

Wiley Finance Series



Foreign Exchange Operations

*Master Trading Agreements,
Settlement, and Collateral*

DAVID F. DEROSA

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Foreign Exchange Operations

*Master Trading Agreements,
Settlement, and Collateral*

DAVID F. DEROSA, Ph.D.

WILEY

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For Francesca

Preface

The topic of this book is foreign exchange operations. At the outset, there is the question of why to study operations. The answer comes in three parts.

First, there are the practical reasons. The sums of money that are traded in the foreign exchange market are utterly massive. This makes for an enormous incentive to improve the functioning and accuracy of not just the dealing room but also the operations facility. Specifically, learning about operations can help to reduce costly mistakes. Mistakes can be expensive because they cause positions to be incorrectly hedged and create inadvertent exposure to risk. Additionally, there is always the possibility for fraud. Realistically, financial markets are natural breeding grounds for fraud, not just in sales and trading but also in operations. One objective in learning about operations should be to make fraud close to impossible to carry out, and, if it does occur, easy to discover.

The second reason for being interested in this subject is that digging into operations leads to encounters with financial history. One can learn how financial infrastructure developed as the product of changes in the foreign exchange market, legal practices, technology, and institutional arrangements.

The largest spur to the development of modern operations was the collapse of the Bretton Woods agreement in the early 1970s. This led to the creation of floating, or nearly floating, exchange rates among major currencies. During the next four decades, trading in foreign exchange and its related derivatives exploded in volume. This caused foreign-exchange-dealing banks, central banks, and industry groups to embark on a remarkable journey with the objective of

creating efficient and safe operations and, in particular, a secure settlements environment.

Along the way:

- The legal community, with the help of industry groups and central banks, designed the modern master agreements, confirmations, collateral agreements, and master give-up agreements. Particularly important was the development of closeout netting and bankruptcy-remote safe harbors for trading accounts.
- Specialized institutions came into prominence, including SWIFT (Society for Worldwide Interbank Financial Telecommunication, a communications network for secure messaging) and CLS Bank (for escrow-style bilateral settlements).
- Foreign-exchange-dealing banks acquired sophistication in the management of margin and collateral practices.
- Central banks established Real-Time Gross Settlements systems for large-scale money transfers.
- Trading desks have been automated in increasingly sophisticated ways. In Chapter 3, we look at an example of an electronic platform, FXall. Many of these platforms have direct linkages to operations departments.
- Foreign exchange dealers have capitalized on their existing operations technology to create new services for their trading customers. One example is foreign exchange prime brokerage, a subject to which I devote the whole of Chapter 7.

The third reason for being interested in operations is that it reveals how the development of the foreign exchange market has evolved around *sponsored transactional patterns*.¹ By this I mean transactional patterns that are facilitated by central banks and affiliated institutions. One normally thinks of a central bank as a creator of money, a regulator of commercial banks, and an authority in conducting monetary policy. There is another role that they

play. Central banks have broad powers over the format of trading and the actual settlement of transactions simply by their affording the market efficient funds transfer systems. Prime examples are the real-time gross settlement systems that are operated by dozens of central banks. These systems are used in practically every foreign exchange settlement because they are an efficient and economical means of effecting large value transfers.

My primary intention is to convey the practical details of how foreign exchange operations work. For this reason I have prepared more than a hundred examples of trading conversations, SWIFT messages, confirmations, statements, and other types of reports.

I have adopted a somewhat broad definition of *operations* that includes many related topics, including:

- Execution, documentation, and confirmation of trades.
- Trade settlement and funds transfers.
- Master agreements and other contractual arrangements that support trading and settlement.
- Margin and collateral practices.
- Foreign exchange prime brokerage.

Before I can begin these topics I present two introductory chapters. Chapter 1 is about the size and nature of the foreign exchange market. Chapter 2 introduces the essential concepts of currency options.

David F. DeRosa
June 2013

¹ DeRosa, David F. 2013. Sponsored transactional patterns: Comments on Mehrling's "Essential hybridity: A money view of FX." *Journal of Comparative Economics*, 41 (2) 364-366.

