Basic Interest Rate Calculations - Answers

1

month	
October	**31 - 15 = 16**
November	**22**
Total	**38 (b)**

2

b. Actual/365

3

d.

▪ 12th June is Saturday
▪ According to the modified following convention: Monday 14 June

4

According to the end of month (EOM) convention, the 3 month value date is Tuesday 31th May (d).

5

b

▪ Spot is 30th April
▪ Regular 6 months date would be Saturday 30th October
▪ According to the modified following convention: Friday 29 October because Monday would be 1 November and the value date should not exceed a month ultimo

6

d. $r_b = 4,20\% + 20/30 \times 0.30 = 4,40\%$

7

b

▪ The 70 days interpolated rate can be calculated from the 2 months (60 days) and the 3 months (90 days) rates
▪ There are 10 days in the broken period
▪ 4.20% + 10/30 x 0.30% = 4.30%

8

d

- The rate for 15 July can be derived from the 2 month (61 days) and the 3 months (91 days) rates
- There are 22 days in the broken period: 8 (31 - 23) + 14
- Therefore, the broken rate is 2.30% + 22/30 x 0.10% = 2.37%

9

c.

- 50M x (1+31/360 x 0.0367)

10

c. CHF 15,000,000 (1 + 3/360 x 0.0125) = CHF 15,001,562.50

11

b

- 100,000 / 15,500,000 x 360/91

12

c

- Note: daycount convention on the GBP money market is actual/365
- GBP 15,000,000 x (1 + 31/365 x 0.0325) = 15,041,404.11

13

b.

- 29,275 / 5,000,000 x 360 / 91 = 0.0232

14

a. 360/365 x 3.00%

15

d. 365/360 x 4.40%

16

c. $(1 + 0.042 / 2)^2 - 1 = 0.0424$

17

b. $((1.0287)^{0.5} - 1) \times 2 = 0.0285$

18

c

▪ 0.025/ (1 - 180/360 x 0.025) = 0.0253

19

c

▪ The equation to be used is annual yield = (1 + semi annual yield/2)^2-1
▪ Filled in: $(1+ 0.0275/2)^2$-1 = 0.0277

20

c

▪ The equation to be used
  is $\text{Yield} = \dfrac{\text{PDR}}{1 - \#\,\text{days}\,/\,360 \times \text{PDR}}$

▪ $\text{Yield} = \dfrac{0.035}{1 - 316\,/\,360 \times 0.035} = 0.0361$

21

c

▪ yield = 0.021 / (1 - 70/360 x 0.021)

22

d. $\text{Present value} = \dfrac{\text{NOK } 20{,}000{,}000}{1 + 60/360 \times 0.035} = \text{NOK } 19{,}884{,}009.94$

23

c

▪ $\text{Price (present value)} = \dfrac{\text{SEK } 20\text{ mio}}{1 + 0{,}017 \times 120\,/\,360} = \text{SEK } 19{,}887{,}305.27$

24

a

$\text{Price} = \text{USD } 5\text{ mio} \times (1 - 0.04 \times 90\,/\,360) = \text{USD } 4{,}950{,}000$

25

a. Discounted amount= USD 10,000,000 x (1 - 90/360 x 0.025) =
   USD 9,937,500

26

b.

▪ ((1 + 180/360 x 0.0575)/(1 + 90/360 x 0.055625) - 1) x 360/(180-90)

27

b.

▪ ((1 + 91/360 x 0.0205)/(1 + 31/360 x 0.0175) - 1) x 360/(91-31)

28

a.

$$r_{fw} = \left(\frac{1 + 0,0273 \times 180/360}{1 + 0,0257 \times 90/360} - 1\right) \times 360/90 = \left(\frac{1,01365}{1,006425} - 1\right) \times 4 = 0,0287$$

29

d

▪ The general to calculate a forward rate in the money market is:

$$r_{fw} = \left(\frac{1 + r_l \times d_l/360}{1 + r_s \times d_s/360} - 1\right) \times 360/(d_l - d_s)$$

▪ Here

$$r_{fw} = \left(\frac{1 + 0.016 \times 273/360}{1 + 0.015 \times 182/360} - 1\right) \times 360/91 = 0.0179$$

30

c

▪ The equation to calculate a forward rate in the money market is:

$$r_{fw} = \left(\frac{1 + r_l \times d_l/365}{1 + r_s \times d_s/365} - 1\right) \times 360/(d_l - d_s)$$

▪ Here

▪ $r_{fw} = \left(\frac{1 + 0.0080 \times 154/365}{1 + 0.0070 \times 62/365} - 1\right) \times 360/92 = 0.0087$
▪

31

c

▪ 3 month deposit rate 1.13% (91 days)
▪ 3 - 6 Forward rate   1.25% (92 days)

▪ Calculate the future value of one unit amount after the whole term
  (1 + 91/365 x 0.0113) x (1 + 92/365 x 0.0125) = 1.0059768
▪ Then subtract one: 1.0059768 - 1 = 0.0059768
▪ Then multiply this outcome by the inverse of the daycount fraction: 365 / 183
  x 0.059768 = 0.0119%.

32

d.

- ((1 + 31/360 x 0.0234) x (1 + 60/360 x 0.0255) x (1 + 92 /360 x 0.0262) - 1)
  x 360/183

33

a.

34

a.

35

b.

Cash Money Markets - Answers

36

b. Annually

37

d.

