CHAPTER 6

In addition to the instruments traded in the OTC market, the organized exchanges in Chicago, Philadelphia, and New York trade currency futures, and options on foreign currencies and on currency futures (Figure 6-1). This chapter describes exchange-traded futures and options.

1. Exchange-Traded Futures

In the U.S. exchanges, a foreign exchange *futures* contract is an agreement between two parties to buy/sell a particular (non-U.S. dollar) currency at a particular price on a particular future date, as specified in a standardized contract common to all participants in that currency futures exchange. (See Box 6-1 on the evolution of foreign exchange futures.) When entering into a foreign exchange futures contract, no one is actually buying or selling anything—the participants are *agreeing* to buy or sell currencies on pre-agreed terms at a specified future date if the contract is allowed to reach maturity, which it rarely does.

A foreign exchange *futures* contract is conceptually similar to an outright *forward* foreign exchange contract, in that both are agreements to buy or sell a certain amount of a certain currency for another at a certain price on a certain date. However, there are important structural and institutional differences between the two instruments:

- Futures contracts are traded through public "open outcry" in organized, centralized exchanges that are regulated in the United States by the Commodity Futures Trading Commission. In contrast, forward contracts are traded "over-the-counter" in a market that is geographically dispersed, largely self-regulated, and subject to the ordinary laws of commercial contracts and taxation.

- Futures contracts are standardized in terms of the currencies that can be traded, the amounts, and maturity dates, and they are subject to the trading rules of the exchange with respect to daily price limits, etc. Forward contracts can be customized to meet particular customer needs.

- Futures contracts are "marked to market" and adjusted daily; there are initial and maintenance margins and daily cash settlements. Forward contracts do not require any cash payment until maturity (although a bank writing a forward contract may require collateral). Thus, a futures contract can be viewed as a portfolio or series of forwards, each covering a day or a longer period between cash settlements.

- Futures contracts are netted through the clearinghouse of the exchange, which receives the margin payments and guarantees the performance of both the buyer and the seller in every contract. Forward contracts are made directly between the two parties, with no clearinghouse between them.

The differences between the two instruments are very important. The fact that futures contracts are channeled through a clearinghouse and

FIGURE 6-1

EXCHANGES IN THE UNITED STATES TRADING FX FUTURES & OPTIONS

(Note-this table lists the FX futures and options contracts traded on the U.S. exchanges *before* the introduction of the euro in 1999. A number of the contracts will be changed when the euro is a traded currency).

Exchange and Contract	Face Value of Contract	1994 Volume of Contracts (000)
Chicago Mercantile Exchange (CME)		
Futures:		
Japanese Yen	¥12,500,000	6,613
Deutsche Mark	DEM125,000	10,956
DEM Rolling Spot	$250,000	127
French Franc	FRF500,000	49
Pound Sterling	£62,500	3,523
Pound Sterling		
Rolling Spot	$250,500	—
Canadian Dollar	CAN$100,000	1,740
Australian Dollar	$A100,000	355
Swiss Franc	SwF125,000	5,217
Cross Rate DEM	DEM125,000 x	
Japanese Yen	DEM/¥ Crossrate	—
Options on Futures:		
Yen Futures	(Same as Futures)	2,946
DEM Futures	(Same as Futures)	4,794
DEM Rolling Spot Futures	(Same as Futures)	—
FR Franc Futures	(Same as Futures)	1
Pound Sterling	(Same as Futures)	920
Pound Sterling		
Rolling Spot Futures	(Same as Futures)	—
Can. Dollar Futures	(Same as Futures)	186
Australian Dollar Futures	(Same as Futures)	8
Swiss Franc Futures	(Same as Futures)	768
Cross Rate DEM/Yen Futures	(Same as Futures)	—
Philadelphia Board of Trade		
Futures:		*42*
Australian Dollar	$A100,000	
Canadian Dollar	CAN$100,000	
Deutsche Mark	DEM125,000	
ECU	ECU125,000	
French Franc	F500,000	
Japanese Yen	¥12,500,000	
Pound Sterling	£62,500	
Swiss Franc	CHF125,000	