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The author is solely responsible for any errors.

CHAPTER 1

Introduction to Foreign Exchange

The foreign exchange market is the market where currencies are traded. A currency is the money of a country. It serves as the country's legal tender, the medium with which debts can be discharged and taxes can be paid.

As a general rule, every country has its own currency, though there are some prominent exceptions. By extension, practically every country has a central bank (DeRosa 2009).

Large money-center banks are the primary dealers in foreign exchange, trading in spot, forward, forward swaps, and options. Central banks are also instrumental to the foreign exchange market, acting as policy agents for their respective governments and as operators of the primary settlements systems. This chapter will introduce the key players, the varieties of transactions, and the important conventions of the marketplace.

DEFINING MONEY

In an international context, we say *currency*, but in a local environment the term is *money*.

Currency, or money, is curious in at least one regard. At its core, it is a creation of a central bank. Monetary economists describe central bank money, or high-powered money, as the sum of currency outstanding and in the hands of the public plus commercial bank deposits (or reserves) held at the central bank. This part of the money supply is state created. Add to this the money that is created privately in

the banking system through expansion because of fractional reserve requirements. The implication is that money is a hybrid concept, part state and part private in origin. Mehrling (2013) and DeRosa (2013) recognize this hybridity and call attention to the role of the central bank in establishing pricing parity between state money and private money.

One exception to the one-country, one-currency rule is the euro, established in 1999 and now the common currency of 17 European countries. As of 2013, the euro participants¹ are:

- Austria
- Belgium
- Cyprus
- Estonia
- Finland
- France
- Germany
- Greece
- Ireland
- Italy
- Luxembourg
- Malta
- Netherlands
- Portugal
- Slovak Republic
- Slovenia
- Spain

The euro zone is the primary example of a currency zone. Another is the Central African CFA franc zone. There are also cases of countries that use other countries' currencies, such as Ecuador and Panama, which use the U.S. dollar. Still, the general rule holds that most countries have their own unique currency.

The broader significance of this is that a specific currency is legal tender only in its own country. Therefore, if you buy dollars in exchange for yen, you must receive dollars in the United States and pay yen in Japan. This central fact of foreign exchange has implications that are discussed at length in this book.

An *exchange rate* is the price at which one currency can be exchanged for another.

PARTICIPANTS IN THE FOREIGN EXCHANGE MARKET

The foreign exchange market is the largest component of the international capital market. By this I mean that its traded volumes are substantially larger than those of the international stock and bond markets. Foreign exchange is traded everywhere there is a banking center. A large and diverse group of market participants are active in the foreign exchange market, including:

- Large-scale money-center banks that are marketmaking dealers² and the core of the foreign exchange market. They supply the bulk of the liquidity that exists in the market. These banks operate institutional trading rooms in the major money centers, those being London, New York, Tokyo, Singapore, Hong Kong, Zürich, and Sydney.
- Banks and investment banks that engage in international finance and capital markets functions.
- Commercial and merchant banks that use the foreign exchange market as part of their lending and trade finance activities.
- Smaller banks that are customers of the foreign exchange market in the sense that although they initiate transactions, they are not market makers. For the most

part, these banks act as intermediaries for clients that have the need to do foreign exchange transactions.

- Hedge funds and other alternative asset management funds that trade the whole range of foreign exchange products. They employ a variety of styles, ranging from very-short-term arbitrage and momentum strategies to long-term strategic positioning to complex options and volatility strategies.
- Other financial institutions that are customers of the foreign exchange market, including insurance companies, thrift institutions, pension funds, endowment funds, mutual funds, and investment management companies.
- Commercial institutions that use foreign exchange, such as credit card companies.
- Corporations and other commercial interests that use foreign exchange in their treasury functions and hedging programs.
- Private individuals who in some instances trade foreign exchange in much the same way and sometimes in comparable sizes as trades done by the largest hedge funds.
- Central banks are instrumental in the foreign exchange market for a variety of reasons.

