CHAPTER 14 INTEREST RATE AND CURRENCY SWAPS
SUGGESTED ANSWERS AND SOLUTIONS TO END-OF-CHAPTER QUESTIONS AND PROBLEMS

QUESTIONS

1. Describe the difference between a swap broker and a swap dealer.

Answer: A swap broker arranges a swap between two counterparties for a fee without taking a risk position in the swap. A swap dealer is a market maker of swaps and assumes a risk position in matching opposite sides of a swap and in assuring that each counterparty fulfills its contractual obligation to the other.

2. What is the necessary condition for a fixed-for-floating interest rate swap to be possible?

Answer: For a fixed-for-floating interest rate swap to be possible it is necessary for a quality spread differential to exist. In general, the default-risk premium of the fixed-rate debt will be larger than the default-risk premium of the floating-rate debt.

3. Discuss the basic motivations for a counterparty to enter into a currency swap.

Answer: One basic reason for a counterparty to enter into a currency swap is to exploit the comparative advantage of the other in obtaining debt financing at a lower interest rate than could be obtained on its own. A second basic reason is to lock in long-term exchange rates in the repayment of debt service obligations denominated in a foreign currency.

4. How does the theory of comparative advantage relate to the currency swap market?

Answer: Name recognition is extremely important in the international bond market. Without it, even a creditworthy corporation will find itself paying a higher interest rate for foreign denominated funds than a local borrower of equivalent creditworthiness. Consequently, two firms of equivalent creditworthiness can each exploit their, respective, name recognition by borrowing in their local capital market at a favorable rate and then re-lending at the same rate to the other.

5. Discuss the risks confronting an interest rate and currency swap dealer.

Answer: An interest rate and currency swap dealer confronts many different types of risk. *Interest rate risk* refers to the risk of interest rates changing unfavorably before the swap dealer can lay off on an opposing counterparty the unplaced side of a swap with another counterparty. *Basis risk* refers to the floating rates of two counterparties being pegged to two different indices. In this situation, since the indexes are not perfectly positively correlated, the swap bank may not always receive enough floating rate funds from one counterparty to pass through to satisfy the other side, while still covering its desired spread, or avoiding a loss. *Exchange-rate risk* refers to the risk the swap bank faces from fluctuating exchange rates during the time it takes the bank to lay off a swap it undertakes on an opposing counterparty before exchange rates change. Additionally, the dealer confronts *credit risk* from one counterparty defaulting and its having to fulfill the defaulting party's obligation to the other counterparty. *Mismatch risk* refers to the difficulty of the dealer finding an exact opposite match for a swap it has agreed to take. *Sovereign risk* refers to a country imposing exchange restrictions on a currency involved in a swap making it costly, or impossible, for a counterparty to honor its swap obligations to the dealer. In this event, provisions exist for the early termination of a swap, which means a loss of revenue to the swap bank.

6. Briefly discuss some variants of the basic interest rate and currency swaps diagramed in the chapter.

Answer: Instead of the basic fixed-for-floating interest rate swap, there are also zero-coupon-for-floating rate swaps where the fixed rate payer makes only one zero-coupon payment at maturity on the notional value. There are also floating-for-floating rate swaps where each side is tied to a different floating rate index or a different frequency of the same index. Currency swaps need not be fixed-for-fixed; fixed-for-floating and floating-for-floating rate currency swaps are frequently arranged. Moreover, both currency and interest rate swaps can be amortizing as well as non-amortizing.

7. If the cost advantage of interest rate swaps would likely be arbitraged away in competitive markets, what other explanations exist to explain the rapid development of the interest rate swap market?

Answer: All types of debt instruments are not always available to all borrowers. Interest rate swaps can assist in market completeness. That is, a borrower may use a swap to get out of one type of financing and to obtain a more desirable type of credit that is more suitable for its asset maturity structure.

8. Suppose Morgan Guaranty, Ltd. is quoting swap rates as follows: 7.75 - 8.10 percent annually against six-month dollar LIBOR for dollars and 11.25 - 11.65 percent annually against six-month dollar LIBOR for British pound sterling. At what rates will Morgan Guaranty enter into a $/£ currency swap?