Exchange and Contract	Face Value of Contract	1994 Volume of Contracts (000)
Philadelphia Stock Exchange (PHLX)		
Options:		
Japanese Yen	¥6,250,000	999
Deutsche Mark	DEM62,500	3,445
French Franc	FR250,000	4,508
Pound Sterling	£31,250	411
Canadian Dollar	CAN$50,000	158
Australian Dollar	$A50,000	7
Swiss Franc	CHF62,500	428
ECU	ECU62,500	20
Cross Rate £/DEM	£31,250	28
Cross Rate DEM/¥	DEM62,500	33
Cash Settled DEM	DEM62,500	43
Customized Currency (Var. Underlying Currencies)		7
New York Board of Trade (FINEX Div.)		
Futures:		
U.S. Dollar Index	$1,000 x Index	558
ECU	ECU100,000	Not Traded
U.S. Dollar/DEM	DEM125,000	30
Cross Rate DEM/Yen	DEM125,000	31
Cross Rate DEM/F.Franc	DEM500,000	10
Cross Rate DEM/It.Lira	DEM25,000	4
Cross Rate £/DEM	£125,000	12
Options:		
U.S. Dollar Index	$1,000 x Index	42
Options on ECU Futures	ECU100,000	Not Traded
Mid-America Commodity Exchange (MIDAM)		
Futures:		
Japanese Yen	£6,250,000	68
Deutsche Mark	DEM62,500	11
Pound Sterling	£12,500	66
Canadian Dollar	CAN$50,000	10
Swiss Franc	CHF62,500	65

Source: International Capital Markets, Developments, Prospects, and Policy Issues. International Monetary Fund. Washington, D.C. August 1995, pp. 192-201.

BOX 6-1

Development of Foreign Currency Futures

Foreign exchange futures—and *financial futures* generally—were introduced by the International Monetary Market (IMM) of the Chicago Mercantile Exchange in 1972, at the time of the breakdown of the Bretton Woods system of par value exchange rates. Prior to that time, there were organized exchange markets only for *commodity* futures, which first developed in the mid-1800s in the United States for trading in agricultural commodities such as wheat and pork bellies, imported foodstuffs such as coffee and cocoa, and industrial commodities such as copper and oil.

The IMM moved to apply the same organizational and trading techniques used in the commodity markets to a range of financial instruments, including foreign currency futures. This approach spread to other exchanges in the United States and abroad. A number of financial futures contracts are now traded, not only for currencies, but also for stock indexes and interest rates. In foreign exchange, the futures market now provides an alternative channel through which individual investors and businesses can take positions in foreign currencies for hedging or speculating.

In addition to the IMM of the Chicago Mercantile Exchange, the exchanges in the United States that trade foreign exchange futures are the Mid-America Commodity Exchange, which is a subsidiary of the Chicago Board of Trade; the Financial Instrument Exchange (Finex), which is a subsidiary of the New York Board of Trade (formerly Cotton Exchange); and the Philadelphia Board of Trade. In the United States, the Commodity Futures Trading Commission (CFTC) has jurisdiction over futures contracts, including foreign exchange futures.

The system of trading in futures markets is not greatly different from the practices introduced in the United States in the middle of the last century. There is a designated location (a "pit") where a large number of traders ("locals" who buy and sell for themselves, and "pit brokers" who also execute trades for others) communicate, often by hand signals, and complete their deals according to established rules, with all bids and offers announced publicly. Some new practices have been introduced. An "exchange for physicals" (EFP) market provides for trading futures contracts outside exchange hours, with prices for foreign exchange futures determined by interest parity from the spot market, which trades on a 24- hour day basis. Also, the Chicago Mercantile Exchange, working with others, has developed a system called "Globex" to provide for trading futures contracts when a futures exchange is closed.