Some expansion on the multifaceted role of central banks is needed. First, they are the creators of money (in the sense of the monetary base). Second, they are the regulators of the world's banks; as previously mentioned, it is the banks that are the marketmaking dealers in foreign exchange.

On a different level, central banks execute government exchange rate policies. Specifically, central banks engage in intervention and stabilization initiatives.

One other role is important to this book. Central banks are operators of *Real-Time Gross Settlements* payment systems

(Chapter 4). These operations facilitate settlement of domestic funds transfers and, by extension, foreign exchange transactions.

In another regard, some central banks and other related institutions have been known to trade foreign exchange in the fashion of an aggressive speculator or hedge fund. At times some have accumulated large positions in spot, forward, options, or exotic options. These activities are naturally controversial as they confuse the accepted role of a central bank with that of a speculator. Still, the presence of these speculator central banks cannot be dismissed, however counterintuitive their activities may seem.

IDENTIFYING CURRENCIES AND EXCHANGE RATES

Currencies have industry-defined three-letter code identifiers. The following are some examples:

Euro	EUR
Pound sterling	GBP
Australian dollar	AUD
U.S. dollar	USD
Japanese yen	JPY
Swiss franc	CHF

A more comprehensive list of currency identifiers created by the International Standards Organization is contained in the Appendix to this chapter.

Exchange rate pairs also have defined names. For example, EUR/USD refers to the exchange rate for the purchase or sale of euros in exchange for dollars. Another example is USD/JPY, which is the exchange rate for the purchase or sale of dollars in exchange for Japanese yen. These exchange rate names are universal.

The ordering of currencies in a named pair follows a convention. For example, it would not be proper to call the exchange rate “JPY/USD” or “yen/dollar”; the correct name is USD/JPY or “dollar/yen.” Likewise it is EUR/USD and never “USD/EUR” (i.e., “euro/dollar” and never “dollar/euro”). The general rule is that the first name in the exchange rate pair is currency that is being bought or sold and in whatever amount. To say “10 million EUR/USD” means a transaction to buy or sell 10 million euros against dollars. Or to say “20 million USD/JPY” means a transaction to buy or sell \$20 million against yen. The rules as to which of two currencies must come first in an exchange rate pair derive from a hierarchy that, while arbitrary, is universal:

Code	Currency Name
EUR	Euro
GBP	Pound sterling
AUD	Australian dollar
NZD	New Zealand dollar
USD	U.S. dollar
CAD	Canadian dollar
CHF	Swiss franc
JPY	Japanese yen

The euro is listed above all other currencies, which means it is always the first currency in an exchange rate pair, and as a consequence it is what is being purchased or sold in the designated amount. The major exchange rates against the euro are EUR/USD, EUR/JPY, EUR/CHF, and EUR/GBP.

The dollar is above the balance of currencies. Hence, it comes first for many currencies, such as the Canadian dollar, the Swiss franc, and the Japanese yen. This is also true for most emerging market currencies, an example being the Thai baht (THB), which trades as USD/THB.

QUOTATION CONVENTIONS

Foreign exchange dealers supply quotations for exchange rates upon demand. A quote consists of a *bid* and an *ask* on a designated quantity of currency. The bid is the price at which the dealer is willing to buy the indicated quantity of currency. The ask is the price at which the dealer is willing to sell the indicated quantity of currency. The mechanics of trading foreign exchange are covered in Chapter 3. For now I will cover some important trading rules.

There are two conventions for giving quotes in trades that involve the U.S. dollar. The euro, the pound sterling, the Australian dollar, and the New Zealand dollar are all quoted “American,” meaning the number of dollars and cents it takes to buy one unit of those currencies: A quote on EUR/USD of 1.2052 means that the euro is worth \$1.2052. If a trader buys €10 million at this rate, on value date he will receive €10 million in his European bank account and deliver \$12,052,000 into an American bank account of his counterparty's choosing.

