FINA 4360   **Homework 1: Solutions**

1.1. $S_t(\text{BRL/MXN}) = (1/.45 \text{ USD/BRL}) \times .076 \text{ USD/MXN} = \textbf{.1689 BRL/MXN}$

1.2. a) The inflation of the US would put downward pressure on the US dollar which would make people in the US want to import more.

b) Country K's people would invest in the US dollar which would have a negative effect on country K's economy

c) People in the US would have more income to invest in Country K's government and corporate securities.

d) Depending on the size of the tariff, US would demand for Country K's goods would decrease and US would look to bring this product in from another country or domestically produce it.

e) Overall it probably wouldn't do a whole lot since a lot of these impacts negate each other.

1.3. (A) Deacon Bank can capitalize on its expectations about pesos (MXN) as follows:
1. Borrow MXN 70M
2. Convert the MXN 70M to USD: MXN 70M x .08 USD/MXN = USD 5.6M
3. Lend the USD at 2% over a 20-day period. Accrued interest in 20 days:
    USD 5.6M×[1+(.02×30/360)] = USD 5.6M×[1.001111] = USD 5,606,216
4. Repay the peso loan. The repayment amount on the peso loan is:
    MXN 70M × [1 + (.05×20/360)] = 70M × [1.004167] = MXN 70,291,690
5. Based on the expected S_t= .10 USD/MXN, repay the MXN loan:
    MXN 70,291,690 × .072 USD/MXN = USD 5,061,001.7
6. Deacon Bank's expected profits (if its forecasted exchange rate is accurate):
    USD 5,606,216– USD 5,061,001.7 = USD **545,214.30**

    NOTE: You could have also calculated Deacon Bank's expected profits as follows:
1. Borrow MXN 70M
2. Convert the MXN 70M to USD: MXN 70M x .08 USD/MXN = USD 5.6M
3. Lend the USD at 2% over a 20-day period. Accrued interest in 20 days:
    USD 5.6M×[1+(.02×30/360)] = USD 5.6M×[1.001111] = USD 5,606,216
4. Based on the expected S_t= .072 USD/MXN, convert the USD 5,606,216 to MXN
    USD 5,606,216 x 1/.072 USD/MXN = MXN 77,864,111
5. Repay the peso loan. The repayment amount on the peso loan is:
    MXN 70M × [1 + (.05×20/360)] = 70M × [1.004167] = MXN 70,194,444
6. Deacon Bank's expected profits
    MXN 77,864,111 – MXN 70,194,444 = MXN 7,669,667.0 (or -10.96% per MXN borrowed)

1.4 Call is not exercised (X_{call} =.86 USD/CAD > S_t=.82 USD/CAD)
        Premium received per unit   = USD. 02 = Net profit.
            => (net profit = USD .02 x 50,000= **USD 1,000**)

1.5 Put is exercised (X_{put} =.85 USD/CAD > S_t=.82 USD/CAD)

Profit per unit = USD .04 + (USD .82 – USD .85) = USD 0.01
(=>net profit = USD 0.01 x 50,000 = **USD 500**)

1.6

Possible S_t (USD/CAD)	Exercise?	Net profit per unit
.81	Yes	0.09 - 03 = .06
.86	Yes	0.02 - 03 = -.01
.89	No/Indifferent	-0.02
.92	No	-0.02
.95	No	-0.02
1.01	No	-0.02

1.7   a). Hong Kong exports to Japan should *increase* because the JPY will have appreciated against the HKD (HKD goods will be less expensive).
b) Hong Kong exports to the U.S. should *increase* a little bit, because Japanese goods become more expensive to U.S. importers as a result of JPY appreciation. Thus, some U.S. importers may find that even though the USD/HKD exchange rate is unchanged, the Hong Kong prices are now lower than Japanese prices.

