DERIVATIVES (Wikipedia)

In finance, derivatives is the collective name used for a broad class of financial instruments that derive their value from other financial instruments (known as the underlying), events or conditions.

Derivatives are usually broadly categorised by the:

* relationship between the underlying and the derivative (e.g. forward, option, swap)
* type of underlying (e.g. equity derivatives, foreign exchange derivatives, interest rate derivatives, commodity derivatives or credit derivatives)
* market in which they trade (e.g., exchange traded or over-the-counter)
* pay-off profile (Some derivatives have non-linear payoff diagrams due to embedded optionality)

Another arbitrary distinction is between:
* vanilla derivatives (simple and more common) and
* exotic derivatives (more complicated and specialized)

There is no definitive rule for distinguishing one from the other, so the distinction is mostly a matter of custom.

Derivatives are used by investors to

* provide leverage or gearing, such that a small movement in the underlying value can cause a large difference in the value of the derivative
* speculate and to make a profit if the value of the underlying asset moves the way they expect (e.g. moves in a given direction, stays in or out of a specified range, reaches a certain level)
* hedge or mitigate risk in the underlying, by entering into a derivative contract whose value moves in the opposite direction to their underlying position and cancels part or all of it out
* obtain exposure to underlying where it is not possible to trade in the underlying (e.g. weather derivatives)
* create optionality where the value of the derivative is linked to a specific condition or event (e.g. the underlying reaching a specific price level)
Hedging

Hedging is a technique that attempts to reduce risk. In this respect, derivatives can be considered a form of insurance.

Derivatives allow risk about the price of the underlying asset to be transferred from one party to another. For example, a wheat farmer and a miller could sign a futures contract to exchange a specified amount of cash for a specified amount of wheat in the future. Both parties have reduced a future risk: for the wheat farmer, the uncertainty of the price, and for the miller, the availability of wheat. However, there is still the risk that no wheat will be available because of events unspecified by the contract, like the weather, or that one party will renege on the contract. Although a third party, called a clearing house, insures a futures contract, not all derivatives are insured against counterparty risk.

From another perspective, the farmer and the miller both reduce a risk and acquire a risk when they sign the futures contract: The farmer reduces the risk that the price of wheat will fall below the price specified in the contract and acquires the risk that the price of wheat will rise above the price specified in the contract (thereby losing additional income that he could have earned). The miller, on the other hand, acquires the risk that the price of wheat will fall below the price specified in the contract (thereby paying more in the future than he otherwise would) and reduces the risk that the price of wheat will rise above the price specified in the contract. In this sense, one party is the insurer (risk taker) for one type of risk, and the counterparty is the insurer (risk taker) for another type of risk.

Hedging also occurs when an individual or institution buys an asset (like a commodity, a bond that has coupon payments, a stock that pays dividends, and so on) and sells it using a futures contract. The individual or institution has access to the asset for a specified amount of time, and then can sell it in the future at a specified price according to the futures contract. Of course, this allows the individual or institution the benefit of holding the asset while reducing the risk that the future selling price will deviate unexpectedly from the market's current assessment of the future value of the asset.
Derivatives serve a legitimate business purpose. For example, a corporation borrows a large sum of money at a specific interest rate.[1] The rate of interest on the loan resets every six months. The corporation is concerned that the rate of interest may be much higher in six months. The corporation could buy a forward rate agreement (FRA). A forward rate agreement is a contract to pay a fixed rate of interest six months after purchases on a notional sum of money.[2] If the interest rate after six months is above the contract rate the seller pays the difference to the corporation, or FRA buyer. If the rate is lower the corporation would pay the difference to the seller. The purchase of the FRA would serve to reduce the uncertainty concerning the rate increase and stabilize earnings.

**Speculation and arbitrage**

Derivatives can be used to acquire risk, rather than to insure or hedge against risk. Thus, some individuals and institutions will enter into a derivative contract to speculate on the value of the underlying asset, betting that the party seeking insurance will be wrong about the future value of the underlying asset. Speculators will want to be able to buy an asset in the future at a low price according to a derivative contract when the future market price is high, or to sell an asset in the future at a high price according to a derivative contract when the future market price is low. Individuals and institutions may also look for arbitrage opportunities, as when the current buying price of an asset falls below the price specified in a futures contract to sell the asset.

