

Final Exam

No points will be given by simply writing down formulas, and writing down definitions or irrelevant statements from the book, or saying "yes," will get you zero points. Justify all your answers. If you cannot prove something give some intuition. Good luck. Reminder: this is an open book exam, but no open notes.

Estimated Time: 2 hrs 30 minutes.

I. Problems (10 points each).

1. Bilardo Inc. considers investing excess funds at home, in the U.S., at 1% for 180 days. Bilardo also considers investing in Canada, in Japan and forming a portfolio with 80% invested in Euros (EUR) and 20% in Japanese yen (JPY). The forecasts of appreciation in the EUR and JPY for the 180 days are as follows:

<u>Currency</u>	$e_{f,T}$	<u>Probability</u>
EUR	1%	70%
EUR	3%	30%
JPY	0%	60%
JPY	1%	40%

The interest rate on the EUR is 3%, and the interest rate on the JPY is 1%. Where should Bilardo Inc invest: at home, in Japan, in Europe, or in the 80-20 portfolio?

2. You work for Kempes Industries, U.S. MNC. Kempes gives you the following projections for next year:

Currency	Total inflows	Total outflows	Current Exchange rate
NZD	NZD 200,000	NZD 50,000	.70 USD/NZD
ARS (peso argentino)	ARS 300,000	ARS 500,000	.05 USD/ARS

a.- What is Kempes's net transaction exposure (NTE)?

b.- Suppose the NZD and the ARS have a perfect negative correlation. The USD/NZD exchange rate increases to .77 USD/NZD. What is the change in net transaction exposure for Kempes Industries?

c.- Go back to part (a). Assume that changes in exchange rates (e_t) follow a normal distribution. The NZD's mean and standard deviation are 0 and .10, respectively; while the ARS's mean and standard deviation are -0.2 and .20, respectively. Determine the VAR (Value-at-Risk) for each currency using a 97.5% confidence level.

3. On May 5, a swap dealer wants to price a one-year fixed-for-floating interest rate swap against the 3-month LIBOR, that starts on June 17. The fixed rate will be paid semiannually and is quoted bond basis. Find the swap coupon rate. Get the appropriate rates from the attached quotes.

	Price	# days covered
Mar 17	98.64	92
Jun	98.69	92
Sep	98.64	91
Dec	98.49	90
Mar 18	98.22	92

4.- You have data on the SEK/USD and CPI indexes for Sweden and the US from January 1970 to November 2007. You run the following regression: changes in the SEK/USD exchange rate against inflation rate differentials ($I_{\text{Swed}} - I_{\text{US}}$). Below, you have the excel regression output.

	Coefficients	Standard Error	t -stat	P-value
Intercept	0.00063769	0.001387156	0.459710491	0.645951097
$I_{\text{Swed}} - I_{\text{US}}$	0.42083281	0.246676358	1.706011931	0.088711535

a) Let $SSR(H_0) = 0.37515$. Test PPP, using individual t-tests and a joint F-test.

b) Let $S_{\text{Nov}} = 6.326$ SEK/USD, $S_{\text{Dec}} = 6.3889$ SEK/USD and $S_{\text{Jan}} = 6.3521$ SEK/USD.

Suppose that you have a forecast for the inflation rates:

$E_{\text{Nov}}[I_{\text{Swed,Dec}}] = .005$; $E_{\text{Nov}}[I_{\text{Swed,Jan}}] = .001$; $E_{\text{Nov}}[I_{\text{US,Dec}}] = .001$; $E_{\text{Nov}}[I_{\text{US,Jan}}] = .002$.

Forecast the SEK/USD exchange rate in December and January, conditional on November information.

c) Using the MSE as your metric, is your PPP model better than the Random Walk?

5. Bank A gives the following quotes: BOB/USD=8.00 - 8.02. The one-year interest rates for the BOB, i_{BOB} , and for the USD, i_{USD} , are 9.25% – 9.75% and 2.50% – 3.10%, respectively. Strongest Bank quotes $F_{t,180}^{\text{SB}} = 8.20 - 8.25$ BOB/USD.
- A. Is arbitrage possible? If so, design a covered arbitrage strategy to take advantage of Strongest Bank's quote.
 - B. Determine an arbitraguer's profits.
 - C. Describe the international capital flows between Bolivia and the U.S.

