

STRAND: FINANCE

Unit 1 *Exchange Rates*

TEXT

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1 Exchange Rates

1.1 Straightforward Exchanges

The ability to convert between different currencies is a useful life-skill, not just for travelling abroad but also for comparing salaries, buying goods online from a supplier outside the UK, comparing property prices, etc.

For the Worked Examples and Exercises below, we refer to the currency *exchange rate* - the value of one currency expressed in the currency of another. The exchange rate is also known as the foreign-exchange rate, Forex rate, FX rate or Agio.



Worked Example 1

The exchange rate between the pound sterling (sign: £; code: GBP) and the euro (sign: €; code: EUR) is

$$£1.00 = €1.247$$

- (a) How many euros do you receive for £200 ?
- (b) How many pounds will you receive for €400 ?



Solution

- (a) $£200 = 200 \times €1.247 = €249.40$
- (b) $€1 = £\frac{1}{1.247} \Rightarrow €400 = £\frac{400}{1.247} \approx €320.77$



Worked Example 2

The exchange rate between the British pound and the US dollar (sign: \$; code: USD) is

$$£1.00 = \$1.56621$$

The Jamaican dollar (J\$, JMD) is *pegged* (see Note below) to the US dollar at the rate of

$$\$1.00 = J\$ 117.10$$

- (a) How many Jamaican dollars will you receive for £50 ?
- (b) If you have J\$4000, how much is this worth in British pounds?



Note

A *pegged currency* is defined as

'A country or government's exchange-rate policy of pegging the central bank's rate of exchange to another country's currency. Currency pegs allow importers and exporters to know exactly what kind of exchange rate they can expect for their transactions, simplifying trade. Jamaica's currency is aligned to the US\$ in a 'crawling peg' which allows its exchange rate to fluctuate only within a band of rates: this prevents any sudden significant devaluation in the value of the currency.'



Solution

The obvious starting point for these problems is to find the exchange rate between pounds sterling and Jamaican dollars; that is

$$\begin{aligned}\text{£}1.00 &= \$1.56621 \\ &= \text{J\$}1.56621 \times 117.10 \\ &\approx \text{J\$} 183.40\end{aligned}$$

(a) Hence $\text{£} 50 = \text{J\$}50 \times 183.40$

$$= \text{J\$}9170$$

(b) Similarly, $\text{J\$}1 = \frac{1.00}{183.40}$

so $\text{J\$}4000 = \text{£} \frac{1.00}{183.40} \times 4000$

$$\approx \text{£}21.81$$

(Note that you could first exchange £ for \$ and then \$ to J\$.)



Exercises

1. The exchange rate between J\$ and £ is

$$\text{J\$}183 \equiv \text{UK£}1$$

- (a) How many J\$ would you get if you exchanged £27 ?
- (b) How much did you exchange in £ if you received J\$9150 ?
- (c) How much would J\$6900 be exchanged for in £ ?
2. Brent exchanged 200.00 Barbados dollars (Bds\$) for East Caribbean dollars (EC\$), using the exchange rate

$$\text{Bds } \$1.00 = \text{EC\$}1.35.$$

- (a) Calculate the amount he received in EC dollars.

Brent shared the amount of money he received among Pat, Calvin and Lyn.

Pat received $\frac{1}{3}$ of the amount.

Calvin received EC\$108.00.

Lyn received the remainder.

- (b) Calculate
- (i) Calvin's share as a percentage of the total amount shared,
- (ii) Lyn's share as a fraction of the total amount shared.

Use the exchange rates given in the table for US dollars, British pounds, Canadian dollars, euros and Australian dollars to answer the following questions.

	USD (\$)	GBP (£)	CAD (C\$)	EUR (€)	AUD (A\$)
USD	1.00	0.64	1.31	0.91	1.36
GBP	1.57	1.00	2.04	1.42	2.13
CAD	0.77	0.49	1.00	0.70	1.04
EUR	1.10	0.70	1.44	1.00	1.50
AUD	0.73	0.47	0.96	0.67	1.00

- Emily's father gave her £100 for Christmas. The new bodyboard she wants to buy costs \$120 AUD. After her purchase how much money will she have left in British pounds?
- Jon lives in Paris, France. His aunt in Plymouth, England sent him £20. How many euros can he buy with this money?
- Amy is staying with her friends in Perth, Australia. Her mother sends her €40 to buy a shirt. How many Australian dollars will she have to spend on the shirt?
- Bob, who lives in New York, has saved \$11 USD to buy a computer game from his friend Tom who lives in Sydney, Australia. The game costs \$10 AUD. Does Bob have enough money to buy the game? If not, how many more US dollars will he need?
- Ruby wants to buy a necklace for \$25 CAD and a bracelet for \$15 CAD. She has saved €55. After her purchases, how many euros will she have left? (Round to the nearest euro.)

1.2 Buying and Selling

As you may have noticed, for example in banks and at currency exchange desks in airports, TWO rates are quoted: a *selling rate* (i.e. the rate at which the bank sells to you) and a *buying rate* (the rate at which the bank buys from you). An example is shown in the picture on the right.

