International Finance

A note on the foreign exchange market and its instruments

i. FOREX MARKET

The foreign exchange (forex or FX) **market** is an over-the-counter (OTC) market, in that trading is not physically located on an exchange but instead is decentralized. The authoritative source on global FX market activity is the Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity published by the BIS ("the Triennial"). As of its latest triennial survey in April 2010, the BIS reported that thirteen financial centers, chief among them London, make up 90% of the trading volume (BIS 2010 Triennial Survey, p.9).

The market has three compartments: wholesale ("interbank," see below); brokered (for big trades involving institutions wishing to remain anonymous); and retail (see below). The most widely quoted figure about the worldwide FX turnover (4 trillion USD/day) comes from the last thorough survey of the BIS (2010 Triennial Survey, p.1). This turnover is almost 25% higher than in 2007 due mostly to sharp increases in trading by non-bank financial institutions in general and high-frequency/algorithmic trading in particular.

Recent estimates by BIS staff (Bech, 2012) suggested that daily turnover may have peaked at almost $5trn in Summer 2011 – but had since fallen somewhat. It reached 5.3trn this Spring.

The **interbank forex market** is made up of traders working for several hundred large banks and some large non-bank corporations with their own trading desks, all linked by electronic means of communication and trade confirmation. In practice, fewer than 100 banks make up more than three fourths of all trading (see BIS 2007 Triennial Survey, pp. 6-9). Transactions are customized, including with respect to trade size. A typical interbank deal is perhaps $10m for major currencies. **Payments** themselves do not move physically across borders. Instead, traders rely on a system of correspondent accounts, i.e., an international network of working balances that banks in different countries keep with each other.[1] Participants in the **retail** side of the market include some sizeable regional banks that do not have a forex trading desk.

[1] The demand accounts held by a domestic bank abroad are called *nostro* ("on us" or "due from") accounts, whereas the demand accounts held by foreign banks with a domestic bank are called *vostro* ("on you" or "due to") accounts.

ii. SPOT TRANSACTIONS

1. Characteristics

Spot foreign exchange (forex) transactions are "single outright transactions involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery (cash settlement) within two business days." (BIS 2010 Triennial Survey, p.32).

Spot forex deals, then, entail settlement by transfer of ownership of cash balances, typically two business banking days forward in the country of the bank providing quotations. To the best of my knowledge, the only exception to the convention that the settlement (or "value") date (i.e., the "spot day") be the 2nd business day after the trade (or "deal") date is for some trades involving two currencies that are cleared in the same time zone, such as the customary one-day settlement period for spot Canadian-dollar/U.S.-dollar transactions.

Note that traders can also trade "pre-spot" (or "ante-spot") by trading for "value tomorrow" (value date = trade date + 1 business day) or by trading for "cash" or for "value today" (value date = trade date). Outright pre-spot transactions have traditionally made up a small fraction of the forex market (see e.g. FRBNY, 1998, p.31).

To sum up, a **spot transaction** is a binding commitment for an exchange of funds, with normal settlement and delivery of bank balances within two business days. Exceptions to the two-day rule are almost always in the direction of making the settlement period shorter – not longer or indefinite.

2. Rolling over (forward) of an open spot position

In the interbank foreign exchange market, traders who wish to **roll over** their spot positions can do so by using FX swap transactions: traders who are long spot a currency simultaneously sell it spot and buy it forward (e.g., one-day forward if they want to roll the position to the next day); whereas traders who want to roll over a short position do the opposite. These **foreign exchange swaps** commit two counterparties to the "actual exchange of two currencies (principal amounts only) on a specific date at a rate agreed at the time of conclusion of the contract (the short leg), and a reverse exchange of the same two currencies at a date further in the future and at a rate (generally different from the rate applied to the short leg) agreed at the time of the contract

(the long leg). Both spot/forward swaps (involving the sale of one currency for another in the spot market with the simultaneous repurchase of the first currency in the forward market, at a rate and for a delivery date – usually the day following the spot's value date – that are agreed on at the time of the swap deal) and forward/forward swaps are included. Short-term swaps carried out as "tomorrow/next day" transactions are also included in this category. (2010 BIS Triennial Survey, p. 32)

Pricing of forex swaps is via a swap rate proportional to the differential in the interest rates applicable to deposits in the two relevant currencies. For example, when FX rates are quoted in dollars per unit of foreign exchange, the **swap rate** (quoted in "points" or fractions of a U.S. dollar) is equal to the spot rate times the periodic interest rate differential, discounted at the foreign interest factor. Because outright forward prices are priced by reference to the same interest rate differential (the so-called "**interest-rate parity**" relation), taking a spot forex position and rolling it forward later in the day with an *n*-day swap is equivalent to having taken an *n*-day outright forward position in the first place (up to swap rate fluctuations in the hours separating the spot and swap deals, and abstracting from settlement issues – see also Section iii.4 below on rolling-spot futures).