- He will choose the lowest interest rate
- The lowest rate with daycount convention actual/360 is that of Saxo Bank
- Converted to 30/360, this rate would be 4.16% x 365/360 = 4.22%
- ABN AMRO's rate would be even higher: 4.18% x 365/360 = 4.24%
- Therefore, the rate of Den Danske Bank is the most favourable

38

a

- Use the PV equation, calculate the first FV. Next use the calculated FV as the
  PV for the next calculation
- FV's are respectively: 25,205,381.95, 25,429,079.71, 25,695,837.82,
  25,962,011.01

39

c.

- After the first period, your investment has a value of 10,000,000 x 91/360 x 0.0314 = 10,079,372.22
- After the second period, your investment has a value of 10,079,372.22 x 90/360 x 0.0324 = 10,161,015.14
- After the third period, your investment has a value of 0,161,015.14 x 89/360 x 0.0306 = 10,237,883.21
- After the last period, your investment has a value of 10,237,883.21 x 92/360 x 0.0298 = 10,315,850.38

40
d. UK treasury bill

41
b. 1 Year

42
a.Certificates of Deposit

43
b. Commercial Paper

44
d. All of these

45
b. Repo

46
a. Treasury bill

47
b. Credit institution

48
c. Corporate

49
b. BA or bank bill

50
c. Treasury bill

51

b ECP

52

d. 5 years

53

b More than the face value

54

b. Issue Price $= \dfrac{\text{EUR } 10,000,000}{1 + 90/360 \times 0.032} = $ EUR 9,920,634.92

55

c. Price = USD 10,000,000 x (1 - 60/360 x 0.06) = USD 9,900,000.00

56

d. Value at maturity = 10,000,000 x (1 + 90/360 x 0.04) = EUR 10,100,000.00

57

b. Price $= \dfrac{\text{GBP } 10,000,000}{1 + 90/365 \times 0.035} = $ GBP 9.914,437.05

58

c

- The maturity amount of this CD is 10,000,000 (1 + 90/360 x 0.05) = USD 10,125,000 (FV)
- The present value of this CD is 10,057,947.022
- ? = (10,125,000 /10,057,947.02 / - 1) x 360/30 = 0.08

59

c.

- Value at maturity of the CD = 100,000,000 x (1 + 90/360 x 0.005) = 100,125,000
- Present value of the value at maturity = 110,125,000 / (1 + 60/360 x 0.0025) = JPY 100,083,298.62

60

c

- Purchase price 50,000,000
- Selling price 50,000,00 x (1 + 90/360 x 0.045) / (1 + 30/360 x 0.045) = 50,373,599.00
- Result: 373,599 (Capital gain/loss + accrued interest)
- Accrued interest = 50,000,000 x 60/360 x 0,045 = 375,000
- Capital gain/loss= 373.599 - 375.000 = -1.400,99

61

c

- Current price of the CD: PRCD: NOM = 1,500,000, C% = 0.0275, DT =181, B =360, DR=31, Y% = 0.026 -> PRCD = 1,517,342.42.
- Take this as FV in your PFV equation and take PV as 1,500,000, D=150 and B=360. You will find 0.02775.
  or
- Purchase price = 1,500,000
- Selling price = 1,500,000 x (1 + 181/360 x 0,0275) / (1 + 31/360 x 0,0260) = 1,517,342.42
- Result = 17.352,42.
- Yield= 17.352,42 / 1,500,000 x 360 / 150 = 0,02775.

62

c

- The price of the CD is (10,000,000 x 90/360 x 0.03) / (1 + 60/360 x 0.03) = 1,024,875.62
  You can use the PRCD equation: NOM = 10,000,000 , DT = 90, B = 360, C% = 0.03, DR = 60, Y% = 0.03, solve for PRCD.
- You have bought the CD at 10,000,000
- Your total return, therefore is 24,875.62
- This includes accrued interest, however: 10,000,000 x 30/360 x 0.03 = 25,000,000
- Your capital result is negative: 24,875.62 - 25,000,000

63

a. Either party

64

d. It is immediately transfered to the seller

65

b. A repo that is not closed in repect to liquidity management

66

a. Only I and II

67

b. It is transfered by the third party to the buyer's account

68

a. The buyer can liquidate the collateral

69

b. The credit risk on the repo counterparty

70

a. A documentary sell buy back is a sell buy back that is agreed under a GMRA and for which daily margining applies

71

a Funding

72

b.

▪ You reverse in repo means that you are the repo buyer.
▪ You are the market maker and lend money: the rate is 3.33%.
▪ Interest = 266.125.000 x 14/360 x 0.0333 = EUR 344,631.88

73

c. Mat. Cons. = USD 20,300,000 x (1 + 7/360 x 0.0178) = USD 20,307,065.53

74

b. Init. Cons. = EUR 15,000,600 / 1.10 = EUR 13,636,909.09

75

c. Interest Amount = (GBP 50,000,000 x 1.02) x 5/365 x 0.02 = GBP 13,972.60

76

c

▪ If the bond goes special, this means that the buyer very much wants to have the bond
▪ Therefore he is willing to lend money at a lower rate than would be the case with GC
▪ rate = 3.25% - 0.50% = 2.75%

77

b

- The initial consideration is equal to the dirty market price
- As market user and as buyer of the repo you lend the money at the bid rate
- USD 20,360,000 x (1 + 4/360 x 0,0130) = USD 20,362,940.89

78

d

- Interest amount = USD 51,250,000 x 5/360 x 0.0200 = USD 14,236.11

79

d

- 20,329,927.30 x (1 + 10/360 x 0.0125) = 20.336,986.30.