There is a significant difference between the two values.



Worked Example 1

The AnyBank currency rates for euros on a particular date were given as

	<i>Sell rate</i>	<i>Buy rate</i>
Euros	1.3454	1.5376

This means that the bank will sell euros to you at €1.3454 per £, and buy euros from you at €1.5376 per £.

Currency	Selling Rate	Buying Rate
Turkey Lira	3.8585	5.4483
UAE Dirham	4.8265	6.6933
Australia Dollar	1.8750	2.5856
Barbados Dollar	2.6017	3.6625
Bulgaria Lev	2.3038	3.1948
Canada Dollar	1.7446	2.4057
Switzerland Franc	1.2953	1.7862
China Yuan	8.3786	11.617
Czech Republic Koruna	31.836	44.226
Denmark Krone	8.8406	12.186
Egypt Pound	9.9900	14.267

Convert £100 to euros and then convert this amount back to £s.

The difference between the original £100 and the amount after the two conversions is



Solution

$$\begin{aligned}\text{£}100 &= \text{€}100 \times 1.3454 \text{ (this is the selling rate)} \\ &= \text{€}134.54\end{aligned}$$

So now you exchange these euros for pounds:

$$\begin{aligned}\text{£}1 &= \text{€}1.5376 \\ \text{that is,} \quad \text{€}1 &= \text{£} \frac{1}{1.5376}\end{aligned}$$

$$\begin{aligned}\text{So} \quad \text{€}134.54 &= \text{£} \frac{134.54}{1.5376} \\ &= \text{£}87.50\end{aligned}$$

Hence the bank has received £12.50 for its work in converting and re-converting your £100.

So the conclusion is that it pays to budget carefully when exchanging money or, of course, you could save the euros for another time.



Worked Example 2

Jane exchanged £500 for US dollars at her bank before she went on holiday to Florida. These were the buying and selling rates.

	<i>Sell rate</i>	<i>Buy rate</i>
\$US	1.4962	1.7048

On holiday, she spent \$620 and changed her remaining dollars back to British pounds on her return. How much money did she receive?



Solution

$$\begin{aligned}\text{£}500 &= \$1.4962 \times 500 \\ &= \$748.10\end{aligned}$$

After spending \$620, she had \$128.10 left.

The buying rate is

$$\begin{aligned}\text{£}1 &= \$1.7048 \\ \text{that is} \quad \text{£}1 &= \$ \frac{1}{1.7048}\end{aligned}$$

$$\begin{aligned}\text{Hence} \quad \$128.10 &= \text{£} \frac{128.10}{1.7048} \\ &= \text{£}75.14\end{aligned}$$

and Jane spent $\text{£}500 - \text{£}75.14 = \text{£}424.86$.

One way of avoiding this 'loss' of money is to use cash machines (ATMs-automated teller machines) when abroad. The problem here though is that the banks charge a fee on any transactions made abroad; for example, some banks charge $2\frac{1}{2}\%$ on any transaction abroad. Is this better value than obtaining currency from your bank before you travel?



Worked Example 3

Using the data from Worked Example 2, would Jane have saved money by using ATMs in the US to obtain her dollars? (The bank would have used the rate £1 = \$1.60.)



Solution

Assuming she obtained \$620 in total from an ATM, she would have been charged a $2\frac{1}{2}\%$ fee on that amount, that is, a fee of

$$\$620 \times 0.025 = \$15.50$$

So in total, Jane would have spent

$$\$620 + \$15.50 = \$635.50$$

If she had obtained her dollars from the bank, the conversion rate would have been £1 = \$1.60,

$$\text{that is,} \quad \$1 = \text{£} \frac{1}{1.60}$$

$$\begin{aligned} \text{So} \quad \$635.50 &= \text{£} \frac{635.50}{1.60} \\ &= \text{£}397.19 \quad (\text{correct to 2 d.p.}) \end{aligned}$$

Jane would be better off by

$$\text{£}413.13 - \text{£}397.19 = \text{£}15.94$$

if she used the ATM machine in the US to obtain the \$620 she needed rather than buying currency from her bank and exchanging the dollars she brought home.

So it appears that using your debit card, either for cash at an ATM or for paying for goods, is a better option than obtaining foreign currency before you travel abroad.

If you are buying foreign currency before you leave the UK it is worth comparing rates and conditions offered by several different banks and financial institutions as their exchange rates do vary.



Exercises

- The MEP internet bank advertises the following exchange rates for euros:

	<i>Sell rate</i>	<i>Buy rate</i>
Euros	1.35	1.52

The bank sells you £200 worth of euros but you spend only €135; the bank buys back the remainder. How much have you 'lost' in this transaction?

2. Jay exchanged £600 for US dollars at his local bank before going on holiday to Las Vegas. When he was there he spent \$520 and also lost \$270 at the casinos. The buying and selling rates for his bank were:

	<i>Sell rate</i>	<i>Buy rate</i>
US\$	1.4962	1.7048

On his return, Jay changed his US dollars back to pounds. How much UK currency did he receive?