All other currencies are quoted “European” when traded against the dollar. This means the number of units of foreign currency it takes to buy or sell one dollar. A quotation of 90.50 on USD/JPY means the dollar is worth 90.50 yen. If a trader sells \$10 million at this rate, on value day he must deliver \$10 million to an account at an American bank of his counterparty's choosing and he will receive ¥905,000,000 in his Japanese bank account.

Exchange rates that do not directly involve the dollar are called cross rates (or crosses). The most important crosses are EUR/JPY, EUR/CHF, and EUR/GBP. Cross rates are linked to dollar exchange rates through *triangular arbitrage*. For example, a trader could buy dollar/yen directly, meaning through USD/JPY (buying dollars and selling yen), or alternatively by going through the cross: Sell euros against

dollars (EUR/USD) and buy euros against yen (EUR/JPY). For example, suppose USD/JPY is quoted 90.50–90.52 on \$10 million. The first number, 90.50, is the bid, and the second, 90.52, is the ask. Also suppose euro/dollar is quoted 1.2052–1.2054. A party who wished to buy \$10 million USD/JPY could buy dollar/yen directly and pay ¥905,200,000. Alternatively, the party could try working through the cross. If euro/yen were quoted 109.09–109.10, the party could sell €8,297,378 for \$10 million and then buy the same number of euros at the EUR/JPY ask price of 109.10 to arrive at ¥905,243,943. In this example, the cross would be a more expensive way of buying the dollars. But if the ask of the cross had been .01 lower, 109.09, the \$10 million could be acquired for ¥905,160,969. In the normal markets, triangular arbitrage keeps cross rates and dollar rates in close formation.

THE FOREIGN EXCHANGE MARKET

Foreign exchange trading rooms are located in money centers all around the globe. The portion of the foreign exchange market that concerns us here is the *wholesale* market, properly called the Interbank Foreign Exchange Market (this is what I mean by *foreign exchange market*).

The preponderance of trading is between banks in benefit of themselves and their clients.

The foreign exchange market is a 24-hour market that operates during the week and sometimes on weekends and holidays. There are three trading time zones. The foreign exchange week opens Monday at 7 A.M. in New Zealand (Smyth 2007). One hour later, Sidney opens. Later, Tokyo, Hong Kong, and Singapore begin trading to complete the Australasia Time Zone. Next, trading shifts to Europe, where some of the principal centers are Frankfurt, Zurich, Geneva, Paris, and Milan. But London is the dominant center; indeed,

it is the largest foreign exchange trading center in the entire world. Hence this bloc is called the London Time Zone. At midday London time, New York opens for trading. Other cities in North America are active, such as Chicago, San Francisco, Los Angeles, and Toronto, but New York is the main foreign exchange trading location in this time zone (hence this is called the New York Time Zone). The foreign exchange day ends at 5 P.M., but this does not mean the market is closed because, except on Friday, the new day starts immediately. The reason for the New York 5 P.M. close is for booking purposes. Friday's 5 P.M. New York close marks the end of the week, but with the advent of electronic trading it is possible to do some trading over weekends.

Basic Trades

The Bank for International Settlements (BIS 2010) defines four types of foreign exchange transactions³ that are relevant for our purposes:

- 1.** A *spot* transaction is an agreement to exchange sums of currency at an agreed-upon exchange rate on a value date that is in two bank business days' time.
- 2.** A *forward outright* transaction is an agreement to exchange sums of currency at an agreed-upon exchange rate on a value date that will be in more than two bank business days' time.
- 3.** A *forward swap* consists of a spot transaction plus a forward outright at a different exchange rate in the reverse direction for value beyond spot value.
- 4.** A *currency option* is a put or a call on a quantity of foreign exchange. Options without special features are referred to as *vanilla options*. There are also *exotic options* on foreign exchange that include nonstandard features, such as *knock-out features*.