Speculative trading in derivatives gained a great deal of notoriety in 1995 when Nick Leeson, a trader at Barings Bank, made poor and unauthorized investments in futures contracts. Through a combination of poor judgment, lack of oversight by the bank's management and by regulators, and unfortunate events like the Kobe earthquake, Leeson incurred a $1.3 billion loss that bankrupted the centuries-old institution.[3]
Types of derivatives

OTC and exchange-traded
Broadly speaking there are two distinct groups of derivative contracts, which are distinguished by the way they are traded in the market:
* Over-the-counter (OTC) derivatives are contracts that are traded (and privately negotiated) directly between two parties, without going through an exchange or other intermediary. Products such as swaps, forward rate agreements, and exotic options are almost always traded in this way. The OTC derivative market is the largest market for derivatives, and is largely unregulated with respect to disclosure of information between the parties, since the OTC market is made up of banks and other highly sophisticated parties, such as hedge funds. Reporting of OTC amounts are difficult because trades can occur in private, without activity being visible on any exchange. According to the Bank for International Settlements, the total outstanding notional amount is $684 trillion (as of June 2008). Of this total notional amount, 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 other. Because OTC derivatives are not traded on an exchange, there is no central counterparty. Therefore, they are subject to counterparty risk, like an ordinary contract, since each counterparty relies on the other to perform.
* Exchange-traded derivative contracts (ETD) are those derivatives instruments that are traded via specialized derivatives exchanges or other exchanges. A derivatives exchange acts as an intermediary to all related transactions, and takes Initial margin from both sides of the trade to act as a guarantee. The world's largest derivatives exchanges (by number of transactions) are the Korea Exchange (which lists KOSPI Index Futures & Options), Eurex (which lists a wide range of European products such as interest rate & index products), and CME Group (made up of the 2007 merger of the Chicago Mercantile Exchange and the Chicago Board of Trade and the 2008 acquisition of the New York Mercantile Exchange). According to BIS, the combined turnover in the world's derivatives exchanges totaled USD 344 trillion during Q4 2005. Some types of derivative instruments also may trade on traditional exchanges. For instance, hybrid instruments such as convertible bonds and/or convertible preferred may be listed on stock or bond exchanges. Also, warrants (or "rights") may be listed on equity exchanges. Performance Rights, Cash xPRTs and various other instruments that essentially consist of a complex set of options bundled into a
simple package are routinely listed on equity exchanges. Like other derivatives, these publicly traded derivatives provide investors access to risk/reward and volatility characteristics that, while related to an underlying commodity, nonetheless are distinctive.

**Common derivative contract types**

There are three major classes of derivatives:

1. **Futures/Forwards** are contracts 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 written by a clearing house that operates an exchange where the contract can be bought and sold, while a forward contract is a non-standardized contract written by the parties themselves.

2. **Options** are contracts that give the owner the right, but not the obligation, to buy (in the case of a call option) or sell (in the case of a put option) an asset. The price at which the sale takes place is known as the strike price, and is specified at the time the parties enter into the option. The option contract also specifies a maturity date. In the case of a European option, the owner has the right to require the sale to take place on (but not before) the maturity date; in the case of an American option, the owner can require the sale to take place at any time up to the maturity date. If the owner of the contract exercises this right, the counterparty has the obligation to carry out the transaction.

3. **Swaps** are contracts to exchange cash (flows) on or before a specified future date based on the underlying value of currencies/exchange rates, bonds/interest rates, commodities, stocks or other assets.

More complex derivatives can be created by combining the elements of these basic types. For example, the holder of a swaption has the right, but not the obligation, to enter into a swap on or before a specified future date.

**Examples**

The overall derivatives market has five major classes of underlying asset:

* interest rate derivatives (the largest)
* foreign exchange derivatives
* credit derivatives
* equity derivatives
Some common examples of these derivatives are:

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Other examples of underlying exchangeables are:

- **Property (mortgage) derivatives**
- **Economic derivatives** that pay off according to economic reports[^6] as measured and reported by national statistical agencies
- **Freight derivatives**
- **Inflation derivatives**
- **Weather derivatives**
- **Insurance derivatives**[^citation needed]
- **Emissions derivatives**[^7]

### Valuation

Two common measures of value are:

* Market price, i.e. the price at which traders are willing to buy or sell the contract
* Arbitrage-free price, meaning that no risk-free profits can be made by trading in these contracts; see rational pricing

#### Determining the market price

For exchange-traded derivatives, market price is usually transparent (often published in real time by the exchange, based on all the current bids and offers placed on that particular contract at any one time). Complications can arise with OTC or floor-traded contracts though, as trading is handled manually, making it difficult to automatically broadcast prices. In particular with OTC contracts, there is no central exchange to collate and disseminate prices.