80

b. (0.066875 - 0.06625 - 0.0002) x 7/365 x 25M = 203.77

81

c. The maturities of your deposits given and deposits taken are not the same

82

c

- He has borrowed for a longer period than he has lent
- has to lend for three months after two months
- also: long cash in

83

b

- Break-even rate = ((1 + 180/360 x 0,0118)/(1+90/360 x 0.0123) - 1) x 360 / 90 = 0.01126 - 1.13%

84

b.

- You pay a total interest amount of 20,000,000 x 60/360 x 0.0314 + 30,000,000 x 60/360 x 0.0328 = 104,666.67 + 164,000 = 268,666.67
- You earn an interest amount of 50,000,000 x 60/360 x 0.0345 = 287,500
- You make a profit of 287,500 - 268,666.67 = 18,833.33

Foreign Exchange - Answers

85

c.

86

d.

87

c.

88

c.

89

c. Your ask price is 1.6055 therefore 3,000,000 / 1.6055 = 1,868,576

90

c. is overbought in Sterling and oversold in US-dollars

91

d. EOM convention: Thursday 31 March

92

b. The most favourable two-way price is the one with the highest bid price: 1.3598

93

b.

94

a. You quote 1/1.3715 - 1/1.3710.

95

b. You want to buy US-dollars and sell Sterling. This means you get the bid price GBP/USD. The Sterling amount needed is 5,000,000 / 1.65 =
GBP 3,030,303.03

96

a. You want to buy euro. Therefore the rate is 1.2930. The amount of euro is 300.000 / 1.2930 = 232,018.56.

97

b. You want to buy GBP, so your bid price should be high and your ask price too: therefore: 0.9051- 53.

98

b

▪ You buy Japanese Yen, therefore you sell CHF
▪ As a market user to will get the market maker's bid price: 110.50
▪ 120,000,000 / 110.50 = 1,085,972.85

99

a.

▪ You want to sell GBP and buy euro, so you should quote a high bid rate
▪ You don't want to quote either way because than you run the risk that the counterparty is going to buy euro from you, which would increase your long GBP position

Position keeping

100

a.

▪ 1.000.000 x 0.0100 GBP

101

b.
The big figure is always 100 pips, therefore: 10,000,000 x 0.01 = 10,000 CAD

102

b.

▪ You have sold at 1.5250 and you now can buy at 1.5237

103

d.

▪ To close your position you should buy euro in the market as a market user at the higher rate of 1.9262, therefore you suffer a loss
▪ The result is (1.9250 - 1.9262) x 5,000,000 = minus SGD 6,000

104

a.

▪ 10.000.000 x (0.6712 - 0.6729)

105

a.

- To close your position you should sell USD in the market as a market user at 8.53
- The result is (8.53 - 8.42) x 10,000,000 = HKD 1,100,000 profit

106

a. If you should close your position, you should sell your euro. Therefore you would get the bid price of 1.3640. You would suffer a loss of 10,000,000 x 0.0010 = USD 10,000.

107

b.

- ((5 x 1.3456 - 8 x 1.3612 - 3 x 1.3584) / (5 - 8 - 3) - 1.3602) x 6,000,000

108

b.

	EUR	USD
transaction 1	+ 4,000,000	- 5,781,200
transaction 2	- 5,000,000	7,237,000
transaction 3	+ 3,000,000	- 4,296,300
	+2,000,000	2,840,500

Average rate = 2,840,500 / 2,000,000 = 1.4203

109

d

	EUR	USD
transaction 1	- 4,000,000	5,021,200
transaction 2	- 5,000,000	6,337,000
transaction 3	+ 2,000,000	- 2,464,200
	-7,000,000	8,894,000

The average rate of the position is 8,894,000 / 7,000,000 = 1.2706. The valuation rate is 1.2500, this means a profit of 7,000,000 x (1.2706 - 1.2500) = 142,200.

110

c.

- Transaction 3: sell 3 million euro, Transaction 4: buy 7 million euro.
- Position = + 4 - 5 - 3 + 7 = 3 million euro long
- Average rate = (4 x 1.3245 - 5 x 1.3308 - 3 x 1.3275 + 7 x 1.3323) / 3 = 1.3292

FX spot cross rates

111

d. $\dfrac{EUR/NOK_{ask}}{EUR/GBP_{bid}} = GBP/NOK_{ask}$

112

d. $EUR/USD_{ask} \times USD/CAD_{ask} = EUR/CAD_{ask}$

113

c.

114

d.

115

a.

- Using common sense leads to the conclusion that answers c and d can not be correct: if one euro is worth approximately 8.30 Norwegian crowns and the euro is worth more than one US dollar, the USD/NOK rate can not be lower than 8.30
- Therefore you should divide the EUR/NOK rate by the EUR/USD rate
- The bid rate can be calculated by dividing the bid rate EUR/NOK by the ask rate USD/NOK
- 8.30 / 1.5060 = 5.5113

116

c.

$\dfrac{EUR/USD_{bid}}{AUD/USD_{ask}} = \dfrac{1,3500}{0,9060} = 1,4901$

117

b.

- You should divide the EUR/CHF rate by the EUR/USD rate
- The ask rate can be calculated by dividing the ask rate EUR/CHF by the bid rate USD/CHF

$\dfrac{EUR/CHF_{ask}}{EUR/USD_{bid}} = USD/CHF_{ask}$

- 1.3520 / 1.5050 = 0.8983

FX Forwards

118
b. Only for very large movements and longer terms

119
c.

120
d.

