

Derivative (finance)

In finance, a **derivative** is a financial instrument derived from some other asset; rather than trade or exchange of the asset itself, market participants enter into an agreement to exchange money, assets or some other value at some future date based on the underlying asset. A simple example is a futures contract: an agreement to exchange the underlying asset (or equivalent cash flows) at a future date. The exact terms of the derivative (the payments between the counterparties) depend on, but may or may not exactly correspond to, the behaviour or performance of the underlying asset.

There are many types of financial instruments that are grouped under the term derivatives, but options/futures and swaps are among the most common. Options are contracts where one party agrees to pay a fee to another for the right (but not the obligation) to buy something from or sell something to the other. For example, a person worried that the price of his Microsoft stock may go down before he plans to sell it may pay a fee to another person (the writer of a put option) who agrees to buy the stock from him at the strike price. The person in this example is using an option to manage the risk that his stock may go down, while the writer of the put option may be using the option as a way to benefit from the increase in the stock price and the fee income. In contrast to a put option, a call option gives the buyer of the option the right to purchase the underlying asset at a later date and at the specified strike price.

Later, contracts known as swaps appeared, where one party agrees to swap cash flows with another. For example, a business may have a fixed-rate loan, while another business may have a variable-rate loan; each of the businesses would prefer to have the other type of loan. Rather than cancel their existing loans (if this is possible, it may be expensive), the two businesses can achieve the same effect by agreeing to "swap" cash flows: the first pays the second based on a floating-rate loan, and the second pays the first based on a fixed-rate loan (in practice, the two will net out the amounts owing). By swapping the cash flow, each has "converted" one type of loan into another.

Derivatives can be based on different types of assets such as commodities, equities or bonds, interest rates, exchange rates, or indices (such as a stock market index, consumer price index (CPI) — see inflation derivatives — or even an index of weather conditions, or other derivatives). Their performance can determine both the amount and the timing of the payoffs. The main use of derivatives is to either remove risk or take on risk depending if one were a hedger or a speculator. The diverse range of potential underlying assets and payoff alternatives leads to a huge range of derivatives contracts available to be traded in the market. The main types of derivatives are futures, forwards, options and swaps. In today's uncertain world, derivatives are increasingly being used to protect assets from drastic fluctuations and at the same time they are being re-engineered to cover all kinds of risk and with this the growth of the derivatives market continues.

Hedge (finance)

In finance, a **hedge** is an investment that is taken out specifically to reduce or cancel out the risk in another investment. **Hedging** is a strategy designed to minimize exposure to an unwanted business risk, while still allowing the business to profit from an investment activity. Typically, a hedger might invest in a security that he believes is under-priced relative to its

"fair value" (for example a mortgage loan that he is then making), and combine this with a short sale of a related security or securities. Thus the hedger doesn't care whether the market as a whole goes up or down in value, only whether the under-priced security appreciates relative to the hedge.

Speculation, in the narrow sense of financial speculation, involves the buying, holding, selling, and short-selling of stocks, bonds, commodities, currencies, collectibles, real estate, derivatives or any valuable financial instrument to profit from fluctuations in its price as opposed to buying it for use or for income via methods such as dividends or interest. Speculation or **agiotage** represents one of three market roles in western financial markets, distinct from hedging, long term investing and arbitrage. Speculators in an asset have no intention to have long term exposure to the asset

Speculation and arbitrage

Of course, speculators may trade with other speculators as well as with hedgers. In most financial derivatives markets, the value of speculative trading is far higher than the value of true hedge trading. As well as outright speculation, derivatives traders may also look for arbitrage opportunities between different derivatives on identical or closely related underlying securities.

Derivatives such as options, futures, or swaps, generally offer the greatest possible reward for betting on whether the price of an underlying asset will go up or down. For example, a person may believe that a drug company may find a cure for cancer in the next year. If the person bought the stock for \$10.00, and it went to \$20.00 after the cure was announced, the person would have made a 100% return. If he borrowed money to buy the stock (in US law the general maximum he could borrow would be 5.00 or half of the purchase price), he could have bought the stock for 5 dollars and made a 300% return. However, if he paid a 1 dollar option premium to buy the stock at 11 dollars, when it shot up to 20 dollars he could have received the difference (9 dollars) and thus make an 800% return.

