Comparing Futures and Forwards for Managing Currency Exposures

By Ira G. Kawaller
Updated April 2003

Original version reprinted (1996) with permission from Derivatives: Tax Regulation and Finance, published by Warren, Gorham & Lamont, the RIIA Group. Updated currency contract listings are the only changes.

For internationally oriented firms that choose to immunize themselves from the effects of fluctuating exchange rates, either of two financial instruments could be selected to satisfy the requirement: currency forward contracts or currency futures. Both tools lock in prospective exchange rates, thereby eliminating both risk and opportunity-whether in connection with forthcoming cross-border transactions or in the context of international investment portfolios. Though similar in their result, futures and forwards have a number of institutional differences that may foster different preferences among different populations of users. This article strives to clarify those differences, allowing the selection between these two alternatives to be made on a rational basis.

FUTURES VS. FORWARDS

Starting from a more generic orientation, a forward contract is one where the buyer and the seller agree on a price, but the actual transfer of payment for property is deferred until a later time. Although typically not thought of in these terms, the purchase of a house or certain large consumer durable items typically falls into this category. With such purchases, the buyer and the seller agree on the price but delivery of the goods and payment comes later-perhaps in a week, perhaps in a month, or perhaps even later than that.

Forward contracts are arranged between two principals with complete flexibility as to exactly what property is being transferred and when the transfer will occur. In contrast, futures contracts are transacted in the arena of a futures exchange. Transactions must be made in prescribed increments (i.e., whole numbers of futures contracts covering a designated "size" per contract), where the price-setting capability applies to a limited number of prospective settlement dates. Traditionally, all buyers and sellers of futures come together in one central place-the pit designated for the exchange of the specific type of contract (e.g., the Treasury bill pit or the cattle pit). In recent years, a number of exchange markets have instituted electronic systems where essentially the same trading practices are performed. That is, the terminal has been substituted for the pit. Under both systems, however, transactions take place at the best bids and offers provided by the exchange members.

Cash flow obligations are very different for forward contracts and futures contracts. With a forward contract, a price is established on the trade date; but cash changes hands only on the value (or settlement) date, when, as agreed, the buyer pays the seller and takes possession of the property. With a futures contract, the change in value of the futures is passed between the two parties to the trade following movements of the futures price each day, making use of the clearinghouse as an intermediary. When the futures price rises, the buyer (who holds the long position) "earns" the change in value of the contract, and the seller (the short-position holder) loses. Opposite adjustments are made when the futures price declines. This daily cash adjustment thus collects from the loser and pays to the winner each day, with no extension of credit whatsoever. The daily dollar value that changes hands is called the "variation settlement."

This cash-flow aspect of the futures contact is perhaps the most difficult conceptual hurdle, as well as the hardest operational feature, for a potential futures market user. Maintaining a futures position requires that the position taker, both the buyer and the seller, be ready and able to pay funds into the clearinghouse (via a broker) each day that the futures position generates losses. Alternatively, efficient participation in the futures market requires that the trader/hedger be ready and able to employ funds that may be generated from profitable futures positions. Naturally, the former situation is the one that would cause potential problems. Due to the high leverage nature of the futures contract, the cash-flow requirements of a losing futures position may be quite onerous. The futures participant must either have the cash readily available or have the prearranged capability of financing this cash flow requirement. The "silver lining" to this process is that the cash requirement fosters a discipline that focuses attention on a market situation as it is happening-not months after the fact when it is too late to take corrective action.

Parties to forward contracts may require some form of collateral security in the form of compensating balances or a performance letter of credit. With futures contracts, customers must provide their brokers with a performance bond, which typically takes the form of U.S. government securities, or letters of credit for corporate customers.[1] The dollar value of this requirement varies depending on the particular futures contract traded; and this amount is adjusted as volatility conditions change.

Futures transactions tend to be used primarily as price-setting mechanisms rather than as a means of transferring property. That is, when using futures contracts, buyers and sellers typically offset their original positions prior to the delivery date specified by the contract, and then they secure the desired currency via a spot market transaction. This offset of the futures hedge is accomplished simply by taking a position opposite from the initial trade. For example, if one were to enter a long futures position, the offset would require selling the futures contracts. Conversely, if one started with a short position, offset would be arranged by buying the contracts. The complete buy/sell (or sell/buy) is referred to as a "round turn" and, with the completion of a round turn, commissions are charged on a "per contract" basis.

