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Risk Management on Foreign Exchange

Practice Questions – Part 1

Chartered Accountancy
Strategic Level

Corporate Finance & Risk Management (CFRM)

Samira Anthony
BB. Mgt. (Finance) Sp., ACA, Reading for MBA., CA Prize Winner

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JMC Jayasekera Management Centre (Pvt) Ltd
Pioneers in Professional Education
65/2A, Chittampalam Gardiner Mawatha, Colombo 02 | T: +94 112 430451 | E: info@jmc.lk | F: +94 115 377917

CORPORATE FINANCE & RISK MANAGEMENT

(SL2)

Strategic Level Examination - **June 2020**

Practice Questions on:

✓Risk Management on Foreign Exchange

SAMIRA ANTHONY

December 2014 – ACCA

Keshi Co is a large multinational company with a number of international subsidiary companies. A centralised treasury department manages Keshi Co and its subsidiaries' borrowing requirements, cash surplus investment and financial risk management. Financial risk is normally managed using conventional derivative products such as forwards, futures, options and swaps.

Assume it is 1 December 2014 today and Keshi Co is expecting to borrow $18,000,000 on 1 February 2015 for a period of seven months. It can either borrow the funds at a variable rate of LIBOR plus 40 basis points or a fixed rate of 5·5%. LIBOR is currently 3·8% but Keshi Co feels that this could increase or decrease by 0·5% over the coming months due to increasing uncertainty in the markets.

The treasury department is considering whether or not to hedge the $18,000,000, using either exchange-traded March options or over-the-counter swaps offered by Rozu Bank.

The following information and quotes for $ March options are provided from an appropriate exchange. The options are based on three-month $ futures, $1,000,000 contract size and option premiums are in annual %.

March calls	Strike price	March puts
0·882	95·50	0·662
0·648	96·00	0·902

Option prices are quoted in basis points at 100 minus the annual % yield and settlement of the options contracts is at the end of March 2015. The current basis on the March futures price is 44 points; and it is expected to be 33 points on 1 January 2015, 22 points on 1 February 2015 and 11 points on 1 March 2015.

Rozu Bank has offered Keshi Co a swap on a counterparty variable rate of LIBOR plus 30 basis points or a fixed rate of 4·6%, where Keshi Co receives 70% of any benefits accruing from undertaking the swap, prior to any bank charges. Rozu Bank will charge Keshi Co 10 basis points for the swap.

Keshi Co's chief executive officer believes that a centralised treasury department is necessary in order to increase shareholder value, but Keshi Co's new chief financial

officer (CFO) thinks that having decentralised treasury departments operating across the subsidiary companies could be more beneficial. The CFO thinks that this is particularly relevant to the situation which Suisen Co, a company owned by Keshi Co, is facing.

Suisen Co operates in a country where most companies conduct business activities based on Islamic finance principles. It produces confectionery products including chocolates. It wants to use Salam contracts instead of commodity futures contracts to hedge its exposure to price fluctuations of cocoa. Salam contracts involve a commodity which is sold based on currently agreed prices, quantity and quality. Full payment is received by the seller immediately, for an agreed delivery to be made in the future.

Required:

(a) Based on the two hedging choices Keshi Co is considering, recommend a hedging strategy for the $18,000,000 borrowing. Support your answer with appropriate calculations and discussion. (15 marks)

(b) Discuss how a centralised treasury department may increase value for Keshi Co and the possible reasons for decentralising the treasury department. (6 marks)

Answer

(a) Using traded options

Need to hedge against a rise in interest rates, therefore buy put options.
Keshi Co needs 42 March put option contracts ($18,000,000/$1,000,000 x 7 months/3 months).

Expected futures price on 1 February if interest rates increase by 0·5% =
100 – (3·8 + 0·5) – 0·22 = 95·48

Expected futures price on 1 February if interest rates decrease by 0·5% =
100 – (3·8 – 0·5) – 0·22 = 96·48

If interest rates increase by 0·5% to 4·3%

Exercise price	95·50	96·00
Futures price	95·48	95·48
Exercise?	Yes	Yes
Gain in basis points	2	52
Underlying cost of borrowing		
4·7% x 7/12 x $18,000,000	$493,500	$493,500
Gain on options		
0·0002 x $1,000,000 x 3/12 x 42	$2,100	
0·0052 x $1,000,000 x 3/12 x 42		$54,600
Premium		
0·00662 x $1,000,000 x 3/12 x 42	$69,510	
0·00902 x $1,000,000 x 3/12 x 42		$94,710
Net cost	$560,910	$533,610
Effective interest rate	5·34%	5·08%

If interest rates decrease by 0·5% to 3·3%

Exercise price	95·50	96·00
Futures price	96·48	96·48
Exercise?	No	No
Gain in basis points	0	0
Underlying cost of borrowing		
3·7% x 7/12 x $18,000,000	$388,500	$388,500
Gain on options	$0	$0
Premium	$69,510	$94,710
Net cost	$458,010	$483,210
Effective interest rate	4·36%	4·60%

Using swaps

	Keshi Co	Rozu Bank offer	Basis differential
Fixed rate	5·5%	4·6%	0·9%
Floating rate	LIBOR + 0·4%	LIBOR + 0·3%	0·1%

Prior to the swap, Keshi will borrow at LIBOR + 0·4% and swaps this rate to a fixed rate. Total possible benefit is 0·8% before Rozu Bank's charges.