"marked to market" daily means that credit risk is reduced. The fact that the clearinghouse is guaranteeing the performance of both sides also means that a contract can be canceled (or "killed") simply by buying a second contract that reverses the first and nets out the position. Thus, there is a good "secondary market." In a forward contract, if a holder wanted to close or reverse a position, there would have to be a second contract, and if the second contract is arranged with a different counterparty from the first, there would be two contracts and two counterparties, with credit risk on both.

Because of the differences in the two markets, it is not hard to understand why the

two markets are used differently. Futures contracts seldom go to maturity—less than two percent result in delivery—and are widely used for purposes of financial hedging and speculation. The ease of liquidating positions in the futures market makes a futures contract attractive for those purposes. The high degree of standardization in the futures market means that traders need only discuss the number of contracts and the price, and transactions can be arranged quickly and efficiently.

Forward contracts are generally intended for delivery, and many market participants may need more flexibility in setting delivery dates than is provided by the foreign exchange futures market, with its standard quarterly delivery dates and its one-year maximum maturity. Transactions are typically for much larger amounts in the forward market —millions, sometimes many millions, of dollars—while most standardized futures contracts are each set at about $100,000 or less, though a single market participant can buy or sell multiple contracts, up to a limit imposed by the exchange. Also, forward contracts are not limited to the relatively small number of currencies traded on the futures exchanges.

The foreign currency futures market provides, to some extent, an alternative to the OTC forward market, but it also complements that market. Like the forward market, the currency futures market provides a mechanism whereby users can alter portfolio positions other than through the alternative of the cash or spot market. It can accommodate both short and long positions, and it can be used on a highly leveraged basis for both hedging and speculation. It thus facilitates the transfer of risk—from hedgers to speculators, or from speculators to other speculators.

In addition, the foreign currency futures market contributes to the "information" and the "price discovery" functions of markets—although the contribution may be moderate in the case of foreign exchange, since the estimated total turnover of currency futures markets is far below that of the market in outright forwards.

As in the case of forwards, prices in the foreign currency futures market are related to the spot market by *interest rate parity*. The theoretical price of a forward contract will be the spot exchange rate plus or minus the net cost of financing (the cost of carry), which is determined by the interest rate differential between the two currencies. In the case of futures, where there are margin requirements, daily marking to market, and different transactions costs, the price should presumably reflect those differences. In practice, however, the market prices of forwards and futures seem not to diverge very much for relatively short-term contracts.

◗ Quotes for Foreign Currency Futures

Figure 6-2 reports data from The New York Times, showing the foreign currency futures quotes on April 27, 1998—an arbitrarily chosen date—for contracts trading on the International Money Market (IMM) of the Chicago Mercantile Exchange; including the Japanese yen, the Deutsche mark, the Canadian dollar, the British pound, and the Swiss franc. (With the introduction of the euro in 1999, a number of the contracts will be changed.) Contracts for each currency are of a standard size—e.g., for the pound sterling the face amount is £62,500; for the Deutsche mark it is DEM 125,000. There are trading rules—for example, there is a minimum allowable price move between trades, and a maximum allowable price movement in a day. The

