

	A	B	C	D	E	F	G	H	I	J	K
19	Case ii										
20	market forward price	5,300.00									
21	market forward price > calculated forward price										
22	sell the gold at the spot price of \$5,050 and earn interest of 3.5% on the cash you received. This is a gain of 176.75.										
23	assume a long position of a forward contract to buy the gold at the strike price of \$5,300. This is a loss of \$5,050 - \$5,300									-250.00	
24	total gain/loss	-73.25	NO								
25	OR										
26	borrow the amount of the spot price of \$5,050 at 3.5% to buy the ounce of gold at \$5,050. This a loss of \$176.75.										
27	assume a short position of a forward contract in order to sell the gold at the strike price of \$5,300. This is a gain of -\$5,050 + \$5,300									250.00	=-B3 + B20
28	total gain/loss	73.25	=-B5 + J27	yes, an arbitrage opportunity exists							

Problem 1.2

Assume that an interest rate is quoted as 3.25% with semi-annual compounding. What is the rate when expressed with: i) annual compounding. ii) quarterly compounding? iii) continuous compounding.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
32	Problem 1.2													
33	semi-annual compounding rate is 3.25%													
34	annual compounding rate	1.03276406	sanity check											
35														
36	case i			case ii			case iii							
37	m1 = compounding rate1	2.00000		m1	2.00000		m1	2		formulaB40	=B\$39*((1 + B\$38/B\$37)^(B\$37/B\$39) - 1)			
38	r1 = interest rate with m1	0.03250		r1	0.03250		r1	0.0325		formulaE40	=E\$39*((1 + E\$38/E\$37)^(E\$37/E\$39) - 1)			
39	m2 = compounding rate2	1.00000		m2	4.00000					formulaH40	=H\$37 * LN(1 + H\$38/H\$37)			
40	r2 = new interest rate	0.0327641		r2	0.03237		r2	0.032239						
41														

Problem 1.3

Credit card companies quote the APR on the outstanding balance. APR means Annual Percentage Rate and is the interest rate with annualized compounding. Typical APRs are shown in the Table below. However, credit card interest rate is compounded daily, for 365 days a year. Suppose the balance on a credit card is \$10,000. Compute the total balance including interest after 30 days, if the customer has Excellent Credit?

	A	B	C	D
43	Problem 1.3			
44	Amount =	10,000.00		
45	Rate =	0.1715	over one year	
46	Time =	0.08219	30 days of 365 days	
47	Rate * Time =	0.014096		
48	Balance after 30 days	10,141.957	=B44 * EXP(B47)	
49				

Problem 1.4

We are given the zero rates $R(T)$ for several maturities in Table 2. These zero rates apply for all maturities in the ranges shown. 1) Price a bond B1 with annual coupon 5.0% paid twice a year with maturity 2Y. 2) Price a bond B2 with annual coupon 6.0% paid twice a year, with maturity 10Y. 3) Compute the bond yields of the two bonds in points 1) and 2).

	A	B	C	D	E	F	G	H
50	Problem 1.4							
51	(1)							
52	principal	100.00	cpnRateYear	0.05	cpnYear	5	cpn6m	2.5
53	2.46277985			=\$H\$52*EXP(-0.03*0.5)				
54	2.42611383	1yr		=\$H\$52*EXP(-0.03*1)				
55	2.37213580			=\$H\$52*EXP(-0.035*1.5)				
56	7.26102949	sum of just coupons		=SUM(A53:A55)				
57	95.57036654	2yr		=(\$B\$52+\$H\$52)*EXP(-0.035*2)				
58	102.83139603			=SUM(A56:A57)				
59	(2)							
60	principal	100.00	cpnRateYear	0.06	cpnYear	6	cpn6m	3
61	2.95533582			=\$H\$60*EXP(-0.03*0.5)				
62	2.91133660	1yr		=\$H\$60*EXP(-0.03*1)				
63	2.84656296			=\$H\$60*EXP(-0.035*1.5)				
64	2.79718146	2yr		=\$H\$60*EXP(-0.035*2)				
65	2.69759946			=\$H\$60*EXP(-0.0425*2.5)				
66	2.64088025	3yr		=\$H\$60*EXP(-0.0425*3)				
67	2.58535360			=\$H\$60*EXP(-0.0425*3.5)				
68	2.53099445	4yr		=\$H\$60*EXP(-0.0425*4)				
69	2.47777824			=\$H\$60*EXP(-0.0425*4.5)				
70	2.42568095	5yr		=\$H\$60*EXP(-0.0425*5)				
71	2.34225066			=\$H\$60*EXP(-0.045*5.5)				
72	2.29013848	6yr		=\$H\$60*EXP(-0.045*6)				
73	2.23918574			=\$H\$60*EXP(-0.045*6.5)				
74	2.18936662	7yr		=\$H\$60*EXP(-0.045*7)				
75	2.14065592			=\$H\$60*EXP(-0.045*7.5)				
76	2.09302898	8yr		=\$H\$60*EXP(-0.045*8)				
77	2.04646167			=\$H\$60*EXP(-0.045*8.5)				
78	2.00093043	9yr		=\$H\$60*EXP(-0.045*9)				
79	1.95641221			=\$H\$60*EXP(-0.045*9.5)				
80	46.16713451	sum of just coupons		=SUM(A61:A79)				
81	65.67569962	10yr		=(\$B\$60+\$H\$60)*EXP(-0.045*10)				
82	111.842834			=SUM(A80:A81)				
83	(c)							
84	Yield for (1)	"=2.5e^(-y0.5) + 2.5e^(-y1.0) + 2.5e^(-y1.5) + 102.5e^(-y2.0)"						
85	0.03521442	=YIELD("02/06/2026","02/06/2028",D52,A58,100,2)					approximately	
86								
87	Yield for (2)	=3e^(-y0.5) + 3e^(-y1.0) + 3e^(-y1.5) + 3e^(-y2.0) + 3e^(-y2.5) + 3e^(-y3.0) +						
88		3e^(-y3.5) + 3e^(-y4.0) + 3e^(-y4.5) + 3e^(-y5.0) + 3e^(-y5.5) + 3e^(-y6.0) +						
89		3e^(-y6.5) + 3e^(-y7.0) + 3e^(-y7.5) + 3e^(-y8.0) + 3e^(-y8.5) + 3e^(-y9.5) + 103e^(-y10.0)						
90	0.045152036	=YIELD("02/06/2026","02/06/2036",D60,A82,100,2)					approximately	

