

**Professor Canzoneri**

**International Finance: Exercises**

**Due date will be announced in class.**

**Last Revised: August 9, 2005**

**International Finance**  
**Exercise 1**

**Professor Canzoneri**  
**Due:**

Preliminary figures (in billions of dollars) for 2004 taken from the 2005 Economic Report of the President showed that:  $Y = 11,728.0$ ,  $C = 8,231.1$ ,  $EX = 1,170.2$ ,  $IM = 1,779.6$ ,  $G = 2,183.8$  and  $T = 1771.7$ . We can use the national income identities to describe the financing of U.S. business investment and the U.S. government deficit

Part A: Use the income identities to find what U.S. private business investment,  $I$ , was in 2004. Show your work.

Part B: Use the income identities to find what U.S. private savings,  $S$ , was in 2004. Show your work.

Part C: Both U.S. private business investment and the U.S. government deficit need to be financed each year. What were the total financing needs of business and government in 2004?

Part D: Was private savings sufficient to finance both private business investment and the government deficit? What was the shortfall? Where did U.S. firms and the U.S. government find the extra financing? Can you see the shortfall in the numbers provided at the outset (Hint: think about the current account)?

**International Finance**  
**Exercise 2**

**Professor Canzoneri**  
**Due:**

**In the exercise, you will study two “arbitrage” conditions that show how financial markets determine exchange rates.**

**I. CROSS RATE ARBITRAGE:  $E_{\$/\epsilon} = E_{\$/\text{¥}} * E_{\text{¥}/\epsilon}$**

- A. Find recent quotes (Financial Times or use the internet<sup>1</sup>) for the dollar rates for Euro and Yen, and also find the cross rate between Euro and Yen. Suppose you sell \$1 and buy Euros, then you sell the proceeds to buy Yen, and finally you sell the proceeds of that sale to buy back dollars. Do you end up with more or less than the \$1 you started out with?
- B. Economists would expect the rate of return in Part A to be quite small. Explain why? (Hint: think what would happen if there were a big return?)

	1997	1998	1999	2000
<b>US Dollar</b>	1	1	1	1
<b>JPN Yen</b>	116.05	130.615	113.3	102.31
<b>INA Rupiah</b>	2363	5535	8005	7050

Figures for January 1<sup>st</sup> of each year

- C. Use the above figures for Part C.
  1. Suppose you are manager of an Indonesian company that borrowed the equivalent of US\$1,000,000 in Yen from a Japanese bank at the beginning of 1997. That amount is immediately converted into Rupiah for operations in your Indonesian factory. How much Rupiah do you now have for operations?
  2. If you were to pay back the Japanese bank at the beginning of 1998, how much Rupiah does your company have to pay for the full principal borrowed in 1997? What about in 1999? And in 2000?
  3. If you were manager of an Indonesian company that exported goods to America, how would these exchange rate movements have affected the dollar sales price of your goods?

**2. INTEREST RATE ARBITRAGE:  $R_{\$} = R_{\epsilon} + (E_{\$/\epsilon}^e - E_{\$/\epsilon})/E_{\$/\epsilon}$**

- A. Suppose the rate of return on a Eurobond is 4.3%, and suppose the dollar is expected to depreciate by 0.5%; what is the expected dollar rate of return on the Eurobond?
- B. Suppose the rate of return on a Eurobond is 4.3%, and suppose the Euro is expected to appreciate by 0.5%; what is the expected dollar rate of return on the Eurobond?
- C. Use the interest rate parity equation to calculate the spot exchange rate ( $E_{\$/\epsilon}$ ) when  $R_{\$} = 0.045$ ,  $R_{\epsilon} = 0.043$ , and  $E_{\$/\epsilon}^e = 1.094$ . Is the resulting  $E_{\$/\epsilon}$  greater or less than 1.094?
- D. Suppose  $R_{\$}$ ,  $R_{\epsilon}$ , and  $E_{\$/\epsilon}^e$  are at the values specified in Part C, but suppose that the spot exchange rate ( $E_{\$/\epsilon}$ ) is initially equal to 1.094. Describe the market forces that would drive the spot rate to the answer you found in Part C.