Answer: Morgan Guaranty will pay annual fixed-rate dollar payments of 7.75 percent against receiving six-month dollar LIBOR flat, or it will receive fixed-rate annual dollar payments at 8.10 percent against paying six-month dollar LIBOR flat. Morgan Guaranty will make annual fixed-rate £ payments at 11.25 percent against receiving six-month dollar LIBOR flat, or it will receive annual fixed-rate £ payments at 11.65 percent against paying six-month dollar LIBOR flat. Thus, Morgan Guaranty will enter into a currency swap in which it would pay annual fixed-rate dollar payments of 7.75 percent in return for receiving semi-annual fixed-rate £ payments at 11.65 percent, or it will receive annual fixed-rate dollar payments at 8.10 percent against paying annual fixed-rate £ payments at 11.25 percent.

9. A U.S. company needs to raise €50,000,000. It plans to raise this money by issuing dollar-denominated bonds and using a currency swap to convert the dollars to euros. The company expects interest rates in both the United States and the euro zone to fall.

a. Should the swap be structured with interest paid at a fixed or a floating rate?
b. Should the swap be structured with interest received at a fixed or a floating rate?

CFA Guideline Answer:

a. The U.S. company would pay the interest rate in euros. Because it expects that the interest rate in the euro zone will fall in the future, it should choose a swap with a floating rate on the interest paid in euros to let the interest rate on its debt float down.

b. The U.S. company would receive the interest rate in dollars. Because it expects that the interest rate in the United States will fall in the future, it should choose a swap with a fixed rate on the interest received in dollars to prevent the interest rate it receives from going down.

*10. Assume a currency swap in which two counterparties of comparable credit risk each borrow at the best rate available, yet the nominal rate of one counterparty is higher than the other. After the initial principal exchange, is the counterparty that is required to make interest payments at the higher nominal rate at a financial disadvantage to the other in the swap agreement? Explain your thinking.

Answer: Superficially, it may appear that the counterparty paying the higher nominal rate is at a disadvantage since it has borrowed at a lower rate. However, if the forward rate is an unbiased predictor of the expected spot rate and if IRP holds, then the currency with the higher nominal rate is expected to depreciate versus the other. In this case, the counterparty making the interest payments at the higher nominal rate is in effect making interest payments at the lower interest rate because the payment currency is depreciating in value versus the borrowing currency.

PROBLEMS

1. Alpha and Beta Companies can borrow for a five-year term at the following rates:

	Alpha	Beta
Moody's credit rating	Aa	Baa
Fixed-rate borrowing cost	10.5%	12.0%
Floating-rate borrowing cost	LIBOR	LIBOR + 1%

a. Calculate the quality spread differential (QSD).

b. Develop an interest rate swap in which both Alpha and Beta have an equal cost savings in their borrowing costs. Assume Alpha desires floating-rate debt and Beta desires fixed-rate debt. No swap bank is involved in this transaction.

Solution:

a. The QSD = (12.0% - 10.5%) minus (LIBOR + 1% - LIBOR) = .5%.

b. Alpha needs to issue fixed-rate debt at 10.5% and Beta needs to issue floating rate-debt at LIBOR + 1%. Alpha needs to pay LIBOR to Beta. Beta needs to pay 10.75% to Alpha. If this is done, Alpha's floating-rate all-in-cost is: 10.5% + LIBOR - 10.75% = LIBOR - .25%, a .25% savings over issuing floating-rate debt on its own. Beta's fixed-rate all-in-cost is: LIBOR+ 1% + 10.75% - LIBOR = 11.75%, a .25% savings over issuing fixed-rate debt.

2. Do problem 1 over again, this time assuming more realistically that a swap bank is involved as an intermediary. Assume the swap bank is quoting five-year dollar interest rate swaps at 10.7% - 10.8% against LIBOR flat.

Solution: Alpha will issue fixed-rate debt at 10.5% and Beta will issue floating rate-debt at LIBOR + 1%. Alpha will receive 10.7% from the swap bank and pay it LIBOR. Beta will pay 10.8% to the swap bank and receive from it LIBOR. If this is done, Alpha's floating-rate all-in-cost is: 10.5% + LIBOR - 10.7% = LIBOR - .20%, a .20% savings over issuing floating-rate debt on its own. Beta's fixed-rate all-in-cost is: LIBOR+ 1% + 10.8% - LIBOR = 11.8%, a .20% savings over issuing fixed-rate debt.

