

MANAGEMENT OF CURRENCY RISK :
The choice between fixed forward and option contracts.

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Introduction

Question 4, part b, on the November exam paper for Financial Strategy involved a company that was planning to hedge its currency risk using either a fixed forward contract or a European currency option. Candidates were asked to recommend, with reasons, the most appropriate methods for the company to use to hedge its foreign exchange risk for the next three months. This question was not popular, probably because it concerned a topic new to the syllabus. It also caused some discussion, post-examination, about the correct approach to an acceptable answer. This article aims to explain the approach taken in the published solution and to raise some issues for discussion about the practical use of options.

Important note from the examiner – what I explain here is also way beyond what I might expect in the exam and I am conscious that this is a very tricky topic; the marking process recognises the difficulties for students in an examination environment, especially those who may have no practical exposure to foreign exchange risk management.

Question and answer

The company information and figures given in the question were as follows:

PS is a medium sized UK-based company that trades mainly in the UK and US. In the past PS has not hedged its currency risks but movements in the exchange rate have recently become more volatile. Assume it is now 30th September. The company expects net cash flow in US\$ (sales receipts less purchases) on the 31st December of US\$2,350,000

*The current quoted spot rate of exchange is US\$1.4180 to 1.4220 to the £1
 The US\$ discount on the three month forward rate of exchange is 0.36 - 0.46 cents
 Option prices (cents per £, payable on purchase of the option, contract size £31,250)*

Strike Price \$	September Contracts*	
	Calls	Puts
1.41	2.28	1.69
1.42	1.77	2.19
1.43	1.36	2.68

Assume there are three months from now to the expiry of the September contracts.

* Strictly, these are December contracts. The question was worded in this way as a "belt and braces" approach to make sure the candidates understood that the contracts were purchased in September but expired at the end of December. The columns could have been headed "December contracts" and the sentence underneath omitted.

The published solution is reproduced below.

It is first necessary to calculate the forward rate using the information given. As the US\$ is trading at a discount against the £, it is expected to weaken against the £.

Spot rates	1.4180	1.4220
Discount	+ .0036	+.0046
Forward rates	1.4216	1.4266

Method i Forward market cover

Hedge the risk by selling \$ forward.

The £ proceeds in 3 months time would be \$2,350,000/1.4266 = £1,647,273

Method ii - Option Contracts

The company is looking to hedge the risk of exchange movements between now and the date when the money is due to be received. The company will need to buy sterling call options for the £ equivalent of the \$ amount expected. At any rate less than 1.4266 the company would be better off selling on the spot market. An option contract at an exercise price of 1.41 or 1.42 would not seem sensible. The company would therefore buy options at an exercise price of \$1.43 to the £, option price 1.36 cents.

The first step is to determine the number of contracts needed:

$$\$2.350 \text{ million} / 1.43 / \text{£}31,250 = 52.59$$

The company can take out 52 contracts and cover the remainder of the transaction risk with a fixed forward contract, or bear the residual risk itself. In the case here, 52 contracts would cover \$2,323,750, leaving a balance of \$26,250. For such a relatively small amount, the company would probably bear the risk itself.

The sterling receipts, if the options were exercised, would be:

52 contracts at £31,250	=	1,625,000
\$26,250 sold at spot in 3 months (1.4266)		<u>18,400</u>
Total		1,643,400

Less option costs

*£31,250 * 52 * 1.36 cents*

= \$22,100/1.418

Net receipts

$$- \underline{15,585}$$

$$\text{£ } 1,627,815$$

Costs are payable when the option is taken out. If the option costs have to be paid in \$ the exchange rate to use would be the current spot buying price (assuming the company had to buy the \$s).

*The main advantage of options is clearly that they offer the firm the opportunity of **not** exercising the option. The main benefit to the company here is that if the spot rate moves in the firms favour, the company would allow the option to lapse at any rate below 1.43. The option costs of £15,585 would have been paid but this is the total extent of the "loss". In the example here, if the \$ strengthens against the £ to, say, 1.38 then the company would be better off selling the \$ on the spot market*

There are two main disadvantages. The first is the cost involved. The cost of an option is substantially higher than for fixed contracts to reflect the risk of the writer of the option. The second is that options are sold in standard contract amounts. This indivisibility means that the buyer of the option may have to use a fixed forward contract to cover a portion of the transaction amount or, more likely, carry the balance of the risk themselves, though this will be small.

