Study
Notes

Paper P3
Foreign currency hedging

Many P3 students understand the principles behind foreign currency hedging techniques but struggle to demonstrate the calculations in an exam. Let's get some practice on how to figure out those numbers

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Hedging involves reducing or eliminating financial risk by passing that risk on to someone else. It can provide certainty of cash flows, which helps with budgeting, encourages management to undertake investment, reduces the possibility of financial collapse and makes for a more attractive company to risk-averse staff.

Foreign currency hedging specifically tries to reduce the risk that arises from future movements in an exchange rate. This is a two-way risk since exchange rates can move adversely or favourably. Management generally hedges for adverse movements only, for example higher costs and reduced income.

Foreign currency hedging is a topic that frequently worries CIMA P3 students. Many seem to understand the basic principles of the available hedging techniques. However, demonstrating the calculations in an exam, under pressure, can cause problems. In this article, each foreign currency hedging technique is demonstrated numerically to give students further practice. Then the conditions for the use of each technique are discussed. Throughout this article the following scenario will be used:

Imagine USB Inc, an American software house, is due to pay a UK supplier £1m in three months' time. It is now 1 May.

Relevant data from the foreign currency and money market is given below.

Exchange rates quoted today are:

	£ / $
Spot rate	0.5120 – 0.5152
One-month forward rate	0.5141 – 0.5171
Three-month forward rate	0.5171 – 0.5202

Interest rates (p.a.) are:

	%
UK	5 – 5.5
US	2 – 2.4

Futures market (£100,000 contracts, margins are $1,000 per contract)

	£1
June	$1.9305
September	$1.9170
December	$1.9005

Note: The contract size of £100,000 has been chosen to avoid under- or over-hedging. The usual contract size is £62,500.

Options market (£250,000 contracts, premiums are quoted in cents per £1)

	Call option		Put option	
Exercise price	June	September	June	September
1.9000	2.88	3.55	0.15	0.28
1.9200	1.59	2.32	1.00	1.85
1.9400	0.96	1.15	2.05	2.95

Note: The contract size of £250,000 has been chosen to avoid under- or over-hedging.

Let us calculate the dollar payment using each type of hedging technique suggested by the information above.

Hedging using a forward contract

The transaction is to pay £1m in three months' time. USB is an American company that would usually trade in dollars. It will have to buy some pounds ▶

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sterling (by selling some dollars) so that it can make this payment to its UK supplier.

The three-month forward rates are given: 0.5171 – 0.5202. But which one is it? And what do you do with it?

To answer "which one is it?" you need to remember that whenever you buy something you invariably pay more than you want to. (And when you sell something you will usually get less than you wanted. Believe me, I have just sold my old car and bought a new one – it was painful.) Alternatively you can think of yourself as a loser. The bank will always win and you will always lose when exchanging money. (If you are ever in doubt as to which rate to use, calculate both and choose the one where you lose.)

In this example we use the rate of 0.5171.
To answer "what do you do with it?" you need to look at the brackets at the top of the table – £ / $. This means that the numbers in the table are the dollars you would swap for £1. (The sign on the left-hand side is the 1, in this case the £.) This means that we will swap $0.5171 for £1.

So if we want to swap £1m for dollars we need to divide the £1m by $0.5171, giving $1,933,862. This is the fixed amount of dollars it will cost USB in three months' time to pay its £1m supplier invoice.

Hedging using the money market
A money market hedge tries to eliminate foreign currency risk by trading the currency today on the spot market. To do this we must rely on interest rates instead, which might be more stable (although you should realise that the Interest Rate Parity theory links these two variables – exchange rates and interest rates – which means that if exchange rates vary then interest rates may have also varied).

To perform a money market hedge USB will undertake three steps:
1 USB is going to make a payment of £1m in three months' time. It should put these pounds sterling "aside" now (invest) in readiness for this payment.
2 Since USB doesn't have any spare pounds sterling, it will need to buy some. To do this it sells some dollars and buys pounds sterling today (at spot).
3 To sell the dollars it will need to have some dollars in the first place. The usual way to get the dollars in an exam question is to borrow them. (We assume this in order to make a valid comparison with the forward contract, where delivery is at a later date.)

Using our example:
1 Invest pounds sterling for three months
To calculate the amount to invest now you need to calculate the amount of interest that would be earned over the three months. To do this you should use the formula:

Amount invested today x (1 + 3 months' interest as a decimal) = £1m

The interest is interest "earned" for depositing pounds sterling in a bank account for three months until USB needs to make the payment. Since it is a deposit it will earn the lower interest of five per cent. This interest is per annum, but USB will only be depositing for three months, so you should divide this by four to get 1.25 per cent.

