Ch. 5 The Foreign Exchange Market

Topics

- FOREX (or FX) Markets
- FOREX (or FX) Transactions
- FOREX (or FX) Market Participants
- FOREX (or FX) Rates & Quotations
- Cross Rates and Arbitrage

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Foreign Exchange Markets

- The FOREX market provides the physical and institutional structure through which
  - The money of one country is exchanged for that of another country.
  - The rate of exchange between currencies is determined.
  - Foreign exchange transactions are physically completed.
- A foreign exchange transaction is an agreement between a buyer and a seller that a fixed amount of one currency will be delivered for some other currency at a specified rate.

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Size of the FOREX Market

- The Bank for International Settlements (BIS) estimates that daily global net turnover in traditional FOREX market activity to be $7.5 trillion per day in April 2022.
  - Trading in OTC FX markets reached $7.5 trillion per day in April 2022 ("net-net" basis,3 all FX instruments), up 14% from $6.6 trillion three years earlier.
  - Turnover of FX swaps accounted for 51% of global turnover, up from 49% in 2019. The share of spot trades fell to 28% from 30% in 2019, and that of outright forwards remained unchanged at 15%.
  - The US dollar was on one side of 88% of all trades (unchanged from 2019). The share for the euro decreased marginally to 31% (from 32% in 2019), and those for the Japanese yen and the pound sterling remained unchanged at 17% and 13%, respectively. The renminbi's share rose to 7%, making it the fifth most traded currency in 2022 (up from eighth place in 2019 with a 4% share).

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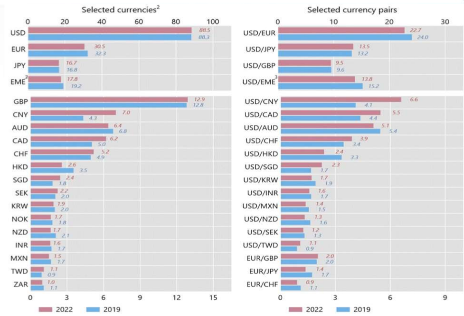
Global FX market turnover by currency pair, 2019 vs. 2022



[1] Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis. [2] As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200%. [3] Emerging market economy currencies excluding the Chinese renminbi and Russian rouble: AED, ARS, BGN, BHD, BRL, CLP, COP, CZK, HKD, HUF, IDR, ILS, INR, KRW, MXN, MYR, PEN, PHP, PLN, RON, SAR, SGD, THB, TRY, TWD and ZAR.

Source: BIS Triennial Central Bank Survey. For additional data by currency and currency pairs, see Tables 4 and 5. See our Statistics Explorer for access to the full set of published data.

Data Source: Bank for International Settlements

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Geographic Extent of the Market

- Geographically, the FOREX market spans the globe with prices moving and currencies trading every hour of every business day.
- Major world trading starts each morning in Sydney and Tokyo.
- Then moves west to Hong Kong and Singapore.
- Continuing to Europe and finishing on the West Coast of the U.S.

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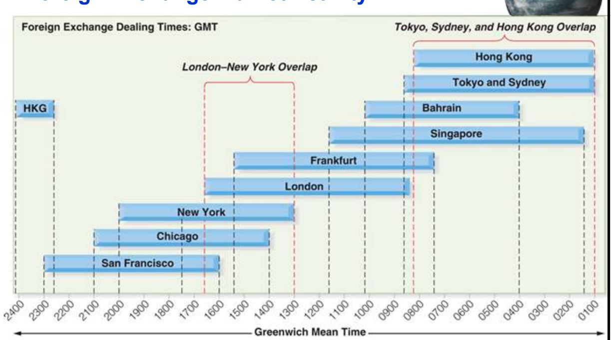
Foreign Exchange Market Activity



The currency trading day literally extends 24 hours per day. The busiest time of the day, which used to be when London and New York overlapped, has now started shifting 'further East,' to the Tokyo–Hong Kong dominated part of the day.

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Functions of the FOREX Market

- The FOREX market is the mechanism by which participants
  - Transfer purchasing power between countries: This is necessary as international trade and capital transactions normally involve parties living in countries with different national currencies.
  - Obtain or provides credit for international trade transactions: Inventories in transit must be financed.
  - Minimize exposure to exchange rate risk: FOREX markets provide instruments utilized in "hedging" or transferring risk to more willing parties.

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Market Participants

- The FOREX market consists of two tiers, the interbank or wholesale market, and the client or retail market.
- Five broad categories of participants operate within these two tiers.
  - Bank and non-bank foreign exchange dealers
  - Individuals and firms conducting commercial or investment transactions
  - Speculators and arbitragers
  - Central banks and treasuries
  - Foreign exchange brokers

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Bank and Non-bank Dealers

- These participants profit from buying currencies at a **bid** price and then reselling them at an **offer** or **ask** price.
- Competition among dealers narrows the spread between the bid and offer rate contributing to the market's efficiency.
- Dealers on behalf of large international banks often act as market makers, often willing to stand in and buy or sell these currencies without having a counterpart with which to unload the "inventory".
- Currency trading is profitable and often contributes between 10% - 20% of a banks' average net income.
- Small- to medium-sized banks rarely act as market makers yet still participate in the interbank market.