3. Company A is a AAA-rated firm desiring to issue five-year FRNs. It finds that it can issue FRNs at six-month LIBOR + .125 percent or at three-month LIBOR + .125 percent. Given its asset structure, three-month LIBOR is the preferred index. Company B is an A-rated firm that also desires to issue five-year FRNs. It finds it can issue at six-month LIBOR + 1.0 percent or at three-month LIBOR + .625 percent. Given its asset structure, six-month LIBOR is the preferred index. Assume a notional principal of $15,000,000. Determine the QSD and set up a floating-for-floating rate swap where the swap bank receives .125 percent and the two counterparties share the remaining savings equally.

Solution: The quality spread differential is [(Six-month LIBOR + 1.0 percent) minus (Six-month LIBOR + .125 percent) =] .875 percent minus [(Three-month LIBOR + .625 percent) minus (Three-month LIBOR + .125 percent) =] .50 percent, which equals .375 percent. If the swap bank receives .125 percent, each counterparty is to save .125 percent. To affect the swap, Company A would issue FRNs indexed to six-month LIBOR and Company B would issue FRNs indexed three-month LIBOR. Company B might make semi-annual payments of six-month LIBOR + .125 percent to the swap bank, which would pass all of it through to Company A. Company A, in turn, might make quarterly payments of three-month LIBOR to the swap bank, which would pass through three-month LIBOR - .125 percent to Company B. On an annualized basis, Company B will remit to the swap bank six-month LIBOR + .125 percent and pay three-month LIBOR + .625 percent on its FRNs. It will receive three-month LIBOR - .125 percent from the swap bank. This arrangement results in an all-in cost of six-month LIBOR + .825 percent, which is a rate .125 percent below the FRNs indexed to six-month LIBOR + 1.0 percent Company B could issue on its own. Company A will remit three-month LIBOR to the swap bank and pay six-month LIBOR + .125 percent on its FRNs. It will receive six-month LIBOR + .125 percent from the swap bank. This arrangement results in an all-in cost of three-month LIBOR for Company A, which is .125 percent less than the FRNs indexed to three-month LIBOR + .125 percent it could issue on its own. The arrangements with the two counterparties net the swap bank .125 percent per annum, received quarterly.

*4. A corporation enters into a five-year interest rate swap with a swap bank in which it agrees to pay the swap bank a fixed rate of 9.75 percent annually on a notional amount of €15,000,000 and receive LIBOR. As of the second reset date, determine the price of the swap from the corporation's viewpoint assuming that the fixed-rate side of the swap has increased to 10.25 percent.

Solution: On the reset date, the present value of the future floating-rate payments the corporation will receive from the swap bank based on the notional value will be €15,000,000. The present value of a hypothetical bond issue of €15,000,000 with three remaining 9.75 percent coupon payments at the new fixed-rate of 10.25 percent is €14,814,304. This sum represents the present value of the remaining payments the swap bank will receive from the corporation. Thus, the swap bank should be willing to buy and the corporation should be willing to sell the swap for €15,000,000 - €14,814,304 = €185,696.

5. Karla Ferris, a fixed income manager at Mangus Capital Management, expects the current positively sloped U.S. Treasury yield curve to shift parallel upward.

Ferris owns two $1,000,000 corporate bonds maturing on June 15, 1999, one with a variable rate based on 6-month U.S. dollar LIBOR and one with a fixed rate. Both yield 50 basis points over comparable U.S. Treasury market rates, have very similar credit quality, and pay interest semi-annually.

Ferris wished to execute a swap to take advantage of her expectation of a yield curve shift and believes that any difference in credit spread between LIBOR and U.S. Treasury market rates will remain constant.

a. Describe a six-month U.S. dollar LIBOR-based swap that would allow Ferris to take advantage of her expectation. Discuss, assuming Ferris' expectation is correct, the change in the swap's value and how that change would affect the value of her portfolio. [No calculations required to answer part a.]

Instead of the swap described in part a, Ferris would use the following alternative derivative strategy to achieve the same result.

b. Explain, assuming Ferris' expectation is correct, how the following *strategy* achieves the same result in response to the yield curve shift. [No calculations required to answer part b.]

Settlement Date	Nominal Eurodollar Futures Contract Value
12-15-97	$1,000,000
03-15-98	1,000,000
06-15-98	1,000,000
09-15-98	1,000,000
12-15-98	1,000,000
03-15-99	1,000,000

c. Discuss *one* reason why these two derivative strategies provide the same result.