1.8 Expectations of a weak dollar can cause expectations of higher inflation, because a weak dollar places upward pressure on U.S. prices. Higher inflation tends to place upward pressure on interest rates. Because there is an inverse relationship between interest rates and bond prices, bond prices would be expected to decline. Such an expectation causes bond portfolio managers to liquidate some of their bond holdings, thereby causing **bond prices to decline immediately**.

1.9   a) An increase in P_{oil} increases the value of UAE's exports (TB↑), generating downward pressure on the USD. To support the fixed exchange rate, the CB buys USD, thereby increasing its FX reserves.
b) UAE's domestic money supply increases and UAE's interest rates decrease.
c) The CB of the UAE can sterilize with an OMO (buy AED/sell UAD T-bills)

1.10 ECB Intervention. The ECB could step in and buy USD. This FX intervention would increase the European money supply. This increase in the European money supply would decrease Euro interest rates.

1.11 Triangular covered arbitrage (Key: From the first two quotes, we get S_t= 1.889 CAD/GBP. Third quote, S_t= 2 CAD/GBP is out-of-line: Relative to the first two quotes, the GBP is overvalued against the CAD.)
    1. Borrow USD 1
    2. Sell USD/ Buy GBP at S_t = 1.70 USD/GBP. Get GBP 0.5882
    3. Sell GBP 0.5882/ Buy CAD at S_t = 2.1 CAD/GBP. Get CAD 1.1765
    4. Sell CAD 1.1765/Buy USD at S_t = .9 USD/CAD. Get USD 1.0588
    5. Return USD 1 loan. Keep profit (π=**USD .0588** or **5.88% per USD borrowed**)

Note: Market forces will:
- increase the value of the GBP against the USD (Step 2);

- increase the value of the CAD against the GBP (Step 3);
- increase the value of the USD against the CAD (Step 4).
=> Very soon, triangular arbitrage strategy will not be profitable.

1.12 IRP Calculate $F^{IRP}_{t,90}$ = 1.50 USD/EUR*(1+.0375/4)/(1+.055/4) = 1.49355 USD/EUR ($\neq$1.49 USD/EUR). Covered arbitrage is profitable.
Covered arbitrage strategy (at 1.49 USD/ERU, the forward EUR is undervalued):
1) Borrow EUR 1 at 5.50% for 90 days.
2) Convert to USD at S_t = 1.50 USD/EUR (Get USD 1.50)
3) Deposit USD 1.50 at 3.75% for 90 days.　　　　　=> Get USD 1.5140625
4) Buy EUR forward at $F_{t,90}$ = 1.49 USD/EUR.　　　=> Get EUR 1.0161493
　　π = EUR 1.0161493 – EUR 1 (1+.055/4) = **EUR .0024**. (or **0.24% per EUR borrowed**)

1.13 IRP Calculate $F^{IRP}_{t,180}$ = 6 ARS/EUR*(1+.07/2)/(1+.02/2) = 6.1485 ARS/EUR ($\neq$6.25 ARS/EUR). Covered arbitrage is profitable.
Covered arbitrage strategy (at 6.25 ARS/ERU, the forward EUR is overvalued):
1) Borrow ARS 1 at 7% for 180 days.
2) Convert to EUR at S_t = 6 ARS/EUR (Get 0.16667)
3) Deposit EUR 0.16667 at 2% for 180 days.　　　　=> Get EUR 0.168333
4) Sell EUR/Buy ARS forward at $F_{t,180}$ = 6.25 ARS/EUR.　　=> Get ARS 1.052083
　　　π = ARS 1.052083 – ARS 1 (1+.07/2) = **ARS .017083**. (or **1.7% per ARS borrowed**)

1.14 Since they both require the same real interest rate, the 2 percent difference in interest rates in favor of the CAD would result in the same amount of rate exchange difference in favor of the USD according to PPP.

