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Valuing Stock Options For Divorce and Estate Planning

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Husband to family law attorney: *My ex-wife has stock options in a public company that I know a little something about. I know that the strike price is $50 per share but the stock is currently trading at only $40 per share. My broker told me that the options are "underwater" – that is, it doesn't make any sense to buy the stock for $50 if you could turn around and sell them for only $40 per share – you would lose $10 per share. Are these options worthless? Should we forget about these options and focus on other assets in the marital estate?*


Michael Paschall

Increasing Popularity of Stock Options as Compensation. The answers to the above two questions are "probably not" and "definitely not." Although at times confusing, stock options have become an increasingly popular form of corporate compensation. This trend has necessitated many family law and estate planning attorneys to become quickly educated on the basic features of stock options, including their treatment for tax purposes, their transferability from one party to another party, and most importantly, how these investments are valued. Our business valuation experience at Banister Financial has frequently led us to the valuation of these often-complex securities. In recent years we have had an increasing number of requests to value stock options and warrants for a number of reasons, including gifting and estate planning, divorce, and for the establishment of incentive stock option (ISOs) plans in privately held companies. This article will deal only with the valuation of stock options, and not with other complex areas such as tax treatment and transferability. Additionally, if the stock options pertain to a closely held company, the underlying shares of the company must also be valued, a separate topic not discussed here.

Call and Put Options. Options take two very basic forms. A "call" option allows the holder to purchase stock at a set price. A "put" option allows the holder to sell stock at a set price. For purposes of this article, we will deal with "call" options only as they are the logical form of option used for compensation purposes and are the easiest form of option to understand. As will be illustrated below, the holder of a call option wants the stock price to go up. This is the logical interest that employees of a business should have. When the company's stock price goes up, the options owned by the employee are more valuable and everybody is happy. In contrast, the holder of a put option wants the stock price to go down. This is not a desirable position for company employees to be in as in the put option scenario, it is in the best interest of the employees for the stock to fall as low as possible. Therefore, as concerns this article, the term "stock option" will refer to call options only.

Basic Operations of Stock Options. In its most simple form, a call option allows its holder to purchase a specified number of shares of company stock at a specified price within a specified time period. For example, suppose an employee who works for IBM is issued options to buy 100 shares of IBM stock at an "exercise" (or "strike") price of $100 per share. Assume also that the option has a five-year period, meaning that the employee can exercise the option at any time during the next five years. Suppose IBM is trading at $100 per share on the day the options are granted. On the day the option is granted, that option gives the employee the right to buy 100 shares of IBM for $100 per share. The employee could then turn around and sell these shares in the market for $100 per share, essentially breaking even

(less transaction costs). One might falsely conclude that the option therefore has no value, however this is not necessarily true.

Stocks Go Up. However, assume the price of IBM stock goes up to $150 per share within the next year. Now the employee has the opportunity to buy 100 shares of IBM at $100 per share and turn around and sell those shares for $150 per share in the market. This would give the employee an instant profit of $50 per share, or $5,000 total for the 100 shares purchased and then sold. The employee would spend $10,000 buying 100 shares at the exercise price of $100 per share, however, the employee would immediately receive $15,000 upon selling those 100 shares at $150 per share in the market. Options in this situation are said to be "in the money" as they have immediate (or "intrinsic") value. The fact that this option is "in the money" does not mean that the value of each option is simply calculated as $50. As will be discussed later, there are a number of other factors that influence option valuation.

Stocks Go Down. Of course, the opposite scenario can also happen. Assume the price of IBM falls to $50 per share and stays there for the next five years. Under this circumstance, the employee lets the options expire unexercised at the end of five years, as it never made sense to exercise the options. No logical investor would exercise an option and pay $100 per share for a stock that is trading at $50 per share in the market – this would guarantee a $50 loss. A logical investor, if they wanted to buy the stock, would simply buy the stock at $50 per share in the market. Options in this situation are said to be "out of the money" or "underwater." As will be discussed later, the fact that an option is currently "underwater" does not mean that the option has no value.