Keshi Co borrows at	LIBOR + 0·4%
From swap Keshi Co receives	LIBOR
Keshi Co gets 70% of the benefit	
Advantage (70% x 0·8 – 0·10)	0·46%
Keshi Co's effective borrowing rate (after swap)	5·04%

Alternatively (Swap)

From swap Keshi Co receives	LIBOR
Keshi Co pays	4·54%
Effective borrowing rate (as above)	4·54% + 0·4% + 0·10% = 5·04%

Discussion and recommendation

Under each choice the interest rate cost to Keshi Co will be as follows:

	Doing nothing	95·50 option	96·00 option	Swap
If rates increase by 0·5%	4·7% floating; 5·5% fixed	5·34%	5·08%	5·04%
If rates decrease by 0·5%	3·7% floating; 5·5% fixed	4·36%	4·60%	5·04%

Borrowing at the floating rate and undertaking a swap effectively fixes the rate of interest at 5·04% for the loan, which is significantly lower than the market fixed rate of 5·5%.

On the other hand, doing nothing and borrowing at the floating rate minimises the interest rate at 4·7%, against the next best choice which is the swap at 5·04% if interest rates increase by 0·5%. And should interest rates decrease by 0·5%, then doing nothing and borrowing at a floating rate of 3·7% minimises cost, compared to the next best choice which is the 95·50 option.

On the face of it, doing nothing and borrowing at a floating rate seems to be the better choice if interest rates increase or decrease by a small amount, but if interest rates increase substantially then this choice will no longer result in the lowest cost.

The swap minimises the variability of the borrowing rates, while doing nothing and borrowing at a floating rate maximises the variability. If Keshi Co wants to eliminate the risk of interest rate fluctuations completely, then it should borrow at the floating rate and swap it into a fixed rate.

(b) Free cash flows and therefore shareholder value are increased when corporate costs are reduced and/or income increased.

Therefore, consideration should be given to how the centralised treasury department may reduce costs and increase income. The centralised treasury department should be able to evaluate the financing requirements of Keshi Co's group as a whole and it may be able to negotiate better rates when borrowing in bulk. The department could operate as an internal

bank and undertake matching of funds. Therefore it could transfer funds from subsidiaries which have spare cash resources to ones which need them, and thus avoid going into the costly external market to raise funds. The department may be able to undertake multilateral internal netting and thereby reduce costs related to hedging activity. Experts and resources within one location could reduce duplication costs.

The concentration of experts and resources within one central department may result in a more effective decision-making environment and higher quality risk monitoring and control. Further, having access to the Keshi Co group's entire cash funds may give the company access to larger and more diverse investment markets. These factors could result in increasing the company's cash inflows, as long as the benefits from such activity outweigh the costs.

Decentralising Keshi Co's treasury function to its subsidiary companies may be beneficial in several ways. Each subsidiary company may be better placed to take local regulations, custom and practice into consideration. An example of custom and practice is the case of Suisen Co's need to use Salam contracts instead of conventional derivative products which the centralised treasury department may use as a matter of course.

Giving subsidiary companies more autonomy on how they undertake their own fund management may result in increased motivation and effort from the subsidiary's senior management and thereby increase future income. Subsidiary companies which have access to their own funds may be able to respond to opportunities quicker and establish competitive advantage more effectively.

March/June 2019 – ACCA

Lurgshall Co is a listed electronics company. Lurgshall Co has recently appointed a new chief executive, who has a number of plans to expand the company. The chief executive also plans to look carefully at the costs of all departments in Lurgshall Co's head office, including the centralised treasury department.

The first major investment which the chief executive will oversee is an investment in facilities to produce applications-specific components. To finance the planned investment, it is likely that Lurgshall Co will have to borrow money. It is now 1 May. At present, it seems that Lurgshall Co will need to borrow $84 million on 1 September, for a period of six months, though both the amount and the period of borrowing are subject to some uncertainty. The treasurer plans to borrow the funds at a variable rate of LIBOR plus 50 basis points. LIBOR is currently 4·5% but is expected to rise by up to 0·6% between now and 1 September.

So far, the possibility of hedging a rise in LIBOR of 0·6% using a forward rate agreement or September $ futures has been investigated. The results of the calculations for these instruments were as follows:

4–10 Forward rate agreement from Birdam Bank: 5·38%

Three-month traded September $ futures: 5·36%

Lurgshall Co's treasurer also wants to consider using options on futures to hedge loans. Although Lurgshall Co has not previously used swaps for hedging purposes, the treasurer has asked Birdam Bank to find a counterparty for a potential swap arrangement. Relevant information about options and swaps is as follows:

Options

The current price for three-month $ September futures, $2 million contract size is 95·05. The price is quoted in basis points at 100 – annual % yield.

Options on three-month September $ futures, $2 million contract size, option premiums are in annual %

September calls	Strike price	September puts
0·132	95·25	0·411

It can be assumed that futures and options contracts are settled at the end of each month. Basis can be assumed to diminish to zero at contract maturity at a constant rate, based on monthly time intervals. It can also be assumed that there is no basis risk and there are no margin requirements.

