Lesson II: A Deeper Insight into Everyday FX Market Practice

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Getting Started

Some useful trading jargon:

- **Bid**: rate at which a certain market player is willing to buy
- **Ask**: rate at which a certain market player is willing to sell

Watch out: Bid<Ask

The Bid/Ask Spread

Bid/Ask Spread=Ask-Bid

The bid-ask spread can be conceived as a **transaction cost** (step back to Lesson I)

The Bid/Ask Spread in Practice I

Apart from two notable exceptions (GBP and EUR), all the other major currencies are quoted in **European terms**, that is **foreign currency per USD** (Lesson I).

$S_{\frac{F}{USD}} \Rightarrow$ think of these exchange rates as the **buying and selling prices of USD**

The Bid/Ask Spread in Practice II

For instance,

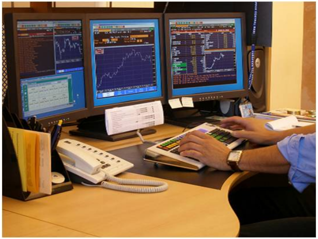
- $S_{\frac{CHF}{\textbf{bid}USD}} \Rightarrow$ rate at which a certain mkt player is willing to

  buy USD against CHF

- $S_{\frac{CHF}{\textbf{ask}USD}} \Rightarrow$ rate at which the same mkt player

  sells USD against CHF

- **Watch out**: $S_{\frac{CHF}{\textbf{bid}USD}} < S_{\frac{CHF}{\textbf{ask}USD}}$



The Bid/Ask Spread in Practice III

Conversely, EUR and GBP are quoted in **USD equivalent**

$S_{\frac{USD}{F}}$ $\Rightarrow$ think of these exchange rates as the **buying and selling prices of EUR or GBP**

The Bid/Ask Spread in Practice IV

For instance,

- $S_{\frac{USD}{\textbf{bid}\,GBP}}$ $\Rightarrow$ rate at which a certain mkt player is willing to

  buy GBP against USD

- $S_{\frac{USD}{\textbf{ask}\,GBP}}$ $\Rightarrow$ rate at which the same mkt player

  sells GBP against USD

- **Watch out**: $S_{\frac{USD}{\textbf{bid}\,GBP}} < S_{\frac{USD}{\textbf{ask}\,GBP}}$

A Closer Focus on Everyday Mkt Practice I

- $S_{\frac{USD}{\textbf{bid}EUR}} = 1.0758 \Rightarrow$ the price provider is willing to

buy EUR at 1.0758 USD

- $S_{\frac{USD}{\textbf{ask}EUR}} = 1.0759 \Rightarrow$ the price provider is willing to

sell EUR at 1.0759 USD

A Closer Focus on Everyday Mkt Practice II

- $S_{\frac{JPY}{\textbf{bid}\,USD}} = 113.05 \Rightarrow$ the price provider is willing to

  buy USD at 113.05 JPY

- $S_{\frac{JPY}{\textbf{ask}\,USD}} = 113.06 \Rightarrow$ the price provider is willing to

  sell USD at 113.06 JPY

Equivalent Notations I

$$S_{\frac{USD}{\textbf{bid}\,GBP}} = S_{\frac{\textbf{ask}\,USD}{\textbf{bid}\,GBP}}$$

Rate at which the price provider is willing to **buy GBP against (selling) USD** (i.e. the buying rate for GBP and the selling rate for USD)

Equivalent Notations II

$$S_{\frac{USD}{\textbf{ask}\,GBP}} = S_{\frac{\textbf{bid}\,USD}{\textbf{ask}\,GBP}}$$

Rate at which the price provider is willing to **sell GBP against (buying) USD** (i.e. the buying rate for USD and the selling rate for GBP)

Watch Out!

Given

$$S_{\frac{USD}{\textbf{bid}GBP}} \text{ and } S_{\frac{USD}{\textbf{ask}GBP}},$$

what if **YOU** were to sell/buy GBP?

- $S_{\frac{USD}{\textbf{bid}GBP}}$ $\Rightarrow$ number of USD **YOU** will receive from the bank from the sale of GBP per USD
- $S_{\frac{USD}{\textbf{ask}GBP}}$ $\Rightarrow$ the price that **YOU** must pay to buy GBP from USD

Evidence on the bid-ask spread

The **bid ask spread** tends to:

- **vary** throughout the day $\Rightarrow$ in particular, the spread is higher:
  - at the start/end of the trading day;
  - on Fridays (at closing), on Mondays (at opening) as well as on the last trading day of the month;
  - on market holidays (for big financial centres)
- **increase with the volatility** of the spot rate
- **decrease when more dealers** are in the market $\Rightarrow$ the larger the number of dealers, the thinner the spread

Reciprocal Rates and Bid/Ask Spread

When bid-ask prices are taken into account:

$$S_{\frac{i}{\mathbf{ask}j}} = \frac{1}{S_{\frac{j}{\mathbf{bid}i}}}$$

and

$$S_{\frac{i}{\mathbf{bid}j}} = \frac{1}{S_{\frac{j}{\mathbf{ask}i}}}$$

Cross Rates and Triangular Arbitrages I

Suppose you were to buy GBP from EUR and assume that:

	Bid	**Ask**
$S_{\frac{USD}{EUR}}$	1.102	1.105
$S_{\frac{USD}{GBP}}$	1.5775	1.581
$S_{\frac{GBP}{EUR}}$	0.696	0.6965

In principle, you could **either** choose a **direct** transaction (you sell EUR to buy GBP) or an **indirect** transaction via USD (you first sell EUR to buy USD and then you sell USD to buy GBP)...

