports once it has spent its export earnings? Since the country as a whole can import more than it exports only if it can borrow the difference from foreigners, a country with a current account deficit must be increasing its net foreign debts by the amount of the deficit.

Similarly, a country with a current account surplus is earning more from its exports than it spends on imports. This country finances the current account deficit of its trading partners by

lending to them. The foreign wealth of a surplus country rises because foreigners pay for any imports not covered by their exports by issuing IOUs that they will eventually have to redeem. The preceding reasoning shows that *a country's current account balance equals the change in its net foreign wealth.*

Notes; A country finances its deficit by borrowing from the surplus country. How? The deficit country issues an IOU (which will be redeemed later).

The current account is also equal to the difference between national income and domestic residents' spending $C + I + G, it\ gives\ Y - (C + I + G) = CA$.

- If a country is spending less than income (production), it must be running a current account surplus.
- If a country is spending more than income (production), it must be running a current account deficit.

The current account shows the amount of international lending or borrowing. Essentially, a CA deficit is trading current consumption for future consumption.

A current account surplus is like giving up current consumption in exchange for future consumption (Intertemporal Consumption).

If we are borrowing money, then our net wealth must be falling (debts are increasing). For a country, it is the same. If our net foreign wealth is falling, our net foreign debt is rising.

The links between saving, investment and the current account

In a closed economy, national saving always equals investment. This tells us that the economy as a whole can increase its wealth only by accumulating new capital.

Let S stand for national saving. Our definition of S tells us that: $\mathrm{S} = \mathrm{Y} - \mathrm{C} - \mathrm{G}$

Since the closed-economy GNP identity, Y = C + I + G, may also be written as;

$\mathrm{I} = \mathrm{Y} - \mathrm{C} - \mathrm{G}$, then $S = I$

It implies that the national saving must equal investment in a closed economy. While in a closed economy saving and investment must always be equal, in an open economy they can differ. Remembering that national saving, S, equals $Y - C - G$ and that $CA = EX - IM$, we can rewrite the GNP identity as $S = I + CA$,

Components of national saving:

Private saving is defined as the part of disposable income that is saved rather than consumed.

Disposable income is national income, Y, less the net taxes collected from households and firms by the government, T(Net taxes are taxes less government transfer payments), Private saving, denoted S^p, can therefore be expressed as; $S^p = Y - T - C$.

Government saving is defined similarly to private saving. The government's "income" is its net tax revenue, T, while its "consumption" is government purchases, G. If we let Ss stand for government saving, then $S^g = T - G$.

The two types of saving we have defined, private and government, add up to national saving. To see why, recall the definition of national saving, *S,* as $Y - C - G$. Then

S= $Y - C - G = (Y - T - C) + (T - G) = S^p + S^g$.

We can use the definitions of private and government saving to rewrite the national income identity in a form that is useful for analyzing the effects of government saving decisions on open economies. Because $S = S^p + S^g = I + CA$,

$$S^p = I + CA - S^g = I + CA \sim (T - G) = I + CA + (G - T).$$

The above equation then states that a country's private saving can take three forms: investment in domestic capital (I), purchases of wealth from foreigners (CA), and purchases of the domestic government's newly issued debt (G $-$ *T).*

From this relationship: $CA = S^p - I - (G - T)$ *then;*

If the government deficit rises *(G - T* goes up) and private saving and investment do not change much, the current account surplus must fall by roughly the same amount as the increase in the fiscal deficit. In general, in a open economy, we have:

$$S = Y - C - G = I + CA$$

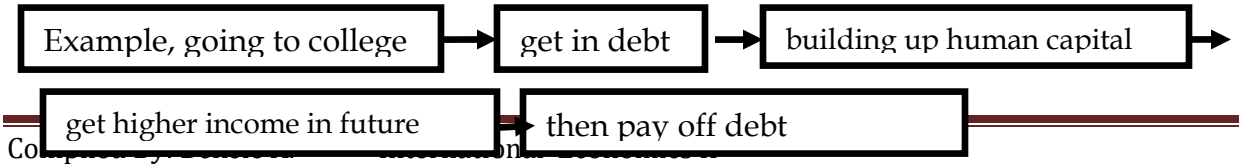
$$S - I = CA$$

Thus,

- If savings is greater than investment, we must be lending money to the rest of the world (ROW). The ROW is borrowing money to increase their capital stock.
- If savings is less than investment, we must be borrowing money from the rest of the world (ROW). Domestic country is borrowing money to increase our capital stock.

NB: Why might, $I > S$?

Is this necessarily a bad thing?



Term of trade, balance of trade and balance of payments

Term of trade:

The terms of trade is defined as the *quantity of one good that exchanges for a quantity of another.* For example, how many apples exchange for how many oranges? It is typical to express the terms of trade as a ratio.

If one apple exchanges for four oranges, we can write the terms of trade as follows:

$$ToT = \frac{1apple}{4oranges} = \frac{1}{4}\ apple/orange$$

The term of trade is equivalent to the ratio of prices between two goods. Suppose P_A is the price of apples (measured in \$/apple) and P_O is the price of oranges (measured in \$/orange). Then

$$ToT = \frac{P_o}{P_A}\left[\frac{\frac{\$}{Orange}}{\frac{\$}{apple}} = \frac{\$}{orange} \times \frac{apple}{\$} = \frac{apples}{orange}\right]$$

We can refer to this price ratio as the price of oranges in terms of apples, i.e. how many apples one can get in exchange for every orange. Notice that the price of ***oranges*** over apples is in units of ***apples*** per **orange.**

By definition the terms of trade of a nation is the ratio of the price of its export commodity to the price of its import commodity. Export and import prices must both be measured in terms of either the domestic or the foreign currency. Since the prices of both the nation's exports and imports rise in terms of the domestic currency as a result of its **depreciation** or d**evaluation**; the terms of trade of the nation can rise, fall, or remain unchanged, depending on weather the price of exports rises by more than, by less than, or by the same percentages as the price of imports.

Balance of trade:

Balance of trade transactions arising from trade in **goods** and **services** including:

- The visible trade balance
  - Payments and receipts from the import/export of tangible goods (cars, food, textiles,…)
- The invisibles trade balance
  - Payments and receipts for financial services, shipping and tourism, interest and dividends payments on investments, etc.…

Balance of payment:

Definition, it is a record of international transactions between residents of one country and the rest of the world.

✓ International transactions include exchanges of goods, services or assets

Balance of payments shows the net change in the foreign exchange (dollar) reserves of an economy during a certain time period.

❖ All transactions are either debit or credit transactions

➢ Transactions that generate a receipt of a payment from foreigners are a credit item in the accounts with a **+ sign**

⇨ These represent a supply of foreign exchange ($) and a demand for the local currency (birr)

➢ Transactions that comprise a payment to foreigners are reported as a debit item with a **- sign**

⇨ These represent demand for foreign exchange ($) and a supply of the local currency (birr)

■ Credit transactions result in receipt of payment from foreigners

⇨ Merchandise exports (valued f.o.b.)
⇨ Transportation and travel receipts
⇨ Income received from investments abroad
⇨ Gifts received from foreign residents
⇨ Aid received from foreign governments

■ Debit transactions involve to payments to foreigners

⇨ Merchandise imports
⇨ Transportation and travel expenditures
⇨ Income paid on investments of foreigners
⇨ Overseas investments by home country residents
⇨ Gifts to foreign residents
⇨ Aid given by home government

NB: Each credit transaction has a balancing debit transaction, and vice versa, so the <u>overall</u> balance of payments is always in balance.

Components of balance of payment:

a) The balance of payments on **Current Account**
b) The balance of payments on **Capital Account**
c) The balance for **Official Financing** *(International reserves account operated by central bank)*

The **current account** is that balance of payments account in which all short-term flows of payments are listed:

⇨ **Goods and services balance** (exports – imports)

a) Merchandise trade balance (exports – imports)

b) Services balance (exports – imports)

Services like ⇨
- Travel and tourism
- Trade transportation
- Insurance
- Education
- Financial, technical, and marketing services
- Telecommunication
- Use of property rights (royalties)
- Other professional and consulting services

⇨ **Net Investment income**

- Net Income from Foreign Capital (interest+profit transfers)
- ✓ Interest on bonds and loans
- ✓ Dividends and other claims on profits by owners of foreign businesses
- ✓ Payments made to temporary (nonresident) workers

⇨ **Unilateral transfers**

a) Private transfer payments

b) Governmental transfers

Unilateral Transfers ⇨
- ➢ Official government grants in aid to foreign governments
- ➢ Charitable giving (e.g., famine relief)
- ➢ Migrant workers transfers to families in their home countries

BOP on current account is also referred to as Net Foreign Investment because the sum represents the contribution of foreign trade to GNP.

Capital account:

The capital and financial account is that balance of payments account in which all cross-border transactions involving financial assets are listed. This includes transactions between foreign and domestic residents, and foreign and domestic governments.

All purchases or sales of assets, including:

- Direct investment
- Securities (debt)
- Bank claims and liabilities
- When U.S. citizens buy foreign securities or when foreigners buy U.S. securities, they are listed here as outflows and inflows, respectively.

In general capital account consists:

1. **Long term capital account**

It includes the amount of capital that has moved in to or out of the country in a year. Any capital that has moved in and out of the country for a period of one year or more is regarded as long term capital movement. The long term capital account includes the following categories:

- **Private direct investment**: these investments are done by home country citizens and firms in foreign countries (debit) and by foreigners in the home country (credit). This type of capital movement is induced by differences in profit rate between the home country and the rest of the world.
- **Private portfolio investment**: these investments are done by home country's citizens and firms in foreign securities, stocks, shares …etc (debit) and by foreigners in the home country securities, stocks, shares…etc (credit). This type of movement in and out of the country is induced by differences in interest rate, dividends, or rate of return on capital between the home country's financial assets and those of the foreign nations.
- Government loans to foreign countries: these are loans given by home country's government (debit) and to the home country government (credit).

Capital lending countries would experience deficits on long-term capital account and capital borrowing countries, like the LDCs experience surpluses in their long term capital account.

2. **Short term capital account**

This account also called as '' error and omissions'' or ''unrecorded transactions account''. Bank deposits and other short-term payments and credit arrangements fall in to this category. Short-term capital items fall on due of demand or in less than one year as opposed to long-term capital flows, which have maturity after one year or thereafter.

The vast majority of short-term capital account represents bank transfers that finance trade and commerce. It is often difficult to keep track of all short-term capital movements in and out of the country. They cannot be rough estimates. In fact, for some countries the separate category of short-term capital does not exist. These transactions are simply included in an account under the general term ''error and omissions''.

3. **The balance for Official Financing**

This account simply records net changes in foreign exchange reserves. Especially this account lists internationally acceptable means of settling international obligations. This liquidity account is best understood as follows.

Balance of payment = current account (1)+ capital account (2)

- Since BoP = Current Account + Capital Account:
  - a Current Account surplus => a Capital Account deficit
  - a Current Account deficit => a Capital Account surplus

Table 1: BOP Surplus case ($ millions)

Item	Credit (receipts)	Debits (payments)
Goods Account	1,500	800
Service Account	500	1400
Unilateral Transfers Account	100	120
Long Term Capital Account	900	400
Errors & Omissions	500	630
International Liquidity Account		150
Balance of Payments	3,500	3,500

The total receipts are $3,500 Million and the total payments are $3,350 million. There is a net BOP surplus amounting to $150 million. This sum of $150 million is entered in to international liquidity account as debit. The logic of accounting for this sum of $150 million as a debit of repayment is that, this represents either

A. Purchase or import of gold worth $150 million; or
B. Net addition to accumulation of foreign reserves of $150 million; or
C. Capital lending in the sum of $150 million to other countries on short or long-term basis.

The international liquidity account in this case represents the BOP surplus magnitude and only shows how the BOP surplus is entered or accounted in the balance sheet.

A debit entry in the international liquidity account shows that there is a surplus in the BOP of the country for that year.

The following table has the exact opposite figure. The sum of debit payments ($3,500 million) exceeds the sum of credit receipts ($3,350 million by $150 million which represents the net deficit in the BOP due to the first five accounts in the table).

Table 2: BOP deficit case ($ millions)

Item	Credit (receipts)	Debits (payments)
Goods Account	800	1,500
Service Account	1400	500
Unilateral Transfers Account	120	100
Long Term Capital Account	400	900
Errors & Omissions	630	500
International Liquidity Account	150	
Balance of Payments	3,500	3,500

The question here to ask is, how was this deficit of $150 million financed?

It is financed in one of the following ways:

A. Selling or exporting of gold worth $150 million; or
B. Drawing down upon the past accumulated foreign reserves of $150 million; or
C. Borrowing of capital in the sum of $150 million from friendly countries or international institution like IMF on short or long term basis.

The international liquidity account in this case, represents the BOP deficit sum of $150 million. This amount is entered as credit item to indicate how the sum of $150 million was brought in to finance the deficit of that magnitude arising out of the first five accounts in the BOP schedule. A credit entry in the international liquidity account shows that the country had a deficit in its BOP of that magnitude in that particular year.

HOW TO UNDERSTAND WHETHER THE SURPLUS OR DEFICIT IS GOOD OR BAD

Is it possible to generalize that surplus is always favorable for a country?

I think your answer is no. Good! There are cases in which surplus is not considered as unfavorable for a country. Next, you will have a case in which surplus is considered unfavorable for a country?

As we know LDCs are net borrowers of foreign capital and receipts of foreign investment and to that extent they would enjoy favorable BOP trends. But sooner or later this foreign capital and investment will leave the LDCs and return to their home countries mostly in the form of profits, interest, dividends and royalties would be repatriated from the host countries to the home

countries. And this sum would create deficit tendencies in the current account of the BOP of the LDCs concerned.

So capital account surplus of the present year will create current account deficits of a potential nature in the form of investment income outflows for the year ahead.