- 1.1005 x (1 + 180/360 x 0.0125) / (1 + 180/360 x 0.0345) - 1.1005

121
b. The euro trades at a premium

122
b. Full forward exchange rate

123
b.

$$\text{Forward FX rate} \; = \; \frac{0{,}9500 \times (1 + 90/360 \times 0{,}03)}{1 + 90/360 \times 0{,}04} \; = \; \frac{0{,}9571}{1{,}01} \; = \; 0{,}9476$$

124
c. 8.05 + 0.03 = 8.08

125
a.

- The one month bid price can be calculated by adding the left hand side of the swap quotation to the spot bid rate
- Since the swap quotation is reverse, the EUR trades at a discount: - 0.06
- 9.75 - 0.06 = 9.69

126
a.

- $\text{FXFW} \; = \; \dfrac{80.50 \times (1 + 90/360 \times 0.0025)}{1 + 90/360 \times 0.01}$

127
b.

▪ Forward FX rate $= \dfrac{1.4650 \times (1 + 90/360 \times 0.0075)}{1 + 90/360 \times 0.01} = 1.4641$

128
d.

▪ You want to sell CHF, which means that you should buy GBP
▪ 'You are quoted' means that you are a market user.
▪ Therefore, you will get the ask price of the spot rate and the right hand side of the swap points
▪ GBP trades at a discount and therefore the swap points should de subtracted from the spot rate
▪ Therefore: 1.8457 - 0.0218 = 1.8239

129
b

▪ The one month ask price can be calculated by adding the right hand side of the swap quotation to the spot ask rate
▪ Since the quotation is reverse, the EUR trades on a discount: - 0.12
▪ Therefore: 8.80 - 0.12 = 8.68

130
a.

▪ The bid price GBP/USD for 1.5 months can be calculated by adding the left hand side of the swap quotation to the FX spot bid price
▪ The swap points for 1.5 months can be derived by using interpolation between one month and two months: 1/2 x 50 (102 - 52) points = 25 points
▪ The GBP trades at a discount
▪ Therefore: 1.4500 - 0.0052 - 0.0025 = 1.4423

131
b.

▪ 114 + 10/31 x 90 = 114 + 29 = 143

Ex ante rates

132
d. I, II and III

133

b. GBP trades at a discount, therefore the points should be added with ex ante dates. Because of the fact that an ask rate should be calculated, the highest number of points should be added.

	bid
spot GBP/USD	**0.8700**
tom/next	**1.3**
overnight	**1.1**
	0.87024

134

c.

- The bid price value 13 April is the bid price of the FX spot rate adjusted with the tom/next points
- The GBP is trading at a discount, therefore the tom/next points should be added to the FX spot rate
- The right hand side of the tom/next quotation is 0.00013
- The FX rate value tomorrow is 1.1500 + 0.00013 = 1.15013

135

d.

- You should use the spot ask rate and the tom/next left hand side rate
- Since is it a reverse quotation, the euro trades at a discount
- This means that the FX rate value tomorrow is higher than the FX spot rate
- You add the ask price of the tom/next quotation = + 1.25 points to the spot rate: 1.2432 + 0.000125 = 1.243325

136

b.

- You should use the spot ask rate and the tom/next left side rate
- Since is it a normal quotation, the euro trades at a premium
- This means that the FX rate value tomorrow is lower than the FX spot rate
- You take the ask price of the tom/next quotation = - 0.50 points
- Therefore: 1.3432 - 0.000050 = 1.34315

FX Cross Forward Rates

137

$$EUR/USD_{bid} \times USD/CAD_{bid} = (1.3050 - 0.0013) \times (0.9550 + 0.0010) = 1,2463$$

138

b.

- The 1 month forward ask price USD/NOK can be calculated by dividing the EUR/NOK 1 month forward ask price by the EUR/USD 1 month forward bid price
- The EUR/NOK 1 month forward ask price is 8.0200 - 0.0080 = 8.0120
- The EUR/USD 1 month forward bid price is 1.3050 + 0.0012 = 1.3062
- Therefore, EUR/NOK$_{ask}$ / EUR/USD$_{bid}$ 1 month forward is 8.012 / 1.3062 = 6.1338

139

b.

- The 1 month forward ask price CHF/SEK can be calculated by dividing the EUR/SEK 1 month forward ask price by the EUR/CHF 1 month forward bid price

$$\frac{EUR/SEK_{ask}}{EUR/CHF_{bid}} = CHF/SEK_{ask}$$

- The EUR/SEK 1 month forward ask price is 10.0675 - 0.0080 - 10.0595
- The EUR/CHF 1 month forward bid price is 1.3050 - 0.0010 = 1.3040
- Therefore, CHF/SEK 1 month forward ask price is 10.0595 / 1.3040 = 7.7143

FX swaps

140

b. A spot sale (purchase) and a forward purchase (sale) of two currencies agreed simultaneously between two parties

141

d.

142

c.

143

a. Bought and sold. As a result of the premium, in the far leg you receive more US dollars than you have paid in the near leg (buy low, sell high).

144

b.

- The swap points are the expression of the interest rate differential between euro and US dollar. Because the euro is trading at a premium, the euro interest rates are lower than the US dollar interest rates. If the euro interest rates

stay the same and the US dollar interest rate will decrease, the interest rate differential will decrease and, as a result, the bid and the ask price of an FX swap will decrease.

145

a.

- The swap points are the expression of the interest rate differential between the euro and the Swiss franc. Because the euro is trading at a discount, the euro interest rates are higher than the CHF interest rates. If the euro interest rates stay the same and the CHF interest rates decrease, the interest rate differential increases and, as a result, both the bid and the ask price of an FX swap will increase.