6. It is May 3, 2017. Sabella, a U.S. company, exports baseball equipment to Taiwan. Sabella expects to receive a payment of TWD 100 million in October 1, 2017 (TWD=Taiwanese Dollar). Sabella decides to hedge this exposure using an October forward contract, which expires on October 1, 2017. The 3-month, 4-month and 5-month Taiwanese interest rates are 3%, 3.2% and 3.4%, while the 3-month, 4-month and 5-month U.S. interest rates are 2%, 2.1% and 2.3%, respectively. On May3, the spot exchange rate is 28.90 TWD/USD and the October 1 forward trades at 29.23 TWD/USD.

- (A) Use the information given in the attached Excel output (based on 15 years of monthly changes) to calculate:
- i) The VAR associated with Sabella's open position (use a 97.5% C.I.).
 - ii) The worst case scenario for Sabella.
- (B) Calculate the amount to be received on October 1, using a forward hedge.
- (C) Calculate the amount to be received on October 1, using a money market hedge.

• **DATA** (based on monthly percentage changes from 2001:1 to 2016:12).

1-mo % change TWD/USD	
Mean	-0.077%
Standard Error	0.1329%
Median	-0.029%
Mode
Standard Deviation	1.4495%
Sample Variance	2.1
Kurtosis	0.561619
Skewness	-0.26282
Range	8.2225
Minimum	-4.365%
Maximum	3.8576%
Sum	-9.202
Count	119

7. Laudrup F.C., a Danish fund, holds a British stock portfolio worth GBP 100M on which it earns a volatile equity return which is highly correlated with the FT-100 index (the U.K. stock index). This return is in GBP. The manager of Laudrup, Mr. Piazza, decides to have all foreign income in the form of fixed-rate DKK for one year, with quarterly payments. You work for Mr. Piazza.

A. Present in an exhibit your proposed financial engineering solution with 2 swaps, where the equity swap is a variable-variable equity swap, where one leg of the equity swap is 3-mo LIBOR + 2%.

B. At inception, 3-mo LIBOR was 2.5%. Suppose for the first cash flow exchange, the return on the FTSE-100 was -1%. What was the net exchange between the parties on the equity swap?

8. Suppose Telefónica (TEF) is considering offering cellular phone service in Panamá, El Salvador, Guatemala, Nicaragua and Honduras. The success of the investment, with a 10-year horizon, depends on the number of subscribers. TEF determines two states for the numbers of subscribers: “high growth” or “low growth.” If the state is “high”, the expected NPV of future cash flows is EUR 80M per market; if the state is “low,” the expected NPV of the future cash flows is EUR 20M per market. Suppose, the probability of a high number of subscribers is 50% and after one year TEF knows learns the state (high growth or low growth) for the whole investment. Suppose the upfront initial investment is EUR 45M per market if investing in one market. A joint investment in all markets reduces the total upfront investment by 5%. Evaluate the investment under the 3 situations described in A, B & C, using a discount rate of $k=15\%$:

A. TEF invests in one market only, say Panamá.

B. TEF decides to test one market, say Panamá, first. After one year, if successful in test market –i.e., number of subscribers is high-, TEF enters the other 4 markets. TEF learns from the investment in Panamá: with this knowledge, now, the upfront investment in additional markets is reduced by 10%, while the probability of high increases to 60% in additional markets.

C. TEF decides to invest in all the markets simultaneously.

II. CASE (30 points)

These questions are based on the online article. Briefly answer the following questions:

Note: No points will be given by simply writing lines from the article.

1) Mr. Bennet, currency analyst at Banco Santander, believes the GBP is cheap. Do you agree with his statement? Justify your answer.

2) According to the article, analysts worry about rising U.K. inflation. What is the effect of higher U.K. inflation on the USD/GBP exchange rate? Draw a graph.

3) Using the 10-year yields and IFE, forecast next year's USD/GBP exchange rate.

4) Suppose, the European Central Bank (ECB) decides to intervene to stop the depreciation of the EUR against the GBP. Draw two graphs showing the effect of ECB's intervention on the FX market and on European money markets.

5) The U.S. economy has been doing very well, while analysts worry about a slowdown in consumer spending in the U.K. What is the effect of both factors on the USD/GBP exchange rate? Be specific regarding the theory you use to justify your answer.

6) According to the article, there is a lot uncertainty regarding Trump's tax policies. What is the effect of this uncertainty on the USD/GBP exchange rate? Draw a graph.