By making productive use of foreign capital and investment and increasing both the GNP and export capacity, the LDCs can avoid future BOP deficit on current account i.e they can offset investment income outflows and capital repatriation by increasing merchandise exports as well as service exports.

Alternatively, the developed countries today's capital account deficits are future surpluses. The significance of BOP deficit and surplus arising out of transactions in the capital account can be seen only with perspective and future prospects.

Overall balance of payments

This is the sum of the balance on current account and on capital account together. It includes all international monetary transaction of the reporting country with rest of the world. It is highly aggregative, and like any other aggregative variable, the concept cannot be of much significant. Because the aggregate debit and credit figures don't reveal the behavior of changes components which constitute the aggregate.

i. If the overall surplus in the BOP caused by current account surplus but not capital account surplus, then that surplus may be a good sign for the country.

ii. If the overall deficit in the BOP was caused by current account deficits rather than capital account deficits, then the deficit may be considered as a bad sign for the importing country.

The overall Bop figures by themselves, whether they indicate a surplus or a deficit, do not reveal the real situation. For this reason much economic significance cannot be attached to the overall BOP concept. The current and capital account break down is very useful and significant.

Autonomous and accommodating transactions

Economists have often found it useful to distinguish between autonomous and accommodating capital flows in the BOP. Transactions are said to Autonomous if their value is determined independently of the BOP. **Accommodating** capital flows on the other hand are determined by the net consequences of the autonomous items. An autonomous transaction is one undertaken for its own sake in response to the given configuration of prices, exchange rates, interest rates etc,

usually in order to realize a profit or reduced costs. It does not take into account the situation elsewhere in the BOP.

Autonomous transactions are those that take place regardless of the size of the other items in the balance of payments.

Example:

a) The export of goods to a foreign buyer is an initiating or an autonomous transaction and its value results in payments by foreigners to the home country, which is entered as a credit item.
b) When the home country borrows $100 million from the World Bank to construct a high way, the sum of $100 million is credited in to the long term capital account of the home country.
c) If the foreign MNC repatriate $300 million of their profit to their country of origin, then the amount is entered in to BOP service account as investment income outflow or capital service debit item.

An accommodating transaction on the other hand is undertaken with the motive of settling the imbalance arising out of other transactions. An alternative nomenclature is that capital flows are 'above the line' (autonomous) or 'below the line' (accommodating). Obviously the sum of the accommodating and autonomous items must be zero, since all entries in the BOP account must come under one of the two headings. Whether the BOP is in surplus or deficit depends on the balance of the autonomous items. The BOP is said to be in surplus if autonomous receipts are greater than the autonomous payments and in deficit if vice – a – versa.

Example;

Suppose South Africa, a gold exporting country, exports $800 million worth of gold as a commodity export, then these $800 million export proceeds are entered as credit in that country's merchandise account. Here gold is exported as an autonomous activity or as a current account transaction. This activity causes foreign exchange earnings and there by determines the BOP situation for the country.

If Ethiopia is forced to settle its BOP deficits, then we can say that this gold export is not an autonomous bur accommodating transaction undertaken exclusively with a view to solve its BOP problem. Here the gold export is the result of BOP situation. This accommodating gold export transaction is entered in to Ethiopia's international liquidity account as a credit item.

Disequilibrium in the balance of payments

Disequilibrium in the balance of payment exists when the autonomous transaction (current account + capital account) will be ether in surplus or deficit.

Disequilibrium in the balance of payment means that Official Settlements Balance (B≠ 0) which means that $B = CA + KA$

Because the balance of payments must sum to zero, any imbalance in the official settlements balance must be financed (paid for) by official reserves flows:

$B + OR = 0$

- The Official Settlements Balance (B) is sometimes referred to as the net sum of the items above the line or autonomous transactions, and
- The Official Reserves Transactions (OR) are referred to as the sum of the items *below the line,* also called non-autonomous or accommodating transactions.

- When $B = 0$, there is said to be a BOP equilibrium, and if $B \neq 0$, a BOP disequilibrium.
- When $B > 0$, there is said to be a BOP surplus.
- When $B < 0$, there is said to be a BOP deficit.

Types of disequilibrium in the balance of payments

Broadly speaking there are three main kinds of disequilibrium in the balance of payments:

- Cyclical disequilibrium
- Secular disequilibrium
- Structural disequilibrium

A. **Cyclical disequilibrium**: it arises due to the influence of cyclical factors. Cyclical disequilibrium may arise because:

- ✓ Trade cycle follow different path and pattern in different countries. There are no identical timings and periodicity of occurrence of cycle in different countries.
- ✓ No identical stabilization programs and measures are adopted by different states
- ✓ Income elasticity of demand for import in different countries are not identical
- ✓ Price elasticity of demand for imports differs in different countries.

Since deficit or surplus alternatively takes place during depression and prosperity phase of a cycle, the balance of payment equilibrium is automatically set forth over the complete cycle.

B. **Secular Disequilibrium**: it is a long-term phenomenon. It is caused by persistent, deep-rooted dynamic change, which slowly takes place in the economy over a long period of time.

It includes such as capital improvement, population growth, territorial expansion, technological advancement, innovation…etc. A newly developing country, for instance, in the initial growth of stage requires huge investment exceeds savings. In the view of its low capital formation, it has to import large amount of capital from the rest of the world. If there is no inflow of capital, there will be secular disequilibrium.

C. **Structural disequilibrium:** it emerges of the account of structural change occurring in some sectors of the economy at home or abroad which may alter the demand or supply relationship of exports or imports or both. Suppose, if foreign demand for Ethiopia coffee decline because of usage of other substitutes, then resources employed by Ethiopia in the production of coffee should shift towards some other commodities of exports. But this is not an easy task. It takes time. This results in decline of export which in turn results in balance of payment disequilibrium. Furthermore, structural changes are also produced by variations in the rate of international capital movements. A rise in the inflow of the international capital lends to have a direct impact on a country's balance of payment.

Structural disequilibrium at the factor level takes place when a country's factor prices deviate disproportionately to its factor endowment.

Causes of disequilibrium

Disequilibrium in the balance of payments arises owing to a large number of causes and many complex factors interacting on one another. On aggregate the following are the important causes producing disequilibrium in the balance of payments in a country.

1. **Cyclical fluctuation**: their phases and amplitudes differ in different countries, which generally produce cyclical disequilibrium.
2. **Huge development and investment program**: these are the root cause of disequilibrium in the developing nations. At a time of expansion, the demand for imports goes on increasing, but the exports don't increase to that extent since LDCs are the exporters of primary products mainly.
3. **Due to rapid economic development**: at this time, income and price effects will adversely affect the balance of payments position of a developing country. With an increase in income, the marginal propensity of import being high in these countries, their demand for imported articles will rise. Moreover, marginal propensity to consume is also high in these countries; more will be consumed in the domestic country and little left for exports.

4. **Shift in production by DCs:** a vast increase in the domestic production of food staffs, raw materials, substitutes…etc in the developed countries decrease the demand of LDCs export.
5. **Huge population and its high rate of growth:** this also adversely affects BOP of the LDCs. It is easy to see that an increase in population also increases the need of these countries import and decrease the capacity to export.
6. **Demonstration effect**: when people of the underdeveloped nations come in to contact with the people of advanced countries due to economic and political or social relations, there will be demonstration effect on the consumption pattern of these people and they will desire to have western rises, whereas the export quantum may remain the same or may even decline with the increase in income, thus causing an adverse balance of payments for the country….etc

Measures for correcting disequilibrium

Any disequilibrium (deficit or surplus) in the balance of payments when it persists continuously is certainly undesirable because of its disastrous effect on the country's economy and orderly world trade. Thus, one of the basic problems of international economics policy is restoring even balance to a country whose balance of payment is seriously and persistently in deficit and in surplus, since both are bad for normal internal economic operations and international economic relations. Especially a deficit or adverse balance of payment is more harmful for a country's economic growth and therefore to be corrected sooner than later.

The measures that may be used for correcting an adverse balance of payment are of two kinds:

I. Monetary measures

II. Non monetary measures

I. Monetary measures include

a) Deflation
b) Exchange rate depreciation and
c) Exchange control

II. Non monetary measures include

a) Import quota
b) Tariff
c) Export promotion ,policies and programs

MONETARY MEASURES

The following monetary measures are employed for boosting exports and checking or curtailing imports, so as to correct the adverse balance of payment.

a) Deflation

A traditionally suggested method of correcting disequilibrium is to deflate the home currency. Deflation in this context to mean contraction of the home currency through dear money and credit policy, and fall in cost and prices of domestic goods. Naturally domestic goods and so the exporting items of the country in the foreign market become relatively cheaper and demand for them will rise so that exports will increase. Moreover deflation attempt to restrict home consumption through reduction of income; demand for goods at home will be reduced and more supplies become available for export purpose so that the value of total exports will increase.

The net impact of the above activity is increasing the value of exports but reducing the value of imports so that the adverse balance of payment will be corrected.

However, deflation is fruitfully employed when countries are on good standard or on fixed exchange rates, because its workability assumes that exchange rates are unchanged through its course. More over in the interest of international economic growth of a country and to achieve a high or full employment level, deflation is not welcome. It is disliked because it implies unemployment and reduction in money income which means reduction in wages so that working class will suffer the most. In short deflation is not a very desirable method to correct an adverse balance of payment.

b) Exchange rate depreciation

Exchange rate depreciation is the method of reduction the value of domestic currency relative to foreign currency. Suppose that the exchange rate between birr and dollar is equal to 20Br/$.. If the exchange rate is raised to 22Br/$, this refers to reduction in the value of domestic currency i.e. Birr.

Exchange rate depreciation of a country will tend to cheapen its domestic goods to foreigners so that its export will be boosted up. While its imports will be costly, so that they will tend to decline. The country thus may achieve a favorable balance to pay off an earlier deficit.

If the country's demand for imports and exports is fairly elastic, small exchange rate depreciation will tend to correct a normal deficit in the balance of payment. Under free trade policy, its operation is automatic. However, very large exchange rate depreciation will be needed to control

the situation if the demand for imports and exports is inelastic.

c) Exchange control

Another most commonly adherent to method of correcting disequilibrium of the balance of payment is exchange control. It is usually surer method adopted by the government of the country to correct disequilibria. Under this method all the exporters are directed by the exchange control authority, usually the central bank, to surrender their foreign exchange earnings to it. And the foreign exchange is rationed out among the licensed importers. In this way the national bank will be in a position to control the exchange rate so that it will be possible to limit the amount of imports as per the volume of BOP deficit or surplus. If there is adverse BOP situation in the balance of payment, the central bank will give only small amount of hard currency to limit the amount of imports so that the adverse condition on BOP will be corrected.

I. NON-MONETARY MEASURES

Among non-monetary measures import duties and quotas are generally used for correcting an adverse Balance of payments.

a) Import Quotas:

As a restrictive measure import duties are commonly imposed when such duties are levied on selected imported items their price would rise so that contraction in import demand would occur if exports quantum remaining the same are being increased and when the volume of imports declines the adversity in the balance payments is reduced or eliminated.

Fixing of import quotas is another and perhaps a better device used for correcting an adverse balance of payments. Under the quota system the government may fix and permit the maximum quantity or value of a commodity to be imported during a given period by restricting imports though quota system. Deficit is reduced or eliminated and thereby the balance of payments position is improved.

As direct method of correcting disequilibrium in the balance of payments, import quota is assumed to be better than import duties. Quotas have immediate action of restricting imports as the marginal propensity to import becomes zero once the quota limit is reached. Thus the effect of quotas on quantitative restriction of import is explicit. But the balance of payments effects of imports duties are not so certain.

b) Tariffs

It will not be very effective in reducing imports when the demand for imports is inelastic. Further tariffs are rigid and less flexible because tariffs are a budgetary phenomenon subject to parliamentary control. Quotas on the other hand can be more easily changed without resorting to legislation. Quota system, particularly bilateral quota, is more suitable for negotiation of trade concessions and mutual agreements with other nations but in other respects tariffs have their own merits such as they bring revenue to the state and preserve competitive market conditions as against quotas which bring no revenues and breed monopolistic position among importers. Besides, the distribution of quotas may involve corruption and discrimination. A prudent government thus adopts both the measures simultaneously to achieve its goal along with these measures the government of a deficit country has to formulate and implement export promotion policies and programmers. Export duties may be reduced, export bounties may be provided and subside to exporting industries may be given as incentives for exports. Import substitution producing industries may be induced and encouraged by the state to be more self – sufficient and less reliant on imports.

All these non-monetary measures are however, considered more effective, significant and are normally applicable than monetary measures in correcting the adverse balance of payments.

c) Export promotion programmes

It is perhaps the best solution of correcting the disequilibrium in the balance of payment. Devolution of currency may be resorted to only under abnormal conditions.

Above all what is basically needed for correcting the long term deficits in the balance of payments of under-developed counties is large-scale direct export promotion measures properly planned and executed and ever-increasing effects to mould the structure of their exports, with the diversification of supply of exportable commodities as per the changing pattern of pattern of worlds demand.

Chapter Four

4. Theories of the Balance of Payments Measurements

a. The absorption approach

The original Keynesian balance of payments theory was the absorption model developed by Alexander, of the IMF, in the early 1950s. **As** in all Keynesian models, the balance of payments, on current account, is analyzed as a macroeconomic phenomenon in the goods market. The (current account) balance of payments will necessarily equal the difference between aggregate domestic output and aggregate domestic expenditure (with a surplus if output is larger and vice versa). This conclusion follows from a manipulation of the basic national income identity, which is that there are three ways of measuring national income: income, output (0) and expenditure (E), of which only the latter two are relevant here.

$O = E$ _____(4.1)

The expenditure is defined as the sum of consumers' expenditure (C), investment (I), government expenditure (G) and exports (X) less import (M).