Amount invested today x (1 + 0.0125) = £1m

Amount invested today = £987,654

2 Buy pounds sterling at spot
£987,654 / 0.5120 = $1,929,012

3 USB will borrow the dollars
The interest rate used will be the borrowing (higher) one for

3 months (per annum / 4) = 2.4% / 4 = 0.6%.

$1,929,012 x (1 + 0.006) = $1,940,586

So, to summarise, we have borrowed dollars for three months, swapped them today for pounds sterling, earned interest on the pounds sterling until it reached £1m and then paid the supplier at a cost of $1,940,586.

(This equates to an exchange rate of $1,940,586 / £1,000,000 = $1.9406 or £0.5153 (1 / 1.9406), which is close to the forward rate, as it should be.)

Hedging using the futures market
The best way to tackle a futures question is to adopt a step-by-step approach, such as the one outlined below:

Buy or sell futures?	Look at the futures contract currency type. It is in £ (£100,000 contracts). We need to sell $ and buy £, so we need to buy futures.
How many contracts?	£1,000,000 / £100,000 = ten contracts
Which expiry date?	Futures contracts have quarterly close-out dates that may not be the same date as the transaction. You should choose the first quarterly date that expires after the transaction date, i.e. September. (You could use a December contract but this leaves more basis risk, which is why you should choose the first quarterly date.)
Price?	1.9170 $/£
Summary	Buy ten September futures contracts at a price of 1.9170 $/£. ▶

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(Note that closing out a September future on 31 July will leave some risk, since futures prices vary with time. However, we don't know from the question what this might be, so ignore it.)

The intention from setting up the futures contract is that we have now fixed the exchange rate at 1.9170, which would give a cost of $1,917,000.

(Don't forget the margin of $1,000 per contract. USB needs to buy ten contracts leading to an upfront cost of $10,000. This is refunded at close-out, but the time value of money will have cost USB a small sum, which we will ignore. Alternatively, had the example been based on a UK company, then the buying and selling of dollars for the margin payment and its refund would have given rise to a further profit or loss on exchange. Again this would tend to be small and often ignored.)

Hedging using an option

Again the best way to tackle an options question is to adopt a step-by-step approach such as the one set out below:

Put or call?	A put option is to sell whereas a call option is to buy. In order to know which one you need you first need to know the currency of the options. The question uses £250,000 contracts, the key part being the £. We are required to buy £ so we must buy a call £.
How many contracts?	£1,000,000 / £250,000 = four contracts
Which expiry date?	September, for the same reason as for futures – the first quarter that expires after the transaction date. (Remember that there are two types of options – European (exercisable on a particular date, for example 30 June, 30 September) and American (exercisable any time up to and including expiry). We will assume that these are American options and can be exercised on our preferred date of, say, 31 July.)
Which exercise price?	We are using these options as a form of insurance. We don't want to use them, but we will if we have to – when the worst happens. You should choose the cheapest one that includes the exercise price and the premium. For example, if you are buying £ then you add the premium cost to the $ cost. (If you were selling then you would deduct the premium from the $ receipt.) **In the question this gives:** 1.9000 + 0.0355 = 1.9355 (this is the cheapest) 1.9200 + 0.0232 = 1.9432 1.9400 + 0.0115 = 1.9515 (this is the most expensive)
Summary	Buy four September call options at an exercise price of 1.9000 $/£ at an upfront premium cost of 0.0355, which equates to $35,500 (0.0355 x £1m).

Depending on what happens to the dollars/pounds sterling exchange rate on 31 July, USB may or may not exercise the option. Let us imagine it does. It will pay $1,900,000 in exchange for £1m (having already paid the premium of $35,500 on 1 May).

The total cost of the option (ignoring the time value of money) is $1,900,000 + $35,500 = $1,935,500.

Summary of costs

	$
Forward contract	1,933,862
Money market hedge	1,940,586
Futures market	1,917,000
Option	1,935,500

In this example, the futures market was the cheapest technique as at 1 May.

However, the option may actually have worked out to be the best choice if the future exchange rate was favourable and we chose not to exercise the option. For example, if the future spot on 31 July was, say, £ / $ 0.5320, then USB would only need to pay $1,879,699 (£1,000,000 / $0.5320), which when added to the $35,500 premium gives a total option cost of $1,915,199.