CFA Guideline Answer

a. The Swap Value and its Effect on Ferris' Portfolio

Because Karla Ferris believes interest rates will rise, she will want to swap her $1,000,000 fixed-rate corporate bond interest to receive six-month U.S. dollar LIBOR. She will continue to hold her variable-rate six-month U.S. dollar LIBOR rate bond because its payments will increase as interest rates rise. Because the credit risk between the U.S. dollar LIBOR and the U.S. Treasury market is expected to remain constant, Ferris can use the U.S. dollar LIBOR market to take advantage of her interest rate expectation without affecting her credit risk exposure.

To execute this swap, she would enter into a two-year term, semi-annual settle, $1,000,000 nominal principal, pay fixed-receive floating U.S. dollar LIBOR swap. If rates rise, the swap's *mark-to-market* value will *increase* because the U.S. dollar LIBOR Ferris receives will be *higher* than the LIBOR rates from which the swap was priced. If Ferris were to enter into the same swap after interest rates rise, she would pay a higher fixed rate to receive LIBOR rates. This higher fixed rate would be calculated as the present value of now higher forward LIBOR rates. Because Ferris would be paying a stated fixed rate that is lower than this new higher-present-value fixed rate, she could sell her swap at a premium. This premium is called the "replacement cost" value of the swap.

b. Eurodollar Futures Strategy

The appropriate futures hedge is to *short* a combination of Eurodollar futures contracts with different settlement dates to match the coupon payments and principal. This futures hedge accomplishes the same objective as the pay fixed-receive floating swap described in Part a. By discussing how the yield-curve shift affects the value of the futures hedge, the candidate can show an understanding of how Eurodollar futures contracts can be used instead of a pay fixed-receive floating swap.

If rates rise, the mark-to-market values of the Eurodollar contracts decrease; their yields must increase to equal the new higher forward and spot LIBOR rates. Because Ferris must *short or sell* the Eurodollar contracts to duplicate the pay fixed-receive variable swap in Part a, she gains as the Eurodollar futures contracts decline in value and the *futures hedge* increases in value. As the contracts expire, or if Ferris sells the remaining contracts prior to maturity, she will recognize a gain that increases her return. With higher interest rates, the value of the fixed-rate bond will decrease. If the hedge ratios are appropriate, the value of the portfolio, however, will remain unchanged because of the increased value of the hedge, which offsets the fixed-rate bond's decrease.

c. Why the Derivative Strategies Achieve the Same Result

Arbitrage market forces make these two strategies provide the same result to Ferris. The two strategies are different mechanisms for different market participants to hedge against increasing rates. Some money managers prefer swaps; others, Eurodollar futures contracts. Each institutional market participant has different preferences and choices in hedging interest rate risk. The key is that market makers moving into and out of these two markets ensure that the markets are similarly priced and provide similar returns. As an example of such an arbitrage, consider what would happen if forward market LIBOR rates were lower than swap market LIBOR rates. An arbitrageur would, under such circumstances, sell the futures/forwards contracts and enter into a received fixed-pay variable swap. This arbitrageur could now receive the higher fixed rate of the swap market and pay the lower fixed rate of the futures market. He or she would pocket the differences between the two rates (without risk and without having to make any [net] investment.) This arbitrage could not last.

As more and more market makers sold Eurodollar futures contracts, the selling pressure would cause their prices to fall and yields to rise, which would cause the present value cost of selling the Eurodollar contracts also to increase. Similarly, as more and more market makers offer to receive fixed rates in the swap market, market makers would have to lower their fixed rates to attract customers so they could lock in the lower hedge cost in the Eurodollar futures market. Thus, Eurodollar forward contract yields would rise and/or swap market receive-fixed rates would fall until the two rates converge. At this point, the arbitrage opportunity would no longer exist and the swap and forwards/futures markets would be in equilibrium.

6. Rone Company asks Paula Scott, a treasury analyst, to recommend a flexible way to manage the company's financial risks.

Two years ago, Rone issued a $25 million (U.S.$), five-year floating rate note (FRN). The FRN pays an annual coupon equal to one-year LIBOR plus 75 basis points. The FRN is non-callable and will be repaid at par at maturity.

Scott expects interest rates to increase and she recognizes that Rone could protect itself against the increase by using a pay-fixed swap. However, Rone's Board of Directors prohibits both short sales of securities and swap transactions. Scott decides to replicate a pay-fixed swap using a combination of capital market instruments.

a. Identify the instruments needed by Scott to replicate a pay-fixed swap and describe the required transactions.
b. Explain how the transactions in Part a are equivalent to using a pay-fixed swap.

