Introduction to Global Securities Market

国际证券市场简介

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Learning Objectives

After studying this session, you should be able to:

1) Gain a solid understanding of fundamental concepts related to Foreign Exchange including markets, participants, quotation and conventions, trading instruments and basic calculations

2) Convert exchange rates based on the quotations

3) Calculate arbitrage opportunities if any

4) Derivative Securities (衍生证券）

What is Foreign Exchange?

Foreign Exchange (also known as "forex" or "FX") is the exchange of one country's currency for another. All foreign exchanges are determined by a rate of exchange, or a ratio valuing one currency against another.

An Exchange Rate is a ratio that describes how many units of one currency you can buy per unit of another currency.

e.g. on June 10, 2021

USD 1 = CNY 6.38895

Or

EUR 1 = USD 0.15645

What is Foreign Exchange?

- **In finance, the exchange rate between two currencies specifies how much one currency is worth in terms of the other.**
- **For example, an exchange rate of 110 Japanese Yen to the Dollar means that ¥110 is worth the same as $1.**
- **An exchange rate is also known as a foreign exchange rate, or FX rate.**
- **Each sovereign state issues and manages its own currency through a national central bank. The exception is the Euro Zone, which covers multiple countries**

Foreign Exchange Market

- The FX market facilitates:
  - Conversion of purchasing power from one currency to another; bank deposits of foreign currency; credit denominated in foreign currency; foreign trade financing; trading in foreign currency options & futures, and currency swaps
- Unlike stock exchanges, there is no central market place
  - World-wide linkage of bank currency traders, non-bank dealers (IBanks, insurance companies, etc.), and FX brokers—like an international OTC market
  - Trading conduct over the counter
- Largest and most liquid financial market in the world
  - Daily trading volumes reached US$6.6trillion in 2021, US$5.5 trillion in 2014 vs $1.7 trillion in 1998
  - Trading occurs 24 hours a day, five days a week, with currencies being traded worldwide among the eight major financial centers of London, New York, Tokyo, Zürich, Hong Kong, Singapore, Paris and Sydney -spanning most time zones.

Foreign Exchange Market

- London is the largest FX trading center: in April, 2019, 43.1% of total trading volumes in the world

- New York: 16.5%

- Singapore: 7.6%

Foreign Exchange Market

- Participants
  - Banks
  - Commercial companies
  - Central banks
  - Investment management firms
  - Hedge funds as speculator
  - Retail

- Only about 15% of FX is directly driven by cross-border trade in goods and services. Approximately 85% is driven by capital transactions conducted by banks for financial engineering and speculation.

Foreign Exchange Market

- Most liquid Market
- Exchange rates are highly sensitive to a great variety of factors
- Round-the-clock market
- Main international Banks continuously provide both bid and ask rates
- Exchange rate fluctuations are usually caused by actual monetary flows as well as anticipations on global macroeconomic conditions
- Traded in pairs like, USD/CHF, USD/JPY, EUR/USD, GBP/USD, USD/CAD etc

Foreign Exchange Market

Average daily international foreign exchange trading volume was $6.6 trillion in 2021 according to the BIS study:

Volumes by countries

- UK, 43.7%
- US, 16.5%
- Singapore, 7.6%

Top 5 Most Traded Currencies

RANK	CURRENCY	CODE	SYMBOL
1	United States Dollar	USD	$
2	Euro	EUR	€
3	Japanese Yen	JPY	¥
4	British Pound Sterling	GBP	£
5	Australian Dollar	AUD	AU $

As of: February 2021

Foreign Exchange Market

- 180 currencies as of 2020
- 36 major currencies, such as the U.S. dollar, the Japanese yen, the Euro, and the British pound are determined largely by market forces.
- 82 countries, including China, India, Russia, and Singapore, adopt some forms of “Managed Floating” system. (Source: 2014, International Monetary Fund)
- 41 countries do not have their own national currencies!
- 40 countries, including many islands in the Caribbean, many African nations, UAE and Venezuela, do have their own currencies, but they maintain a peg to another currency such as the U.S. dollar.
- The remaining countries have some mixture of fixed and floating exchange-rate regimes.

The Euro

- Product of the desire to create a more integrated European economy.
- Eleven European countries adopted the Euro on January 1, 1999:
  - Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.
- The following countries opted out initially:
  - Denmark, Greece, Sweden, and the U.K.
- Euro notes and coins were introduced in 2002
- Greece adopted the Euro in 2001
- Slovenia adopted the Euro in 2007

Foreign Exchange Market

As per Bank for International Settlements (BIS) study, in FX spot market heavily traded products are:

- EUR/USD -28 %
- USD/JPY -17 %
- GBP/USD (also called *Pounds*/*cable*) -14 %

- US currency was involved 89% of transactions, followed by the euro (37%), the yen (20%) and sterling (17%)

- The foreign exchange market is thus still overwhelmingly dollar-centered

Foreign Exchange Market

- Round the clock Market –Market opens from Sydney –Tokyo -Hong Kong – Singapore –Dubai –London –Frankfurt –Paris -New York

- FX market is open 24 hours a day throughout the week.