$E = C + I + G + X - M$ _____(4.2)

(4.2) can be substituted into (4.1) to give

$O = C + I + G + X - M$ _____ (4.3)

Can be arranged as

$X - M = O - (C + I + G)$_____ (4.4)

This piece of manipulation is the ***absorption approach***. Alexander called (C + I + G) absorption rather than the more usual 'total domestic expenditure'. The implication of the approach is simple. One should not seek to explain the balance of payments directly, rather one should look at the determinants of output and total domestic expenditure and the balance of payments will be automatically defined as a residual.

Competitiveness, the exchange rate and any other factor will matter only in so far as it influences either TDE or output. These effects may be substantial or small but, critically, they may be apparently perverse. Devaluation will increase expenditure, and may even reduce output (or output may already be at a maximum). In this case, devaluation would worsen the balance of payments, irrespective of the size of elasticities.

The traditional approach ignored supply side effects and income effects. The absorption approach looks only at these two effects. The two approaches can be combined. It is also interesting to note that two of the basic implications of this approach, but not the conclusion, are included in the most elementary textbooks. It is common to see statements like:

1. Deflation can improve the balance of payments.
2. Devaluation can improve the balance of payments but only if it is 'made to work' by deflation. (Strictly assuming output is fixed). However, the obvious conclusion is not drawn.
3. The balance of payments can only be improved if there is deflation.

Deflation lowers TDE so it will improve the balance of payments. However, it will reduce output as well, so the improvement in the balance of payments will be less than the reduction in expenditure.

As the absorption approach is the open economy version of the Keynesian model, this is usually illustrated by an analysis in which output is demand determined. In this case output is X + (1 - m) (C + I + G), where m is the marginal propensity to import, i.e. output is that which is necessary to satisfy export demand plus the part of home demand not spent on imports. In this case, the fall in output is (1 - m) times the fall in expenditure; exports are taken to be exogenous. This fall in output is obviously less than the fall in expenditure (unless m is negative).

The improvement in the balance of payments is m times (the fall in expenditure).

In effect, a reduction in (C + I + G) automatically reduces imports and so improves the balance of payments. This conclusion is perhaps obvious and the analysis simplistic, but like so many other obvious facts, it took economists to point it out! (In such models, it is necessary for m to be less than 1 otherwise the model is unstable; this is not demonstrated as the model is only illustrative and it is difficult to see how m could exceed 1, so long as other influences are properly specified.)

The next statements, (2) and (3) above are very easy to demonstrate,

So ***long as output is fixed,*** an improvement in the balance of payments must be accompanied by a reduction in expenditure. Even if output can rise, it is necessary to ensure that output rises by more than expenditure. In both cases, any impact of devaluation will be negated by income effect unless expenditure is controlled by deflationary policies. Absorption analysis can be used to demonstrate this formally and to put into the appropriate framework statements made at a

more elementary level. This is not its sole merit as it is a very flexible framework into which almost any analysis can be put. One of the most common and useful involves the concepts of 'expenditure switching' and 'expenditure reducing'. These would be better named 'output switching' and 'output reducing'. The balance of payments can be improved by either:

1. A reduction in expenditure (absorption), without a fall in output (expenditure switching)
2. A reduction in expenditure accompanied by a fall, although smaller, in output.

In summary:

The absorption approach was first presented by Alexander (1952). He sought to look at the balance of trade from the point of view of national income accounting. It is useful in pointing out that an improvement in the balance of trade calls for an increase in production relative to absorption.

When unemployed resources exist, the following mechanism is visualized: the effect of devaluation is to increase exports and decrease imports. This in turn causes an increase in production (income) through the multiplier mechanism. If total expenditure rises by a smaller amount, there will be an improvement in the balance of trade. Thus, the balance is set to be identical with the real hoarding of the economy, which is the difference between total production and total absorption of goods and services, and therefore equal to the accumulation of securities and/or money balances. In the presence of unemployment, therefore, devaluation not only aids the balance of payments, but also helps the economy move towards full employment and is, therefore, doubly attractive.

Suppose, however, that the country is at full employment to begin with. It cannot hope to improve its trade balance by increasing real income. Here, it has to depend on its ability to reduce absorption. How can devaluation achieve this? Alexander argued that the rise in the price level consequent upon the devaluation would tend to discourage consumption and investment expenditures out of a given level of income. One way this will happen is through the real balance effect - a reference to the public's curtailment of expenditure in order to rebuild their stock of real cash balances that was diminished by the increase in the price level.

However, under conditions of full employment, devaluation cannot be expected to produce, by itself, the desired extent of change in the overall balance. The reduction in the public's expenditure in order to build their money balances will have to be supplemented by domestic

deflationary policies, the so-called ***expenditure-switching and expenditure-reducing policies***. This, of course, is because the balance of trade cannot be improved through a rise in the output level.

The absorption approach can be said to work only in the presence of unemployed resources.

The absorption approach is a significant improvement over the special case of the elasticities approach in one important sense; this is its view of the external balance via national income accounting. In this manner, the approach relates the balance to the happenings elsewhere in the economy rather than taking the partial equilibrium view of the special case of the elasticities approach in analyzing the external sector in isolation.

b) The elasticity theory of BOP

The elasticities approach applies the Marshallian analysis of elasticities of supply and demand for individual commodities to the analysis of exports and imports as a whole. It is spelled out by Joan Robinson (1950).

Robinson was mainly concerned with the conditions under which devaluation of a currency would lead to an improvement in the balance of trade. In this context, it is generally assumed that exports depend on the price of exports, and imports depend on the price of imports. These relations are then translated into elasticities, by differentiating the above equation with respect to the exchange rate. A criterion for a change of the balance of trade in the desired direction can be established, assuming that export and import prices adjust to equate the demand for and supply of exports and imports.

The effect of devaluation on the trade balance depends on four elasticities: the foreign elasticity of demand for exports, and the home elasticity of supply, the foreign elasticity of supply of imports, and the home elasticity of demand for imports. For the special case where it is assumed that the trade balance is initially zero and that the two supply schedules are infinitely elastic, the elasticities condition for the impact of a devaluation to be an improvement in the trade balance is that the sum of the demand elasticities exceeds unity. This has been termed the ***Marshall-Lerner condition***.

What are the effects of a depreciation or devaluation on the current account?

We assume the prices of goods and services are fixed so that changes in the nominal exchange rate imply corresponding changes in the real exchange rate; (i.e. we assume that the supply

elasticities for the domestic export good and foreign import good are perfectly elastic so that changes in demand volumes have no effect on their price).

Current account:

$$CA = P \times X - eP^* \times M$$

Where P (P^*) is the domestic (foreign) price level; '**e**' is the nominal exchange rate; 'X' is the volume of domestic exports; 'M' is the volume of domestic imports.

We have that X depends positively on the exchange rate: $\frac{\mathbf{dX}}{\mathbf{de}} > \mathbf{0}$. When the exchange rate depreciates foreign residents and domestic goods cheaper.

We have that M depends negatively on the exchange rate: $\frac{\mathbf{dX}}{\mathbf{de}} < \mathbf{0}$. When the exchange rate depreciates domestic residents and foreign goods more expensive.

We define the price elasticity of demand for exports as the percentage change in exports over the percentage change in prices (here the nominal exchange rate): $\mathbf{ɲ_x = \frac{dx}{X} / \frac{de}{e}}$

Similarly for imports: $\mathbf{ɲ_m = \frac{dm}{M} / \frac{de}{e}}$

Now we want to examine the effect of a change in the nominal exchange rate on the current account.

$$\frac{\boldsymbol{dCA}}{\boldsymbol{de}} = \frac{\boldsymbol{dx}}{\boldsymbol{de}} - \boldsymbol{e}\frac{\boldsymbol{dm}}{\boldsymbol{de}} - \boldsymbol{M}$$

Suppose that we are initially in a balanced current account, $X = eM$. Divide both sides by M :

$$\frac{\boldsymbol{dCA}}{\boldsymbol{de}}\frac{\mathbf{1}}{\boldsymbol{M}} = \frac{\boldsymbol{dx}}{\boldsymbol{de}}\frac{\boldsymbol{e}}{\boldsymbol{M}} - \frac{\boldsymbol{e}}{\boldsymbol{M}}\frac{\boldsymbol{dm}}{\boldsymbol{de}} - \mathbf{1}$$

So that: $\frac{\boldsymbol{dCA}}{\boldsymbol{de}}\frac{\mathbf{1}}{\boldsymbol{M}} = ɲ_{\boldsymbol{X}} + ɲ_{\boldsymbol{m}} - \mathbf{1}$

Marshall-Lerner condition says that, starting from a position of equilibrium in the current account, depreciation will improve the current account only if the sum of the two elasticities is greater than unity.

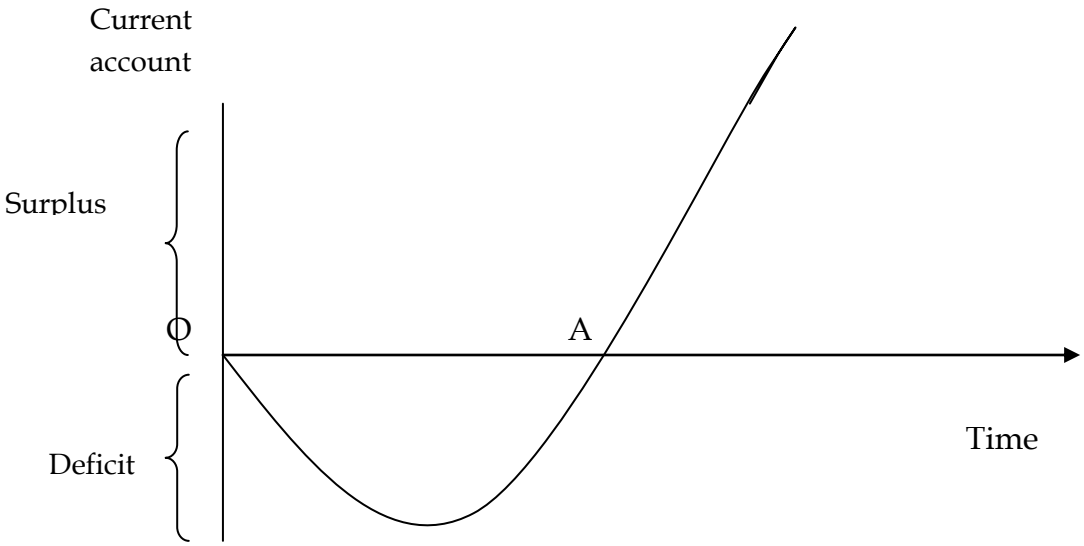
This brings two possible effects:

1) Price effect contributes to a worsening of the current account because imports become more expensive: for a given M, we have that eM increases.

2) Volume effect contributes to improving the current account because exports become cheaper from a foreign country's perspective: "X increasing and decreasing M.

J-curve: In the short-run, the Marshall-Lerner condition might not hold. In the short-run exports and imports volume do not change that much, so that the price effect dominates leading to a worsening of the current account following a depreciation of the exchange rate. The evolution of the current account following depreciation is illustrated by a J-curve.

Not only are short-run elasticities in international trade likely to be much smaller than long-run elasticities, but a nation's trade balance may actually worsen soon after a devaluation or depreciation, before improving later on. This is due to the tendency of the domestic-currency price of imports to rise faster than export prices soon after the devaluation or depreciation, with quantities initially not changed every much. Over time, the quantity of exports rises and the quantity of imports falls, and export prices catch up with import prices, so that the initial deterioration in the nation's trade balance is halted and then reversed.



Starting from the origin and a given trade balance, a devaluation or depreciation of the nation's currency will first result in a deterioration of the nation's trade balance before showing a net improvement (after time A).

c) The monetary theory of balance of payment (MABoP)

The MABP, which regards the balance of payments as a —monetary phenomenon, expresses the relationship between a country's balance of payments and its money supply (Chacholiades, 1990:463). MABP shows that the overall balance of payments (measured by international

reserves) is influenced by imbalances prevailing in the money market. Furthermore, it argues that there is disequilibrium in the money market if there are surpluses and deficits in the balance of payments. Deficits are caused by money supply exceeding money demand, while surpluses are caused by money demand exceeding money supply (Howard & Mamingi, 2002). Under a system of fixed exchange rates, excess money supply induces increased expenditure, hence increased domestic demand for foreign goods and services. The high domestic demand needs to be financed by running down foreign exchange reserves, thereby worsening the balance of payments. The outflow of foreign exchange reserves reduces money supply until it is equal to money demand, thereby restoring monetary equilibrium and halting an outflow of foreign exchange reserves. An excess demand for money leads to an opposite adjustment, which in turn induces foreign exchange reserves inflow, and hence causes a BOP surplus. This triggers domestic monetary expansion and eventually a restored balance of payments equilibrium position.

The formal MABP model includes money supply and money demand functions and an equilibrium condition. The model consists of the following set of equations:

$$Ms = (R + D) \quad (1)$$

$$Md = f(Y, P, I) \quad (2)$$

$$Ms = M = Md \quad (3)$$

Where Ms =Money supply, Md= Money demand, R= foreign reserve (NFA), D= domestic credit (NDA), Y= real domestic income, P= price level, M= money market equilibrium.

Where, NFA represents Net Foreign Assets and NDA represents Net Domestic Assets including domestic credit and liabilities.

Where, NFA = Foreign Asset - Foreign Liabilities - includes international reserves, export and import, net capital inflow and outflow, etc.

NDA = Domestic Credit - Domestic Liabilities- in which domestic credit incorporates all sorts of credit or loans provided by the banking system to the public and private sectors of the domestic economy.

Equation 1 shows that money supply is determined by the availability of international reserves and the level of domestic credit created by the country's monetary reserves, while Equation 2

sets out the real demand for money as a function of real income, the inflation rate and the interest rate. The monetary theory states that there is a positive relationship between money demand and income ($\frac{\partial M^d}{\partial Y} > 0$) and, money demand and the price level ($\frac{\partial M^d}{\partial P} > 0$), and a negative relationship between money held and the interest rate ($\frac{\partial M^d}{\partial I} > 0$). If interest rates are increased, people will demand less money as the opportunity cost of holding cash balances is increased, thus creating incentives for investing in interest-bearing securities. Equation 3 is the equilibrium condition in the money market.