CFA Guideline Answer

a. The instruments needed by Scott are a fixed-coupon bond and a floating rate note (FRN).

The transactions required are to:

- issue a fixed-coupon bond with a maturity of three years and a notional amount of $25 million, and
- buy a $25 million FRN of the same maturity that pays one-year LIBOR plus 75 bps.

b. At the outset, Rone will issue the bond and buy the FRN, resulting in a zero net cash flow at initiation. At the end of the third year, Rone will repay the fixed-coupon bond and will be repaid the FRN, resulting in a zero net cash flow at maturity. The net cash flow associated with each of the three annual coupon payments will be the difference between the inflow (to Rone) on the FRN and the outflow (to Rone) on the bond. Movements in interest rates during the three-year period will determine whether the net cash flow associated with the coupons is positive or negative to Rone. Thus, the bond transactions are financially equivalent to a plain vanilla pay-fixed interest rate swap.

7. A company based in the United Kingdom has an Italian subsidiary. The subsidiary generates €25,000,000 a year, received in equivalent semiannual installments of €12,500,000. The British company wishes to convert the euro cash flows to pounds twice a year. It plans to engage in a currency swap in order to lock in the exchange rate at which it can convert the euros to pounds. The current exchange rate is €1.5/£. The fixed rate on a plain vaninilla currency swap in pounds is 7.5 percent per year, and the fixed rate on a plain vanilla currency swap in euros is 6.5 percent per year.

a. Determine the notional principals in euros and pounds for a swap with semiannual payments that will help achieve the objective.
b. Determine the semiannual cash flows from this swap.

CFA Guideline Answer

a. The semiannual cash flow must be converted into pounds is €25,000,000/2 = €12,500,000. In order to create a swap to convert €12,500,000, the equivalent notional principals are

- Euro notional principal = €12,500,000/(0.065/2) = €384,615,385
- Pound notional principal = €384,615,385/€1.5/£ = £256,410,257

b. The cash flows from the swap will now be

- Company makes swap payment = €384,615,385(0.065/2) = €12,500,000
- Company receives swap payment = £256,410,257(0.075/2) = £9,615,385

The company has effectively converted euro cash receipts to pounds.

8. Ashton Bishop is the debt manager for World Telephone, which needs €3.33 billion Euro financing for its operations. Bishop is considering the choice between issuance of debt denominated in:

- Euros (€), or
- U.S. dollars, accompanied by a combined interest rate and currency swap.

a. Explain *one* risk World would assume by entering into the combined interest rate and currency swap.

Bishop believes that issuing the U.S.-dollar debt and entering into the swap can lower World's cost of debt by 45 basis points. Immediately after selling the debt issue, World would swap the U.S. dollar payments for Euro payments throughout the maturity of the debt. She assumes a constant currency exchange rate throughout the tenor of the swap.

Exhibit 1 gives details for the two alternative debt issues. Exhibit 2 provides current information about spot currency exchange rates and the 3-year tenor Euro/U.S. Dollar currency and interest rate swap.

Exhibit 1

World Telephone Debt Details

Characteristic	Euro Currency Debt	U.S. Dollar Currency Debt
Par value	€3.33 billion	$3 billion
Term to maturity	3 years	3 years
Fixed interest rate	6.25%	7.75%
Interest payment	Annual	Annual

Exhibit 2

Currency Exchange Rate and Swap Information

Spot currency exchange rate	$0.90 per Euro ($0.90/€1.00)
3-year tenor Euro/U.S. Dollar fixed interest rates	5.80% Euro/7.30% U.S. Dollar

b. Show the notional principal and interest payment cash flows of the combined interest rate and currency swap.

Note: Your response should show both the correct currency ($ or €) and amount for *each* cash flow.

Answer problem b in the template provided.

Template for problem b

Cash Flows of the Swap	**Year 0**	**Year 1**	**Year 2**	**Year 3**
World pays				
Notional principal				
Interest payment				
World receives				
Notional principal				
Interest payment				

c. State whether or not World would reduce its borrowing cost by issuing the debt denominated in U.S. dollars, accompanied by the combined interest rate and currency swap. Justify your response with *one* reason.

CFA Guideline Answer

a. World would assume both counterparty risk and currency risk. Counterparty risk is the risk that Bishop's counterparty will default on payment of principal or interest cash flows in the swap.