Swap

Birdam Bank has found a possible counterparty to enter into a swap with Lurgshall Co. The counterparty can borrow at an annual floating rate of LIBOR + 1·5% or a fixed rate of 6·1%. Birdam Bank has quoted Lurgshall Co a notional fixed rate of 5·6% for it to borrow. Birdam Bank would charge a fee of 10 basis points to each party individually to act as the intermediary of the swap. Both parties would share equally the potential gains from the swap contract.

Treasury staffing

Lurgshall Co's new chief executive has made the following comments: 'I understand that the treasury department has a number of day-to-day responsibilities, including investing surplus funds for the short-term liquidity management and hedging against currency and interest rates. However, these tasks could all be carried out by the junior, less experienced, members of the department. I do not see why the department needs to employ experienced, expensive staff, as it does not contribute to the strategic success of the company.'

Required:

(a) Compare the results of hedging the $84 million, using the options and the swap, with the results already obtained using the forward rate agreement and futures, and comment on the results. Show all relevant calculations, including how the interest rate swap would work. (15 marks)

(b) Discuss the advantages and disadvantages of using swaps as a means of hedging interest rate risk for Lurgshall Co. (5 marks)

(c) Criticise the views of the chief executive about the work carried out by the treasury department and the staff required to do this work. (5 marks)

(25 marks)

Answer

(a) Options

Buy put options as need to hedge against a rise in interest rates.

Number of contracts required: $84,000,000/$2,000,000 x 6/3 = 84

Total basis = current price (1 May) – futures price = (100 – 4·50) – 95·05 = 0·45

Unexpired basis on 1 September = 0·45 x 1/5 = 0·09

Expected futures price = 100 – 5·1 – 0·09 = 94·81

Exercise price	95·25
Futures price as above	94·81
Exercise?	Yes
Gain in basis points	44

	$
Interest paid ($84,000,000 x 5·6% x 6/12)	2,352,000
Gain from options	
0·0044 x $2,000,000 x 3/12 x 84	(184,800)
Premium	
0·00411 x $2,000,000 x 3/12 x 84	172,620
Net payment	2,339,820
Effective annual interest rate	
2,339,820/84,000,000 x 12/6	5·57%

Swaps

	Lurgshall Co	Counterparty	Interest rate differential
Fixed rate	5·60%	6·10%	0·50%
Floating rate	LIBOR + 0·50%	LIBOR + 1·50%	1·00%

Lurgshall Co has an advantage in borrowing at both fixed and floating rates, but the floating rate advantage is larger.

Gain % for Lurgshall Co = 50% (1 – 0·5 – 0·2) = 0·15

	Lurgshall Co	Counterparty
Rate without swap	(5·60%)	(LIBOR + 1·50%)
Benefit	0·15%	0·15%
Net result	(5·45%)	(LIBOR + 1·35%)
Swap		
Borrows at	(LIBOR + 0·50%)	(6·10)
Lurgshall Co pays	(4·85%)	4·85%
Counterparty pays	LIBOR	(LIBOR)
Bank fee	(0·10%)	(0·10%)
Net result	(5·45%)	(LIBOR + 1·35%)

Comments

The swap gives a result which is marginally worse than the forward rate agreement and the futures. The options give a worse result than the other choices.

Risks which might be considered include counterparty risk for the forward rate agreement and swap. Using Birdam Bank should mean that this risk is low for forward rate agreements, and also for swaps, assuming that the bank bears the risk of the counterparty defaulting.

Basis risk should be considered for the traded futures. Here, because the differences between the instruments are small, a failure to estimate basis accurately may mean that futures are chosen when they do not offer the lowest borrowing cost. For the swaps, if Lurgshall Co swaps into fixed rate debt, it faces the market risk of an unexpected fall in interest rates.

Other factors to consider include the possibility that rates will increase rather less than forecast, meaning that the option would not be exercised and at some point would be the lowest cost choice. The length of time of the swap also needs to be considered. Although it commits Lurgshall Co to the fixed rate, if the borrowing turns out to be longer than the six months, the swap may provide a better time match than the other hedging opportunities.

(b) Advantages of swaps

Transaction costs are generally relatively low. If Lurgshall Co arranged the swap itself, the costs would be limited to legal fees.

The transaction costs may also be lower than the costs of terminating one loan and arranging another.

Lurgshall Co can, as here, swap a commitment to pay a variable rate of interest which is uncertain with a guaranteed fixed rate of interest. This allows Lurgshall Co to forecast finance costs on the loan with certainty.

Swaps are over-the-counter arrangements. They can be arranged in any size and for whatever time period is required, unlike traded derivatives.

The period available for the swap may be longer than is offered for other interest rate derivatives.

Swaps make use of the principle of comparative advantage. Lurgshall Co can borrow in the market where the best deal is available to it, and then use the swap to access the loan finance it actually wants at an overall cheaper cost.

Disadvantages of swaps

Swaps are subject to counterparty risk, the risk that the other party to the arrangement may default on the arrangement. This would apply in particular if Lurgshall Co arranged the swap itself. If it is arranged through a bank, the bank can provide a guarantee that the swap will be honoured.

If Lurgshall Co swaps into a fixed rate commitment, it cannot then change that commitment. This means it cannot take advantage of favourable interest rate changes as it could if it used options. This may be a particular problem if the swap period is more than a few months and interest rates are expected to be volatile.

As swaps are over-the-counter instruments, they cannot be easily traded or allowed to lapse if they are not needed or become no longer advantageous. It is possible that a bank may allow a reswapping arrangement to reverse a swap which is not required, but this will incur further costs.

