

Foreign exchange

1. Introduction

1.1. Chapter overview

This chapter provides an overview to the biggest market in the world - the foreign exchange market. It begins by describing the basic features of the marketplace and identifies the major market participants, who are, in fact, financial institutions rather than private investors.

You will learn of the two components to the foreign exchange market: the **spot** market, where currencies are bought and sold at current exchange rates, and the **forward** market, where a rate is fixed today but settlement takes place at a later date. The chapter describes the characteristics of these markets and highlights the conventions for quoting prices amongst the participating banks.

The chapter finishes by taking you through some of the theories underlying the derivation of exchange rates.

1.2. Learning outcomes

On completion of this module, you will:

FX markets

- • 9.4.10 Describe the nature and basic operations of the foreign exchange market
- • 9.4.12 Explain spot and forward exchange rates

FX rate determination

- 9.4.13 Calculate forward rates using interest rate parity (IRP)
- 9.4.8 Explain the notion of purchasing power parity (PPP) as a forecasting tool for exchange rates
- 9.4.14 Apply the concept of purchasing power parity (PPP) to forecast expected future spot exchange rates using the differential inflation rates between two countries
- 9.4.15 Distinguish between IRP and PPP
- 9.4.16 Explain the International Fisher effect

Portfolio measurement: foreign exchange

- 9.4.11 Explain the nature of exchange rate risk and how it can be managed

Exchange rate regimes and optimal currency areas

- 9.4.4 Distinguish between a fixed, floating and a managed exchange rate ('dirty-floating' regime)
- 9.4.5 Explain the economic benefits and costs of a fixed exchange rate mechanism
- 9.4.6 Explain an optimal currency area (OCA) and identify the advantages and disadvantages of implementing a single currency in an OCA
- 9.4.7 Explain the implications of persistent global imbalances of trade and capital

2. FX rates: standards of quotation

2.1. Background

The foreign exchange (FX) market is a global over-the-counter (OTC, or **off exchange**) market in the world's different currencies.

It is a **quote driven market** in which major international banks and brokerage houses are participants. It is not a market in which private investors or corporates act directly. Even large companies and investment funds use banks to access the FX markets.

Each of the major banks acts as a market maker by making **two-way prices** on demand to any of the others.

Settlement of currency transactions is processed directly between the counterparties to the trade. There is no central counterparty operating in the markets.

There are two components to the FX market, the **spot** market, which is the largest, and the **forward** market. Most deals are carried out for speculative purposes.

London is the largest centre for FX trading.

2.2. Spot Markets

Introduction

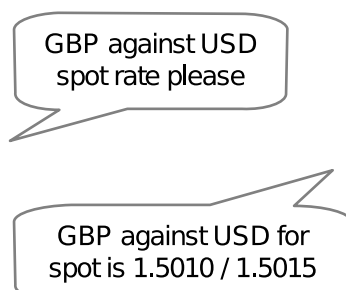
This is the largest component of the FX market.

The term **spot** refers to the standard settlement convention of two business days after the trade date (T+2). For example, a US dollar vs. Japanese yen deal struck on Monday will result in the deal being settled on Wednesday.

Two-way prices

The market is quote driven. The major banks will quote two-way FX prices in any of the major currency pairs.

If Bank A asks Bank B for a sterling vs. US dollar quote, the price received would look like this:



Bank B buys GBP at 1.5010; this is the **bid rate**.

Bank B sells GBP at 1.5015; this is the **offer rate**.

The bank making the quote always buys the base currency at the rate on the left (the bid) and sells it at the rate on the right (the offer). The difference between the bid and offer rate is called the spread; here it is 5 pips.

Bank A would lose money on Bank B's quote if they were to deal on the bid **and** the offer; they (A) would pay \$1.5015 for sterling, and could only sell it back at \$1.5010, making a loss of \$0.0005 (or 0.05 cent) per pound.

In reality the quote that Bank B would give to Bank A would be very much shortened. Every dealer knows that the big figure on the rate is 1.50 and would not bother to mention it; the quote would be reduced to 10/15. The FX market's term for the GBP vs. USD exchange rate is **cable**.

2.3. FX: forward markets

Introduction

FX deals for settlement other than spot (up to 12 months) are known as **forward deals**.