(Whichever hedging technique you have used, you are effectively doing the same thing – buying. You will buy a forward contract, buy at spot using a money market hedge, buy pounds sterling futures or buy (call = buy pounds sterling) options.)
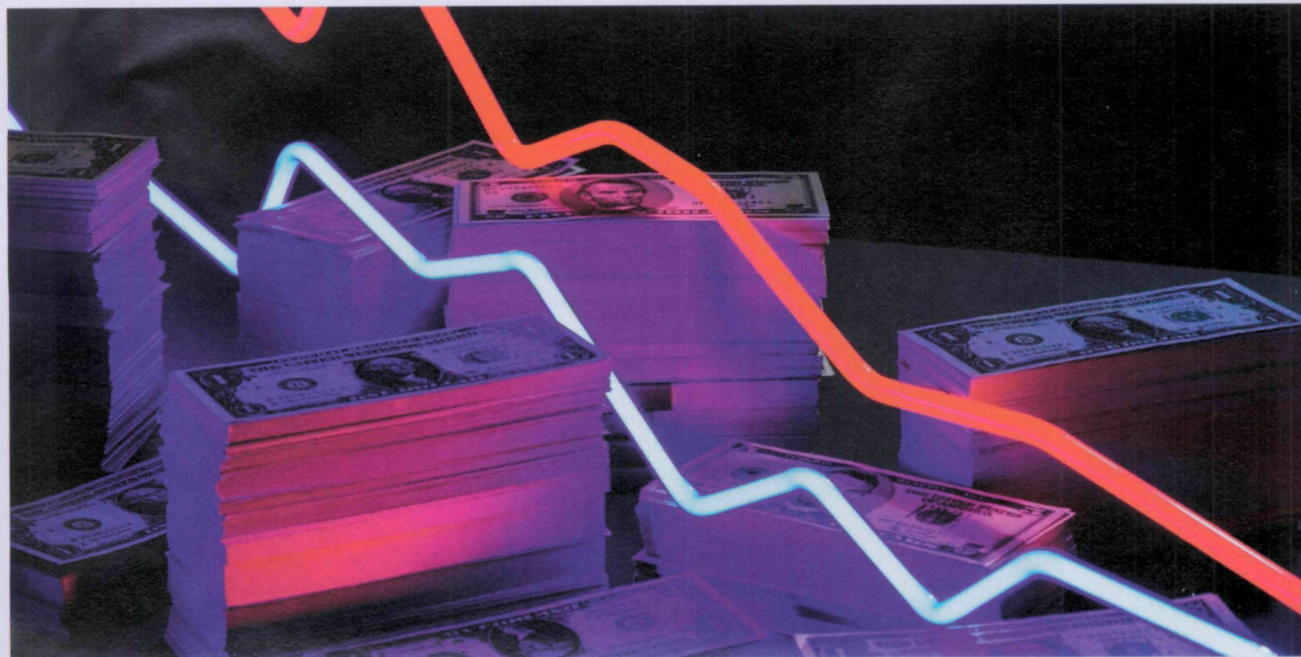
Currency swap

A further possible foreign currency hedging technique is a currency swap. If USB could find an American company it trusted, which was going to receive £1m, it could simply agree a rate of exchange and take the £1m for the agreed number of dollars.

Currency swaps are usually a longer-term hedging technique.

Narrative question

Having performed the calculations there is, unfortunately, also the (greater) possibility of a written question on foreign currency hedging. The examiner so far has tended to concentrate on written elements of the foreign currency syllabus rather than the numbers. In fact, it is highly unlikely that you would encounter a question testing all the hedging techniques numerically.

Choosing which, if any, of the hedging techniques would be appropriate for the transaction is a higher-

level skill. Key considerations are:

● **Whether to hedge at all** – USB may consider the currency markets to be relatively stable and, therefore, doesn't expect the cost of the transaction to be materially different in the future. The use of a hedging technique would be considered a waste of time and money. Alternatively, USB may be a risk taker and predict that exchange rates will move in its favour. Again, it may do nothing, anticipating the making of a profit for USB.

It might also make many transactions in a wide variety of currencies and therefore argue that not all rates would go down. Losses on the transaction in one currency could be offset by an equivalent gain from another currency.

