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Additional Reading Material
on
Over-the-Counter Derivatives

(Issued in May 2019)

Relevant for

1. Module 14: Derivatives *(Formerly known as Futures and Options)*

2. Module 18: Securities and Derivatives Trading (Products and Analysis)

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(This document consists of 108 pages including the cover page)

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Over-the-Counter Derivatives

Topic 1 - OTC Derivatives

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Learning Objective

- Demonstrate understanding of OTC derivatives
- Compare the different types of OTC derivatives
- List the characteristics of different types of OTC derivatives
- List the uses of OTC derivatives
- Analyse the risks associated with OTC derivatives

1. Introduction

Securities such as stocks are generally traded on formal or regulated exchanges like Bursa Malaysia and New York Stock Exchange. When a security is traded outside a formal or regulated exchange, it is said to be traded Over-the-Counter (OTC).

This "over-the-counter" marketplace is typically made up of a network of dealers and banks. This OTC marketplace is where dealers and bankers deal with each other directly instead of through a central exchange. The dealers and bankers involved in the transaction are called counterparties in the transaction.

A derivative is an instrument that derives its value from an underlying asset. Derivatives traded in a formal or regulated exchange are called exchange-traded derivatives whereas derivatives not traded in a formal exchange are called Over-the-Counter Derivatives. Note that the underlying security or asset for an OTC derivative may be traded on a formal or regulated exchange.

Types of derivative instruments include futures, options, forwards and swaps. These instruments can be traded on exchanges and/or Over-the-Counter. Futures are traded on formal regulated exchanges, while forwards and swaps are traded OTC. As for options, it can be traded on both regulated exchanges and OTC.

1.1 Participants in the OTC Derivatives Market

Generally, derivatives market participants are hedgers, speculators and arbitrageurs. Details of these participants are in Topic 2 of Module 14: Futures and Option SC Licensing Examination Study Guide.

Market participants for OTC derivatives are described below and the participants can be both buyers and sellers of the OTC derivatives contract.

No	Market Participant	Activity
1	Banks	Commercial and investment banks, acting as both buyers and sellers of OTC Derivatives
2	Central Banks	End-users of OTC Derivatives, managing the country's reserves

3	Corporates	Uses the OTC Derivatives to hedge risks arising from their business operations
4	Funds	Includes Real Money funds and Hedge funds, who could be either buyers and sellers of OTC Derivatives
5	Retail	High Net Worth Individuals investing or speculating in particular asset classes

1.2 Exchange-traded Derivatives and OTC Derivatives

Exchange-traded derivatives tend to be more structured as they are standardised contracts defined by the exchange. The standardised structures tend to have a fixed amount of the underlying assets, fixed expiries (or maturities) that fall on certain days of the week or month, and standardised settlement terms.

OTC derivatives are typically structured on demand, depending on the buyer's needs. They are private contracts traded between the two parties, known as counterparties, on terms that only the two counterparties need to negotiate and agree. As such, they are highly customised to suit the buyer's needs, and have risk and reward characteristics that meet the buyer's requirements. The seller would assess the risk and return profile of the OTC derivative and price it accordingly, so that it makes sense from the seller's own perspective.

There are two types of OTC market: customer market and inter-dealer market:

- Customer market is between a dealer or bank and an end-user or customer. Bilateral negotiations and dealing will take place between them through telephone communication or electronic means such as e-messages or e-mail. When all terms and conditions are agreed upon, the deal is done and forms a private contract between the two parties.

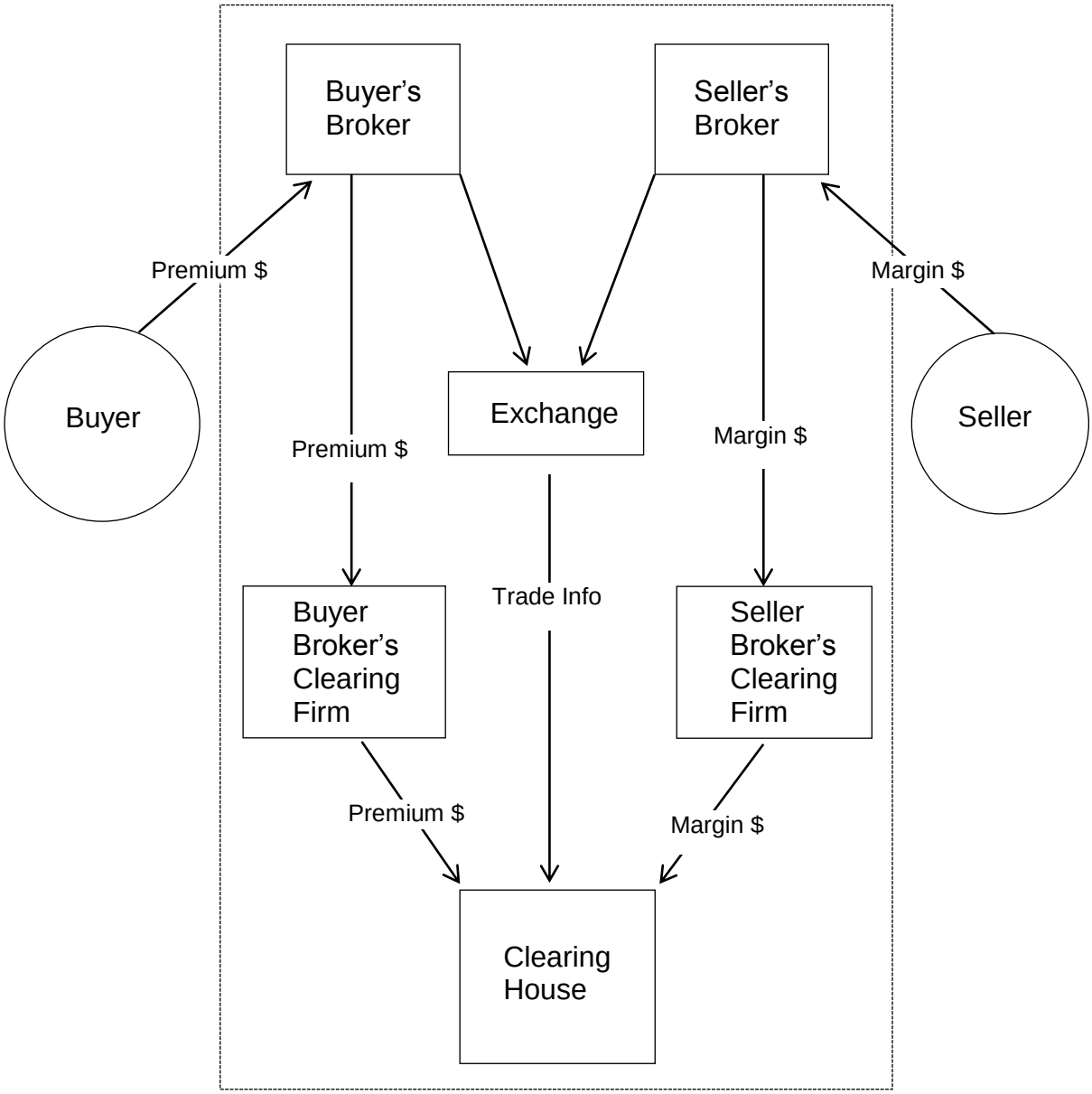
- Inter-dealer market is between dealers and/or banks themselves, where they will mitigate their risks, typically resulting from an end-user buying/selling a derivative from/to them. The dealers/banks quote prices to one another and they will deal in these instruments when the risks and prices match their risk and return profile. Very often, there are also "voice brokers", who would facilitate trades between dealers and banks in this inter-dealer market.

1.3 Comparison between Exchange-Traded Derivatives and OTC Derivatives

OTC derivatives such as options are also traded on the exchange. However the dealing and settlement process is different.

The transactions involved in an exchange-traded option and an OTC traded option is compared in Graph 1 and Graph 2 below.

Graph 1: An exchange-traded option transaction on a derivatives exchange

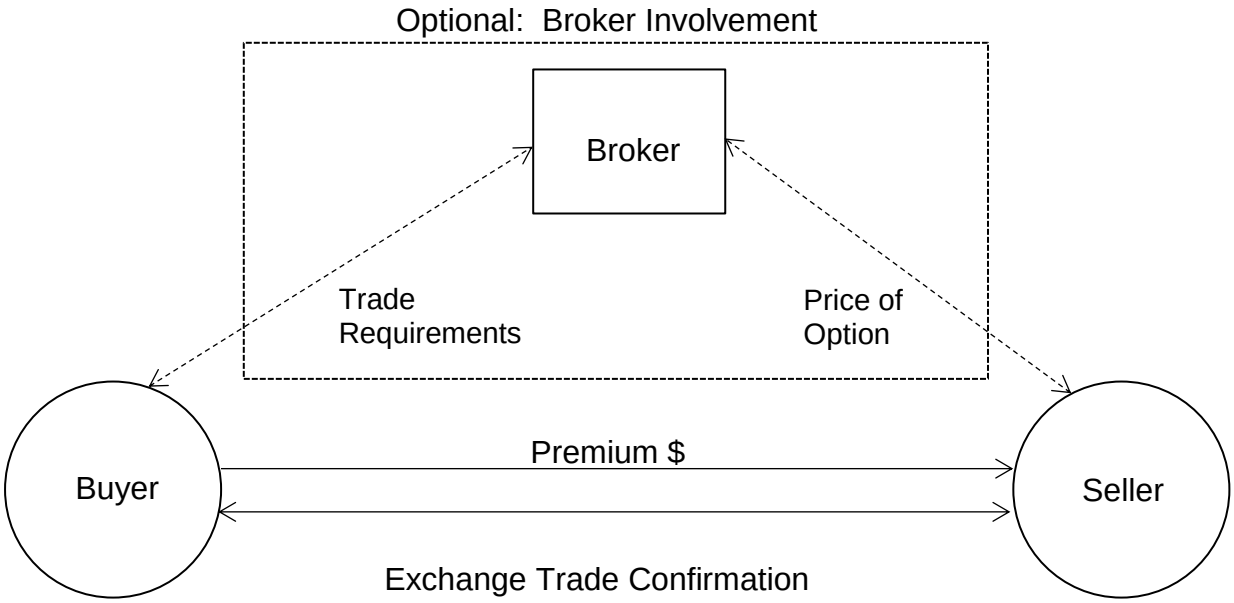


Exchange related transactions

For exchange-traded derivatives, the exchange is at the centre of the transaction. Brokers are there to facilitate the trade. The brokers' clearing firms and clearing house are the other parties involved and are rather transparent to the buyer and seller as they settle the trade in the back office.

Compare that to the transactions involved in an OTC Option:

Graph 2: An OTC option transaction



In an OTC Derivative transaction, a broker may occasionally be involved. If a broker is present in that transaction, the broker would act as an intermediary matching the needs of the buyer with the seller, at a price agreeable to both parties. Once agreed, the buyer and seller would be settling the trade directly with each other, and the broker would typically just charge a commission during trade settlement.

If a broker is not involved, the buyer would look for its own seller, share its needs, negotiate and agree a price, and settle the trade directly with the Seller.

As can be seen from the options example, there are several distinct differences between exchange-traded derivatives and OTC derivatives. The broad differences between an exchange-traded derivative and an OTC derivative are summarised on the following table:

	Exchange-traded Derivatives (ETD)	Over-The-Counter Derivatives (OTCD)
Terms	Standardised contracts	Negotiated contracts, highly customizable
Counterparty	Clearing house is counterparty	Faces the other private party directly
Margin	Initial margin and variation margin	Initial margin and variation margin may be required, depending on jurisdictions; Alternatively, collateral needs to be negotiated
Credit Risk	Credit risk exposure to clearing house	Credit risk exposure to counterparty
Pricing	Transparent pricing on exchange	Price on enquiry
Closing Trade	Can square off with other parties on exchange	Typically close off with opening counterparty
Capital Requirement	Much less for banks	Much more for banks

1.4 Advantages and Disadvantages of OTC Derivatives

With each of the differences between exchange-traded derivatives (ETD) and OTC derivatives (OTCD), there are strengths and weaknesses for each type of derivatives. Here's a summary of the advantages and disadvantages of OTC derivatives.

	OTCD Advantage	OTCD Disadvantage
Terms	As contract terms are highly customizable, it will almost always better match with the end-user's needs.	Highly customized trades make it more difficult for dealers/banks to price. The end result tends to be a worse off price for the end-user.
Counterparty	Facing the private party directly means one is not bound by the rules of the exchange.	In most instances, it is better to have a clearing house as counterparty, as the rules are much clearer.
Margin	Generally, there is no need to post initial margin or subsequently top-up and extract variation margin when the derivative's mark-	The margin requirements cut both ways for the two parties. If the collateral is not fair to both parties, one side might be worse off in volatile markets,

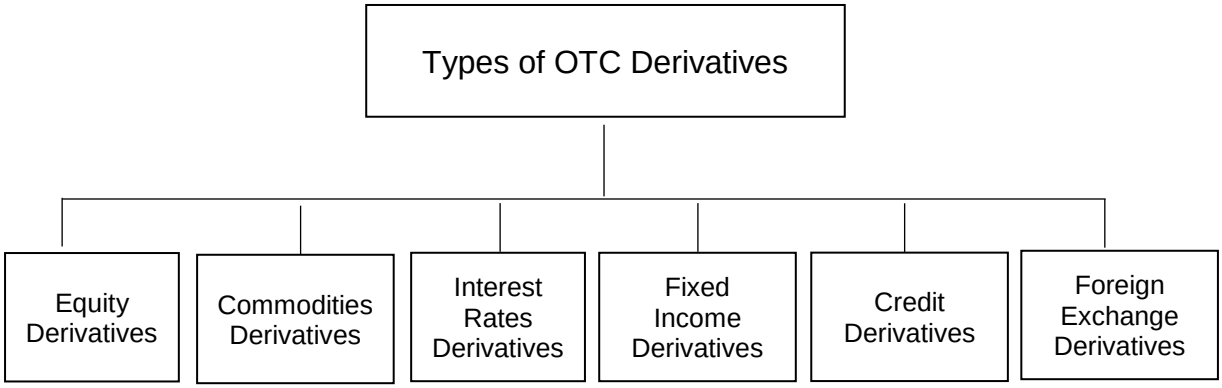
	OTCD Advantage	OTCD Disadvantage
	to-market price fluctuates, thus more efficient and lower administrative costs.	when there are losses on the OTC derivatives.
Credit Risks	The private counterparty is rarely of higher credit risk rating than a clearing house, thus there is usually little credit advantage facing a private counterparty. However, a clearing house model also has a high concentration risk, which potentially may be the single point of failure during major crisis.	The clearing house is typically very highly rated, and imposes stringent capital requirements and loss provisions, making it a preferred choice as counterparty, from a credit perspective in most normal market situations. This systemic risk could be minimized if the clearing house comes under the oversight of a country's regulator.
Pricing	As OTCD are highly customized, the pricing could vary a fair bit between one counterparty and another. Occasionally but rarely, good deals can be found when the OTCD suits both sides exactly.	As OTCD are not publicly traded, it is difficult to get a current price, other than asking the counterparty to price it again. Bear in mind that the counterparty who is on the other side of the deal may be quoting a price that is less than neutral.
Closing Trade	Similar to pricing, one may or may not get a good price when one wants to close off a trade with the existing counterparty.	It is tedious to go to other counterparties to close off a trade. As such, the convenience of being able to close off with anyone on an exchange is a distinct advantage for ETD.
Capital Requirements	no capital requirements if both party are non-banks	Under Basel requirements, the capital charge for credit risk exposure of banks arising from an OTC derivative transaction is much higher. ETD total exposures can be net off, while OTCD exposures are assessed on a gross basis, making it hugely prohibitive from a capital charge perspective.

2. Types of Underlying Instruments and Their Characteristics

There are six common types of underlying instruments, from which OTC derivatives derive their values:

- Stocks
- Commodities
- Interest rates
- Fixed income
- Credit
- Foreign exchange

Similarly, OTC derivatives are broadly classified by the underlying securities or instruments from which their values are derived:



2.1 Equity Derivatives

Equity derivatives are instruments deriving its value from one or more underlying stocks or stock indices. Common examples: individual stock options, stock index options, equity-linked notes (ELNs)

An equity option gives the owner the right but not the obligation to buy or sell an agreed amount of stocks at a specified price on or before a pre-determined date. A single-stock option is linked to one stock, while a stock index option will have the stock index as its underlying instrument.

As an option is a very commonly used OTC derivative, it is worth examining options in more details. We will look at equity options here, but the principles of options are similar across all underlying securities and instruments.

Equity Option Basics

An equity option will have the following terms:

Term	Description
Type	Call or Put
Stock Name	Underlying stock
Strike Price	Also called “Exercise Price”; this is the price at which the transaction will occur upon option exercise
Expiry Date	Also called “Maturity Date”; this is the last date the option can be exercised
American/European	American-style option allows the option holder to exercise the option any time on or before the expiry date; European-style option allows the option holder to exercise the option only on the expiry date itself
Settlement Terms	To settle in cash or deliver the stock
Notional Amount	The size of the option
Premium of Option	The price of the option, usually a percentage of the notional amount

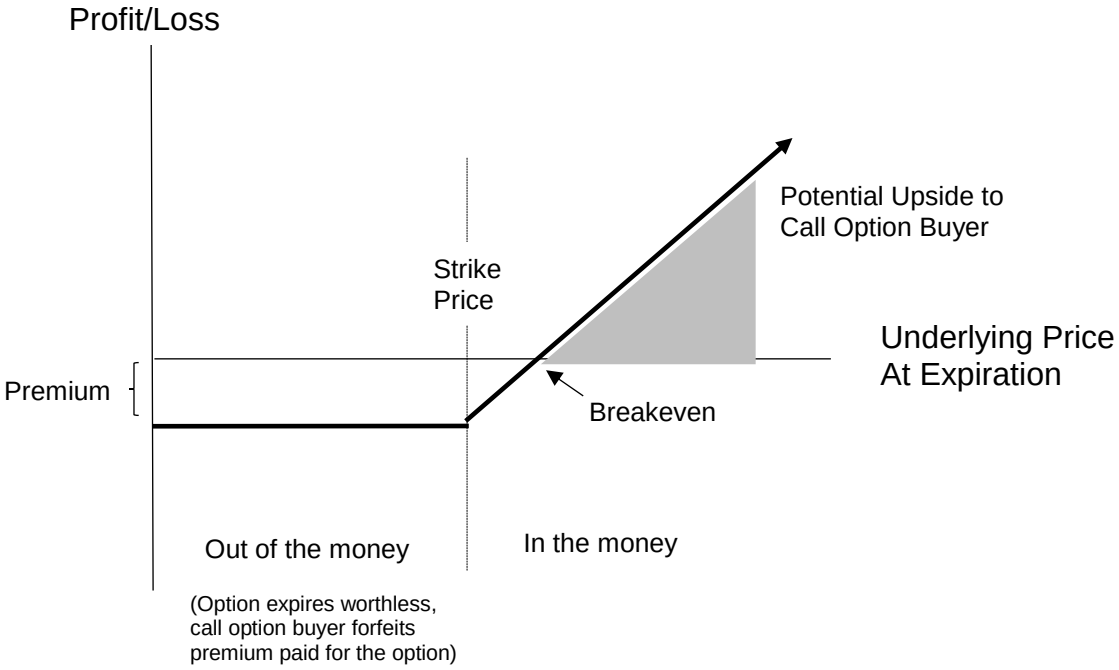
The two common types of options are call options and put options.

Call Options – Buyer

An equity call option gives the owner or call option holder the right but not the obligation to buy an agreed amount of stocks, at a specified price on or before a pre-determined date.

One who expects a stock’s price to go up can buy a call option instead of buying the stock outright. The buyer of the call option will have the right to exercise his rights to own the stock at the stipulated strike price. The cost to the buyer is the premium paid to purchase the stock option.

Payoff Diagram of a "Long Call" on Expiry date



Risk and Reward Analysis

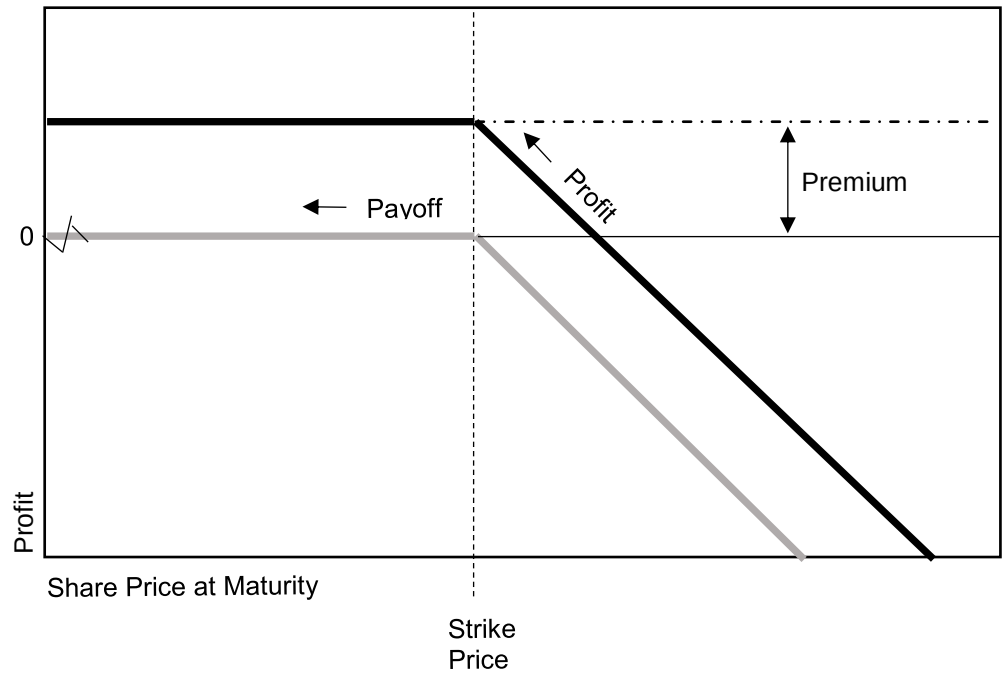
- If the stock price closes at or above the strike price on the expiry date, the buyer of the option could exercise the option and take delivery of the stock.
- Note that the buyer of the option could also choose to exercise the option even if the stock ends below the strike price on expiry date. This could happen if the stock is just below the strike price, and exercising it would cost less than the buyer going to the market to buy the stock and pay the bid-ask spread plus brokerage.
- The buyer of the option needs the stock price to be higher than the combined strike price plus the premium paid for the option, in order to breakeven or make a profit.
- If the final stock price is below the "breakeven" price, the buyer of the option would lose, at a maximum, the premium already paid.
- The owner of the option is not restricted to holding the option to expiry date. He could sell this option to a counterparty before expiry. He would realise a profit if the stock had a quick and strong rally soon after he purchased the option. On the other hand, he would suffer a loss if the stock price had fallen or stayed stagnant for a while.