146

d. You have borrowed GBP and have lent US-dollars. Therefore, the most favourable movement is an decrease in US-dollar interest rates and a in crease in GBP interest rates.

147

c. You have lent euro and have borrowed US-dollars. Therefore, the most favourable movement is an increase in US-dollar interest rates and a decrease in euro interest rates.

148

c. The interest differential will increase and, as a result, the number of swap points will increase too.

149

c. Only the swap points are stated as a price. This means that the transactio was an FX wap. As a market user the client gets the most unfavourable rate which here is - 54. This means that he has bougt in the far leg. Therefore, you as market maker have bought and sold.

150

d. You should sell EUR per spot or forward. If you sell them spot, you need to square your liquidity position by either buying and selling the euro or borrowing euro and investing is USD.

151

b. Sold and bought, because the FX rate in the far leg is lower than in the near leg and that is favourable for you (buy low, sell high).

o/n and t/n Swaps

152
c.

If an FX spot dealer is short euro, this means that he has to transfer the euro amount on the spot date. The dealer, however, waits until the next day to roll over his positon for one more day. He then buys the euro value tomorrow and sells them back on the spot date.

153
d. If a dealer is long euro, this means that the euro will be transfered to him on a specific value date. The dealer waits until the day before this value date to roll over his positon for one more day. He then sells the euro value tomorrow and buys them back value spot.

154
d.

- You are long EUR, therefore you have to sell and buy euro in the tom/next swap
- As a buyer in the forward leg, you will hit the market's right hand side: +2
- Since the euro is trading at a premium, the points are against you
- You have to make good the tom/next points when closing your position by selling the euro
- Your new break-even rate, therefore, is 0.8850 + 0.0002 = 0.8852

155
a.

- You are short USD, therefore you have to buy and sell USD in the tom/next swap
- As a seller in the forward leg, you will hit the market's left hand side: -5
- Since the USD is trading at a discount, the points are against you
- You have to make good the tom/next points when closing your position by buying the US dollars
- Your new break-even rate, therefore, is 112.34 - 0.05= 112.29

156
a.

GBP is trading at a discount against the US dollar and you buy and sell the GBP. This means that the swap points are against you. You lose 2 points in the t/n swap. Your average (selling) rate, therefore, decreases to 1.6541.

157

b.

- In the t/n swap you have to sell and buy euro, hence you are quoted 0.0001 (against you).
- Break-even rate = 1.1537 + 0.0001 = 1.1538

158

c

- In the t/n swap you have to buy and sell JPY, hence you are quoted = 0.0001 (your favour).
- Break-even rate is 0.0584 + 0.0001 = 0.0585

159

d. You have to buy GBP per spot to cover your FX position. Next you have to sell them spot and buy them tomorrow: buy and sell in the t/n swap.

Covered interest arbitrage

160

d Selling a low interest rate currency to invest in a high interest rate currency should not be profitable if one hedges the currency risk

161

b. Borrow euro and sell and buy euro in an FX arbitrage swap

162

c.

- Lend euro and buy and sell euro in an FX arbitrage swap

163

b. Borrow GBP and sell and buy GBP which means buy and sell EUR.

164

b.

- You receive the US dollars from your taken US-dollar deposit
- This means you should sell and buy the US-dollars
- This means that you trade on the ask side of the FX swap quotation
- The points are in your favour, therefore - 147 is the most favourable quote for you
- Alternative explanation:
  In the swap you 'lend' the US dollars and 'borrow' the Swissies. Since the US-dollar interest rate is higher than the CHF interest rate, you receive the

interest rate differential (expressed in swap points). This is why the points are in your favour. And of course you want as many points in your favour as you can get, i.e. 147 instead of 145.

Forward-forward FX swaps

165
d

- You have to pay USD/ receive euro after four months and now need them after two months
- to offset the original trade, you buy and sell euro for four months
- next, you sell and buy euro in two months

166
a

- You need to be overborrowed in euro and overlent in US dollars after three months
- Therefore you have to buy and sell euro in six months and buy and sell them at three months
- As a result, you can sell and buy euro for three months again. This means lending euro and borrowing US dollars

167
a

- the trader has bought at 22 and sold at 38

168
a

- euro trades at a premium and the client sells at a later date than (+50) he buys (=30). The points are in his favour.

169
b.

- The euro trades at a discount and as a client you sell at an earlier date (- 50) than you buy (-60). The points are in your favour and you are quoted -10.

170

c

- The spot legs will offset eachother; then remain the forward leg of the 3 months FX swap, i.e. buy euro and the forward leg of the 6 month swap, i.e. sell euro

171

b

- market practice is to use the FX forward rate at the moment of concluding the transaction for the near leg

Time options and NDF

172

d

- Selling USD means buying EUR
- In these types of contracts, the client always is offered the worst possible rate. In this case, this means the highest ask rate for euro. This is obviously the two month ask rate of 1.3521 + 0.0021.

173

a

- In these types of contracts, the client always is offered the worst possible rate. In this case, this means the lowest bid rate for euro. This is obviously the two month bid rate of 1.4500 - 0.0008 = 1.4492.

