

FRCS Revision Tute

Question 03 Answer

Requirement (a)

(i) The five variables are as follows

Share price or value

The current market price of a share.

Exercise price

Also known as the "strike" price - the price the holder of the option wishes to buy or sell the share at.

Risk free rate

As with the CAPM. the rate typically paid on three-month treasury bills.

Time to expiry

The number of days/months to the expiry of the option.

Share price volatility

This is the variability of the share price over a period of time measured by the variance.

(ii) As applied to capital investments, the variable could relate as follows:

Share price

Present value of expected cash flows

Exercise price

Initial Outlay on the investment

Risk free Interest rate

Risk free Interest rate

Time to expiry

Time until the Investment opportunity disappears (not the time to the end of the Investment)

Requirement (b)

Supporting calculations

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	+ 0.0036	+0.0046
Forward rates	1.4216	1.4266

Method (i) Forward market cover

Hedge the risk by selling \$ forward The £ proceeds in 3 month's time would be

$$\frac{\$2,350,000}{1.4266} = \text{£}1,647,273$$

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. If the forward rate in three months' time is 1.4266 then at any rate less than this, 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 \$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		<u>1,643,400</u>
Less Option costs		
£31,250 x 52 x 136 = \$22,100/1.418		<u>-15,585</u>
Net receipts		<u>1,627,815</u>

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 company the opportunity of not exercising the option. The main benefit to the company here is that if the spot rate moves in the company's 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, 1.40 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 and carry some risk themselves, but this is likely to 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.

Question 04 Answer

Requirement (a)

The procedure for a swap will be:

- 1 Exchange of principal at spot (either notional or physical transfer - in this case probably physical) in order to provide the basis for computing interest.
- 2 Exchange of interest streams.
- 3 Re-exchange of principal on terms agreed at the outset.

The currency swap will provide some protection against the likely depreciation of the EE mark. A total of 1,500 million EE marks will be swapped, with the swap reversed at the year end. At a swap rate of 15 EEmarks/£ the principal involved in the swap will be:

EE marks 1,500 million/15 = £100 million

At the end of the year, 1,500 million EE marks can be swapped back at the same rate of 15 EE marks/£. 500 million EE marks - the profit in the contract - is therefore still exposed to currency risk.

The expected level of inflation in the UK is 3% and in the EE country 25%. In the absence of available forward rates, the purchasing power parity (PPP) theory can be used to estimate an exchange rate at the end of the year. PPP states that if the rate of inflation in one country is greater than the rate of inflation in another country, exchange rates will adjust to offset the differential, therefore the cost of living in each country would be the same.

Using PPP, the £ is expected to strengthen against the EE mark. The expected year-end exchange rate is therefore:

$18 \times (1.25/1.03) = 21.85$ EE marks/£

The interest cost of the swap is 1,500 million EE marks x 20% = 300 million EE marks

	£m
The amount of EE marks to be remitted at the spot rate at the year-end is therefore: $(2,000 - 1,500 - 300)/21.85 = 200/21.85 =$	9.15
Interest received from the EE-based company is $£100 \times 12\% =$	<u>12.00</u>
Total net sterling receipts	21.15
Note that AS pic also has 750 million EE marks tied up for 6 months. There is an opportunity cost attached to this which should be offset against the interest receipt:	
750 million EE marks/18 = £4167 million @ [15%/2] assuming simple bi-annual interest =	<u>3.15</u>
Total receipts after opportunity costs	<u>18.03</u>

If the company can invest the 750 million EE marks in some way, the receipts can be offset against the opportunity cost of £3.15 million. If the swap is not used, the full 2,000 million EE marks is exposed to currency risk.

Sterling costs are:	£m
750 million EE marks @ 18/£ =	(41.67)
Exchanged immediately	
750 million EE marks @ 19.93/£ =	(37.63)
Exchanged in 6 months and assuming the exchange rate EE mark/£ moves downward at a constant rate throughout the year	
Year end receipt of 2,000 million EE marks at 21.85 EE marks/£ =	<u>91.53</u>
Total	<u>12.23</u>

Recommendation:

- 1 The swap option appears the most advantageous.
- 2 The opportunity cost of total funds needs to be considered. However, assuming an investment appraisal has been done, this is a financing and risk management decision rather than an investment decision.
- 3 The credit worthiness of the EE-based company needs to be fully evaluated as it is taking on significant risk itself on the interest payments.

Requirement (b)

A swap is the exchange of one stream of future cash flows for another stream of future cash flows with different characteristics. Such opportunities generally exist because of imperfections in financial markets, although the difference here is unusually large to be explained in this way. In respect of interest rate swaps, it is because risk premiums charged to a company in the fixed rate borrowing market are not necessarily the same as the risk premiums charged in the floating rate market. Currency swaps are contracts to exchange cash flows relating to debt obligations.

The potential benefits include:

- 1 Ability to match financing with operations, for example if the company has a high level of fixed interest debt, but its operational income is now correlated with short term interest rates, it can enter into a swap arrangement with a company with the opposite profile.
- 2 Ability to obtain finance, or cheaper finance, than by borrowing directly in the market if AB plc has a comparative advantage in terms of credit rating. This provides an arbitrage opportunity that can be shared by the participants in the swap.
- 3 Hedging against foreign exchange risk - currency swaps can be particularly useful here, especially when dealing with countries with no formal capital markets or volatile exchange rates, such as is likely to be the case with the EE contract which involves a soft, depreciating currency.
- 4 Interest rate commitments can be altered without redeeming old or issuing new debt, which is an expensive procedure.
- 5 Swaps can be developed to meet specific needs, for example zero coupon swaps or "swaptions".

However, there are disadvantages. Swaps are typically arranged through intermediaries, which creates opportunities for speculators. This is a high-risk business and should not be undertaken without extensive expertise. In the circumstances here, the company appears to have a treasurer with knowledge and perhaps expertise in this area. Swaps may well have a part to play in AS plc's treasury management.