(c) The chief executive appears to underestimate the degree of knowledge required for day-to-day work. Less experienced staff may be able to arrange borrowing if the lender has already been chosen or, for example, arrange forward rate agreements to be used if they are prescribed.

However, if judgement is required as to, for example, which lender or hedging instrument to use, using less experienced staff may mean that a sub-optimal decision is taken. Poor decisions may result in opportunity costs, for example, not using the lender who gives the best deal or being committed to a fixed forward rate agreement when an

option would have allowed the business to take advantage of favourable rate movements. These opportunity costs may not be as clear as the salary costs of experienced staff.

As the business operates internationally, the treasury department will need to monitor financial market conditions and exchange rates, and other issues which may be significant such as political developments. Because of their previous experiences, longer-serving staff are more likely to appreciate the implications of developments and whether treasury policies and decisions need to change in response to changes in risk. Senior staff are also needed to manage the work of less experienced staff to prevent or mitigate the effect of mistakes which may be costly.

Experienced staff are also needed to establish overall guidelines and policies for treasury activities. Their judgement will be required to establish principles which will mean that actions taken by staff are in line with the risk appetite of the business and are sufficiently prudent from the viewpoint of risk management. Experienced staff will also have greater knowledge of law, accounting standards and tax regulations, which can help the business avoid penalties and perhaps structure its dealings so that it can, for example, minimise the level of tax paid.

The chief executive has plans for a major expansion of the business, involving significant investment and financing decisions.

Advice from experienced treasury staff will be invaluable in supporting the decisions required. If Lurgshall Co is planning a major acquisition, the treasury function can provide advice on the structure of consideration and financing implications. If, as here, a major investment is being contemplated, experienced staff can advise on translating views on risk into a relevant cost of capital, which will help ensure that the financial appraisal of the investment is realistic.

December 2018 – ACCA

Nutourne Co is a company based in the USA, supplying medical equipment to the USA and Europe.

It is 30 November 20X8. Nutourne Co's treasury department is currently dealing with a sale to a Swiss customer of CHF12·3 million which has just been agreed, where the customer will pay for the equipment on 31 May 20X9. The treasury department intends to hedge the foreign exchange risk on this transaction using traded futures or options as far as possible. Any amount not hedged by a futures or option contract will be hedged on the forward market.

Exchange rates (quoted as US$/CHF 1)

Spot	1·0292–1·0309
Three months forward	1·0327–1·0347
Six months forward	1·0358–1·0380

Currency futures (contract size CHF125,000, futures price quoted as US$ per CHF1)

	Futures price
December	1·0318
March	1·0345
June	1·0369

Currency options (contract size CHF125,000, exercise price quotation US$ per CHF1, premium: US cents per CHF1)

	Calls			Puts		
Exercise price	December	March	June	December	March	June
1·0375	0·47	0·50	0·53	0·74	0·79	0·86

Futures and options contracts mature at the month end.

Non-executive director's comments

A new non-executive director has recently been briefed about the work of the treasury department and has a number of questions about hedging activities. He wants to understand the significance of basis risk in relation to futures. He also wants to know the significant features of over-the-counter forward contracts and options, and why Nutourne Co prefers to use exchange-traded derivatives for hedging.

The non-executive director has also heard about the mark-to-market process and wants to understand the terminology involved, and how the process works, using the transaction with the Swiss customer as an example. The treasury department has supplied relevant information to answer his query. The contract specification for the CHF futures contract states that an initial margin of US$1,450 per contract will be required and a maintenance margin of US$1,360 per contract will also be required. The tick size on the contract is US$0·0001 and the tick value is US$12·50.

You can assume that on the first day when Nutourne Co holds the futures contracts, the loss per contract is US$0·0011.

Required:

(a) Evaluate which of the exchange-traded derivatives would give Nutourne Co the higher receipt, considering scenarios when the options are and are not exercised. (12 marks)

(b) Discuss the benefits and drawbacks for Nutourne Co in using forward contracts compared with using over-the-counter currency options, and explain why Nutourne Co may prefer to use exchange-traded derivatives rather than over-the-counter derivatives to hedge foreign currency risk. (7 marks)

(c) Explain to the non-executive director how the mark-to-market process would work for the CHF futures, including the significance of the data supplied by the treasury department. Illustrate your explanation with calculations showing what would happen on the first day, using the data supplied by the treasury department. (6 marks)

(25 marks)

Answer

(a) Nutourne Co will have a Swiss Franc receipt in six months' time and needs to hedge against the dollar strengthening.

Futures

Sell Swiss futures and use June futures contracts.

No. of contracts = CHF12,300,000/125,000 = 98·4, say 98, hedging CHF12,250,000

Remainder to be hedged on the forward market is

CHF12,300,000 – CHF12,250,000 = CHF 50,000

Receipt = CHF50,000 x 1·0358= $51,790

Calculation of futures price

Assume that basis reduces to zero at contract maturity in a linear fashion.

Estimate from March and June futures contract rates.