By combining Equations 1, 2 and 3, and making reserves as the dependent variable, the reserve flow equation can be written as follows, with the variables expressed in percentage changes:

$$\Delta K = \Delta[f(Y, P, I)] - \Delta \quad ---------- (4)$$

Equation 4 is the fundamental monetary approach to balance of payments equation. It shows that foreign reserves (BOP) represent the deviation in growth of money demand from the growth of domestic credit with the monetary consequences of the balance of payments bringing the money market into equilibrium. The international reserves equalize the changes in domestic credit and the coefficient of ΔD is recognized as an offset coefficient. It shows the extent to which changes in domestic credit are offset by changes in international reserves, and the coefficient assumes a negative sign for MABP in the reserve flow equation (Dhliwayo, 1996).

The MABP claims that balance of payments deficits result in decreases in the money supply as a consequence of a loss in international reserves. This loss in reserves will only be temporary, however, provided that monetary authorities do not completely sterilize them. Many small economies experience persistent deficits in their balance of payments because authorities use "credit policies and expenditure policies to maintain levels of output and employment" (Howard & Mamingi, 2002:218).

In summary:

To say that something is essentially a monetary phenomenon means that money plays a vital role, but does not imply that only money plays a role. The monetary approach takes explicit account of the influence of real variables such as levels of income and interest rates on the behavior of the balance of payments.

In general, the approach assumes full employment and emphasizes the budget constraint imposed on the country's international spending. It views the current and capital accounts of the balance of payments as the windows to the outside world, through which an excess of domestic stock demand for money over domestic stock supply of money, or of excess domestic stock supply of money over domestic stock demand for money, are cleared. Accordingly, surpluses in the trade account and the capital account, respectively, represent excess flow supplies of goods and of securities, and as excess domestic demand for money. Consequently, in analyzing the money account, or more familiarly, the rate of increase or decrease in the country's international reserves, the monetary approach focuses on the determinants of the excess stock demand for, or supply of, money.

This theory divides the country's monetary base into foreign assets and domestic assets of the monetary authorities. An increase in foreign assets of the central bank is achieved when the central bank purchases foreign exchange or gold. Under pegged exchange rates, the central bank buys foreign exchange in order to prevent the national currency from appreciating in the foreign exchange market. The central bank's purchase of foreign assets increases its domestic monetary liabilities by the same amount.

An increase in domestic assets of the central bank is achieved when the central bank purchases bonds from the fiscal branch of the government (the treasury), or from the public. The central bank's purchases of domestic assets (e.g., bonds) increases its domestic monetary liabilities, i.e., the monetary base, by the same amount. The excess supply of money has to be matched by an equivalent excess demand for goods and/or securities. This is because the budget constraint deems that the public's flow demand for goods, securities, and money - assuming that these three encompass all that the public demands - should add up to the public's total income. Therefore, with an unchanged level of income, an excess supply of money has to be matched by an equivalent excess demand for goods and/or securities. Viewing the economy as a whole, what does the excess demand for goods and securities imply? In a closed economy, an excess demand for goods would lead to an increase in the domestic price level and a consequent fall in the real money balances the public holds.

An excess demand for securities would increase their price (decrease the interest rate), increasing desired money balances. Price and interest rate changes eventually cause the existing

nominal money supply to be willingly held by the public. However, in a small open economy with fixed exchange rates, the domestic price level has to maintain at parity with the price level in the rest of the world, and the domestic price of securities (and therefore the interest rate) is determined by the price of securities (and therefore the interest rate) in the world as a whole. So, in the absence of sales of domestic assets by the central bank, the desired level or real money balances is achieved by importing goods and/or securities from abroad. This creates a deficit in the money account, resulting in a fall in foreign assets of the central bank and, therefore, in the money supply.

The monetary approach is seen to have an appreciation of the inter-related nature of the various markets. The monetary approach insists that when one market is eliminated from a general equilibrium model by Walras' law, the behavioral specifications for the included markets must not be such as to imply a specification for the excluded market that would appear unreasonable if it were made explicit. The monetary approach focuses on stock and flow equilibrium, with emphasis on stock equilibrium for money. In this way it considers inter-relationships among various markets and, therefore, the inter-relationship between stock and flow equilibrium. The stock-flow consideration of the monetary approach is in fact the essential difference between the monetary approach and the elasticities and absorption approaches, where the latter two consider the flow equilibrium only.

The monetary approach, like the absorption approach, stresses the need for reducing domestic expenditure relative to income, in order to eliminate a deficit in the balance of payments. However, whereas the absorption approach looks at the relationship between real output and expenditure on goods, the monetary approach concentrates on deficient or excess nominal demand for goods and securities, and the resulting accumulation or decumulation of money.

Putting just monetary assets rather than all assets below the line contributes to the simplicity of the monetary approach. Other things being equal, growth in demand for money, and of factors that affect it positively should lead to a surplus in the balance of payments. Growth in domestic money, other things being equal, should worsen it. Thus, the growth of real output in a country with constant interest rates causes its residents to demand a growing stock of real and nominal cash balances. This means that the country will run a surplus in the balance of payments. In order to avoid a payments surplus, the increase in money must be satisfied through domestic

open market operations. To produce a deficit, domestic money stock must grow faster than the growth of real income.

This analysis suggests that if a country is running a deficit, then assuming that the economy is growing at its full-employment growth rate with a given rate of technological progress, it should curtail its rate of domestic monetary expansion. Use of other measures like the imposition of tariffs, devaluation or deflation of aggregate demand by fiscal policy can succeed only in the short run.

The decision on which variables are exogenous and which are endogenous is made in the following manner: real income is assumed exogenous in the long run. In addition, in the long-run, prices and interest rates are exogenous for small countries. Thus, the quantity of money demanded is exogenous. The monetary approach assumes that the domestic assets component of the monetary base is unaffected by balance of payments flows. This (the domestic assets) is the variable which the monetary authorities control, and, thereby, indirectly control the balance of payments.

Under fixed exchange rates, a small country controls neither its price level nor quantity of domestic money in anything but the short run. Its money supply is endogenous, and what it controls by open market operations is simply the international component of the monetary base.

In a system of flexible exchange rates, the focus of analysis shifts from determination of the balance of payments to the determination of the exchange rate.

So far, we have ignored financial flows. The BOP analysis becomes more complex when the capital account is taken into consideration. When the official reserve account (OR) is small, the KA provides the other side of the CA. That is,

KA = -CA.

A CA surplus equals a KA deficit. For example, in 1979, Kuwait was earning much more on its oil exports than it was spending on imports. Since it was earning more than it was spending, it was accumulating foreign IOUs, or financial assets, in the form of bank deposits in New York and other financial centers. By looking at the KA, we can see that when the CA is in a deficit, then the country is either accumulating debt or else running down its current stock of foreign assets. If the CA is in surplus, then the country is either repaying debt or building up its stock of foreign assets.

The monetary approach to the BOP incorporates international financial flows to the model. The monetary approach views any BOP disequilibrium as a monetary disequilibrium, which is manifested through the capital account.

Under fixed exchange rates, the intuition of the monetary approach to the BOP is very simple: if the central bank is supplying more money than what domestic residents demand, the excess supply will be eliminated through capital outflows. Given the excess supply of money, domestic prices increase. Foreign goods become relatively cheaper. Since the exchange rates are fixed, the excess money supply leaves the country as capital outflows until domestic prices get to the level of the rest of the world. At that point, equilibrium is achieved again. On the other hand, when there is an excess money demand in the domestic country, the country will receive an inflow of capital. That is, under fixed exchange rates, international capital flows adjust monetary disequilibria.

Under flexible exchange rates, the adjustment mechanism is different. Recall that the KA includes financial transactions associated with international trade as well as flows associated with portfolio shifts involving the purchase of foreign stocks, bank deposits, and bonds. The KA is assumed to depend on the interest rate differential. Since investors only care about returns denominated in their home currency, the KA also depends on St. Thus,

KA = f(id-if, St).

To see how the above equation works, suppose the BOP is in equilibrium. Assume that domestic interest rates increase relative to foreign interest rates, that is, id-if increases. Foreign and domestic investors will attempt to substitute foreign denominated assets by domestic denominated assets, which in turn might lead to a capital inflow. Demand for domestic currency increases and therefore the domestic currency appreciate. This appreciation will bring the BOP back to equilibrium, since foreign assets and goods become cheaper than domestic assets and goods. That is, under flexible exchange rates, changes in the level of exchange rates adjust monetary disequilibria.

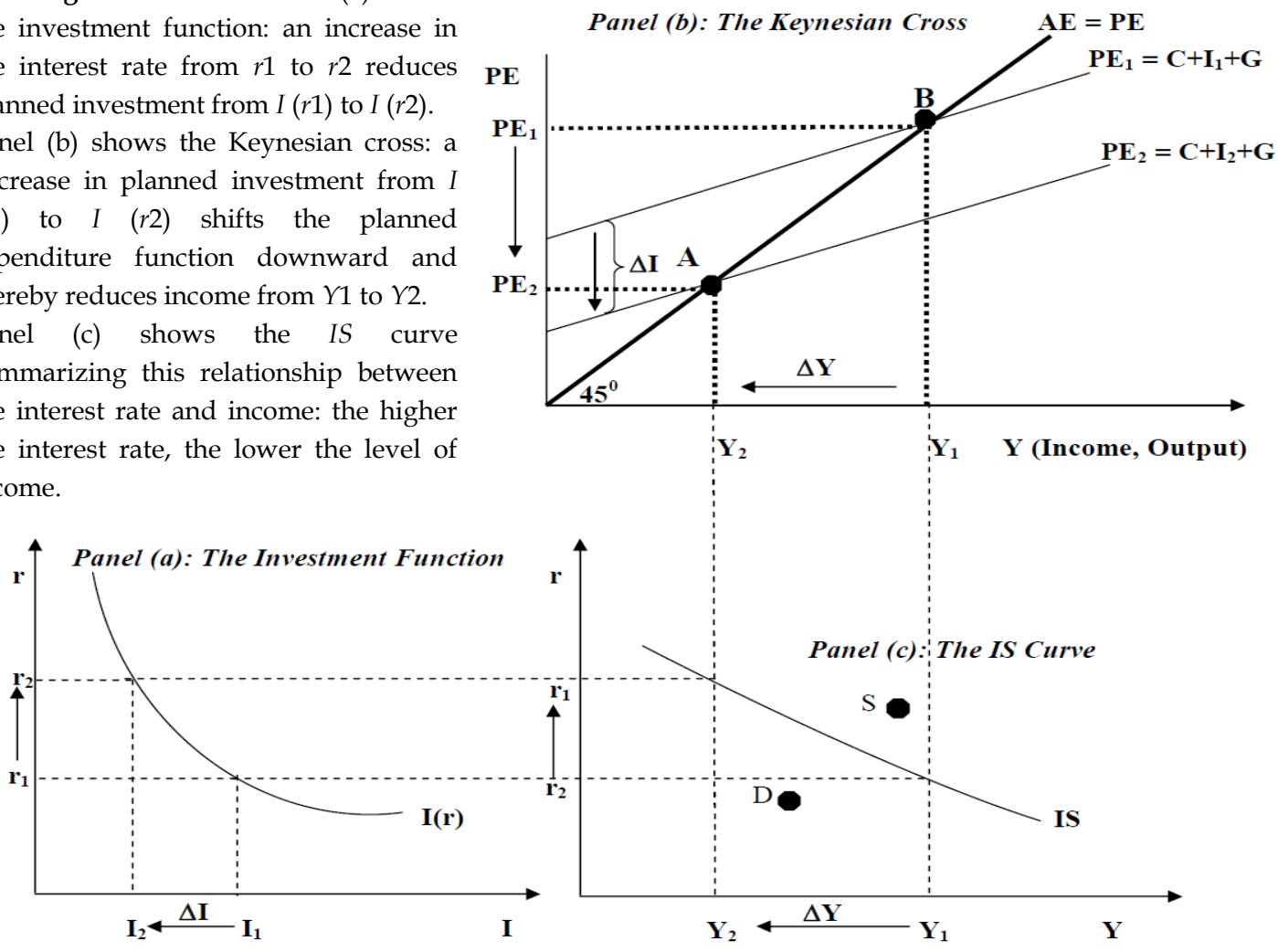
1. Brief review of equilibrium in the goods market and the money market

In this chapter, we are now introduce the Muldel-fleming model to shows how a nation can use fiscal and monetary policies to achieve both internal and external balance without any change in the exchange rate.

The new tools of analysis take the form of three curves:

i. **IS- curve**, it shows all the points at which the goods market is in equilibrium. The IS curve shows the combinations of the interest rate (i) and the level of income (Y) that are consistent with equilibrium in the market for goods and services. The goods market is in equilibrium whenever the quantity of goods and services demanded equals the quantity supplied or the IS curve represents the equilibrium points in the goods market: the combinations of r and Y for which investment (I) is equal to saving (S).

Deriving the *IS* Curve Panel (a) shows the investment function: an increase in the interest rate from *r*1 to *r*2 reduces planned investment from *I* (*r*1) to *I* (*r*2). Panel (b) shows the Keynesian cross: a decrease in planned investment from *I* (*r*1) to *I* (*r*2) shifts the planned expenditure function downward and thereby reduces income from *Y*1 to *Y*2. Panel (c) shows the *IS* curve summarizing this relationship between the interest rate and income: the higher the interest rate, the lower the level of income.



- The IS curve is basically affected by **fiscal policy** (↑↓ in T and G)

- **Expansionary** fiscal policy shifts the **IS** line to the **right**
- **Contractionary** fiscal policy shifts the **IS** line to the **left**

The IS curve is negatively inclined because lower rates of interest (and higher investments) are associated with higher incomes (and higher savings and imports) for the quantities of goods and services demanded and supplied to remain equal.