FIGURE 6-2

OTHER FUTURES

	Vol.	High	Low	Settle	Net Chg.	Lifetime High	Lifetime Low	Open Int
LIBOR 1-MONTH (CME) $3 million- pts of 100 pct.								
May 98	3228	94.34	94.30	94.31	– .03	94.55	94.00	16869
30-DAY FED. FUNDS (CBT) $5 million- pts. of 100 pct.								
Apr 98	971	94.53	94.52	94.53		94.74	94.18	4573
MUNICIPAL BONDS (CBT) $1000x index-pts & 32nds								
Jun 98	3355	120-31	119-27	120-02	– 1 18	125-19	119-27	23655
US DOLLAR INDEX (CTN) 1000 x index								
Jun 98	451	99.65	99.05	99.22	– .05	102.00	93.68	4575
CRB INDEX X 500 (NYFE) 500 x index								
Jun 98	65	226.40	224.80	226.20	+ .15	236.60	224.80	608
GSCI (Goldman S. Index) (CME) $250 X Nearby Index								
May 98	505	164.70	162.50	164.60	+ .40	192.80	159.30	25451
OATS (CBT) 5,000 bu minimum- cents per bushel								
May 98	427	124 1/2	122	122	– 9 3/4	182 1/2	122	2116
WINTER WHEAT (KC) 5,000 bu minimum- cents per bushel								
May 98	2975	318	314	317 1/4	– 1 3/4	411	333	7295
ROUGH RICE (CBT) 2,000 CWT- dollars per CWT								
May 98	169	10.140	10.090	10.110	– .030	11.690	9.640	1929
LUMBER (CME) 80,000 bd. ft.- $ per 1,000 bd. ft.								
May 98	560	302.40	296.00	297.00	– 4.00	370.00	291.70	1790
PALLADIUM (NYM) 100 troy oz- dollars per oz								
Jun 98	545	310.00	301.50	303.60	– 9.30	327.70	174.15	3824
BRITISH POUND (CME) 62,500 pounds, $ per pound								
Jun 98	6691	1.6740	1.6592	1.6702	+ .0062	1.6920	1.5656	37142
CANADIAN DOLLAR (CME) 100,000 dollars, $ per Cdn. dlr								
Jun 98	5542	.6986	.6951	.6956	– .0020	.7453	.6825	52131
GERMAN MARK (CME) 125,000 marks, $ per mark								
Jun 98	22557	.5622	.5577	.5613	+ .0011	.5981	.5409	109245
JAPANESE YEN (CME) 12.5 million yen, $ per 100 yen								
Jun 98	15311	.7697	.7574	.7615	– .0064	.8746	.7456	87335
SWISS FRANC (CME) 125,000 francs, $ per franc								
Jun 98	12419	.6785	.6712	.6768	+ .0020	.7304	.6560	63240

delivery dates fall on the third Wednesday of the months of March, June, September, and December. The longest maturity is for one year.

Note that the futures exchange rates of all of the contracts are quoted in terms of the value of the foreign currency as measured in U.S. dollars, and premiums are quoted in U.S. cents per mark or pound—that is, in "direct" or "American" terms. This technique is consistent with long-standing practice in commodity exchanges for quoting futures contracts for agricultural and industrial products. But it differs from conventions in other parts of the exchange market—a Swiss franc forward would be priced at, say, "1.6000" (in CHF per dollar) while a Swiss franc future would be priced at the reciprocal, or "0.6250" (in dollars per CHF).

2. Exchange-Traded Currency Options

Exchange-traded currency options, like exchange-traded futures, utilize standardized contracts—with respect to the amount of the underlying currency, the exercise price, and the expiration date. Transactions are cleared through the clearinghouses of the exchanges on which they are traded, and the clearinghouses guarantee each party against default of the other. The option buyer—who has no further financial obligation after he has paid the premium—is not required to make margin payments. The option writer—who has all of the financial risk—is required to put up initial margin and to make additional (maintenance) margin payments if the market price moves adversely to his position.

In the United States, exchange-traded foreign exchange options were introduced in 1982. Options on foreign currencies presently are traded on the Philadelphia Stock Exchange (PHLX) and the Chicago Mercantile Exchange (CME). Options on a U.S. dollar index and on the ECU are traded on Finex, the financial division of the New York Cotton Exchange. The Securities and Exchange Commission (SEC) has jurisdiction over options on foreign currencies traded on national securities exchanges, while the Commodity Futures Trading Commission (CFTC) regulates options on foreign currency futures and options on foreign currencies traded on exchanges that are not securities exchanges. Abroad, options

on foreign exchange are traded in various centers, including Singapore, Amsterdam, Paris, and Brussels.

