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## Financial Derivatives: Forwards, Futures, Options, Warrants, Swaps

In this series of blog I will share my notes on financial derivatives. In this post we're going to look at

- What are Financial Derivative
- Who Trades
- Major Derivatives Types
- Where Derivatives are traded



### Derivatives — A Zero Sum Game

In game theory and economic theory, a zero-sum game is a mathematical representation of a situation in which a participant's gain (or loss) of utility is exactly balanced by the losses (or gains) of the utility of the other participant(s). If the total gains of the participants are added up, and the total losses are subtracted, they will sum to zero. Many economic situations are not zero-sum, since valuable goods and services can be created, destroyed, or allocated in a number of ways, and any of these will create a net gain or loss of utility to the combined various stakeholders.

Derivatives are bilateral contracts, so one party's loss is equal to its counterparty's gain and therefore the transaction as a whole is a zero-sum game. Often derivatives traders also trade in the underlying security, such as trading a stock option against the underlying stock. In this case their overall outcome will not be a zero sum game due to the impact of the underlying security. Certain securities, such as mortgage-backed bonds, can be considered



## What is a Financial Derivative

A financial derivative is an economic contract whose value depends on or is derived from the value of another instrument or underlying asset. So a derivative is not a security like a stock or a bond where you have ownership in a company or have lent money to a company. A derivative is simply a side bet with another party on how a different security will perform. These derivatives are not issued by companies the way stocks and bonds are. They don't raise money for companies the way an IPO or a bond offering does. They are simply a side bet on how another financial product will perform and they derived their price from that financial product which referred to as the underlying asset or underlying. Derivatives are often broken down or categorized by the relationship between the underlying asset and the derivative.

Things like

- Forwards and Futures
- Options
- Swaps

They can also be broken down by the type of underlying asset. Things like

- Equity derivatives,
- Foreign exchange derivatives,
- Interest rate derivatives,
- Commodity derivatives
- Credit derivatives.

Finally they can be broken down by the market in which they trade. Things like

- Exchange-traded derivatives
- Over-the-counter derivatives

Derivatives can be used for the purpose of speculation or for hedging.

A **speculator** is a trader who's taking position with the goal of making a profit.

A **hedger** is a trader who already has an economic exposure and who takes an offsetting position in order to reduce a risk that they already have exposure to.

Often people are a bit confused by the term hedging they think it relates to the idea of a hedge fund. A hedger is not a hedge fund. It's simply a person who is trading a financial instrument in order to reduce their risks. They are hedging their risk that are already exposed to a financial risk. Their trading activity reduces that risk exposure.

There are a number of underlyings for derivatives available and new ones are being developed all the time. Some of the most popular underlyings are: *Equities* which are also known as stocks which are listed on public exchanges companies like Apple, GE, Tesla, Verizon etc.

Then there are fixed income derivatives like government *bonds*, corporate bonds, credit spreads, baskets of mortgages etc. We also have things



## Who Trades Derivatives

Let's talk about who trades derivatives. Lots of people trade derivatives. They are often broken down into different groups like hedgers, speculators, arbitrageurs and middleman.

**Hedgers** are often producers or consumers of an underlying. They are required to typically have exposure to a particular underlying in the normal running of their business. Derivatives allow the risk related to the price of the underlying asset to be transferred from one party to another. For example a corn farmer and the breakfast cereal manufacturing company like Kellogg's could enter into a futures contract to exchange a specified amount of cash for a specified amount of corn at some point in the future. In doing so both parties will have reduced a future risk and thus both would be considered hedgers. Both parties reduce their exposure to certain variations in the price of corn which could materially affect their respective businesses. Essentially what we've got in that case is it's really just that they fixed a price in advance for a trade that they'll be doing at some point in the future.

**Speculators** are individuals who seek exposure to risky assets with the aim of making a profit. They're often things like pension plan managers, insurance companies or asset management firms. Financial speculation can involve trading like buying holding or selling and short selling stocks, bonds, commodities, currencies, real estate, derivatives or any valuable asset to attempt to profit from fluctuations in its price. Irrespective of its underlying value. Many try to differentiate the concept of speculation from investing. But for our purposes a speculator and an investor are individuals or companies who take a derivatives position with the goal of profiting from it rather than with the goal of reducing their risk or hedging their exposure.