The size of the commission is negotiated, reflecting the amount of support and assistance that the broker provides, as well as the volume of trade generated by the customer. On the forward side, commissions may or may not be charged, depending on whether the trade is arranged directly with the dealer or if a broker serves as an agent. Importantly, it is not safe to assume that direct dealing necessarily reduces transaction costs. Often, the use of a broker-whether a futures broker or an interbank currency broker- allows customers to access more competitive market prices than they can otherwise. The factor most likely to determine whether futures or forwards provide the better prices is the size of the required transaction.

ECONOMICS OF HEDGING WITH CURRENCY FUTURES

The difference between hedging and speculating relates to risk existing before entry into the futures/forward market. The speculator starts with no risk and then enters into a transaction that takes on risk in order-one hopes-to make profits. The hedger, on the other hand, starts with a preexisting risk generated from the normal course of his or her traditional business. Futures (forwards) are then used to reduce or eliminate this pre-existing exposure. These contracts may be used to hedge some or all of such risk, essentially by fixing the price or exchange rate associated with the relevant exposure. Once so hedged, the manager is insulated from the effects of subsequent changes in the exchange rate, either beneficial or adverse.

[1] Some other forms are acceptable, but those mentioned are the most common.

As of April 2003, 30 different currency futures contracts (representing 13 currencies) are listed and actively traded at the Chicago Mercantile Exchange, which is the only U.S. exchange that trades futures on individual currencies. They are:

1. Australian Dollar Futures
2. Brazilian Real Futures
3. British Pound Futures
4. Canadian Dollar Futures
5. E-Mini Euro Futures
6. Euro Futures
7. Euro /SF Cross Rate Futures
8. Euro /BP Cross Rate Futures
9. Euro /JY Cross Rate Futures
10. E-Mini J-Yen Futures
11. Japanese Yen Futures
12. Mexican Peso Futures
13. New Zealand Futures
14. Russian Ruble Futures
15. South African Rand Futures
16. Swiss Franc Futures
17. CME$Index™ Futures
18. Australian Dollar/Canadian Dollar Futures
19. Australian Dollar/Japanese Yen Futures
20. Australian Dollar/New Zealand Dollar Futures
21. British Pound/Swiss Franc Futures
22. British Pound/Japanese Yen Futures
23. Euro /Australian Dollar Futures
24. Euro /Canadian Dollar Futures
25. Euro /Norwegian Krone Futures
26. Canadian Dollar/Japanese Yen Futures
27. Euro /Swedish Krona Futures
28. Swedish Krona Futures
29. Swiss Franc/Japanese Yen Futures
30. Norwegian Krone Futures

EXHIBIT 1

Perfect Long Futures Hedge Exposed to the risk of strengthening pound sterling
Size: £62,500
Hedge Instrument: 1 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of hedge	Liquidation of hedge
Transaction date	March 1	June 15
Spot value date	March 3	June 17
Futures delivery date	June 17	June 17
Spot price($/FX)	$1.5120	$1.5876
Futures price	$1.5070	$1.5876

Results

Dollars paid for £62,500 on June 17: £62,500 x $1.5876/£ = $99,225.00
Hedge result: £62,500 x ($1.5876/£ - $1.5070/£) = $5,037.50
Effective exchange rate = ($99, 225.00 - $5,037.50)/£62, 500 = $1.5070/£

Strictly speaking, each futures contract locks in an exchange rate for a specific value date or delivery date. This result is demonstrated above in Exhibit I, which shows the case of the hedger who initiates a long hedge of a single futures contract on March 1 to protect against a strengthening British pound. The size of the exposure is £62,500 (equal to the size of the futures contract), and the desired value date is precisely the same as the futures delivery date (June 17). Following a 5% rise in the spot price for pound sterling, the British pounds are purchased at the new, higher spot price; but profits on the hedge foster an effective exchange rate equal to the original futures price. At the time the hedge is initiated, highest quality bank customers would likely find the price of the forward contract for the same futures value date to be virtually identical to the futures contract, so an analogous trade with a forward contract with the same settlement date in June would foster the same economic result. Lesser quality (i.e., smaller) customers, however, might find discriminatory pricing in forward markets, resulting in a slightly disadvantaged outcome.

Of course, the assumption that the currency requirement coincides with the futures value date schedule is overly restrictive. A more likely scenario would be one in which the hedge value date differs from the available futures delivery (value) dates. In such cases, it may seem that forward contracts have an advantage over futures, given the flexibility to select a value date that coincides precisely with the exposure being hedged. This judgment typically turns out to be overstated, however, and thus this preference may not be justified. Even when using forwards, the date for which the currency exchange is expected to take place may need to be altered, so additional transactions might be required, adding to the cost of the currency hedge. Also, many users of forwards have to "bundle" their exposures, thus having individual forward contract hedges cover the exposures of several planned cash transactions. The capacity to select a specific value date therefore involves somewhat of a compromise.