Forward FX rates

Adjustments to the spot rate

In order to agree a forward FX deal, the spot rate needs to be adjusted. This adjustment can either be positive or negative.

Discounts

If the adjustment is positive, pips are added on, and the forward rate is known as a **discount**.

A bank quotes a spot rate of 1.5020 and a forward adjustment of +15 pips (i.e. a 15 pip discount). The forward rate is calculated as follows:

SPOT RATE	GBP 1 = USD 1.5020
Forward adjustment	+ 15 pips
<hr/>	
FORWARD RATE	GBP 1 = USD 1.5035

It is referred to as a discount because dollars are cheaper for forward delivery (there are more dollars to one pound).

This is a discount because dollars are cheaper forward than spot.

Premiums

Alternatively the adjustment could be negative; pips are subtracted from the spot rate. This is known as a **premium**.

A bank quotes a spot rate of 1.5020 and a forward adjustment of -10 pips (i.e. a 10 pip premium). The forward rate is calculated as follows:

SPOT RATE	GBP 1 = USD 1.5020
Forward adjustment	- 10 pips
<hr/>	
FORWARD RATE	GBP 1 = USD 1.5010

It is referred to as a premium because dollars are more expensive for forward delivery (there are less dollars to one pound).

The premium arises because the dollars are more expensive forward than the spot.

3. Exchange rate determination

3.1. Introduction

A number of theories seek to explain the relationship between current and future exchange rates.

These theories focus on relative movements in interest rates and inflation.

3.2. Purchasing power parity (PPP)

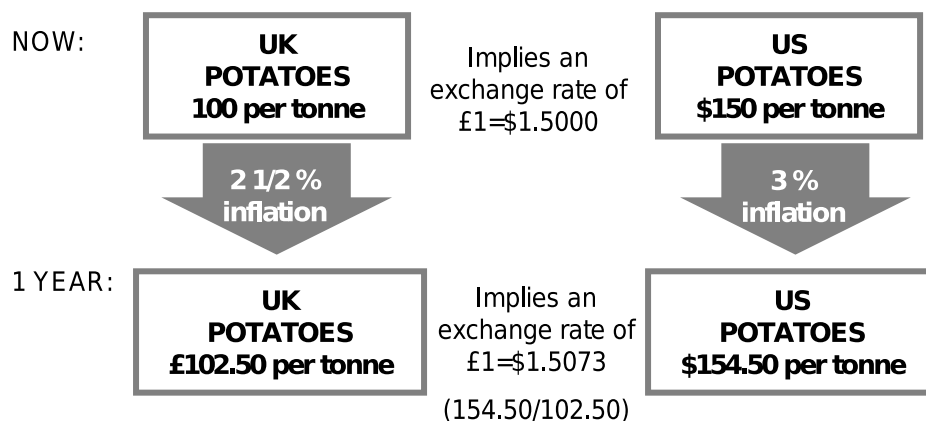
The theory of PPP states that the exchange rates between two countries' currencies will adjust automatically in order to take into account their respective inflation rates.

The rationale behind this is that a good (e.g. kilo of sugar or a tonne of potatoes) ought to cost the same regardless of which country it is bought in.

This is known as the **law of one price**.

Thus the 'law of one price' suggests that should a good be cheaper in one country than anywhere else, the demand for that country's currency would appreciate, as consumers buy up the currency in order to buy the cheaper good.

This would continue until the cost of the currency outweighed the benefit of the good being cheaper.



This can be summarised in a formula:

$$\frac{F}{S} = \frac{(1 + i_{\text{variable}})}{(1 + i_{\text{base}})}$$

Where:

F = the forward rate.

S = the spot rate.

i_{variable} i_{base} = the inflation rates for each currency, variable and base.