1.15 PPP S_t will adjust conversely according to the inflation rate of the two countries. The amount of adjustment is directly dependent on the inflation rates of the two countries according to PPP.

　　　e_f = (1 + I_d)/(1 + I_f)– 1 = (1+ .03)/(1+ .05) -1 = -0.019047
　　　=> S_t = 1.60 USD/GBP x (1-0.019047) = **1.5695 USD/GBP**

1.16 IFE
　　　e_f = (1+i_dxT/360)/(1+i_fxT/360)– 1 = (1+.03x180/360)/(1+.07x180/360) -1 = -0.019324
　　　=> S_t = .80 x (1-0.019324) = **.78454 USD/SGD**

1.17 a) Expectations Hypothesis: (.115 -.13)/.13 = -0.1154 (**-11.54%**).
　　　b) Relative PPP: (.01 - .07) = -.06 (**-6%**)
　　　c) Random Walk: **0%**

1.18 Testing Relative PPP
t(α=0): 0.00063769/0.001387156 = **0.4597** => cannot reject H_0
t(β=1): (0.459710491-1)/0.246676358 = **-2.19** => reject H_0
F(α=0 & β=1): [(0.37515 - 0.370467333)/2]/ [0.370467333/(442-2)] = **2.7807762** => cannot reject H_0

1.19 (Chapter 9)

Country	4-year compounded return		
U.S.	$(1.09)^4 - 1 = 41\%$		
Singapore	$(1.06)^4 - 1 = 26\%$	=>	$p = (1.41/1.26) - 1 = .119$ (11.9%)

The 4-year forward rate should contain an 11.9% <u>premium</u> above today's spot rate of .60, which means the forward rate $(F_{t,4\text{-}yr})$ is .60 USD/SGD x $(1 + .119) = .6714$ USD/SGD. The 4-year forecast is .6714 USD/SGD (SGD is expected to appreciate against USD by 11.9%).

1.20 (Chapter 9)

Interest Rate Differential	Forecast of the % Change in JPY $(E[e_{f,t}])$	Probability
0%	.9(0%) + .8(3%) = 2.4%	30%
1%	.9(1 %) + .8(3%) = 3.3%	60%
2%	.9(2%) + .8(3%) = 4.2%	10%

$E[e_{f,t}] = 3.12\%$

1.21 (Chapter 10)

The net exposure to each currency in U.S. dollars:

Currency	Net Inflows in Foreign Currency	S_t	TE
DKK	DKK 1 0,000,000	0.15 USD/DKK	USD 1.5 M
GBP	GBP 1,000,000	1.50 USD/GBP	USD 1.5 M

The DKK and the GBP are highly correlated. Both the DKK and the GBP exposure show positive net inflows. The exposure is not "hedged" => high exposure.

1.22 (Chapter 10) The bottom line is that transaction exposure is reduced since Vegas will have less receivables in Canadian dollars (CAD). It should be noted that economic exposure will not necessarily be reduced because a weak CAD could cause a lower demand for its exports.

1.23 (Chapter 10)

	(Figures are in USD millions)		
	.50 USD/NZD	.55 USD/NZD	.60 USD/NZD
Sales			
U.S.	800	800	800
New Zealand	400	440	480
Total	1,200	1,240	1,280
Cost of Goods Sold			
U.S.	500	500	500
New Zealand	50	55	60
Total	550	555	560
Gross Profit	650	685	720
Operating expenses	300	300	300
EBIT	350	385	420
Interest expenses	100	100	100
Earnings after taxes	250	285	320

The table shows that DeKalb Inc. is adversely affected by a weaker NZD value.

1.23 **(Chapter 10)** A possible regression model for this task is to regress percentage change in its stock price over quarter t (stockret$_t$) against the percentage change in the USD/SGD exchange rate (e$_f$) in the three previous quarters, shown as follows.

$$\text{stockret}_t = \alpha + \beta_1\, e_{f,t-1} + \beta_2\, e_{f,t-2} + \beta_3\, e_{f,t-3} + u_t$$

where u$_t$ is the error term. The sum of the ßs ($\beta_1 + \beta_2 + \beta_3$) measures the sensitivity of stock prices (through stock returns) to changes in the USD/SGD exchange rate (through e$_{f,t}$).