T-503-AFLE Derivatives

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Problem Set II – Forwards

Q1/ Explain carefully the difference between hedging, speculation, and arbitrage.

Q2/ What is the difference between a long forward and a short forward position for an investor?

Q3/ What is the difference between the over-the-counter market and the exchange-traded market? What are the bid and offer quotes of a market maker in the over-the-counter market?

Q4/ Explain why a futures contract can be used for either speculation or hedging.

Q5/ A dually listed tech company stock is currently trading @ 32 USD on the New York Stock Exchange (NYSE) and @34 CAD on the Toronto Stock Exchange (TSX). The current FX rate is USDCAD=1.02 (1 USD = 1.02 CAD). Explain what is likely to happen to prices as traders take advantage of this opportunity?

Q6/ Modelling question in two parts

1) With Excel, create a chart with 3 payoffs at maturity:

(a) Long Forward with fwd price K=12

(b) Short Forward with fwd price K=15

(c) 0.3 * Long call with fwd price K=20

2) Let the variable 'x' be the variable tracking the underlying price at maturity. What would be the equation of the payoff for a financial instrument made of the sum of the 0.3 long call with fwd price K=20 and a short forward with K=15.

Q7/ A US company needs to pay a bill of 6.4m € in four months. In order to hedge in case of adverse variation in the EURUSD pair, the head trader enters into a long forward contract to buy 6.4m Euros (€) for US Dollars ($) at an exchange rate of 1.22 USD per EUR in 4 months.

1) How much does the investor gain or lose if the exchange rate at the end of the contract is:

(a) EURUSD=1.195 and (b) EURUSD=1.226 ?

2) A few minutes before the expiry of the contract, the spot rate is 1.226. The trader heard from her back-office that the scheduled payment is cancelled and does not need to hedge anymore the position. She decides to sell the contract. At which price, would it be fair to sell the contract?

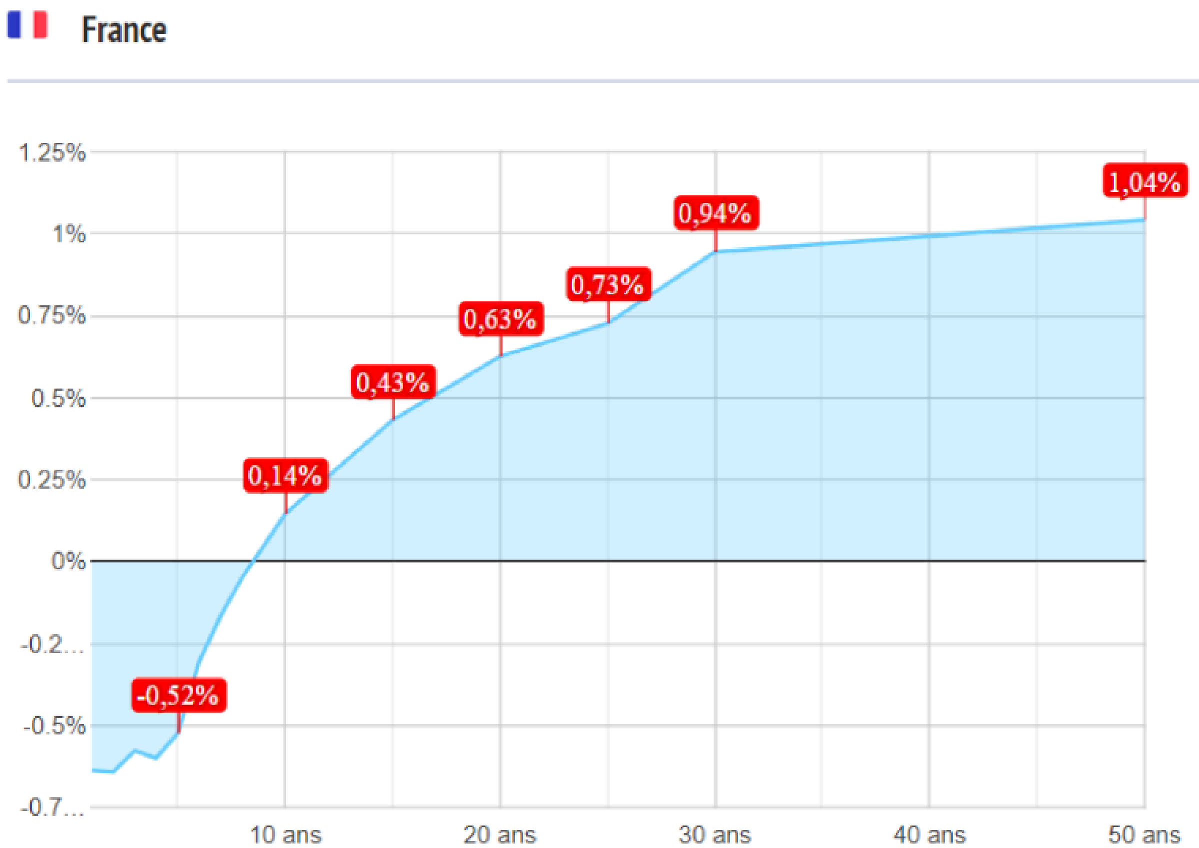
Q8/ A trader enters into a short forward contract on 100 million yen. The forward exchange rate is $0.0090 per yen. How much does the trader gain or lose if the exchange rate at the end of the contract is (a) $0.0084 per yen; (b) $0.0101 per yen?

Q9/ A trader enters into a short cotton futures contract when the futures price is 49.5 cents per pound. The contract is for the delivery of 50,000 pounds. How much does the trader gain or lose if the cotton price at the end of the contract is (a) 44.5 cents per pound; (b) 51.55 cents per pound?

Q10/ Annual interest rates are 0.5% over 3m, 0.6% over 6m and 0.75% over 1Y. Today, the price of an asset is 9 € / kg. It is assumed that there is no storage cost. What is the arbitrage free price of a future contract with 6m maturity should be?

Q11/ On Bloomberg, you do see that a Future quotes @57 GBP / unit. The discount rate is 0.96 at the contract time horizon. What should be the spot value? What do you do if the spot is 1 GBP lower?

Q12/ Here are the current interest rates on French gov bonds:



Time horizon	Interest Rate
10Y	0.14%
15Y	0.43%
20Y	0.63%
25Y	0.73%
50Y	1.04%

What would be: (a) the forward rate 20Y in 10Y time? (b) 20Y in 15Y time?

Q13/ The spot price of an Allianz share is St = 217.1 EUR and in 5 months it is expected to pay €9.5 dividend.

(a) What is the fair price for a one year forward contract on this stock assuming that the 5 month interest rate is 0.6% and the one year rate 0.85%?

(b) What is the forward rate $\boldsymbol{F(0, 5m, 1y)}$?