

**First Midterm Exam – Practice Questions**

1. Assume you are given the following exchange rates  $S_t=1.054$  USD/EUR and  $S_t=1.369$  AUD/EUR.
- What is the cross rate USD/AUD?
  - Suppose the 180-day forward rate is  $F_{t,180}=1.08$  USD/EUR. Calculate the forward premium. Does the forward rate contain a premium or a discount?
  - Suppose Kwiki Bank quotes  $S_t=.81$  USD/AUD. Is arbitrage possible? (Why?)
  - If yes, describe a triangular arbitrage strategy and determine an arbitrageur's profits.

2. It is February 2017. A Big Mac costs CZK 80 in the Czech Republic, while it costs USD 4.8 in the U.S. The spot rate is 25 CZK/USD (CZK= Czech Koruna).

- According to PPP, what should be the USD/CZK exchange rate in February 2017?
- Take the USD as the domestic currency. Calculate the real exchange rate,  $R_t$ . What is the over/under-valuation of the CZK relative to the USD?
- According to the  $R_t$ , which country is more efficient?
- The GDP per capita in the Czech Republic is CZK 440,000. Translate the GDP per capita in CZK to (nominal) USD and to PPP USD prices.
- Suppose in March 2017, the price of the Big Mac increases to CZK 88 in the Czech Republic, while it decreases to 4.56 in the U.S. According to the *linearized* version of PPP, what should the USD/CZK exchange rate be in March 2017?
- Assume that in March 2017 the exchange rate is .045 USD/CZK. Generate a trading signal based on PPP.

3. Suppose you use monthly Swiss and U.S. data from January 1971 to January 2017. You fit the following regression:

$$s_t (\text{CHF/USD}) = (S_t - S_{t-1})/S_{t-1} = \alpha + \beta (I_{\text{SWIT}} - I_{\text{US}})_t + \varepsilon_t.$$

$$R^2 = 0.022127$$

$$\text{Standard Error } (\sigma) = .034494$$

$$\text{Residual SS (RSS)} = 0.63198$$

$$\text{Observations} = 539$$

	Coefficients	Stand Error
Intercept	-0.00096	0.001550
$(I_{\text{SWIT}} - I_{\text{US}})$	1.142955	0.395672

- Are the signs of the coefficients consistent with PPP?
- Using individual t-tests, test PPP at the 5% level.
- Assume the sum of  $\{s_t - (I_{\text{SWIT}} - I_{\text{US}})_t\}^2$  during the estimation period is 0.63291 – i.e.,  $\text{RSS}(H_0)$ . Using an F-test, test PPP at the 5% level.
- Suppose  $S_{\text{Jan}17} = 1.01$  CHF/USD and  $(I_{\text{SWIT}} - I_{\text{US}})_{\text{Jan}17} = .0035$ . Assume inflation rates follow a Random Walk, that is  $E_t[I_{\text{SWIT}} - I_{\text{US}}]_{t+1} = [I_{\text{SWIT}} - I_{\text{US}}]_t$ . Using the regression model, forecast the exchange rate for Feb 2017 ( $S_{\text{Feb}17}$ ).
- What is your Random Walk forecast for  $S_{\text{Feb}17}$ ?
- Suppose  $S_t = 1.02$  CHF/USD. Looking at (iv) and (v), which forecast has the lowest squared error?

4. Ms. Benes is a U.S. arbitrageur. The one-year interest rate offered in the U.S. is 1%, while the one-year interest rate offered in Brazil is 17%. The spot rate is 3.90 BRL/USD. Beckham Bank offers Ms. Benes a one-year forward

contract at 4.10 BRL/USD.

- (1) Determine the arbitrage-free one-year forward contract exchange rate.
- (2) Can Ms. Benes make a risk-free profit? If yes, describe a covered arbitrage strategy.
- (3) Determine Ms. Benes's profits.
- (4) Calculate the forward premium and compare it to the interest rate differential. Based on these numbers, what kind of capital flows will the U.S. economy experience?

5. Chambers Inc. has a GBP 10,000,000 payable in 180 days. It considers using (1) a forward hedge, (2) a money market hedge, (3) an option hedge, (4) a collar, or (5) no hedge. Chambers develops the following information:

$S_t = 1.61$  USD/GBP  
 Interest USD = 5% - 5.25%  
 Interest GBP = 6% - 6.5%  
 $F_{t,180\text{-day}} = 1.60$  USD/GBP  
 Put ( $X_p = 1.565$  USD/GBP;  $p_p = \text{USD } .01$ )  
 Call ( $X_c = 1.58$  USD/GBP;  $p_c = \text{USD } .04$ )

Distribution for  $S_{t+180}$

<u><math>S_{t+180}</math>(USD/GBP)</u>	<u>Probability</u>
1.56	.30
1.59	.60
1.63	.10

A. Carefully describe each strategy and cash flows (if possible, calculate sure amounts and expected values). Which hedging strategy would you recommend to Chambers Inc? Do preferences matter for your strategy recommendation? Justify your answer.

B. Describe the exposure of Chambers. Given the information formulate a range for transaction exposure.

C. Suppose a consultant tells you the distribution of monthly changes in the USD/GBP exchange rate is  $s_t \sim N(0, .03^2)$ . Calculate the VaR(mean, 97.5%).

6. Kramerica Company. does business in the United States and New Zealand. In attempting to assess its economic exposure, it compiled the following information. Today's exchange rate is  $S_t = .50$  USD/NZD.

a. Kramerica's U.S. sales are somewhat affected by the value of the New Zealand dollar (NZD), because it faces competition from New Zealand exporters. It forecasts the U.S. sales based on the following three exchange rate scenarios:

<u>Exchange Rate of NZD</u>	<u>Revenue from U.S. Business (in millions)</u>
.48 USD/NZD	USD 100
.50 USD/NZD	USD 105
.54 USD/NZD	USD 110

b. Its New Zealand dollar revenues on sales to New Zealand invoiced in New Zealand dollars are expected to be NZD 600 million.

c. Its anticipated cost of goods sold is estimated at USD 200 million from the purchase of U.S. materials and NZD

100 million from the purchase of New Zealand materials.

d. Fixed operating expenses are estimated at USD 30 million.

e. Variable operating expenses are estimated at 20 percent of total sales (after including New Zealand sales, translated to a dollar amount).

f. Interest expense is estimated at USD 20 million on existing U.S. loans, and the company has no existing New Zealand loans.

i. Create a forecasted income statement for KramERICA Co. under each of the three exchange rate scenarios. Explain how KramERICA's projected earnings before taxes are affected by possible exchange rate movements.

ii. Calculate the CF elasticity (to changes in  $S_t$ ). Interpret the CF elasticity.

iii. Explain how it can restructure its operations to reduce the sensitivity of its earnings to exchange rate movements without reducing its volume of business in New Zealand.