- Closing worldwide Friday afternoon at 5pm New York time, ie 2100 GMT, and reopening Sunday 1900 GMT when Wellington, New Zealand opens on their Monday morning

FX Market Structure & Participants

- The FX market is a two-tiered market:
  - Interbank Market (Wholesale)
    - Accounts for about 83% of FX trading volume—mostly speculative or arbitrage transactions
    - About 100-200 international banks worldwide stand ready to make a market in foreign exchange
    - FX brokers match buy and sell orders but do not carry inventory
  - Client Market (Retail)
    - Accounts for about 17% of FX trading volume

- Market participants include international banks, their customers, non-bank dealers, FX brokers, and central banks

Exchange Rate

- The exchange rate between two currencies specifies how much one currency is worth in terms of the other.

- An exchange rate is also known as a foreign-exchange rate, forex rate or FX rate.

- For example an exchange rate of 110 Japanese yen (JPY, ¥) to the United States dollar (USD, $) means that JPY 110 is worth the same as USD 1

Exchange Rate

In-class exercise:

If you read that the Japanese yen is trading at $0.01232, how many yen will each dollar buy?

- 0.01232
- 1.232
- 81.169
- 8.119

Exchange Rate

In-class exercise:

The U.S. dollar was recently quoted at CHF0.8594 (Swiss francs). If you have placed an order for CHF 50,000 worth of watches from a Swiss watch dealer, how many dollars will this order cost?

- $58,180
- $42,970
- $50,000
- $52,180

Exchange Rate

A currency appreciates when it rises in value relative to another foreign currency and likewise a currency depreciates when it falls in value relative to another foreign currency.

For example, If the Mexican Peso moves from $0.09 to $0.10, the Peso has appreciated – each Peso can buy $0.10 now instead of $0.09.

For US dollar, it has depreciated. By how much?

Determinants of Exchange Rates

- Demand, Supply, and Equilibrium in the FX Market: Exchange rates are determined by supply and demand
- Changes in Exchange Rates are caused by:
  - Differential Income Growth among nations will cause those nations with the highest income growth to demand more imported goods. The heightened demand for imports will increase demand for foreign currency – appreciating the foreign currency and depreciating the domestic currency.
  - Differential Inflation Rates will also cause a movement in exchange rates.
  - Differential Interest Rates will cause a flow of capital into those countries with the highest available real rates of interest.

Determinants of Exchange Rates

What will cause a nation's currency to appreciate?

- Slow growth of income relative to one's trading partners will cause imports to lag behind exports
- A rate of inflation that is lower than that of one's trading partners
- Domestic real interest rates that are greater than real interest rates abroad

Determinants of Exchange Rates

What will cause a nation's currency to depreciate?

- Rapid growth of income relative to one's trading partners that stimulates imports relative to exports
- A rate of inflation that is higher than that of one's trading partners
- Domestic real interest rates that are lower than real interest rates abroad

Determinants of Exchange Rates

In-class exercise:

If the Mexico Peso moves from $0.09 to $0.10, which of the following is true?

- It becomes more expensive for Americans to buy Mexican goods
- It becomes less expensive for Mexicans to buy American goods
- Mexican industry becomes less competitive with Americans in the U.S. market
- All of the above are true

Bid/Offer Spread

- Like any other market, there is a Bid/Offer Spread –Difference between buying and selling prices.

- Market maker buys at a lower price and sells at a higher price. For example: 1 USD = 1.3273/1.3275 means, I as a market maker, buy 1 USD at 1.3273 CHF and sell 1 USD at 1.3275 CHF.

- But, this is narrow spread only for interbank market or wholesale market.

- For Individual currency speculators, spread is more, say, 1 USD = 1.3250/1.3300 CHF

Bid/Offer Spread

A bid price is the exchange rate the bank is willing to buy a currency at.

An offer/ask price is the exchange rate the bank is willing to sell at a currency at.

In-class exercise:

You receive a bid-ask quote for pesos 8.00-8.50. If you have $100, how many pesos will you be able to buy?

- 118
- 125
- 800
- 850

What will happen if you hold pesos and want to convert back to USD?

Exchange Rate Quotation

- An exchange rate quotation is given by stating the number of units of a counter currency that can be bought in terms of 1 Base currency.

- Counter Currency is also called as Given Currency or Variable Currency.