Call Options – Seller

Unlike a buyer of the call option who has the right but not the obligation to buy the stock, the seller of the call option has an obligation to sell the stock to the call buyer at the agreed strike price.

One who expects a stock's price to fall can choose to sell or "short" or "write" a call option. The seller will receive an option premium for selling the option. If the option seller does not own the stock on expiry date when the option is exercised by the option buyer, the seller will have to purchase the stock from the market and deliver the stock to the option buyer.

Payoff Diagram of a "Short Call" on Expiry date



Risk and Reward Analysis

- If the stock price closes at or above the strike price on expiry date, the seller of the option would have to deliver the stock to the buyer of the option.
- The seller of the option has some buffer as it has received the option premium upfront. The seller will only start to lose money if the stock price ends much higher than the strike price, such that the loss is greater than the option premium received.
- If the final stock price ends below the strike price, the seller of the option could safely keep the option premium received. Note that this

option premium received is also the maximum amount the option seller would profit.

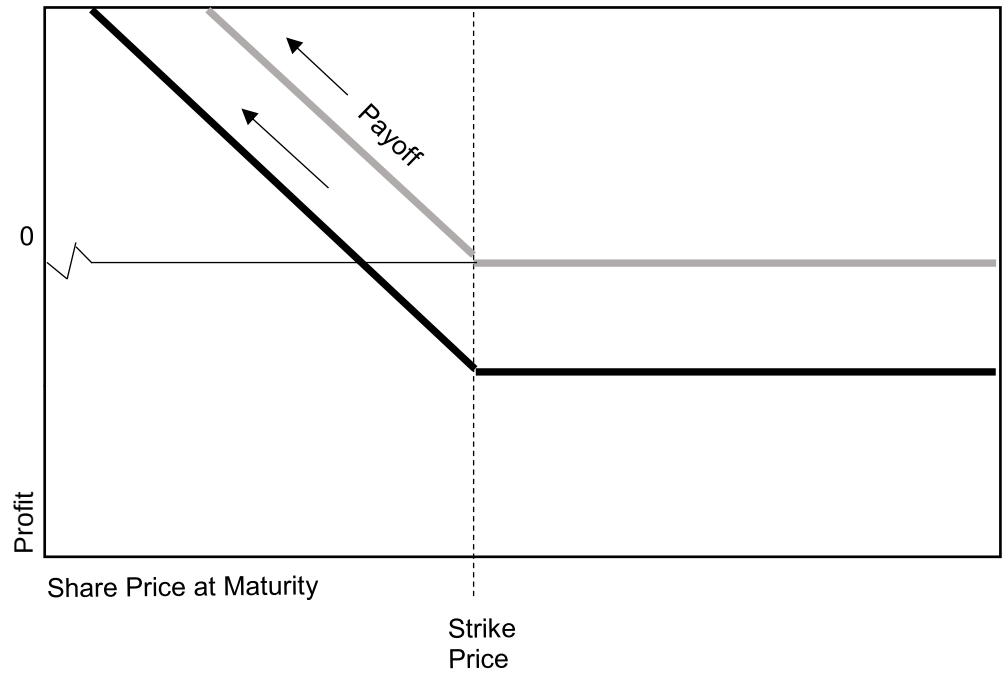
- The seller of the option is not restricted to holding the option to expiry date too. He could buy this option back from the same or another counterparty before expiry. He would realise a profit if the stock price were lower. Conversely, he would suffer a loss if the stock price rises.

Put Option – Buyer

An equity put option gives the owner the right but not the obligation to sell an agreed amount of stocks at a specified price on or before a pre-determined date.

One who expects a stock's price to fall can buy a put option. The buyer of the put option will have the right to exercise his rights to sell the stock at the stipulated strike price. The risk to the buyer is the premium paid to purchase the put option.

Payoff Diagram of a "Long Put" on Expiry date



Risk and Reward Analysis

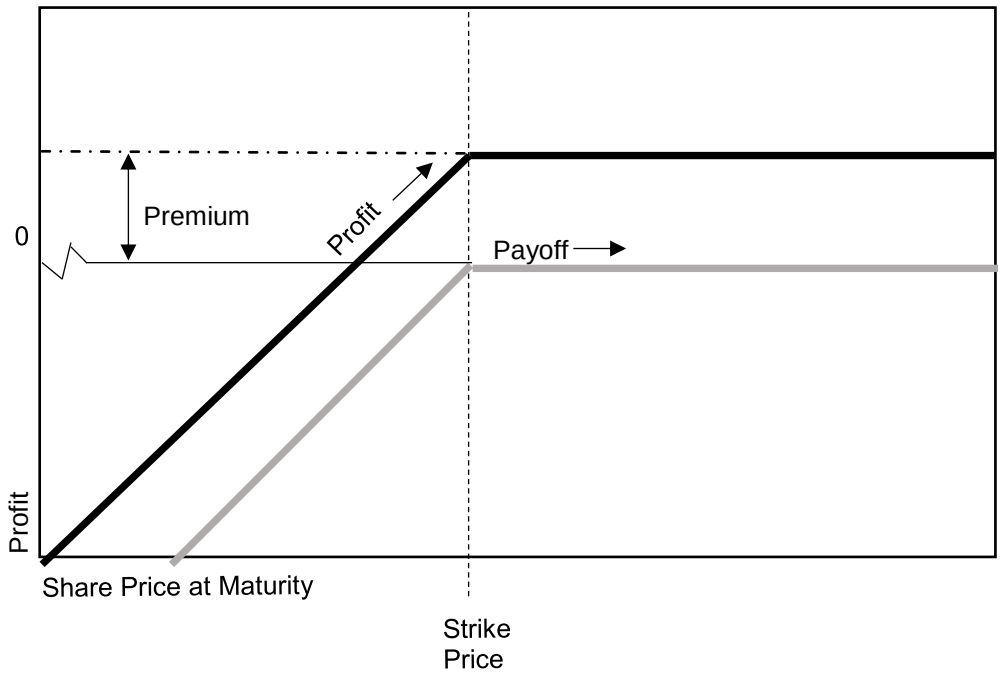
- If the stock price closes at or below the strike price on expiry date, the buyer of the option could exercise the option and sell the stock at the strike price to the option seller.
- To make a profit, the stock price needs to fall more than the strike price, enough to recover the option premium paid by the option buyer.
- If the final stock price is above the “breakeven” price, the buyer of the option would lose a maximum of the premium already paid.
- The owner of the option is not restricted to holding the option till the expiry date. He could sell this option off to the same or another counterparty before the expiry date. He would realise an early profit if the stock had a quick and big fall soon after he purchased the option. On the other hand, he could suffer a loss if the stock had risen or stayed stagnant for a while.

Put Option – Seller

Unlike a buyer of the put option who has the right but not the obligation to sell the stock, the seller of the put option has an obligation to buy the stock from the put buyer at the agreed strike price.

One who expects a stock’s price to have bottomed out or rise slightly can choose to sell or “write” a put option. The seller will receive an option premium for selling the option.

Payoff Diagram of a “Short Put” on Expiry date



Risk and Reward Analysis

- If the stock price closes at or below the strike price on expiry date, the seller of the option would have to buy the stock from the buyer of the option.
- The seller of the option has some buffer as it has received the option premium upfront. The seller will only start to lose money if on the expiry date the stock price closes a fair bit lower than the strike price, such that the loss more than offsets the option premium received.
- If the final stock price closes above the strike price, the seller of the option would safely keep the option premium received. Note that this option premium received is also the maximum amount the option seller would profit.
- The seller of the option is not restricted to holding the option till the expiry date. He could buy this option back from the same or another counterparty before the expiry date. He would realise a profit if the stock price closes higher on expiry date. Conversely, he would suffer a loss if the stock price had fallen quickly.

Equity Derivative Structures

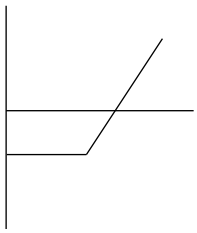
We have discussed the risk, reward and payoffs for the basic types of options, namely call and put options. These two basic types of options are also called “plain vanilla” options.

There are other variations to these plain vanilla options, including the more common “knock-in”, “knock-out”, “reverse knock-in”, “reverse knock-out”. Collectively, these more complicated options are known as “exotic” options.

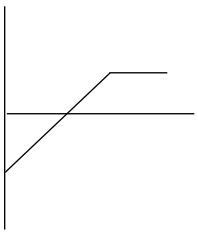
A combination of several options could also be put together to form an option with a payoff structure that matches exactly what the end-user needs. Several common option structure types include “Call Spread”, “Put Spread”, “Call Butterfly”, “Condor”, “Straddle” and “Strangle”. Each structure type is made up of at least 2 vanilla options, and sometimes as many as 4 vanilla and/or exotic options.

The payoff diagrams for some of these structures are as follows:

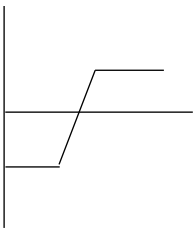
Long Call



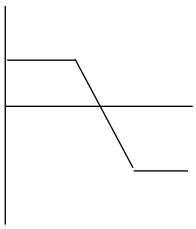
Covered Call



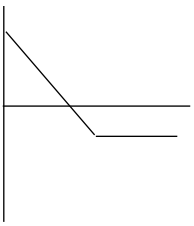
Bull Call Spread



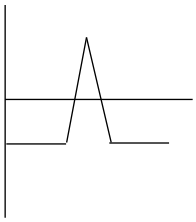
Bear Put Spread



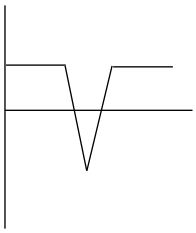
Long Put



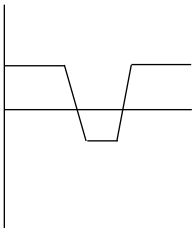
Long Call (or Put) Butterfly



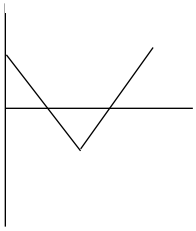
Long Call (or Put) Butterfly



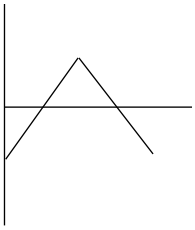
Iron Condor



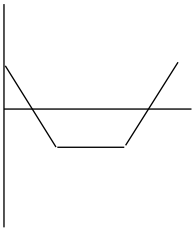
Long Straddle



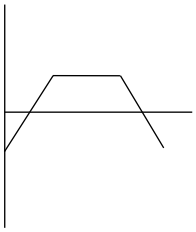
Short Straddle



Long Strangle



Short Strangle



Equity-linked Notes (ELNs)

Equity-linked notes, or ELNs are usually not classified as OTC derivatives but as a structured product. However, as it is widely used by investors like an OTC derivatives, it is covered in brief here.

ELNs typically comprise an interest-bearing note bundled with one or more derivatives. The note could be a deposit, a short-term bill or paper, or a money market instrument. The derivatives included in the bundle are usually OTC derivatives such as a put or a call, typically of the exotic type that includes some “Knock-Out” features.

A typical ELN is as follows:

Underlying stock	:	DBS
Tenor	:	6 months
Coupon/Interest Rate	:	10%
Strike (Delivery) Price	:	96% of initial price
Barrier (Knock-Out) Price	:	101% of initial price

Early redemption:
When the stock trades at or above the barrier price on any day during the observation period (between the start of the second month and maturity date), the investor gets interest up to that day and the ELN terminates

Redemption on maturity: If no early redemption,
If stock>= strike price, the investor gets the principal plus interest in cash
If stock< strike price, the investor gets the principal plus interest in stock

ELN is a structure incorporating an OTC derivative which promises high yield, but at the risk of being delivered the stock when the stock trades lower. This is a product popular with high net worth individuals, and is offered only over-the-counter.

2.2 Commodity Derivatives

There are many types of commodities traded in the market. They can be broadly classified as:

- Precious metals
- Base metals
- Energy
- Agriculture or soft commodities

Common types of commodities within each classification are:

- Precious metals: Gold, Silver
- Base metals: Tin, Copper, Aluminum
- Energy: West Texas Intermediate (WTI), Brent (both are crude oil)
- Agriculture or soft commodities: Corn, Crude Palm Oil (CPO)

Examples of commodities derivatives are gold options and gold forwards.

We have covered options in great detail in the section on equity derivatives. Commodity options work in the same way, the only difference is that the underlying is a commodity like gold instead of a stock.

Commodity forwards such as gold forwards will be discussed in more detail in the next chapter.

Swaps such as commodity swaps will be discussed in Topic 3.

2.3 Interest Rate Derivatives

The underlying securities for interest rate derivatives are usually the interbank lending rate or the benchmark interest rates, such as KLIBOR, LIBOR, Eurodollar, US Treasury Bills and bonds.

Common examples of interest rate derivatives are interest rate swaps (IRS) and swaptions.

Interest Rate Swaps

An interest rate swap (IRS) is an agreement to exchange a stream of interest payments for another, over an agreed period of time. The most common IRS is where a stream of fixed rate interest payments are exchanged for a stream of floating rate interest payments. This type of IRS is also known as “vanilla” swaps. The most common floating rate interest benchmark being traded is LIBOR, the London Interbank Offered Rate, which is the rate high quality banks charge each other for short-term financing.

IRS is typically used by corporations and financial institutions to manage their interest rate risks. In a rising interest rate environment, a corporate might want to lock in favourable lower fixed rates before rates rise further. In such a case, they will be looking to “pay fixed” and “receive floating”.

Conversely, if the forecast is lower interest rates in the future, then they may prefer to “receive fixed” and “pay (the lower) floating”. Corporations often also use IRS to match their assets and liabilities, depending on their borrowing profile, as well as receivables. This is referred to as asset-liability management.

The “Swap Rate” is the fixed rate that the receiver gets in exchange for paying the floating (e.g., LIBOR) rate. It is this swap rate that will fluctuate daily, depending on market’s expectations of where LIBOR rates will be, as implied by the forward LIBOR curve.

If interest rates fall, the “receiver” of fixed will profit because the amount he has to pay in floating will be lower. Conversely if interest rates rise, the “receiver” of fixed will lose out because he has to pay increasingly higher floating amounts, while receiving the low fixed amounts.

Swaptions

A swaption is the option to enter into an interest rate swap or some other types of swaps. Similar to options, the buyer of a swaption has the right but not the obligation to enter into the swap.

There are two common types of swaptions; a payer swaption and a receiver swaption. A payer swaption is a swap option contract where the buyer has the right to be the fixed rate payer and floating rate receiver. A receiver swaption is a swap option contract where the buyer has the right to be the fixed rate receiver and floating rate payer.

Just like equity options, swaptions also have the two option styles of European (option holder can exercise option only on expiry date) and American (option holder can exercise option any time before or on expiry date). On top of that, swaptions have a third style of “Bermudan”. The “Bermudan” style allows the buyer to exercise the option and enter into the agreed swap on a pre-determined set of specific dates.

Swaptions are more sophisticated than vanilla OTC derivatives and used mostly by financial institutions and hedge funds, though large corporations might also buy them. They are used mainly to hedge interest rates risk positions when the speed and direction of interest rate movements are uncertain.

Fixed Income Derivatives

Unlike interest rate derivatives, fixed income derivatives' underlying securities are bonds, as opposed to referencing an interest rate. Example of a fixed income derivative is a bond swaps.

Bond Swaps

A bond swap is simultaneously selling a bond and buying another bond with the proceeds from the sale.

The usage of bond swaps are as follows:

- Changing the quality of the bond portfolio – e.g., swapping a bond of lower credit rating to a higher rating, or vice versa

- Improving the total portfolio returns – e.g., swapping a similarly rated lower return bond with a higher return bond; or a shorter maturity bond with one with a longer maturity

- Take advantage of interest rate changes – e.g. swapping to a shorter duration bond, if one anticipates rates to be rising and vice versa

- Lower taxes – e.g. selling a bond that is losing money to realise the loss immediately and buy a similar (but not the same) bond. Doing that will realise the "paper" loss so that it could offset profits from elsewhere, and buying a similar bond ensures that you continue to own a similar bond, which, of course, you believe could make you money later, but that will be taxed later

2.4 Credit Derivatives

Credit derivatives' underlying instruments are usually the credit worthiness of a sovereign country or a company.

Credit derivatives were designed to help users hedge credit risks. Over the years, its popularity resulted in a credit derivative market that was many times the size of its underlying securities. The collapse of the credit derivative market was seen as the main cause of the Global Financial Crisis in 2008.

Common examples of credit derivatives are credit default swap (CDS) and collateralised debt obligations (CDO).

Credit Default Swap (CDS)

A credit default swap, or CDS, is a financial swap agreement where the CDS seller will compensate the buyer in the event of a loan default or other credit event. This is essentially an insurance against a loan default, and the buyer pays a fee for the "insurance".

A CDS is linked to a reference entity, which is usually a corporation or a government. Note that the reference entity is not a party to the contract. In fact, they may not even know of the existence of this CDS contract, as many of them are traded OTC.

Investors may buy CDS to hedge or protect against default of loans they may have in their books. Speculators may buy a CDS to speculate that the chance of default for a certain entity is likely to be increasing, that is credit worthiness is likely to deteriorate, even if they do not own any of the entity's loans in their books. The speculator could also sell a CDS if they are convinced that the entity's credit worthiness is likely to be improving.

When investors or speculators buy or sell CDS without owning the debt or loans of the underlying reference entity, they are said to be "naked" CDS. Naked CDS constitute most of the CDS market.

The price of a CDS is the "spread". It is quoted in percentage of the notional amount. For example, a CDS spread of 0.8% or 80 basis points means the CDS buyer would have to pay RM80,000 for RM10 million worth of protection. Payments are to be made on a quarterly basis in most instances.

Collateralised Debt Obligations (CDO)

A collateralised debt obligation, or CDO, is a type of asset-backed security. It is a financial instrument that pools together several cash flow generating assets and repackages them before selling to investors. The underlying assets could be mortgages, bonds or retail/business loans.

There may be different tranches for the underlying assets (or debts), indicating their riskiness. The most senior tranches will have first claim on the collateral in the event of default, and it cascades down to the less senior tranches until funds are depleted. As such, the higher the credit rating, the lower the coupon rates and vice versa.

Buyers of CDOs are the same entities that tend to buy bonds, as CDOs are essentially bonds with collaterals that are of varying risks and credit ratings.

As CDOs tend to pay higher coupon than corporate bonds of similar ratings, they were popular among investors and private banks in the past. After the Global Financial Crisis in 2008, trading in the CDO market is mainly by sophisticated investors.

2.5 Foreign Exchange Derivatives

Foreign exchange (FX) is the largest traded instrument in the world, with a turnover of over USD5 trillion a year, based on Bank of International Settlement's Triennial Central Bank Survey. As there is no official exchange for foreign exchange (other than currency futures), essentially the bulk of the turnover in FX and its derivatives is carried out over-the-counter. The examples of foreign exchange derivatives are FX forwards, FX swaps and FX options. FX forwards and swaps are discussed in the coming chapters.

FX options are also similar in idea to the equity options. However in FX, there are two currencies involved.

For example, Mr. A could buy a call FX option if he expects the US Dollar versus the Japanese Yen to be bullish. He anticipates that the US Dollar will strengthen, while the Japanese Yen will weaken. He would "buy a USD call, JPY put".

The FX Derivatives market is known as the most developed by virtue of its large daily turnover. It is here where many different types of exotic options like Knock-ins, Knock-Outs, Reverse Knock-Ins, Reverse Knock-Outs, One-Touch, No-Touch are quoted.

3. Uses of OTC Derivatives

OTC derivatives provide customised solutions for investors who want risk and reward profiles that are different from buying and owning the underlying security or instrument.

Some common uses of OTC derivatives include:

- Hedging
- Investment and speculation
- Leverage

3.1 Hedging

With customisable contracts to be negotiated with the opposing counterparty directly, an OTC derivative can be structured to match exactly the kind of risks that a buyer wants to hedge. For example, an option holder could choose a maturity date of the options.

Case study:
Due to outstanding performance as a bank employee, Mr. A has 1,000 shares of his employer's bank stock vesting on 28th December. He could buy a put option with a strike price of 3% lower than the underlying share price that expires on 28th December, in order to hedge against the bank stock price falling too steeply.

On 28th December, if the bank stock price did not fall or raise much, then Mr. A would have wasted his money buying the put option. However, Mr. A is still better off as he could sell his by now vested bank shares without losing anything other than the cost of the put option.

If the bank stock rallied a lot on 28th December, Mr. A would be happier as he can sell his now vested bank shares at the much higher price.

If the bank stock fell a lot by 28th December, Mr. A is protected as he could now sell his vested bank shares at the put option strike price, which is limited to just 3% lower.

Overall the hedging strategy would ensure that the outcome for Mr. A would not be worse, which is what hedging is all about.

3.2 Investment/Speculation

Just like one could invest directly in the underlying securities or instruments, one could also choose to invest in them via derivatives. There are advantages and disadvantages of choosing to express a view via exchange-traded derivatives compared to OTC derivatives. The key difference lies in the types of views one wants to express. If one wants the flexibility and risk profile offered by an Option for example, then one would most likely have to go the OTC derivatives route for maximum customisation and benefit.

The difference between investment and speculation is quite vague. Irrespective of whether one tends to invest or speculate more, OTC derivatives could have a role to play.

Example: One could limit exposure to loss by buying an option. All that the buyer could lose would be the premium paid for the option.

Case I:
Mr. B has a view that ABC Berhad stock would be going up in the next six months. Mr. B could buy a ABC Berhad call option at a strike price of 5% higher than the underlying share price for a period of six months.

Six months later, if his view turns out to be wrong, all he would lose would be the premium paid for the option.

If his view turns out to be right, that is the stock price rallied higher than his strike price of 5%, then he would have gained.

Case II:
Mr. C has a view that ABC Berhad stock would be going up in the next three months by up to another 10% and no more. Mr. C could buy a ABC Berhad call option strike say 5% higher and sell two times the amount of call option strike 10% higher, all for a period of 3 months. Chances are Mr. C would pay only a small premium on a net basis as he sold more options than he bought.

Three months later, how much money Mr. C makes or loses depends on where ABC Berhad's shares are trading.

If the ABC Berhad stock is trading lower or only up to 5% higher, Mr. C would only lose his premium paid.

If Mr. C's view is right that ABC Berhad stock is trading between 5% and 10% higher than it started, that's when Mr. C makes money. He makes the most money if ABC Berhad stock is exactly 10% higher. Note that when ABC Berhad starts stock to trade higher than 10% and up to 15%, he would gradually make less and less money.

If ABC Berhad stock is trading much higher, i.e., >15% higher than when it started, Mr. C would start to lose money because he had sold twice the amount of a 10% call.