With a fixed forward contract the company is locked into the deal. So that even if the exchange rate fell dramatically, to 1.38 say, the company is committed to selling at 1.4266 and could not take advantage of the windfall profits arising from currency fluctuations. However, as the company is stated as risk-averse and as the money due to be received appears virtually certain, in \$ terms, a fixed forward contract would be the sensible choice.

"Value for Money" calculations

It has been suggested that an alternative approach would be to make comparisons between the expected receipts if options were purchased at the three option prices given in the question. It has to be remembered contracts can only be bought in units of £31,250. As noted in the published solution, you could choose a number of contracts above or below what is needed and buy or sell the difference on the spot market. The number of contracts likely to be purchased is shown in table 1 below.

Rate	Calculation		No. of contracts	\$ value (no. of contracts x option price x £31,250)
1.41	$\$2,350,000/1.41/\text{£}31,250$	=	53.33 (Say 53)	2,335,313
1.42	$\$2,350,000/1.42/\text{£}31,250$	=	52.96 (Say 53)	2,351,875
1.43	$\$2,350,000/1.43/\text{£}31,250$	=	52.59 (Say 52)	2,323,750

The sterling receipts would be as shown below:

	@1.41	@1.42	@1.43
52 contracts at £31,250			1,625,000
53 contracts at £31,250	1,656,250	1,656,250	
\$14,687 sold at spot in 3 months [$(\text{£}2,350,000 - 2,335,313)/1.4266$]	10,295		
\$1,875 bought at spot in 3 months [$(\text{\$}2,350,000 - 2,351,875)/1.4216$]		-1,319	
\$26,250 sold at spot in 3 months [$(\text{\$}2,350,000 - 2,323,750)/1.4266$]			18,400
Total	1,666,545	1,654,931	1,643,400
Less option costs:			
[$(\text{£}31,250 \times 53 \times 2.28 \text{ cents})/1.418$]	-26,631		
[$(\text{£}31,250 \times 53 \times 1.77 \text{ cents})/1.418$]		-20,674	
[$(\text{£}31,250 \times 52 \times 1.36 \text{ cents})/1.418$]			-15,585
Net receipts	1,639,914	1,634,257	1,627,815

TABLE 1

This suggests a choice of an option at 1.41 because net receipts are highest. However, what is being done here is a calculation of “best value for money” purchase of an option hedge at various strike prices and comparing with each other *assuming they were exercised*. The arithmetical accuracy of these calculations is fine, but the issue is whether they make pragmatic sense, and whether the solution provided meets, or better meets, the requirements of the question.

The net receipts using an option at \$1.41 strike price would be £1,639,914. This compares with a sale at the spot rate at the end of December of £1,647,273, assuming the forward rate quoted in September holds as the spot rate in December. This implies the option would be abandoned. It could be argued that the option costs of £26,631 are a sunk cost and the comparison should be between the gross total receipts from exercising the option of £1,666,545 and the receipts if sold at spot. This would suggest exercising the option.

However, what we are looking at in this question is a decision on a hedging strategy *before* the hedge mechanism is decided. This will depend on what the company treasurer expects is going to happen, and therefore it is a comparison of net receipts that would be considered.

Options versus fixed forward contracts

A question could provide the spot rate in three months' time and ask, with the benefit of hindsight, which is the better method? This was not the case with this question. Here it could be assumed that the spot rate in three months time equated to the forward rate of \$1.4266. If the exercise price of a currency option is worse than the forward rate, and exchange rates move in the direction expected (that the dollar will weaken against the pound), it does not make sense to acquire an option at that price. In other words, you will only select an option price of \$1.41 if you expect to exercise it. Underlying a decision to purchase an option is the expectation that it will *not* be exercised. If the spot rate is below the option rate at the time the money is received by the company, then the option would be allowed to lapse because it would be more advantageous to sell the dollars on the spot market.

Given the forecast of forward rates in September the company would only take out an option if it thinks the dollar is going to weaken against the pound more than the markets do. If it doesn't, it will buy a forward contract.¹

If exchange rates move in the opposite direction (in this case if the dollar strengthens against the pound), then you would be better off with the option whose exercise price is less favourable than the forward rate. This suggests acquiring an option with an exercise price of \$1.43. This has greater upside potential, and a lower premium due to the less favourable strike rate. Gross and net receipts (before and after option costs) at three potential future spot rates compared with receipts using fixed forwards or options at 1.41 and 1.43 are shown in table 2 below.

¹ A further, minor, issue is that the net receipts do not reflect the opportunity cost of having to pay the premium at the outset. Candidates who made a sensible attempt to adjust for this in their answers would have gained credit.

