

Using Put Option Analysis on Real Estate Holding Entities to Estimate a Discount for Lack of Marketability

The solution may lie in providing quantified methods that continually narrow down the portion of the overall analysis in which we must apply qualitative judgment.

By **Ben C. Towne, CPA/ABV/CFE, CVA**

The quest for improved methods of quantifying discounts for lack of marketability (DLOMs) is a seemingly never-ending one. The DLOM is laborious to estimate for thinly-traded public companies, difficult to estimate for small, closely-held operating companies, and very difficult to estimate for closely held, passively operating companies such as real estate holding entities (REHEs). In one Tax Court case after another, valuation experts vehemently debate the adjustments required when comparing a non-marketable interest in a REHE to benchmark studies based on public operating company data. As with most issues in business valuation, the solution may lie in providing quantified methods that continually narrow down the portion of the overall analysis in which we must apply qualitative judgment.

I suggest using a tried-and-true method of quantifying a DLOM, the put option analysis or protective put option analysis. This method has been used successfully in other valuation arenas, but its application in quantifying a DLOM for an REHE is fresh.

A Right to Sell at a Fixed Price

In general, a put option is a contract that gives the owner the right, but not the obligation, to sell an asset at a fixed price in the future; i.e., to “put” it to the other party in the contract at a certain price. The concept of using a put option to estimate the DLOM is not a new one; it has been around for years. Notably, David Chaffe discussed the concept in his article on European Options in 1993.¹

More quantitative methods of DLOM estimation have become more accepted, even preferred, as business valuation has become more technical; and a premium has been placed on quantitative, verifiable, and consistent methods. James Hitchner said at a recent conference that “if you’re not using options analysis within the next three years, then you’re behind the curve.” At the same conference, his fellow panelist Bob Duffy concurred, saying, “I guarantee you, everyone will be using the option pricing models. They will be state of the art.”² Like all good professionals, they present a number of caveats to using these option-based methods (which I will examine later in this article); however, their endorsement of the utility of an option-based method is undeniable.

Protective Put Calculation

Put option analysis³ estimates the hypothetical cost of locking-in a certain minimum price of a security using an “at the money” put option.⁴ Estimating this cost is done with the Black-Scholes put option pricing model. This model takes five key inputs to estimate the value of a put option, or six if dividends are considered.

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To calculate the DLOM on a REHE, the variables are:

1. Price of the underlying asset. The equity value of the asset (total equity value or subject interest value on a prorata basis).
2. Strike/exercise price. Because we use a put option to lock in a certain price (the current price) for the subject interest, we set the exercise price equal to the underlying asset price which means that the option contract is “at the money.”
3. Volatility. the standard deviation of the periodic (daily, weekly, monthly) prices of the subject interest. Because we are talking about non-public companies, we must estimate the volatility of the subject interest by looking at the volatility of comparable public companies.
4. Term. An estimate of the desired period until liquidity for the subject interest (i.e., when it sells) and determines how long to “guarantee” the price of the asset. Often the subject interest has no plans to change ownership, and imposing a short to mid-term “holding period” expiration actually is a conservative estimate.
5. Risk-free rate. This approximates the economic “rent” for money tied up in the put option contract for the period of the term to liquidity. It is often estimated as an appropriate yield on constant maturity U.S. Treasury bonds of the same term as the option.

This analysis is based on two major assumptions. First, it assumes that future equity values are log-normally distributed. In other words, the logarithm of the probability distribution looks like the “normal” bell curve that we all remember from statistics class. This means that most often we expect our future values to fall in the middle range, surrounding the “average.” Second, we assume that volatility is known and constant throughout the period.⁵

Benchmark Hurdles

The historical problem with many analyses of the DLOM for an REHE is that they are highly subjective because the benchmarks (various restricted stock studies and pre-IPO studies) are not always comparable to the subject interests. The benchmark studies face a number of significant hurdles to be comparable to an REHE, including:

- The benchmark studies are based on publicly traded stock.
- The benchmark studies are date-specific (single transaction date).
- The benchmark studies may have insufficient numbers of companies similar to the subject company (like REITs or real estate development companies). The benchmark therefore must often be adjusted heavily to account for these differences.
- The restricted stocks studies are often “aged,” and may be considered less relevant.
- The pre-IPO studies show bias towards successful IPOs (and ignore the unsuccessful IPO attempts).