- Two types of Quotations :
    1. Market Quotation
    2. Inverted Quotation

Exchange Rate Quotation

- Market Quotations are the quotations which market players use in Trading and is popularly quoted across all the Trading centers.

e.g.: 1 USD = 1.2025 CAD
1 EUR = 1.1880 USD
1 GBP = 1.7550 USD

- Inverted Quotations are the reverse of the Market Quotations. Inverted quotations are reciprocal to Market Quotations.

e.g.: 1 CAD = 0.8316 USD
1 USD = 0.8417 EUR
1 USD = 0.5698 GBP

FX Quotation

- Quote Pair : USD / HKD
- Bid / Ask (offer) : 7.7753 / 7.7780
- Spread point: 27 basis points
- Quote convention: the last two digits of decimal point (e.g. 53, 80)
  - Direct quote: Foreign currency/Local currency e.g. In Hong Kong, the quote: USD/HKD=7.7753/7.7780
  - Indirect quote: Local currency/Foreign currency e.g. In Sydney, the quote: AUD/USD=0.7358/0.7361

Exchange Rate Quotation

- In foreign exchange markets, the base currency is the first currency in a currency pair.

- Exchange rates are quoted in per unit of the base currency

- Currently the euro is the dominant base currency against all other global currencies.

- Many market participants use the expressions "currency 1" and "currency 2", where one unit of CCY1 equals a variable number of units of CCY2.

Exchange Rate Regime

- Fixed Exchange Rate : is a type of exchange rate regime wherein a currency's value is matched to the value of another single currency or to a basket of other currencies, or to another measure of value, such as gold.

- For Ex: Chinese RMB use to be stable for many years around 1 USD = 8.08 (between 8.07 and 8.12)

- Floating exchange rate or a flexible exchange rate is a type of exchange rate regime where in a currency's value is allowed to fluctuate according to the foreign exchange market.

- For Ex: EUR/USD, GBP/USD, AUD/USD, USD/CHF etc.

Fluctuations in Exchange Rate

- Demand and Supply
- Country's level of business activity and FOREX RESERVES.
- Gross Domestic Product (GDP) and Employment Levels
- Volume of Trade / Exports & Imports
- Trade Deficit/Current Account Deficit
- Interest Rates / Monetary Policy
- Political stability

Spot Exchange

- The exchange of two currencies for immediate delivery, normally with T+2.

- Some spot exchanges can be delivered on the same day (T+0) or “Value TOM-tomorrow” (T+1), depending on the country market practices. Eg. USD/CAD

  - Example:
  - Trade Date: May 13th, 2005

  - Value Date / Settlement Date : May 15th, 2005

Spot Exchange

- The spot market involves the immediate purchase or sale of foreign exchange
  - Cash settlement occurs 1-2 days after the transaction
- Currencies are quoted against the US dollar
- Interbank FX traders buy currency for their inventory at the *bid price*
- Interbank FX traders sell currency for their inventory at the *ask price*
- Bid price is less than the ask price
- Bid-ask spread is a transaction cost

FX - Spot

Reuters Screen for FX Spot prices:

Currency Pair	BID	OFFER	Bank	High Bid	Low Bid
EUR/USD	1.1880	1.1882	JP Morgan	1.1922	1.1860
GBP/USD	1.7460	1.7462	Deutsche Bk	1.7475	1.7380
USD/JPY	116.85	116.88	HSBC Bank	117.11	116.57
AUD/USD	0.7275	0.7278	RB of Aus	0.7318	0.7265
USD/CAD	1.1715	1.1718	HSBC Bank	1.1734	1.1692
USD/CHF	1.3140	1.3145	Std. Chd Bk	1.3155	1.3102
USD/INR	45.21	45.22	State Bank	45.34	45.18
USD/SGD	1.1661	1.1664	Deutsche Bk	1.1686	1.1654

The Spot Market

- **Trade Date:** The date on which the deal is concluded between the two counterparties.

- **Value Date:** The date of settlement of currencies between each other. Spot Date is the value date for all FX Spot deals I.e, usually two working days.

- **Bid:** Is the rate at which market maker buys the Base Currency

- **Offer / Ask :** Is the rate at which market maker sells the Base Currency

- **Base Currency 1 EUR = 1.1880 USD Variable Currency**

The Spot Market

Percent Spread Formula (PS):

$$PS = \frac{Ask - Bid}{Ask} x100$$

The Spot Market – Direct Quotes

- US dollar price of 1 unit of foreign currency—$ are in the numerator (foreign currency is priced in terms of dollars)
  - $/€ = 1.5000 (1€ costs $1.5000)
  - $/£ = 2.0000 (1£ costs $2.0000)

- Currency changes
  - Suppose that today, $/€ = 1.5000 and in 1 month, $/€ = 1.5050
    - The $ has *depreciated* in value
    - Alternatively, the € has *appreciated* in value