3.3 Leverage

There are two types of leverage a derivative could offer. The first is by virtue of the structure of derivatives, where it is in itself a leveraged instrument. The second leverage offered by the counterparty or broking, dealing, or securities houses and it is related to trader's creditworthiness or relationship with the institution.

The first type of leverage exists in most exchange-traded derivatives and OTC derivatives, and varies only with the types and terms of the derivatives that are entered into.

The leverage offered by the second type varies but one is more likely to find slightly better terms in OTC derivatives simply because everything could be negotiated.

With both types of leverage, derivatives traders could have a magnified gain or loss profile that is not possible from merely investing in the underlying instruments. This enables traders with a smaller capital amount to participate more in a market move. It is important to realise that leverage cuts both ways, where the trader could make many times more if he is right and also possibly losing just as much if he is wrong.

Example: A trader who has limited capital could have a strong view of a particular underlying instrument. He could buy an option to express his view.

Case:
Mr. D has a view that the S&P500 index is looking expensive and is about to have a meaningful correction. He could buy an S&P500 put option strike say 20% lower for six months for very little premium.

Within the next six months, if S&P500 did have a major correction exceeding 20%, he would be making a lot of money due to the large leverage he has from buying the “low delta” option. He would be making much more than he would as he might have found it difficult to borrow and short US stocks with his small amount of capital. Note that he doesn’t need to hold the option to maturity to be able to make money as he could easily sell off the option anytime within the six months period.

If he turns out wrong and the S&P500 index stays where it was or rallied even more, all he would lose would be the small premium he paid to buy the option.

4. Hedge Accounting

Accounting for derivatives instruments at fair value creates a common issue for companies that hedge risk using such instruments. Specifically, such companies may face an accounting mismatch between the derivatives instruments which is measured at fair value, and the underlying exposures which are recognised assets or liabilities that are accounted for on a cost or an amortised cost basis, or future transaction that have yet to be recognised. These accounting mismatches result in volatility in the financial statements as there is no offset to the change in the fair value of the derivatives instruments.

Hedge accounting provides this offset by effectively eliminating or reducing the accounting mismatch through any of the following:

Fair Value Hedge
It is achieved by accounting for the underlying exposure, assets or liability (the hedge item) by adjusting the carrying value for changes in the hedge risk, which would then offset (to the extent effective) the change in the fair value of the derivatives instruments.

Cash Flow Hedge
Changes in the fair value of the derivatives instrument are deferred in shareholders' equity (to the extent effective) until the underlying exposure impacts the income statement in the future.

Net Investment Hedge
A variation on a cash flow hedge, it is used to hedge foreign exchange risk associated with net investments in foreign currency denominated operations.
Used this way, an OTC derivative is broadly similar to hedging. The main difference is that in hedging, there is no requirement for the hedge and the underlying risk it is hedging to be matched off exactly.

As the underlying risks to be hedged differ between companies and are usually unique, one is less likely to find an effective hedge from an exchange-traded derivative. As such, OTC derivatives are often used instead to create a hedge that could better match against the risks of the underlying.

For example, a company that has exposure to floating rate loans may be exposed to mark-to-market losses in a rising interest rate environment.

Case:
In their normal course of business, Corporation A has issued a bond linked to the USD LIBOR, that is Corporation A pays this floating interest rate. For this bond issuance, Corporation A's source of financing the above payment is from fixed

quantum receivables from their monthly sales. As interest rates are rising, Corporation A find that they are increasingly exposed to the higher (floating) interest payments. Corporation A would thus like to find a hedge against the higher USD LIBOR.

Corporation A entered into an interest rate swap (IRS) where it will receive floating USD LIBOR against paying fixed monthly, with expiry matching the bond's maturity date. The notional amount of the IRS also matches exactly the outstanding bond notional amount.

In doing so, what Corporation A receives from the IRS would be used to pay the floating rate of the bond, thus eliminating the interest rate risks. This would be a highly effective hedge that almost effectively matches 100% of the underlying risks from the floating rate bond, and would qualify for hedge accounting.

5. Risks associated with OTC Derivatives

Risk associated with OTC derivatives can be divided into two types:

- Risks of derivatives in general
- Risks specific to Over-the-counter derivatives.

5.1 Risks of Derivatives in General

Understanding the Structure

Derivatives are in theory a zero-sum game. For every loser, there is also a winner. It is highly risky if a trader enters into a derivative contract without first understanding the structure, the underlying instrument, and/or the risks of the derivative. By the same token, it could also be highly lucrative if a trader understands it well enough to take advantage of market mispricing.

A derivative is much more than trading on the underlying security or instrument. If a trader buys an underlying security or instrument, he/she would make a profit or loss in a linear fashion. For example, a trader would profit RM1 for a RM10 investment if the value of the underlying instrument increases by 10%, or loses RM1 if the value of the underlying instrument decreases by 10%.

For OTC derivatives, the profit and loss may not be linear and it depends on the structure of the derivatives.

For example, in a derivative structure called accumulator, the buyer of the accumulator structure is required to periodically buy shares of an underlying security at a pre-determined strike that is lower than the current prices. This gives the buyer of the accumulator a chance to accumulate the underlying security.

This all sounds good, as who doesn't want to buy shares cheaper than current level? Many bought into the structure based on this understanding. What happens when stocks prices keep declining? The buyer of accumulator needs to buy the shares periodically, at prices now higher than the then going market price in a rapidly falling market. That's when large losses build up as many investors are not familiar with the risks of the structure and don't have the means or knowledge to hedge a rapidly falling stock price.

Accumulators were subsequently prohibited in certain jurisdictions, as regulators found that buyers were not sophisticated enough to understand the risks of the product. Some products like "mini-bonds" structures were also prohibited after the 2008 Global Financial Crisis due to similar reasons and mis-selling by product sales staff.

In conclusion, buyers should understand how derivatives instruments are traded, such as the risk and return profile of the instruments.

Leverage

Very often, people think derivatives are risky because they tend to make or lose money quickly with derivatives. What many do not realise is that very often, derivatives are not risky because of the volatility of the underlying instrument, but it is risky due to the leverage offered.

Take for example that of foreign exchange spot, forwards, non-deliverable forwards (NDFs) and options. Many investors and speculators make or lose millions in minutes by trading them, so it creates the impression that FX and its derivatives are very risky. What most fail to appreciate is that the volatility of foreign exchange (e.g., US Dollar versus Japanese Yen) is far less than the volatility of a typical stock (e.g., Apple, Facebook). Then why is FX perceived as riskier than buying a blue-chip stock like Apple? The answer lies in the leverage that one is accorded when buying FX versus stocks.

It is quite common to find leverage of 20 times given to retail investors to trade in FX contracts. In comparison, traders would struggle to find leverage of more than two times in trading stocks. As such, a relatively small movement in FX is magnified many times more compared to stocks, and the

corresponding gains or losses made FX and its derivatives look like extremely risky instruments.

An example of high leverage gone wrong happened on 15 Jan 2015. On that day, the Swiss National Bank (SNB), the central bank of Switzerland announced that it would stop supporting the Euro against Swiss Franc (EUR/CHF) exchange rate at 1.20. That level was explicitly supported by SNB for years, resulting in many traders taking huge positions betting that SNB will not let it fall through 1.20. These huge positions are in the magnitude of 20, 50 or even over 100 times leverage.

When SNB stopped supporting EUR/CHF at 1.20 on 15 Jan 2015, EUR/CHF fell sharply and found support only around 1.04, several seconds later. What that means is that traders who were "long" EUR/CHF are now staring at losses of over 13% in a matter of seconds. Now if one is leveraged about 50 times on average, and has a EUR100 million position, one would have just lost about EUR13 million in seconds, with their capital of just EUR2 million completely wiped out and owing the counterparty some EUR11 million!

Now while what happened to EUR/CHF on 15 Jan 2015 is a "black swan" event in the FX market, it highlights the incredible risks one is exposed to, should one not manage leverage in a responsible manner.

In conclusion, it is best to leverage only up to an amount where the trader could afford to lose it all.

Market Risks

As with any investment, there is always a market or price risk. Markets and securities move up and down, and so do the prices of derivatives that are referencing these securities. The more volatile the underlying securities or instruments, the higher are the market risks of the derivative.

On top of the usual market risks linked to market movements of the underlying, derivative tends to magnify the moves even more due to the 'second order' effect it sometimes has.

Take for example an option for a stock. The option is not only a leveraged play on the underlying stock, it is also a play on the volatility, convexity, and other risk factors. As such, derivatives prices are often more volatile than the underlying securities prices.

5.2 Risks Unique to Over-The-Counter Derivatives

Counterparty Risks

Counterparty risks, or counterparty credit risks, exist in both exchange-traded derivatives (ETD) and OTC derivatives. For ETD, the counterparty is the central clearing house, and its risks are deemed to be miniscule, especially if backed by the country's regulators. For OTC derivatives, the counterparty is the other dealing party, which could be a bank, a fund, a financial institution, or another corporate with opposite interests.

The counterparty risk is much higher for OTC derivatives as the market is not regulated and all terms are agreed bilaterally. The credit rating and credit worthiness of the counterparty are important risks but are often ignored when times are good. During the 2008 global financial crisis, the importance of having a strong and credible counterparty became obvious. When Lehman went into trouble, the businesses, lending practices and financial strengths of counterparties came into acute focus, but it was too late for many.

For an ETD, the mechanism of daily margin mitigates the counterparty risks further. That is typically not present in OTC derivatives, where weekly or monthly mark to market is more commonplace. For small and medium size corporations lacking robust monitoring process due to lean manpower, the credit risks would be even higher, should the underlying instrument be highly volatile.

Separately, when one opens and closes a trade on an exchange, the risks are net off irrespective of which counterparties you traded with, and one is left with no open position. This is not the case if one opens OTC derivatives with one party and closes the same OTC derivatives with another party. One will still be exposed to the credit risks of both parties until the maturity of the OTC derivatives. In this case, if both counterparties went belly-up, one, in theory has to pay the party on the winning side of the OTC derivatives, while possibly receive nothing from the losing side of the OTC derivatives.

Liquidity Risks

Liquidity risks come about when the trader intends to close out a derivative trade prior to maturity. With exchange-traded derivatives, the price is more transparent, and liquidity tends to be better in general for more liquid contracts. With OTC derivatives, the price can only be obtained by asking a broker, the counterparty who has the other side of the trade, or another party.

Getting a price quote is a risk for OTC derivatives as sometimes the counterparty whom you entered the trade with initially might have squared off the risks with another inter-bank or dealer, and so may not be able to quote you a price at all.

Even when the trader could get one or more counterparties to quote prices for OTC derivatives, the trader still has a risk of wide bid-ask spread. This could mean the cost of closing off an OTC derivative could be much higher than for an ETD.

Generally, derivatives by nature are complex instruments. OTC elements can make derivatives even more complex as the structures are unlimited and evolves by the day. It is thus worthwhile to ask the counterparty for a detailed term sheet that lists the best, likely and worst scenarios and understand the structure thoroughly before considering trading OTC derivatives.

In Summary

The OTC marketplace is made up of a network of dealers and banks, dealing with each other directly instead of through a central exchange. The types of OTC derivatives traded include options, forwards and swaps. As OTC derivatives are bilateral contracts, they tend to be less structured and highly customisable.

There are six common types of OTC derivatives; equity, commodity, interest rate, fixed income, credit and foreign exchange. Each of the derivatives derive its value from the respective underlying asset class. The common uses of OTC derivatives include hedging, investment or speculation and leverage.

The risks of OTC derivatives may be magnified due to leverage. Other risks specific to OTC derivatives include counterparty risks and liquidity risks.

Activity

1. Which of the following statements is FALSE regarding OTC derivatives?

   (A) OTC derivatives are typically bilateral contracts between two parties
   (B) Clearing house is used to clear OTC derivatives
   (C) OTC derivatives' pricing are usually less transparent
   (D) One can square off an open OTC derivative with another counterparty

2. Which of the following statements is FALSE for an equity option?

   (A) An equity call option gives the owner the right but not the obligation to buy an agreed amount of stocks at a specified price
   (B) American-style option allows the option holder to exercise the option at any time on or before the expiry date
   (C) The owner of an equity call option could only exercise the option if the stock ends at or above the strike price on expiry date
   (D) The seller of an equity call option is exposed to an unlimited amount of potential losses

3. Mr. A currently owns the stock of XYZ Berhad. With the company results due next week, he is confident the stock price would fall. Which of the following OTC derivatives best suit his view?

   (A) Buy XYZ Berhad's call option or Sell XYZ Berhad's put option
   (B) Sell XYZ Berhad's call option or Sell XYZ Berhad's put option
   (C) Buy XYZ Berhad's call option or Buy XYZ Berhad's put option
   (D) Sell XYZ Berhad's call option or Buy XYZ Berhad's put option

4. Which of the following is not a valid use of a bond swap?

   (A) Swapping a bond of lower credit rating to a higher rating
   (B) Swapping bonds to improve the total portfolio returns
   (C) Swapping bonds for a longer or shorter duration
   (D) Swapping bonds to evade taxes

5. Stock A is trading at RM8.80. Which of the following do you think is closest to being the “right” price?

   (A) Stock A’s call option strike at RM9 for 1 week costs 1% of notional amount
   (B) Stock A’s call option strike at RM99 for 1 month costs 1% of notional amount
   (C) Stock A’s put option strike at RM10 for 1 week costs 1% of notional amount
   (D) Stock A’s put option strike at RM100 for 1 month costs 1% of notional amount

Suggested Answers to Activity

1. (B)
2. (C)
3. (D)
4. (D)
5. (A)

Topic 2: Forward Contracts

Contents

1. Basic Concepts and Features of Forward Contracts
2. Uses of Forward Contracts
3. Risks of Forward Contracts
4. Mechanics and Applications of Forward Contract

Learning Objective

- Demonstrate understanding of forward contracts
- List the feature of forward contracts
- Describe the mechanics of forward contracts
- Compare the different applications of forward contracts
- Calculate the payoffs for parties in a forward contract
- Analyse the risks of forward contracts

1. Basic Concepts & Features of Forward Contracts

A forward contract is a customised arrangement between two parties to buy or sell an asset at a specified price at a future date. Its settlement terms, including the forward price, are agreed at the onset of the contract. A forward contract settlement can occur on a cash or physical delivery basis. The party who is buying the contract is known as the buyer, who is going long, while the party who is selling the contract is known as the seller, who is going short.

Forward contracts are transacted on all types of financial instruments and commodities. The transaction is not publicly reported as the contracts are not traded on formal or regulated exchanges. Forward contracts are essentially private contracts transacted over-the-counter (OTC) and is subject to the risk of default by counterparties. Therefore, the contracts are usually carried out between two parties of high creditworthiness and the transaction sizes tend to be large. Unlike futures contracts, forwards do not have standardised terms, such as the size of each contract, settlement currency and expiry dates. Most forward contracts transacted are based on currencies and commodities.

Forward markets are loosely organised and have no physical location devoted to the trading. The best developed forward market is the market for foreign exchange, which comprises mainly of a worldwide network of banks and brokers with no organised exchange nor central trading point. Unlike futures contracts, forward contracts have customised terms. Below is a table comparing forwards and futures contracts:

Forward Contract	Futures Contract
Over-the-counter	Exchange traded
Customised terms	Standardised terms (contract size, maturity and other specifications)
Margin may not be required	Initial margin required
Settlement occurs at the end of the contract	Daily mark-to-market
Private agreements, leading to higher default risk	Clearing house guarantees the transaction, leading to significantly lower default risk
Self-regulated	Regulated by the exchange
Lower liquidity (exception for forex)	Higher liquidity

Forwards have a limited lifespan usually of less than a year. They are also considered leveraged instruments because for a small amount or no cash outlay, an investor can profit from price movements in the underlying asset without immediately having to pay for the full value of the underlying asset.
Forward price for a forward contract is defined as the delivery price, which makes the value of the contract at initiation to be zero.

Forward contract value = Forward Price – Delivery Price

Delivery Price = Spot Price + Cost of Carry; *and*

Cost of Carry = Cost of Fund + Storage Cost

At initiation:

Forward price = Spot Price + Cost of Funds + Storage Cost,

Hence,

Forward contract value = 0

The forward price $F_{(t,T)}$ priced at time t for delivery at time T is the sum of the current/spot price $S_{(t)}$ at time t plus the cost of storage $C_{(t,T)}$. This relationship can be represented as:

$$F_{(t,T)} = S_{(t)} + [S_{(t)} . r_f . (T - t)/360)] + C_{(t,T)}$$

The day-count convention is the system used to calculate the pro-rated value of the interest rate. The interest on most money market deposits and floating- rate notes are calculated on an actual/360-day basis. The major exceptions are those denominated in the British pound (and AUD, NZD, HKD), for which interest is calculated on the actual/365 basis.

Example:

Spot price of one ton of commodity is RM100,000
6-month interest expenses; i.e., cost of funds of RM100,000 is RM500 (1% interest rate p.a.)
Storage cost of one ton of commodity for 6 months is RM600

6-month forward price of one ton of commodity
= RM100,000 + RM500 + RM600 = RM101,100

2. Uses of Forward Contracts

Forward contracts can be used for hedging, speculating and arbitraging purposes. Below are examples of forward contract usage:

- Hedging – short forwards
  A plantation company could enter into a short forward contract to lock in the selling price of the commodity today for settlement via physical delivery at a future date. The company which wants to hedge against lower commodity prices in the future would enter into forward contracts especially if there are no futures contracts for that commodity.

  Hedging via a forward contract allows for more precise hedging in terms of the quantity of commodity to be hedged and the settlement date of the contract.

- Hedging – long forwards
  A refinery company could enter into a long forward contract to lock in the purchase price of the commodity used as raw materials, if it expects the commodity prices to increase sharply in the future.

- Speculating – long or short positions
  Traders may use derivative instruments on a particular asset for speculation purposes instead of trading in the spot market on the underlying asset.

- Arbitraging
  Traders may use forward contracts as part of a strategy to profit from pricing inefficiencies.

3. Risks of Forward Contracts

The parties to a forward contract tend to bear more credit risk than the parties to futures contracts because there is no clearing house that guarantees performance. The key risk of forward contracts is the risk of default by the counterparty (i.e., counterparty risk).

Both parties are at risk because typically no cash is exchanged at the beginning of the transaction. However, some transactions do require that one or both sides to provide some form of collateral, for protection from default by the other party.

At inception, the value of a forward contract is zero, as the price of the forward equates to its spot price plus carrying costs. As prices deviate from the forward price, one party in the contract will have a paper loss, which will be realised on settlement

date. The loss will build up as the spread between forward and spot price widens. It may come to a point whereby the counterparty decides not to honour the contract and defaults on it.

Except for the highly liquid forwards market like the forex market, some forwards are difficult to unwind or offset once it is instituted, assuming neither party defaults. Due to the customised nature of the contract, either party may find it difficult to find another party, relative to an exchange traded futures contract, to "take over" its position.

In some instances, it ties up the capital of the selling party as there are no intermediate cashflows before settlement. Contrast this to selling in the physical market whereby the proceeds of the sale would be available.

4. Mechanics and Application of Forward Contracts

Hedging – short forward contract

A plantation company expects a harvest of 100 Metric Tons (MT) of crude palm oil (CPO) at the end of September. It has decided to sell this forward at RM2,700 per MT of CPO due to expectations that there will be more supply of the commodity in the market from August onwards. The price on expiry for physical delivery turns out to be RM2,500 per MT of CPO.

If settlement is on a cash basis, the plantation company makes a profit of 100 MT x (RM2,700 – RM2,500)= RM20,000 from the forward contract from the counterparty at the end of September. The plantation company can at the same time sell 100 MT of CPO in the spot market for RM2,500 per MT and collect RM250,000. In total, the proceeds are RM270,000.

If settlement is physical, the counterparty would need to pay the plantation company that contracted forward price of RM2,700 per MT for 100 MT of CPO, for the same total of RM270,000.

Hedging – long forward contract

A refinery company needs raw materials to produce its next batch of products in 100 days' time. It has run out of stock of the crude palm oil (CPO) in its inventory. This requires the purchase of 864 metric tons (MT) of CPO and the company expects prices to be on an upward trend given the expected seasonal demand for it. The company decides to lock-in the required quantity of CPO using a physical settled forward contract at RM3,000 per MT of CPO at a cost of RM2,592,000.

In 100 days' time, prices increased to RM5,000 per MT of CPO due to low yield from the oil palm plantations because of extreme drought. But it does not matter what the price is subsequent to the contract date as the company has locked in its purchase based on the forward price.

Speculating – long or short positions

If there are no underlying assets to be hedged, an outright forward contract for the above two examples would yield profits of:

1) Short forward contract (RM2,700 – RM2,500) x 100 = RM20,000
2) Long forward contract (RM5,000 – RM3,000) x 864 = RM1,728,000

Forward Rate Agreement (FRA)

FRAs are over-the-counter interest rate forward contracts to be paid or received on an obligation beginning at a future start date. Besides the rate to be used, FRAs also determine the termination date and notional value of the contract. FRAs are cash-settled with the payment based on the net difference between the interest rate and the reference rate in the contract.

The payoff formula of an FRA (long position) is:

$$\textit{Notional principal} \times \frac{[(\textit{Underlying rate at expiration} - \textit{Forward rate})(\textit{Days in underlying-rate}/360)]}{[1 + \textit{Underlying rate at expiration}\ (\textit{Days in underlying-rate}/360)]}$$

FRAs should be contrasted with interest rate options as both parties to the contract are obligated to settle the contract based on the payoff formula described above. For options, the holder has the choice to exercise the option should the contract be in his favour.

In financial markets, the London Interbank Offer Rate (LIBOR) is most commonly used in US Dollar-based derivative contracts outside the United States. The LIBOR is the rate at which banks in London lend Dollars to other banks. Although such activities would represent loans outside the United States, LIBOR is considered the best representative rate on a US Dollar borrowed by private, high quality borrowers. If the derivative in question were to be based on another currency, for example, the Euro, then a different representative rate, such as the Euro Interbank Offered Rate (EURIBOR) in this case, would be used. As the mechanics involved in the FRA computations are the same, we are likely to see most illustrations using LIBOR as the reference rate.

The settlement of a LIBOR contract is in arrears, so if the underlying is the 180-day LIBOR, and suppose the FRA expires in 30 days, the settlement will not be in 30 days' time, but in 210 days (180 days after expiration date).

Example:

If the forward rate (180-day LIBOR) is quoted as 2.00% today, and 30 days later, on expiration date of the FRA, LIBOR increases to 2.20%, assuming a $10 million notional principal, the payoff to the holder of the FRA is:

$$\$10{,}000{,}000 \times \frac{(0.0220 - 0.0200)\,(180/360)}{[1 + 0.022(180/360)]} = \$9{,}891$$

Note that settlement is 180 days after the fixing date and expiration of the contract.

