

Forward Contracts

A Forward Contract is an agreement to exchange a given amount of currency with another one at a predetermined exchange rate for a value date¹ beyond the second business day following the transaction. Forward contracts are legally binding contracts between two parties. These contracts are highly customized in terms of amounts and value dates (maturity) and they are privately negotiated between parties.

Since forward contracts cannot be replaced easily, they have market risk. Forward contracts also have considerable credit risk since one of the parties may default. In practice, a forward contract is between two parties that have a working relationship and mutual trust. All contracts are covered under a master agreement between bank and the clients prior to transactions. The absence of an established relationship between parties may change the nature of the forward contract; banks may require collateral/margin for the contract.

Forward contracts are privately negotiated between parties, therefore price information on individual transactions are not available as exchange traded contracts. Most financial press prices are mere indications calculated from money market rates, or averages for a group of transactions. Both WSJ and Financial Times publish indications based on money market interest rates. The following is a quote from Financial Times reflecting spot and forward rates on Pound and Euro on February 10th 2012.

DOLLAR SPOT FORWARD AGAINST THE DOLLAR

Feb 10		Closing mid-point	Change on day	Bid/offer spread	Day's mid		One month		Three month		One year	
					High	Low	Rate	%PA	Rate	%PA	Rate	%PA
Europe												
Czech Rep.	(Koruna)	19.0898	0.2477	751-044	19.2310	18.8290	19.0948	-0.3	19.0978	-0.2	19.0983	0.0
Denmark	(Danish Krone)	5.6356	0.0493	346-366	5.6499	5.5897	5.6347	0.2	5.6318	0.3	5.6166	0.3
Hungary	(Forint)	222.303	3.6467	515-539	223.870	218.820	223.148	-4.5	224.798	-4.4	231.303	-3.9
Norway	(Nor. Krone)	5.7592	0.0112	568-616	5.7873	5.7384	5.7663	-1.5	5.7813	-1.5	5.8482	-1.5
Poland	(Zloty)	3.1941	0.0432	928-953	3.2072	3.1430	3.2037	-3.6	3.2237	-3.7	3.3016	-3.3
Russia	(Rouble)	30.0600	0.3675	500-700	30.1065	29.6920	30.1695	-4.4	30.4320	-4.9	31.5800	-4.8
Sweden	(Krona)	6.6745	0.0562	723-767	6.6940	6.6193	6.6832	-1.6	6.7001	-1.5	6.7601	-1.3
Switzerland	(Fr)	0.9173	0.0071	169-176	0.9200	0.9099	0.9170	0.3	0.9162	0.5	0.9109	0.7
Turkey	(New Lira)	1.7654	0.0108	651-657	1.7723	1.7495	1.7778	-8.3	1.8021	-8.1	1.9020	-7.2
UK	(£)	1.5752	-0.0091	750-754	1.5849	1.5735	1.5749	0.3	1.5741	0.3	1.5697	0.4
Euro	(Euro)	1.3189	-0.0115	187-191	1.3291	1.3153	1.3190	-0.1	1.3194	-0.1	1.3218	-0.2
SDR	(SDR)	0.6458	0.0027	-	-	-	-	-	-	-	-	0.0
Americas												
Argentina	(Peso)	4.3463	-	430-495	4.3495	4.3393	4.3873	-11.2	4.5163	-15.1	5.1888	-16.2
Brazil	(Real)	1.7268	0.0090	265-270	1.7314	1.7160	1.7389	-8.4	1.7605	-7.7	1.8421	-6.3
Canada	(Canadian \$)	1.0012	0.0073	009-014	1.0038	0.9939	1.0018	-0.8	1.0033	-0.8	1.0099	-0.9
Mexico	(Mexican Peso)	12.7730	0.0436	719-740	12.8415	12.6616	12.8035	-2.9	12.8680	-3.0	13.1903	-3.2
Peru	(New Sol)	2.6835	-0.0040	830-840	2.6860	2.6820	2.6880	-2.0	2.6935	-1.5	2.7217	-1.4
USA	(US \$)	-	-	-	-	-	-	-	-	-	-	0.0

A forward contract is essentially a risk management tool available to financial managers. A company with a foreign currency denominated receivable or payable due at a future date faces an uncertainty regarding the domestic currency

¹ Value date is the date on which the funds are exchanged. Value date has to be a banking date.

equivalent of the cash flow. A forward contract can be used to remove this uncertainty. Company locks into an exchange rate that will remain the same regardless the spot rate.

What Do We Need to Know About Currency Forwards?

