

Currency Futures and Forward Contracts

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In the past 30 years exchange rates have become much more volatile and less predictable than they were during the fixed exchange rate period. For many multinational enterprises (MNE), foreign exchange risks can raise the cost of capital and lower optimal debt ratios. Using currency futures and forward contracts can help MNEs reduce their foreign exchange risk by better projecting future expected cash flows. This is but one of many uses of currency futures and forward contracts for which trading has become increasingly important in recent years. This paper will start by clarifying what futures and forward contracts are. It will then move on to describe where these financial instruments are traded. The final section will explain how currency futures and forward contracts are priced.

1 Defining Futures and Forward Contracts

1.1 Futures Contracts

“A futures contract is an agreement to buy or sell an asset at a certain time in the future for a certain price.”¹Futures contracts are generally traded on exchanges, but can also be traded in over-the-counter markets. They are an agreement between two parties where there is a seller and a buyer. The party that is selling is said to be taking a short position while the party that is buying into a futures contract is said to be taking a long position. Before an agreement can be reached between both parties, the contract underlying the exchange must be specified in some detail, that is, it must state the underlying asset, the contract size, the location of the delivery as well as the expiry date.

The underlying asset

The underlying asset can either be a commodity or a financial asset. When the asset is a commodity, the exchange must clearly state the quality level acceptable since a good's worth can vary substantially in the marketplace. Examples of commodities traded in futures contracts are corn, oats, wheat, copper and oil. Financial assets underlying futures contracts are generally well defined and unambiguous. Examples of financial assets underlying futures

¹Hull (2001) p.1

contracts are bonds, Treasury notes, stocks, market indices and currencies. Therefore, currency futures contracts differ from other futures contracts because the underlying asset is a certain number of units of currency rather than a commodity or some other financial asset. There are two different ways to state the trading exchange rate used in currency futures contracts; the first being direct quotes and the second indirect quotes. A direct quote is the home currency price of one unit of foreign currency whereas an indirect quote is the foreign currency price of a unit of home currency. For example, the foreign exchange rate quote “GBP0.4678/USD” is a direct quote in the UK and an indirect quote in the US.

The contract size

“The contract size specifies the amount of the asset that has to be delivered under one contract.”²In the case of a currency futures contract, trading in each currency must be done in an even multiple of currency units. A typical currency futures contract size found on an exchange could be for 62,500GBP.

The location of the delivery

A futures contract must state the place where the delivery will be made. When the asset underlying the futures contract is a commodity the location of the delivery becomes important due to the transportation costs associated.

The expiry date

Futures contracts also differ according to their expiry date. The expiry dates for currency futures contracts are usually the third Wednesday of the months of March, June, September and December. Trading stops two business days prior the expiry date while delivery of the actual asset typically takes place two business days following the expiration date. Generally, only the three contracts closest in maturity are traded.

Marking to market

Futures contracts are not traded between two individuals but rather the agreements are made between a client and the exchange clearinghouse. Usually, a third party such as a

²Hull (2001) p.18

broker is also involved in the transaction. The broker acts as an intermediary between the client and the exchange clearinghouse unless the broker is himself already a member of the clearinghouse. The reason why futures contracts are not negotiated directly between two individuals but rather through clearinghouses is to avoid the possibility of one of the parties defaulting. This is why clearing corporations require that investors make an initial deposit that acts as collateral. This amount is called the initial margin and it is deposited in the margin account. At the end of each trading day, the margin account is adjusted to reflect the investor's gain or loss during the day. "This practice is referred to as marking to market the account."³

To further explain how this works, a bit of notation is required. The exchange rate stipulated in the futures contract will be referred to as K while the futures exchange rate at any time T will be noted as F_T . Depending on the investors position when entering the currency futures contract (short or long), $F_T - K$ will either represent a gain or a loss for the investor at the end of a trading day. Suppose an investor enters a long futures contract to buy 1 Million Canadian dollars at an exchange rate of $\frac{CAD1.26}{USD}$ (this is K). At the end of the first trading day after entering the contract, the futures exchange rate on the same contract is now $\frac{CAD1.28}{USD}$ (this is F_1) . The price of Canadian dollars relative to US dollars has risen which puts the investor in a favorable position. On the first day of trading since entering the contract, the investor has made a gain of:

$\frac{USD}{1.26CAD} - \frac{USD}{1.28CAD} \times 1\,000\,000\,CAD = 12\,400.80\,CAD$. Therefore, this amount will be deposited in his margin account. If the currency futures exchange rate after the first trading day had instead fallen, the investor would have suffered a loss and that amount is withdrawn from their margin account. When the investor's margin account drops below a predetermined amount called the maintenance margin, the investor is required to deposit funds until the account is back to the initial margin. An investor can close out his position at any time while the futures contract is still trading on the exchange. To do so, an investor must enter

³Hull (2001) p.21

into the same futures contract but with the opposite position. Thus, an investor holding a long position on a currency futures contract expiring in 3 months can close out his position by entering into the same contract but with a short position. Their total gain or loss will be the sum of their daily gains or losses recorded in his margin account minus the funds used to top up the margin account.

1.2 Forward Contracts

A forward contract is very similar to a futures contract in that it is also an agreement to buy or sell an asset at a certain time in the future for a certain price. Forward contracts differ from futures contracts because they are traded on the over-the-counter market rather than on exchanges. They are private contracts generally entered into by two financial institutions or a financial institution and one of its corporate clients. Because forward contracts are not traded on exchanges, they are flexible and much less standardized than futures contracts. The contract size and the delivery date are negotiated between the two parties. Whereas most futures contracts are closed out before their expiry date, forward contracts generally end with the physical delivery of the good or with a final cash settlement in the case of financial assets. Therefore, forward contracts are not marked to market daily and the investors gain or loss is realized when the contract matures and there is a final cash settlement between both parties. Since there is no exchange clearinghouse involved in forward contracts, there is a greater possibility that one party might default. This risk tends to make forward contracts higher-priced.

2 Location of Trading

As previously mentioned, futures contracts are traded on exchanges whereas forward contracts are traded on the over-the-counter market. The two largest futures exchanges in the United States are the Chicago Board of Trade and the Chicago Mercantile Exchange. The two largest exchanges in Europe are the London International Financial Futures and

Options Exchange and Eurex. The most important market for foreign currency futures in the United States is the International Monetary Market (IMM) of Chicago, a division of the Chicago Mercantile Exchange. The over-the-counter market “is a telephone and computer-linked network of dealers who do not physically meet.”⁴ The trades are done over the phone with the conversations usually being taped. Because contracts negotiated on the over-the-counter market are not as standardized as those on the exchange and can vary substantially as to their size and maturity, the over-the-counter market is much less liquid than exchanges. Therefore, the secondary market which consists of reselling futures and forward contracts is less important.

3 Pricing Currency Futures and Forward Contracts

In order to show how currency futures and forward contracts are priced, some assumptions must be made and are as follows: ⁵:

- There are no transaction costs.
- All market participants face the same tax rate on net trading profits.
- Market participants can borrow and lend money at the same risk free interest rate.
- Market participants take advantage of arbitrage opportunities as they occur.

The notation used is the following:

- T is the the time until delivery date in a forward or futures contract.
- S_0 is the spot price in dollars of one unit of the foreign currency.
- F_0 is the forward or futures price in dollars of one unit of the foreign currency.
- r is the domestic risk-free interest rate.

⁴Hull (2001) p.3

⁵Hull (2001) p.44

- r_f is the foreign risk-free interest rate.

The relationship between F_0 and S_0 is: $F_0 = S_0 e^{(r-r_f)T}$. The risk free interest rates are continuously compounded which is why they are modelled in an exponential form. This relationship between F_0 and S_0 follows from the theory of interest rate parity. If this relationship does not hold then arbitrage opportunities arise which will put pressure on the market until the equality is re-established.

4 Conclusion

With more and more companies expanding internationally and global markets becoming increasingly intertwined, currency futures and forward contracts represent invaluable tools in dealing with foreign exchange risk. Without them, a company's profits could vary substantially due to fluctuations in foreign exchange rates. Today, currency futures and forward contracts are used mainly by hedgers, speculators and arbitrageurs who use them all for different purposes.

References

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