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Foreign Exchange Rates & Quotations

- Interbank quotes are given as a bid and ask.
  - The bid is the price at which a dealer will buy another currency.
  - The ask or offer is the price at which a dealer will sell another currency.
- Example
  - ¥118.27 - ¥118.37/$ is the bid/ask for Japanese yen.
  - The bank will buy $ (and sell ¥) at ¥118.27 per dollar and sell $ (and buy ¥) at ¥118.37 per dollar making profit on the spread.

$$\text{bid/ask spread (\%)} = \frac{\text{ask rate} - \text{bid rate}}{\text{ask rate}} =$$

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Individuals and Firms Conducting Commercial/Investment Transactions

- Importers, exporters, portfolio investors, MNEs, tourists and others use the FOREX market to facilitate execution of commercial or investment transactions.
- Some of these participants use the market to hedge foreign exchange rate risk.

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Speculators and Arbitragers

- Speculators and arbitragers seek to profit from trading in the market itself.
  - They operate for their own interest, without need or obligation to serve clients or ensure a continuous market.
  - Speculators seek all their profit from exchange rate changes.
  - Arbitragers try to profit from simultaneous differences in exchange rates in different markets.
- A large proportion of speculation and arbitrage is conducted on behalf of major banks by traders employed by those banks.

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Central Banks and Treasuries

- Central banks and treasuries use the market to acquire or spend their country's currency reserves as well as to influence the price at which their own currency trades.
- They may act to support the value of their currency because of their government's policies or obligations or because of commitments entered through joint float agreements such as the European Monetary System (EMS).
- Consequently, their motive is not to profit but rather influence the foreign exchange value of their currency in a manner that will benefit their interests.

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Transactions in the Interbank Market

- Transactions in the interbank market can be executed on a spot, forward, or swap basis.
  - A spot transaction requires almost immediate delivery of foreign exchange.
  - A forward transaction requires delivery of foreign exchange at some future date.
  - A swap transaction is the simultaneous exchange of one foreign currency for another.

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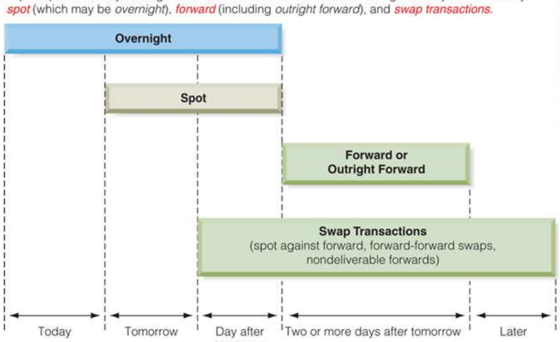
Foreign Exchange Settlement

Foreign exchange operations are defined by the timing—*the future date*—set for delivery. There are in principle three major categories of over-the-counter transactions categorized by future delivery: *spot* (which may be *overnight*), *forward* (including *outright forward*), and *swap transactions*.



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Spot Transactions

- A spot transaction in the interbank market is the purchase of foreign exchange, with delivery and payment between banks to take place, normally, on the second following business day.
  - The settlement date is often referred to as the value date.
  - This is the date when most dollar transactions are settled through the computerized Clearing House Interbank Payment Systems (CHIPS) in New York.

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Forward Transactions

- Forward transaction requires delivery at a future value date of a specified amount of one currency for another.
- The exchange rate is agreed upon at the time of the transaction, but payment and delivery are delayed.
- Forward rates are contracts quoted for value dates of one, two, three, six, nine and twelve months.
  - Terminology typically used is buying or selling forward.
  - A contract to deliver dollars for euros in six months is both buying euros forward for dollars and selling dollars forward for euros.

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Swap Transactions

- A swap transaction in the interbank market is the simultaneous purchase and sale of a given amount of foreign exchange for two different value dates.
- Both purchase and sale are conducted with the same counterpart.
- A common type of swap is a spot against forward:
  - The dealer buys a currency in the spot market and simultaneously sells the same amount back to the same bank in the forward market.
  - Since this transaction occurs at the same time and with the same counterpart, the dealer incurs no exchange rate exposure.

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Swap Transactions

- Forward-forward swaps
  - The difference between the buying and selling price is equivalent to the interest rate differential.
  - Thus a swap can be viewed as a technique for borrowing another currency on a fully collateralized basis.
  - Example: A dealer sells £20,000 forward for dollars for delivery in two months at \$1.6870/£ and simultaneously buys £20,000 forward for delivery in three months at \$1.6820/£.

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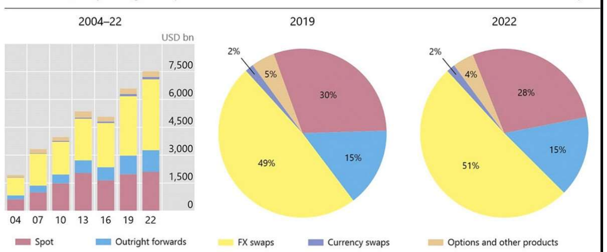
Global Foreign Exchange Market Turnover

Net-net basis, daily averages in April — Graph 1



[1] Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis.