Method	Spot \$1.38	Spot \$1.45	Spot \$1.4266
No hedge	£1,702,899	£1,620,690	£1,647,273
Forward contract	£1,647,273	£1,647,273	£1,647,273
Option – strike price \$1.41			
Net receipts	£1,640,262 ²	£1,639,748	£1,639,914
Gross receipts	£1,666,893	£1,666,379	£1,666,545
Option – strike price \$1.43			
Net receipts	£1,628,437	£1,627,518	£1,627,815
Gross receipts	£1,644,022	£1,643,103	£1,643,400

TABLE 2

Outcomes are shown at future spot rates above and below the forward rate, and at the forward rate. At the rate of \$1.4266, an option with an exercise price of \$1.41 would be exercised as this realises more than abandoning. An option with exercise price of \$1.43 would not be exercised, as gross receipts would be lower than selling at spot. A forward contract would have been better than using currency options regardless of the exercise price of the option once option costs are considered. If this exercise had been undertaken *before* the hedge was decided then the choice would have been:

If treasurer expects spot to be 1.4266: Fixed forward if risk averse, no hedge if prepared to take risk (to save transaction costs).

If treasurer expects spot to be 1.45: Fixed forward

If treasurer expects spot to be 1.38: No hedge, or if the risk is unacceptable, option at 1.43 (see below)

In reality, options are rarely financially advantageous over forward contracts because of the costs and administrative complexities. The main benefit is the fact that it is an *option* and therefore allows the company to take advantage of a windfall gain should one arise. So, for example, should the spot rate fall to 1.38 and you had taken out a fixed forward contract at 1.4266, you forego a windfall gain of £55,000+ (£1,702,899 - £1,647,273). If you had taken out an option at 1.43 then you simply let the option lapse, having paid premium costs of £15,585. This would still leave you with net

² Calculated as:
Value of contracts in \$ is 53 x £31,250 x 1.41 = \$2,335,312 which leaves \$14,688 uncovered.
Receipts are therefore:

53 x £31,250	=	£ 1,656,250
\$14,688 sold at spot (1.38)	=	<u>10,643</u>
Gross receipts		£ 1,666,893
Less option costs		<u>26,631</u>
Net receipts		£ 1,640,262

The other columns are similarly calculated. In essence they are calculated on the same basis as table 1 but use different spot rates.

receipts of £1,687,314 (£1,702,899 - £15,585), which is £40,000+ better off than with a fixed forward contract. If the option had been taken out at 1.41 then the premium paid would have been £26,631, and you would still let the option lapse.³ Therefore, if you confidently expect a spot rate less than 1.43, there is no financial logic in taking out an option because you would forfeit a higher premium and still sell on the spot market.⁴

What is not established by this question or its solution is the rationale that would be used to determine which option would be purchased, as this is deemed to be entirely dependent on the *expectation* of what the spot rate is likely to be in three months time. If the expectation is that the option will *not* be exercised, an option with an exercise price of \$1.43 should be purchased.

An interesting point is whether companies actually make choices between fixed forward and option contracts. Options are more expensive and administratively more difficult. Pike and Neale (1999) note: "options tend to be used to cover major isolated expenditures, e.g. the cost of completing the acquisition of an overseas company or the phased payments in a major overseas construction project. However, their use in very large multinational companies is not insignificant. A recent survey [Marshall, 2000] shows that currency options were used by 46% of respondent UK companies (76 in number) to manage transaction exposure. This compares with 92% who use forward contracts. The figures are not mutually exclusive and many of the multinational companies surveyed use more than one method of hedging currency risk. Informal, anecdotal evidence suggests smaller companies stick with fixed forwards for day-to-day hedging.

Concluding comment on expectations theory

A classic example of options being preferable to forwards is dealing with uncertain transactions. If the transaction does not happen the forward is binding and can result in a large loss but the largest loss with the option is the premium. However, if we truly believe in the expectations theory we may choose to do nothing, for example an exporter facing a weak forward rate would not use a forward or an option but may choose to remain unhedged.

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³ Although of course if you had taken out an option the decision at that stage would be based on a comparison of the gross receipts expected, that is £1,702,899 (spot) compared with £1,666,893 (\$1.41 option) or £1,644,022 (\$1.43 option) as the option premium payment is a sunk cost.

⁴ Given that the spot rate in three months time was not given in the question, candidates could have justified illustrating the option using either \$1.41 or \$1.43. Credit was available for all sensible approaches, although some indication of an understanding of expectations theory as it applies to options was expected for the highest marks.

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