Chapter 4 - The Foreign Exchange Market

Market Structure and Roles

Volume and distribution by Country, Currencies

Who trades with Whom

Introduction to different kinds of Foreign Exchange contracts

Spot, Forward, FX swap, Futures, etc.

Quote Conventions

Arbitrage and Calculation of implicit rates

Suggested Exercises:

1, 2, 4, 5, 6 and W2.

Functions of the FX Market

Transfer of Purchasing Power

International buying/selling of goods, services, assets

Provision of Credit

We don't talk much about trade credit in this course. (Chap. 20)

Hedging FX Risk

Allowing agents to protect themselves from unexpected movements in exchange rates.

The Traditional FX Market

Two tiers: Interbank (wholesale) and Client (retail).

- Interbank transactions usually for round numbers (millions of USD, EUR, ...)
- Client transactions usually for precise amounts (down to last dollar or penny.)

The interbank market is the most liquid of any market, anywhere, ever.

- Worldwide trading volume is about 1.5 *Trillion* USD ($\$ \times 10^{12}$) *per day*
- Transactions costs are often extremely low (can be $\sim$ 0.05%)

The market is global, active 24/5 (most liquid when NY & London both open.)

- See inside cover of textbook

This is an informal market: Unincorporated, unregulated, no directors, no specific location. It is an informal network of financial agents who are prepared to trade with one another.

- Reputation is critical; everyone screens their own counterparties.

FX Derivatives Market

Non-traditional FX Market is for Derivatives (e.g. futures and options).

These are organized, regulated, incorporated exchanges, with specific locations.

- LIFFE, IMM, PHLX, SIMEX, etc.

Contracts are standardized in size, maturity, trading times.

- Counterparty is the exchange's clearing house, so no default risk

Exchange requires margin deposits, adjusted by marking to market.

- Must cover maintenance margin or lose your contracts.
- This protects clearing house by preventing defaults by clients.

A single market price is quoted at which you can buy or sell.

- However, you pay a commission to establish a position (not to liquidate it.)
- ~95% of all contracts are liquidated prior to settlement.

Exhibit 4.10 compares markets for forwards/futures.

Check out *www.cme.com* for more info.

FX Market Activity

Hard to measure what goes on in FX markets. The most comprehensive guide is the BIS triennial survey of FX market activity.

- Only every third year, for the month of April.
- Only goes back to the early 1980s, and early surveys had limited coverage.
- Latest was in April 1998. (See the web page.)

Worldwide *daily* trading in FX markets is about 1.5 *Trillion* USD ($\$ \times 10^{12}$)

- That's up from $1.2 Trillion in 1995 (about an 8% annual growth rate.)
  That's slower growth than previously, but might just reflect a stronger USD.

Exhibit 4.2 shows growth over time and breakdown by product

Only about 25% of the total volume is just straight spot fx contracts.

- The rest is mostly forward contracts and forex swaps.
  FX swaps usually outnumber forwards by about 10-to-1.
- Derivatives trading growing faster than traditional market.

FX Market Activity (cont.)

Exhibit 4.3 - Worldwide distribution of activity

London is by far the biggest centre. New York is 2nd.

Asia-Pacific together (Tokyo, Singapore, Hong Kong) = New York.

Derivatives trading more concentrated than traditional activity.

Exhibit 4.4 - Use of Different Currencies

USD is by far the most popular. DEM is a distant 2nd, JPY 3rd.

- Expect EUR to be 2nd, but bigger than DEM.
- Vast majority of transactions for each currency are against USD.
  (Lowest for DEM)

If a quote does not involve the USD, we call it a "cross rate."

- Cross Rates are typically calculated from USD rates.

FX Market Participants

Individuals and Firms (Clients): Need FX, but it's not their *raison d'être*

- e.g. tourists, exporters, importers, MNEs, intnl investors, etc.

Central Banks (and Treasuries): Buy or sell reserves to influence exchange rate

- May be willing to lose money (but this claim is controversial.)
- May also act as "Client" for government's FX needs.

FX Dealers: Passive strategy of buying or selling, depending on demand.

- Profits come from spread between buying and selling prices.

Market Makers ready to do both in Interbank market at all times.

- This role usually restricted to a few large international banks.
- Different banks make markets in different currencies.
- Requires reserves, trading limits to reduce risk.

Small & Medium-sized institutions act as dealers for their clients, then use Interbank market to unload their positions and manage their reserves.

FX Market Participants (cont.)

Foreign Exchange Brokers: They neither buy nor sell; they simply bring buyer and seller together for a small fee.

- Don't require reserves, trading limits

Speed and information is key

- maintain live links to hundreds of dealers' desks
- keep close watch on who might be looking to unload a position

Sometimes used for anonymity, so identity of client doesn't influence price.

Speculators & Arbitrageurs: no clients - trading for private gain.

- Often working at Banks/non-banks alongside dealers, brokers.

Arbitrageurs look to find buying price > selling price

- usually requires passing through many intermediate assets.

Speculators hope to make money from future changes in prices.

- Usually very short-term positions (day-trading.)

FX Contracts

Definition: A **spot** contract for foreign exchange is one in which the parties agree to exchange given amounts of foreign currency "soon."

- This is only about 1/4 of FX market volume.

In Interbank market, *value date* is the end of the 2nd business day after deal.

- If CAD/USD or USD/MXP or CAD/MXP, it is day after.
- No delay if dealing with client.

Definition: A(n outright) **forward** contract for FX specifies value date *later* than for spot contract. No money changes hands until then.

- Maturity could be anything, but typically round numbers (30, 90) and < 1 yr.