Reasons for the Use of Stock Options as Compensation. The main reason that stock options are a popular form of compensation (as opposed to salary and bonus) is that they create an incentive for employees to work to grow shareholder value. As opposed to employees who draw a salary and are motivated only to keep drawing a higher and higher salary (which may decrease earnings and hurt the company's stock price), stock options motivate employees to seek ways to increase income or reduce expenses in order to grow the value of the business. By making these employees shareholders, everyone shares in the increase or decrease in company value – employee shareholders and non-employee shareholders alike. Like commissions or incentive pay, stock options only benefit their holder when the entire company benefits.

Real World Illustration. Although the basic mechanics of options are easy enough to understand, examples from the real world illustrate why option valuation can be so confusing. A real world example is offered here as an illustration of this complexity. As a part of his 1999 compensation, Bank of America Chairman and CEO Hugh McColl was granted a number of options on Bank of America stock (BAC). Specifically, Mr. McColl was granted options on 1,400,000 shares of BAC at an exercise price of $74.50 per share with an expiration date of July 1, 2009 (source: Form Def 14A / proxy statement filed with the SEC on March 20, 2000). The grant was made on July 1, 1999, a day when the closing price of BAC was $74.50.

Bad Timing. Since Mr. McColl's options were issued in July of 1999, BAC has trended downward, trading in a $40 to $60 range for much of 2000 and closing at about $46 per share as of December 31, 2000. The fact that the stock is trading at a price below the $74.50 strike price creates a situation where Mr. McColl's options are "underwater," having no "intrinsic value." That is, it does not make sense for Mr. McColl to exercise his options as he would be paying more per share for the stock ($74.50) than he could receive in the market for selling the same stock (about $46). In effect, Mr. McColl has a loss of over $28 per share ($74.50 minus $46) in his option stock. This fact illustrates one of the reasons why stock options are popular compensation vehicles – these options will not have any value upon exercise for Mr. McColl until BAC stock rises above $74.50 per share. This motivates Mr. McColl and his management to take measures to increase the company's stock price as this will result not only in overall shareholder enrichment, but also in the increase of Mr. McColl's personal wealth.

The Confusing Part. Although it is true that Mr. McColl's options had no value upon exercise as of December 31, 2000, it is not entirely true to say that his options have no value. The best way to illustrate this point is to go back to the proxy statement. As noted earlier, the options were granted at an exercise price of $74.50 per share on July 1, 1999. Also on July 1, 1999, BAC closed at $74.50 per share. This means that Mr. McColl could have exercised his options on July 1, 1999, paying $74.50 per share, and then turned around and sold his stock in the market at $74.50 per share, netting no profit or loss on the transaction (brokerage fees aside). However, according to the proxy statement, Mr. McColl's options were valued at $27,244,000 on July 1, 1999, or $19.46 per share based on the 1,400,000 options granted. How can this be when, as illustrated

above, there was no profit upon exercise in these options on July 1, 1999?

Great Expectations. The answer to the above question lies in the belief that BAC is expected to increase in value at some point in the next ten years (the duration of the option grant), to a point where there will be a profit in the options. Said another way, although BAC is trading only at about $46 per share now, there is a reasonable chance that the stock could increase to $75 per share, $100 per share, or an even higher price at some period during the time before Mr. McColl's option period expires in 2009. The fancy term for this is the "time value" of the option (discussed below). This potential for (and expectation of) future appreciation is why the options had a value of $19.46 per share on the date of their grant. Even though BAC has fallen to about $46 as of December 31, 2000, there is still the chance that the stock will rise above $74.50 at some point before July 1, 2009. It is this chance that gives the options their current value. Indeed, under the Black-Scholes Model (explained below) the options value as of November 1, 2000, was $11.35 per share, this despite the fact that the options are about $28 per share "under-water."