Problem 1.5

A US company is due to make a payment of 1.0m Euros in 6 months. They plan to hedge this payment by taking a long position in a forward contract for 1.0m Euros with maturity 6 months, at a forward exchange rate 1.150. The current EUR/USD rate is $X_0 = 1.100$, and the actual exchange rate realized at maturity is $X(6M) = 1.175$. i) What is the gain or loss of the company at maturity? ii) What is the interest rate differential $r_{USD} - r_{EUR}$ for maturity 6M implied by the quoted forward FX rate?

	A	B	C	D	E	F	G	H	I	J	K	L
93	Problem 1.5											
94	case (i)											
95	To avoid exposure to a weaker dollar, the company chose to go long a 6m forward contract to purchase EUR at a forward rate of 1.15 USD.											
96	At the 6m maturity, the cost to purchase a EUR increased to 1.175 USD in the spot market											
97	To hedge their USD position by purchasing the EUR with 1.15 USD as defined in the forward contract, the company made a good decision since the dollar weakened by 0.025											
98												
99	forward contract amount	1,000,000.00 EUR										
100	spot rate at T=0	1.100 EUR/USD										
101	spot rate at T=6m	1.175 EUR/USD										
102	forward rate	1.150 EUR/USD										
103	spot rate at T=6m - forward rate	0.025 EUR/USD		=B101-B102								
104	Scenario A from my email											
105	if the company did NOT go long the contract											
106	if bought 1m EUR at T=0	1,100,000.00 USD		=B99*B100								
107	instead of buy 1m EUR at T=6m	1,150,000.00 USD		=B99*B102								
108	then the gain (or savings) is	50,000.00		=B107-B106								
109	Scenario B from my email											
110	however, if the company committed to the contract											
111	since buy 1m EUR at T=6m	1,150,000.00										
112	instead of spot rate at T=6m	1,175,000.00 USD		=B99*B101								
113	then the gain (or savings) is	25,000.00 USD		=B112-B111								
114												
115	(ii)											
116	$R(F) = R_e * ((R_{fUSD} - R_{fEUR}) * T)$											
117	$1.150 = 1.100 * \exp((R_{fUSD} - R_{fEUR}) * 0.5)$											
118	$1.04545 = \exp((R_{fUSD} - R_{fEUR}) * 0.5)$											
119	$\ln(1.04545) = \ln(\exp((R_{fUSD} - R_{fEUR}) * 0.5))$											
120	$0.044452 = (R_{fUSD} - R_{fEUR}) * 0.5$											
121	$0.0889 = R_{fUSD} - R_{fEUR}$	assuming the company DID go long the contract										

Please see photo of email I sent on the next page



Ara Meyer - ameyer3

☺️ 😊 ↩️ Reply ↩️ Reply all ➡️ Forward 📎 🗨️ ⋮

To: 🟢 Hao Fu

Fri 2/6/2026 10:28 PM

Hi,

I have a question regarding Problem 1.5 - I will rewrite it here:

Problem 1.5 A US company is due to make a payment of 1.0m Euros in 6 months. They plan to hedge this payment by taking a long position in a forward contract for 1.0m Euros with maturity 6 months, at a forward exchange rate 1.150. The current EUR/USD rate is $X_0 = 1.100$, and the actual exchange rate realized at maturity is $X(6M) = 1.175$. i) What is the gain or loss of the company at maturity?

Are we expected to judge the decision made by the company to hedge at all or just assume that the forward contract is a given? The word "plan" makes this a bit ambiguous to me and leads me to believe that we need to compare the decision to hedge vs not to hedge since the gain/loss would be different in the two scenarios.

Scenario A. If the company purchased the EUR at $T=0$ instead of going long the forward, the company would pay less for the EUR at $T=0$ than purchasing the EUR at $T=6m$ which is at a higher rate. The savings would be \$50,000 USD.

Scenario B. If the company "committed" to going long a forward contract, then they are purchasing the EUR at the forward rate which is lower than the spot price at 6m. The savings would be \$25,000.

This is also open to interpretation of the possibility of this being a loss since the company only saved \$25,000 instead of \$50,000.

Please advise