Cash-and-Carry Arbitrage on a Non-Dividend Paying Stock

This strategy is a combination of a long position in a stock or commodity plus a short position in the underlying forward contract on the asset (or vice versa) to take advantage of a mis-pricing of either the asset or its corresponding forward contract. Suppose a stock trades at RM10 today, and a forward contract on the stock (6 months) trades at RM11. The cost of carry for this asset, in which case the stock, is its financing cost as there should be no storage or insurance costs involved.

Interest rates are at 10% per annum and hence, financing cost for this case would be RM0.50. A long position on the stock plus its carrying cost would result in a theoretical price for the forward contract at RM10.50. The trader should simultaneously take a short position on a 6-month forward at RM11, thereby earning a riskless profit RM0.50 per stock.

If the forward price is less than RM10.50, then the trader should take the opposite action of shorting the stock and then taking a short position on the forward contract.

This example assumes the trader can lend and borrow at the risk-free rate and there are no transaction costs. The example also assumes that the stock does not pay any dividends.

Cash-and-Carry-Arbitrage on a Dividend Paying Stock

A variation to the above example, suppose the stock has a yield of 3% during the 6-month holding period of the trade.

The theoretical price of the forward contract would now be the stock price plus the holding cost minus the dividend yield: RM10 + RM0.50 - RM0.30 = RM10.20. If the actual forward price is above this level, the trader should take a long position in the stock and short the forward contract, and should the forward price be below this level, the opposite positions are to be taken.

The Foreign Exchange Market

The foreign exchange (FX) market is a large over-the-counter market, which operates round the clock and concurrently across major financial centres. The primary purpose of the FX market is to facilitate international trade and investments. More than 90% of the transactions involve either the inter-bank spot, forward and swap market.

Major currencies display 4 different FX quotes: spot, 30-day, 60-day, 90-day forward.

In Malaysia, the FX forward contracts have a settlement period of more than two days and up to one year. The FX forward contract is an obligation to buy or sell a certain amount of foreign currency at a pre-agreed rate of exchange on or before a certain date. To better understand the mechanics behind FX forward contracts, we need to first understand FX quotations, currency cross-rates and arbitrage.

The three largest FX trading centres as of April 2016 are London, New York and Singapore. The FX market involves financial institutions, central banks, corporations, and individuals buying and selling foreign currencies in a network of computers and communications equipment.

Between 1944 and 1971, the exchange rate regime was under a fixed exchange rate system where currency values are pegged to the US Dollar or gold. Since 1971, most countries adopted a flexible exchange rate system whereby the value of their currencies relative to other currencies is to be determined largely by market forces.

FX Quotations

A FX transaction involves the purchase of one currency against the sale of another currency for settlement on or before a specified date. The rate of exchange is the price per unit of one of the currencies expressed in units of the other currency.

Spot Quotations

They can be expressed as an American term (USD/foreign currency) or European term (Foreign currency/USD). Trades involving the USD (except for UK and Irish pounds) are mostly expressed in European terms. For example, the Japanese Yen trades would be quoted as JPY120 = USD1.

Banks would give a direct quotation when dealing with retail customers, the home currency price per standard quantity (1, 10, 100 or 1000 units) of foreign currency. If the exchange rate is MYR3.00 = SGD1.00 and in Malaysia, the quote would be Malaysian Ringgit 3 per Singapore Dollar. The foreign currency is the base currency in a direct quote. A direct quote is also known as a price quotation.

An indirect quotation would be stated in terms of foreign currency per standard unit of the home currency. The domestic currency is the base currency in an indirect quote. An indirect quote is also known as quantity quotation.

American Terms	European Terms
USD per unit of foreign currency	Foreign Currency per USD
A direct quote in the US	A direct quote outside the US
An indirect quote outside the US	An indirect quote in the US

The Bid-Ask Spread

Spread percentage (%) = (Ask – Bid)/Ask x 100

Typical spreads for the widely traded Pound Sterling, Japanese Yen and Euro would be 0.05%-0.08%, but the spreads for forwards would normally be about double of its spot market spread. These quotes are for institutional customers for transactions between USD1 – USD10 million.

Spreads differ from market to market for the same currency but the difference would be very small for the widely traded currencies listed above. The differences in currency spreads are normally due to:

- Market conditions: volatile markets lead to wider spreads.
- Bank/dealer positions: fewer participants lead to wider spreads
- Volume : less liquidity leads to wider spreads
- Length/maturity : longer settlement leads to wider spreads

Currency Cross-Rates

Since most currencies are traded and quoted against the USD, we can work out the exchange rates between two non-US countries by using cross-rates. For example:

Japanese Yen: JPY110 /USD
Malaysian Ringgit : MYR4.40/USD

In Malaysia, the direct quote (MYR per JPY) for Japanese Yen would be:

MYR/USD = 4.40 = MYR0.0400 / JPY or MYR4.00 per JPY100
JPY/USD 110

The calculation for cross-rates is straightforward when the quotes given are average rates. The computation becomes complicated when bid-ask quotes for the two currencies are given. The bid-ask quotes are often stated with the final two decimals of ask quote displayed.

For example if the MYR/USD quotation is 4.4000 buying and 4.4050 selling, it would be quoted as MYR4.4000 – 50 / USD

Example:
Malaysian Ringgit : 4.4000-50/USD
Japanese Yen: 110.00-40/USD

In a local market, a direct quotation would therefore be stated as:

$$\textit{Bid Cross-Rate for Foreign Currency} = \frac{\textit{Bid Rate for Local Currency/USD}}{\textit{Ask Rate for Foreign Currency/USD}}$$

$$\textit{Ask Cross-Rate for Foreign Currency} = \frac{\textit{Ask Rate for Local Currency /USD}}{\textit{Bid Rate for Foreign Currency/USD}}$$

Bid Cross-rate for JPY = Bid Rate for Malaysian Ringgit /Ask Rate for Japanese Yen
= MYR0.03986/JPY

Ask Cross-rate for JPY = Ask Rate for Malaysian Ringgit / Bid Rate for JPY
= MYR0.04005/JPY

Triangular Currency Arbitrage

A triangular currency arbitrage is a sequence of simultaneous transactions that yield a riskless profit, taking advantage of the exchange rate inconsistencies in three currencies. These trades straddle across several money centres.

> Example A:
> If a US trader finds the quote in Singapore SGD1.3850 = USD1, he would sell USD1 million to buy SGD1,385,000.00. At the same time, London's quote for Singapore Dollars, GBP1 = SGD1.8000, he changes the SGD1,385,000 for GBP769,444.44. And immediately resells the Pound Sterling in New York at the rate of GBP1 = USD1.3025, for USD1,002,201.38.
>
> If there were no transaction costs, the arbitrage profit would be USD2,201.38 per million of USD traded.
>
> The impact of the arbitrage would bid up the price of Singapore Dollars against the USD in Singapore, and depreciate Singapore Dollars against Pound Sterling in London but the Pound Sterling would depreciate in New York.

Forward Quotations

The forward rate can be quoted in two distinct ways: the outright rate (direct or indirect quotation as noted above) and the swap rate. Retail customers are normally quoted the former, and interbank dealers use the latter.

The swap rate is the forward rate quoted as a premium or a discount from the spot. A forward discount for a foreign currency occurs when the forward rate quoted in dollars is lower than the spot, and vice-versa for a forward premium.

$$\textit{Forward premium (discount)} = \frac{\textit{Forward Rate} - \textit{Spot Rate}}{\textit{Spot Rate}} \times \frac{360}{\textit{forward contract days}}$$

To convert the above annualised rate into percentage terms, multiply by 100. The convention for the rates would be domestic currency/ foreign currency.

Assuming the following quotation is based in the United States, where the spot rate is $0.007960/JPY and forward rate is $0.008184/JPY

$$\text{Forward Premium} = \frac{0.008184 - 0.007960}{0.007960} \times \frac{360}{180} = 0.0563$$

The 180-day forward Japanese JPY is selling at 5.63% annualised premium. If JPY is at a forward premium, then it is the currency that is expected to strengthen.

Introduction to the Gold Market

In the gold market, there are alternatives available for investors who want to hedge or speculate. They may use gold futures which are quoted on exchanges or trade in spot gold, forwards and swaps in the over-the-counter market.

Based on statistics from the World Gold Council for 2016, the three most important gold trading centres are the London OTC market, the US futures market (COMEX) and the Shanghai Gold Exchange (SGE). These markets comprise more than 90% of global trading volumes

The London OTC Market

The London OTC market has historically been the centre of the gold trade and was the most important gold market until the 1970s when COMEX started to trade gold futures. Today the London OTC market comprises approximately 70% of global notional trading volume based on the World Gold Council's estimates.

The London Gold Market is part of the London Bullion Market, which is a wholesale over-the-counter (OTC) market for the trading gold and silver, coordinated by the London Bullion Market Association (LBMA). It is a wholesale market and the usual minimum size of transaction is 2,000 ounces of gold. It is a decentralised over-the-counter dealer market, whereby dealers independently quote bid and ask prices and trades. Market makers in each product (spot, forwards and options) are obliged to provide bid-offer price quotations, in agreed quantities for that product during London market trading hours. These market making members of LBMA are London-based entities of international investment banks. Other bullion banks who are ordinary members of LBMA also trade in the London OTC gold market but they are not obliged to make two-way price quotations. Participants in this market also include brokers and customers of the banks and brokers.

On 20 March 2015, ICE Benchmark Administration Ltd (IBA) became the administrator for the LBMA Gold Price, which replaced the London Gold Fix as the principal global benchmark for daily gold prices. IBA operates electronic auctions for spot and unallocated loco London gold. The auctions are run at 10:30am and 3:00pm London time and the final auction prices are published to the market as the LBMA Gold Price AM and the LBMA Gold Price PM, in US Dollars.

The final benchmark price is converted into multiple currencies including: Australian Dollars, British Pounds, Canadian Dollars, Euros, Onshore and Offshore Yuan, Indian Rupees, Japanese Yen, Malaysian Ringgit, Russian Rubles, Singapore Dollars, South African Rand, Swiss Francs, New Taiwan Dollars, Thai Baht and Turkish Lira. The gold auctions settle against US Dollars only. The benchmarks in the other currencies are not tradeable directly through the auction.

The US Futures Market

Despite London's leading role in the physical market, the COMEX derivatives exchange operated by CME Group has become an increasingly important venue in driving price discovery. Trading activity on COMEX is primarily concentrated on the nearest dated contract month which acts as a proxy for the spot price. Only a small number of contracts physically settle into delivery of bars into COMEX vaults but the market is nonetheless tightly linked to physical markets through a very active Exchange for Physical (EFP) market. Notably, a steadily increasing share of COMEX volume is transacted during Asian market hours reflecting the exchange's success of tapping into Asian market growth.

The Chinese Market

The largest purely physical spot exchange in the world is the Shanghai Gold Exchange (SGE). Established in 2002 under close oversight of the People's Bank of China, SGE has enjoyed a rapid rise to prominence that has mirrored China's growing importance in the gold market. In 2016 SGE introduced the Shanghai Gold Price benchmark to cement China's role as a price-setter, to help the internationalisation of the Renminbi (RMB) and to broaden international participation in the Chinese market. It should be noted that SGE's spot and deferred contracts are complemented by very active futures trading on the Shanghai Futures Exchange (SHFE), although the two exchanges are not directly related.

Gold Forwards

Gold forwards (gold forward contracts) are not traded in organised markets. Because there is no clearing house and no mark-to-market mechanism, forwards have counterparty risk. Forwards are not standardised, and they can customised to meet the investors' needs. Therefore, a gold forward contract is a transaction whereby two parties agree on the purchase and sale of gold at a future date. These bilateral contracts often contain terms that are party specific that are difficult to transfer readily to other parties. Investors usually pay larger premiums for the privilege of customisation.

Clearing and settling in the London Bullion Market is provided by the London Precious Metal Clearing Limited (LPMCL) – which is owned and operated by the five clearing LBMA members. Traditionally, bilateral credit arrangements are made between two parties of a gold forward contract. This method has been used for many years, and makes up the majority of all forward trades but alternatives exist.

Members of a common 'Central Counterparty'(CCP) in the London OTC market that has a facility to clear forwards may novate their trades and thus avoid bilateral credit risk. In the absence of an exchange, these OTC trades have the ability to be cleared. This method of credit mitigation is known as OTC Cleared. The parties agree the parameters of the trade and then pass the trade to the CCP. The CCP then becomes the principal to the trade and margins the open positions between its members.
Other clearing houses include CME Clearport and LME Clear. Both clearing houses use a central counterparty clearing model.

Application for Gold Forwards

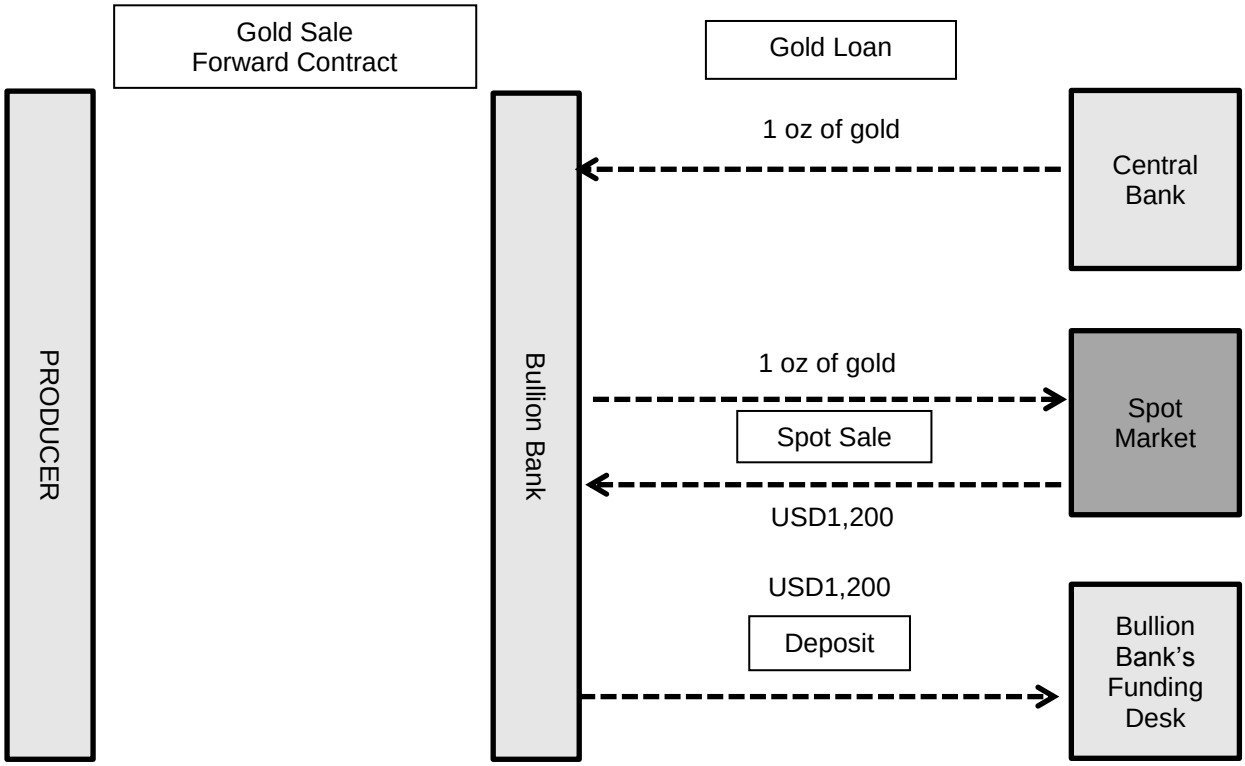
Gold forwards enable producers to enter into a contract to sell its gold production at a fixed price. This is usually the case when the producer expects a higher price in the future and wants to lock in this price and futures contracts aren't a good fit to its specifications.

For the forward gold sale to proceed:

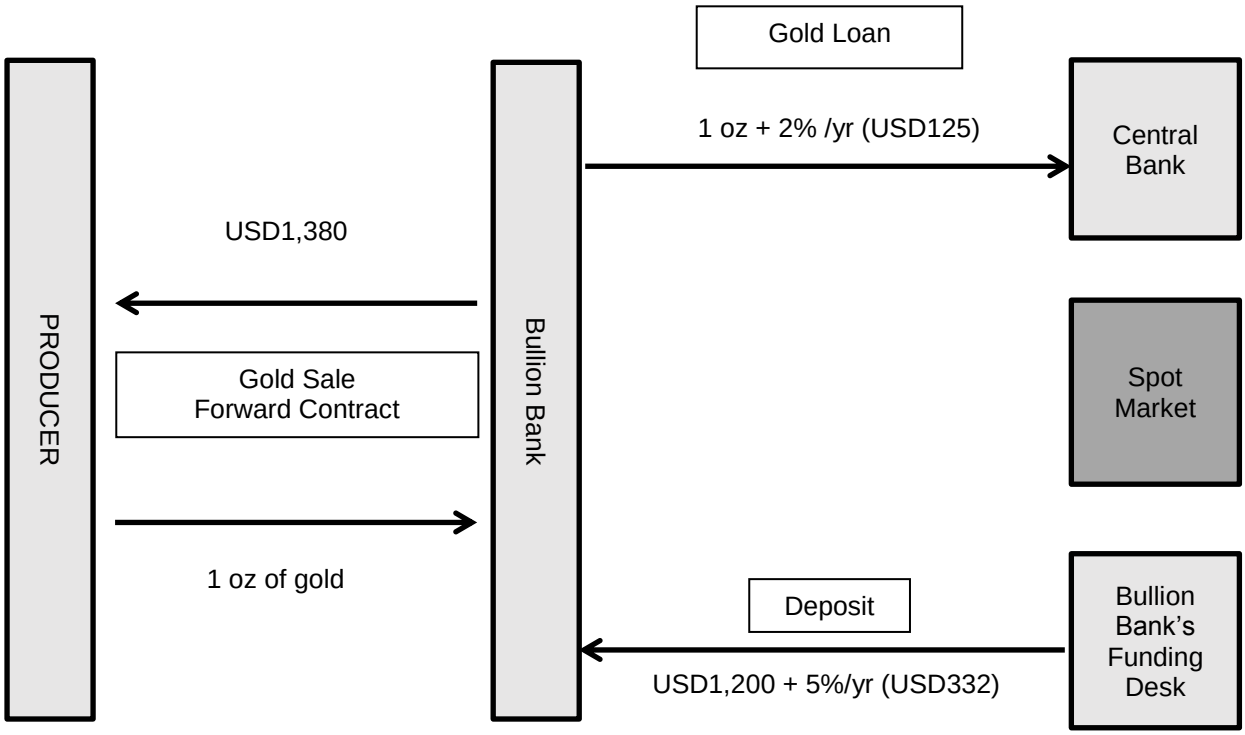
1) A producer sells forward and delivers the physical gold on settlement;
2) A bullion bank, which plays an intermediary role in creating the gold lending and gold hedging market, and
3) A central bank which lends the gold

In the following diagram, the producer sells gold at a forward price of USD1,380. The spot price is at USD1,200. At the same time, the bullion bank leases the same quantity of gold from the central bank at a gold lease rate of 2%. The bullion bank would sell this gold in the spot market and obtains USD1,200, and uses this cash as a deposit with its internal funding desk to earn interest at 5%.

Flows Upfront



Flows at Maturity (at the end of 5 years)



For each ounce of gold,

1) The producer secures a premium of USD180 higher forward premium than spot and faces potential opportunity cost should the spot price on maturity date is higher than this forward price.
2) The bullion bank profits from the arbitrage transaction such that on maturity date, it makes USD27 (inflow of USD1,200 + USD332, and outflows of USD1,380 and USD125). It faces a potential counterparty risk of the producer not delivering the physical gold.
3) The central bank receives USD125 for lending the gold. It faces a potential counterparty risk of the bullion bank not returning the physical gold it had borrowed.

In Summary

A forward contract is a customised over-the-counter (OTC) arrangement between two parties to buy or sell an asset at a specified price at a future date.

Forward contracts can be used for hedging, speculating and arbitraging purposes and are transacted on all types of financial instruments and commodities. The key risk of forward contracts is the risk of default by the counterparty.

The foreign exchange (FX) market is a large OTC market, which operates round the clock and concurrently across major financial centres. Its primary purpose of the FX market is to facilitate international trade and investments.

Investors may hedge or speculate in the gold market through the use of exchange traded gold futures, or spot gold, forwards and swaps in the OTC market.

Activity

1. Which of the following is a feature of forward contracts? Forward contracts are:

   (A) exchange traded
   (B) marked to market on a daily basis
   (C) regulated by an exchange
   (D) settled only at the end of its contract

2. Forward contracts are used for a variety of purposes. Which of the following is LEAST likely use for forward contracts?

   (A) Arbitraging
   (B) Financing
   (C) Hedging
   (D) Speculating

3. Producers of a commodity who want to protect themselves from volatile prices of its future produce would likely hedge their revenues by taking a _____ position in the forward or futures market.

   (A) long
   (B) market-neutral
   (C) short
   (D) speculative

4. Before you head off for a 1-month holiday within ASEAN counties, you visit a local bank to change some money. Banks would give a direct quotation, whereby the base currency would be the _____.

   (A) home currency
   (B) foreign currency
   (C) unit currency
   (D) US Dollar

5. The spot rate for Japanese Yen (JPY), when quoted in the United States, is USD0.009515, and the 180-day forward rate is USD 0.009588. The JPY is trading at a forward _____ and it is expected to _____ against the US Dollar.

   (A) discount, strengthen
   (B) premium, strengthen
   (C) discount, weaken
   (D) premium, weaken

Suggested Answers to Activity

1. (D)
2. (B)
3. (C)
4. (B)
5. (B)

Topic 3: Swap Contract

Contents

1. Basic Concepts and Features of Swap Contracts
2. Uses of Swap Contracts
3. Risks of Swap Contracts
4. Mechanics and Applications of Swap Contract
5. Foreign Currency Swaps
6. Equity Swap
7. Commodity Swaps
8. Credit Derivatives
9. Credit Default Swap
10. Total Return Swap

Learning Objective

- Demonstrate understanding of swaps
- List the various uses of swaps
- Describe the mechanics of swaps
- Compare the different applications of swaps
- Analyse the risks of swaps

1. Basic Concepts and Features of Swap Contracts

Swaps are agreements between two counterparties to exchange of cashflows at fixed periodic intervals and the amount of principal that are determined at the onset of the agreements. At least one of the cashflow streams is uncertain at the inception of the agreement. The change in value of this uncertain stream could benefit one party financially. But at the onset both parties are likely to benefit from the risk management function of the swap. Like many other derivative products, swaps are a zero-sum contract.

The underlying asset of the swap is typically a debt instrument or a foreign currency. The two common types of swaps are interest rate swaps and currency swaps.

There is also the presence of swap facilitators, who match counterparties. These facilitators are acting as brokers. Alternatively, the facilitators themselves may take a position and trade for their own accounts, in which case they are acting as dealers. The facilitator, whether acting as a broker or dealer, exposes himself to counterparty risk and therefore prices the swaps such that he is rewarded for bearing the risk.

