(a) Long call

(b) Long put

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Option Contract

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An option contract is a financial instrument that gives the holder of the contract the right, but not the obligation, to buy or sell an underlying asset at an agreed upon price for a future date. Like futures and swaps, options are also examples of derivative products. There are two basic option types: a call option gives the holder of the contract the right to buy the asset, whereas a put option gives the holder the right to sell the asset. As in every contract, there is also a seller/writer of the call or put options. The writer of an option contract may be trying to hedge the risk from another contract or he/she may be trying to profit from future price changes based on his/her future expectations. The price that an option writer receives is known as option premium. The price in the option contract is known as the strike or exercise price. The date the contract expires is called the expiration or maturity date. Options are either traded in organized exchanges or in over-the-counter (OTC) markets. Option contracts can also be categorized as American or European options. American options could be exercised at any time prior to the expiration date, while European options could only be exercised at the expiration date. Options on assets other than stocks and currencies are also widely traded. There are options on market, industry, stock indexes, prices of future contracts, metal products, fixed-income securities, etc.

For a call option, if the spot price at the expiration is equal to the strike price (for a European option), option will be at-the-money, indicating that the option holder do not gain or lose by exercising his/her rights. On the other hand, if the strike price is less than the spot price, option will be in-the-money, indicating a positive gain from the option exercise. For an out-of-the-money option, strike price will be larger than spot price. An out-of-the-money option will not be exercised by the contract holder, and the direct loss will be limited to the option premium paid to the option writer. A call option has potentially unlimited gain if the strike price is less than the spot price. Similarly, for the holder of a put option, the contract will

be in-the-money if the spot price is lower than the strike price, providing potentially unlimited gain from exercising the option.

Consider a trader who bought a call option for the delivery of 125,000 euros in 90 days at a strike price of $1.3500 for an option premium of $0.0157 per euro. The cost of holding the contract is equal to $1962.50. If the spot price is $1.3650 next day, for an American option holder, option exercise will lead to a gain of $1875. However, since this is less than the option premium paid, owner of the option will have no intention to exercise the option. If the spot price at the expiration is $1.3350, option will be out-of-money and the holder will prefer to let the option expire. The cost to the holder will be the option premium paid, which is also the gain to the option writer. On the other hand, if the spot price at the expiration date is $1.3700, exercising the option will create a gain of $537.50, net of the premium paid. As it is clear, the writer of the call option faces with a potentially unlimited liability. Break-even price for the option is equal to $1.3343 and represents the spot price where the holder is indifferent between exercising or expiring the option.

There are basically six factors that affect option prices. These are (a) the current spot price, (b) the strike price, (c) the time to expiration, (d) the volatility of the price of the underlying asset, (e) the risk-free interest rate, and (f) the dividends expected during the life of the option (for stock options).

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Option Premium

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The option premium is the price that is paid to buy an option. This price results from the demand and supply in the option market. In an arbitrage-free world, that is, in the absence of market frictions such as direct and indirect transaction costs, the option premium will represent the true value of the option. However, the real-world option premium may divert from the true value. The divergence may be particularly high for over-the-counter (OTC) options and for real options, because market mechanisms can hardly be applied to these types of options. In order to determine the true value and to assess the deviation of the actual option premium from the true value, an option pricing model, also called option valuation model, is applied. Despite some recent development of alternative option pricing models, the most widely used and discussed option pricing models are based on the application of a pricing tree, such as a binomial tree as proposed by Cox et al. (1979) or a trinomial tree, or they are based on the Black–Scholes model—sometimes referred to as the Black–Scholes–Merton model—as developed by Black and Scholes (1973) and Merton (1973). The Black–Scholes model is typically used to determine the value of European options, whereas the pricing of American options and, in particular, of exotic options requires the application of other models such as pricing tree models.

The value of an option and, analogously, the option premium are typically influenced by six factors: the spot price of the