The volumes traded in the foreign exchange market are simply enormous. The most recent estimates from survey data collected in April 2010 are nearly \$4 trillion per day. [Exhibit 1.1](#) contains data from the BIS 2010 Triennial Central Bank Survey of the foreign exchange market prepared and published by the Bank for International Settlements. The BIS survey is the best source of information available on the size of the foreign exchange market. The actual surveys are taken by central banks around the world under the direction of the BIS. The BIS compiles the data and publishes the results. Each triennial survey is a snapshot of trading on one specific day in the month of April.

[Exhibit 1.1](#) Global Foreign Exchange Market Turnover^a

Daily Averages in April (billions of U.S. dollars)					
Instrument/Maturity	1998	2001	2004	2007	2010
Foreign exchange instruments	1,527	1,239	1,934	3,324	3,981
Spot transactions ^b	568	386	631	1,005	1,490
Outright forwards ^b	128	130	209	362	475
Up to 7 days	65	51	92	154	219
Over 7 days	62	80	116	208	256
Foreign exchange swaps ^b	734	656	954	1,714	1,765
Up to 7 days	528	451	700	1,329	1,304
Over 7 days	202	204	252	382	459
Currency swaps	10	7	21	31	43
Options and other products ^c	87	60	119	212	207
Memo:					
Turnover at April 2010 exchange rates ^d	1,705	1,505	2,040	3,370	3,981
Estimated gaps in reporting	49	30	116	152	144
Exchange-traded derivatives ^e	11	12	26	80	168

Source: BIS 2010.

^a Adjusted for local and cross-border inter-dealer double-counting (i.e., “net-net” basis).

^b Previously classified as part of the so-called “traditional FX market.”

^c The category “other FX products” covers highly leveraged transactions and/or trades whose notional amount is variable and where a decomposition into individual plain-vanilla components was impractical or impossible.

^d Non-U.S. dollar legs of foreign currency transactions were converted into original currency amounts at average exchange rates for April of each survey year and then reconverted into U.S. dollar amounts at average April 2010 exchange rates.

^e *Sources:* FOW TRADEdata; Futures Industry Association; various futures and options exchanges. Reported monthly data were converted into daily averages of 20.5 days in 1998, 19.5 days in 2001, 20.5 in 2004, 20 in 2007, and 20 in 2010.

[Exhibit 1.1](#) shows the remarkable expansion in trading between 1998 and 2010. It breaks down trading by type of transaction. The largest category is in short-dated foreign exchange swaps. These trades are used by market participants to postpone immediate settlements by rolling to future value dates. The second largest category is spot transactions. Forward outright and currency options round out the mix in third and fourth positions, respectively. There are also currency swaps, but they are a small portion of the total market.

[Exhibit 1.2](#) also comes from the BIS survey. It shows the percentage shares of daily volume by currency. The preponderance of trades have the dollar on one side. The vast majority of all trading involves the dollar, the euro, the Japanese yen, the pound sterling, the Australian dollar, the Swiss franc, and the Canadian dollar. This is why foreign exchange is sometimes referred to as a hierarchical market. Other currencies have a much smaller share of the overall market but one must remember that even a small share of a \$4 trillion-a-day market can still be a very large number.

[Exhibit 1.2](#) Currency Distribution of Global Foreign Exchange Market Turnover^a