**Arbitrageurs** arbitrage is the practice of taking advantage of a price difference between two or more markets. It usually involves the simultaneous purchase and sale of an asset. The profit being the difference between the market prices. Arbitrage is a trade that profits by exploiting price differences of identical or extremely similar financial instruments on different markets or in different forms. Arbitrage exists as a result of market inefficiencies. It provides a mechanism to ensure that prices do not deviate substantially from fair value for long periods of time. The term arbitrage in academics is a transaction that involves no negative cash flow at any probabilistic or temporal state and the positive cash flow in at least one state. In simple terms that means it's the possibility of a risk-free profit at zero costs. It's an important idea in pricing derivatives. The key idea being that any two assets with the same cash flows and risk should have the same price.

Next let's discuss about **middleman** who are the final group of market participants in the derivatives market. They're usually investment banks, market makers, brokers. They trade derivatives with the goal of earning a commission or a bid-ask spread between customers who are undertaking opposing positions. These market participants typically are not aiming to accurately predict or profit from movements in the price of the underlying. They just aim to profit from the commission or spread that they get to charge their customers. While in the ordinary running of their business middlemen can sometimes end up holding a position which might cause a profit or loss. They typically do avoid this though and will usually hedge any residual



## Major Derivative Contract Types

The most common types of derivative contracts are as follows:

1. **Forwards:** An OTC contract between two parties, where payment takes place at a specific time in the future at today's predetermined price.
2. **Futures:** An exchange-listed contract to buy or sell an asset on or before a future date at a price specified today. A futures contract differs from a forward contract in that the futures contract is a standardized contract which is then backed by a clearing house working with an exchange where the contract can be bought and sold; the forward contract is a non-standardized OTC contract written by the parties themselves.
3. **Options:** An option is a derivative financial instrument that specifies a contract between two parties for a future transaction on an asset at a reference price — the strike. The buyer of the option gains the right, but not the obligation, to engage in that transaction, while the seller incurs the corresponding obligation to fulfil the transaction. Options can be either exchange-traded or OTC. An option which conveys the right to buy something at a specific price is called a call; an option which conveys the right to sell something at a specific price is called a put.
4. **Warrants:** A warrant is quite similar to an option, but it is typically issued by a company on its own stock and, when exercised, new equity is issued causing ownership dilution to common stockholders.
5. **Swaps:** A swap is an OTC derivative in which counterparties exchange cash flows of one party's financial instrument for those of the other party's financial instrument.

## How are Derivatives Traded?

There are two groups of derivative contracts, which are distinguished by the way they are traded in the market: Over-the-counter derivatives and exchange traded derivatives.

### Over-the-counter derivatives (OTC)

Over-the-counter derivatives are contracts that are traded directly between two parties, without going through an exchange. Products such as swaps, forward rate agreements, exotic options — and other exotic derivatives — are typically traded in this way. The OTC derivatives market is the largest market for derivatives. The OTC market is largely made up of banks, large corporations, and other highly sophisticated parties. Knowing the size of the OTC market is not easy as trades can occur in private, without the activity being visible on any exchange. According to the Bank for International Settlements, the total outstanding notional amount of OTC derivatives is US\$532 trillion as of June 2017. Of this total notional amount, approximately 67% are interest rate contracts, 8% are credit default swaps (CDS), 9% are foreign exchange contracts, 2% are commodity contracts, 1% are equity contracts, and 12% are classified as "other." Because OTC derivatives are not traded on an exchange, there is no central counterparty. Thus they are subject to counterparty risk, the risk of one party defaulting at settlement or closure of the contract, like any ordinary legal contract. Despite the complexity risks of OTC trading, most transactions are quite standardized, with standardized documentation.

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exchange is a market where standardized contracts that have been defined by the exchange are traded. A derivatives exchange acts as an intermediary to all related transactions, and takes margin payments from the customers who trade with them to act as a guarantee. According to the Bank for International Settlements, the combined turnover in the world's derivatives exchanges totaled \$8,989 billion in June 2018. Some types of derivative instruments also may trade on traditional exchanges. For instance, hybrid instruments such as convertible bonds and/or convertible preferred stock may be listed on stock or bond exchanges. Warrants or rights may be listed on equity exchanges. Most exchange traded derivatives are traded electronically. Historically, financial markets were physical locations where buyers and sellers met and negotiated. With the improvement in communications technology in the late 20th century, the need for a physical location became less important, since traders could transact from remote locations. One of the earliest examples of widespread electronic trading was on Globex, the CME Group's electronic trading platform that allows access to a variety of financial, foreign exchange, and commodity markets. The Chicago Board of Trade produced a rival system "E Open Outcry," an electronic trading platform that allowed for electronic trading to take place alongside the trading that took place in the CBOT pits. Electronic trading makes transactions easier to complete, monitor, clear, and settle. Electronic trading brought down the cost of trading, improved liquidity and increased transparency when introduced.

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
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
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