Swap dealers usually manage a large portfolio of swaps that result from the numerous transactions facilitated. Most of the swaps involve the US Dollar.

A swap transaction is only known to the two counterparties. A swap transaction hence affords privacy, which is not obtainable in exchange-based trading. The key success factor of the swaps market is its flexibility as swaps are negotiated over-the-counter.

Some limitations of the swaps market include its illiquidity and the need to find a counterparty that is willing to take the opposite side of a transaction, in order to fulfil a deal. Since swaps are so varied, this can prove to be difficult. Secondly, since it is a contract, it cannot be altered or terminated without the consent of both parties. Lastly, as there is no formal central exchange to act as guarantor for the trade, parties that swap must be certain of the creditworthiness of their counterparties. In contrast, the Futures market has a daily mark-to-market valuation and settlement procedures that limit credit risk in that there will be no unrealised value accumulated over time.

The participation in the swaps market is virtually limited to large corporations and financial institutions due to the above limitations.

2. Uses of Swap Contracts

Interest Rate Swaps

Interest rate swaps are used to hedge exposures to changes in the interest rate. Basically, an interest rate swap is an agreement between two parties to exchange one set of interest payments (could be floating rate) for another (could be fixed rate interest payments) in the same currency. Parties in an interest rate swap usually involve a bank and a company. This type of swap does not involve swapping any principal amount but it does involve the interest on the principal amount.

Exchange Rate Swaps

Currency swaps are used to hedge long-term borrowing commitments to exposures in interest rates risk and foreign exchange risk, and access to cheaper cost of borrowing. Basically, a currency swap is an agreement between two parties to exchange a series of cashflows denominated in one currency, for those denominated in another currency. Parties swap the currency amounts for an agreed period and payments of interest during a specified period of time. Unlike an interest rate swap, a currency swap requires the actual exchange of the two principal currency amounts. This exchange takes place at the beginning of the arrangement and at maturity the amounts are swapped back.

Traders also make use of interest rate swaps and exchange rate swaps to speculate on their views in the interest rates and exchange rate markets respectively.

3. Risks of Swap Contracts

The key risk of swap contracts is counterparty risk whereby there are main three factors that would affect how swaps are priced i.e., creditworthiness, availability of counterparties and term structure. Both parties to an interest rate swap additionally face interest rate risks.

Creditworthiness

Since there is no clearing house involved in a swap transaction, it is important for parties to appraise the creditworthiness of their counterparties to guard against possible defaults. But because the swap involves a periodic exchange of a net amount, interest rate swaps are not as catastrophic as a bond default as no principal amount is involved.

Because of the potential risks involved, dealers seldom undertake swaps with companies that have a poor credit standing.

Availability of Additional Counterparties

Most swap facilitators would like to act as brokers instead of dealers so that they can avoid the risk of interest rate movements and earn a fixed spread for matching two counterparties. Hence, if there is a market for certain types of swaps, the broker is likely to accept less favourable terms at his end as he knows that there are other counterparties in the market that could share his risks.

Term Structure

The term structure which is an important feature in bond pricing, has a corresponding impact on swap pricing as well. The interest rate swaps market reflects the term structure that prevails in the bond market because swap rates incorporate forward expectations of the sovereign interbank offer rate such as the KLIBOR, as the market's perception of other factors such as liquidity, supply and demand dynamics, and the credit quality of the banks involved. Consequently the swap curve is typically similar in shape to the treasury yield curve.

If the term structure is rising, then the swap dealer must charge a higher yield on swaps of longer maturity.

Interest Rate Risk

The receiver of the fixed leg, who would pay the floating rate, risks the floating interest rate going higher, thereby losing interest that it would have otherwise received. The receiver of the variable leg, who would pay the fixed rate, risks interest rates going lower, which results in lower cashflow received.

4. Mechanics and Application of Swap Contracts

Interest Rate Swaps

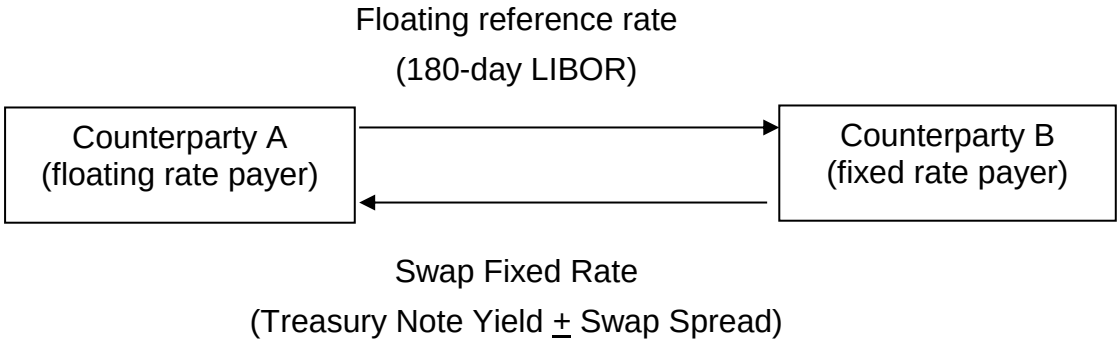
In a plain vanilla interest rate swap, one counterparty has a pay-fixed position, while the other has a floating rate obligation. The most common floating rate obligation used globally is tied to LIBOR and fixed rates to the Treasury Note Yield for US Dollar denominations. Both cash flows are denominated in the same currency. The fixed rate payer is said to have a long position in the swap, but at inception, the swap is neither an asset nor liability, and there is no exchange of principal at origination date and termination date of the swap.

At Origination

Negotiate Terms of the Transaction

No exchange of cashflow

On Each Settlement date

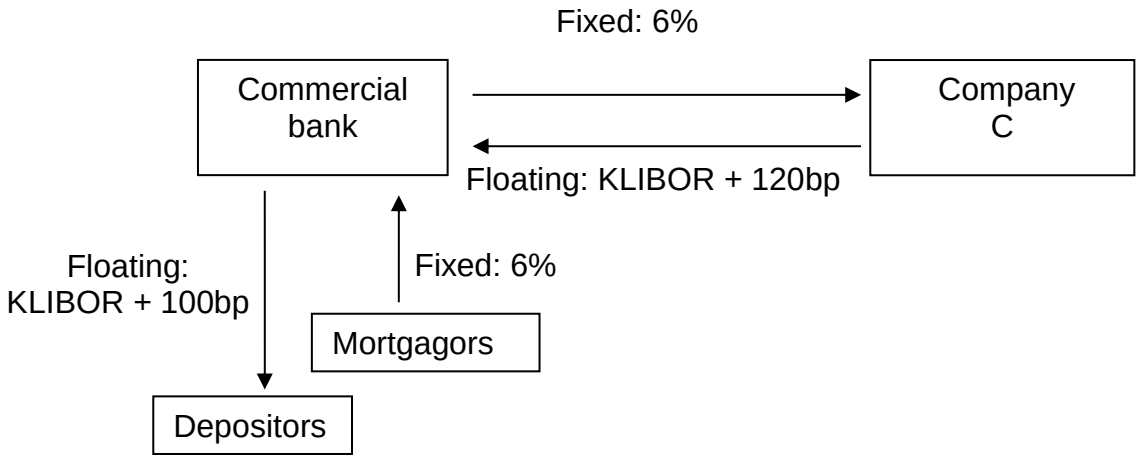


Notice that the floating rate side is quoted flat, any modification is adjusted on the fixed side's spread. One important feature of swaps is that settlements are on a net basis, the difference between the floating and fixed rates multiplied by the notional principal. The date of the final payment is known as the termination date, which is the equivalent of the expiration date in other derivatives.

Applications

A prime candidate for an interest rate swap is a commercial bank, where it accepts deposits and lends out those funds as long-term mortgages. Because depositors can withdraw their funds at short notice, deposit rates must adjust to changing interest rate conditions. Assuming house owners (mortgagors) borrow at a fixed rate, then the lending bank (mortgagee) would have floating rate liabilities and fixed rate assets. Therefore, they are vulnerable to rising interest rates.

What they can do is to swap fixed rate assets into floating rate, or vice-versa (asset-liability matching concept). For example, the commercial bank may want to swap fixed for floating rate. Assuming the bank has a total loan portfolio of MYR100 million with average life of five years at 6% and its deposit rates are KLIBOR+100bp. The bank loses money if the KLIBOR goes above 5%.



Supposing the commercial bank has entered into a swap with Company C for a notional MYR100 million, pays 6% and receives KLIBOR+120bp. Now, no matter what happens to the interest rates, the bank has locked in a 20-basis point spread for the duration of five years for MYR100 million. This is the motivation for banks to enter into the swaps market as their risk exposure to rising rates is minimised, and a fixed return is secured.

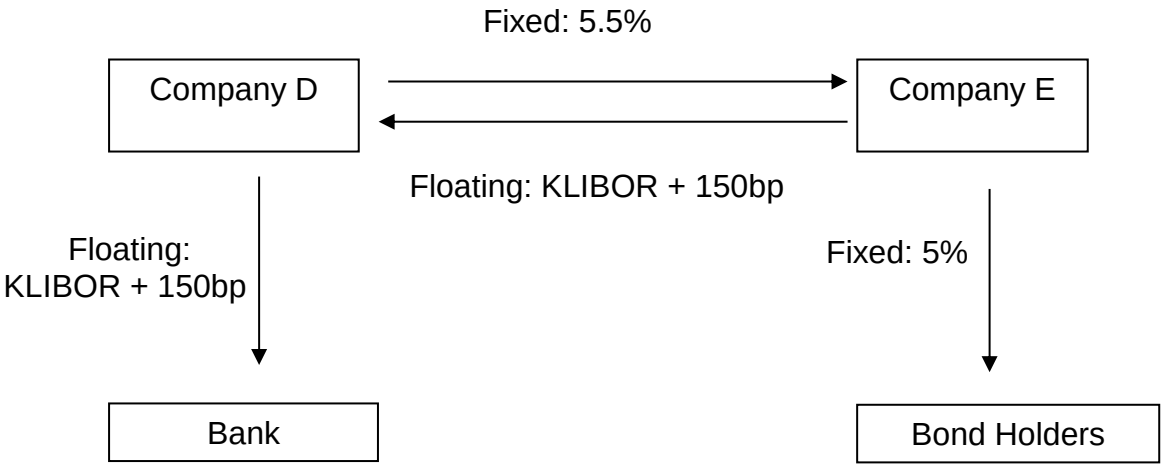
Other application:

Obtaining a fixed rate financing when it is not feasible to access the bond markets directly

Since bond markets are normally available to high credit-quality, well-known borrowers, smaller companies cannot raise funds this way but would be able to borrow from banks at a floating rate. Such smaller companies could swap a pay-floating for a pay-fixed obligation, thus locking in a fixed-rate liability.

Example:

Suppose Company D is able to borrow at a variable rate from a bank at KLIBOR + 150bp assuming KLIBOR is currently at 4%. It wants to lock in a fixed rate payment but is unable to get it at a reasonable rate from neither the bond market nor the bank. It goes to the swap market to swap the floating obligations for a fixed rate of 6% less a spread of 0.5%, on a notional principal of $10,000,000. Its counterparty Company E has a loan obligation at 5%, swaps away the fixed obligation for a floating obligation of KLIBOR + 150bp.



Company D has effectively swapped its floating obligation of KLIBOR + 150bp for a fixed obligation of 5.5%. Company E has effectively swapped its fixed obligation of 5% for a floating obligation of KLIBOR + 100 bp..

5. Foreign Currency Swaps

The swap market for currency swaps developed as a result of the financial industry's innovation in response to the United Kingdom currency controls in the 1970s. UK companies during that era had to pay a premium when they borrowed US Dollars in the United States. To avoid paying this premium, a bank would find a US company operating in the UK, which needed funding in pound sterling. The bank would arrange for the US company to lend US Dollars to the UK company's unit in the United States and for the UK company to lend pounds sterling to the US company's unit in the United Kingdom. Swaps evolved from this initial structure. Essentially, currency swaps exploit a comparative advantage where one company has relatively lower borrowing costs in one currency than in another.

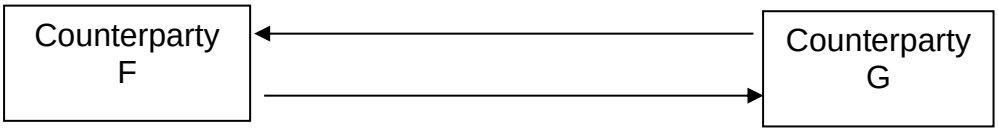
Variations in Currency Swaps:

Counterparty F	**Counterparty G**
Pay fixed in home currency	Pay fixed in foreign currency
Pay fixed in home currency	Pay floating in foreign currency
Pay floating in home currency	Pay fixed in foreign currency
Pay floating in home currency	Pay floating in foreign currency

In a plain vanilla foreign currency swap, one party holds one currency and desires a different currency. There are three sets of cash flows in a fixed-for-fixed currency swap:

Initial Cash Flow – exchange of principal:

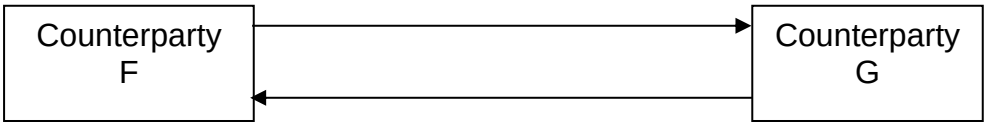
MYR 30 million



SGD 10 million

On Each Settlement date (including the maturity date):

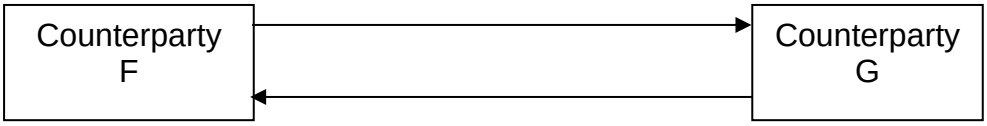
MYR 0.9 million



SGD 0.1 million

Repayment of Principal:

MYR30 million



SGD 10 million

The above assumes a spot rate of MYR3.00/SGD1.00, Malaysia interest rate is 3% and Singapore rate is 1%. Company F's principal is SGD10 million.

In practice, only net payments are made for the annual settlements. For example, if the spot rate on a particular settlement date is MYR3.20/SGD1.00, Company F owes MYR0.9 million to Company G, while Company G owes only MYR 320,000 to Company F, so Company F would pay Company G the difference of MYR580,000. At different times, a different rate would prevail, and hence the settlements would differ.

At the end of the contract, the two parties exchange the principal again. This final payment then terminates the swap.

6. Equity Swaps

An equity swap works in a similar way as an interest rate swap whereby the variable performance on the equity is exchanged for a fixed return. In an equity swap, the variable component is the return on an equity security or index instead of the variable interest rate.

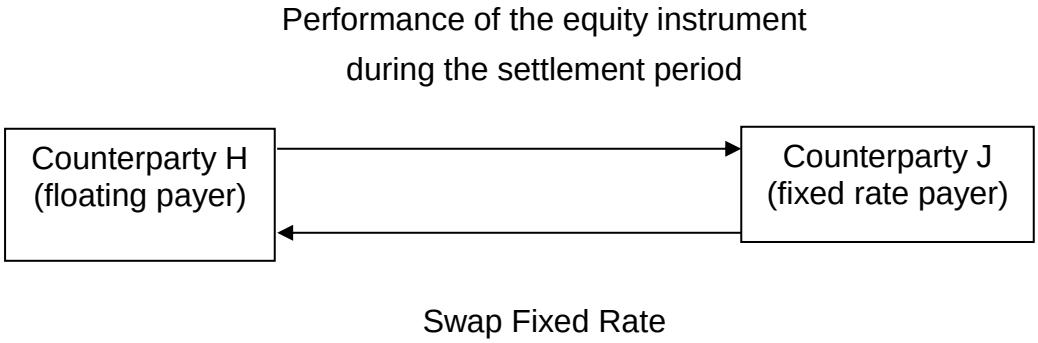
The cashflow on each settlement date is exchanged as follows:

At Origination

Negotiate Terms of the Transaction

No exchange of cash flow

On Each Settlement date



The floating payoff = Notional principal x equity performance during settlement period

The fixed payoff = Notional principal x nominal fixed rate x Days in settlement period/365

There are some differences between an equity swap and a plain vanilla interest rate swap. Counterparty J, the fixed rate payer could also end up paying a floating rate should the equity performance be negative. For interest rate and currency swaps, the floating rate is set at the beginning of the settlement period as settlement is in arrears. For equity swaps, the floating payment is not known until the end of the settlement period. The rate of variable returns for equity swaps often includes both dividends and capital gains. Capital gains are not paid for interest rate and currency swaps.

Example:

Insurance Company H holds a portfolio of well diversified blue-chips listed on Bursa Malaysia, valued at MYR100,000,000. On average, over the past 10 years, the KL Composite Index on Bursa Malaysia yielded an annual return of 9.4%. Company H wants to lock in a fixed rate of return and swaps it with a Family Office J which is currently having a portfolio of high yield bonds with the same principal value. Family Company J had all along wanted to switch out of risky bonds into the local equities market. The settlement period is every six months, for a period of three years. By engaging in an equity swap, both parties are able to achieve their intended exposure into the respective assert classes.

7. Commodity Swaps

Industrial consumers use commodity swaps to hedge against price fluctuations in commodity prices, commonly energy and agriculture commodities. During the swap settlement, no commodities are exchanged and cash is exchanged instead. In commodity swaps, exchanged cash flows are dependent on the price (floating/market/spot) of an underlying commodity. A commodity swap, like an equity swap, is similar to a fixed-floating interest rate swap whereby the floating leg is based on the price of the underlying commodity instead the floating interest rate.

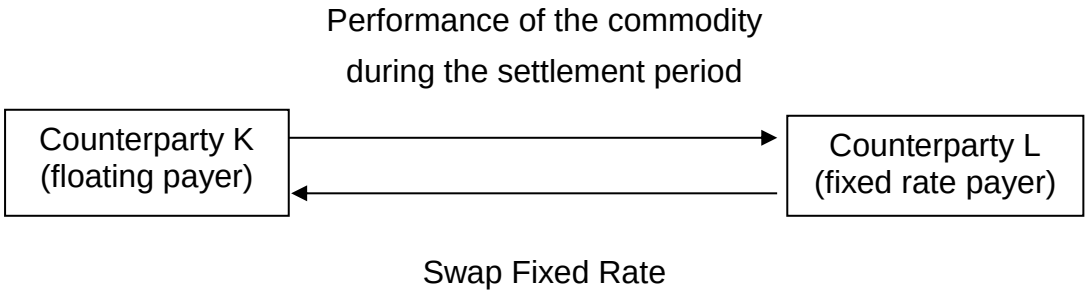
The cashflow on each settlement date is exchanged as follows:

<u>At Origination</u>

Negotiate Terms of the Transaction

No exchange of cash flow

<u>On Each Settlement date</u>



The floating payoff = Notional principal x commodity performance during settlement period

The fixed payoff = Notional principal x nominal fixed rate x Days in settlement period/365

Example:

Airline Company L, heavy users of jet fuel, will often benefit by entering into a swap deal. In the contract, Company L agree to make a series of fixed payments at a pre-determined frequency of every three months over three years, thus locking in the price for jet fuel for three years.

8. Credit Derivatives

In financial markets, investors could insure against credit risks by using credit derivatives to protect themselves from the risk of loss. A credit derivative is a financial contract in which one party has the right to claim a payment from its counterparty in the event that a specific credit event occurs during the life of the contract. A credit event is defined in the contract and would usually include events such as a failure to make a required payment (of interest and/or principal), bankruptcy, debt restructuring, repudiation of debt, change in credit rating or specific events that can materially affect the likelihood of default on future payments of an underlying.

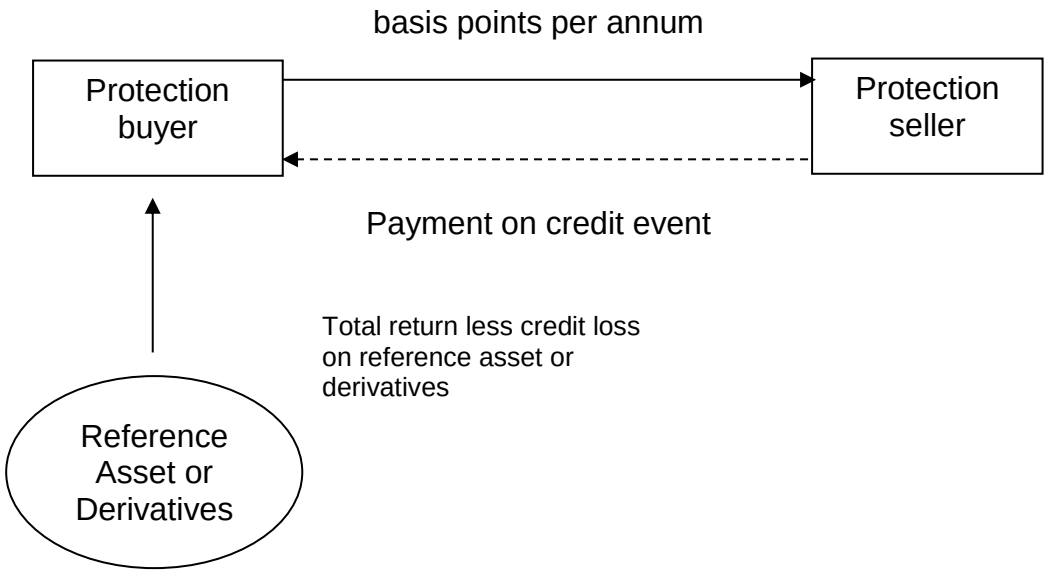
Credit derivatives allow investors to separate market risks from credit risks and thereby allowing each of these risks to be priced and traded in separate markets. An investor with a high concentration of credit risk can strip off this portion of risk and sell it to someone else. There are four main forms of credit derivatives: credit default swaps, total return swaps, credit spread options and credit-linked notes. The former two forms are widely used and will be discussed in this section.

9. Credit Default Swap (CDS)

A credit default swap is a swap designed to transfer the credit exposure of fixed income products between two parties. The examples of fixed income products are bonds, loans, debt securities and mortgage backed securities. It is an agreement between a protection buyer and a protection seller, whereby the buyer pays a periodic fee in return for a contingent payment by the seller upon a credit event (such as a certain default, bankruptcy or debt restructuring happening to the reference entity). Most CDS contracts are physically settled, where upon a credit event, the protection seller must pay the par amount of the contract against the protection buyer's obligation to deliver a bond or loan which protection is being sought. The swap is then terminated after this.