Indirect Transaction (via USD)

	Bid	Ask
$S_{\frac{USD}{EUR}}$	1.102	1.105
$S_{\frac{USD}{GBP}}$	1.5775	1.581

- Step 1:**sell EUR to buy USD**$\Rightarrow S_{\frac{USD}{\textbf{bid}EUR}}$
- Step 2:**sell USD to buy GBP**$\Rightarrow S_{\frac{USD}{\textbf{ask}GBP}}$

The **indirect** FX rate $S_{\frac{GBP}{\textbf{bid}EUR}}$ is thus

$$\frac{S_{\frac{USD}{\textbf{bid}EUR}}}{S_{\frac{USD}{\textbf{ask}GBP}}} = \frac{1.1020}{1.581} = 0.6970$$

Direct Transaction

	Bid	Ask
$S_{\frac{GBP}{EUR}}$	0.696	0.6965

In this case, you only have to **sell EUR to buy GBP**$\Rightarrow$
$S_{\frac{GBP}{\mathbf{bid}EUR}} = 0.696$

Some Profit to Cash In...

Notice that, if you choose the **indirect transaction**, you would get 0.6970 GBP. If you conversely go for the **direct transaction**, you would only get 0.696: are there profit opportunities? If so, how would you exploit them?

In More General Terms...

- As long as $S_{\frac{GBP}{\text{bid}EUR}} \geq \frac{S_{\frac{USD}{\text{bid}EUR}}}{S_{\frac{USD}{\text{ask}GBP}}}$, you are better off choosing the **direct** transaction
- Conversely, if $S_{\frac{GBP}{\text{bid}EUR}} \leq \frac{S_{\frac{USD}{\text{bid}EUR}}}{S_{\frac{USD}{\text{ask}GBP}}}$, the **indirect** transaction will offer you a better return

The Empirical Evidence

In practice, however, **triangular arbitrage opportunities are very unlikely to materialize**.

An **increasing number of people will try to profit** from the price differential and will consequently sell EUR $\Rightarrow$ buy USD $\Rightarrow$ sell USD $\Rightarrow$ buy GBP, thus driving EUR down and GBP up, until equilibrium is finally restored **(No free lunch principle)**

$$S_{\frac{GBP}{\mathbf{bid}EUR}} = \frac{S_{\frac{USD}{\mathbf{bid}EUR}}}{S_{\frac{USD}{\mathbf{ask}GBP}}}$$

To Rust Off - Lesson I

- **Spot exchange rate**: FX rate that is contracted today for **immediate** delivery (generally, t+1 or t+2)
- **Forward exchange rate**: rate that is contracted today for the exchange of currencies on a specific date in the **future** (1m, 3m, 6m).

FX Fwd Markets: an Overview

Exactly **like the spot** market:

- **No** central **location**
- **24h** trading
- Direct **interbank market** (decentralized, continuous, open-bid, double-auction) and indirect **broker-based** market (quasi-centralized, continuous, limit-book, single-auction market) [Step back to Lesson I]
- **Bid/Ask** quotation

Adopted Notation

Forward exchange rate: rate that is contracted today for the exchange of currencies on a specific date in the future. $F_n(\frac{i}{j})$ is the n-year forward exchange rate of currency i per unit of currency j

Quoting Conventions

Forward rates are generally quoted in terms of the corresponding **spot rate** $\pm$ a suitable number of **swap points**, depending on the forward maturity taken into consideration.

Swap points will be **added to (subtracted from) the spot bid-ask** quotes whenever they are ascending (descending).

Quoting Conventions: an Example

Given the spot rates and the swap points below, how to find the corresponding fwd bid-ask quotation?

Spot Bid/Ask	Swap Points
1.3965/1.3970	27/23

Descending swap points $\Rightarrow$ to be **subtracted**

$F_{bid} = 1.3965 - .0027 = 1.3938$

and

$F_{ask} = 1.3970 - .0023 = 1.3947$

A Closer Mkt Insight

The **bid-ask spread for forward quotations** is wider as time to maturity increases: this is mostly due to market "**thinness**"

Fwd Premium and Discount

When it is necessary to pay more (less) for forward delivery than for spot delivery of a currency, we say that the currency is at a **forward premium (discount)**.

