FINA 7360: International Finance **Spring 2023**

Midterm I: SOLUTIONS

1)

i) $F^{IRP}_{t,180} = S_t\,[(1 + i_d * 180/360)/(1 + i_f * 90/360)]$ = **19.33 MXN/CHF** [(1 + .1053/4)/(1 - .0087/4)]
= **19.8821 MXN/CHF**

ii) Quote by Lozano Bank: $\mathbf{F_{t,90} = 20.30}$ **MXN/CHF** > $F^{IRP}_{t,90}$ = **19.8821** ⇒ Yes!

iii) Covered arbitrage strategy (Key: Lozano Bank undervalues the MXN forward):
1. Borrow MXN 1 at i_{MXN} = 10.53% for 90 days. (repay in 90 days MXN 1.026325)
2. Convert MXN 1 to CHF at S_t = **19.33 MXN/CHF** (get CHF 0.0517)
3. Deposit CHF 0.0517at i_{CHF} = 0.87% for 90 days.
4. Sell the CHF forward at $\mathbf{F_{t,90} = 20.30}$ **MXN/CHF**

Profits = CHF 0.0517* (1+.0087/4) * **20.30 MXN/CHF** – MXN 1.026325.= MXN 0.0255
(or 2.63% per MXN borrowed)

iv) p = (**20.30** – **19.33**)/ **19.33** * 360/90 = -0.2007 > $i_{MXN} - i_{CHF}$ = .1053 + .0087 = 0.0966
⇒ capital flies to CHF

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2) Solution for Exam A

A. 3-mo changes in % (last **20 years**):

	Exam A
S_t	**0.9316**
$F_{Dec\ 30,Mar\ 30}$	**0.9189**
average	**-0.00454**
SD	**0.04054**
min	**-0.11191**
max	**0.16397**

Note: Mexican volatility is huge (due to the behavior during the 1980s debt crisis). Some numbers will make no sense !

(i) Transaction Exposure (TE): **USD 50M** * **0.9316 CHF/USD** = **CHF 46.58M**

(ii) Best/Worst Case TE Range: [**CHF 41.367M; CHF 54.218M**]

(iii) Normal-based 95% C.I. for TE:
[**CHF 46.58 M** * (1 + (**-0.00454** - 1.96 * **0.04054**)); **CHF 46.58 M** * (1 + (**-0.00454** + 1.96 * **0.04054**))
= [**CHF 42.668M; CHF 50.070M**]

(vi) We need 12 month Var(99%), given that we have 3-mo data, we adjust data by 4.
VaR(99%) = **CHF 46.58 M** * (1+ ((**-0.00454** * 4 - 2.33 * **0.04054** * sqrt(4))]
= **CHF 38.332M**

VaR(99%)-mean = **CHF 38.332M** - **CHF 46.58 M** = **CHF -8.248 M**

B. $F^{IRP}_{t,3-mo} = S_t[(1 + i_d * 90/360)/(1 + i_f * 90/360)]$ = **0.9316 CHF/USD** [1 - .0087/4)/(1 + .0425/4)]
= **0.9198 CHF/USD**

Amount to be received = **USD 50M** * **0.9198 CHF/USD** = **CHF 45.944 M**

C. Buy the **0.9210 CHF/USD** put ⇒ Total premium: **CHF 0.01842** * **50M** = **CHF 0.921M**
Adding the opportunity cost: **CHF 0.921M** * (1 - .0075*90/360) = **CHF 0.9192731**

If $S_{Mar\ 30}$ < **0.9210 CHF/USD** ⇒ Net Amt = **USD 50M** * **0.9210 CHF/USD**
– **CHF 0.9192731**= **CHF 45.13073 M**
If $S_{Mar\ 30}$ > **0.9210 CHF/USD** ⇒ Net Amount = **USD 50M** * $S_{Mar\ 30}$ – **CHF 0.9192731**

D. Check notes.

E. $F_{Feb\ 28,Mar\ 30}$ = **0.96 CHF/USD** * (1+.009*30/360)/(1+.045*30/360) = 0.9571 CHF/USD
Value of forward contract = $\frac{F_{Dec\ 30,Mar\ 30} - F_{Feb\ 28,Mar\ 30}}{[1 + i_{CHF} * (T/360)]}$ = $\frac{(0.9189 - 0.9571)}{[1 + .009 * (30/360)]}$ = **CHF -0.03817**

Total value of Forward position (HP) = 50M * (**-0.03817**) = **CHF -1.91 M**

⇒ Total Amount to be received = **USD 50M** * **0.96 CHF/USD** – **CHF 1.91 M**
= **CHF 46.09 M**

3) Check lecture notes for graphs and diagrams.
(A) Higher interest rates: i_{USD} ↑
Now, U.S. T-bills more attractive than Thai T-bills.
Both supply and demand curves move. ⇒ (i_{THB} - i_{USD}) ↓ ⇒ S_t (THB/USD) ↑ (THB depreciates)

(B) Higher inflation rates: (I_{THB} - I_{USD}) ↑
U.S. goods more attractive than Thai goods.
Both supply and demand curves move. ⇒ S_t (THB/USD) ↑ (THB depreciates)

(C) We follow from (A). CBT sells USD (& receives THB).
FX Mkt effect: S_t (THB/USD) ↓ (USD depreciates against THB).
Thai Money Mkt effect: Interest rates in Thailand increase.

(D) CBT sells USD (which were invested in USD T-bills, yielding 5%) and receives THB (which they likely invest in Thai T-bills yielding 1.75%). Likely a small to medium effect.

4) Exam A - Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.124921

R Square	0.015605
Adjusted R Square	0.008072
Standard Error	0.025407
Observations	396

ANOVA

	df	*SS*	*MS*
Regression	3	0.004011	0.001337
Residual	392	0.253044	0.000646
Total	395	0.257055	

	Coefficients	*Standard Error*	*t Stat*
Constant	8.51E-05	0.001552	0.054808
$(I_{DC} - I_{US})_t$	0.879727	0.36015	2.442665
$(i_{DC} - i_{US})_t$	-0.02361	0.081074	-0.29123
$(m_{DC} - m_{US})_t$	0.004829	0.009151	0.527629

(ii) Higher interest differential, appreciates DC ($s_t \uparrow$) $\Rightarrow$ Not consistent with IFE (should be positive).

(iii)
t-stat(alpha) = 8.51E-05/0.001552 = 0.054808 <= cannot reject alpha=0
t-stat(beta) = [0.879727- 1]/ 0.36015 = -0.3340 (|t-stat| < 1.96) <= cannot reject beta=1

$\Rightarrow$ We cannot reject PPP.

(iv) MSE = 0.00025

(v) MSE = 0.00021

(vii) Lowest forecast is the RW => Q1 2023 Forecast: **0.9316 CHF/USD**

BONUS

Exam A – ABB EE
Regression ABB returns against 3-FF factors and changes in FX rates.
Dates: 2001 - 2022
The coefficient of s is not signficant (|t = **-1.0623**| < **1.96**) => No EE!

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.018524	0.013967	1.326251	0.185939
Mkt-RF	-1.20185	2.238583	-0.53688	0.591816
HML	0.705653	0.944337	0.747248	0.4556
SMB	-0.05138	0.050633	-1.01482	0.31115

s (CHF/USD)	-0.41495	0.390618	**-1.0623**	0.289101