Predicted futures rate at the end of May = 1·0345 + ([1·0369 – 1·0345] x 2/3) = 1·0361

Expected receipt = CHF12,250,000 x 1·0361 = $12,692,225

Outcome

	$
Futures	12,692,225
Remainder on forward market	51,790
	12,744,015

Or

Calculation of futures price

Alternatively, use spot rate = 1·0292

Predicted futures rate at the end of May = 1·0292 + (6/7 x (1·0369 – 1·0292)) = 1·0358 (when the June futures contract is closed out in May).

Expected receipt = CHF12,250,000 x 1·0358 = $12,688,550

Outcome

	$
Futures	12,688,550
Remainder on forward market	51,790
	12,740,340

Options contract

Nutourne Co would purchase CHF June put options.

Number of contracts 98, as before.

Amount not hedged, hedged by forward contract CHF translated as $51,790 as before.

Assuming the options are exercised:

	$
Receipt (W1)	12,709,375
Premium (W2)	(105,350)
Forward contract	51,790
	12,655,815

Workings

1 **Receipt**

CHF125,000 x 98 x 1·0375 = $12,709,375

2 **Premium**

1·0375 options = 98 x 125,000 x 0·0086 = $105,350

The options would give the higher receipt if they were not exercised and the spot rate moved sufficiently in Nutourne Co's favour. If Nutourne Co allowed the option to lapse, it would obtain the same receipt as under the futures if the US$/CHF spot rate was x, such that:

12,692,225 = 12,250,000x – 105,350
12,250,000x = 12,692,225 + 105,350

so that x is US$1·0447 = CHF1.

Or

$12,688,550 = 12,250,000x - 105,350$
$12,250,000x = 12,688,550 + 105,350$

so that x is US$1·0444 = CHF1.

Comments

If the options are exercised, the futures would give the higher receipt. The options give a lower receipt because of the premium which Nutourne Co has to pay. The futures will be subject to the risk that basis (the difference between the futures price and the spot price) may not decrease linearly as the futures approach maturity as assumed in the above calculations. This will mean that the hedge of the CHF 12,250,000 is imperfect, and the receipt may be unpredictable despite a futures hedge being taken out.

The options can also be allowed to lapse if for some reason the contract is not completed. If this happens, Nutourne Co will only have to settle the forward contract.

(b) Benefits of a forward contract

A forward contract would not involve payment of a large premium upfront to the counterparty.

A forward contract is a simple arrangement to understand, whereas the basis of calculation of the premium for an over-the-counter (OTC) option may be unclear.

A forward contract gives a certain receipt for the purposes of budgeting.

Drawbacks of a forward contract

A forward contract has to be fulfilled, even if the transaction which led to the forward contract being purchased is cancelled.

Exchange rate movements may mean that the contract has to be fulfilled at an unfavourable rate. An OTC option can be allowed to lapse if it is not needed.

A forward contract does not allow the holder to take advantage of favourable exchange rate movements. An OTC option need not be exercised if the exchange rate moves in the holder's favour.

A forward contract may only be available for a short time period, depending on what currencies are involved. An OTC option may be purchased for a longer time period, over a year.

The rate offered on a forward contract will be determined by a prediction based on expected interest rates. The rate offered on an OTC option may be more flexible. This may suit a holder who is prepared to tolerate the risk of some loss in order to have the opportunity to take advantage of favourable exchange rate movements, but who wishes to use the option to set a limit to possible losses.

Reasons why exchange-traded derivatives are used

One of the main reasons why the treasury function uses exchange-traded derivatives is that the contracts can be bought and sold as required. Also, because the markets are regulated by an exchange, counterparty risk (the risk of the other party to the transaction defaulting) should be minimised.

(c) The mark-to-market process begins with Nutourne Co having to deposit an amount (the initial margin) in a margin account with the futures exchange when it takes out the futures. The margin account will remain open as long as the futures are open.

The profit or loss on the futures is calculated daily and the margin account is adjusted for the profit or loss.

The maintenance margin is the minimum balance which has to be maintained on the margin account.

If the losses on the futures are so large that the balance on the margin account is less than the maintenance margin, then the futures exchange will make a demand (a margin call) for an extra payment (the variation margin) to increase the balance on the account back to the maintenance margin.

In the example, initial margin = $1,450 x 98 = $142,100

Maintenance margin = $1,360 x 98 = $133,280

Loss in ticks = 0·0011/0·0001= 11

Total loss = 11 ticks x $12·50 x 98 = $13,475

Balance on margin account = $142,100 – $13,475 = $128,625

This is less than the maintenance margin, so Nutourne Co would have to deposit an extra ($133,280 – $128,625) = $4,655

(the variation margin) to bring the balance on the margin account up to the maintenance margin.

Alternative solution

In some exchanges, a variation margin may be required to increase the balance on the account back to its initial margin level.

Therefore, in this case, the variation margin amount would be $13,475 (i.e. $142,100 – $128,625).

June 2018 – ACCA

The Adverane Group is a multinational group of companies with its headquarters in Switzerland. The Adverane Group consists of a number of fully-owned subsidiaries and Elted Co, an associate company based in the USA in which Adverane Group owns 30% of the ordinary equity share capital. Balances owing between the parent, Adverane Co, and its subsidiaries and between subsidiaries are settled by multilateral netting. Transactions between the parent and Elted Co are settled separately.

Transactions with Elted Co

Adverane Co wishes to hedge transactions with Elted Co which are due to be settled in four months' time in US$.