- IS: Y = C (Yd) + I(r) + G + NX(Y, Y*, *R*)……(1) where
- NX = $x_1Y^* + x_2R - m_1Y + m_2R$

Because:

Export (X) depends on the exchange rate $e = \frac{birr}{\$} or\ e = \$/birr$, international price ($P_f$) and domestic price (P). Real exchange rate (R) was defined as $e^{P}/_{P^f}$. Thus; our export depends simply on real exchange rate. If the real exchange rate is high, foreign goods are relatively cheap, & domestic goods are relatively expensive and net exports are lower (since X will fall). If real exchange is low, foreign goods are relatively expensive, and domestic goods are relatively cheap & hence export will rise. In general, R and X are inversely related. However, R is positively related with e and P and inversely related with P^f. Thus, export should relate to e & P indirectly & to P^f directly, i . e.

- If $'e'$ is large the value of domestic currency appreciates and hence export will fall (since income from export falls in local currency with higher \$/Birr-e). $DX/de<0$.
- If domestic goods are less expensive to foreign goods (i.e. lower domestic price relative to P^f), revenue from export of goods will rise. Thus, export is positively related with P^f & inversely related to P.

In general, the export function is given as:

$X = x\ (Y^*, e, (\frac{eP}{P^f})$, where $\frac{\partial X}{\partial P} < 0\ , \partial X/\partial Y^* > 0$, and $\frac{\partial X}{\partial P^f} > 0 ------(2)$

Imports (M) also depend on the country's level of income (Y), e, P and P^f. An increase in e (= \$/Birr) will increase the foreign price (P^f) of domestic goods (at a given P), and increase imports. An increase in P will raise the price of domestic goods that compete with imports,

tending to increase import. Obviously, as income increases, the demand for imported goods also increases. Thus, the import function is:

$M = m(Y, \mathrm{e}\frac{\mathrm{P}}{\mathrm{P^f}})$ Where $\frac{\partial M}{\partial Y} > 0, \frac{\partial M}{\partial e} > 0, \frac{\partial M}{\partial P} > 0,$ & $\frac{\partial M}{\partial Pf} < 0$----------(3)

Now substituting equation (2) and (3) into the left-hand side of expression (1a), we get a trade balance (current account-CA- balance) as:

NX=CA= $x\left(e, \mathrm{Y}*, \mathrm{e}\frac{\mathrm{P}}{\mathrm{P^f}}\right) - M(Y, \mathrm{e}\frac{\mathrm{P}}{\mathrm{P^f}})$ ……..…… (4)

Once we plug the above into the IS equation we get:

Thus, finally the IS curve:

$$Y = \alpha + cY_d + \bar{I} - br + G + x_1 Y^* + x_2 R - m_1 Y + m_2 R$$

$$Y = \frac{1}{1 - c(1-t) + m_1}(\alpha + cY_d + \bar{I} - br + G + x_1 Y^* + RV)$$

Where $V = x_2 + m_2$ is the real exchange rate elasticity of net export.

ii. **LM**- curve shows the various combinations of interest rates (i) and national income (Y) at which the demand for money is equal to the given and fixed supply of money, so that the money market is in equilibrium. Money is demanded for transactions and speculation purposes. The transaction demand for money consists of the active working balances held for the purpose of making business payments as they become due.

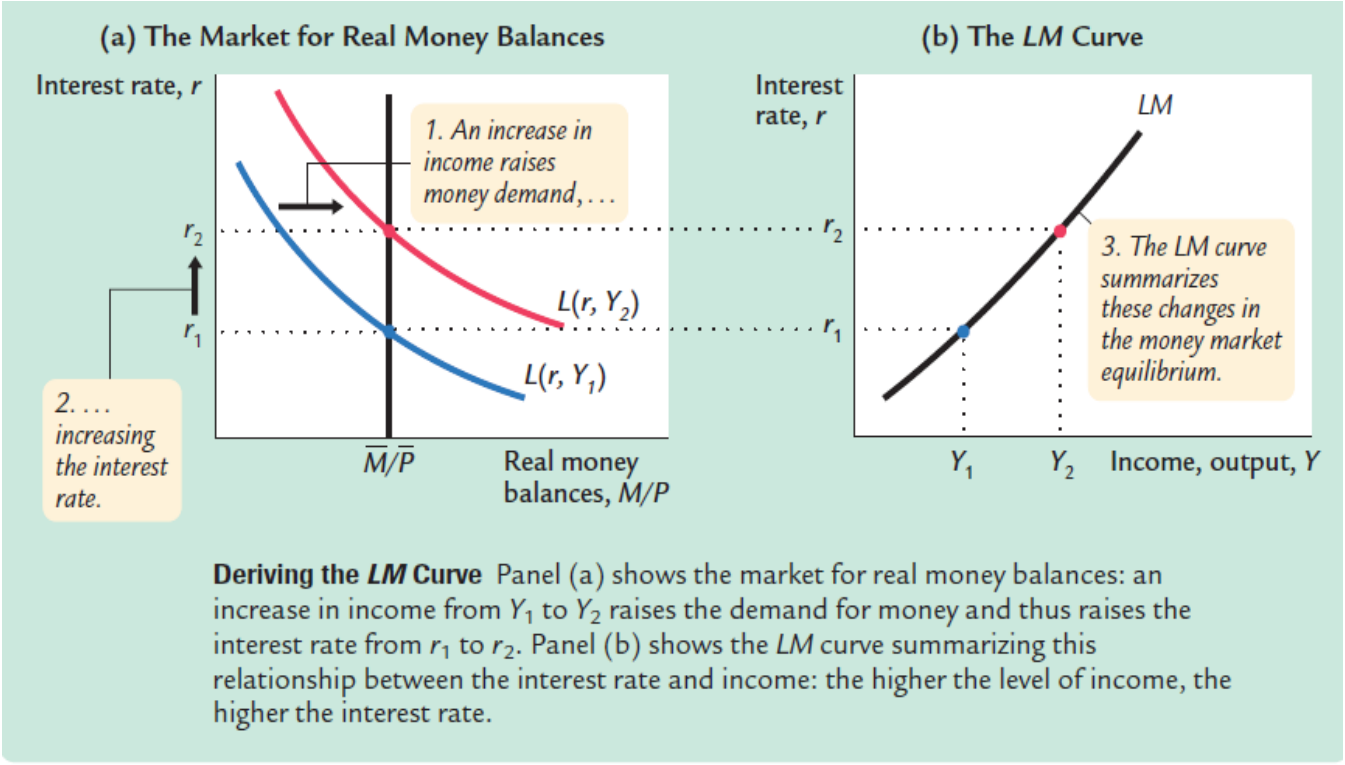
The transaction demand for money is positively related to the level of national income, since as income increase the volume of transaction increases.

The speculative demand for money arises from the desire to hold money balances instead of interest-bearing securities.

The LM schedule or money market equilibrium schedule shows all combinations of interest rates and levels of income such that the demand for real balances is equal to the supply. Along the LM schedule, the money market is in equilibrium. The LM curve is positively sloped. An increase in the interest rate reduces the demand for real balances.

To maintain the demand for real balances equal to the fixed supply, the level of income has to rise. Accordingly, money market equilibrium implies that an increase in the interest rate is accompanied by an increase in the level of income.

The LM curve is positively inclined because higher incomes (and a larger transaction demand for speculative money) must be associated with higher interest rates (and a lower demand for speculative money balances) for the total quantity of money demanded to remain equal to the given supply of money.



Deriving the *LM* Curve Panel (a) shows the market for real money balances: an increase in income from Y_1 to Y_2 raises the demand for money and thus raises the interest rate from r_1 to r_2. Panel (b) shows the *LM* curve summarizing this relationship between the interest rate and income: the higher the level of income, the higher the interest rate.

- The LM curve is basically affected by **monetary policy** (↑↓ in M)

- **Expansionary** monetary policy shifts the **LM** line to the **right**
- **Contractionary** monetary policy shifts the **LM** line to the **left**

➢ $LM: \frac{M}{P} = L(r, Y)$ ……(2)

To sum up:

Internal Macroeconomic Analysis with the IS-LM Model

- The crossing of the IS and LM curves (Y_E) will represent simultaneous short-run equilibrium in the goods and money markets.
- Whether or not that short-run equilibrium represents the full employment (Y*) of all factors of production (K and N) can be seen on the graph:

– When $Y_E < Y^*$, and therefore, $u_E > u^*$, there is a **recessionary gap**.

– When $Y_E > Y^*$, and therefore, $u_E < u^*$, there is an expansion, and an **inflationary gap**.

- Two different types of economic policies can be applied to close a recessionary gap:

- **Expansionary** fiscal policy: ↓T or ↑G (at the new equilibrium ↑Y but also ↑r)

- ↓T may be ineffective if Ricardian equivalence holds
- ↑G may cause some **crowding out** of private investment

- **Expansionary** monetary policy: ↑M (at the new equilibrium ↑Y and also ↓r)

- ↑M causes other problems, such as high inflation, not captured by this model.
- ↑M may be ineffective if there is a **liquidity trap** or inflationary expectations by households.

.1. The balance of payments

The balance of payment (BP) curve shows the various combinations of interest rates (i) and national income ((Y) at which the nation's balance of payments is in equilibrium at a given exchange rate. The balance of payments is in equilibrium when a trade deficit is matched by an equal net capital inflow, a trade surplus is matched by an equal net capital outflow, or a zero trade balance is associated with a zero net international capital flow.

We have already shown (e.g. the classical model of the open economy) that the balance of payments equals:

$BP = KA + CA = 0$: *With* CA = CA= $x\left(e, Y*, e\frac{P}{P^f}\right) - M(Y, e\frac{P}{P^f})$: which means that $CA = NX = xY* - mY + Rv$. **and**

Thus, balance of capital account or net capital inflow (K) is given as:

$$K = k\left[(r - r^*) - E(\frac{\Delta e}{e})\right], \text{, where } \frac{\Delta K}{\Delta(r - r^*)} > 0, and \frac{\Delta K}{\Delta e} < 0$$

Where *K* stays for the international mobility level of capital.

Capital mobility depends on two major macroeconomic variables:

- The magnitude of domestic interest rate(r) relative to international rate of interest (r*) - Interest rate differential (r-r*). The higher the domestic rate of interest relative to the international rate, the higher is the inflow of capital.

The expected value of exchange rate, i.e. E (Δe/e). The lower the expected value of the exchange rate (i.e. a decrease in the value of domestic currency in terms of foreign

currency), the higher is the inflow of capital. Thus, the inflow of capital is negatively related with expected value of exchange rates.

Plugging the above into equation of the balance of payments and solving for r we receive the BP curve equation:

Clearly, the BOPs or the overall foreign balance (BP) is equal to the trade balance plus the capital account balance. That is:

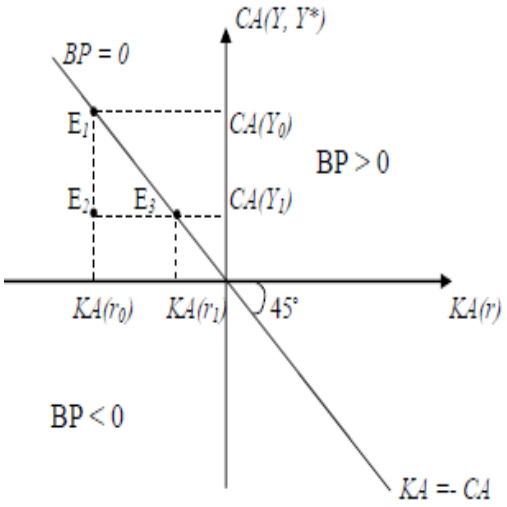
$$BP = \left[x(,Y^*, e\frac{P}{P^f}) - z(Y, e\frac{P}{P^f}) \right] + k\left[(r - r^*) - E(\frac{\Delta e}{e}) \right]$$

Here an increase in Y worsens the trade balance, and an increase in r above r* pulls in capital from abroad and hence improves the capital account. Thus, when income increases, a small rise in interest rates is enough to maintain an overall BOPs equilibrium. The trade deficit would be financed the capital inflow.

$$BP: r = r^* - (xY^* - mY + RV)/K$$

- *There is a negative relationship between domestic interest rate and domestic national income*

Balance of payments and the relation between CA and KA



All points on the right hand side of the BP curve show the balance of payments surplus (since CA + KA > 0).

• All points on the left hand side of the BP curve show the balance of payments deficit (since CA + KA < 0).

• The logic of the relation between the CA and the KA is the following:

Starting at point E1 (where the income and the interest rate equal Y0 and r0 respectively) we may see that an increase in domestic income to Y1 will lead to a fall of current account balance (import increases). Hence, we move to the point E2. Here, a balance of payments deficit must be compensated by an increased capital inflow. Therefore, the interest rate increases from r0 to r1, which leads to a decrease in the KA deficit. As a result, we move from E2 to E3.

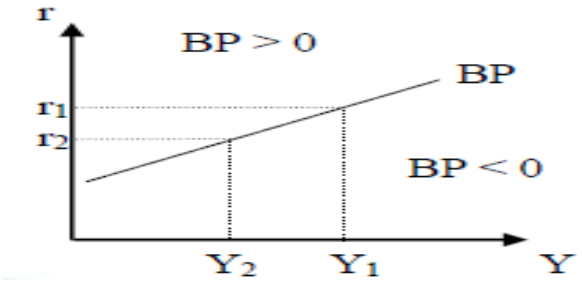
The BP curve in the IS-LM framework

The BP curve depicts different combinations of income and interest rate that assure the balance of payment equilibrium.

The BP curve is drawn for a given exchange rate and a given foreign interest rate. To derive the BP curve, start with a specific level of income, Y0. At that income level, imports are Vo. The CA (X - M) is, therefore, X - M_O. Assume this is negative (i.e. Mo > X), which means there is a deficit in the CA. To offset the deficit in the CA, there has to be a KA surplus-(i.e. K inflows). Assume that a domestic interest rate i_0 attracts sufficient capital inflows K_0 to exactly offset the Current Account deficit. Thus, at the interest rate i_0 and the income level Y_0 the Current and the Capital Accounts offset each other, and these represent, therefore, one point on the BP curve.