N-year forward premium/discount$= \frac{F_{n\frac{i}{j}} - S_{\frac{i}{j}}}{n \cdot S_{\frac{i}{j}}}$

Fwd Premium and Discount:an Exmple

Given $S_{\frac{JPY}{USD}} = 76.89$ and $F_{0.5\,\frac{JPY}{USD}} = 76.65$,

$$\textbf{Fwd Premium/Discount} = \frac{76.65 - 76.89}{0.5 \cdot 76.89} = 0.00624$$

Fwd **discount** of the Dollar versus the Yen (or, equivalently, fwd **premium** of the Yen versus the Dollar)

Major Traded Instruments

- **Outright fwd contract**: agreement to exchange currencies at a pre-determined price on a future date
- **FX Swap**: agreement to buy and sell foreign exchange at pre-specified exchange rates, where the buying and selling are separated in time (two major components: a spot transaction plus a forward transaction in the reverse direction). A **swap-in** (**swap-out**) EUR consists of an agreement to buy (sell) EUR spot and to sell (buy) them forward
- **Currency Swap**: agreement involving two parties in the exchange of principal and interest payments on a loan in one currency for principal and interest payments in another currency.
- **Options**: derivative contracts that give the buyer the opportunity to buy (call) or to sell (put) the underlying asset at a given price sometime in the future

Some Trading Jargon

Source: Bloomberg, 8th January 2015

BIG FIGURE

PIPS (1 pip= $\frac{1}{100}$ of a percentage point)

The Trading Book

MMID	Bid	Size	Time	MMID	Ask	Size	Time
NSDQ	617.77	1	10:54:04	baty	617.87	1	10:54:05
baty	617.60	1	10:54:04	edga	617.87	1	10:54:05
edga	617.60	1	10:54:01	NSDQ	617.88	1	10:54:04
edgx	617.51	1	10:53:52	bats	617.92	4	10:54:04
cinn	617.50	3	10:53:51	edgx	618.05	1	10:53:28
UBSS	617.50	1	10:51:39	arcx	618.36	1	10:54:04
bats	617.50	1	10:54:04	UBSS	618.40	1	10:49:20
arcx	617.43	2	10:54:02	amex	618.40	1	10:54:00
amex	616.93	1	10:53:59	WCHV	618.50	1	10:16:10
bosx	616.60	1	10:54:05	cinn	618.50	1	10:53:51
HDSN	616.59	1	10:53:52	HDSN	618.81	1	10:54:04
NITE	616.32	1	08:30:36	bosx	618.87	1	10:54:05
SBSH	615.37	1	10:53:52	NITE	620.13	1	08:30:36
cbsx	611.51	1	06:56:46	cbsx	624.02	1	06:56:46
NMRA	611.49	1	08:33:23	NMRA	624.93	1	08:33:23
BOOK	611.00	1	05:29:01	SBSH	625.00	1	10:36:17
SUSQ	603.61	1	07:24:09	SUSQ	631.05	1	07:24:09
SURG	603.00	1	07:02:27	MSCO	633.21	1	10:53:18

- **Bid Section**: **buying** proposals, **ascending** prices
- **Ask Section**: **selling** proposals, **descending** prices
- **Ranking criteria**: **Price** priority and **Time** priority
- **Mkt Depth**: Ability to **sustain large mkt orders without impacting the price** of a security $\Rightarrow$ a very large order will **not** significantly move the price of a security
- **Mkt Width**: it refers to the **cost of executing a trade** of a given size

No Free Lunch Principle

Free Lunch: situation where a good or a service is received at **NO** cost. In strict financial terms, **No Free Lunch** means that an investor will not be able to make **large and riskless** profits on a continuous, persistent basis.

To put it into practice I

2.1: Based on the table below, answer the following questions:

	Bid	Ask
$S_{\frac{USD}{Currency_1}}$	1.35135	1.35227
$S_{\frac{Currency_2}{USD}}$	83.365	83.3925

- How much would you lose if you converted USD 1000 into Currency_1 and then back into USD?
- What is the bid-ask spread for $S_{\frac{Currency_2}{USD}}$?
- What is the bid-ask spread for $S_{\frac{Currency_2}{Currency_1}}$?
- How much would you lose if you converted USD 1000 into Currency_1, then into Currency_2 and finally back into USD?

To put it into practice II

2.2: Fill in the table below and answer the following questions:

	Bid	**Ask**
$S_{\frac{CZJ}{GBP}}$	42.7512	42.7983
$S_{\frac{DKK}{GBP}}$	11.3065	11.3235
$S_{\frac{EUR}{GBP}}$	1.2439	1.2501
$S_{\frac{NOK}{GBP}}$	12.3363	12.3479
$S_{\frac{DKK}{EUR}}$		
$S_{\frac{EUR}{NOK}}$		
$S_{\frac{GBP}{CZJ}}$		

- Find the bid-ask spread for the $S_{\frac{EUR}{CZJ}}$ quote.
- How much would you lose if you converted 1500 DKK into GBP, then into EUR, further into NOK and finally back into DKK?