A corporate treasurer needs two sets of key skills to use forward contracts:

- Pricing: How do bankers price them? Treasurer should be able to judge if the price quoted is a fair price.
- Characteristics as a hedging tool: When would forward contracts be advantageous over other risk management products such as futures and options? Is the use of forward contract justified for a particular exposure?

First, we will focus on the pricing, and consider forward contract as a risk management tool later.

Pricing Logic:

When a currency dealer receives a request to buy or sell a particular currency forward, he/she goes through a simple pricing exercise. Let us see this in an example:

Assume that a banker in State Street bank receives a call from client to buy 1 year Japanese Yen (JPY) forward in exchange for USD. The exporter, who sold goods to Japan, expects a payment in Japanese Yen in one year. The exporter wants to convert its expected JPY cash flows into USD. In this case, State Street will receive JPY from its customer and will deliver USD in exchange. Exporter requests a forward quote from the State Street Bank, in other words, what will be the number of JPY it will have to deliver to bank in exchange for each dollar he/she will receive.

The bankers cannot quote an arbitrary rate based on their forecast of the exchanged rate one year from now. This is too risky and dangerous. If they are wrong, they may lose money. For instance if they decide to quote 110 JPY per dollar, they legally agree to exchange 110 JPY with a dollar. Client pays them 110 JPY and gets 1 USD one year from now. If State Street cannot purchase at least 1 USD with this 110 JPY, it will lose money. So they have to be very clever in their quote and make sure that they do not lose money under any circumstances. Otherwise, quoting a price based on forecast would simply be speculating. Regulations, discourage speculation by financial institutions, therefore they set rules about risk taking. Unfortunately, banks can get around these rules, and they can take more risk than they should as we have seen in the last financial crisis.

Prudent forward pricing, requires that bank does not take any risk in the process.:

Spot: USD/JPY 105-106 (read as JPY105/\$ and JPY106/\$)

US 6%-6.5%

Japanese 3%-3.25%

As you see, the exchange rates above are expressed in BID-OFFER format. The two interest rate quotes given for each currency also expressed in bid and offer format. You can think of the Bid side of the interest rate as the interest rate you earn when you deposit your money (or lend to the dealer). The Offer interest rate is the interest rate that you pay when you borrow money from the dealer.

The third parity relationship, Interest Rate Parity established that forward rates and spot rates are linked through domestic and foreign interest rates. More specifically Interest Rate Parity suggest that the Forward rate at time t with m maturity is given as:

$$F_{t+m} = S_t \times \frac{(1+i_d)}{(1+i_f)}$$

Please note that interest rates also represent interest rates at time t for a $t+m$ horizon. In order to quote a forward price, dealer in State Street Bank needs to know the spot rate, and 1-year interest rates in Japanese Yen and US dollars. Given the spot rate and the interest rate data, we can plug in the numbers and calculate the forward rate. But we have a challenge here: Should we use bid or ask spot rate? Should we use bid or offer interest rates? To answer these questions we need to dig deeper. The State Street banker's thought process may help us to sort this problem out. Let see what goes on the dealer's mind.

The dealer thinks as follows:

1. The exporter will give me some amount of JPY in exchange for one USD (base currency). I need to figure out what should this JPY amount be? (This is the forward rate the dealer will quote!)
2. What I know as of now is that I will have to deliver one USD to the exporter one year from now. This means that I have to make a dollar available one year from now.
3. To do this safely, today I will borrow X amount of USD. I can put this amount to earn interest so that it becomes \$1 when the time comes to deliver USD.
4. This means that X should be equal to $X = 1/(1+0.06) = \$0.9434$. This amount grows into \$1 in one year when it is deposited in an account earning 6% interest (note that this is the bid interest rate in the US)

$$\rightarrow \$X (1+0.06) = \$1$$

5. This means that now, I need \$0.9434 to prepare \$1 one year from now. I can buy this amount of USD at the spot market by using JPY. Since I can buy one USD with JPY106, I need $JPY106 \times 0.9434 = JPY100$, to buy \$0.9434.

6. Where do I get this 100 JPY? I borrow it at 3.25% in the JPY money market. If I do so, I need to pay back (principal and interest) $100 \times (1 + 0.0325) = 103.25$ JPY one year from now.

Now if we look at what the dealer did:

Now:

- Entered into the forward contract, promised to deliver \$1 one year from now (due to forward contract) in exchange for JPY103.25 that we identified above
- Borrowed JPY100 and bought \$0.9434 in the spot market,
- Deposited \$0.9434 for one year to grow into \$1

In one year:

- 0.9434 → became \$1,
- \$1 delivered to the client in exchange for JPY103.25
- Principal and interest payment for JPY loan JPY100 is due; pay JPY 103.25

The JPY liability that is due 1 year from now, is the key in determination of the forward rate. If we quote the client JPY103.25, we cover 100% of our liability and we cover the deal without any loss at a breakeven.