EXHIBIT 2

Long Futures Hedge: Early Liquidation, Strengthening British Pound

Exposed to the risk of strengthening pound sterling

Size: £62,500

Hedge Instrument: 1 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of hedge	Liquidation of hedge
Transaction date	March 1	June 1
Spot value date	March 3	June 3
Futures delivery date	June 17	June 17
Spot price($/FX)	$1.5120	$1.5876
Futures price	$1.5070	$1.5870

Results

Dollars paid for £62,500 on June 3: £62,500 x $1.5876/£ = $99,225
Hedge result: £62,500 x ($1.5870/£ - $1.5070/£) = $5,000
Effective exchange rate = ($99, 225.00 - $5,000.00)/ £62, 500 = $1.5076/£

When the hedge value date differs from one of the available futures delivery dates, the hedger simply initiates a futures hedge with the contract that expires as soon as possible after the desired currency exchange date. The hedge would then simply be liquidated before expiration. Mechanically, when the need for the currency is at hand, the hedger would secure the desired currency using the spot market and simultaneously offset the futures hedge. An example is shown above in Exhibit 2. Here, as before, the hedge is initiated on March 1; but now the hedge must take possession of the British pounds on June 3-approximately three weeks prior to the expiration of the June futures contract. On June 1 (the trade date appropriate for a June 3 value date), the hedger simultaneously buys the required £62,500 with a spot market trade at a price of $1.5876/£ and offsets the futures hedge at a price of $1.5870/£. At the time of the hedge liquidation or offset, the difference between futures and spot prices (the basis) thus equals $0.0006. The consequence of this non-convergence is that the effective exchange rate realized from hedging the futures is $1.5076-a difference of .0006 from the original futures price.

The outcome shown is predicated on the assumption that the differential between U.S. interest rates and British interest rates present in the market on March 1, when the futures value date was 104 days away, remains in effect on June 1, when the futures have 16 days to go before expiration. Relatively higher UK interest rates (versus U.S. interest rates) on June 1 would have fostered a higher effective exchange rate, and vice versa. Clearly the futures hedge necessarily has some small degree of uncertainty in terms of the ultimate exchange rate realized; but this incremental effect can be either beneficial or adverse.

Again, the hedger might have chosen to operate with a forward contract rather than with the futures. When the need for the currency arises before the futures value date, however, the relevant forward price would not be the same as the futures price. Typically, interbank market forward prices are quoted as spot prices plus some premium (or less some discount), where premiums and discounts are expressed as "forward swap points," or "swap prices." In this example where the desired currency exchange is scheduled for June 3, the swap points would likely be roughly proportional to the basis, where the constant of proportionality would reflect the ratio of time to the desired forward date divided by the time to the futures delivery date. In this case, that ratio is 90/104. The forward pricing, therefore, could be estimated as follows:[2]

Future basis =
    1.5170-1.5120=-0.0050 (for 104 days)
Approximate swap price =
    -0.0050 x (90/104) = -0.0043 (for 90 days)
Approximate forward price =
    1.5120 - 0.0043 = 1.5077 (for 90 days)

Exhibit 3
Long Futures Hedge: Early Liquidation, Weakening British Pound
Exposed to the risk of strengthening pound sterling
Size: £62,500
Hedge Instrument: 1 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of hedge	Liquidation of hedge
Transaction date	March 1	June 1
Spot value date	March 3	June 3
Futures delivery date	June 17	June 17
Spot price($/FX)	$1.5120	$1.4364
Futures price	$1.5070	$1.4358

Results

Dollars paid for £62,500 on June 3: £62,500 x $1.4364/£ = $89,775
Hedge result £62,500 x ($1.4358/£ - $1.5070/£) = $4,450
Effective exchange rate = ($89,775 - $4,450)/£62,500 = $1.5076/£

[2] Actual forward prices quoted may differ somewhat from this estimate; but the closer the hedge value date is to the futures value date, the greater the confidence one should have for this approach to estimation.