174

c

- Your client has to buy 500,000 at the contract rate 0.9349
- He has to sell them at your bid price 0.9330

175

a

- Your client has to sell EUR 500,000 at the contract rate 1.1014
- He has to buy them at your ask price of 1.1014
- He has a profit of 500,000 x (1.1140 - 1.1014) = CHF 6,300

176
d

- NDF are always settled in the convertible currency.
- Here, this is USD.
- 'Sold' 100,000,000 TWD in the NDF contract: 100,000,000 / 32.50 USD
- 'Bought' 100,000,000 TWD to fix the contract: 100,000,000 / 33.45 USD
- The settlement amount is USD 2,989,536.61 - USD 3,076,923.08 = -/- USD 87,386.45

177
d

- The seller of a USD/PHP NDF sells USD outright and buys PHP. This market party therefore can be speculating on an appreciation of the Phillipine peso

178
b

NDF are always settled in the convertible currency. Here, this is USD. The settlement amount is 50,000,000 / 32.50 - 50,000,000 / 35 = 67,873.30 USD. The USD obviously has increased in value and the Taiwanese dollar has, in turn, lost value. Therefore, as the buyer of the TWD you should pay.

Precious Metals

179
c

180
d

- First you should buy USD against HKD at 7.7552
- Then you should buy gold against USD at 1246.25
- 100 x 7.7552 x 1246.25 = 966,492.

181
c.

- The gold forward price can be calculated by adding a premium to the spot price
- The premium can be calculated by the following equation:
  Spot midprice x days/360 x GOFO
- GOFO = 8.75%
- Gold forward price = 950 x (1 + 90/360 x 0.0875) = USD 970.78

Money Market Derivatives - Answers

182
a.

▪ a loan means that you lend out money which you need to fund.

183
b.

▪ you have a closed position from spot until 3 months, then you are overbor-
rowed

184
c.

▪ From June to October is 4 months. And from October to January (underlying
period) is 3 months
▪ You are over-borrowed which means that you have to invest your money and
your risk is a decrease in interest rates

185
c.

▪ you have a loan which will be reprised in 1 month for a periode of 3 months
(= underlying period), therefore you are exposed to rising interest rates, there-
fore you have to buy an FRA
▪ As a market user you buy at the ask rate

186
a.

187
c.

▪ An adjusted settlement amount is paid at the start of the FRA underlying
period that is discounted for early payment

188
d.

189
d.

190

b.

- Fixing is on 8th septemer (9 months after the trade date), fixing is two days later

191

b. His risk is an increase in interest rates after six months, therefore he should buy a 6s v 9s FRA.

192

b. You will get an ask price from the market maker and ABN AMRO's ask price is the lowest.

193

c. Hedging against increasing interest rates

194

d.

- If he borrows for nine months and lends for only six months and he proves to be right, after six months, he will be able to give a 3 months deposit at the then higher interest rate.

195

c.

- His risk is an decrease in interest rates after three months, therefore he should sell a 6s v 9s FRA.

196

c.

- You will get a bid price from the market maker and INGs bid price is the highest.

197

d.

- PV of 40,000,000 x (0.0365- 0.0375) x 90/360 = 10,000,000, therefore 10,000,000 / (1 + 90/360 x 0.0365) = 9,909.58.

198

d.

- With this parallel shift, all short term interest rates rates will fall
- To take profit from this movement you should sell FRAs for all maturities

199

a.

▪ ((1 + 180/360 x 0.00350) / (1 + 90/360 x 0.0368) - 1) x 360/90 = 0.0329

200

b.

FRA settlement amount $= \dfrac{10,000,000 \times 91/360 \times (0,047 - 0,045)}{1 + 91/360 \times 0,047} = 4,996,20$

201

a.

▪ PV of 5,000,000 x (0.044 - 0.0375) x 183/360 = 16.520,83
  1,520.83 / (1 + 183/360 x 0.044) = 16,159.40

202

b. buy a 3s v 6s FRA and sell a 9s v 12s FRA

Money Market Futures

203

a.

204

c

▪ Maitaince margin is the amount of money that should be at least at the margin account.
▪ If the value of this futures position becomes negative, the clearing house starts to debit the margin account for the negative value.
▪ Once the value of the margin account becomes lower than the maintaince margin, the clearing house start demands a margin caal in order to keep the value at the margin account at the level of the maintainance margin.

205

d.

206

a.

207

b.

208

d.

209

d.

210

d.

211

a.

212

c.

213

d. I, II and II

214

c.

- He is long and the price went down with 33 points
- The market value of his position decreases with 20 x JPY 2500 x 33 =
  JPY 1,650,000
- He has to pay the margin call

215

c. The margin call is 10 x 500,000 x 0.0030 x 1/4= GBP 3,750. Since the futures price has increases and the dealer has a long position, he will receive this amount.

216

c. The closing of the short position leaves the dealer with a loss of
20 x 1,000,000 x 0.0012 x 1/4 = 6,000

217

c. sell MM futures of buy FRAs

218

d. He expected interest rates to decrease and suffered a loss.

219

b. He expected interest rates to increase and suffered a loss.

220

a.

- The market value of the FRA and of the money market futures will develop more or less in the opposite direction
- At the moment the money market futures are closed, the implied forward rate apparently was 100 - 96.92 = 3.18
- The market value of the FRA then was 25,000,000 x (3.18 - 2.87) x 90/360 = EUR 19,375,000
- This profit is locked in by closing the position

221

c.

Interest Rate Swaps

222

b.

- The seller receives fixed this gives the same result as investing in a fixed-rate asset. He pays floating wicht gives the same result as attracting a floating rate funding.

223

c.

224

b. The seller of the swap pays 1% calculated over a term of three months.

225

d. Both coupons are paid at maturity on a netted basis.