Percentage Shares of Average Daily Turnover in April					
Currency	1998	2001	2004	2007	2010
U.S. dollar	86.8	89.9	88.0	85.6	84.9
Euro	—	37.9	37.4	37.0	39.1
Japanese yen	21.7	23.5	20.8	17.2	19.0
Pound sterling	11.0	13.0	16.5	14.9	12.9
Australian dollar	3.0	4.3	6.0	6.6	7.6
Swiss franc	7.1	6.0	6.0	6.8	6.4
Canadian dollar	3.5	4.5	4.2	4.3	5.3
Hong Kong dollar	1.0	2.2	1.8	2.7	2.4
Swedish krona	0.3	2.5	2.2	2.7	2.2
New Zealand dollar	0.2	0.6	1.1	1.9	1.6
Korean won	0.2	0.8	1.1	1.2	1.5
Singapore dollar	1.1	1.1	0.9	1.2	1.4
Norwegian krone	0.2	1.5	1.4	2.1	1.3
Mexican peso	0.5	0.8	1.1	1.3	1.3
Indian rupee	0.1	0.2	0.3	0.7	0.9
Russian rouble	0.3	0.3	0.6	0.7	0.9
Chinese renminbi	0.0	0.0	0.1	0.5	0.9
Polish zloty	0.1	0.5	0.4	0.8	0.8
Turkish lira	—	0.0	0.1	0.2	0.7
South African rand	0.4	0.9	0.7	0.9	0.7
Brazilian real	0.2	0.5	0.3	0.4	0.7
Danish krone	0.3	1.2	0.9	0.8	0.6
New Taiwan dollar	0.1	0.3	0.4	0.4	0.5
Hungarian forint	0.0	0.0	0.2	0.3	0.4
Malaysian ringgit	0.0	0.1	0.1	0.1	0.3
Thai baht	0.1	0.2	0.2	0.2	0.2
Czech koruna	0.3	0.2	0.2	0.2	0.2
Philippine peso	0.0	0.0	0.0	0.1	0.2
Chilean peso	0.1	0.2	0.1	0.1	0.2
Indonesian rupiah	0.1	0.0	0.1	0.1	0.2
Israeli new shekel	—	0.1	0.1	0.2	0.2
Colombian peso	—	0.0	0.0	0.1	0.1
Romanian leu	—	—	0.0	0.0	0.1
Saudi riyal	0.1	0.1	0.0	0.1	0.1
Argentine peso	0.1	—	0.0	0.0	0.0
Peruvian nuevo sol	—	0.0	0.0	0.0	0.0
Lithuanian litas	—	—	0.0	0.0	0.0
Other currencies	8.7	6.6	6.5	7.6	4.6
All currencies	200.0	200.0	200.0	200.0	200.0

Source: BIS 2010.

^a Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200 percent instead of 100 percent. Adjusted for local and cross-border inter-dealer double-counting (i.e., “net-net” basis).

[Exhibit 1.3](#) continues with data from the survey on turnover by currency pair. The top three currency pairs account for half of all currency trading: EUR/USD (28%), USD/JPY (14%), and GBP/USD (9%). What emerges from the survey is a picture of a market consisting of massive amounts of trading in the major currency pairs and much

smaller amounts of trading in possibly as many as three dozen other minor currency pairs.

Exhibit 1.3 Global Foreign Exchange Market Turnover by Currency Pair

Daily Averages in April (billions of U.S. dollars and percentages)								
Currency Pair	2001		2004		2007		2010	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
U.S. dollar/euro	372	30%	541	28%	892	27%	1,101	28%
U.S. dollar/yen	250	20%	328	17%	438	13%	568	14%
U.S. dollar/sterling	129	10%	259	13%	384	12%	360	9%
U.S. dollar/Australian dollar	51	4%	107	6%	185	6%	249	6%
U.S. dollar/Swiss franc	59	5%	83	4%	151	5%	168	4%
U.S. dollar/Canadian dollar	54	4%	77	4%	126	4%	182	5%
U.S. dollar/Swedish krona	6	0%	7	0%	57	2%	45	1%
U.S. dollar/other	193	16%	300	16%	612	18%	705	18%
Euro/yen	36	3%	61	3%	86	3%	111	3%
Euro/sterling	27	2%	47	2%	69	2%	109	3%
Euro/Swiss franc	13	1%	30	2%	62	2%	72	2%
Euro/other	22	2%	44	2%	123	4%	162	4%
Other currency pairs	28	2%	50	3%	139	4%	149	4%
All currency pairs	1,240	100%	1,934	100%	3,324	100%	3,981	100%

Source: BIS 2010.

FOREIGN EXCHANGE REGIMES

The major currencies have floated against the dollar since 1973 when the Bretton Woods-Smithsonian fixed exchange rate regime collapsed. Intra-European exchange rates were periodically subject to various forms of fixed exchange rate arrangements (such as the European Monetary System's