This is how the formula may be used:

If sterling (GBP) inflation is at 2.5% pa, US (USD) inflation 3% pa and the spot rate is GBP1 = USD 1.5000 (note: GBP is base and USD is variable). The 12-month forward rate may be calculated as follows:

$$\frac{F}{1.5000} = \frac{(1 + 0.03)}{(1 + 0.025)}$$

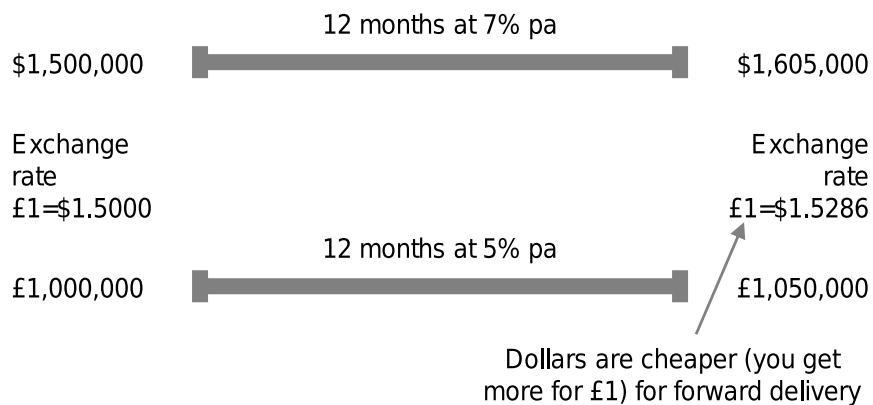
$$F = \frac{1.03}{1.025} \times 1.5000 \quad \text{Ans} = 1.5073$$

3.3. Interest rate parity (IRP)

IRP suggests that the exchange rate between two currencies for a given date in the future will take account of the difference in their interest rates over the period up to the future date.

So, for example, if spot GBP - USD is currently 1.5000 and we are trying to calculate the 12-month forward rate, we would need the one-year interest rates for GBP and USD which are, say, 5% and 7% respectively.

The forward exchange rate is the ratio of the two currencies inflated by their own interest rates, as shown below:



This may be summarised in the formula:

$$\frac{F}{S} = \frac{(1 + r_{\text{variable}})}{(1 + r_{\text{base}})}$$

Where:

F = the forward rate.

S = the spot rate.

r_{variable} r_{base} = the interest rates for each currency variable and base.

If the information in the above example is inserted into the formula, we can use it to check the forward rate:

If sterling vs. the US dollar is currently trading at £1=\$1.5000, sterling interest rates are 5% pa and US interest rates are 7% pa the interest rate parity (IRP) may be used to calculate the forward rate:

$$\frac{F}{S} = \frac{(1 + r_{\text{variable}})}{(1 + r_{\text{base}})}$$

$$\frac{F}{1.5000} = \frac{1.07}{1.05}$$

$$F = \frac{1.07}{1.05} \times 1.5000 \text{ so } F = 1.5286$$

3.4. International Fisher effect

The international Fisher effect states that in a global market with free capital flows the **real** interest rate (the interest rate less an adjustment for inflation) will be equal in all countries.

This has the overall effect of bringing together PPP and IRP:

$$\frac{F}{S} = \frac{(1 + i_{\text{variable}})}{(1 + i_{\text{base}})} = \frac{(1 + r_{\text{variable}})}{(1 + r_{\text{base}})}$$

Where:

F = the forward rate.

S = the spot rate.

i_{variable} i_{base} = the inflation rates for each currency, variable and base.

r_{variable} r_{base} = the interest rates for each currency variable and base.

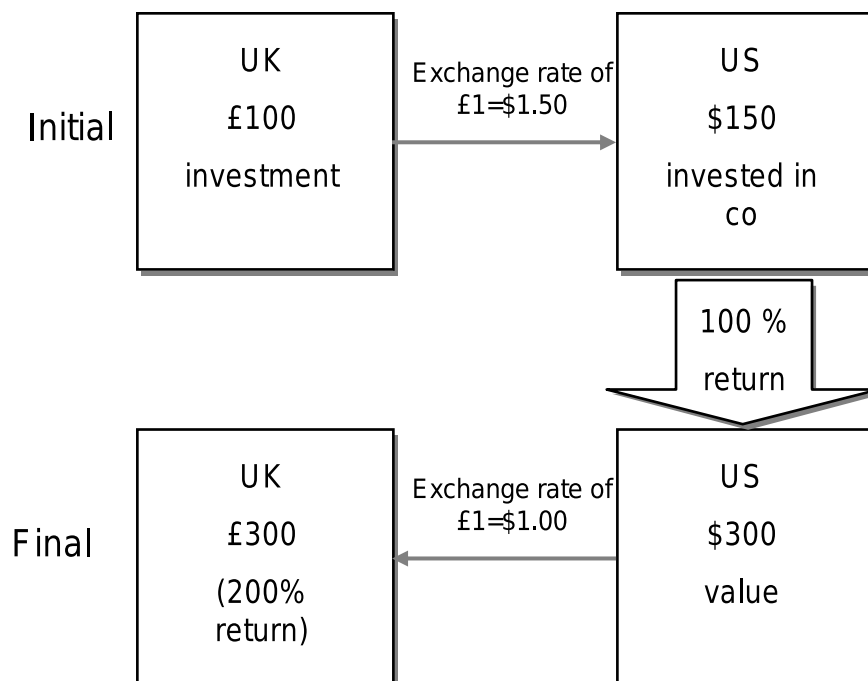
4. Portfolio measurement: foreign exchange