Today we agreed to exchange \$1 with 103.25 one year from now
 Borrowed JPY 100 and purchased \$0.9434 this created a liability that we have to pay one year from now equal to 103.25
 Deposited \$0.9434 to earn 6% to get \$1
 When one year passes by and contract expires we have \$1 in the bank, deliver this to the client in exchange for 103.25. Then pay our liability of 103.25. A complete wash!!

NOTE: State Street can make profit by quoting a forward rate over its breakeven forward rate. For instance, in this example breakeven forward rate is 103.25. If state street wants to make 2% profit in this transaction the rate it should quote to the exporter be: $103.25 \times (1 + 0.02) = 105.31$. However, keep in mind that this market is very competitive and it does not allow high profit margins. Dealer Banks make money by creating a large volume of business rather than by charging high margins.

In this example, the State Street plays the role of a dealer, the forward price quoted to the exporter is the “Offer Rate”, since exporter buys the base currency USD from the bank. In other words, we calculated the Forward Offer rate in this example. A short cut to break-even forward offer rate is given as:

$$\text{Forward}_{\text{offer}} = \text{Spot}_{\text{offer}} \times \frac{(1+i_{d-\text{offer}})}{(1+i_{f-\text{bid}})} = 106 \times \frac{(1+0.0325)}{(1+0.0600)} = 103.25$$

This means that in order to quote a forward offer rate, we use spot offer, domestic offer interest rate, and foreign bid interest rate.

If the State Street were contacted by an importer, instead of an exporter, it would quote Forward Bid rate. In this case, problem can be restated as:

Assume that a banker in State Street bank receives a request from an importer to buy 1 year Japanese Yen (JPY) forward. An importer, who bought goods from Japan, expects to make a payment in Japanese Yen in one year. Importer wants to convert its USDs into JPY to be able to make payment. In this case, State Street will receive USD from its customer (the importer) and will deliver JPY. Importer requests a forward quote from the State Street Bank.

Spot: USD/JPY 105-106

US : 6%-6.5%

Japanese 3%-3.25%

In this case the dealer thinks along the following lines:

1. I will receive \$1 from the importer (in this case the base currency) in exchange for some amount of JPY. I need to figure out what should this JPY amount be (This is the forward quote that we need to find in this particular case)
2. Since I will receive \$1 from the importer one year from now, I can create X amount of dollar liability today that will be \$1 one year from now. I can offset (payback as interest+principle) this liability with the \$1 that I will receive from the importer.
3. To do this, today I could borrow X amount of dollar, that is $X=1/(1+0.065)=\$0.9390$. Since I will pay 6.5% interest on it, at maturity, I will payback \$1.
4. Now, I can convert this X amount of dollar (\$0.9390) into JPY at the spot market @105, this will yield $0.9390 \times 105 = \text{JPY } 98.59$.
5. I can put this amount (JPY 98.59) to earn 3% interest so that it becomes $\text{JPY } 98.59(1+0.03) = \text{JPY } 101.55$. This means that I can offer to deliver an amount of JPY up to JPY 101.55.

Assume that today we entered in to the forward contract to receive \$1 and pay JPY101.55

Behind this decision we have the following:

- 1-A promise to receive \$1 one year from now (due to forward contract)
- 2-Borrowing \$0.9390 that I will have to pay 6.5% interest which will require me to pay USD 1 one year from now (principle and interest).
- 3-Buying JPY98.59 by using borrowed funds of \$0.9390 at the spot market.
4. Depositing JPY98.59 for one year at 3%
5. An accumulated JPY 101.55 in the bank at the end of the year.

When we receive \$1 from the client, we pay our \$1 liability back

We collect 101.55 from the bank, and deliver it to client

As in the previous case this is a complete wash. We breakeven when we quote this rate.

NOTE: State Street can make profit by discounting its breakeven forward rate. For instance, in this example breakeven forward rate is 101.55. If state street wants to make 2% profit in this transaction the rate it should quote to the exporter should be: Quoted Rate=Break-even Forward Bid Rate/(1+profit margin)

$$=101.55/(1+0.02)=JPY99.56$$

In this example state street plays the role of a dealer. The forward price quoted to the exporter is the “Bid Rate”, since importer sold the base currency USD to the bank. In other words, we calculated the Forward Bid rate in this example. A short cut to break-even forward bid rate is:

$$\text{Forward}_{\text{bid}} = \text{Spot}_{\text{bid}} \frac{(1+i_{\text{d-bid}})}{(1+i_{\text{f-offer}})} = 105 \times \frac{(1+0.030)}{(1+0.065)} = 101.55$$