The PHLX trades options contracts on *spot* foreign exchange for the Deutsche mark, Japanese yen, British pound, Australian dollar, Canadian dollar, French franc, Swiss franc, and ECU. (As with futures contracts, several of the options contracts will be changed when the euro is introduced.) The amounts of the foreign currencies per contract are set at one-half those in IMM futures contracts (e.g., a PHLX option contract on DEM is set at DEM 62,500 spot, or one-half of the IMM futures contract on DEM, which is DEM 125,000). Similarly, the expiration dates generally correspond to the March, June, September, and December maturity dates on IMM foreign exchange futures. The PHLX trades both American- and European-style options.

The CME trades options on the same eight currencies as the PHLX, but trades options on futures, rather than on spot, or cash. That is to say, at the CME a buyer can purchase a contract that provides the right, but not the obligation, for example, to go long on an exchange-traded foreign exchange futures contract at a strike price stated in terms of a different currency. If an option on foreign currency futures is exercised, any profit can be immediately recognized by closing out the futures position through an offsetting transaction.

All CME options on foreign exchange futures are American style—exercisable on or before the maturity date. These CME options contracts are the same size as IMM futures standardized contracts—each CME option represents the right to go long or short a single IMM foreign exchange futures contract. Figure 6-3 shows the quotes for call and put options on April 27, 1998.

3. Linkages

It is important to note how all of the main foreign exchange instruments described in Chapters 5 and 6 are linked to each other, creating a comprehensive network within which the forces of arbitrage can induce consistent rate relationships and pooled liquidity, which can benefit the various sectors of the market.

◗ *These linkages are summarized in Box 6-2.*

BOX 6-2

Linkages Between Main Foreign Exchange Instruments in both OTC and Exchange-Traded Markets

◗ SPOT (settled two days after deal date, or T+2) = Benchmark price of a unit of the base currency expressed in a variable amount of the terms currency.

◗ Pre-Spot: *VALUE TOMORROW* (settled one day after deal date, or T+1) = Price based on spot rate adjusted for the value for one day of the interest rate differential between the two currencies. (Higher interest rate currency trades at a *premium* from spot.)

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- Pre-Spot: CASH (settled on deal date, or T+0) = Price based on spot rate adjusted for the value for two days of the interest rate differential between the two currencies. (Higher interest rate currency trades at a premium from spot.)
- OUTRIGHT FORWARD = Price based on spot rate adjusted for the value of the interest rate differential between the two currencies for the number of days of the forward. (Higher interest rate currency trades at a forward *discount* from spot.)
- FX SWAP = One spot transaction plus one outright forward transaction for a given amount of the base currency, going in opposite directions, or else two outright forward transactions for a given amount of the base currency, with different maturity dates, going in opposite directions.
- CURRENCY FUTURES = Conceptually, a series of outright forwards, one covering each period from one day's marking to market and cash settlement to the next.
- CURRENCY SWAP = An exchange of principal in two different currencies at the beginning of the contract (sometimes omitted) and a re-exchange of same amount at the end; plus an exchange of two streams of interest payments covering each interest payment period, which is conceptually a series of outright forwards, one covering each interest payment period.
- CURRENCY OPTION = A *one-way* bet on the forward rate, at a price (premium) reflecting the market's forecast of the volatility of that rate. A synthetic forward position can be produced from a combination of options, and a package of options can be replicated by taking apart a forward.

FIGURE 6-3

OPTIONS ON FUTURES

FINANCIAL

EURODOLLARS (CME)
$1 million,pts of 100 pct.