Commodities

In the world of business, a commodity is an undifferentiated product, good or service that is traded based solely on its price, rather than quality and features. Examples include: electricity (most users of electric power are only concerned with energy consumption; only a minority of users are concerned with the quality and technical details of voltage and frequency deviations, phase imbalance, "stability" as guaranteed by backup equipment, etc.), wheat, bulk chemicals such as sulfuric acid, base and other metals, and even pork-bellies and orange juice. More modern commodities include bandwidth, RAM chips and (experimentally) computer processor cycles, and negative commodity units like emissions credits.

In the original and simplified sense, *commodities* were things of value, of uniform quality, that were produced in large quantities by many different producers; the items from each different producer are considered equivalent. It is the contract and this underlying standard that define the commodity, not any quality inherent in the product. One can reasonably say that food commodities, for example, are defined by the fact that they substitute for each other in recipes, and that one can use the food without having to look at it too closely.

Commodities exchanges include:

- Chicago Board of Trade
- Euronext.liffe
- London Metal Exchange
- New York Mercantile Exchange

Microeconomists also include labor, and currency as commodities that can be bought and sold.

Examples

Wheat is an example of a soft commodity. Wheat from many different farms is pooled. Generally, it is all traded at the same price; wheat from farm A is not differentiated from wheat from farm B. Some uniform standard of quality must necessarily be assumed. There may be various standards leading to different pools: one say for genetically modified wheat, and one for unmodified wheat. Failures to match the consumer's assessment of risk and usefulness for some purpose, can lead to lower prices or the necessity of dividing the market into different pools - a very major issue in agricultural policy.

Markets for trading commodities can be very efficient, particularly if the division into pools matches demand segments. These markets will quickly respond to changes in supply and demand to find an equilibrium price and quantity.

Futures Contracts

In finance, a **futures contract** is a standardized contract, traded on a futures exchange, to buy or sell a certain underlying instrument at a certain date in the future, at a specified price. The future date is called the **delivery date** or **final settlement date**. The pre-set price is called the **futures price**. The price of the underlying asset on the delivery date is called the **settlement price**. The settlement price, normally, converges towards the futures price on the delivery date.

A futures contract gives the holder *the obligation* to buy or sell, which differs from an options contract, which gives the holder *the right, but not the obligation*. In other words, the owner of an options contract **may exercise** the contract. If it is an American-style option, it can be exercised on or before the expiration date; a European option can only be exercised at expiration. Thus, a Futures contract is more like a European option. Both parties of a "futures contract" **must** fulfill the contract on the settlement date. The seller delivers the commodity to the buyer, or, if it is a cash-settled future, then cash is transferred from the futures trader who sustained a loss to the one who made a profit. To exit the commitment prior to the settlement date, the holder of a futures position has to offset his position by either selling a long position or buying back a short position, effectively closing out the futures position and its contract obligations.

Futures vs. Forwards

While futures and forward contracts are both a contract to deliver a commodity on a future date, key differences include:

- Futures are always traded on an exchange, whereas forwards always trade over-the-counter, or can simply be a signed contract between two parties.

- Futures are highly standardized, whereas each forward is unique
- The price at which the contract is finally settled is different:
 - Futures are settled at the *settlement price* fixed on the last trading date of the contract (i.e. at the end)
 - Forwards are settled by the delivery of the commodity at the specified contract price.
- The credit risk of futures is much lower than that of forwards:
 - Traders are not subject to credit risk because the clearinghouse always takes the other side of the trade. The day's profit or loss on a futures position is marked-to-market in the trader's account. If the mark to market results in a balance that is less than the margin requirement, then the trader is issued a margin call.
 - The risk of a forward contract is that the supplier will be unable to deliver the grade and quantity of the commodity, or the buyer may be unable to pay for it on the delivery day.
- In case of physical delivery, the forward contract specifies to whom to make the delivery. The counterparty on a futures contract is chosen randomly by the exchange.
- In a forward there are no cash flows until delivery, whereas in futures there are margin requirements and a daily mark to market of the traders' accounts.

Who trades futures?

Futures traders are traditionally placed in one of two groups: hedgers, who have an interest in the underlying commodity and are seeking to *hedge out* the risk of price changes; and speculators, who seek to make a profit by predicting market moves and buying a commodity "on paper" for which they have no practical use.

Hedgers typically include producers and consumers of a commodity.

For example, in traditional commodities markets farmers often sell futures contracts for the crops and livestock they produce to guarantee a certain price, making it easier for them to plan. Similarly, livestock producers often purchase futures to cover their feed costs, so that they can plan on a fixed cost for feed. In modern (financial) markets, "producers" of interest rate swaps or equity derivative products will use financial futures or equity index futures to reduce or remove the risk on the swap.