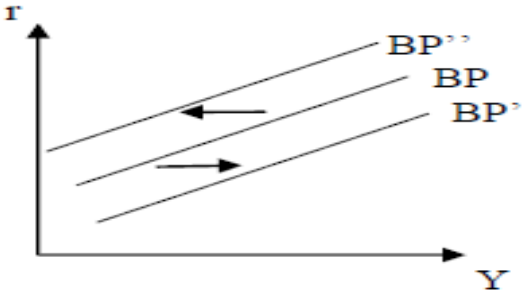
Consider a higher income level, Y_1. At Y_1, since income is higher, consumption is higher: consumption of our goods and consumption of foreign goods. Thus, at Y_1 there are imports of $M_1 > M_0$. Since X is fixed, (foreign income is constant and e is fixed), the CA is in even greater deficit than it was at income Y_0. To offset this greater deficit in the CA, there need to be greater capital inflows than what occurred at i_0. To induce more capital inflows, we need a higher domestic interest rate (remember i* is constant). Assume that the interest rate i_1 induces capital inflows of K_1 which are just sufficient to completely offset the CA deficit. Thus, i_1 and Y_1 are another combination of i and Y for which the BoP is in equilibrium, and therefore they represent another point on the BP curve.

- The points below the BP curve refer to the balance of payments deficit (e.g. an increase of income given constant interest rate will cause a fall in NX-CA).
- By analogy, the points above the BP curve refer to the balance of payments surplus



The shift of the BP curve

- The BP curve equation implies that it will shift in the IS-LM framework once there is a change of Y*, r* or q.
- A fall of Y^* and q together with an increase of r^* will shift the BP to the left to BP'' (for a given r the points at BP show now a deficit).
- An increase of Y^* and q together with a fall of r^* will shift the BP to the right to BP' (for a given r the points at BP show now a surplus).
  - ❖ $BP: r = r^* - (xY^* - mY + Rv)/K$



The slope of the BP curve

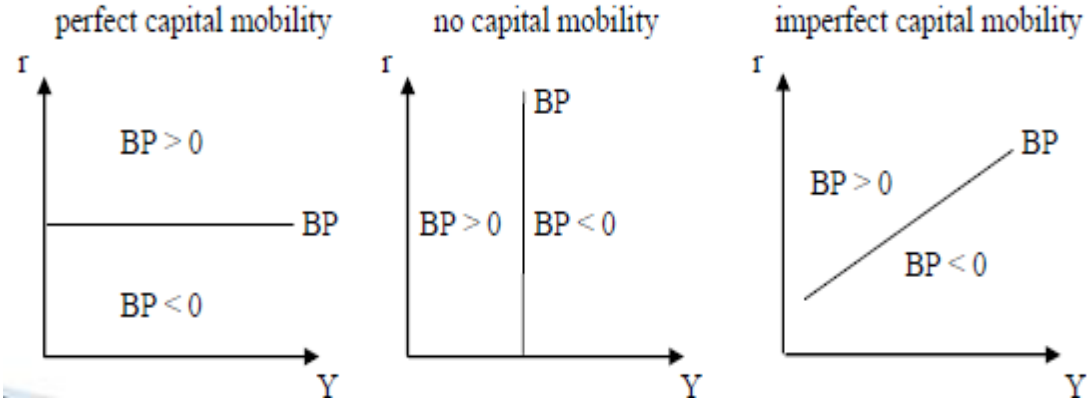
The slope of the BP curve has 3 ranges, characterizing the degree of capital mobility in the economy. The BP is perfectly horizontal when capital is perfectly mobile. This situation occurs when financial assets are perfect substitute across countries. Any small deviation in the domestic interest rate from the foreign interest rate results in an infinite amount of capital flows. If the domestic interest rate is lower than the foreign interest rate, there are infinite amounts of capital outflows. If the domestic interest rate is higher than the foreign interest rate, there are infinite amounts of capital inflows.

When capital is mobile (but not perfectly mobile), the BP curve is not perfectly horizontal, but is flatter than the LM curve (note that capital mobility in this and the following instance is relative to the LM curve). Assets are not perfect substitutes across countries. Immobile capital occurs when the BP curve is steeper than the LM curve. As you will see below, the degree of capital mobility has a bearing on the outcome of various fiscal and monetary policies.

- *The slope of BP curve depends on the international mobility level of capital (parameter K). With perfect capital mobility BP curve is horizontal because:*

$k \Rightarrow \infty$ *And* $r = r^*$

• *With no capital mobility K = 0, and BP curve is vertical (interest rate do not influence capital flows). Finally, with imperfect capital mobility BP curve is positively sloped.*



The slope of the BP line indicates the degree of capital mobility in a country

- Horizontal: perfect capital mobility
  - Domestic R = World R
- Vertical: complete capital immobility
  - Domestic R completely independent of world R
- Upward sloping: partial capital mobility
  - Domestic R differs from the world R

The equilibrium in the goods and money market and in the balance of payment with imperfect capital mobility:

The IS, LM and BP curve show the various combinations of interest rates and national income at which the goods market, money market and the national balance of payments respectively are in equilibrium.

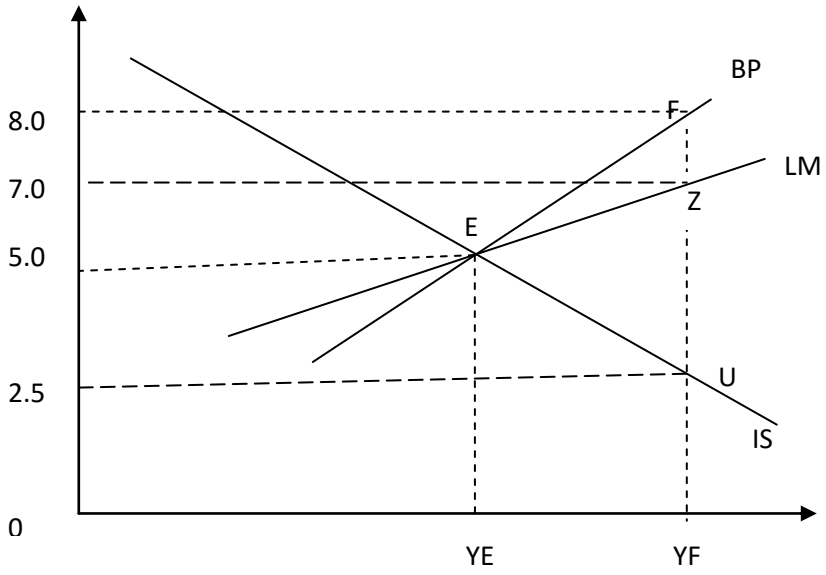
The BP curve is positively inclined because higher incomes (and imports) require higher rates of interest (and capital inflows) for the nation to remain in balance of payments equilibrium.

To the left of the BP curve, the nation has a balance of payments surplus and to the right a balance of payments deficit.

The more the responsive international short-term capital flows are to changes in interest rates, the flatter is the BP curve.

The BP curve is drawn on the assumption of a constant exchange rate. A devaluation or depreciation of the nation's currency shifts the BP curve down, since the nation's trade

balance improve, and so a lower interest rate and smaller capital inflows (or greater capital outflows) are required to keep the balance of payments in equilibrium.



One final point regarding the BP curve has to do with what happens when the economy is above (or to the left) of the curve, and what happens when the economy is below (or to the right) of the curve. If the internal equilibrium (the intersection of the IS-LM curves) is above the BP curve, then the domestic interest rate is inducing greater capital inflows than are necessary at that level of income to maintain the Balance of Payments in equilibrium. The greater than necessary capital inflows represent an additional credit, which means the BoP is in surplus (under a fixed exchange rate regime, or in incipient surplus -- a surplus about to happen -- under a flexible exchange rate regime) when the internal equilibrium is above the BP curve. Conversely, if the internal equilibrium is below the BP curve, there are insufficient capital inflows at that level of income to maintain a BoP equilibrium. In both of these cases there will have to be an adjustment made so that there is simultaneous equilibrium in the internal and the external sectors.

The adjustment to an overall equilibrium (i.e., an equilibrium in the internal and external sectors) depends on the exchange rate regime. Under fixed exchange rates, the Central Bank stands ready to buy and sell sufficient quantities of the domestic currency to keep the exchange rate fixed at an agreed upon level. Thus, the BP curve never moves under fixed exchange rates: the adjustment is done through monetary policy (i.e. movements in the

LM curve). Under flexible exchange rates, the price of foreign exchange is allowed to adjust to get the economy simultaneously to internal and external equilibrium.

When the exchange rate changes, this affects the level of net exports: as *e* increases (i.e. the domestic currency depreciates), NX rises. The change in e, and its effect on NX, affects both the IS and the BP curves (subject to the qualification below). As NX rises, the level of total expenditures increases, therefore the IS curve shifts to the right. Simultaneously, as NX rises, the Current Account improves (i.e., the Current Account equals the level of net exports: as NX rises, the CA rises -- becomes less negative). As the CA improves, the economy does not need as high a level of capital inflows at each income level as it did before, therefore, the BP curve simultaneously shifts to the right.

The one qualification about the BP curve shifting to the right when the exchange rate depreciates (i.e., e increases) has to do with the case of perfect capital mobility. When capital is perfectly mobile, if the internal equilibrium is below the BP curve, there is pressure on the exchange rate to depreciate (i.e., there is an infinite amount of capital outflows as investors seek to earn the higher rate of return they can earn on foreign assets). As e increases (depreciates), the level of NX rises, therefore, the CA-improves. The improvement in the CA is a finite number, whereas the capital outflows are an infinitely large number. Thus, under the case of perfect capital mobility, the BP does not shift when the exchange rate changes.

Fiscal and monetary policies under fixed exchange rate regime and imperfect capital mobility

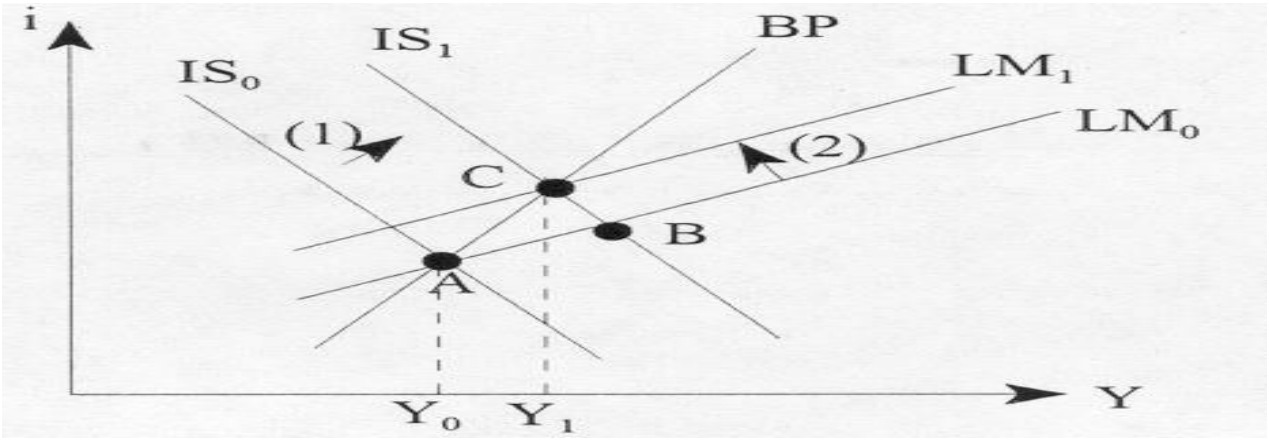
Case one: Fixed Exchange Rates, lower degree of capital mobility (BP steeper than LM), Increase in G

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0, and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the money supply is decreased: the LM curve moves to the left, the economy moves from B to C.

There has been an increase in the domestic level of output from the expansionary fiscal policy. In abbreviated notation (acceptable on tests) this would be:

↑G → ↑TE → IS right: A to B; at B: BoP deficit (below the BP curve). To maintain the fixed e, Fed buys $ and sells For. Ex. → ↓ Ms → LM left: B to C. ↑Y from Y_0 to Y_1.

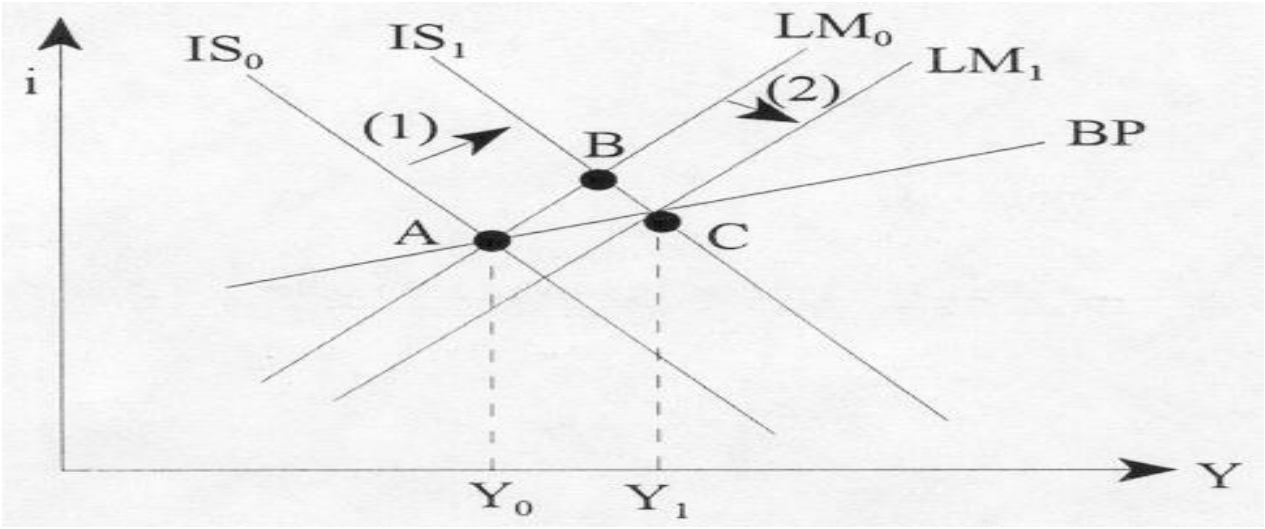
NB: Fiscal policy is effective in altering the level of domestic output under fixed exchange rates with immobile capital, but not as effective as if capital had been mobile or perfectly mobile.