#### Determining the arbitrage-free price

The arbitrage-free price for a derivatives contract is complex, and there are many different variables to consider. Arbitrage-free pricing is a central topic of financial mathematics. The stochastic process of the price of the underlying asset is often crucial. A key equation for the theoretical valuation of options is the Black–Scholes formula, which is based on the assumption that the cash flows from a European stock option can be replicated by a continuous buying and
A simplified version of this valuation technique is the binomial options model.

Criticisms
Derivatives are often subject to the following criticisms:

Possible large losses

The use of derivatives can result in large losses because of the use of leverage, or borrowing. Derivatives allow investors to earn large returns from small movements in the underlying asset's price. However, investors could lose large amounts if the price of the underlying moves against them significantly. There have been several instances of massive losses in derivative markets, such as:

* The need to recapitalize insurer American International Group (AIG) with $85 billion of debt provided by the US federal government.[10] An AIG subsidiary had lost more than $18 billion over the preceding three quarters on Credit Default Swaps (CDS) it had written.[11] It was reported that the recapitalization was necessary because further losses were foreseeable over the next few quarters.
* The loss of $7.2 Billion by Société Générale in January 2008 through mis-use of futures contracts.
* The loss of US$6.4 billion in the failed fund Amaranth Advisors, which was long natural gas in September 2006 when the price plummeted.
* The bankruptcy of Orange County, CA in 1994, the largest municipal bankruptcy in U.S. history. On December 6, 1994, Orange County declared Chapter 9 bankruptcy, from which it emerged in June 1995. The county lost about $1.6 billion through derivatives trading. Orange County was neither bankrupt nor insolvent at the time; however, because of the strategy the county employed it was unable to generate the cash flows needed to maintain services. Orange County is a good example of what happens when derivatives are used incorrectly and positions liquidated in an unplanned manner; had they not liquidated they would not have lost any money as their positions rebounded.[citation needed] Potentially problematic use of interest-rate derivatives by US municipalities has continued in recent years. See, for example:[12]
Nick Leeson, a trader at Barings Bank in 1995, made poor and unauthorized investments in futures contracts. Through a combination of poor judgment, lack of oversight by the bank's management and by regulators, and unfortunate events like the Kobe earthquake, Leeson incurred a $1.3 billion loss that bankrupted the centuries-old institution.[3]

Members of President Clinton's Working Group on Financial Markets: Larry Summers, Alan Greenspan, Arthur Levitt, and Robert Rubin, have been criticized for torpedoing an effort to regulate the derivatives' markets, and thereby helping to bring down the financial markets in Fall 2008. President George W. Bush has also been criticized because he was President for 8 years preceding the 2008 meltdown and did nothing to regulate derivative trading. Bush has stated that deregulation was one of the core tenets of his political philosophy.

Counter-party risk

Derivatives (especially swaps) expose investors to counter-party risk.
For example, suppose a person wanting a fixed interest rate loan for his business, but finding that banks only offer variable rates, swaps payments with another business who wants a variable rate, synthetically creating a fixed rate for the person. However if the second business goes bankrupt, it can't pay its variable rate and so the first business will lose its fixed rate and will be paying a variable rate again. If interest rates have increased, it is possible that the first business may be adversely affected, because it may not be prepared to pay the higher variable rate.

Different types of derivatives have different levels of risk for this effect. For example, standardized stock options by law require the party at risk to have a certain amount deposited with the exchange, showing that they can pay for any losses; Banks who help businesses swap variable for fixed rates on loans may do credit checks on both parties. However in private agreements between two companies, for example, there may not be benchmarks for performing due diligence and risk analysis.
Unsuitably high risk for small/inexperienced investors

Derivatives pose unsuitably high amounts of risk for small or inexperienced investors. Because derivatives offer the possibility of large rewards, they offer an attraction even to individual investors. However, speculation in derivatives often assumes a great deal of risk, requiring commensurate experience and market knowledge, especially for the small investor, a reason why some financial planners advise against the use of these instruments. Derivatives are complex instruments devised as a form of insurance, to transfer risk among parties based on their willingness to assume additional risk, or hedge against it.