3. In Question 2 above, another option Jay could have chosen was to use ATM machines in Las Vegas to obtain his US currency. The rate would have been £1 = \$1.59 and he would have incurred a $2\frac{1}{4}\%$ transaction charge on any money withdrawn. How much would Jay have saved using this method?
4. Here are a sample of buying and selling rates from a major High Street bank on 1st September 2015.

	<i>Sell rate</i>	<i>Buy rate</i>
Norwegian kroner	11.9897	13.8711
Chinese yuan	8.8948	10.9776
Japanese yen	173.8870	200.7820
Egyptian pounds	10.5447	13.2544

- (a) Without taking account of commission or any other charges, calculate the amount you would lose if you converted £100 from pounds to each of these currencies, and then converted it back to UK£.
- (i) Norwegian kroner (ii) Chinese yuan
(iii) Japanese Yen (iv) Egyptian pounds.
- (b) Can you suggest reasons why the answers vary in part (a) of this question?

1.3 Currency Exchange with Commission

In the previous section it appeared that using ATMs was the most efficient way of obtaining foreign currency when travelling abroad. Although this works well in many countries, you might be planning to travel to areas where ATMs are not easy to find or where UK cash cards are not always accepted. Also, many people like the reassurance of having local currency with them when they arrive in a new destination, so foreign currency provision continues to be a thriving industry.

As well as banks, there are specialist money exchange desks and offices, particularly at airports, and internet-based companies offering often attractive rates; some high street stores offer limited facilities, mainly for US dollars and euros.

The decision as to how to obtain your currency is further complicated by such companies also charging commission or a buy-back fee. The following examples illustrate these concepts but note that we are not making recommendations of the optimum policy, just showing how the calculations are made.



Worked Example 1

MEP bank offers the following rates for US dollars:

	<i>Sell rate</i>	<i>Buy rate</i>
US\$	1.48	1.75

CTC internet bank offers a sell rate of 1.54 US dollars for £1, with a $3\frac{1}{2}\%$ commission charge.

- (a) How many US\$ would you receive for £500 from
- (i) *MEP* bank (ii) *CTC* bank?
- (b) What rate of commission would make the amounts you receive equal?



Solution

- (a) (i) Using *MEP* bank you would receive

$$\$1.48 \times 500 = \$740$$

- (ii) Using *CTC* internet bank, the commission charge is

$$0.035 \times £500 = £17.50$$

so you will pay the bank $£500 - £17.50 = £482.50$
and receive

$$\$1.54 \times 482.50 = \$743.05$$

- (b) Suppose you have £ x to change. Then *MEP* bank gives you

$$\$1.48x$$

whilst *CTC* internet bank, with commission charged at $r\%$ ($= 0.0r$), gives you

$$\$x \times 1.54 \quad \$ (1 - 0.0r)x \times 1.54$$

as $\$(1 - 0.0r)x$ is the money left over to exchange after the commission charge of $r\%$ has been deducted from your £ x . The two results are equal when

$$1.48x = (1 - 0.0r)x \times 1.54$$

i.e. $1.48 = (1 - 0.0r)1.54$

or $1 - 0.0r = \frac{1.48}{1.54}$

$$0.0r = 1 - \frac{1.48}{1.54}$$

i.e. $r = 100 \left(1 - \frac{1.48}{1.54} \right)$

$$r \approx 3.896\%$$



Worked Example 2

An internet company offers a buyback facility of £6 per transaction, and a sell rate of €1.33 for £1.

- (a) How many euros will you receive when you change
- (i) £200 (ii) £400
- if you also accept the buyback facility?
- (b) In each case, what is the equivalent rate with a buyback facility?



Solution

- (a) (i) Here you have £200 – £6 = £194 to change, giving you
- $$£194 \times 1.33 = €258.02$$
- (ii) Similarly, you have £394 to change, giving you
- $$£394 \times 1.33 = €524.02$$
- (b) (i) For £200 you receive €258.02, so the equivalent rate is $\frac{258.02}{200} \approx 1.29$.
- (ii) Similarly, £400 gives an equivalent rate of $\frac{524.02}{400} \approx 1.31$.

Note that this 'deal' becomes more favourable to you, the more money you change in a single transaction.



Exercises

1. An internet company offers the following selling rates for £1.

	<i>Sell rate</i>
US\$	1.52
€	1.35

There is also a $2\frac{1}{2}\%$ commission charge.

How many (i) US\$ (ii) € would you get when changing £250 ?

2. A travel company offers a buyback facility of £5 per transaction with a sell rate of €1.29 for £1.
- (a) If you opted for the buyback facility, how many euros would you receive when changing £400 ?
- (b) With the buyback facility, what is the effective rate for changing £400 ?
- (c) What would the effective rate be for changing (i) £100 (ii) £1000 ?
3. MEP bank now offers a rate of £1 = €1.35 with a rate of commission of $r\%$. If you received €654.75 when changing £500, what is the rate, $r\%$, of commission charged?