  - Suppose that today, $/£ = 2.0000 and in 1 month, $/£ = 1.9950
    - The $ has *appreciated* in value
    - Alternatively, the £ has *depreciated* in value

The Spot Market – Indirect Quotes

- Foreign currency price of $1—$ are in the denominator (US dollar is priced in terms of foreign currency)
  - €/$ = 0.6667 ($1costs €0.6667)
  - £/$ = 0.5000 ($1 costs £0.5000)

- Currency changes
  - Suppose that today, €/$ = 0.6667 and in 1 month, €/$ = 0.6600
    - The $ has *depreciated* in value
    - Alternatively, the € has *appreciated* in value

  - Suppose that today, £/$ = 0.5000 and in 1 week, £/$ = 0.5050.
    - The $ has *appreciated* in value
    - Alternatively, the £ has *depreciated* in value

The Spot Market – Conventions

- **Denote the spot rate as S**
- **For most currencies, use 4 decimal places in calculations**
  - With exceptions: i.e. S(¥/$)=109.0750, but S($/¥)=0.009168
- **If we are talking about the US, always quote spot rates as the dollar price of the foreign currency**
  - i.e. as direct quotes, S($/€), S($/C$), S($/£), etc
- **Increase in the exchange rate ⇒ the US dollar is depreciating**
  - Costs more to buy 1 unit of foreign currency
- **Decrease in the exchange rate ⇒ the US dollar is appreciating**
  - Costs less to buy 1 unit of foreign currency

The Spot Market

Wednesday, January 8, 1997

EXCHANGE RATES

The New York foreign exchange selling rates below apply to trading among banks in amounts of $1 million and more, as quoted at 4 p.m. Eastern time by Dow Jones Telerate Inc. and other sources. Retail transactions provide fewer units of foreign currency per dollar.

Country	U.S. $ equiv. Wed.	U.S. $ equiv. Tues.	Currency per U.S. $ Wed.	Currency per U.S. $ Tues.
Argentina (Peso)	1.0012	1.0012	.9988	.9988
Australia (Dollar)	.7805	.7902	1.2812	1.2655
Austria (Schilling)	.09043	.09101	11.058	10.988
Bahrain (Dinar)	2.6525	2.6525	.3770	.3770
Belgium (Franc)	.03080	.03105	32.470	32.205
Brazil (Real)	.9607	.9615	1.0409	1.0401
Britain (Pound)	1.6880	1.6946	.5924	.5901
30-Day Forward	1.6869	1.6935	.5928	.5905
90-Day Forward	1.6843	1.6910	.5937	.5914
180-Day Forward	1.6802	1.6867	.5952	.5929
Canada (Dollar)	.7399	.7370	1.3516	1.3568
30-Day Forward	.7414	.7386	1.3488	1.3539
90-Day Forward	.7442	.7413	1.3437	1.3489
180-Day Forward	.7479	.7450	1.3370	1.3422
Chile (Peso)	.002352	.002356	425.25	424.40
China (Renminbi)	.1201	.1201	8.3272	8.3276
Colombia (Peso)	.0009985	.0009985	1001.50	1001.50
Czech. Rep (Krouna)	....	....	....	....
Commercial rate	.03662	.03677	27.307	27.194
Denmark (Krone)	.1663	.1677	6.0118	5.9633
Ecuador (Sucre)	....	....	....	....
Floating rate	.0002766	.0002787	3615.00	3587.50
Finland (Markka)	.2121	.2135	4.7150	4.6841
France (Franc)	.1879	.1893	5.3220	5.2838
30-Day Forward	.1882	.1896	5.3126	5.2741
90-Day Forward	.1889	.1903	5.2935	5.2558
180-Day Forward	.1901	.1914	5.2617	5.2243
Germany (Mark)	.6352	.6394	1.5744	1.5639
30-Day Forward	.6364	.6407	1.5714	1.5607
90-Day Forward	.6389	.6432	1.5652	1.5547
180-Day Forward	.6430	.6472	1.5552	1.5450
Greece (Drachma)	.004049	.004068	246.98	245.80
Hong Kong (Dollar)	.1292	.1292	7.7390	7.7390
Hungary (Forint)	.006139	.006164	162.89	162.23
India (Rupee)	.02787	.02786	35.875	35.890
Indonesia (Rupiah)	.0004233	.0004233	2362.15	2362.63
Ireland (Punt)	1.6664	1.6714	.6001	.5983
Israel (Shekel)	.3079	.3085	3.2474	3.2412
Italy (Lira)	.0006483	.0006510	1542.50	1536.00
Japan (Yen)	.008639	.008681	115.75	115.20
30-Day Forward	.008676	.008718	115.26	114.71
90-Day Forward	.008750	.008791	114.28	113.76
180-Day Forward	.008865	.008907	112.80	112.28
Jordan (Dinar)	1.4075	1.4075	.7105	.7105
Kuwait (Dinar)	3.3367	3.3389	.2997	.2995
Lebanon (Pound)	.0006445	.0006445	1551.50	1551.50
Malaysia (Ringgit)	.4018	.4002	2.4885	2.4990
Malta (Lira)	2.7624	2.7701	.3620	.3610
Mexico (Peso)	....	....	....	....
Floating rate	.1278	.1277	7.8220	7.8330
Netherland (Guilder)	.5655	.5699	1.7685	1.7547
New Zealand (Dollar)	.7072	.7106	1.4140	1.4073
Norway (Krone)	.1540	.1548	6.4926	6.4599
Pakistan (Rupee)	.02529	.02529	39.540	39.540
Peru (new Sol)	.3814	.3840	2.6218	2.6039
Philippines (Peso)	.03800	.03802	26.318	26.300
Poland (Zloty)	.3460	.3475	2.8900	2.8780
Portugal (Escudo)	.006307	.006369	158.55	157.02
Russia (Ruble) (a)	.0001787	.0001788	5595.00	5594.00
Saudi Arabia (Riyal)	.2666	.2667	3.7503	3.7502
Singapore (Dollar)	.7116	.7124	1.4053	1.4037
Slovak Rep. (Koruna)	.03259	.03259	30.688	30.688
South Africa (Rand)	.2141	.2142	4.6705	4.6690
South Korea (Won)	.001184	.001184	844.75	844.65
Spain (Peseta)	.007546	.007603	132.52	131.53
Sweden (Krona)	.1431	.1435	6.9865	6.9697
Switzerland (Franc)	.7334	.7387	1.3635	1.3537
30-Day Forward	.7357	.7411	1.3593	1.3494
90-Day Forward	.7401	.7454	1.3511	1.3416
180-Day Forward	.7470	.7523	1.3386	1.3293
Taiwan (Dollar)	.03638	.03637	27.489	27.493
Thailand (Baht)	.03902	.03906	25.625	25.605
Turkey (Lira)	.00000911	.00000915	109755.00	109235.00
United Arab (Dirham)	.2723	.2723	3.6720	3.6720
Uruguay (New Peso)	....	....	....	....
Financial	.1145	.1145	8.7300	8.7300
Venezuela (Bolivar)	.002098	.002096	476.70	477.12
SDR	1.4315	1.4326	.6986	.6980
ECU	1.2308	1.2404	.....	.....