Currency risk is the currency exposure risk associated with all cash flows. If the US$ appreciates (Euro depreciates), there would be a loss on funding of the coupon payments; however, if the US$ depreciates, then the dollars will be worth less at the swap's maturity.

b.

	Year 0	Year 1	Year 2	Year 3
World pays				
Notional Principal	$3 billion			€3.33 billion
Interest payment		€193.14 million[1]	€193.14 million	€193.14 million
World receives				
Notional Principal	$3.33 billion			€3 billion
Interest payment		$219 million[2]	$219 million	$219 million

[1] € 193.14 million = € 3.33 billion x 5.8%
[2] $219 million = $ 3 billion x 7.3%

c. World would not reduce its borrowing cost, because what Bishop saves in the Euro market, she loses in the dollar market. The interest rate on the Euro pay side of her swap is 5.80 percent, lower than the 6.25 percent she would pay on her Euro debt issue, an interest savings of 45 bps. But Bishop is only receiving 7.30 percent in U.S. dollars to pay on her 7.75 percent U.S. debt interest payment, an interest shortfall of 45 bps. Given a constant currency exchange rate, this 45 bps shortfall exactly offsets the savings from paying 5.80 percent versus the 6.25 percent. Thus there is no interest cost savings by selling the U.S. dollar debt issue and entering into the swap arrangement.

MINI CASE: THE CENTRALIA CORPORATION'S CURRENCY SWAP

The Centralia Corporation is a U.S. manufacturer of small kitchen electrical appliances. It has decided to construct a wholly owned manufacturing facility in Zaragoza, Spain, to manufacture microwave ovens for sale in the European Union. The plant is expected to cost €5,500,000, and to take about one year to complete. The plant is to be financed over its economic life of eight years. The borrowing capacity created by this capital expenditure is $2,900,000; the remainder of the plant will be equity financed. Centralia is not well known in the Spanish or international bond market; consequently, it would have to pay 7 percent per annum to borrow euros, whereas the normal borrowing rate in the euro zone for well-known firms of equivalent risk is 6 percent. Alternatively, Centralia can borrow dollars in the U.S. at a rate of 8 percent.

Study Questions

1. Suppose a Spanish MNC has a mirror-image situation and needs $2,900,000 to finance a capital expenditure of one of its U.S. subsidiaries. It finds that it must pay a 9 percent fixed rate in the United States for dollars, whereas it can borrow euros at 6 percent. The exchange rate has been forecast to be $1.33/€1.00 in one year. Set up a currency swap that will benefit each counterparty.

*2. Suppose that one year after the inception of the currency swap between Centralia and the Spanish MNC, the U.S. dollar fixed-rate has fallen from 8 to 6 percent and the euro zone fixed-rate for euros has fallen from 6 to 5.50 percent. In both dollars and euros, determine the market value of the swap if the exchange rate is $1.3343/€1.00.

Suggested Solution to The Centralia Corporation's Currency Swap

1. The Spanish MNC should issue €2,180,500 of 6 percent fixed-rate debt and Centralia should issue $2,900,000 of fixed-rate 8 percent debt, since each counterparty has a relative comparative advantage in their home market. They will exchange principal sums in one year. The contractual exchange rate for the initial exchange is $2,900,000/€2,180,500, or $1.33/€1.00. Annually the counterparties will swap debt service: the Spanish MNC will pay Centralia $232,000 (= $2,900,000 x .08) and Centralia will pay the Spanish MNC €130,830 (= €2,180,500 x .06). The contractual exchange rate of the first seven annual debt service exchanges is $232,000/€130,830, or $1.7733/€1.00. At maturity, Centralia and the Spanish MNC will re-exchange the principal sums and the final debt service payments. The contractual exchange rate of the final currency exchange is $3,132,000/€2,311,330 = ($2,900,000 + $232,000)/(€2,180,500 + €130,830), or $1.3551/€1.00.

*2. The market value of the dollar debt is the present value of a seven-year annuity of $232,000 and a lump sum of $2,900,000 discounted at 6 percent. This present value is $3,223,778. Similarly, the market value of the euro debt is the present value of a seven-year annuity of €130,830 and a lump sum of €2,180,500 discounted at 5.50 percent. This present value is €2,242,459. The dollar value of the swap is $3,223,778 - €2,242,459 x 1.3343 = $231,665. The euro value of the swap is €2,242,459 - $3,223,778/1.3343 = -€173,623.