Chicago Mercantile Exchange Futures

Product	Trading Unit	Point Description	Contract Listings
AUSTRALIAN DOLLAR FUTURES	One Australian dollar futures contract *Physically Delivered*	1 point = $.0001 per Australian dollar = $10.00 per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
BRAZILIAN REAL FUTURES	100,000 Brazilian reals *Cash Settled*	½ point = $.00005 per Brazilian real = $5.00 per contract	Twelve consecutive calendar months
BRITISH POUND FUTURES	62,500 pounds sterling (British pounds) *Physically Delivered*	1 point = $.0001 per pound sterling = $6.25 per contract	Six months in the March Quarterly Cycle Mar, Jun, Sep, Dec
CANADIAN DOLLAR FUTURES	100,000 Canadian dollars *Physically Delivered*	1 point = $.0001 per Canadian dollar = $10.00 per contract	Six months in the March Quarterly Cycle, Mar, Jun, Sep, Dec
E-MINI EURO FX FUTURES	62,500 Euro *Physically Delivered*	1 point = $.0001 per Euro = $6.25 per contract	Two months in the March Quarterly Cycle, Mar, Jun, Sep, Dec
EURO FX FUTURES	125,000 Euro *Physically Delivered*	1 point = $.0001 per Euro = $12.50 per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
EURO FX/SF CROSS RATE FUTURES	125,000 Euro *Physically Delivered*	1 point = 0.0001 Swiss francs per Euro = 12.5 Swiss francs	Six months in the March Quarterly cycle, Mar, Jun, Sep, Dec
EURO FX/BP CROSS RATE FUTURES	125,000 Euro *Physically Delivered*	.5 point = 0.00005 British pounds per Euro = 6.25 British pounds	Six months in the March, June, September, December quarterly cycle
EURO FX/JY CROSS RATE FUTURES	125,000 Euro *Physically Delivered*	1 point = 0.01 Japanese yen per Euro = 1,250 Japanese yen	Six months in the March Quarterly cycle, Mar, Jun, Sep, Dec
E-MINI J-YEN FUTURES	6,250,000 Japanese yen *Physically Delivered*	1 point = $.000001 per Japanese yen = $6.25 per contract	Two months in the March Quarterly Cycle, Mar, Jun, Sep, Dec
JAPANESE YEN FUTURES	12,500,000 Japanese yen *Physically Delivered*	1 point = $.000001 per Japanese yen = $12.50 per contract	Six months in the March Quarterly Cycle, Mar, Jun, Sep. Dec
MEXICAN PESO FUTURES	500,000 Mexican pesos *Physically Delivered*	1 point = $.00001 per Mexican peso = $5.00 per contract	Thirteen consecutive calendar months plus two deferred March quarterly cycle contracts
NEW ZEALAND FUTURES	100,000 New Zealand dollars *Physically Delivered*	1 point = $.0001 per New Zealand dollar =$10.00 per contract	Six months in the March Quarterly cycle, Mar, Jun, Sep, Dec
RUSSIAN RUBLE FUTURES	2,500,000 Russian rubles *Cash Settled*	1 point = $.00001 per Russian ruble = $25.00 per contract	Four months in a Quarterly Cycle, Mar, Jun, Sep, & Dec
SOUTH AFRICAN RAND FUTURES	500,000 South African rand *Physically Delivered*	1 point = $.00001 per South African rand = $5.00 per contract	Thirteen consecutive calendar months plus two deferred March quarterly cycle contracts

Chicago Mercantile Exchange Futures *(Continued)*

SWISS FRANC FUTURES	125,000 Swiss francs *Physically Delivered*	1 point = $.0001 per Swiss franc = $12.50 per contract	Six months in the March Quarterly cycle, Mar, Jun Sep, Dec
CME$INDEX™ FUTURES	$1,000 times the CME$INDEX™ (approximately $106,450)	1 point=$.01 of a CME$INDEX™ point=$10.00 per contract	Six months in the March Quarterly Cycle. March, June, September, December
AUSTRALIAN DOLLAR/CANADIAN DOLLAR FUTURES	200,000 Australian dollars *Physically Delivered*	1 point = 0.0001 CAD/AUD = 20 CAD per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
AUSTRALIAN DOLLAR/JAPANESE YEN FUTURES	200,000 Australian dollars *Physically Delivered*	1 point = 0.01 JPY/AUD = 2,000 JPY per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
AUSTRALIAN DOLLAR/NEW ZEALAND DOLLAR	200,000 Australian dollars *Physically Delivered*	1 point = 0.0001 NZD/AUD = 20 NZD per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
BRITISH POUND/SWISS FRANC FUTURES	125,000 British pounds *Physically Delivered*	1 point = 0.0001 CHF/GBP = 12.50 CHF per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
BRITISH POUND/JAPANESE YEN FUTURES	125,000 British pounds *Physically Delivered*	1 point = 0.01 JPY/GBP = 1,250 JPY per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
EURO FX/AUSTRALIAN DOLLAR FUTURES	125,000 Euro *Physically Delivered*	1 point = .0001 AUD/EUR = 12.50 AUD per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
EURO FX/CANADIAN DOLLAR FUTURES	125,000 Euro *Physically Delivered*	1 point = .0001 CAD/EUR = 12.50 CAD per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
EURO FX/NORWEGIAN KRONE FUTURES	125,000 Euro *Physically Delivered*	1 point = .001 NOK/EUR = 125 NOK per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
CANADIAN DOLLAR/JAPANESE YEN FUTURES	200,000 Canadian dollars *Physically Delivered*	1 Point = .01 JPY/CAD = 2000 JPY per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
EURO FX/SWEDISH KRONA FUTURES	125,0O0 Euro *Physically Delivered*	1 point = .001 SEK/EUR = 125 SEK per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
SWEDISH KRONA FUTURES	2,000,000 Swedish kronor *Physically Delivered*	1 Point = 0.00001 USD/SEK = $20.00 per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
SWISS FRANC/JAPANESE YEN FUTURES	250,000 Swiss francs *Physically Delivered*	1 point = 0.01 JPY/CHF = 2,500 JPY	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec
NORWEGIAN KRONE FUTURES	2,000,000 Norwegian kroner *Physically Delivered*	1 point = 0.00001 USD/NOK = $20.00 per contract	Six months in the March Quarterly Cycle. Mar, Jun, Sep, Dec