Case 2: **Fixed Exchange Rates, higher degree of capital mobility (BP flatter than LM), Increase in G**

The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is a surplus in the Balance of Payments because the level of capital inflows is more than sufficient to offset the deficit in the CA that prevails at B. The surplus in the BoP means there is pressure on the exchange rate to appreciate (there is an increased demand for dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0, and therefore satisfies this demand for dollars by selling dollars and buying foreign exchange. As the Fed sells the dollars, the Money supply is increased: the LM curve moves to the right, the economy moves from B to C. There has been an increase in the domestic level of output from the expansionary fiscal policy. In abbreviated notation (acceptable on tests) this would be: ↑G → ↑TE → IS right: A to B; at B: BoP surplus (above the BP curve). To maintain the fixed e, Fed sells $ and buys For. Ex. → ↑ Ms → LM right: B to C. ↑Y from Y_0 to Y_1.

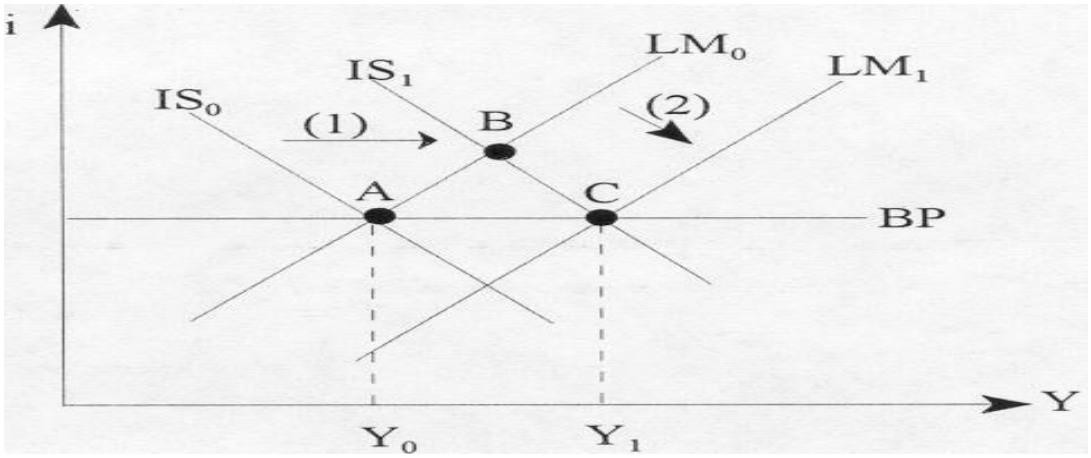
NB: *Fiscal policy is effective in altering the level of domestic output under fixed exchange rates with mobile capital, but not as effective as if capital had been perfectly mobile.*



Case 3: **Fixed Exchange Rates, Perfect Capital Mobility, Increase in G**

The increase in G means an increase in Total Expenditures, therefore the IS curve shifts to the right and the economy goes from point A to point B. At B, there are infinite capital inflows as foreign investors seek to purchase higher returning domestic assets. These investors are exchanging their foreign currency for dollars. The Federal Reserve has agreed to maintain the exchange rate at e_0, and therefore buys up the unwanted foreign exchange and sells dollars. As the Fed sells the dollars, the Money supply is increased: the LM curve moves to the right and the economy goes from point B to point C. There is a large change in Y from this fiscal expansion. In abbreviated notation (acceptable on tests) this would be: ↑G → ↑ TE → IS right: A to B at B: BoP surplus due to infinite K inflows. To maintain the fixed e, Fed sells $ and buys For. Ex. → ↑M_S → LM right: B to C. ↑Y from Y_0, to Y_1.

NB: Fiscal policy is extremely effective in altering the level of domestic output under fixed exchange rates and perfect capital mobility.

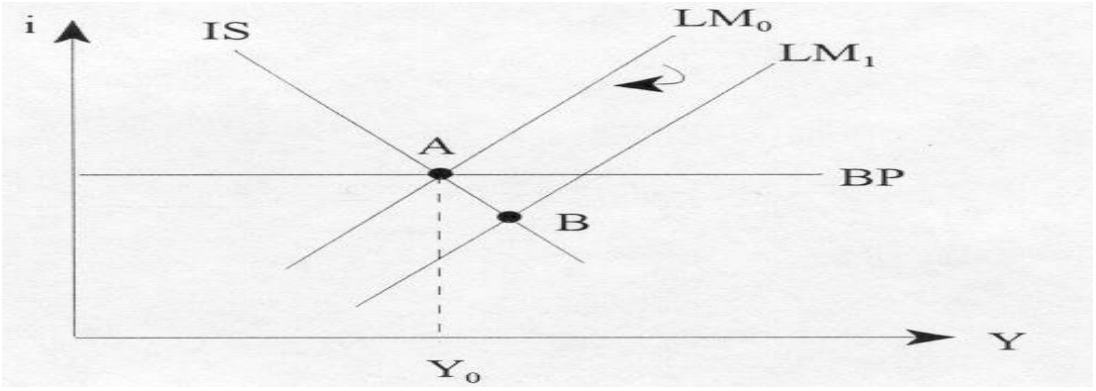


Monetary policy:

Case 1: Fixed Exchange Rates, Perfect Capital Mobility, Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right; the economy goes from point A to point B. At B, there are infinite capital outflows as domestic investors seek to purchase higher returning foreign assets. These investors are exchanging their unwanted dollars for foreign exchange. The Federal Reserve has agreed to maintain the exchange rate at e_0, and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be: ↑Ms → LM right: A to B. At B: deficit in the BoP - infinite K outflows. To relieve the pressure on the exchange rate, the Fed buys $ and sells foreign exchange : ↓ $M_{S\rightarrow}$ LM left, back to A. No change in Y and i.

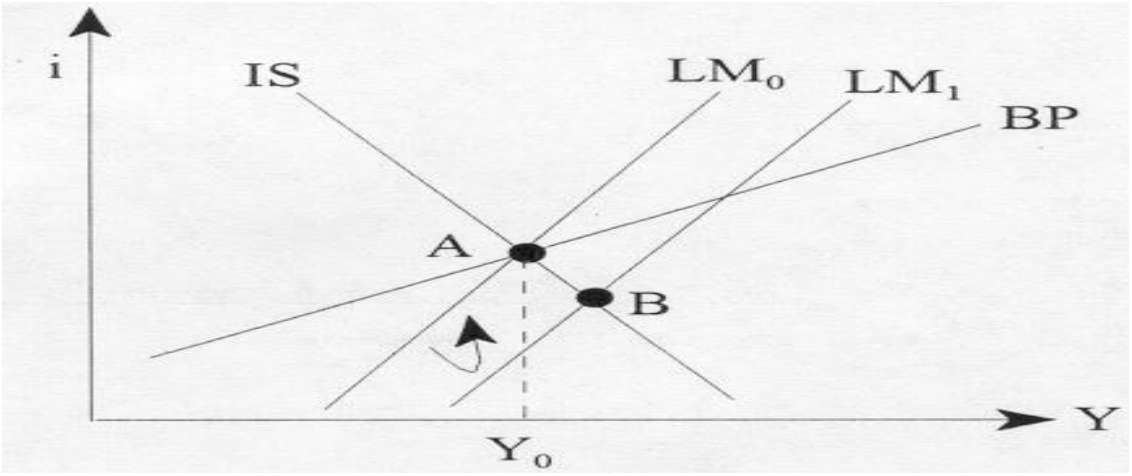
NB: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates and perfect capital mobility.



Case 2: Fixed Exchange Rates, high degree of capital Mobility (BP flatter than LM), Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right, the economy goes from point A to point B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_o, and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the Money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be: ↑Ms → LM right: A to B - at B: BoP deficit (below the BP curve). To maintain the fixed e, Fed buys $ and sells For Ex. → ↓ Ms → LM left : back to A No change in Y and i.

NB: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates with mobile capital.



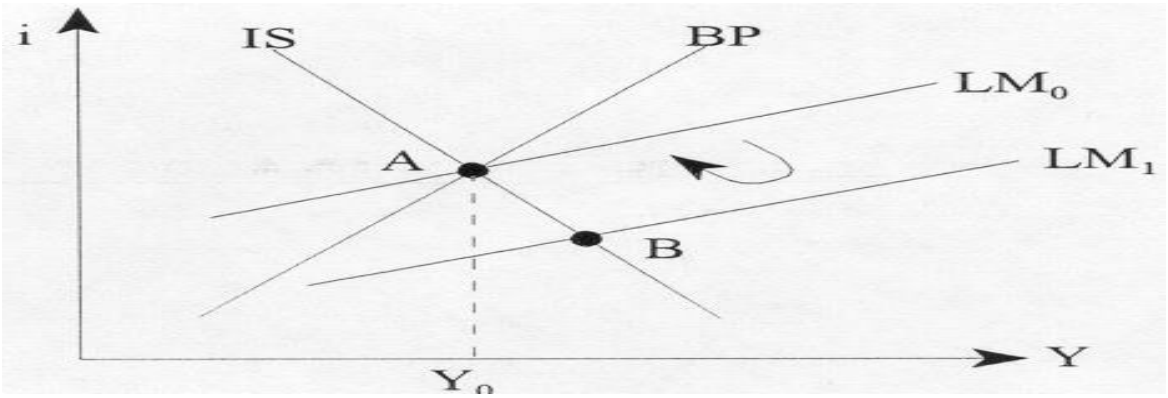
Case 3: Fixed Exchange Rates, lower capital mobility (BP steeper than LM), Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right; the economy goes from point A to point B. At B, there is a deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The deficit in

the BoP means there is pressure on the exchange rate to depreciate (there are unwanted dollars on the foreign exchange market). The Federal Reserve has agreed to maintain the exchange rate at e_0, and therefore buys up the unwanted dollars and sells foreign exchange. As the Fed buys the dollars, the Money supply is decreased: the LM curve moves to the left, coming to rest at its initial position. The economy moves back to A. There is no change in Y or i from this monetary policy. In abbreviated notation (acceptable on tests) this would be:

↑ Ms → LM right: A to B; at B: BoP deficit (below the BP curve). To maintain the fixed e, Fed buys $ and sells For. Ex. ↓ Ms → LM left: back to A. No change in Y and i

NB: Monetary policy is ineffective in altering the level of domestic output under fixed exchange rates with immobile capital.



Fiscal and monetary policies under flexible exchange rate regime

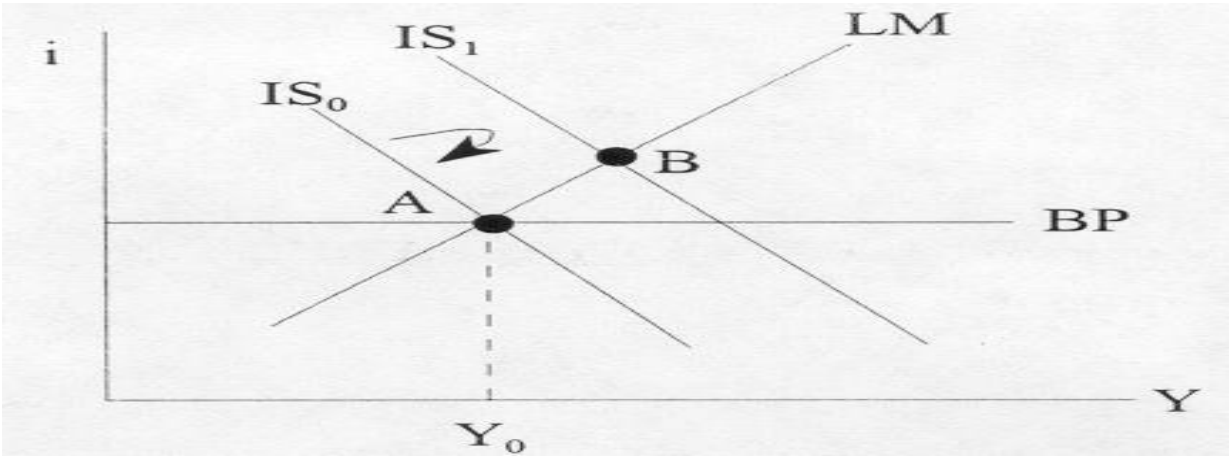
Fiscal policy:

Case 1: Flexible Exchange Rates, Perfect Capital Mobility, Increase in G

The increase in Government spending means there's an increase in Total Expenditures, therefore the IS curve shifts to the right and the economy goes from point A to point B. At B, there are infinite capital inflows as foreign investors seek to purchase higher returning domestic assets. These investors are exchanging their currency for the more desirable dollar. This increased demand for dollars causes the value of the dollar to rise on foreign exchange markets (i.e. the dollar appreciates, e decreases). As e decreases, Net Exports decrease as domestic goods become relatively more expensive on international markets. As NX decreases, Total Expenditures fall and the IS curve shifts to the left. The exchange rate will continue to appreciate, and the IS curve will continue to shift to the left until the

capital inflow is halted (i.e., until the domestic interest rate equals the foreign interest rate). The new equilibrium is at the same level of output as the initial level: the economy moves back to A. In abbreviated notation (acceptable on tests) this would be: ↑G → ↑ TE → IS right: A to B. At B : infinite K inflows → ↓ e (appreciates) as e↓ → ↓ NX → ↓ TE → IS left: back to A. No change in Y.