A CDS is often used like an insurance policy but since there is no requirement to actually hold any asset or suffer a loss, a CDS is not actually insurance. This does not mean that the protection buyer has totally eliminated all risks – as it is possible

for the protection seller itself to default on the CDS. Because the payment of the protection seller is contingent upon the occurrence of a credit event, a credit swap is more like an option than a swap. The typical term of a CDS contract is five years, but almost any maturity is possible as it is an OTC product.



Example:

A pension fund (protection buyer) owns SGD10 million worth of a 5-year bond issued by ABC Ltd. To eliminate the risk of losing money if ABC Ltd defaults on its debt, the pension fund buys a CDS from XYZ Bank for a notional amount of USD10 million, which trades at 100 basis points. The pension fund will pay 1% of USD10 million in quarterly instalments of USD25,000 to XYZ Bank for the protection. If ABC Ltd does not default on its bond payments, the pension fund makes quarterly payments to XYZ Bank for five years and receives its principal amount on the bond from ABC Ltd at the end of the five years. Should ABC Ltd default on its debt during the tenure of the CDS contract, then the premium payments would stop and XYZ Bank would ensure that the pension fund is refunded for its loss of USD10 million. Another scenario would be if ABC Ltd's credit ratings improved dramatically or it is acquired by a stronger company after several years, the pension fund may cancel its original CDS position by selling the remaining years of credit protection in the market.

It is also possible to buy and sell credit default swaps that are outstanding. Like the bonds themselves, the cost to purchase the swap from another party may fluctuate as the perceived credit quality of the underlying company changes. But these pricing

differences are amplified compared to bonds. Therefore, someone who believes that a company's credit quality would change could potentially profit much more from investing in swaps than in the underlying bonds.

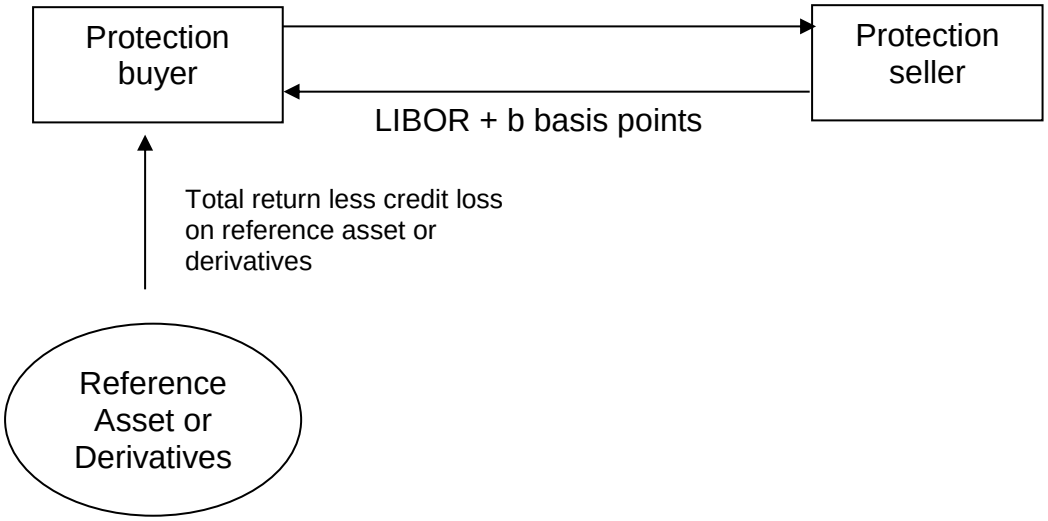
10. Total Return Swap

In a total return swap, the protection buyer holds a reference debt asset or derivative that receives the total return (i.e., interest plus principal or capital gains). It enters into a swap with the protection seller, who will pay an underlying floating rate such as the LIBOR plus a spread of a given number of basis points, in exchange for the total return on the asset.

Regardless of what happens, the protection buyer will pass on the total return on the asset to the seller (even when total return is negative – the protection seller will have to pass the amount to the buyer) and the seller will pay LIBOR plus the spread to the buyer. The protection buyer thus converts the credit-risky asset into a floating-rate asset based on LIBOR, thus eliminating the credit risk on the underlying or reference asset.

Note that this structure is somewhat similar to an equity swap, except that the underlying is a fixed income-based instrument. Like in most swaps, the underlying must be traded actively in a liquid market, in order for the structure to be appealing to both buyers and sellers and for the pricing of the swap to be efficient.

Total return on the underlying:



In Summary

Swaps are over-the-counter (OTC) agreements between two counterparties to exchange of cashflows at fixed periodic intervals and the amount of principal that are determined at the onset of the agreements. At inception, swaps are a zero-sum contract.

The two common types of swaps are interest rate swaps and currency swaps, whereby the underlying asset of these swaps is a debt instrument and a foreign currency respectively. Most of the swaps involve the US Dollar.

The key risk of swap contracts is counterparty risk whereby there are main three factors: creditworthiness, availability of counterparties and term structure.

A commodity swap and an equity swap are similar to a fixed-floating interest rate swap whereby the floating leg is based on the price of the underlying commodity or equity instead the floating interest rate.

Activity

1. As swaps are not transacted through an organized exchange, the main risk faced by parties to the swap is:

   (A) counterparty risk
   (B) currency risk
   (C) interest rate risk
   (D) inflation risk

2. In a plain vanilla interest rate swap, one party will have a pay-fixed position while the other party has a floating rate obligation. At inception:

   (A) both parties will start exchanging cashflows as dictated by their agreement.
   (B) both parties will negotiate the terms of the transaction without any exchange of cashflow.
   (C) one party will pay the agreed fixed rate.
   (D) one party will pay the agreed floating rate.

3. Smaller companies typically cannot access the bond markets directly and tend to borrow from banks which charge them a floating rate. If they wish to lock in a fixed-rate liability in the same currency, then they would need to:

   (A) enter into a currency swap with a pay-fixed obligation
   (B) enter into a currency swap with a pay-floating obligation
   (C) enter into an interest rate swap with a pay-fixed obligation
   (D) enter into an interest rate swap with a pay-floating obligation

4. In a currency swap, the principal amounts of the 2 currencies in the swap will be exchanged:

   (A) at inception and at the end of the contract but not at regular settlement intervals.
   (B) at the regular settlement intervals of the contract.
   (C) at the inception of the contract only.
   (D) at the end of the contract only.

5. In a credit default swap agreement, the payment by the protection seller is contingent upon the occurrence of a credit event. Effectively, this means the credit default swap instrument is essentially:

(A) a futures
(B) an option
(C) an equity security
(D) a fixed income security

Suggested Answers to Activity

1. (A)
2. (B)
3. (C)
4. (A)
5. (B)

Topic 4: Contract for Difference (CFD)

Contents

1. What is a CFD
2. Features of CFD
3. Types of the Underlying Assets and its Characteristics
4. Uses of CFD
5. Risks Associated with CFD
6. Margin Requirements and Implications for Different Underlying Assets
7. Mechanics and Applications for the CFD

Learning Objective

- Demonstrate understanding of OTC CFD
- Compare the different types of CFD
- List the various uses of CFD
- List the requirements for trading CFD
- Describe the different characteristics of CFD
- Assess the risks of different types of CFD
- Calculate the profit or loss of different CFD portfolios
- Analyse the current issues with CFD

1. What is a CFD

A contract for difference (CFD) is a type of over-the-counter derivative contract with pricing that either closely mirrors or mirrors that of an underlying asset. A CFD can be settled physically or by cash. One major difference between CFDs and other derivatives is that CFDs are based on spot prices, which have no expiration date. Also, margin requirements on trading CFDs are generally significantly lower than for equities, and similar to that of traditional futures trading (but with lower minimum contract sizes), thus making CFDs an ideal trading and hedging product. Other attractions of using CFDs include the ease (relative to equities) at which they can be short, their straight-forward pricing, and the number of different global markets and asset classes they provide exposure to.

A CFD allows traders or investors to hedge or invest into the price movements of various asset classes such as equities, indices, currencies, commodities and interest rate. Amongst the most popularly traded CFDs are those on widely watched equity indices like the S&P500, as well as FX pairs like the EUR/USD. The most common commodity CFD traded is spot gold. The majority of CFD brokers offer FX trading, with some CFD providers marketing their spot FX brokering service as CFDs on spot FX, while others position spot FX as a separate asset class (and not as a type of CFD). The contract within a CFD is between the end client and the CFD provider. Cash settlement between the two parties is based on the difference in the CFD prices, from the time the CFD position is opened to when it is closed. Participants *do not need to own or deliver* the underlying asset. CFD positions can be initiated on either the long or short side. Going long refers to initiating a new market position by buying, and shorting describes entering a new market position by selling.

CFDs emerged in the 1970s, and were developed for institutions to cost-effectively attain equity exposure, on either the long or short side, without physically settling transactions, and to avoid certain taxes. They were first offered to private clients in the United Kingdom in the late 1990s and have since rapidly grown as a trading and hedging tool in Australia, parts of Europe and Asia, as well as in Canada. CFDs (except for those that are exchange-listed) are unavailable in the United States to retail investors and unofficially serve as a barrier against a product, market or industry that competes against the US equity option exchanges and brokers. There is currently no exchange-listed CFD in the United States.

The world's three largest CFD trading hubs are currently London, Australia, and Europe. Some CFD providers, depending on the jurisdiction, also offer futures, OTC spot FX options, as well as, other products deemed more speculative and less regulated, such as spread-betting and binary options.

2. Features of CFD

Pricing and Settlement

One reason for the rapid adoption of CFDs is their straightforward pricing. Depending on the CFD provider (and market model offered), CFD prices either closely or precisely mirror the prices of the underlying asset. Additionally, because there is no expiration, CFD prices do not decay as is the case with option premiums. All CFDs are settled based on the difference in the CFD price, from the time the CFD position is opened to when it is closed.

Market-Maker vs. Direct Market Access (DMA) Model

There are two major business models that CFD providers can adopt. A CFD provider that makes markets provides liquidity, and may better suit those trading in larger quantities than what is available at the best bid or offer in the underlying market. While market making CFD providers strive to fill orders based on the market depth available in the underlying exchange market, some re-quote traders anytime market orders cannot be satisfied by the size available at the best bid or offer. Depending on the CFD provider, the re-quotes may be based on the volume *weighted average price (VWAP)* of the total bids or offers (possibly several levels of market depth) needed to satisfy the trade. Because CFD market-makers seldom hedge individual client trades (hedging rather net client exposures on a discretionary basis), client orders have little direct impact on the underlying market.

On the other hand, DMA-based CFD providers operate slightly different. CFD orders submitted to a DMA-based CFD provider are replicated by the provider immediately on the underlying exchange market i.e., if the CFD provider were to sell a CFD stock to an investor, the CFD provider will also buy the same stock from the exchange. Clients can thus “see” their orders in the underlying market, as the CFD provider is effectively hedging 100% of CFD trades in the underlying market.

To illustrate the difference between the Market Maker and the DMA model, suppose that a CFD trader sees the prices as illustrated in Figure 1 below. From this example, stock ABC can be bought at the market for as low as $43.65. However, as indicated by the number to the right of this price, there are only 495 shares offered at $43.65. A trader submitting a market order for 1000 share CFDs of ABC (to a market making CFD provider using VWAP) would in theory be re-quoted $43.68 [($43.65 x 495 + $43.71 x 505)/1000]. The trader would then need to decide whether to accept the updated price of $43.68. In practice, many market-making CFD providers would quote an offer price incorporating some spread above the VWAP.

Figure 1 – Market Depth – ABC

985	43.600	△	43.650	495
1,764	**43.500**		**43.710**	927
1,030	**43.480**		**43.750**	618
512	**43.450**		**43.850**	927
3,468	**43.350**		**43.900**	3,280
2,450	**43.320**		**43.920**	1,836
2,060	**43.300**		**43.950**	2,625

Open:	**43.1750**	High:	**44.080**
Close:	**42.4250**	Low:	**43.640**
Mid:	43.6250	Change:	+1.2000 (2.83%)

The same market order for 1000 share CFDs of ABC submitted to a DMA-based CFD provider should result in the theoretical VWAP price ($43.68) as CFD orders are passed directly to the underlying market without any dealer or market maker intervention.

3. Types of the Underlying Assets and its Characteristics

CFDs can be offered for all asset classes as with other derivatives instruments. The most common asset class offered by CFD providers is equity, and depending on the broker, may be complemented by a smaller selection of CFDs on commodity, fixed income, and other asset classes.

Equity CFDs

Equity CFD trading is more similar to traditional margin equity trading than it is to options trading. There are no additional prices to deal with, as is the case with option premiums. For example, if a stock is quoted at $50.00/$50.03, the CFD on the stock would quote either the same prices, or very close to it depending on whether the CFD provider offers a dealing (market-making) or DMA service.

Most equity index CFDs track spot equity index levels, with a few CFD providers offering index CFDs that track index futures. Because CFD providers hedge client index CFD positions using the most equivalent index futures, CFD providers quote spot index levels that are implied from futures prices. The *implied spot index quotes* are essentially the futures prices adjusted for cost of carry.

Carry (Net financing cost)
The difference between the cost of financing the purchase of an asset and the cash yield of the asset. Positive carry describes a scenario where the yield earned is greater than the financing cost; negative carry refers to the financing cost exceeding the yield earned.

Cost of carry is the difference between interest earned by going long an index future instead of the index's constituent equities, and the dividends forgone by not buying and holding the index's underlying equities. In other words, the difference between the index's futures and spot price reflects the advantage or disadvantage a futures holder has over an individual, who buys all of the component stocks, in proportionate amounts, without leverage. For instance, if an institutional bank proprietary trader sees that the dividend yield of the S&P500 is 1.5%, and the trader is able to borrow at 1%, the trader would borrow at 1% an amount sufficient to buy the S&P500 constituents at the same proportion as they are represented within the index. Conversely, because the futures buyer need only outlay (in the form of margin) a fraction of the funds required to proportionately buy all index components, the futures buyer can invest the freed up funds in low risk US Treasuries for instance and earn interest income. A futures holder, however, forgoes any dividends paid to the holder of futures contract. The difference between this potential risk-free interest income and the dividends paid to equity holders produces the spread between the futures and spot price.

Commodity CFDs

The majority of CFD providers offer commodity CFDs, most of which mirror commodity futures. Some commodity CFDs (especially of precious metals) track spot prices. Other popularly traded commodity CFDs includes crude oil, natural gas, corn, wheat and soybean.

CFDs that track spot commodity markets have pricing that reflects same or next day settlement. Commonly offered spot commodity CFDs include gold and silver.

Commodity futures CFDs differ from spot commodity CFDs as their prices are based on the underlying futures contract with an expiry date at some point in the future. As with index futures, commodity futures prices reflect cost of carry. Cost of carry for a commodity is calculated differently though, typically consisting of storage, insurance and transportation expenses, as well as any opportunity cost of tying up capital in purchasing the commodity in full for immediate (spot) delivery. Offsetting this holding cost somewhat is the convenience of having physical possession of the commodity, especially important during near-term supply shortages, spikes in demand, or in the case of non-perishable commodities.

Certain CFD providers automatically roll open positions on expiration. On a contract's last day of trading (beyond a pre-determined cut-off time), a rollover can take place automatically by closing the long position (through a sell order at market) followed immediately by a purchase of the new front month contract at its market price. Conversely, any short positions still open at expiry would be closed (through a buy order at market) followed by a sell of the new front month contract at its market price.

Traders of commodity futures CFDs sometimes avoid carrying positions into the rollover period (futures expiry), especially when a negative roll yield exists. For example, if a June CFD contract had closed at $73 on expiration, with the following month's CFD quoted at $75 at the moment of rollover, a long position of the June contract held into and beyond the rollover date would result in a debit of $2 (negative roll yield). Conversely, where the front month quote is higher than that of the contract being rolled into, rollover of a long position results in a credit.

Fixed Income CFDs

Some CFD providers offer fixed income CFDs on bond, Treasury and money market futures. Certain CFD providers use the term Treasury CFDs to collectively refer to any bond, Treasury or money market CFD. Compared to their underlying futures contracts, fixed income CFDs typically require less margin (as the CFD contract sizes tend to be considerably smaller) and are sometimes traded without commission (as market-making CFD providers are remunerated for their services from the spread between bid and ask prices). Note that fixed income futures CFDs (just like bond, treasury and money market futures, and unlike equity and equity spot index CFDs), have financing already reflected in their pricing. As with commodity futures CFDs, outstanding fixed income futures CFD positions on expiry are typically automatically rolled over into the next month's contract.

4. Uses of CFD

CFDs are used primarily by retail traders to take on a directional position on market movements, with institutional investors such as proprietary and hedge fund traders or managers using CFDs for a combination of speculation and hedging. Speculative traders either trade outright positions in CFDs or may also trade CFDs as spreads i.e., going long on one CFD whilst going short on another CFD.

Spread trading CFDs is identical to trading futures spreads, except that certain futures spreads have the added advantage of being tradable contracts quoted by exchanges or trading software vendors. In other words, when trading spreads using CFDs, there is currently no way of avoiding the legging risk of entering into one of

the 2 legs of the CFDs before the other. For this reason, trading spreads through CFDs is typically done for longer term views on spreads. As an example, assume that a futures trading software vendor offers the ability to trade on CME wheat-corn futures spread. A trader who feels the spread is too high may short the futures spread as one trade.

On the other hand, a CFD trader who shares the same sentiment about the wheat-corn spread would have to manually sell wheat and go long the corn CFDs, requiring the keying in of two separate transactions. Depending on how far the trader's offer (on wheat) and bid (on corn) is from the market, the two separate legs of the spread trade could take significantly more time to execute than if the spread trade is executed as one transaction at the market price of the spread. CFD platforms are not currently sophisticated enough to offer such spread trading functionality, where spreads are quoted and where both legs of the spread can be executed as one trade.

Although some retail traders use CFDs to hedge existing portfolios, most hedging by CFDs is performed by institutional investors such as propriety and hedge fund traders or managers. These hedgers may be able to obtain more precise hedges through CFDs than underlying futures due to the smaller contract sizes of CFDs versus that of underlying futures. Hedges on long equity portfolios through equity CFDs likewise can provide a more precise hedge versus hedging equity exposure through an index future, as equity CFDs allow the offsetting of risk on specific equity names that require hedging.

5. Risks Associated with CFD

As with any leveraged product, CFDs are high risk when traded directionally for speculation, as opposed to as a hedge. Relative to futures contracts though, CFDs can lower the absolute amount risked by a trader if traded in a smaller size than futures will allow. Depending on the CFD provider, and on the underlying market the CFD is based on, the CFD may be traded in substantially lower unit sizes than the corresponding futures. For instance, a CFD provider may make a CFD available on the S&P500, where each unit of the CFD provides a tick exposure of USD1, as opposed to the USD12.50 tick exposure of the S&P500 e-mini future listed on the Chicago Mercantile Exchange (CME). By being able to control exposure within CFD trading accounts with more flexibility due to the smaller contract sizes, the CFD trader is potentially able to control risk (from leverage) better than a futures trader.

A second key risk to trading CFDs is counterparty risk. Counterparty risk within the trading context generally refers to the likelihood of the exchange (on which the trade takes place) or broker handling the trades, of defaulting on its trade settlement or

clearing commitments. This can arise when faith in the creditworthiness of an investment bank or broker quickly deteriorates. (As was the case with Bear Stearns and Lehman Brothers in 2008, a subsequent run on client deposits could result in the bank or broker no longer able to service trades.)

A more recent example of counterparty risk involving a CFD provider was in January 2015 when the Swiss National Bank (SNB) unexpectedly removed a cap that they had on the Swiss Franc versus the Euro, unleashing a 30% intra-day collapse in the EUR/CHF. As numerous trading accounts were caught off guard by the SNB announcement, many retail accounts were suddenly deep in losses with large numbers of accountholders defaulting on their obligation beyond what they had initially funded in their broker accounts. As a result of brokers not being able to pursue many of their claims against certain clients (due to clients declaring bankruptcy or residing in difficult to reach jurisdictions), a number of brokers suffered crippling losses. Alpari, previously a large spot FX/CFD broker, declared insolvency within days of the SNB move, while FXCM, formerly holding the top ranking in market share among spot FX retail brokers in the US, suffered a USD225million loss that would have immediately ended its business had it not been for a capital injection from a third party.

Counterparty risk within the CFD space has additional unique considerations beyond the risk of the broker shutting down. Given how quickly the CFD industry has grown, it has attracted a large number of operators. Many CFD market-makers do not hedge a large percentage of their client trades, and will actually benefit from unhedged losing client trades. When a client loses on a trade, that loss becomes pure revenue for the unhedged CFD market-maker. This practice of betting against the client is known as “B Booking”. The “A Book” is the book of clients whose orders are immediately hedged, while the “B Book” is the book of clients where discretion is used by the market-maker (also referred to as the dealer) to hedge on client trades. B Booking is widespread in the CFD as well as spot FX industry. DMA CFD provider do not present this same conflict of interest with clients, as they route CFD trades directly to the underlying exchange markets. Because DMA as a business model is less profitable to the CFD providers, there are only a handful of DMA CFD providers versus the dozens of market-making CFD firms.

6. Margin Requirements and Implications for Different Underlying Assets

A key advantage to trading CFDs is the substantial leverage available, which is made possible through margin requirements that are much lower than that for stocks and comparable to that for futures. Liquidation typically only occurs if the margin posted by the trader is a certain pre-determined amount below the margin required

by the CFD provider. To avoid taking on too much risk, a trader should never receive margin calls, let alone have positions liquidated. A trader regularly receiving margin calls is trading poorly and/or under funding his/her account.

The minimum margin requirement may be set by the regulator overseeing the jurisdiction in which the CFDs are offered. CFDs that are higher in volatility or lower in liquidity tend to have higher margin rates. Unlike futures exchanges or futures brokers, most CFD providers do not make the distinction between initial and variation margin requirements, and only require one margin percentage requirement for each asset class (of CFDs) throughout the day regardless of underlying exchange margin requirement changes. The leverage effect of CFD positions can be managed by adjusting the size of positions, along with the amount of funds within the CFD account.

Equity CFDs
Some CFD providers require as little as 5% in margin, producing leverage of up to 20:1, on equity CFD trades, while others may require margin as high as 20% or a leverage of 5:1.

Depending on the CFD provider, equity index CFDs can typically be traded for as low as 5% margin, producing leverage of up to 20:1.

Commodity CFDs
Commodity spot and commodity futures CFDs can typically be traded for as low as 20% margin, producing leverage of up to 5:1

Fixed Income CFDs
Fixed Income futures CFDs can typically be traded for as low as 20% margin, producing leverage of up to 5:1.

FX CFDs
CFDs on spot FX can typically be traded for as low as 2% margin, producing leverage of up to 50:1.

7. Mechanics and Applications for the CFD

Contract Sizes

Another attractive feature to using CFDs is their flexible and smaller contract sizes relative to most futures and options. Equity and equity index CFDs for instance, can often be traded one share or unit at a time, whereas equity and equity index options are typically traded in multiples of 100. Without the need to trade equity CFDs in round lots in most cases (some CFD providers still require round lots), positions can be gradually established or reduced. CFDs on commodities and interest rate

products often start at lower minimum contract values than do their underlying futures contracts, providing novice traders a lower risk entry into these markets.