Thus, the hedger should be comparing a forward price of $1.5077 for a June 3 settlement with a June futures contract, traded at $1.5070 but expected to realize an effective exchange rate of $1.5076 as a consequence of early liquidation. It should be clear, then, that the effective rate realized from a futures hedge will likely be quite close to the outcome of a forward hedge (i.e., within a few basis points) irrespective of whether the timing of the risk coincides with the futures value date schedule.

For completeness, Exhibit 3 starts with the same problem as that shown in Exhibit 2. In this case, however, pound sterling depreciates rather than appreciates. Regardless, comparing Exhibits 2 and 3 shows the same effective exchange rate whether sterling appreciates or depreciates. This example thus demonstrates the robust outcome of a futures hedge. That is, once hedged, the hedger is indifferent about the prospective direction of exchange rates in the future, as the effective rate ($1.5076 in this case) is unaffected by subsequent spot market moves.[3]

The general rule for choosing the "correct" futures contract month is to pick the contract expiration concurrent with or immediately following the desired date of the actual currency conversion. For example, if you plan to make an actual conversion on November 1, the closest futures contract expiration following November 1 is available with the December contract. Liquidity conditions, however, may justify a departure from this practice when the planning horizon extends beyond the date for which futures contracts are actively traded. In these cases, hedges temporarily rely on nearby futures positions. After deferred contracts (i.e., later expirations) develop greater liquidity, the original hedge contract is offset and a new position is established in the more distant contract month. This process is called "rolling the hedge." It necessarily introduces a certain amount of uncertainty in that the price differentials between successive futures expirations (i.e., "spread prices") cannot be known with certainty before the roll.

CONCLUSION

Choosing between futures contracts and forward contracts for managing currency exchange rate risk involves consideration of a number of trade-offs. Perhaps most important is the fact that forwards lock in a prospective exchange rate with virtual certainty. Futures contracts, on the other hand, will foster approximately that same exchange rate. The source of risk for the futures contract pertains to the uncertainty associated with the size of the basis at the time the futures hedge needs to be liquidated. Depending on prevailing interest rate differentials in the market at that time, this uncertainty may prove to be beneficial or adverse.

Beyond this consideration, a further issue deals with hedge management practices. Forwards tend to be maintained consistently until the value date arrives when currencies are then exchanged even when the forwards are generating losses. The mark-to-market aspect of futures and the required daily cash settlements tend to foster a reexamination of the desirability of hedging when hedges generate losses, thus allowing for the curtailment of these losses. Put another way, futures provide greater flexibility in that they are more easily offset than forwards if the need for hedging is obviated. And finally, futures have the ancillary benefit that they do not introduce any added credit risk for the hedger as a consequence of the rigorously practiced marking-to-market requirement, while forwards do.

Ira G. Kawaller is the former Vice President-Director of the New York Office of Chicago Mercantile Exchange. He is currently the president of Kawaller & Company, LLC -- a Brooklyn-based consulting firm that specializes in assisting commercial enterprises in their use of derivative instruments for risk management purposes.

[3] This conclusion requires that the hedge is implemented with no rounding error, and it assumes consistent basis conditions upon hedge liquidation regardless of the level of spot exchange rates.