Definition: A **swap** is a combination of a spot and a forward.

- Same counterparty & amount for both, but opposite directions.
- Sometimes called *spot for forward swap.*

Swaps are much more popular than forwards, sometimes more than spot!

- Covers FX risk for temporary use of foreign funds.

FX Contracts (cont.)

Definition: An FX **Futures** contract is conceptually the same as an outright forward, but is exchange-traded. (See Exhibit 4.10)

Definition: A **Forward-Forward swap** is just like a spot-for-forward swap, but spot transaction is replaced with a forward.

- 2 forwards, opposite directions, different maturities, same counterparty.

Swap costs are determined by arbitrage with money markets.

- Remember covered interest rate parity?

Definition: A **Nondeliverable Forward** is just pays an amount equivalent to the profit/loss on a comparable forward (e.g. F-S).

- recent innovation that has caught on.
- Great for speculators, investors, avoiding currency controls & regulations.

By default, when we talk about an FX transaction, it is a *spot* transaction.

FX Quotes

All exchange rate quotations specify the amount of currency A you have to give per unit of currency B.

Direct Quote: Amount of Domestic Currency per unit Foreign Currency

Indirect Quote: Amount of Foreign Currency per unit Domestic Currency

European Terms: Amount of Currency per USD

American Terms: USD per unit Foreign Currency

Example: A quote of 1.5691 CAD/USD is a *direct* quote in Canada, but an *indirect* quote in the US, where the *direct* quote would be 1/1.5691 = 0.6373.

Example: A quote of 0.9136 USD/EUR in Canada is neither a *direct* nor an *indirect* quote; it is in *American* terms.
European terms would be 1.0946 EUR/USD.

The Interbank market uses European terms,
except for EUR, GBP, NZD, AUD, which are quoted in American terms.

FX Quotes (cont.)

Oddly enough, there is not one spot exchange rate, but two.

- The *bid* (or *offer*) is the price at which the bank is willing to buy a currency.
- The *ask* is the price at which the bank is willing to sell a currency.
- Always bid < ask.

The single "exchange rate" we usually see is just the average of the two.
(See Exhibit 4.5, 4.6)

Rule: Bid rates are ask rates for the reverse transaction (and vice versa.)

Suppose we see *JPY spot: 118.27-37*

1. Obviously in JPY/USD
2. 118.27 is bid (or offer) rate, 118.37 is ask rate, so
   Bank is willing to pay 118.27 JPY for 1 USD, or sell 1 USD for 118.37 JPY.
3. To convert to USD/JPY, *bid = 1/ask* and *ask = 1/bid*
   Bank will pay 1/118.37 = 0.008448 USD for 1 JPY or
   sell 1 JPY for 1/118.27 = 0.008455 USD

FX Quotes (cont.)

In a trading room, traders will often mention only the last two digits.

- you might also see 1.5230-35, or 1.5295-05.

The ask price - the bid price = "the spread".

Forward rates are usually quoted in *points*. (F-S)

- This is the amount to add to the spot rate to get the forward rate.

Exhibit 4.5: EUR 9-month rates are 175-177, spot rates 1.0897-1.0901.

- Forward bid rate must be 1.0897 + 0.0175 = 1.1072
- Forward ask rate must be 1.0901 + 0.0177 = 1.1078

Points tell us the cost of a swap (F-S);
i.e. the net interest payment given or received

F > S (in direct quote) means foreign currency is at a *premium*,
F < S means *discount*.

Cross Rates

Definition: Cross rates are exchange rates that do not involve the USD.

However, Cross Rates are typically calculated from USD rates.

Suppose we want the CAD/CHF rate, but we only have their USD rates?

To do this, we can just (1) buy USD with CAD, (2) buy CHF with USD.

- CAD/CHF rate = CAD/USD rate x USD/CHF rate.

However, to do this correctly, we have to remember two tricks.

1. If we are using American terms (USD/xxx), we are *dividing* by USD/CAD.
2. Since one transaction buys USD and one sells, we are using one *bid* rate and one *ask* rate. (Textbook ignores transaction costs.)

Cross Rates (cont.)

Example: GBP are quoted at $1.4419-36 and DEM are quoted at $0.6250-67. Find the implied GBP/DEM quotes.

1. GBP/DEM = GBP/USD x USD/DEM: We need to use 1/ the GBP quotes
2. Each cross rate uses one bid and one ask price, so the cross rates must be 0.6250/1.4436 = 0.4329 and 0.6267/1.4419 = 0.4346
3. Bid < Ask, so bid is 0.4329 and ask is 0.4346.

The Rip-off Rule. The market will always give you the worst possible combination of prices (i.e. biggest spread)

- Worst Bid Price is (lowest) / (highest); Worst Ask is (highest) / (lowest).

Intermarket Arbitrage

We can check whether quoted cross-rates are consistent with the underlying USD quotes.

Calculate the implied cross-rate (bid and ask) from the two USD rates.

Arbitrage possible if

1. implied bid > quoted ask
2. quoted bid > implied ask

If we ignore transaction costs (as in textbook), we only need rates to differ.

- Implies a round-trip must be profitable (in one direction or the other.)

Arbitrage Example:

Exchange Rate	Bid	Ask
CAD/USD	1.6350	1.6360
USD/EUR	0.9010	0.9020
CAD/EUR	1.4730	1.4760

Implied CAD/EUR bid = CAD/USD bid x USD/EUR bid

= 1.6350 x 0.9010 = 1.473135

Implied CAD/EUR ask = CAD/USD ask x USD/EUR ask

= 1.6360 x 0.9020 = 1.475672

No arbitrage possible here.