iii. FORWARDS and FUTURES CONTRACTS

1. Currency forwards.

As recently as 2007, the definition of a forward covered only those contracts that – like spot forex transactions – involve the actual exchange of two currencies (see, e.g., BIS 2007 Triennial Survey p. 35). That is, the main difference between forward and spot transactions was that a forward's value date, which is fixed at the time of the trade, had to be at least one business day later than the spot day. An **outright forward transaction**, then, was meant to be a binding commitment for an exchange of two currencies, at a rate agreed upon at the time of the transaction, with settlement and delivery of bank balances at a point in the future agreed on at the time of the transaction (always more than two banking business days).

Amid the growth in electronic trading and cash-settlement of many forward contracts, the definition of forwards started to include what looks, in many respects, just like an off-exchange

futures (see next section). Indeed, in its most recent Triennial Survey (BIS 2010, pp.34-35), the BIS definition of "forwards" also included non-deliverable forwards and other cash-settled Contracts For Difference (or CFDs).[2]

In the United States, the adoption of the Dodd-Frank rules has renewed the sharp distinction between "commodity-settled" forwards and cash-settled or "non-deliverable" contracts. Given an exemption granted by the U.S. Treasury on November 16, 2012, trading contracts that entail the delivery of currencies (outright forwards and forex swaps) is not subject to clearing requirements or "real time" reporting requirements (though they are subject to some Dodd-Frank rules). In contrast, trading in cash-settled instruments such as NDFs are treated as "swaps" for regulatory purposes and are thus subject to Dodd-Frank provisions.[3] As of February 2013, the European Securities and Markets Authority (ESMA) was still to clarify how foreign exchange derivatives would be affected by European regulation of OTC derivatives, following the end of a public consultation on its draft technical standards on August 5, 2012.

2. Currency futures.

Futures contracts are sometimes defined by direct reference to forwards, as binding agreements that, unless offset, require the counterparties to deliver or to take delivery of some asset at some date in the future, at a price agreed upon today. Indeed, when a futures contract is first introduced, delivery (if any) is specified for a later date than the spot day. However, the above definition is lacking in several ways.

First, whereas some futures call for delivery of the actual underlying asset, other futures merely call for a cash settlement based on a reference price at the contract's expiration.[4] Such

[2] In contracts known as "Non-Deliverable Forwards", the parties agree to make a cash-settlement at maturity equal to the *difference* between the forward rate agreed upon when the NDF was entered into, $F_{t,T}$, and the spot rate prevailing when the NDF matures, S_T. That is, the parties do not exchange the underlying notional (reference) currency amounts; the holder of the long NDF position receives $F_{t,T} - S_T$ from his NDF counterparty (or pays that amount to the short, if $F_{t,T} - S_T$ is negative). Because they do not require settlement by transfer of bank balances in different currencies, NDFs have traditionally been used for currencies of countries whose monetary authorities impose hurdles to currency trading. This practice is changing, which is likely why the BIS in 2010 included NDFs and CFDs in its forex trading volume figures (2010 BIS Triennial Survey, p. 32).

[3] The definition of a swap in recent U.S. regulations is different from that commonly used in financial economics. Note that cross-currency interest-rate swaps, which can be viewed as bundles of currency forwards, are not included in the U.S. Treasury exemption and are thus fully subject to swap regulations in the United States.

[4] The same is true of OTC contracts called non-deliverable forwards (NDFs). In the first half of the past decade (1998-2005), NDF turnover was overwhelmingly made up of trades in Asia involving Asian currencies (BIS

cash-settlement is similar in spirit to the mechanism used in "non-deliverable forwards" (see footnote 2).

Second, and even more importantly, the above definition obscures the fact that, whereas the usual **purpose of forward contracts** is to trade in the underlying asset (or "commodity"), the typical **purpose of futures contracts** is not to obtain delivery of the underlying but instead to replicate the gains and losses that would result from equivalent forward contracts.

In other words, futures are designed to allow for trading in the price risk of the underlying asset -- rather than trading in that commodity itself. To achieve this purpose, investors must be able to **offset** their trades prior to the contract's expiration and avoid delivery altogether by taking an offsetting futures position – and offset they do, as statistics released by futures exchanges show that almost all futures positions are closed in this manner. Key to a traders' ability to offset is the high degree of standardization of futures contracts (in terms of contract size, minimum price movements, etc.).

To sum up, futures contracts entail mechanisms (e.g., cash settlement or offset) to avoid delivery altogether. One can define a **futures contract**, then, as follows:

1. it is a side bet on the price movements of some underlying asset;
2. which is standardized;
3. so that parties to a bet can meet their obligations (i) at the contract's expiration, by delivering (or taking delivery) of the asset or by making a settlement in cash; or (ii) prior to the contract's expiration, if any,[5] by taking an offsetting position.