The social utility of futures markets is considered to be mainly in the transfer of risk, and increase liquidity between traders with different risk and time preferences, from a hedger to a speculator for example.

Options on futures

In many cases, *options* are traded on futures. A put is the option to sell a futures contract, and a call is the option to buy a futures contract. For both, the option strike price is the specified futures price at which the future is traded if the option is exercised.

Forward contract

A **forward contract** is an agreement between two parties to buy or sell an asset (which can be of any kind) at a pre-agreed future point in time. Therefore, the trade date and delivery date are separated. It is used to control and hedge risk, for example currency exposure risk (e.g. forward contracts on USD or EUR) or commodity prices (e.g. forward contracts on oil). Allaz and Vila (1993) suggest that there is also a strategic reason (in an imperfect competitive environment) for the existence of forward trading, that is, forward trading can be used even in a world without uncertainty. This is due to firms having Stackelberg incentives to anticipate their production through forward contracts.

One party agrees to buy, the other to sell, for a forward price agreed in advance. In a forward transaction, no actual cash changes hands. If the transaction is collateralised, exchange of margin will take place according to a pre-agreed rule or schedule. Otherwise no asset of any kind actually changes hands, until the maturity of the contract.

The forward price of such a contract is commonly contrasted with the spot price, which is the price at which the asset changes hands (on the spot date, usually two business days). The difference between the spot and the forward price is the forward premium or forward discount.

A standardized forward contract that is traded on an exchange is called a futures contract.

Option (finance)

An **option** contract is an agreement in which the buyer (*holder*) has the right (but not the obligation) to exercise by buying or selling an asset at a set price (strike price) on (European style option) or before (American style option) a future date (the exercise date or expiration); and the seller (*writer*) has the obligation to honor the terms of the contract. Since the option gives the buyer a right and the writer an obligation, the buyer pays the **option premium** to the writer. The buyer is considered to have a long position, and the seller a short position.

Given that the contract's value is determined by an underlying asset and other variables, it is classified as a derivative.

For every open contract there is a buyer and a seller. Traders in exchange-traded options do not usually interact directly, but through a clearing house such as, in the U.S., the Options Clearing Corporation (OCC) or in Germany and Luxemburg Clearstream International. The clearing house guarantees that an assigned writer will fulfill his obligation if the option is exercised. Options/Derivatives are not rated and/or are below investment grade; however the OCC's clearing process is considered AAA rated.

The contract specifies

- whether it is a put option or call option. Put options give the holder the right to sell the asset at the strike price. Call options give the holder the right to purchase the asset at the strike price.
- the underlying security (e.g. XYZ Co.)
- the strike price or exercise price. It can be specified, or based on a reference rate, or at a strike price 54.00 to expire Dec 2007 with a multiplier of 100.

Types of options

- **Real option** (real option) is a choice that an investor has when investing in the real economy (i.e. in the production of goods or services, rather than in financial contracts). This option may be something as simple as the opportunity to expand production, or to change production inputs. Real options are an increasingly influential tool in corporate finance. They are typically difficult or impossible to trade, and lack the liquidity of exchange-traded options.
- **Traded options** (also called "Exchange-Traded Options" or "Listed Options") is a class of Exchange traded derivatives. As for other classes of exchange traded derivatives, trade options have standardized contracts, quick systematic pricing, and are settled through a clearing house (ensuring fulfillment). Trade options include
 1. stock options, discussed below,
 2. commodity options,
 3. bond options,
 4. interest rate options
 5. index (equity) options,
 6. currency cross rate options, and
 7. swaption.
- **Vanilla options** are 'simple', well understood, and traded options; Exotic options are more complex, or less easily understood. Asian options, lookback options, barrier options are considered to be exotic, especially if the underlying instrument is more complex than simple equity or debt.
- **Employee stock options** (employee stock option) are issued by a company to its employees as compensation.

Swap (finance)

In finance, a **swap** is a derivative, where two counterparties exchange one stream of cash flows against another stream. These streams are called the *legs* of the swap. The cash flows are calculated over a **notional** principal amount. Swaps are often used to hedge certain risks, for instance interest rate risk. Another use is speculation.

Swaps are over-the-counter (OTC) derivatives. This means that they are negotiated outside exchanges. They cannot be bought and sold like securities or futures contracts, but are all unique. As each swap is a unique contract, the only way to get out of it is by either mutually agreeing to tear it up, or by reassigning the swap to a third party. This latter option is only possible with the consent of the counterparty.