226

d.

227

b.LIBOR

228

b.

229

a. Only I and II

230

d. Compounded interest paid at maturity

231

a.

232

d. Sold strip of futures and a receiver's interest rate swap

233

c.

- after six months: pay 10,000,000 x (0.05 - 0.0495) x 1/2 = 2,500
- after twelve months: receive 10,000,000 x (0.0525- 0.05) x 1/2 = 12,500
- After eighteen months: receive 10,000,000 x (0.0535 - 0.05) x 1/2 = 17,500
- After two years: receive 10,000,000 x (0.0540 - 0.05)x 1/2= 20,000

234

d. You pay fixe, therefore in the hedge you should receive fixe = selling an FRA and a 0x6 FRA does not exist

235

b.

- The buyer of a swap pays the fixed rate, here 4.75% and the floating coupon payment is 5.75%, therefore the buyer receives on balance 1%
- The amount to be received by the buyer = 100,000,000 x 1% x 1/2 = EUR 500,000 to be paid by the seller

236

b.

- The 1 year accumulation factor can be calculated by multiplying the accumulation factor over the six months period out of spot by the accumulation factor over the 6s v 12s forward period:
  (1 + 180/360 x 0.0125) x (1 + 180/360 x 0.01325) = 1.0129164
- The corresponding yield can be found by using the following equation:
  (accumulation factor - 1) x B / D = (1.0129164 -1) x 360/360 = 0.0129 = 1.29%

237

a.

- The seller of a swap receives the fixed rate, here 3.50%
- With a fully synchronized swap, each quarterly payment is netted
- The floating coupon payment is 2.50%, therefore the seller receives on balance 1%

238

b. If you want to take profit from decreasing interest rates, you should sell FRAs or sell an interest rate swap

239

c.

▪ The amount to be settled is 0.0005 x 5/360 x 100,000,000 = EUR 694
▪ The fixed rate is higher than the floating rate; therefore the buyer must pay

Options - answers

240

d. American style option

241

c. Bermudan option

242

a. Falls and rises with the price of the underlying commodity, but is always positive

243

c. The right but not the obligation to buy or sell a commodity at a fixed price

244

c. has the obligation to buy GBP and is, therefore, virtually long

245

c. Purchasing an JPY/USD put option

246

c. The price the buyer of the option pays to the seller when entering into the options contract

247

c

▪ Premium is 3,000,000 x 0.0200 and, unless stated otherwise, must be paid in
  the quoted currency

248

d

249

b

▪ The premium amount is 2% x 20,000,000 = 400,000 GBP.

250

c.

251

c.

252

b. 50% probability

253

b. +0.5

254

c. Costs more than an out-of-the-money call option

255

d.

256

c.

257

b.

▪ Delta: underlying value, rho: interest rates, vega: volatility

258

b.

259

a.

▪ The delta-position of the option position = -/- 100,000,000 x -/- 40%
40,000,000 long in euros. The dealer should, therefore, sell 40,000,000 euros.

260
c.

- A call option has a positive delta, therefore a short call position has a negative delta.
- The dealer should buy 0.50% x EUR 100,000,000 = EUR 50,000,000

261
a.

- A put option has a negative delta, therefore a short position in put options has a positive delta
- The short put position can be seen as a potential long position in the underlying (British pounds)
- The dealer should sell 0.30% x GBP 100,000,000 = GBP 30,000,000

262
a. A long call option + long put option with the same strike prices

263
d. To anticipate very high volatility in the price of the underlying commodity

264
b

- Sell an ATM put and sell an ATM call

265
b

- With a short EUR call / USD put you suffer from an increase in the EUR/ USD rate and wirth a long EUR put / USD call you can profit from a decrease in this rate. This is exactly the profile of a short position euro against US dollars

266
b.

267
c.

268
d.

269
c.

Asset & Liability Management -ALM answers

270
d

271
d

272
a.

273
d.

274
d.

275
b.

276
c.

277
d.

278
d

279
b.

280
b.

281
c.

282
c.

283

b.

284

d.

285

b.

286

d.

287

d.

288

a.

289

b

▪ Issuing the CDO's in different tranches decreases the credit risk for the high rated tranches, however, at the same time it increases the credit risk for the lower rated tranches.

290

d.

291

a.

292

a.

▪ If the creditworthiness of the reference entity decreases, then the value of the CDS increases. Your exposure to the seller increases and, therefore, you counter party credit risk increases.

293

b.

▪ Issue fixed rate loan: pay fixed. Receiver's swap: receive fixed and pay floating. Overall: pay floating.

294

d.

Interest immunization is matching the terms of assets and liabilities and since with a typical bank the assets have a longer interest-term than theliabilties this bank must decrease the term of its assets and increase the term of its liabilities.

295

c.

296

b.

297

d.

298

b.

299

d.

300

a.

▪ If the yield curve steepens, this means that long-term interest rates go up relative to short-term rates. Let us assume for the sake of convenience that long-term rates increase and that at the same time short-term rates decrease. This would mean the following:

- the value of short-term assets and liabilities increases

- the value of long-term assets and liabilities decreases

Since usually the assets have a greater term than the liabilities this means the following:

- the value of short-term liabilities increases

- the value of the long-term assets decreases

Because the interest sensitivity of longer-term items is greater that the interest-sensitivity for shorter-term items, the impact on the long-term assets is greatest. The result is that the equity will decrease.

301

d.

- The gap report gives an overview of the remaining interest periods of the assets and liabilities. The interest for the floating rate loan is only fixed for still two months.