Financing Costs

While implicit financing costs are normally built into the price of a futures contract, they are not built into the price of equity, equity index and commodity spot CFDs, but are charged explicitly to the buyer of these CFDs by the CFD provider. Commodity and fixed income futures CFDs have financing reflected in their pricing as mentioned earlier in this study guide. Financing costs apply to all long spot CFD positions held overnight (the cut-off time will depend on the provider). All CFD positions still open at this cut-off point are closed shortly after (at the market price) and then reopened at a price adjusted for one night's financing.

The financing rate charged by a CFD provider on long equity and equity index positions is usually based on the current interbank offered rate (that pertains to the country in which the underlying product is listed) plus a spread. This interest charge is typically levied on the full marked-to-market value of the position and is deducted from the account on a daily basis. Individual providers may vary slightly in their financing policy.

Financing on long spot commodity CFD positions may be calculated slightly differently, depending on the provider. Some CFD providers determine financing loosely based on prevailing financing rates within the relevant spot market. A hundred ounces of spot gold CFD held long overnight for example, might incur financing of USD10 for the night.

Due to financing charges, long CFD positions are generally not held very long and as a result, CFDs are generally better suited for shorter-term trading strategies. For those who use CFDs as a hedging tool (on long underlying positions), CFD positions are short, possibly producing interest *income* rather than charges.

Interest Income

One of the advantages of shorting equities and equity indices through a CFD is the interest that may be received on a short CFD positions held overnight. Any interest paid is calculated based on the interbank offered rate (in the country in which the underlying product is listed) minus a spread (fee). Just as with the financing costs, interest is typically calculated on the full marked-to-market value of the position, and is deposited in the client account on a daily basis. As with financing charges, it is best to research multiple CFD providers to determine how they calculate interest income.

Interest income on short spot commodity CFD positions is typically based on prevailing financing rates within those spot markets, and depends on the quantity of commodity shorted. A hundred ounces of spot gold CFD held short overnight for example, might receive interest income of USD6 for the night.

The spread between the financing rate charged and the interest income paid by CFDs providers represents a substantial part of their revenue.

Commissions and Other Fees

Commissions are fairly competitive when trading CFDs and depending on the CFD provider, may not be charged on index, commodity and fixed income CFD trades. CFD providers that do not explicitly charge commissions are often CFD market makers that build their fees into the bid-ask spread, widening the spread at times from the underlying exchange market. Those that do charge commission often have both a minimum as well as maximum commission structures.

All CFD providers freely offer an online, real-time trading platform, as well as access to international markets. No other charges are typically involved in trading CFDs, although some CFD providers have minimum activity or pass on exchange market data fees.

Liquidity

Liquidity in CFD markets is generally high for two reasons. Firstly, the depth of the CFD market either closely mirrors, or mirrors that of the underlying market, depending on whether the CFD provider offers a DMA or market-making model. Secondly, due to the significant leverage available, a CFD provider generally only offers CFDs on the most liquid mid and large-cap stocks, equity indices, commodities, fixed income and spot FX markets. In contrast, equity options and equity futures markets are less liquid than their underlying equity markets, resulting in wider bid-ask spreads. Certain market-making CFD providers will even provide liquidity where certain underlying markets are closed for trading. For instance, prior to October 2015, when the FTSE100 future was not available to trade during the morning hours in Asia, there were select CFD providers making available CFDs on the FTSE100 ahead of the futures open. Another instance where market-making CFDs occasionally provide superior liquidity to that of the underlying market is where the provider supplements the underlying Depth of Market with additional bid/ask sizing at each price level. Traders of commodity CFDs should be aware though that somewhat illiquid CFDs may be offered on selected agricultural or soft commodity futures.

Corporate Actions

Corporate actions include dividends, rights issues and stock splits, and are reflected in the pricing of equity and equity index CFDs. A dividend is treated as a cash adjustment to the client's account. Stock splits and rights result in a cash adjustment or an adjustment to the size of the CFD position. Since corporate actions have the potential to affect a trader's bottom line, all upcoming actions should be marked on a calendar. Generally investors who are long equity CFDs are not entitled to vote at corporate annual general meetings.

Dividends are the most common corporate action likely to impact CFD accounts. Dividends are credited (on the ex-dividend date) to client accounts that hold dividend-paying equities/indices beyond a predetermined cutoff time (e.g. 5 pm EST) on the day before the ex-dividend date. For instance, a trader who is long a bank stock CFD a day before the ex-dividend date, where the underlying bank stock entitles a shareholder to $1 per share in dividend, would receive a $1 per share of dividend to ensure that the CFD trader is not any worse off than a shareholder in the underlying stock. Accounts short these dividend-paying stocks/indices going into this cutoff before the ex-dividend date are deducted the amount of the dividend. Tax implications should be discussed with a tax specialist.

CFDs vs. Futures

CFDs differ from futures in several important aspects; Table 1 lists the main differences.

Table 1: CFDs vs. Futures

CFDs	Futures
Margin requirements depend on jurisdiction CFD is offered in, but generally range from 2-20%	Margin requirements generally range from 2-10%
No fixed expiration date on CFDs based on spot prices	Standardised expiries
Minimum contract size and generally lower than with related futures	Retail-sized contracts (e.g. E-mini S&P500) typically larger than CFD comparables
Cost of carry charged on long spot-priced CFD positions	Cost of carry built into contract price
Trade typically against single dealer and less so on exchange-like markets	Trade on an exchange
Generally cash settled, with physical	Physical delivery or cash settled

settlement available in some jurisdictions	
Contracts available for liquid markets as well as some less liquid markets	Contracts available for liquid markets as well as some illiquid markets
No third-party clearing (other than CFDs cleared by LCH Clearnet Ltd)	Clearing house guarantees performance

Applications

CFDs, like many other derivatives, allow traders to hedge as well as speculate and can be initiated on either the long or short side. With their ability to provide exposure to thousands of global assets, low margin requirements, low minimum contract sizes and ability to short equities without traditional short selling limitations, CFDs are increasingly used by both hedge funds and retail traders.

Speculation

A large number of hedge funds, proprietary traders and retail traders use CFDs for speculation.

Long Equity CFD

A trader is bullish on US-listed Netflix (NFLX), and wants to leverage its anticipated gains. The CFD provider is quoting the NFLX CFD at the same prices as in the underlying market: Bid $150 – Offer $150.20. All prices in the following examples are in US Dollars (USD). One NFLX CFD share provides exposure to one share of NFLX stock, therefore every dollar move in the CFD is equal to one dollar of profit or loss per CFD share held.

	Equity CFD Trade (with CFD provider)	**Equity Trade (with Discount Brokerage)**
Day 1: 10:00 am	Buy 100 NFLX CFDs @ $150.20 100 x $150.20 = $15,020	Buy 100 NFLX shares @ $150.20 100 x $150.20 = $15,020
Margin Required	$15,020 x 10%* = $1,502	
Full Payment		$15,020
Day 2: 11:30 am	Sell 100 NFLX CFDs @ $160 100 x $160 = $16,000	Sell 100 NFLX shares @ $160 100 x $160 = $16,000
Financing **(NFLX closed at $155 on Day 1)**	Relevant interbank offered interest rate +3%** (Assume US 1 month Libor rate of 1%***)	No interest charged

	1 day interest $155 × 100 × .04 × (1/360) = $1.72	
Gross Profit	$980.00	$980.00
Net Profit****	$978.28	$980.00
Return on Investment (Net Profit/Margin Requirement)	$978.28/$1,502 = **65.1**%	$980/$15,020 = **6.5**%

* *For illustrative purposes, a margin requirement of 10% is assumed for the Equity CFD trade. Actual margin requirement will vary depending on the CFD provider.*
*** The interest charged in addition to the interbank offered rate will depend on the CFD provider*
**** Each country serving as the home market for the equity underlying the CFD has its own interbank offered rate*
***** Commissions were not included in this example as they vary between providers, but should be factored to arrive at a true net profit or loss.*

Depending on actual commissions and financing rates, the net profit on the NFLX CFD trade may be higher or lower than the profit from trading through a traditional brokerage. The advantage of trading the equity CFD is its potential for greater percentage return on investment due to its lower margin requirement. However, with greater leverage also comes greater potential risk.

Long Equity Index CFD

A trader is bullish on the S&P500 and decides to take a long position on its spot CFD. The CFD provider is mirroring the underlying spot market and quoting the CFD at: Bid 2399.50 – Offer 2400.00. Every whole point movement in the index is equal to USD 50 of profit or loss per one CFD unit held. In this example, the S&P500 CFD has a lower margin requirement than the related CME-listed E-mini S&P500 futures contract, which also has a USD 50 per point multiplier. As with equity CFDs, equity index CFD margin requirements vary depending on the CFD provider and the jurisdiction to which the CFD is offered. Futures brokers generally also require a higher margin than the exchanges on which the futures are listed.

	Index Spot CFD Trade (with CFD Provider)	**Index Futures Trade (with Futures Brokerage)**
Day 1: 9:45 am	Buy 1 S&P500 CFD @ 2,400 1 x 2,400 x 50* = $120,000	Buy 1 E-mini S&P500 future @ 2,402 1 x 2,402 x 50 = $120,100

Margin Required	$120,000 x 5%**= $6,000	$3,000/contract** x 1 contract = $3,000
Day 1: 11:45 am	Sell 1 S&P500 CFD @ 2,390 1 x 2,390 x 50 = $119,500	Sell 1 E-mini S&P500 future @ 2,392 1 x 2,392 x 50 = $119,600
Financing	None – position closed before 5 pm EST	None – financing is reflected in futures pricing
Gross Loss	($500)	($500)
Net Loss* (Gross Loss + Financing)**	($500)	($500)
Return on investment (Net Loss/Margin Requirement)	**($500)/$6,000 = (8.3%)**	**($500)/$3,000 = (16.7%)**

** Some CFD providers offer CFDs with smaller multipliers than the underlying futures contract*

*** For illustrative purposes, a margin requirement of 5% is assumed for the Index CFD trade, and $3000 is assumed for the margin required by the futures brokerage. Actual margin requirement will vary depending on the CFD and futures brokerage provider and jurisdiction in which the account is opened.*

**** Commissions were not included in this example as they vary between providers, but should be factored to arrive at a true net profit or loss*.

Another attraction of using CFDs is the greater ease of shorting stocks with CFDs as opposed to through a stock exchange. When shorting with a CFD, margin requirements are the same whether you go long or short, and there is no uptick rule to contend with as is the case with some US and European equity markets. Additionally, unlike most traditional investment or discount brokerages, few CFD providers charge explicitly for borrowing equity shorted, building such costs into the bid-ask spread. A CFD provider typically only allows shorting in a select (but fairly extensive) list of easy to borrow shares. Finally, as mentioned earlier, most CFD providers may pay interest on short CFD positions (assuming the relevant interbank offered interest rate less any haircut levied by the CFD provider yields a positive value).

Short Equity CFD

A trader is bearish US-listed Tesla (TSLA). The CFD provider is quoting the TSLA CFD at underlying market prices: Bid $350 – Offer $351.

	Equity CFD Trade (with CFD Provider)	**Equity Trade (with Discount Brokerage)**
Day 1: 11:30 am	Sell 100 TSLA CFDs @ $350 100 x $350 = $35,000	Sell 100 TSLA shares @ $350 100 x $350 = $35,000
Margin Required	$35,000 x 10*% = $3,500	
Day 2: 11:00 am	Buy 100 TSLA CFDs @ $345 100 x $345 = $34,500	Buy 100 TSLA shares @ $345 100 x $320 = $34,500
Interest Income (Assume TSLA closed at $347 on Day 1)	Relevant interbank offered overnight interest - 3%** (Assume US 1 month Libor rate of 1%) 1 day interest $347 × 100 × (0.01 – 0.03) × (1/360) = $0	N/A
Gross Profit	$500	$500
Net Profit* (Gross Profit + Interest Income)**	$500	$500
Return on investment (Net Profit/Margin Requirement)	**$500/$3,500 = 14.3%**	**$500/$35,000 = 1.4%**

** For illustrative purposes, a margin requirement of 10% is assumed for the Equity CFD trade. Actual margin requirement will vary depending on the CFD provider.*
*** The interest income deducted will depend on the CFD provider*
**** Commissions were not included in this example as they vary between providers, but should be factored to arrive at a true net profit or loss.*

Although depending on actual commissions and interest payout rates, the net profit/loss on the TSLA CFD trade may be higher or lower than that of trading TSLA shares through a traditional brokerage, the potential percentage profit/loss by trading the CFD will always be higher given the lower margin required on shorting equity

CFDs.

Short Commodity CFD

A trader is bearish on gold and decides to take a short position on a gold CFD similar to the CME e-micro gold futures contract. The CFD provider is quoting the CFD at: Bid 1280 – Offer 1280.40.

	Gold Future CFD Trade (with CFD Provider)	**CME e-micro Gold Futures Trade (with Futures Brokerage)**
Day 1: 9:45 am	Sell 1 Gold future CFD @ $1,280 10oz* x $1,280/oz = $12,800	Sell 1 CME E-Micro Gold Futures @ $1,280 10oz* x $1,280/oz = $12,800
Margin Required	$12,800 x 20%** = $2,560	$500/contract** x 1 contract = $500
Day 5: 1:45 pm	Buy 1 Gold Future CFD @ $1,300 10 x $1,300 = $13,000	Buy 1 CME E-Micro Gold Futures @ $1,300 10 x $1,300 = $13,000
Interest Income	Cost of carry priced into contract	Cost of carry priced into contract
Net Loss* **	$200	$200
Net Loss on investment (Net Loss/Margin Requirement)	**$(200)/$2,560 = (7.8)%**	**$(200)/$500 = (40)%**

** For illustrative purposes, assume that the CFD provider offers a gold future CFD with a 10oz minimum contract size. Some gold future CFD contracts have minimum exposure as low as 1 oz.*

*** Assume the CFD provider has a 20% margin requirement on gold future CFDs, and that the futures brokerages requires USD 500 of margin per E-Micro Gold futures margin. Actual margin requirement will vary depending on the CFD and futures brokerage provider and jurisdiction in which the account is opened.*

**** Commissions were not included in this example as they vary between providers, but should be factored to arrive at a true net profit or loss.*

Hedging

Hedging with CFDs often involves taking a CFD position(s) that partially or fully offset the risk from existing equity, equity index, commodity or interest rate exposure. Hedging may also involve initiating a CFD position that has a negative correlation in performance to that of another CFD. Regardless of what they are being used to hedge, the objective is to earn a profit in one market to either fully or partially offset a loss in another market(s).

Although hedging may seem like an unnecessary step when simply closing the original position would eliminate the position's potential for additional losses, hedging through CFDs has the advantage of possibly deferring capital gains tax for the year, as the original position is left intact.

Hedging Equity Portfolio

Equity index CFDs are often used to hedge diversified equity portfolios. Assume an investor decides to hedge a USD 1.5 million US tech stock portfolio in anticipation of the broader US tech sector falling 5%. The investor's portfolio is well diversified correlating fairly well to the E-mini Nasdaq100 futures and to the Nasdaq100 CFDs available. The investor's CFD provider offers a Nasdaq100 CFD with a contract multiplier of 20, meaning each index level increment results in a USD 20 change in the value of the CFD account.

If the Nasdaq100 CFD is at 5700 points, the number of contracts required to hedge the portfolio is 14. Value of portfolio to hedge ÷ Value of Nasdaq100 CFD = $1,500,000 ÷ ($5,700 * 20) = 13.2 contracts = 14 contracts		
Account	**Discount Brokerage**	**CFD Provider**
Initial Portfolio	US tech stock worth $1,500,000	
Hedge Transaction		Sell 14 Nasdaq100 CFDs @ 5700 14 x $5700 x 20 = 1,596,000
Portfolio value after Nasdaq100 index falls 5% to 5415 points	US tech stock worth $1,425,000*	14 x $5415 x 20 = 1,516,200
Gross P/L	$1,425,000 - $1,500,000 = ($75,000)	$1,596,000 - $1,516,200 = $79,800
P/L after hedge**	$79,800 - 75,000 = $4,800	

** For simplicity of illustrating the hedging concept, assume the tech stock portfolio held correlates 100% to the movement in the Nasdaq100; in reality, this is never the case, with correlation between a diversified portfolio (and its benchmark index) reaching somewhere between 0.8 and 1*

***Assumes zero commissions as most CFD providers do not charge an explicit commission on index CFD trades building their service fees into the bid-ask spread*

Just as a diversified equity portfolio can be hedged using equity index CFDs, individual equity CFDs can be used to hedge either the underlying equity positions or other equity CFDs. This strategy may be appropriate when:

- an individual equity or equity CFD position represents a large part of a portfolio.
- the individual equity or equity CFD position is volatile.
- the trader wishes to express a view on relative value of one equity over another (as part of a pairs or spread trade), incurring less risk than buying or selling either equity outright.

For example, a trader feels that the technology sector is about to experience volatility, and feels that between AAPL and AMZN, AAPL has the more robust outlook. The trader decides to buy CFDs on AAPL and sells an equal dollar amount of AMZN CFDs.

Hedging Fixed Income Portfolio

Fixed income CFDs can also be used to hedge diversified fixed income portfolios. Assume an investor decides to hedge a USD 1 million US fixed income portfolio in anticipation of the US Treasuries falling due to the hiking of US interest rates. The investor's portfolio is well diversified correlating fairly well to the US Treasury Bond futures and to the US Treasury Bond CFD available. The investor's CFD provider offers a US Treasury Bond CFD where each full point is valued at USD 10.

If the US Treasury Bond CFD is quoting 152, the number of contracts required to hedge the portfolio is 658. Value of portfolio to hedge ÷ Value of US Treasury Bond CFD = USD 1,000,000 ÷ (152 * USD 10) = 657.9 contracts = 658 contracts		
Account	**Discount Brokerage**	**CFD Provider**
Initial Portfolio	US fixed income portfolio worth $1,000,000	
Hedge Transaction		Sell 658 US Treasury Bond CFDs @ 152 658 x $152 x 10 = 1,000,160
Portfolio value after US Treasury Bond falls 1% to 150.48 points	US fixed income portfolio worth $990,000*	658 x $150.48 x 10 = $990,158.40
Gross P/L	$990,000 - $1,000,000 = ($10,000)	$1,000,160 - $990,158.40 = $10,001.60
P/L after hedge**	$(10,000) + 10,001.60 = $1.60	

** For simplicity of illustrating the hedging concept, assume the fixed income portfolio held correlates 100% to the movement in the US Treasury Bond; in reality, this is never the case, with correlation between a diversified portfolio (and its benchmark index) reaching somewhere between 0.8 and 1*

***Assumes zero commissions as most CFD providers do not charge an explicit commission on fixed income CFD trades building their service fees into the bid-ask spread*

Hedging FX Exposure

FX CFDs can also be used to hedge FX exposure. Assume a US-based investor decides to hedge a European equity portfolio's 1 million Euro exposure (valued at USD 1,140,000 given a 1.1400 EUR/USD rate) in anticipation of the Euro depreciating versus the US Dollar. The equity exposure is already hedged, and the investor is only interested in mitigating any FX risk using a EUR/USD CFD where each basis point (or "pip") is valued at USD 10 on a standard lot.

Quote (bid/offer)	1.1400/01
Sell Price	1.1400
Trade Size	EUR 1,000,000 (10 standard lots)
Initial Outlay (using 2% leveraged margin)	EUR 20,000

In the above example, EUR1,000,000 in short exposure (versus USD 1,140,000 long exposure) has been achieved with an initial margin of EUR 2,000. The risk on the EUR/USD trade is USD100 per pip movement, with each pip equivalent to 0.0001 within the quote. Assume the prediction is correct and the Euro depreciates against the US Dollar. The quote on EUR/USD is now 1.1349/50, and the position can be closed by BUYING EUR/USD 1,000,000 @ 1.1350 (the bid price).

Quote (bid/offer)	1.1349/50
Buy Price	1.1350
Volume	EUR 1,000,000
Profit/loss	(1.1400-1.1350) pips x USD 100/pip = USD 5000 profit = USD 5000 / EUR/USD 1.1350 = EUR 4405.29 profit

Without the EUR/USD hedge, with the equity portfolio falling in USD value to 1,135,000, the FX loss is USD 5,000, identical to the amount that would have been generated from the FX hedge.

This example also assumes zero commissions as most CFD providers do not charge an explicit commission on spot FX CFD trades building their service fees into the bid-ask spread.

In Summary

CFDs are a fast growing OTC derivative, which is increasingly adopted by speculators as well as hedgers. CFDs offer a number of advantages over traditional futures, with the more flexible contract sizes and exposure of particular prime attraction to retail traders. CFDs are available for the same asset classes that futures provide exposure to, with equity index and equity CFDs being the most widely used.

CFD brokers often act as the sole market-makers to their clients, with a few offering Direct Market Access (DMA). CFDs where client trades have a direct impact on the order book of the underlying exchanges. In the post-Lehman regime, clearing houses and exchanges are increasingly looking at the prospects of listing and clearing CFDs to mitigate the counterparty risks inherent with market-making CFD brokers.

Activity

1. Which one of the following statements is FALSE about CFDs?

   (A) CFDs are generally physically settled
   (B) CFDs originated from the UK
   (C) CFDs are largely used for speculation
   (D) CFDs provided tax advantages

2. A trader bullish on Flower shares (FLW) and wishes to leverage its anticipated gains. He entered into the CFD contract by long 100 FLW CFD. The FLW CFD quoted at Bid: RM25 and Ask: RM27.

   How much is the profit from the CFD transaction, if the trader closed out his position by selling all of his FLW CFD at RM28?

   (A) RM100
   (B) RM200
   (C) RM300
   (D) RM2,800

3. What happens to the holder of equity CFD long position when the underlying equity long position holders receive a dividend?

   (A) CFD account holder is neither paid nor owed the dividend, as the equity position (and corresponding CFD) changes in value to reflect the cash being paid out from the company's balance sheet
   (B) CFD account holder must apply to the equity issuer to receive the dividend
   (C) CFD broker pays the equivalent of the underlying equity dividend to the account holding the long CFD position, proportionate to the share exposure
   (D) CFD account holder must apply to the CFD issuer to receive the dividend

4. Which of the following is not a reason for using a CFD?

   (A) Margin requirement is typically lower than with futures and equities
   (B) Counterparty risk can be reduced
   (C) To avoid capital gains and stamp duty in certain jurisdictions
   (D) Positions can be scaled into and out of with more precision than with futures

5. What is the most common reason why a trader might prefer using a DMA CFD broker over one that offers market-making on the same underlying market?