Strike	Calls			Puts		
Price	May	Jun	Sep	May	Jun	Sep
9400	r	0.22	0.23	r	0.01	0.10
9412	r	0.12	s	0.02	0.04	s
9425	0.03	0.05	0.09	0.07	0.09	0.21
9437	0.01	0.02	s	0.17	0.18	s
9450	r	0.01	0.04	0.29	0.30	0.40
9462	r	0.01	s	r	r	s

Prev call vol. 38,262 Call open int.1,188,339
Prev put vol. 52,060 Put open int..882,091

5 YR. TREASURY (CBT)
$100,000, pts & 64ths of 100 pct

Strike	Calls			Puts		
Price	Jun	Sep	Dec	Jun	Sep	Dec
10700	r	r	s	-03	-24	s
10750	r	r	s	-08	-33	s
10800	-16	r	s	-15	-45	s
10832	r	s	s	r	s	s
10850	-20	-52	s	-29	-59	s
10900	-09	-39	s	-49	1-13	s

Prev call vol. ..3,753 Call open int. .....
Prev put vol. ..6,236 Put open int. .....

10 YR. TREASURY (CBT)
$100,000 prin, pts & 64ths of 100 pct

Strike	Calls			Puts		
Price	Jun	Sep	Dec	Jun	Sep	Dec
109	2-38	r	r	-03	-25	-45
109	s	s	r	s	s	r
110	1-43	r	r	-07	-40	1-00
111	-56	2-13	r	-21	-63	1-25
112	-23	1-08	1-30	-50	1-28	1-56
113	-07	-47	1-05	1-35	2-02	2-29

Prev call vol. 13,868 Call open int. .....
Prev put vol. ..8,302 Put open int. .....

US TREASURY BONDS (CBT)
$100,000,pts & 64ths of 100 pct

Strike	Calls			Puts		
Price	Jun	Sep	Dec	Jun	Sep	Dec
116	2-62	3-45	r	-12	1-14	1-63
117	2-09	r	s	-23	1-02	s
118	1-27	2-33	3-01	-42	2-00	2-53
119	s	s	r	s	s	r
119	-56	r	r	1-06	1-46	2-51
120	-31	1-38	2-09	1-44	3-04	3-57

Prev call vol. 39,961 Call open int. .....
Prev put vol. 45,859 Put open int. .....

BRITISH POUND (CME)
62,500 pounds, cents per pound

Strike	Calls			Puts		
Price	May	Jun	Sep	May	Jun	Sep
1650	2.22	2.80	s	0.20	0.78	s
1660	1.44	2.14	3.40	0.42	1.12	3.00
1670	0.82	1.58	s	0.80	1.56	s
1680	0.46	1.14	2.48	1.44	2.12	4.06
1690	0.22	0.80	s	r	2.78	s
1700	0.12	0.56	1.76	r	3.52	r

Prev call vol. .....231 Call open int. ..12,590
Prev put vol.....155 Put open int. 12,172

GERMAN MARK (CME)
125,000 marks, cents per mark

Strike	Calls			Puts		
Price	May	Jun	Sep	May	Jun	Sep
550	1.20	1.40	2.09	0.07	0.28	0.71
555	0.80	1.06	s	0.17	0.43	s
560	0.46	0.78	1.47	0.33	0.65	1.07
565	0.24	0.56	s	0.61	0.93	s
570	0.14	0.38	1.01	r	1.24	1.59
575	0.08	0.26	s	r	r	s

Prev call vol. ...1,176 Call open int. ..64,115
Prev put vol.....926 Put open int. ...28,292

JAPANESE YEN (CME)
12,500,000 yen, cents per 100 yen

Strike	Calls			Puts		
Price	May	Jun	Sep	May	Jun	Sep
750	1.39	1.93	3.60	0.24	0.79	1.48
755	1.03	1.63	s	0.38	0.98	s
760	0.74	1.36	3.00	0.59	1.21	1.86
765	0.52	1.13	s	0.87	1.48	s
770	0.36	0.93	2.47	1.21	1.77	2.31
775	0.25	0.76	s	1.60	2.10	s

Prev call vol. ..4,057 Call open int. ..64,419
Prev put vol. ..3,565 Put open int. ...66,109