● **Internal hedging** – USB may be able to negotiate a price in dollars with its supplier, passing the exchange rate risk to the supplier. It might pay earlier (or later), taking advantage of a favourable exchange rate. It may already have some pounds sterling in a bank account that could be used to make the payment or it might have made a sale to a customer who is going to pay it in pounds sterling, which could be used. In rare circumstances USB may be able to offer its supplier some software or other services where no money actually changes hands. (The taxman doesn't like this, which is why it is quite rare.)

However, USB may choose, or need, to hedge. Which technique it chooses might depend on:

● **Currency** – The transaction is exchanging

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dollars for pounds sterling. The dollar and the pound are two of the most widely traded currencies in the world. All the hedging techniques detailed above are available for exchanging dollars for pounds sterling and vice versa. However, if the transaction included a less commonly traded currency, say, the Angolan kwanza, then many of the hedging techniques, such as futures and options, would be much more difficult or unavailable since there is no actively traded market.

● **Amount** – The transaction is a payment of £1m. Although this amount might be large to you or I, in big businesses it is a relatively small sum. Also the exposure will be on the full £1m, but the actual cash-flow effect will be far less. Some of the hedging techniques, particularly futures and options, are only worthwhile when hedging very large amounts of money (several million pounds). The premiums involved will be costly for these hedging techniques, where the purchaser of the dollars from USB will undertake a certain level of administration (accounting, monitoring and reporting) to set up and manage the contracts. These administrative fixed costs are reflected in the premiums, which will be relatively high for smaller value transactions, putting buyers off using this form of hedging.

● **Expertise** – Hedging using futures and options is relatively complicated to administer and manage. Only larger companies, therefore, tend to use them, where the company is large enough to warrant ▶

the salary of employees who know how to use them. Because these are usually used by large companies, they are invariably for larger-value transactions.

● **Cost** – Each of the hedging techniques has a cost – some are visible, some are hidden. The option premium, for example, can be clearly seen. However, you must realise that all techniques come with a cost and the forward contract costs, for example, are simply factored in to the spread on the rate quoted – for instance it is worse than it could be due to the cost being included. (You didn't think that Thomas Cook and the Post Office really offered "free commission" on your holiday currency, did you?) However, some techniques are cheaper than others. Generally futures or forward rates will be one of the cheaper techniques while options are often the most expensive. (Because rather than fixing the rate you are receiving a minimum, which could get better...) Futures can be cheaper than a forward contract due to its standardisation.

> **'You must realise that all techniques come with a cost. Generally, futures or forward rates will be one of the cheaper techniques while options are often the most expensive'**

● **The money market hedge should be relatively cheap** – Exchanging currency at spot should be cheaper than at a forward rate, but there will be administration costs to consider: taking out a loan in dollars and opening a pounds sterling bank account. Depending on the size of the company, opening a foreign currency bank account, particularly for a loan, can be problematic.

Options are usually the most expensive hedging technique for two reasons – the prices charged by the counterparty and the management time involved in dealing with the more complex technique.

Conclusions

In our example, USB appears to be a relatively large company, being incorporated (like a UK plc). For this reason it may be happy to use any of the techniques. However, if it is actually quite small, and lacks experience in hedging, it may prefer to avoid the future and option techniques.

Further reading *CIMA Official Study Text, Performance Strategy 2011-2012 edition.*

Paper T4 (part b)
The Seven Deadly Sins of a Case Study

Don't miss the killer issue. Don't ignore the numbers. Don't yield to indecision. Take heed of these pitfalls and you'll be ready to crack the T4B Case Study

By *David Harris*
Chartered management accountant, freelance lecturer and management consultant

Most of the articles that have been written about the T4B Case Study tell you, sometimes at great length, what you should do. This one is different – it's a summary of the main things you shouldn't do. I call these the seven deadly sins – seven ways to show your marker that you aren't to be trusted as a qualified management accountant. These are the things that make markers nervous, and nervous markers don't like giving marks.

1 Not recommending anything

The main cause of this is just poor time management. The problem with recommendations is that they come at the end of the report. So if you run out of time (and don't have an "exit strategy") you may never get round to recommending anything. This is a shame, because a report with no recommendations has no value. The whole reason for asking you to produce a report is to get your advice.

Your exit strategy should be to stop writing one hour from the end of the exam, leave a few blank pages, and then write your recommendations (adding clear and detailed explanations and justifications – see below). Once you've done that, spend the remaining time "filling in the gaps", including part (b). You should adjust your style, writing more or less detail for each point you cover, depending on how large the gaps are and how little time you have left.

A report with clear recommendations, but which is a little "light" on content in the middle, has a lot of value. A report with no recommendations has no value at all. ▶