4.1. FX risk

Where an investment is made in a foreign currency the total return consists of two elements:

- The return expressed in the foreign currency
- The return made on changes in the rate of exchange of the foreign currency

The following example illustrates the additional returns (or losses) that may be made by exchange rate fluctuations:



In this example, the FX rate move in favour of the fund manager. This will not always be the case. If a fund manager wishes to reduce the portfolio's exposure to foreign currency risk he may do so by entering into a forward agreement.

5. Exchange rate regimes and optimal currency areas

5.1. Exchange rate regimes

There are three ways in which national governments may, or may not, seek to intervene in managing the value of their domestic currency vs. foreign currencies:

- **Fixed exchange rates**, in which the value of a unit of domestic currency is rigidly fixed to that of a foreign currency (usually a much larger and stronger currency, such as the US dollar)
- **Floating exchange rates**, in which there is no intervention into the foreign exchange marketplace and the price of the domestic currency is allowed to reach its own value via the interchange between supply and demand for that currency
- **A managed, or 'dirty-floating' regime**, whereby there is some intervention in the marketplace to coax the exchange rate in a particular direction, however there is no fixed target in mind

5.2. Arguments for and against fixed exchange rate mechanisms

Arguments for fixed exchange rates

- **Reduced foreign exchange risk.** Importers and exporters of goods can enjoy certainty as to the value of their transactions over time. It is possible that foreign trade may rise as a result
- **Increased government discipline in economic management.** Governments find it very difficult to engage in inflationary policies – depreciation of the domestic currency cannot be used to 'pay for' deficit government spending
- **Speculation is discouraged.** Currency speculation is pointless where exchange rates are fixed, thus discouraging potentially damaging capital inflows and outflows from the country

Arguments against fixed exchange rates

- **No automatic balance of payments adjustment.** Floating exchange rates can automatically deal with current account imbalances between the value of imports and exports (as you shall see in chapter 19). With a fixed rate, current account deficits can only be adjusted for by a drop in aggregate demand
- **The system requires large holdings of foreign currency reserves.** Such holdings of wealth in foreign currency reserves could potentially be put to better use
- **Loss of freedom of economic policy.** The needs of making economic policy decisions regarding the exchange rate can come to dominate economic policy. Monetary policy decisions over interest rates, for example, may be taken to keep the exchange rate fixed, when perhaps other macroeconomic considerations such as inflation or unemployment may be more pressing

5.3. Optimal currency areas

An optimal currency area (or OCA) is a region, usually (though not necessarily) bigger than a single country, in which economic efficiency would be maximised by having the entire region share a single currency. The most recent example of such an OCA being established is, of course, the Eurozone of the European Union, though the United States of America is also a good example of an OCA, whereby the individual states share a currency with one another.

The advantages and drawbacks of OCAs are broadly similar to those of fixed exchange rate regimes, from the point of view of the OCA region as a whole. It should be noted, however, that OCAs only work

properly where political union and shared sovereignty takes place – note the success of the US dollar, and (at the time of writing), the severe issues the Eurozone is facing.

6. Foreign exchange: summary

6.1. Key concepts

FX markets

- 9.4.10 Describe the nature and basic operations of the foreign exchange market
- 9.4.12 Explain spot and forward exchange rates

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Now you have finished this chapter you should attempt the chapter questions.