   (A) DMA broker adds to liquidity of underlying market
   (B) DMA broker charges lower commission
   (C) DMA broker allows client to participate directly on Bid/Ask of underlying market
   (D) DMA broker provides greater leverage

Suggested Answers to Activity

1. (A)
2. (D)
3. (C)
4. (B)
5. (C)

Topic 5: Effects of Corporate Actions on the OTC Underlying Assets

Contents

1. Effects of Corporate Actions on Equity Derivatives
   - Dividend
   - Capital Repayment
   - Share Buy-back
   - Rights Issue
   - Bonus Share
   - Stock Split / Reverse Stock Split

2. Effects of Corporate Actions on Other Derivatives
   - Commodities
   - Interest Rates
   - Bonds and Credit
   - Foreign Exchange

Learning Objectives

- Demonstrate understanding of corporate actions and activities
- Describe the effects of corporate actions on equity derivatives
- Describe the effects of corporate activities on other derivatives
- Compare the advantages and disadvantages of each type of corporate action on equity derivatives
- Compare the advantages and disadvantages of each type of corporate activities on other derivatives
- Calculate ex-dividend stock price
- Calculate the stock price ex-rights issue

In Topic 1, we covered the different types of OTC derivatives based on the underlying instruments. They are namely:

- Stocks
- Commodities
- Interest rates
- Bonds
- Credit
- Foreign exchange

There are many corporate actions that impact the stocks of the corporate concerned. Beyond actions that affect their own stock prices, there are some corporate activities that may affect the underlying instruments of the other types of OTC derivatives too.

In this topic, we will take a detailed look at how common corporate actions affect Equity Derivatives and the underlying stocks. We will also take a broad look at the effects of corporate activities on the underlying assets of the other OTC derivatives.

1. Effects of Corporate Actions on Equity Derivatives

There are many different types of corporate actions, the most common and key types being:

- Dividend
- Capital repayment
- Share buy-back
- Rights issue
- Bonus share
- Stock split / reverse stock split

Corporate actions have varying impacts on exchange-traded derivatives and OTC derivatives. Most exchanges would have built-in mechanisms to take care of some of these corporate actions automatically, but that is not necessarily the case for OTC derivatives.

Corporate actions would clearly have a direct impact on the price of the underlying securities too. We shall examine their effects on the stocks for each type of corporate actions.

Dividend

A listed firm typically pays out dividends twice a year, though some firms may pay quarterly dividends or just once annually. The dividend announcements usually coincide with the firm's results release. Most firms try to have a smooth dividend payout pattern, even when their results are not necessarily smooth. The reason being that investors do not like surprises, so listed firms tend to pay only slightly more dividends when doing well, and only slightly less even when they are doing badly.

When a firm announces a higher than expected dividend payout, the stock usually reacts positively, and vice versa. On the day immediately post the ex-dividend date, the firm's stock price should in theory adjust downwards by the same amount as the dividend paid out. This is especially noticeable for high dividend stocks. For example:

Stock price just prior to ex-dividend date	$2.50
Dividend per stock	$0.12
Theoretical ex-dividend stock price	$2.38

Obviously whether or not the stock trades at the theoretical ex-dividend stock price immediately post ex-dividend date would also depend on the broad market direction and other factors affecting the stock and the sector on that market trading day.

Exchange-traded derivatives like equities options cater for dividend payment by making provision in the term sheet to adjust the strike price automatically. For many OTC equities options, one has to be vigilant as the strike price for the option may or may not be adjusted on actions like dividend payment. This is especially true for structured product like equities linked notes when it isn't even clear to the buyer of the note that they have just bought or sold a derivative. The main reason for that is that dividend amounts are usually too small to matter. Dividend payouts usually range from 0% to 5% for most companies. Compare that to stocks fluctuating around 1-2% on a daily basis. As such, relative to daily stock fluctuations, dividend payments are usually too small to matter, especially when the option is one of low delta.

The exception might be for stable and "boring" high dividend stocks. In that case, the stock dividends are perhaps what really matters to investors and that would clearly put the dividend payout at the top of what investors would focus on. Should that be the case, investors of OTC derivatives should ensure that dividend payment would automatically result in an adjustment to the strike price, irrespective of the certainty or size of the dividend.

Dividends seldom have a lasting impact on the stock price. While the stock price is likely to fall by the dividend amount on ex-dividend date, one also usually finds that the stock tend to rally just prior to the dividend ex-date too. As such, the net effects of a dividend payout say 1 week before and 1 week after the dividend ex-date is seldom clear-cut.

For high dividend stocks, a surprise non-payment of dividend would certainly have a negative impact on the stock. As such, we find that these companies sometimes continue to pay out dividends even when the company is facing a short-term setback or running a loss.

Capital Repayment

Just like dividends payment, capital repayment is another way to reward stockholders. It is often used when a firm has a disproportionately large amount of cash or capital than they would normally pay out in dividends. This usually happens when a firm sells off fixed assets or investments and find re-investment opportunities rather lacking or unattractive.

There are several points to note for capital repayment:

- Usually paid in cash. As capital repayment is a way to reward stockholders with spare cash or capital they can't deploy efficiently, the repayment is usually in cash, though it is possible to be in the form of shares of other companies like subsidiaries or related companies.

- The quantity of shares issued does not change. As it is merely paying out cash or other stocks, the number of shares of the company does not change.

- As capital repayments may be much larger than dividends, the impact on the underlying stock price cannot be ignored. In such instances, exchange-traded derivatives usually have clearly stated clauses in them that explicitly consider and adjust for capital repayments.

However, it is not possible to consider OTC derivatives as those contracts are not lodged with central exchanges and the firm cannot possibly know about all of them. In this case, it is imperative that the OTC derivative contract has clauses to consider instances like this, and adjust the strike price accordingly, in order to be fair to both the buyer and the seller.

Capital repayments usually have at least a short-term benefit to the underlying stock. Similar to an unexpectedly high dividend payout, it is generally seen as an indication of the company's strength to be able to give out cash or capital. As such, investors and speculators tend to buy the stock up immediately after the announcement, all to way to the day just before the capital repayment ex-date. The stock price is also expected to fall by the repayment amount on the ex-date. As the number of issued shares does not change, the theoretical price computation ex-repayment is exactly the same as that in the dividend example.

Whilst most capital repayments are taken positively, there is one very important exception – when the capital repayment is on the back of the selling of a key business or asset of the underlying company. If the sale is going to leave the underlying company as just an empty shell or the sale is going to drastically alter the fundamental business of the underlying company, the investing public would generally re-evaluate the company's business going forward, and the resulting assessment will determine the near term direction for the stock.

Share Buy-back

Yet another variation of corporate action is share buy-back. This usually happens when the share price is perceived to be depressed, unfairly penalised by the market, or to provide support to the share price temporarily. This action typically has to be explicitly approved by the shareholders, and so is not something the management could be doing without proper planning.

There are several advantages for share buy-back, namely:

- It does not lower the share price like capital repayment. Shares are bought from the open market, so there is no concept of distributing cash to shareholders, which tends to have the impact of lowering the stock price.

- It reduces the number of shares outstanding in the market. By buying shares from the open market, it reduces the available "free float". In doing so, the supply of the stock in the market is reduced.

- Improves earnings per share (EPS). If the shares bought back are cancelled, it also will effectively increase the EPS, by virtue of there being fewer shares listed. The effect of a higher EPS usually leads to share price out-performance.

- Fair value. Companies tend to buy back their own shares when they think the share price has fallen below a perceived fair value of the company. For example, Berkshire Hathaway has a standing repurchase program at 120% of

its book value or less, but it has not bought any shares under the program since 2012. Sometimes, the presence of this share buy-back mandate would also support the share price as investors might lean on this possibility to buy ahead of it.

As share buy-back is often perceived by the investing public as a sign of confidence where even the company itself thinks the shares are cheap, it sometimes leads to investors joining in to buy at around the level where the firm buys back their own shares, lending even more support to the share price.

Exchange-traded and OTC derivatives generally do not take into account the effect of share buy-back, simply because it is not possible to know when a company might be in the market buying their own share. As such, derivatives could not possibly plan or objectively adjust its strike price to take this into account.

If a firm has a firmly stated buy-back programme, one can expect some support when a stock falls for no obvious reasons. However, if it was the broader market falling, a company blindly supporting their own share price irrespective of the broad market conditions could also be perceived poorly by investors. Corporates are usually acutely aware of this, and would use this share buy-back tool wisely to manage their underlying stock price.

Rights Issue

Rights issue is a way to raise capital from existing shareholders. How it works is that rights are given to existing shareholders. In turn, rights-holders can buy the shares at a discount to market. Rights-holders would need to pay only the discounted price to exercise the rights.

If rights-holders are not willing to invest more money into the firm, they could sell the rights in the open market before it expires. Shareholders who do not sell or exercise the rights will have their holding diluted because there will be more shares after all the rights are exercised.

In theory, when a company announces a rights issue, the share price would adjust downwards immediately, as the rights issue price is always below the prevailing market price. The theoretical ex-rights price is as follows:

$$\text{Theoretical Ex-Rights Price} = \frac{\text{Market Value of Shares prior to Rights issue} + \text{Cash raised from Rights Issue}}{\text{Number of Shares After Rights Issue}}$$

Take for example a share trading at RM1.50, and a 1-for-2 rights issue at RM1.00 is given to existing shareholders. This means shareholders will be given one rights for every two shares they own. Take for example the company has 10 million shares issued prior to the rights issue.

Market value of shares prior to rights issue = RM1.50 x 10 mil = RM15 mil

Cash raised from rights issue = RM1 * (10 mil/2 mil) = RM5 mil

Theoretical ex-rights price = (RM15 mil + RM5 mil) / (10 mil+5 mil) = RM1.33

The above assumes all rights will be taken up. While not every rights holder would be taking up their rights to subscribe for new shares, there is usually an underwriter or sponsor who commits to buying up all the rights that are not taken up. The value of a company's shares after a rights Issue must equal to the sum of the market capitalisation before the rights Issue and the cash raised from the issue. The total value divided by the number of shares thus gives the theoretical price.

Note that most shareholders do not like rights issue, because the company is seen to be raising money from them instead of paying them. As such, when a rights issue is announced, one usually finds the stock declining immediately post-announcement. Among existing stockholders, those who do not want to deal with the rights that will be given to them will probably choose to sell the stock out before the Rights Ex-date.

A company with exchange-traded derivatives would have mechanisms to automatically adjust the strike prices accordingly, in the event of a rights issue. Again, OTC derivatives would have to depend on its own term-sheets to ensure that a rights issue would result in fair adjustments to the strikes.

Bonus Shares

Some companies give out bonus shares instead of paying dividends. This is most commonly done when a share is rallying fast, to the extent that the share price is much higher than the quantum a retail investor is willing to buy at. Bonus shares could also be given out when companies are growing rapidly but low on cash, which is typical for newer and growth companies.

Bonus shares that are given out tend to be new shares. By giving out new shares, there would be more shares but its net assets remain unchanged, so the net result is a fall in share price. For example:

Company A's share price rallied from RM50 to RM100 in the past six months.

Company A announces a 1-for-1 bonus issue. This means it will give one new share for every share the shareholder holds.

Company A's share rallied immediately post announcement. On the last day before the ex-bonus date, share price was RM110.

Theoretical share price on ex-bonus date
= Price before ex-date x (no. of shares before bonus / no. of shares after bonus)
= RM110 x (1/ 2)
= RM55

In the above example, Company A chose the bonus issue action because they want to lower the stock price to a level that is more accessible by retail investors. The theoretical share price on ex-bonus date is derived from the share price just before the ex-bonus date, as that is how much the company was last valued at.

As giving out bonus shares means shareholders would own more shares and the lower price could mean more investors buying the stock, shareholders are usually delighted with a bonus share issue. As such, investors and speculators tend to buy the shares after the announcement and ahead of its ex-date, driving it higher before the ex-date. The price after ex-date is more uncertain as profit-takers from the earlier buyers would be met with likely increased buying from retail investors.

Much like a rights issue, a bonus issue's impact on the underlying stocks is clear and computable. Corporates can choose a more "desirable" price range for the stock to trade at by adjusting the bonus share issue's ratio. For example, if the corporate only wants to lower the share price slightly, say around 20%, they could do it via a 1-for-4 bonus issue. If they want to lower their share price to a quarter of where it was trading, they could even do a 3-for-1 bonus issue.

As for derivatives, exchange-traded derivatives will be adjusted accordingly for bonus issues, while OTC derivatives would have to take care of that explicitly in the contract terms.

Stock Split / Reverse Stock Split

When a stock's price is too high, retail investors may find the stock out of reach. Instead of a bonus issue, a company can also choose to split its stock in such instance to bring its stock price to more palatable levels for retail investors. It is very similar to a bonus share issue, other than accounting differences in shareholders' equity.

In a stock split, the number of issued shares gets adjusted according to the split ratio. After the split, the share price should in theory adjust according to the split ratio. The formula to compute the theoretical ex-split price is similar to that for the bonus issue.

In a reverse stock split, or alternatively called share consolidation, the reverse happens. A stock may find itself trading too low, worth only cents or pennies sometimes. The label of “penny stocks” is what some companies might want to avoid, and they could choose to consolidate their shares to make it look “stronger”. Another reason for doing this would be to help the stock appeal to fund managers who are prohibited from holding penny stocks. The formula to compute the theoretical ex-reverse-split price is also similar to that for the bonus issue.

Besides the negative perception associated with “penny stocks”, higher priced stocks tend to have narrower bid-ask spread as a percentage of their share price. As such, transaction costs in trading them are lower than trading penny stocks. Higher priced stocks are generally also less susceptible to speculation and market manipulation.

Clearly, a corporate action like a stock split or reverse stock split would have major impact on the underlying stock prices. Stock splits are generally seen as more positive to the stocks, as that is usually done when a company is performing well. As such, the underlying stock tends to rally post the announcement, ahead of the ex-date.

Conversely, reverse stock splits are generally perceived negatively as that usually means the stock is performing so poorly that it needs to be consolidated to boost its appeal. The underlying stock in this case will tend to do poorly post-announcement, though it may do better after consolidation as it might appeal to more investors.

Again exchange-traded derivatives would automatically take care of this corporate action, while OTC derivatives would have to explicitly consider its impact.

The impact of corporate actions on the underlying stock is clear and direct in most cases. Their theoretical prices after the corporate actions could be easily computed too, though the market may not always trade at the theoretical prices after the ex-date. As such, corporates could carefully plan and calibrate their actions depending on what they hope to achieve for their underlying stock prices.

2. Effects of Corporate Actions on other Derivatives

Unlike corporate actions that largely impact their own stock prices, corporate activities that could impact derivatives and their underlying instruments are mainly investments, speculation, or hedging activities.

Generally speaking and in normal circumstances, corporate activities tend to have little impact on the underlying instruments of other derivatives. This is because corporate activities, as a whole, usually form only a very small part of the daily turnover of the underlying instruments.

For example, “real” needs for foreign exchange by corporations account for a low single digit percentage of the daily USD5 trillion turnover. The bulk of the turnover is attributed to professional traders, funds, investors and speculators.

We shall examine corporate activities that may have an impact on each of the following assets or instruments underlying OTC derivatives.

Commodities

Corporates are the main users of commodities, and they tend to only hedge their needs instead of speculating. For example, airline companies tend to have a jet fuel or oil hedge ratio of anywhere between 20% to 80%, depending on their own hedge policies. They tend to hedge at least one year ahead, and sometimes go as long as three or even five years.

Some firms also practise what is commonly termed a “dynamic hedging program”, which is basically having some flexibility in deciding how much to hedge, and to unwind some hedges at opportune time, especially when it is making money.

Continuing with the airlines example, a typical strategy would be to buy more jet fuel or oil for future use when oil prices are perceived to be low. When prices are seen to be in the mid-range of a cycle, a collar strategy could be entered into, where they give up the opportunity to gain on potentially lower prices for hedging against future price rises. If prices are perceived to be relatively high, they might simply reduce the hedge ratio for future. Even when the airlines as a group are heavy users and hedgers of jet fuel and oil, their influence on the underlying prices is still limited.

Commodities are highly speculative and participated by many investors and traders with no real need for the commodities. However, as commodities are also highly complex logistically, there are also dedicated commodity traders whose main role is to facilitate commodities trades and also benefit from commodities trading. These traders would be more regular participants in the commodities market, and would have a more significant influence on the prices of the underlying commodities markets.

Interest Rates

Borrowing and financing is at the heart of all corporate businesses. Without funds, a company cannot grow. Almost all corporate businesses need to borrow to finance their daily operations, or to fuel further growth.

The cost of borrowing is crucial to any corporate as it contributes directly to the profit margin of the corporate. Interest rates are largely dependent on the economy's growth and inflation, and the policy rates are mostly determined by central banks. Corporate businesses have a large role to play in contributing to the economy's well-being, and thus, as a group, is a major contributor to the direction of the interest rates movements.

Individual corporates are price takers in the world of interest rates trading. Like everyone else, corporate businesses try to borrow for longer duration when rates are low, and borrow for shorter duration when rates are high and falling. Firms can do that via borrowing from banks, or issuing bonds themselves.

Corporates also use derivatives like interest rate swaps to hedge their interest rate risks. These are usually fixed to floating rate swaps or vice versa. When interest rates are perceived to be rising, firms may enter into a pay fixed interest rate swap to lock in their borrowing costs. Conversely, when rates are likely to be falling, firms may choose to receive fixed to lower their financing costs by hopefully paying floating rates that become cheaper over time.

Beyond these plain vanilla activities and derivative hedging, corporates tend not to be active participants in the interest rate market. As corporate activities are usually modest, they have little impact on the underlying interest rates.

Bonds and Credit

Through the issuance of bonds, corporates directly play a part in the bond market. Corporates usually prefer to go to the bond market to raise funds as they are generally cheaper than financing through banks. Obviously, the coupons the corporates have to pay would depend largely on the strength and credit-worthiness of their companies. The stronger the financial health of the firm, the higher the credit rating, and the lower the coupon they have to pay.

While each corporate's issuance may be limited in size, together they make up the entire corporate bond market. They therefore have a direct and meaningful influence in terms of the supply of corporate bonds, and thus also the yield of corporate bonds.

Similarly, the credit market comprises mainly of corporate bonds, loans and securities. Besides corporate issuances, financial institutions could also securitise

individuals' liabilities like car loans and mortgages, and sell them as different credit-rated tranches to investors. The credit market is thus made up of corporates and financial institutions issuing debt of different credit ratings. This is what the OTC credit derivatives market is based on.

Corporates are a significant contributor to the underlying credit markets. However, the OTC derivative market for credit could be many times larger than the underlying credit market, as we have seen during the global financial crisis. The corporate activities have a negligible impact on the prices of bonds and credit markets.

Foreign Exchange

Practically all corporates are exposed to foreign exchange (FX) risks, irrespective of whether they are involved in import or export businesses. Even manufacturers who manufacture for domestic use only are likely to need raw materials that are priced in a foreign currency. Services companies are also directly or indirectly exposed to foreign exchange risks in a world where everything is increasingly global.

Many corporates however choose not to hedge their FX risks, let alone invest or speculate in them. There are several reasons:

- FX is a notoriously difficult instrument to forecast
- Hedging comes at a cost, sometimes not small, for the medium term
- FX derivatives, like exotic options, may be confusing

As such, many just leave it to chance, hoping simply that "what goes up must come down" eventually.

As the FX market is one with over RM5 trillion turnovers a day, real corporate activities in FX are basically a drop in the ocean. However, there may be instances where a real corporate activity may have a short-term effect on the FX market.

A common example of corporate activity impacting the underlying FX market would be when a company from country A buys another company from country B. If the transaction amount is large, for example in billions of dollars, one may see the FX market reacting to the announcement. Several parties may be interested in taking advantage of the corporate merger and acquisition (M&A) activity:

- The corporates involved. The corporates involved may or may not have bought Currency B and sold Currency A when the M&A announcement is made. However, they would be expected to do the FX transaction one way or another, just a matter of time.

- The banks. When a corporate does an M&A, the banks are usually involved in financing the deal. Depending on how the deal is structured, the banks involved would be advising on all matters relating to financing and financial risks including FX. The banks could well be engaged in trading the FX for their client ahead of the announcement.
- The speculators. Market participants may jump on the band wagon upon the announcement and buy currency B and sell currency A as a short-term trade. They typically do that in anticipation of the actual companies involved having to do so later.

This corporate activity affecting the underlying FX market is seen quite regularly, but the impact seldom lasts. In the huge FX market, its impact is largely transient, and has no noticeable lasting impact typically beyond a few hours to a day at most.

In Summary

Corporate actions directly impact the stocks of the corporates concerned. These include dividends, capital repayment, share buy-back, rights issue, bonus share and stock split or reverse stock split. Most exchanges have built-in mechanisms to take care of these corporate actions automatically, but that is not necessarily the case for OTC derivatives.

Corporate activities tend to have less impact on the underlying instruments of other derivatives, as the activities tend to form only a small part of the daily turnover of the underlying instruments. Corporate activities tend to have negligible impact on foreign exchange in the USD5 trillion daily turnover markets.

For commodities, most corporates are hedgers by nature. Only those corporates directly involved in commodities trading would have a more significant influence on the commodities markets. For bonds, credit and interest rates, corporates tend to be price-takers and are involved, only sparingly, when they have to raise cash for their investments or funding activities.

Activity

1. Which of the following would most likely have a short term negative effect on the underlying stock?

   (A) High dividends
   (B) Share Buy-back
   (C) Bonus issue
   (D) Rights issue

2. Stock A is trading at RM3.00, and a 1-for-4 rights issue at RM2.00 is declared. Stock A has 10 million shares issued prior to the Rights Issue. Calculate the theoretical ex-Rights price of stock A.

   (A) RM3.00
   (B) RM2.80
   (C) RM2.46
   (D) RM2.00

3. Which may be the most likely reason for a company to do a reverse stock split (share consolidation)?

   (A) To reward shareholders
   (B) After a sale of significant asset, when company has cash
   (C) When the stock price is too high
   (D) When the stock is trading too low, typically worth only cents

4. Stock B was trading at RM15.00, and a 1-for-1 bonus issue was declared. Stock B quickly rallied after the bonus announcement, and on the last day before ex-bonus date, it closed at RM16.00. Calculate the theoretical ex-Bonus price of stock B.

   (A) RM16.00
   (B) RM15.00
   (C) RM8.00
   (D) RM7.50

5. US Corporate C has just announced a deal to takeover an Australian company D worth AUD 5 billion. Corporate C decided quietly to buy AUD 2.5 billion over the next 2 weeks to hedge its exposure.

   Which of the following is likely to be the reaction to the foreign exchange market?

   (A) FX Market does not react to the announcement of the acquisition
   (B) FX Market speculators buy Australian Dollar and sell US Dollar as a knee jerk reaction
   (C) FX Market speculators sell Australian Dollar and buy US Dollar as a knee jerk reaction
   (D) None of the above

Suggested Answers to Activity

1. (D)
2. (B)
3. (D)
4. (C)
5. (B)