Large notional value

Derivatives typically have a large notional value. As such, there is the danger that their use could result in losses that the investor would be unable to compensate for. The possibility that this could lead to a chain reaction ensuing in an economic crisis, has been pointed out by famed investor Warren Buffett in Berkshire Hathaway's 2002 annual report. Buffett called them 'financial weapons of mass destruction.' The problem with derivatives is that they control an increasingly larger notional amount of assets and this may lead to distortions in the real capital and equities markets. Investors begin to look at the derivatives markets to make a decision to buy or sell securities and so what was originally meant to be a market to transfer risk now becomes a leading indicator. (See Berkshire Hathaway Annual Report for 2002)

Leverage of an economy's debt

Derivatives massively leverage the debt in an economy, making it ever more difficult for the underlying real economy to service its debt obligations, thereby curtailing real economic activity, which can cause a recession or even depression. In the view of Marriner S. Eccles, U.S. Federal Reserve Chairman from November, 1934 to February, 1948, too high a level of debt was one of the primary causes of the 1920s-30s Great Depression. (See Berkshire Hathaway Annual Report for 2002)
Benefits

Nevertheless, the use of derivatives also has its benefits:
* Derivatives facilitate the buying and selling of risk, and many people consider this to have a positive impact on the economic system. Although someone loses money while someone else gains money with a derivative, under normal circumstances, trading in derivatives should not adversely affect the economic system because it is not zero sum in utility.
* Former Federal Reserve Board chairman Alan Greenspan commented in 2003 that he believed that the use of derivatives has softened the impact of the economic downturn at the beginning of the 21st century.[citation needed]

Definitions

* Bilateral netting: A legally enforceable arrangement between a bank and a counter-party that creates a single legal obligation covering all included individual contracts. This means that a bank’s obligation, in the event of the default or insolvency of one of the parties, would be the net sum of all positive and negative fair values of contracts included in the bilateral netting arrangement.
* Credit derivative: A contract that transfers credit risk from a protection buyer to a credit protection seller. Credit derivative products can take many forms, such as credit default swaps, credit linked notes and total return swaps.
* Derivative: A financial contract whose value is derived from the performance of assets, interest rates, currency exchange rates, or indexes. Derivative transactions include a wide assortment of financial contracts including structured debt obligations and deposits, swaps, futures, options, caps, floors, collars, forwards and various combinations thereof.
* Exchange-traded derivative contracts: Standardized derivative contracts (e.g. futures contracts and options) that are transacted on an organized futures exchange.
* Gross negative fair value: The sum of the fair values of contracts where the bank owes money to its counter-parties, without taking into account netting. This represents the maximum losses the bank’s counter-parties would incur if the bank defaults and there is no netting of contracts, and no bank collateral was held by the counter-parties.

* Gross positive fair value: The sum total of the fair values of contracts where the bank is owed money by its counter-parties, without taking into account netting. This represents the maximum losses a bank could incur if all its counter-parties default and there is no netting of contracts, and the bank holds no counter-party collateral.

* High-risk mortgage securities: Securities where the price or expected average life is highly sensitive to interest rate changes, as determined by the FFIEC policy statement on high-risk mortgage securities.

* Notional amount: The nominal or face amount that is used to calculate payments made on swaps and other risk management products. This amount generally does not change hands and is thus referred to as notional.

* Over-the-counter (OTC) derivative contracts: Privately negotiated derivative contracts that are transacted off organized futures exchanges.

* Structured notes: Non-mortgage-backed debt securities, whose cash flow characteristics depend on one or more indices and / or have embedded forwards or options.

* Total risk-based capital: The sum of tier 1 plus tier 2 capital. Tier 1 capital consists of common shareholders equity, perpetual preferred shareholders equity with non-cumulative dividends, retained earnings, and minority interests in the equity accounts of consolidated subsidiaries. Tier 2 capital consists of subordinated debt, intermediate-term preferred stock, cumulative and long-term preferred stock, and a portion of a bank’s allowance for loan and lease losses.