Special Drawing Rights (SDR) are based on exchange rates for the U.S., German, British, French, and Japanese currencies. Source: International Monetary Fund.

European Currency Unit (ECU) is based on a basket of community currencies.

a-fixing, Moscow Interbank Currency Exchange.

US dollar price:
S($/£)=1.6880
£1 costs $1.6880

UK pound price:
S(£/$)=0.5924
$1 costs £0.5924

And note that

$$S(\$/£) = \frac{1}{S(£/\$)}$$

The Spot Market

- The current exchange, S($/€)=1.5000. In 1 month, it is S(€/$)=0.6689
  - Has the US dollar appreciated or depreciated?
  - By what % has the exchange rate changed?
- Convert S(€/$)=0.6689 to:

  1/S(€/$)=S($/€)=1.4950.
  - Now we see that the exchange rate has decreased ⇒ US dollar has appreciated.
  - The % change per month is:

$$\frac{1.4950-1.5000}{1.5000} = -0.33\%$$

Cross Exchange Rates

- The exchange rate between 2 currencies where neither currency is the US dollar
- We know the dollar rates. What if we want to know other rates, i.e. S(€/£) ?
  - Calculate cross-rates from dollar rates
  - S($/€)=1.5000 and S($/£)=2.0000. What is S(€/£), i.e. the € price of £?

$$\frac{\in}{£} = \frac{\in}{\$} \times \frac{\$}{£} = \frac{1}{1.5000} \times 2.0000 = \frac{\in 1.3333}{£1}$$

$$\Rightarrow S(\in / £) = 1.3333$$

Cross Exchange Rates

- Cross-rates must be internally consistent; otherwise arbitrage profit opportunities exist.
- Suppose that:

$$\frac{€}{£} \succ \frac{€}{\$} \times \frac{\$}{£}$$

- A profit opportunity exists. Either S(€/£) is too high or S(€/$) or S($/£) is too low.
- How does this work?
- Sell high and buy low.

