

Lecture Notes for Chapter 4

International Financial Markets and Institutions

Chapter 4

Class Examples: The forward market for foreign exchange

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Road Map

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4.1 Valuing riskless HC cashflows in HC terms

1. You will receive USD 100 in 3 months from now. What is the present value of this amount in USD?

[The 3 month USD LIBOR rate is 1.93000% p.a.]

$$\text{USD} \frac{100}{1 + \frac{1}{4} 1.93000\%} = \text{USD} 99.519817$$

4.2 Valuing riskless FC cashflows in HC terms

2. You will receive USD 100 in 3 months from now. What is the present value of this amount in CAD?

[The current spot rate is 1.2902 CAD/USD and the 3 month USD LIBOR rate is 1.93000% p.a.]

Step 1: Compute the present value in units of USD

$$\text{USD} \frac{100}{1 + \frac{1}{4} 1.93000\%} = \text{USD} 99.519817$$

Step 2: Convert the USD present value into CAD using the current spot rate

$$\begin{aligned} & \text{USD} 99.519817 \times 1.2902 \frac{\text{CAD}}{\text{USD}} \\ &= \text{CAD} 128.40 \end{aligned}$$

3. You will receive FC x in 3 months from now. Set $T=3$ months. Now is time t .

- (a) The current spot rate is S_t and the effective 3 month FC interest rate is $r_{t,T}^*$.

Show that the present value of this amount in HC is

$$\text{HC} \frac{x}{1 + r_{t,T}^*} S_t.$$

Step 1: Compute the present value in units of FC

$$\text{FC} \frac{x}{1 + r_{t,T}^*}$$

Step 2: Convert the FC present value into HC using the current spot rate,

$$\text{HC} \frac{x}{1 + r_{t,T}^*} S_t$$

- (b) A different approach: this time you are given the current 3 month forward rate, $F_{t,T}$ and the effective 3 month HC interest rate is $r_{t,T}$. How would you calculate the present value in HC?

Step 1: Compute the value in 3 months time of $FC \times$ in units of HC, using the current 3 month forward rate

$$HCx F_{t,T}$$

Step 2: Compute the present value of the riskless HC amount $x F_{t,T}$

$$HC \frac{x F_{t,T}}{1 + r_{t,T}}$$

(c) How can you show that your answers to b. and c. are equivalent?

Just use CIP.

4.3 Valuing forward contracts

4. One month ago you went long a 4 month forward contract on FC 1. This means that you have arranged to receive FC 1 and pay HC $F_{-1,3}$. These cashflows will occur 3 months from now. What is the current value of the forward contract you entered into 1 month ago?

$$\text{HC} \left(\frac{S_0}{1 + r_{0,3}^*} - \frac{F_{-1,3}}{1 + r_{0,3}} \right)$$

5. You enter into a T period forward contract on FC 1. What will the value of this contract be in 1 period from now?

$$\text{HC} \left(\frac{S_{t+1}}{1 + r_{t+1,T}^*} - \frac{F_{t,T}}{1 + r_{t+1,T}} \right)$$

6. What is the value of a forward contract when it is first initiated?

Zero.

4.4 The certainty equivalent of the future spot rate, \tilde{S}_T

In class we have seen that

$$CEQ_t [\tilde{S}_T] = F_{t,T}$$

7. You are deciding whether to borrow CAD 1M for 3 months in CAD or to borrow in USD and then convert into CAD. What will you do?

[The 3M USD interest rate is 1.93000%, the 3M CAD interest rate is 2.50000%, the spot rate is 1.2902 CAD/USD and the 3 month forward rate is 1.2920 CAD/USD]

Cost of borrowing in CAD is

$$\begin{aligned} 1 + r_{t,T} &= 1 + \frac{1}{4}2.5\% \\ &= 1.00625 \end{aligned}$$

Cost of borrowing in USD is

$$\begin{aligned} \frac{CEQ_t[\tilde{S}_T]}{S_t} (1 + r_{t,T}^*) &= \frac{F_{t,T}}{S_t} (1 + r_{t,T}^*) \\ &= \frac{1.2920}{1.2902} \left(1 + \frac{1}{4}1.93000\%\right) \\ &= 1.006227 \end{aligned}$$

It is cheaper to borrow in USD. You would only save about 23 CAD though!