302

c

- Long term speaks for itself. Low coupons mean that the amortization plays a more important role (the weihtings of the short-term cash flows is relatively low).

303

d.

- A combination of a fixed rate loan with a term of 6 years and a 6 years payer's swap, for instance, would render a synthetic floating rate loan. In this case the duration of the loan decreases from somewhat below 6 to approximately 0.25.

304

c

Demand deposits are assumed to have fairly stable rates on average. Although they are immediately withdrawable, behavioural studies have indicated that demand deposits have a great 'stickyness' which means that they stay with the bank on average for many years without the need for the bank to raise the interest rates in order to keep the customers from transferring the funds to another bank.

305

b.

- The duration of a callable bond is lower than the duration of a regular bond.

306

a.

- If interest rates rise, then the value of the 10 years irs will go up and the value of the 5 years irs will go down
- The 10 years swap is the most interest sensitive and the value of this irs will, therefore, increase more than that the value of the 5 years swap will decrease. The net exposure (EAD) on this client, therefore, will rise.
- If the credit rating of the counterparty decreases, the PD (probability of default) goes up.

307

a.

308

a.

- Because of the sale of the bond, the credit risk becomes smaller. The bank.
  however, is now faced with an open position.

309

c.

310

d

- At the start date and during the term of the hedge.

311

b.

312

a.

- If the bank acquires extra exposure on the hedged item, then the hedge
  accounting relationship is not terminated but only applies to the original
  exposure.

313

d.

314

b.

315

c.

- Usually the short-term rates are lower than the long-term rates and this effect
  is larger than the effect of an optionality

Principles of Risk - answers

316
d

317
b.

▪ ICAAP = Internal Capital Adequacy Assessment Proces

318
d. Fraud is typically classified operational risk

319
c.

320
▪ b.

321
c.

▪ Replacement cost is in the first place a result of credit risk
▪ The second order effect (the amount of the risk) is a result of market risk

322
d

▪ Market risk is related to trader's running an open position. Is speaks for itself that the amount of money that can be lost is influenced by market movements. If a trader has a long position of 1,000 Heineken Shares and the price goes down with 1 euro, he will lose 1,000 euro. If the price goes down with 5 euro, however, he will lose 5,000 euro.
▪ Banks are exposed to pre-settlement risk if they have derivative contracts with a positive market value. If the counterparty in such a contract will default, the bank will lose this positive market value. The market value of the contract is dependent on the current market prices.
▪ If a salesperson e.g. enters a sale of US dollars incorrectly as a purchase, the trader will close a sale transaction in the market in order to square his position. As a consequence he now has a short position of twice the amount of the original transaction. When the mistake will be discovered, the trader has to closes his position by buying the US amount in the market. If the USD-dollar exchange rate has increased, he suffers a loss. With small increases, the loss will also be small. However, with large increases, the loss will also be large. Other mistakes may be sending incorrect settlement instructions or an incorrect valuation of the position.

323

c

- If a dealer has a short position, he has an obligation to deliver the shares.
- If he buys the shares to be able to fulfill this obligation, as a consequence he closes his position. This is obviously not his intention.
- He should borrow the shares by entering into a repo transaction as a buyer.

324

c.

325

d.

326

c.

327

c.

328

a

- Stress tests measure the loss as a result of a pre-defined market event

329

d.

- MM futures are exchange traded; the other instruments are OTC

330

b.

- Comprehensive Risk Measure.
- IRC = Incremental Risk Charge is the capital that banks hold as a buffer against the risk of a default or a downgrade of the issuers of securities that they hold in their trading positions.
- VaR = Value at Risk
- EAD = Exposure at Default

331

a.

332

c.

333

a.

334

c.

335

c.

336

d.

337

b. a Vostro account is the same as a Loro account

338

c

- Pre-settlement risk or replacement risk is the risk that the bank has to replace a derivative contract that ceases to exist because of the default of the counterparty. The bank has to replace the contract in order to keep its position balanced.

339

c

- ISDA is used for interest rate derivatives and credit derivatives
- GMSLA is used for securities lending transactions
- GMRS is used for repos and sell buy back transactions
- IFXCO is used for FX transactions

340

a

- According to the contract, the bank has to pay USD 16,000,000 on the value date
- If the client will default, the bank has to replace the contract for a new contract in which it has to pay USD 16,100,000.
- The replacement cost, therefore, is USD 100,000

341

c

- Payment netting lowers the settlement risk, which is part of credit risk

342

c

- The total obligations of the client to the bank amount to EUR 1,350,000
- The bank has an obligation to the client of EUR 750,000
- With a contractual netting agreement, the mutual obligations are compensated
- This results in a netted obligation of EUR 600,000 from the customer to the bank

343

a

- The day to day settlement of changes in the market value of a contract is also called variation margin
- The initial deposit that a counterparty has to place is also referred to as initial margin

344

a.

- With transaction with sovereigns, there is normally a unilateral collateral obligation.

345

b.

346

d.

- Effected expected positive exposure

347

b.

- Credit value adjustment, credit spread for expected loss on derivatives

348

a.

- Banks have to hold capital to cover for the losses as a result of counter party credit risk. The risk is a function of the probability of default and the exposure at default, amongst others. Banks, however, not only suffer losses if a counter party is actually defaulting, but also suffer (mark-to-market) losses if the creditworthiness of a counterparty deteriorates without this leading to a default. This risk was not covered by the Basel rules and is now included in the form of a CVA (credit value adjustment). CVA applies for all bilaterally traded derivatives.