The Black-Scholes Option Pricing Model. Developed by Fisher Black and Myron Scholes, the Black-Scholes Options Pricing Model is the standard options-pricing model used in the investment business today. The model values options based on the fact that options derive their value from two sources: intrinsic value and time value. Intrinsic value is measured on the basis of whether the option is "underwater" or not. For example, Mr. McColl's options did not have any intrinsic value as of December 31, 2000, as they were "underwater." Mr. McColl's options do have time value, however, the second component of value considered in the Black-Scholes model. The time value of options reflects the fact that the stock may well rise above the strike price at some point during the exercise period. Quantifying this kind of probability with a meaningful value is mathematically very complex and is tied to the historic patterns of up and down volatility of the publicly traded stock. However, through the creation of our own proprietary software, Banister Financial has developed the ability to value stock options under the Black-Scholes Option Pricing Model under a variety of circumstances.

Variables Affecting Option Value. The Black-Scholes Model considers a number of variables in determining the value of an option. The key variables considered by the Model are as follows:

1. Exercise (or strike) price of the option.
2. Current price of the stock.
3. Volatility of the stock.
4. Term to expiration for option.
5. Dividend rate of the stock.
6. Risk-free interest rate.

These variables are discussed below, along with an illustration of the impact each variable has on the value of the option. Note again that the hypothetical option at issue is a "call" option, which gives the holder the right to buy stock at a certain exercise price. This is a similar option to Mr. McColl's options noted above. A "put" option, in contrast, gives the option holder the right to sell stock at a certain exercise price. Although the Black-Scholes Model works in either case, for illustrative purposes, again we are focusing only on the "call" option scenario.

Baseline Case. Assume that our hypothetical option has the following characteristics. The exercise price is $60 per share. The current stock price is also $60 per share. The stock has traded in a $50 to $60 range for the past year. Over the past year, the stock has traded in a very methodical manner, moving up or down in $1 increments each day and for 20 day periods. For example, one day one of each 20-day period, the stock has closed at $51. On day two, the stock has closed at $52, day three at $53, and so on up to a $60 close on day ten. On day eleven, the stock has closed at $59, day twelve at $58, and so on back down to a $50 close on day 20. This 20-day cycle has been repeated over and over during the past year. The volatility variable in the Black-Scholes Model is a reflection of the trading characteristics of the stock. It is not assumed that the historical trading pattern and price range of the stock will repeat itself into the future, however, the tendencies exhibited by the stock in the past are believed to have some predictive value of the stock's behavior in the future. Assume the term to expiration of the option is five years. Assume the stock is paying a $2 dividend per year, paid quarterly. Finally, assume the risk-free rate of interest is 6%. As will be explained below, the risk-free rate of interest is a measure of what the investor could earn in an alternative investment. Under the above assumptions, the value of the "call" option as calculated under the Black-Scholes Model is $15.49.

Impact Due to Exercise Price. As concerns our "call" option example, the greater the exercise price, the lower the calculated option value. This is due to the fact that with a higher exercise price, the stock price has a longer way to go to be "in the money" and have value.

Stock Options *(continued)*

For example, under the scenario above and keeping all other baseline variables the same, a strike price increased to $70 results in the option value falling to $12.50. A strike price increased to $100 results in the option value falling to $6.71. Ultimately, if the strike price is raised high enough (say to $500), the option value falls to a nearly worthless $0.01, reflecting the incredibly long odds that the stock price will ever rise to that level during the five-year option period. Thus, we see the correlation that the higher the strike price (or, conversely, the lower the current price of the stock), the lower the value of the option.

Impact Due to Volatility of the Stock. Under the baseline example, our hypothetical stock traded in a very methodical manner, rising or falling $1 per day over a 20-day cycle and always trading in a $50 to $60 price range. Now assume that the stock trades in the same 20-day cycle, however, the stock now rises or falls by $2 per day, in a $40 to $60 price range. Under the new assumptions, the stock is more volatile as its daily swings are greater as is its overall trading range. Under this new assumption, with all other variables the same as in the baseline assumption, the value of the option is $28.60, significantly higher than the baseline option value of $15.49 calculated above. The value of the option is increased under this scenario due to the fact that a more volatile stock is more likely to move above the strike price at some point during the exercise period. Granted, the more volatile stock also has a better chance to move well below the strike price, however, over the five-year option period, a more volatile stock is more likely at some point be "in the money" than is the less volatile stock. Likewise, a more volatile stock has a greater chance to be further "in the money" than a less volatile stock.