Cross Exchange Rates Example

- **Bank1: S($/¥)=0.0084; Bank2: S($/€)=1.0500; Bank3: S(€/¥)=0.0081.**
- **The implied cross rate between Bank 1 and 2 is: S(€/¥)=0.0080.**
- **You have ¥1,250,000. What should you do?**
  - Go to Bank 3.
    Convert ¥1,250,000 to €10,125.00 @ 0.0081
  -
  - Go to Bank 2.
    Convert €10,125 to $10,631.25 @ 1.0500.
  - Go to Bank 1.
    Convert $10,631.25 to ¥1,265,625.00 @ (1/0.0084)
  - The initial ¥1,250,000 becomes ¥1,265,625. You earn a risk-free profit of ¥15,625, or 1.25%.

Sell ¥ high!

Buy ¥ low!

Cross Exchange Rates Example

- **In-class exercise (hint: cross division formula is used):**

- **The peso quote is 8.00-8.10. The mark quote is 2.00-2.10. What is the peso/mark bid-ask?**
  - 4.00-4.05
  - 3.81-4.05
  - 3.81-3.86
  - 2.47-2.63

The Forward Market

- **Forward market involves contracting today for the future purchase or sale of foreign exchange**
- **Forward prices are quoted the same way as spot prices**
- **Denote the forward price maturing in N days as F_N**
  - i.e. F_{30}(\$/£), F_{180}(\$/€), F_{90}(€/ ¥), etc
- **The forward dollar price of the euro can be:**
  - Same as the spot price
  - Higher than the spot price (euro at a premium)
  - Lower than the spot price (euro at a discount)

FX Forward

- Currency forward contracts, also known as "outright forward", is the contract that holders are obligated to buy or sell the currency at a specified price, at a specified quantity, and on a specified future date.
  - Forward is quoted in premium/discount e.g. USD/HKD Spot = 7.7753 / 7.7780, 1 month forward points = 24/28 (in premium)
  - USD/HKD 1m forward = 7.7777/7.7808

FX Forward Transactions

What is Premium / Discount ?

- Premium / Discount are always quoted in pips in FX Market.
- In FX quotations, fourth decimal is a pip (0.0001 is one pip) except in USD/JPY where second decimal is a pip (0.01)
- When Base Currency is said to be in PREMIUM, against Variable Currency, that means, Rate of Interest is LOWER for Base currency compared to that of variable currency for the period. In Example 1, EUR interest for 1 month is 2.50% and USD interest for 1 month is 4.50%. So, EUR is in PREMIUM.
- When Base Currency is said to be in DISCOUNT, against Variable Currency, that means, Rate of Interest is HIGHER for Base currency compared to that of variable currency for the period. In Example 2, USD interest for 6 months is 5.00% and CHF interest for 6 months is 1.50%. So, USD is in DISCOUNT against CHF.

FX Forward Transactions

In-class exercise:

The current spot rate quote is 7HKD/$. A forward discount of 0.02 would reflect a forward price of:

- 7.04
- 6.96
- 7.02
- 6.98

FX Forward Transactions

What is Premium / Discount ????

How to calculate PREMIUM or DISCOUNT?

- FX spot rates, fx Forward rates and interest rates are interrelated by the interest rate parity (IRP) principle. This principle is based on the notion that there should be no arbitrage opportunity between the FX spot market, FX forward market, and the term structure of interest rates in the two countries.

- Premium or Discount are nothing but, loading of interest rates on respective currencies in a pair from the spot date till forward date to arrive at Forward rates.

FX Forward

Non-Deliverable Forwards (NDF)

An NDF is a short-term committed forward 'cash settlement' currency derivative instrument. It is essentially an outright (forward) FX contract whereby on the contracted settlement date, profit or loss is adjusted between the two counterparties basing on the difference between the contracted NDF rate and the prevailing spot FX rates on an agreed notional amount.

No actual movement of the principal amounts

Every NDF has a fixing date and a settlement (delivery) date. The fixing date is the day and time whereby the comparison between the NDF rate and the prevailing spot rate is made. The settlement date is the day whereby the difference is paid or received

FX SWAP

- An **FX swap** is a combined spot and forward transaction with the same counterparty, concluded at the same time.

- An FX Swap is a financial transaction whereby two parties exchange agreed upon amounts of two currencies as a spot transaction , simultaneously agreeing to reverse the transaction at a future date at two different rates.

- This is simultaneous purchase and sale of one currency against another for two different maturities.

FX SWAP

Why the swap is needed?

- The Bank or a corporate may not be in need of FX in the spot value date. Instead need it for a forward date.
- Hence, they push the FX transaction from spot to forward through a Swap Deal.
- But, FX Market does not quote actively in OUTRIGHT FORWARD. Market is active only in OUTRIGHT SPOT. Outright Forward is derived from the Outright Spot.
- FX Swaps are done by the Banks typically to cover the forward transactions quoted to the corporate clients.

Interest Rate Parity

Spot exchange rates, forward exchange rates, and interest rates must be linked together.