Adverane Co will owe Elted Co US$3·7 million for a major purchase of supplies and Elted Co will owe Adverane Co US$10·15 million for non-current assets. Adverane Group's treasury department is considering whether to use money markets or exchange-traded currency futures for hedging.

Annual interest rates available to Adverane Co

	Investing rate	Borrowing rate
Switzerland	2·7%	3·9%
USA	2·5%	3·7%

Exchange traded currency futures

Contract size CHF125,000, price quotation US$ per CHF1

Three-month expiry: 1·1213

Six-month expiry: 1·1204

Netting

The balances owed to and owed by members of Adverane Group when netting is to take place are as follows:

Owed by	Owed to	Local currency m
Adverane (Switzerland)	Bosha (Eurozone)	CHF15·90
Adverane (Switzerland)	Diling (Brazil)	CHF4·46
Bosha (Eurozone)	Cogate (USA)	€24·89
Bosha (Eurozone)	Diling (Brazil)	€18·57
Cogate (USA)	Adverane (Switzerland)	US$27·08
Cogate (USA)	Diling (Brazil)	US$5·68
Diling (Brazil)	Adverane (Switzerland)	BRL38·80
Diling (Brazil)	Bosha (Eurozone)	BRL51·20

Spot rates are currently as follows:

	CHF	€	US$	BRL
1 CHF =	1·0000	0·9347–0·9369	1·1196–1·1222	3·1378–3·1760

The group members will make settlement in Swiss francs. Spot mid-rates will be used in calculations. Settlement will be made in the order that the company owing the largest net amount in Swiss francs will first settle with the company owed the smallest net amount in Swiss francs.

Transfer price arrangements

The Adverane Group board has been reviewing the valuation of inter-group transactions, as it is concerned that the current system is not working well. Currently inter-group transfer prices are mostly based on fixed cost plus a mark-up negotiated by the buying and selling divisions. If they cannot agree a price, either the sale does not take place or the central treasury department determines the margin. The board has the following concerns:

– Both selling and buying divisions have claimed that prices are unfair and distort the measurement of their performance.

– Significant treasury department time is being taken up dealing with disputes and then dealing with complaints that the price it has imposed is unfair on one or the other division.

– Some parts of the group are choosing to buy from external suppliers rather than from suppliers within the group.

As a result of the review, the Adverane Group board has decided that transfer prices should in future be based on market prices, where an external market exists.

Note: CHF is Swiss Franc, 3 is Euro, US$ is United States dollar and BRL is Brazilian Real.

Required:

(a) Advise Adverane Co on, and recommend, an appropriate hedging strategy for the US$ cash flows it is due to receive from, or pay to, Elted Co. (9 marks)

(b)

(i) Calculate the inter-group transfers which are forecast to take place. (7 marks)

(ii) Discuss the advantages of multilateral netting by a central treasury function within the Adverane Group. (3 marks)

(c) Evaluate the extent to which changing to a market-price system of transfer pricing will resolve the concerns of the Adverane Group board. (6 marks)

(25 marks)

Answer

(a) Net receipt = $10,150,000 – $3,700,000 = $6,450,000

Adverane Co will have a net dollar receipt in four months' time and needs to hedge against the Swiss Franc strengthening.

Money market

Borrow US$: US$6,450,000/(1 + [0·037/3]) = US$6,371,419

Convert into CHF at spot rate: US$6,371,419/1·1222 = CHF5,677,615

Invest in CHF: CHF5,677,615 x (1 + [0·027/3]) = CHF5,728,714

Futures

Buy Swiss Franc futures and use six-month futures contracts.

Basis

Assume that basis reduces to zero at contract maturity in a linear fashion.

Using spot rate, predicted futures rate = 1·1222 – ([1·1222 – 1·1204] x 4/6) = 1·1210

Alternatively, predicted futures rate = 1·1213 – ([1·1213 – 1·1204] x 1/3) = 1·1210

Expected receipt = $6,450,000/1·1210 = CHF5,753,791

Number of contracts = CHF5,753,791/125,000 = 46·03 contracts, approximately 46 contracts

On the basis that futures give the higher expected receipt, they should be chosen, but Adverane Co should assess whether basis risk is likely to be significant. Adverane Co should also consider, as regards money market hedging, that CHF receipts could be used to pay off any existing CHF loans, or for other investment purposes, in which case the benefit to Adverane Co could be greater than hedging using futures.

(b) (i) Use mid-spot rates to translate amounts.

Owed by	Owed to	Local currency m	CHF m
Adverane (Switzerland)	Bosha (Eurozone)	CHF15·90	15·90
Adverane (Switzerland)	Diling (Brazil)	CHF4·46	4·46
Bosha (Eurozone)	Cogate (USA)	€24·89	26·60
Bosha (Eurozone)	Diling (Brazil)	€18·57	19·84
Cogate (USA)	Adverane (Switzerland)	US$27·08	24·16
Cogate (USA)	Diling (Brazil)	US$5·68	5·07
Diling (Brazil)	Adverane (Switzerland)	BRL38·80	12·29
Diling (Brazil)	Bosha (Eurozone)	BRL51·20	16·22

Owed to	Owed by				
	Adverane (Sw) CHFm	Bosha (Eu) CHFm	Cogate (US) CHFm	Diling (Br) CHFm	Total CHFm
Adverane (Sw)			24·16	12·29	36·45
Bosha (Eu)	15·90			16·22	32·12
Cogate (US)		26·60			26·60
Diling (Br)	4·46	19·84	5·07		29·37
Owed by	(20·36)	(46·44)	(29·23)	(28·51)	
Owed to	36·45	32·12	26·60	29·37	
Net	16·09	(14·32)	(2·63)	0·86	

Under the terms of the arrangement, Bosha, the company with the largest debt, will pay Diling, the company with the smallest amount owed to it, CHF0·86 million. Bosha will pay Adverane CHF13·46 million and Cogate will pay Adverane CHF2·63 million.