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<sup>1</sup> For example, you can use <http://finance.yahoo.com> or <http://www.oanda.com/convert/classic>

**International Finance**  
**Exercise 3**

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**Due:**

The financial markets diagram shows how the money market and the bonds market simultaneously determine equilibrium  $E$  and  $R$ . In this exercise, you will get practice using it.

- I. Suppose the European Central Bank (ECB) raises its interest rate ( $R^*$ ) in an attempt to establish an anti-inflation reputation similar to the Bundesbank's.
  - A. Use the financial markets diagram to show what this would do to the US interest rate ( $R$ ) and exchange rate ( $E$ ) assuming the FED did not change the US money supply. Explain intuitively why the exchange rate moves the direction it does? (Hint: what happens to the supplies and demands for home and foreign bonds?) What would all of this do to the price of US imports from Europe?
  - B. Suppose the FED wanted to avoid these price level consequences in the US. Use the financial markets diagram to show what the FED would have to do to its money supply ( $M$ ) to maintain the original exchange rate.
  - C. Is there any way that the FED could simultaneously maintain its original exchange rate and its original interest rate? Justify your answer.
  
- II. As Europe comes out of its present recession, it will import more from the US, and this will expand US output ( $Y$ ).
  - A. Use the diagram to show what this will do to the US interest rate ( $R$ ) and exchange rate ( $E$ ). Explain intuitively why the interest rate and the exchange rate move in the directions they do. (Hint: again, what happens to supplies and demands?)
  - B. Is there any way that the FED could change its money supply so as to simultaneously maintain its original exchange rate and its original interest rate? Use the diagram to justify your answer.

**International Finance**  
**Exercise 4**

**Professor Canzoneri**  
**Due:**

The AA-DD diagram illustrates the short run equilibrium in financial markets and in the goods market. In this exercise, you will get practice using it.

I. Suppose the economy is initially at full employment,  $Y_{fe}$ . Then, a stock market crash (such as the one we had in 1987 or 1998) makes firms curtail some of their investment projects (since they become harder to finance). Use the AA-DD diagram to show how this could cause a recession.

Part A: Do the AA-DD curve analysis; be sure to explain why you shift any curve.

Part B: Tell the “story” of what is happening in the goods market, and how it spills over to the financial markets.

Part C: Show the path of adjustment to the new short run equilibrium. Is there any exchange rate “overshooting”?

II. Now suppose the FED takes steps to offset the recession.

Part A: Begin with an AA-DD diagram that shows where you ended up in question I; then show what the FED would have to do to restore the original level of output,  $Y_{fe}$ . Once again, be sure to explain why you shift any curve.

Part B: Tell the “story” of what is happening in the financial markets, and how it spills over to the goods market; show the path of adjustment to the new short run equilibrium. Is there any exchange rate “overshooting” in this case?

Part C:  $Y$  has been restored to  $Y_{fe}$ , but  $E$  has not been restored to its initial level,  $E_1$ . Why didn't it go back to its initial level; that is, why was a depreciation necessary?

III. Suppose now that the FED wanted to simultaneously offset the recession and appreciate the exchange rate (for lower prices) to some  $E_3 < E_1$ ; suppose further that it could persuade Congress to help in the effort.

Part A: Begin with an AA-DD diagram that shows where you ended up in question I, and then show how a combined monetary and fiscal policy could restore both the initial level of output,  $Y_{fe}$ , and the exchange rate  $E_3$ .

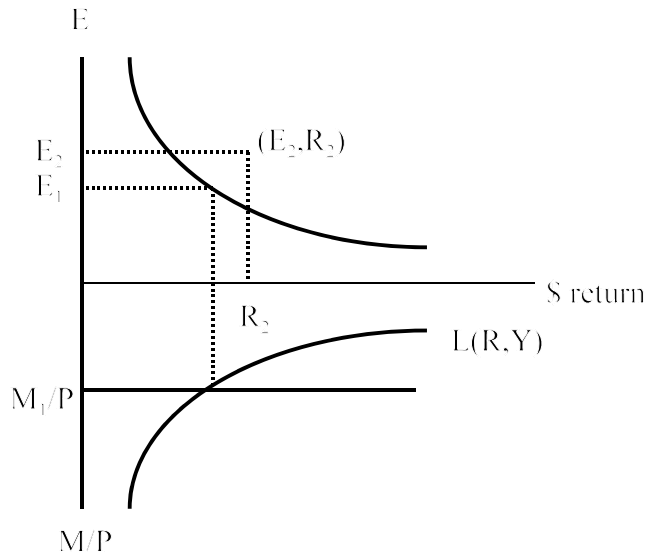
Part B: Could either monetary or fiscal policy have achieved this alone?