Interest rate arbitrage creates the interest rate parity relationship:

(Fforward exchange rate foreign/domestic)/(Sspot exchange rate foreign/domestic) = (1 + rForeign)/(1+ rDomestic)

Example: Given: Interest rates are 10% in the U.S (domestic)., 4% in Switzerland (foreign), and the 1 year forward rate is 2.60 SF/$. If interest rate parity holds, today's spot rate (SF/$) should be:

S = [(1+ domestic r)/(1 + foreign r)]X(Forward rate)

S = [(1.1)/(1.04)]X(2.60SF/$) = 2.75 SF/$

Interest Rate Parity

Interest rate parity describes relationship among current inter-country interest rate differentials and spot/forward foreign exchange rate differentials

FX Retails

The spread for a customer is decided by the Bank basing on certain factors-

Standing of the customer

How important the client is for the Bank

What is the total volume of business to the Bank

What are the other spin-off benefits from the customer?

FX Retails

Usually, Banks keep higher spread for smaller transactions.
>Lesser spread for a good marketable lot.
>For instance, for a 10 Million EUR Transaction , Bank may keep a spread of 5 pips.
>If the transaction is for EUR 80,000,(this is called a Tiny Amount by the Trader), the sales trader keeps a spread of 20 pips.
>This is because, smaller lots are not marketable immediately and hence, this is exposed to adverse movement in the currency pair. So larger spread gives leverage to the sales trader to accumulate the position till he gets a marketable lot and covers the position.

FX Retails

POSITION KEEPING AND Hedging transactions

All customer transactions quoted and trade concluded end up the trader in Exposure of POSITION.

Till the Trader hedges the transaction with a counter trade in the interbank market OR matches with a equal ad opposite position, he remains exposed to the possible ADVERSE MARKET MOVEMENTS.

MARKET MAKER (SELL-SIDE CLIENT) ALWAYS RUNS A HUGE POSITION AND COVERS HIS POSITION ON A CONTINUOUS BASIS AS AND WHEN HE DECIDES ITS THE RIGHT TIME TO HEDGE.

What is Derivatives?

Financial instruments whose value depends upon the value of the underlying.

>play a large and increasingly important role in financial markets
>Derived mathematically from the changes in the underlying assets
>Determined by the value of underlying assets:

- CURRENCY
- INTEREST RATE FUTURES
- Securities
- Agricultural Commodities
- Precious Metals
- Stock Indexes

➢OTC Derivatives/Custom-tailored Options

Who hedges?

- Hedgers
  - Corporate
  - Banks, Financial Institutions to manage ALM and to hedge their proprietary positions
  - Trade Business - Exporters and Importers

- Speculators-to capture market movements with an intention to make profits

Stock Options - Call

A **call option** gives its holder the right to purchase an asset for a specified price, called the **exercise,** or **strike, price,** on or before some specified expiration date.

For example, a June call option on IBM stock with exercise price $105 entitles its owner to purchase IBM stock for a price of $105 at any time up to and including the expiration date in June.
The holder of the call is not required to exercise the option.
The holder will choose to exercise
only if the market value of the asset to be purchased exceeds the exercise price.
The purchase price of the option is called the **premium.** It represents the compensation
the purchaser of the call must pay for the right to exercise the option if exercise becomes
profitable.

Stock Options – Call (Cont'd)

The purchase price of the option is called the **premium.** It represents the compensation the purchaser of the call must pay for the right to exercise the option if exercise becomes profitable.

Seller of the Call Options: write the calls and receive the premium; required to make the delivery when calls exercised

Example:

Stock Price: $107
Exercise Price: $105
Cost of Call: $3.1

Value at expiration = Stock price - Exercise price =$107-$105 =$2

Profit = Final value - Original investment = $2.00 -$3.10 = -$1.10

Stock Options - Put

A **put option** gives its holder the right to sell an asset for a specified price, called the **exercise,** or **strike, price,** on or before some specified expiration date.

For example, a June sell option on IBM stock with exercise price $105 entitles its owner to sell IBM stock for a price of $105 at any time up to and including the expiration date in June.
The holder of the sell is not required to exercise the option.
The holder will choose to exercise only if the market value of the asset to be sold below the exercise price.
The purchase price of the option is called the **premium.** It represents the compensation the purchaser of the sell must pay for the right to exercise the option if exercise becomes profitable.

Stock Options – Put (Cont'd)

The purchase price of the option is called the **premium.** It represents the compensation the purchaser of the call must pay for the right to exercise the option if exercise becomes profitable.

Seller of the Put Options: write the puts and receive the premium; required to accept the delivery when puts exercised

Example:

Stock Price: $101
Exercise Price: $105
Cost of Put: $3.2

Value at expiration = Stock price - Exercise price =$105-$101 =$4

Profit = Final value - Original investment = $4.00 -$3.20 = $0.8

Stock Options - Summary

In the Money: An option is described as **in the money** when its exercise would produce profits for its holder.