(ii) The advantage of using a central treasury for multilateral netting is that the central treasury can coordinate the information about inter-group balances. There will be a smaller number of foreign exchange transactions, which will mean lower commission and transmission costs. There will be less loss of interest through money being in transit. The foreign exchange rates available may be more advantageous as a result of large transaction sizes resulting from consolidation.
The netting arrangements should make cash flow forecasting easier in the group.

(c) Setting the transfer price at market price should enable a fair assessment of the performance of both the buying and selling divisions. Both internal and external sales will be accounted for at the same price. However, this may distort performance in that the costs of internal sales may be lower than external sales. For example, administration costs should be lower and there should be no costs of bad debts. These cost savings should be shared between the two divisions to give a fair picture. If the selling division has spare capacity, selling at incremental cost rather than market price may provide greater certainty that the buying division will use the selling division.
In theory, using market price should mean that the central treasury function has to intervene less. Simple market price provides an objective measure over which the divisions should agree. However, in reality, there may be complications that require central intervention. The market price may be difficult to determine or may fluctuate wildly, and central treasury may have to decide which price to use. If it is decided that an allowance should be made for costs of internal transfer being lower, central treasury may have to determine what this should be as it may vary significantly between products and divisions.

Specifying the transaction takes place at market price is designed to ensure that the buying division buys from the selling division, rather than an external supplier if the buying and selling division have failed to agree a price. The implicit assumption is that the buying division will use the selling division because of better service from, and greater dependability of, dealing within the group. This may not necessarily be the case. If the buying division previously purchased internally as a result of a low transfer price, forcing it to pay market price may mean it chooses an external supplier for non-price reasons.

December 2015 – ACCA

The Armstrong Group is a multinational group of companies. Today is 1 September. The treasury manager at Massie Co, one of Armstrong Group's subsidiaries based in Europe, has just received notification from the group's head office that it intends to introduce a system of netting to settle balances owed within the group every six months. Previously inter-group indebtedness was settled between the two companies concerned.

The predicted balances owing to, and owed by, the group companies at the end of February are as follows:

Owed by	Owed to	Local currency million (m)
Armstrong (USA)	Horan (South Africa)	US $12·17
Horan (South Africa)	Massie (Europe)	SA R42·65
Giffen (Denmark)	Armstrong (USA)	D Kr21·29
Massie (Europe)	Armstrong (USA)	US $19·78
Armstrong (USA)	Massie (Europe)	€1·57
Horan (South Africa)	Giffen (Denmark)	D Kr16·35
Giffen (Denmark)	Massie (Europe)	€1·55

The predicted exchange rates, used in the calculations of the balances to be settled, are as follows:

	D Kr	US$	SA R	€
1 D Kr =	1·0000	0·1823	1·9554	0·1341
1 US $ =	5·4855	1·0000	10·7296	0·7358
1 SA R =	0·5114	0·0932	1·0000	0·0686
1 € =	7·4571	1·3591	14·5773	1·0000

Settlement will be made in dollars, the currency of Armstrong Group, the parent company. Settlement will be made in the order that the company owing the largest net amount in dollars will first settle with the company owed the smallest net amount in dollars.

Note: D Kr is Danish Krone, SA R is South African Rand, US $ is United States dollar and € is Euro.

Required:

(a) (i) Calculate the inter-group transfers which are forecast to occur for the next period. (8 marks)

(ii) Discuss the problems which may arise with the new arrangement. (3 marks)

The most significant transaction which Massie Co is due to undertake with a company outside the Armstrong Group in the next six months is that it is due to receive €25 million from Bardsley Co on 30 November. Massie Co's treasury manager intends to invest this money for the six months until 31 May, when it will be used to fund some major capital expenditure. However, the treasury manager is concerned about changes in interest rates. Predictions in the media range from a 0·5% rise in interest rates to a 0·5% fall.

Because of the uncertainty, the treasury manager has decided to protect Massie Co by using derivatives. The treasury manager wishes to take advantage of favourable interest rate movements. Therefore she is considering options on interest rate futures or interest rate collars as possible methods of hedging, but not interest rate futures. Massie Co can invest at LIBOR minus 40 basis points and LIBOR is currently 3·6%.

The treasury manager has obtained the following information on Euro futures and options. She is ignoring margin requirements.

Three-month Euro futures, €1,000,000 contract, tick size 0·01% and tick value €25.

September	95·94
December	95·76
March	95·44

Options on three-month Euro futures, €1,000,000 contract, tick size 0·01% and tick value €25. Option premiums are in annual %.

Calls			Strike	Puts		
September	December	March		September	December	March
0·113	0·182	0·245	96·50	0·002	0·123	0·198
0·017	0·032	0·141	97·00	0·139	0·347	0·481

It can be assumed that settlement for the contracts is at the end of the month. It can also be assumed that basis diminishes to zero at contract maturity at a constant rate and that time intervals can be counted in months.

