ACF305
International Financial and Risk Management

Week 5 tutorial

Question 1

On the morning of Monday, August 21, you purchased a futures contract for 1 unit of CHF at a rate of USD/CHF 0.7. The subsequent settlement prices are shown in the table below.

a) What are the daily cash flows from marking to market?
b) What is the cumulative total cash flow from marking to market (ignoring discounting)?
c) Is the total cash flow greater than, less than, or equal to the difference between the price of your original futures contract and the price of the same futures contract on August 30?

August	21	22	23	24	25	28	29	30
Futures rate	0.71	0.70	0.72	0.71	0.69	0.68	0.66	0.63

Solution

a) The daily cash flows are the new futures price minus the futures price prevailing on the prior day (both end of day). They are shown in the table below.
b) Add up all the marking to market cash flows (see table).
c) The difference between the futures price at maturity and the price at the origin of the contract is equal to the cumulative cash flow at the end of the period (see table).

August	**21**	**22**	**23**	**24**	**25**	**28**	**29**	**30**
Futures rate	0.71	0.70	0.72	0.71	0.69	0.68	0.66	0.63
(a) marking to market	0.01	−0.01	0.02	−0.01	−0.02	−0.01	−0.02	−0.03
(b) ∑ marking to market	0.01	0.00	0.02	0.01	−0.01	−0.02	−0.04	−0.07
(c) P(30 Aug) − P(20 Aug)								−0.07

Question 2

You want to hedge the EUR value of a cad 1m inflow using futures contracts. On Germany's exchange, there is a futures contract for USD 100,000 at EUR/USD 1.5.

(a) Your assistant runs a bunch of regressions:

I. $\Delta S[EUR/CAD] = \alpha 1 + \beta 1 \, \Delta f[USD/EUR]$

II. $\Delta S[EUR/CAD] = \alpha 2 + \beta 2 \, \Delta f[EUR/USD]$

III. $\Delta S[CAD/EUR] = \alpha 3 + \beta 3 \, \Delta f[EUR/USD]$

IV. $\Delta S[CAD/EUR] = \alpha 4 + \beta 4 \, \Delta f[USD/EUR]$

Which regression is relevant to you?

(b) If the relevant β were 0.83, how many contracts do you buy? sell?

Solution

a) Both sides of the regression should be in HC/FC. HC is the EUR, the foreign currency exposure that you want to hedge is in CAD and the futures contract you want to apply for this purpose is on USD. Therefore, (ii) is the right answer.

b) A beta of 0.83 implies that you should sell approximately four-fifth of the extant EUR/USD futures contract to hedge CAD 1. You want to hedge one million CAD, which means that you multiply beta by 1 million. This means that you would have to sell USD 830,000 (remember: the currency in the denominator is the one you are buying or selling) at maturity to hedge your exposure. Unfortunately, the German futures market does not allow you to sell USD 830,000 – you can only sell multiples of USD 100,000. Therefore, divide USD 830,000 by USD 100,000 to obtain 8.3. Round to the nearest integer to get 8. Consequently, you sell 8 futures contracts on the EUR/USD, i.e., you sell USD 800,000 for EUR 1.5*800,000.

Question 3

A German exporter wants to hedge an outflow of NZD 1m. She decides to hedge the risk with a EUR/USD contract and a EUR/AUD contract. The regression output is, with t-statistics in parentheses, and R2 = 0.59:

$$\Delta S[EUR/NZD] = a + \underset{(1.57)}{0.15}\,\Delta f[EUR/USD] + \underset{(17.2)}{0.7}\,\Delta f[EUR/AUD]$$

a) How will you hedge if you use both contracts, and if a USD contract is for USD 50,000 and the AUD contract for AUD 75,000?
b) Should you use the USD contract, in view of the low t-statistic? Or should you only use the AUD contract?

Solution

a) You would need to buy 0.15 EUR/USD futures contracts and 0.70 EUR/AUS futures contracts to hedge NZD 1. However, you want to hedge one million NZD – not one. Therefore, multiply these numbers by one million. In case of the EUR/USD contract, this implies you have to buy 3 contracts, given that one contract is over USD 50,000. In case of the EUR/AUD contract you compute AUD 700,000/75,000 = 9.33, suggesting that you buy 9 contracts.

b) No, the t-statistic is too low (therefore the coefficient is not statistically different from zero) and using two contracts imply that we would need to face higher transaction costs.