- Call Option: Asset price is greater than the exercise price
- Put Option: Asset price is less than the exercise price

Out of the Money: An option is **out of the money** when exercise would be unprofitable.

- Call Option: Asset price is less than the exercise price
- Put Option: Asset price is greater than the exercise price

At the Money: Options are **at the money** when the exercise price and asset price are equal.

Index Options

An index option is a call or put based on a stock market index such as the S&P 500 or the NASDAQ 100.
Index options are traded on several broad-based indexes as well as on several industry-specific indexes and even commodity price indexes.
Payoff Calculation: (Actual Index Price – Exercise Price) X Multiplier
For example:
Call Option on S&P 500 =1400 (Actual Price) – 1390 (Exercise Price) = 10 --------→ times 100 (multiplier) = $1,000 per contract

In contrast to stock options, index options do not require that the call writer actually "deliver the index" upon exercise or that the put writer "purchase the index." Instead, a cash settlement procedure is used. The payoff that would accrue upon exercise of the option is calculated, and the option writer simply pays that amount to the option holder.

Index Options (Cont'd)

Options on the major indexes, that is,

- S&P 100 (often called the OEX after its ticker symbol)
- S&P 500 (the SPX)
- NASDAQ 100 (the NDX)
- Dow Jones Industrials (the DJX)

These are the most actively traded contracts on the Chicago Board Options Exchange (CBOE). Together, these contracts dominate CBOE volume.

Futures Options

Futures options give their holders the right to buy or sell a specified futures contract, using as a futures price the exercise price of the option.

Although the delivery process is slightly complicated, the terms of futures options contracts are designed in effect to allow the option to be written on the futures price itself. The option holder receives upon exercise a net payoff equal to the difference between the current futures price on the specified asset and the exercise price of the option.

For example, if the futures price is $37, and the call has an exercise price of $35, the holder who exercises the call option on the futures gets a payoff of $2.

Currency Options

A contract for future delivery of a specific currency in exchange for another, in which the holder of the option has the right to buy (or sell) the currency at an agreed price, the strike price, or exercise price, but is not required to do so.

>A currency option offers the right to buy or sell a quantity of foreign currency for a specified amount of domestic currency. Currency option contracts call for purchase or sale of the currency in exchange for a specified number of U.S. dollars.

>Contracts are quoted in cents or fractions of a cent per unit of foreign currency.
>The right to buy is call, the right to sell is a put
>The option seller receives the option premium and is obliged to ensure the delivery
>American options permit the holder to exercise at anytime before the expiration date whereas European options, only at the expiration date.
>Two type of options market: Over the Counter (OTC) & Exchange Traded

Interest Rate Options

>Options are traded on Treasury notes and bonds, Treasury bills, certificates of deposit, GNMA pass-through certificates, and yields on Treasury and Eurodollar securities of various maturities. Options on several interest rate futures also trade.

>Among these are contracts on Treasury bond, Treasury note, municipal bond, LIBOR, Eurodollar, and German euro-denominated government bond futures.

Currency Future

Future contract is a STANDARDIZED agreement with an organized exchange to buy or sell a currency pair at a fixed price at a certain date in the future.
>The contract is exchangeable and thus more liquid.

Forward and Futures Comparison

	Forward	Futures
Size	Tailored	Standardized (typically USD5K –USD100K)
Range of Currencies	Over 50	Limited to major currencies
Settlement Date	Tailored	Standardized, typical 4-6 times a year e.g. PHLX (Mar/May/Jun/Jul/Sep/Dec)
Cost	No fee, cost reflected in the spread points	No spread, paid as brokerage fee
Regulation	Self-regulated	Regulated by exchange
Credit Risk	Counterparty risk is significant	Minimized with marginal deposit and daily cash settlement of profits or loss
Mark to market	Only at maturity	Profit/Loss

Interest Rate Swap

Is a financial contract between two parties exchanging or swapping a stream of interest payments for notional principal amount on multiple occasions during a specified period.

>Coupon swap -fixed to floating

>Floating to fixed (e.g. One party might exchange a variable cash flow equal to $1million times a short-term interest rate for $1million times a fixed rate of 8% for each of the next 7 years)

>Basis swap -floating to floating

Conclusion

- **The foreign exchange market is by far the largest financial market in the world.**
- **Currency traders trade currencies for spot and forward delivery.**
- **Exchange rates are by convention quoted against the U.S. dollar, but cross-rates can easily be calculated from bilateral rates.**
- **Triangular arbitrage forces the cross-rates to be internally consistent.**
- **The euro has enhanced trade within Europe, and the currency has the potential of becoming a major world currency.**