A third and important difference between futures and forward (and spot) contracts is the handling of the risk that either of the counterparties might default (**credit risk**). For OTC spot or forward contracts, this risk is usually handled via the reputation of the parties and extension of credit. With futures, by contrast, credit risk is handled by (i) requiring that buyers and sellers post **performance bonds** with their respective futures commission merchants (FCMs), typically

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Quarterly Review, June 2004, pp. 81-94). Amid strong growth in cash-settled FX derivatives, however, this is no longer true. It is my understanding that, pre Dodd-Frank, NDFs were not recognized by the U.S. CFTC or the BIS as forward contracts.

[5] While almost all futures contracts have an expiration (or "maturity" date), one can imagine futures that are indefinite – see, e.g., the IP contracts discussed in CME v. SEC (1989; Westlaw 883 F.2d 537).

about 1-3% of the contract's value for an outright futures position on any of the world's major currencies; (ii) **marking to market** of the contract on a frequent basis, typically daily or sometimes intra-daily; and (iii) after marking to market of the futures position, allowing the winning counterparty to withdraw its gains and asking the losing counterparty for immediate payment of its losses.

3. CME currency futures contracts

In the United States, futures on a number of foreign currencies are traded on the Chicago Mercantile Exchange (CME). Most of these contracts are offered on a three-month cycle, with delivery dates on the Wednesday following the third Monday of March, June, September or December. Monthly delivery dates are available for some futures contracts, including those on the Brazilian Real, Mexican Peso, and South African Rand. Contract sizes for some of the most popular contracts are standardized to the following amounts:

	Contract size	**tick size**
Australian Dollar	: A$ 100,000	0.0001 =$10.00
Pound sterling	: £ 62,500	0.0001 =$ 6.25
Euro	: € 125,000	0.0001 =$12.50
Swiss Franc	: SF 125,000	0.0001 =$12.50
Japanese Yen	: ¥ 12,500,000	0.000001 =$12.50
Canadian Dollar	: C$ 100,000	0.0001 =$10.00

4. CME rolling spot currency futures contracts

In 1993, the CME received CFTC approval to introduce "**rolling spot futures**" (RSF) contracts on several currencies: the Pound Sterling, Canadian Dollar, Deutsche Mark (DM), Japanese Yen, Swiss Franc, Australian dollar, and French Franc. One of the CME's stated goals in offering RSF was to "automate the one-day forward roll (of spot forex positions) without the back-office complications of arranging currency transfers."

RSF contracts were offered on the same 3-month cycle as other currency futures already listed by the CME at the time, with trading ending on the third Monday of March, June, September or December and delivery on the following Wednesday. RSF contracts in Pound Sterling, Japanese Yen and Deutsche Mark were traded in 1993, 1994 and/or 1995, with a high volume of 126,994 DM RSF contracts in 1994.

One minor difference with other CME currency futures was the contract sizes, which were (i) four times the corresponding "regular" currency futures contracts for the Pound Sterling, i.e., £ 250,000; and (ii) fixed, for the other contracts, the dollar side at $250,000 (rather than fix the foreign currency side).

A second, more important difference with other currency futures was the fact that, though futures, these RSF contracts traded in spot terms and at spot prices. Precisely, each contract's price was set to the relevant current spot exchange rate (as measured by survey of OTC spot forex dealers) and daily price adjustments were made based on spot rate changes and swap points (as measured by a survey of OTC swap dealers).[6]

These RSF contracts illustrate some of the main features of futures contracts:

1. they enable the transfer of a risk component associated with a commodity -- in this case, changes in the spot FX rate rather than the usual changes in the FX futures price (for futures positions held to contract expiration) or in the expected future FX spot rate (for futures positions closed out prior to maturity);

2. delivery, if any, takes place at a price or using a pricing formula agreed upon at the formation of the contract – but traders can readily offset their positions to avoid delivery;

3. unlike in spot FX transactions, an open position is automatically rolled over to the next day (until the contract's expiration date) at no additional transaction cost to the customer.

[6] A similar idea underpinned the CME's Euro Currency TRAKRS futures. These non-traditional futures contracts, introduced a few years ago, were designed to track the Euro Currency TRAKRS Index, an index designed by Merrill Lynch to track the total return performance of the Euro relative to the U.S. dollar.

Interestingly, some exchanges (e.g., the Sydney Futures Exchange) and many OTC participants now offer (mostly to retail investors) contracts for differences (CFDs) that, for all practical purposes, function in a manner very similar to RSFs. The regulatory regime of CFDs varies from country to country and is still evolving (IDAC, 2007).

References

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