**International Finance**  
**Exercise 5**

**Professor Canzoneri**  
**Due:**

In this exercise, you will study the relationship between the substitutability of (home and foreign) bonds and central bank independence.

Suppose the FED wants to raise  $R$  (for domestic reasons) and depreciate  $E$  (for external reasons); that is, the FED wants to achieve the point  $(E_2, R_2)$  in the diagram below.



I. Suppose  $B$  and  $B^*$  are imperfect substitutes. Show that an OMO can bring  $R$  to  $R_2$ , and that a sterilized intervention can then bring  $E$  to  $E_2$ . In each case, explain what assets the FED swaps with the private sector.

II. Suppose  $B$  and  $B^*$  are perfect substitutes. Is there any way the FED can achieve the point  $(E_2, R_2)$ ? What choices of  $(E, R)$  is the FED limited to?

III. In the US, the Treasury Department (and not the FED) has the right to set exchange rate policy. If this right is interpreted to mean that Treasury can tell the FED what  $E$  to set, then does this right in effect abrogate the independence of the central bank? That is, can the FED still set whatever  $R$  it wants, independent of the wishes of the Treasury?

**International Finance**  
**Exercise 6**

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**Due:**

In this exercise, you will practice finding Nash solutions, and we will develop further Barro & Gordon's Inflation Credibility Model and Obstfeld's 2<sup>nd</sup> Generation Speculative Attacks Model.

**I. Finding Nash Solutions –**

**Part A:** Define a “Nash Solution” to a non-cooperative game. (Hint: What must each player be doing in the Nash solution.)

**Part B:** Consider the two games below. Start with Game 1, where the Nash solutions have already been circled. Go from box to box explaining why each is, or is not, a Nash solution. Then, do the same for Game 2, and circle the Nash solution(s?).

Game 1

		COLUMN Player	
		Left	Right
R O W P l a y e r	Up	1, 1	2, 3
	Down	3, 2	1, 1

Game 2

		COLUMN Player	
		Left	Right
R O W P l a y e r	Up	0, 0	2, -1
	Down	-1, 2	1, 1

**II. Recall Able and Bernanke's box matrix example of Barro-Gordon's Inflation Credibility Model:**

**Part A:** Suppose the CB just announced that it would play  $M_1$ , and that there was no need for the wage setters to expect  $P_h$ . Would this announcement be believed? Why or why not?

**Part B:** Suppose we change the point assignments as follows:

W Setters	CB	
$N^*$	1      0	Now, the CB isn't as concerned about achieving high levels of $N$ ; $N_h$ gets 1 point instead of 2, $N_l$ gets -1 instead of -2.
$N_h$	0      1	
$N_l$	0      -1	Otherwise, the point assignments are the same.
$P_h$	0      0	Recalculate the CB's payoffs in the four boxes, and find the new Nash solution(s?). (Hint: there may be more than one.)
$P_l$	0      1	

**Part C:** If there are multiple solutions, how might the CB bring about the best one?

III. Recall Obstfeld's box matrix example of a "2<sup>nd</sup> Generation" Speculative Attack Model:

Part A: When foreign reserves were  $FR = 20$ , "fundamentals" were so strong that an attack was impossible. In this model, what is the minimum number of reserves that would be required to rule out the possibility of multiple equilibria, and thus, self-fulfilling attacks?

Part B: When foreign reserves were  $FR = 6$ , "fundamentals" were so weak that an attack was inevitable. What is the minimum number of reserves that would at least keep the attack from being inevitable?

Part C: Who do you think is to blame for exchange rate crises in Obstfeld's model? The government? Speculators?