NB: *Fiscal policy is ineffective in altering the level of domestic output under flexible exchange rates and perfect capital mobility.*



Case2: Flexible Exchange Rates, higher degree of capital mobility (BP flatter than LM), Increase in G

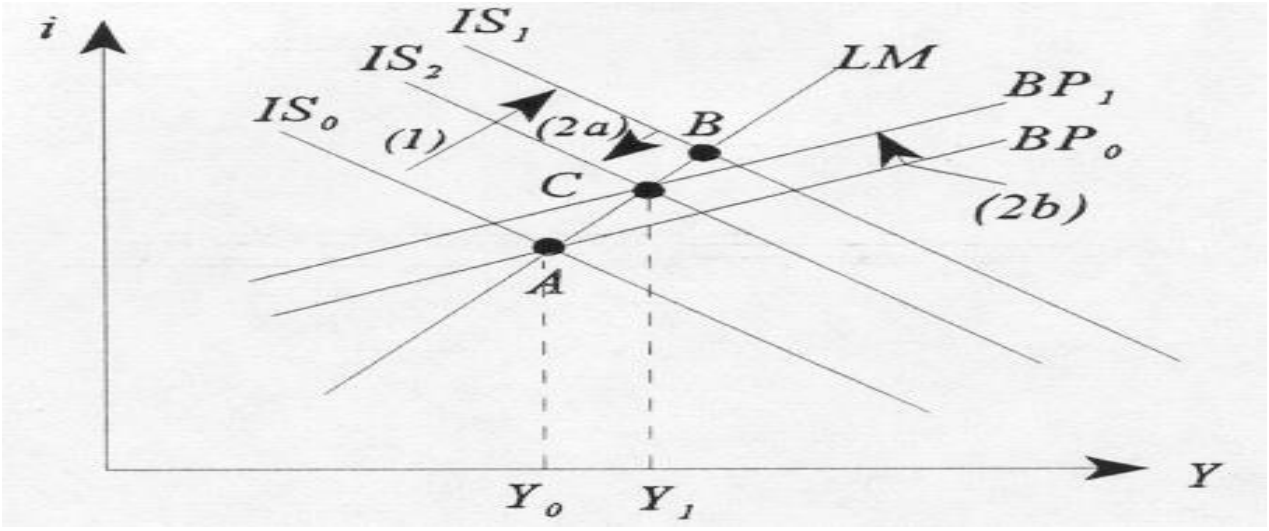
The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is an incipient surplus in the Balance of Payments because the level of capital inflows is more than sufficient to offset the deficit in the CA that prevails at B. The incipient surplus in the BoP means the exchange rate is appreciating (there is an increase in demand for dollars on the foreign exchange market). As the exchange rate appreciates (e decreases), Net Exports decrease because the relative price of domestic goods on international markets has risen. As NX falls, it has two effects that occur simultaneously: 1) Total Expenditures decrease therefore the IS curve moves left, and, 2) the Current Account worsens therefore the BP curve moves left. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capitals in/out flows are infinite, and therefore they overwhelm the effect that the change

in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y. In abbreviated notation (acceptable on tests) this would be: ↑G → ↑TE → IS right: A to B; at B: incipient BoP surplus (above the BP curve): ↓ e (appreciates) As e↓ → ↓ NX.

→ (2a): ↓ TE → IS left;

→ (2 b): ↓ CA → BP left. Together, these cause the economy to move from B to C: Y from Y_0 to Y_1.

NB: Fiscal policy is more effective in altering the level of domestic output under flexible exchange rates with mobile capital than with perfect capital mobility.



Case 3: **Flexible Exchange Rates, Immobile Capital (BP steeper than LM), Increase in G**

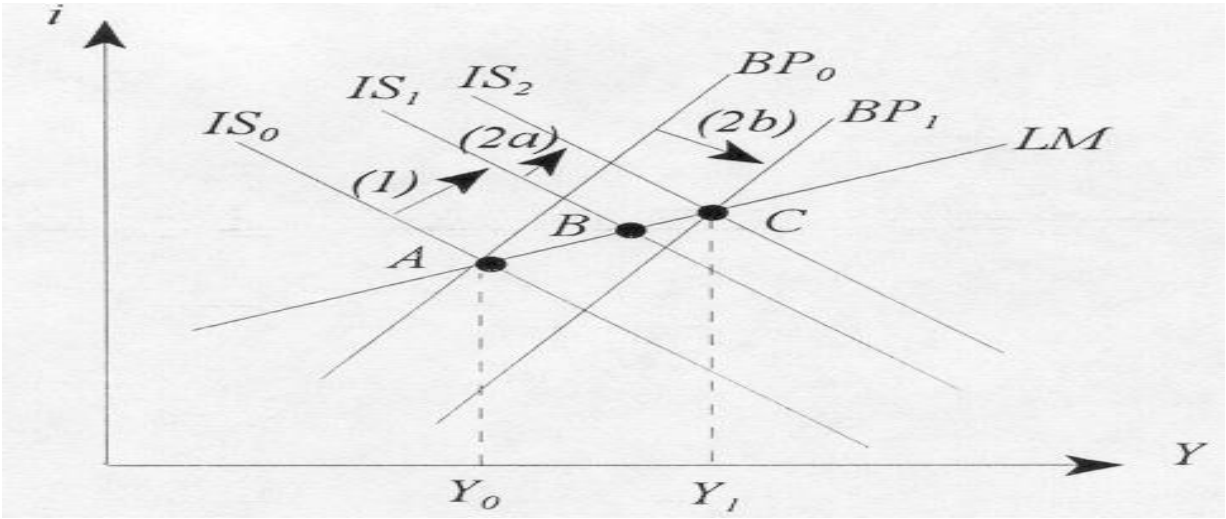
The increase in Government spending means there's an increase in Total Expenditures: the IS curve shifts to the right and the economy moves from A to B. At B, there is an incipient deficit in the Balance of Payments because the level of capital inflows is in sufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right, and, 2) the Current Account improves therefore the BP curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and

non-perfectly mobile capital differ from the perfect capital mobility case. In the later, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y. In abbreviated notation (acceptable on tests) this would be: ↑G → ↑ TE → IS right: A to B; at B: incipient BoP deficit (below the BP curve): ↑e (depreciates) As e↑→ ↑ NX

→ (2a): ↑TE → IS right;

→ (2b): ↑CA → BP right. Together, these cause the economy to move from B to C: Y from Y_0 to Y_1.

NB: Fiscal policy is more effective in altering the level of domestic output under flexible exchange rates with immobile capital than with mobile capital or perfect capital mobility.



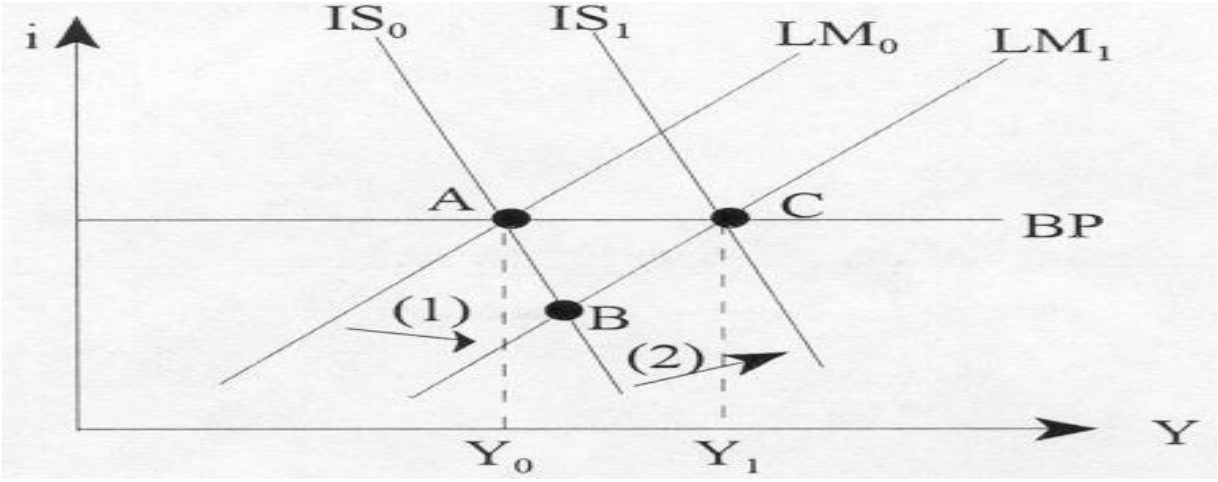
Monetary policy

Case 1: **Flexible Exchange Rates, Perfect Capital Mobility, Increase in Money Supply**

The increase in the Money supply shifts the LM curve to the right; the economy goes from point A to point B. At B, there are infinite capital outflows as domestic investors seek to purchase higher returning foreign assets. These investors are exchanging their unwanted dollars for foreign exchange. This decreased demand for dollars causes the value of the dollar to fall on foreign exchange markets (i.e. the dollar depreciates, e increases). As e increases, Net Exports increase as domestic goods become relatively cheaper on

international markets. As NX increases, Total Expenditures rise and the IS curve shifts to the right. The exchange rate will continue to depreciate, and the IS curve will continue to shift to the right until the capital outflow is halted (i.e. until the domestic interest rate equals the foreign interest rate). The new equilibrium is at C, where domestic output has increased. In abbreviated notation (acceptable on tests) this would be: $\uparrow M_S \rightarrow$ LM right: A to B at B: infinite K outflows: ↑e (depreciates) as e ↑ → ↑NX → ↑TE → IS right: B to C. ↑Y from Y_0 to Y_1.

<u>NB:</u> *Monetary policy is extremely effective in altering the level of domestic output under flexible exchange rates and perfect capital mobility.*



Case 2: Flexible Exchange Rates, higher degree of capital mobility (BP flatter than LM), Increase in Money Supply

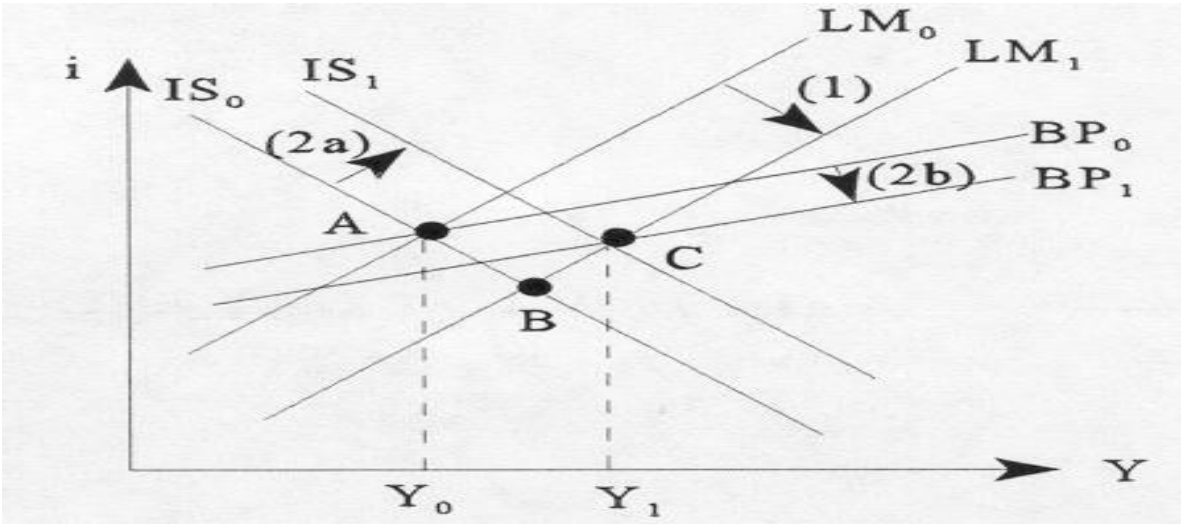
The increase in the Money supply shifts the LM curve to the right; the economy goes from point A to point B. At B, there is an incipient (incipient means about to happen—in reality, it never quite happens) deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right, and, 2) the Current Account improves therefore the BP

curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capital in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y. In abbreviated notation (acceptable on tests) this would be: ↑Ms → LM right: A to B; at B: incipient BoP deficit (below the BP curve) → ↑e (depreciates) As e↑ → ↑NX

→ (2a): ↑TE → IS right;

→ (2b): ↑CA → BP right. Together, these cause the economy to move from B to C: ↑Y from Y_0 to Y_1.

NB: Monetary policy is effective in altering the level of domestic output under flexible exchange rates with mobile capital.



Case 3: Flexible Exchange Rates, Immobile Capital (BP steeper than LM), Increase in Money Supply

The increase in the Money supply shifts the LM curve to the right; the economy goes from point A to point B. At B, there is an incipient deficit in the Balance of Payments because the level of capital inflows is insufficient to offset the deficit in the CA that prevails at B. The incipient deficit in the BoP means the exchange rate is depreciating (there are unwanted dollars on the foreign exchange market). As the exchange rate depreciates (e increases), Net Exports increase because the relative price of domestic goods on international markets

has fallen. As NX rises, it has two effects that occur simultaneously: 1) Total Expenditures increase therefore the IS curve moves right and, 2) the Current Account improves therefore the BP curve moves right. These shifts are labeled 2a and 2b, respectively, in the above diagram. Note that the cases with flexible exchange rates and non-perfectly mobile capital differ from the perfect capital mobility case. In the latter, the BP curve does not shift because the capitals in/out flows are infinite, and therefore they overwhelm the effect that the change in NX has on the CA. The new equilibrium occurs at C, where the economy has had an increase in Y. In abbreviated notation (acceptable on tests) this would be: Ms → LM right: A to B; at B: incipient BoP deficit (below the BP curve) ↑e (depreciates).As e↑ → ↑NX

→ (2a): ↑ TE → IS right;

→ (2b): ↑CA → BP right. Together, these cause the economy to move from B to C: ↑Y from Y_0 to Y_1.

NB: Monetary policy is effective in altering the level of domestic output under flexible exchange rates with immobile capital.