Source: BIS Triennial Central Bank Survey. For additional data by instrument, see Table 1.

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Foreign Exchange Rates & Quotations

- A foreign exchange quote is a statement of willingness to buy or sell at an announced rate.
- European terms quotations are the foreign currency price of one US dollar. American terms are the dollar price of a foreign currency.
- A direct quote is the home currency price of a unit of foreign currency, while an indirect quote is the foreign currency price of a unit of the home currency.
  - The foreign currency price of one dollar (European quote): Sfr1.6000/\$, read as 1.600 Swiss francs per dollar (Direct quote in Swiss / Indirect quote in the US)
  - The dollar price of a unit of foreign currency (American quote): \$0.6250/Sfr, read as 0.625 dollars per Swiss franc (Direct quote in the US / Indirect quote in Swiss)

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Foreign Exchange Rates & Quotations

- Expressing Forward Quotations on a Points Basis
  - Forward quotes are different and typically quoted in terms of points.
  - A point is the last digit of a quotation, with convention dictating the number of digits to the right of the decimal.
  - Generally, a point is equal to 0.0001 of most currencies. (Note: The yen is quoted only to two decimal points.)
  - A forward quotation is not a foreign exchange rate, rather the difference between the spot and forward rates.

	Bid	Ask
Outright spot:	¥118.27	¥118.37
Plus points (3 months)	-143	-140
Outright forward:	¥	¥

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Foreign Exchange Rates & Quotations

- Forward Quotations in Percentage Terms
  - Forward quotations may also be expressed as the percent-per-annum deviation from the spot rate.
  - For indirect quotes (i.e. quote expressed in foreign currency terms), the formula is:

$$f^{FC} = \frac{\text{Spot - Foward}}{\text{Foward}} \times \frac{360}{\text{days}} \times 100$$

  - For direct quotes (i.e. quote expressed in home currency terms), the formula is:

$$f^{H} = \frac{\text{Forward - Spot}}{\text{Spot}} \times \frac{360}{\text{days}} \times 100$$

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Foreign Exchange Rates & Quotations

- Forward Quotations in Percentage Terms
  - Example: Indirect quote
  - Example: Direct quote

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Cross Rates

- Cross rate: An exchange rate between two currencies, calculated from their common relationships with a third currency.
  - Many currencies pairs are inactively traded, so their exchange rate is determined through their relationship to a widely traded third currency.
- Example: A Mexican importer needs Japanese yen to pay for purchases in Tokyo. Both the Mexican peso (MXN) and Japanese yen (¥) are quoted against US dollars.

Japanese yen: ¥110.73/$

Mexican peso: MXN 11.4456/$

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Foreign Exchange Rates & Quotations

- Cross Rates
  - The Mexican importer can buy one US dollar for 11.4456 Mexican pesos and with that dollar buy ¥110.73; the cross rate would be:

$$\frac{\text{Japanese yen/US dollar}}{\text{Mexican pesos/US dollar}} = \frac{¥110.73/\$}{\text{MXN}11.4456/\$} =$$

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Cross Rates and Triangular Arbitrage

- When cross rates differ from the direct rates between two currencies, intermarket arbitrage is possible.
- Example:

Citibank	$1.2223/€
Barclays Bank	$1.8410/£
Deutsche Bank	€1.5100/£

Then, the cross rate between Citibank and Barclays is

$$\frac{\$1.8410/£}{\$1.2223/€} =$$

This cross rate is not the same as Deutsche Bank's rate quote so an opportunity exists for risk-less profit.

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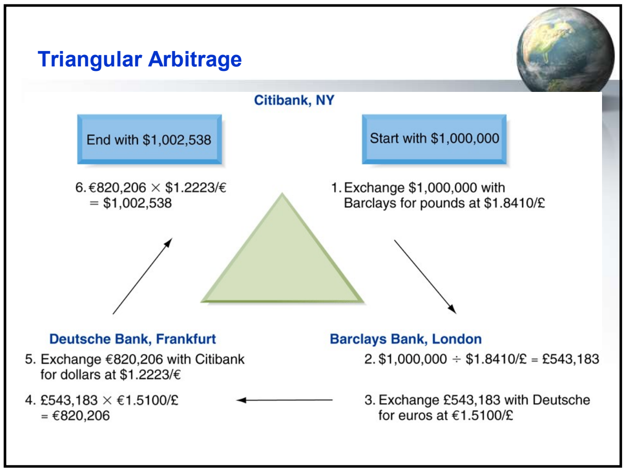
Triangular Arbitrage
Citibank, NY
End with $1,002,538
Start with $1,000,000
6. €820,206 × $1.2223/€ = $1,002,538
1. Exchange $1,000,000 with Barclays for pounds at $1.8410/£
Deutsche Bank, Frankfurt
Barclays Bank, London
5. Exchange €820,206 with Citibank for dollars at $1.2223/€
2. $1,000,000 ÷ $1.8410/£ = £543,183
4. £543,183 × €1.5100/£ = €820,206
3. Exchange £543,183 with Deutsche for euros at €1.5100/£

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