Impact of the Term to Expiration of the Option. Under the baseline example, our hypothetical exercise period was five years. Assuming a new exercise period of ten years, with all other baseline variables the same, the value of the option increases to $18.94, above the $15.49 value calculated in the baseline model. The option value increases with the longer exercise period due to the fact that the stock now has a longer time period in which to be "in the money." This makes sense as the trading range of a stock should be broader over a longer time period, giving the stock a better chance of being "in the money" at some point during the longer exercise period.

Impact of the Dividend Rate of the Stock. Under the baseline example, our hypothetical annual dividend was $2 per year, paid quarterly. Assuming a new dividend of $4 per year, again paid quarterly and with all other baseline variables the same, the value of the option declines to $10.49, down from the $15.49 value calculated in the baseline model. The key reason for this result is the fact that a company paying a higher divided generally has less upside price potential than a company paying a lower dividend. This is due to the fact that the higher-dividend company is paying a greater percentage of the overall return of the stock through current distributions as opposed to through capital appreciation in the stock. In fact, companies with a tradition of high dividends (such as utilities) generally exhibit a much narrower and much less volatile trading pattern, limiting their potential under the option scenario from moving well "into the money." Also, remember that the holder of the option does not actually own the underlying stock and therefore does not receive any dividend income from the stock. Therefore, a higher dividend rate does the option-holder no good.

Impact of the Risk-Free Interest Rate. Under the baseline example, our hypothetical risk-free interest rate was 6%. Assuming a new risk-free interest rate of 10%, and with all other baseline variables the same, the value of the option increases to $19.45, up from the $15.49 value calculated in the baseline model. The reason for this result has to do with the time value of money. The risk-free interest rate here represents the amount an investor can earn on his or her money. Consider the following illustration. Assume an option holder has one option with a strike price of $100 per share. At the end of five years, the stock price is $150 per share and the option holder exercises his option at that time. With a risk-free interest rate of 6%, the option holder needed to invest only $74.73 at the beginning of the five-year period. Earning 6% per year for five years, the option holder has the $100 needed in year five to exercise the option. However, if the risk-free interest rate is 10%, the option holder needs to invest only $62.09 at the beginning of the five-year period to have the necessary $100 at the end of five years. The higher interest rate environment allows the option holder to use a lower amount of funds to invest in his "option fund" in order to have $100 at the end of five years. The higher interest rate scenario is more favorable as the option holder can use the cash he didn't have to invest in the "option fund" to invest in alternative investments that pay him a return. The profit realized by the option holder is identical in both situations ($50 profit realized at the end of year five), however, the option holder was able to invest less cash under the higher interest rate scenario than under the lower interest rate scenario.

Stock Options *(continued)*

This makes the call option worth more in a higher interest rate environment.

What About Options in Privately-Held Companies? The above illustrations are based on real or hypothetical public companies where there is an active market for the stock and such measures as volatility and current market price can be readily measured and calculated. In some cases, however, clients request us to value stock options on stock of privately-held companies, typically for incentive stock option plans (ISOs), which may be needed to attract and retain a skilled workforce. Obviously, this creates a valuation problem as there is no trading market or market price for stock in the privately-held company. In these situations, option values can still be estimated for these privately-held companies, usually by using a similar publicly-traded company as a proxy for the volatility of the privately-held company (were it publicly traded). This process is more complex as a valuation of the privately-held company must first be undertaken, then the option value calculated using the volatility of the public company's stock as a proxy. However, the option value can nonetheless be estimated under this method. Other issues arise in this context related to the lack of marketability of the underlying stock and of the stock options themselves, factors not an issue in the valuation of options on publicly traded shares.

Conclusion. Stock options as a form of compensation are rapidly growing in popularity, necessitating the need for accurate and competent valuations. The valuation of these securities is complex and demands a business appraiser that understands not only the methodology of how these instruments are valued, but also understands the numerous variables that impact the value. ♦

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