Required:

(b) Based on the choice of options on futures or collars which Massie Co is considering and assuming the company does not face any basis risk, recommend a hedging strategy for the €25 million receipt. Support your recommendations with appropriate comments and relevant calculations. (14 marks)

(25 marks)

Answer

(a) (i)

Owed by	Owed to	Local currency m	$ m
Armstrong (USA)	Horan (South (Africa)	US $12-17	12-17
Horan (South Africa)	Massie (Europe)	SA R42-65	3-97
Giffen (Denmark)	Armstrong (USA)	D Kr21-29	3-88
Massie (Europe)	Armstrong (USA)	US $19-78	19-78
Armstrong (USA)	Massie (Europe)	€1-57	2-13
Horan (South Africa)	Giffen (Denmark)	D Kr16-35	2-98
Giffen (Denmark)	Massie (Europe)	€1-55	2-11

Owed to	Owed by Giffen (De) $m	Armtg (US) $m	Horan (SA) $m	Massie (Eu) $m	Total $m
Giffen (De)			2-98		2-98
Armtg (US)	3-88			19-78	23-66
Horan (SA)		12-17			12-17
Massie (Eu)	2-11	2-13	3-97		8-21
Owed by	(5-99)	(14-30)	(6-95)	(19-78)	
Owed to	2-98	23-66	12-17	8-21	
Net	(3-01)	9-36	5-22	(11-57)	

Under the terms of the arrangement, Massie, as the company with the largest debt, will pay Horan $5-22m, as the company with the smallest amount owed. Then Massie will pay Armstrong $6-35m and Giffen will pay Armstrong $3-01m.

(ii) The Armstrong Group may have problems if any of the governments of the countries where the subsidiaries are located object to multilateral netting. However, this may be unlikely here.

The new system may not be popular with the management of the subsidiaries because of the length of time before settlement (up to six months). Not only might this cause cash flow issues for the subsidiaries, but the length of time may mean that some of the subsidiaries face significant foreign exchange risks. The system may possibly have to allow for immediate settlement in certain circumstances, for example, if transactions are above a certain size or if a subsidiary will have significant cash problems if amounts are not settled immediately.

(b) Need to hedge against a fall in interest rate, therefore buy call options. Require 50 contracts (25,000,000/1,000,000) x 6/3.

As Massie is looking to invest on 30 November, December contracts are needed.

Basis

Current price (1 September) – futures price – basis
(100 – 3·6) – 95·76 – 0·64
Unexpired basis – 1/4 x 0·64 – 0·16

Option

Amount received will be (LIBOR – 0·4%) x 25,000,000 x 6/12

If interest rates increase by 0·5% to 4·1%

Expected futures price – (100 – 4·1) – 0·16 – 95·74

Exercise price	97·00	96·50
Futures price	95·74	95·74
Exercise option?	No	No
Gain in basis points	–	–
	€	€
Interest received (€25m x 6/12 x (4·1 – 0·4)%)	462,500	462,500
Gain on options	–	–
Premium (3·2 x €25 x 50)	(4,000)	
(18·2 x €25 x 50)		(22,750)
Net receipt	458,500	439,750
Effective interest rates	3·67%	3·52%

If interest rates fall by 0·5% to 3·1%

Expected futures price – (100 – 3·1) – 0·16 – 96·74

Exercise price	97·00	96·50
Futures price	96·74	96·74
Exercise option?	No	Yes
Gain in basis points	–	24
	€	€
Interest received (€25m x 6/12 x (3·1 – 0·4)%)	337,500	337,500
Gain on options (0 and 24 x €25 x 50)	–	30,000
Premium (3·2 x €25 x 50)	(4,000)	
(18·2 x €25 x 50)		(22,750)
Net receipt	333,500	344,750
Effective interest rates	2·67%	2·76%

Using a collar

Buy December call at 97·00 for 0·032 and sell December put at 96·50 for 0·123. Net premium received – 0·091.

If interest rates increase to 4·1%

	Buy call	Sell put
Exercise price	97·00	96·50
Futures price	95·74	95·74
Exercise option?	No	Yes
	€	
Interest received	462,500	
Loss on exercise (76 x €25 x 50)	(95,000)	
Premium (9·1 x €25 x 50)	11,375	
Net receipt	378,875	
Effective interest rate	3·03%	

If interest rates fall to 3·1%

	Buy call	Sell put
Exercise price	97·00	96·50
Futures price	96·74	96·74
Exercise option?	No	No
	€	
Interest received	337,500	
Loss on exercise	–	
Premium (9·1 x €25 x 50)	11,375	
Net receipt	348,875	
Effective interest rate	2·79%	

Summary

	97·00	96·50	Collar
Interest rates rise to 4·1%	3·67%	3·52%	3·03%
Interest rates fall to 3·1%	2·67%	2·76%	2·79%

The option with the 97·00 exercise price has a higher average figure than the option with the 96·50 exercise price, and can be recommended on that basis, as its worst result is only marginally worse than the 96·50 option. There is not much to choose between them. The collar gives a significantly worse result than either of the options if interest rates rise, because Massie cannot take full advantage of the increase. It is marginally the better choice if interest rates fall. The recommendation would be to choose the option with the 97·00 exercise price, unless interest rates are virtually certain to fall.