Application to REHE

Put option analysis (POA) addresses several of the key arguments against the benchmark studies as applied to REHEs. One of the most significant arguments is that in the benchmark studies, the data used are based on transactions of companies that are in entirely different industries. If transactions can be found touching on real estate at all, they are few and far between.

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In order for a “comparable” company to be included in the benchmark studies, a transaction of the equity must take place. Because there are few companies that we can consider comparable (REITs, real estate development companies), the frequency of a relevant transaction being observed in the benchmark studies is low. Using POA we can directly consider the trading behavior for those few comparable companies by looking at the normal trading (daily) activity of the stock prices of those companies. Therefore, while POA does not address the general problem of using public company data for a private company, we can approximate the relevant characteristics of the public company data to a REHE more closely than before.

If we use REITs or real estate development companies as the guidelines for developing a proxy or benchmark for volatility, we can at rely on the fact that these companies, being a source for inputs to the Black-Scholes model, are holding similar assets and operate in the same industry segment as our subject companies (unlike with restricted stock studies and pre-IPO studies). Then we are left with the familiar issues encountered when comparing private companies to public companies (namely size, concentration, liquidity, economies of scales, resources, etc.). A short summary of some of the pros and cons of using POA follows:

Pros of Using POA:

1. Quantitative. The variables are derived using observable data.
2. Availability of data. POA does not rely on transactions of whole businesses or infrequent trades of large blocks, but on publicly traded entities which have daily transactions of their equity.
3. Comparable. They are more comparable to REHE entities (industry) than restricted stock/pre-IPOs.
4. Consistent with the DCF method. If the discounted cash flow method is used, certain assumptions are made. These same assumptions can be used as inputs to the POA (such as discrete projection period).
5. New application of proven method. POA to quantify DLOMs is relatively well understood in the valuation community. It simply needs to be migrated to the tax-reporting side of business valuation for REHEs.

Cons of Using POA:

1. Public vs. private dilemma. As with any methodology which uses publicly available data to estimate characteristics of a privately-held company, a problem still exists in adjusting for factors such as size, location, geographic diversity, access to capital, depth of management, etc.
2. Estimate of variables. The variables must be carefully considered for POA to yield a reasonable result: garbage-in, garbage-out.
3. Adjustment. As with all methods, POA may require significant valuator adjustment (for example, a Mandelbaum-type analysis), before the final DLOM can be determined.⁶

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4. Potential error in matching guideline companies. For example, a REIT must distribute 90 percent of taxable income, and therefore may or may not be comparable to a non-distributing REHE.
5. Harder to explain. Judges and even many financial professionals are not as familiar with the concept of using a POA to estimate DLOMs for privately held entities. An analyst may remedy this by using several methods concurrently (i.e., the benchmark studies and other “traditional” methods).

Example

To show how this calculation can be done, I will give a simplified example using one comparable public company. In a real case we would use several comparable companies.

Facts: We are asked to value a 10 percent limited partnership interest in a real estate partnership that holds various property types across the owner’s state of residence and has \$20 million in adjusted book value net equity. The purpose of our valuation is for gift tax reporting, and there is no expectation of imminent sale of the interest or any of the properties. The valuation date is December 31, 2008.

First, select the term of the put option. From the standpoint of the valuation date, how long do we need to insure the value of the subject interest until a potential liquidity event? In this case we select five years; however, in a live case it may be reasonable to run this calculation more than once with a spread of terms to provide a range of reasonable exit points. The term helps us derive some of the other inputs.

Second, select the appropriate risk-free rate. It is generally accepted that we use the yield on a constant-maturity U.S. Treasury bill with a term equal to the term selected above. In this case we look up the yield on the five-year bill: 1.52 percent.⁷ We convert this rate to a continuously compounding rate by taking the natural logarithm of one plus the spot rate ($\text{LN}(1+.0152)$), which equals 1.51 percent.

Third, input the value of the underlying asset (the subject interest value) and the strike price . It does not matter what value is input here, but the key is that these two must be equal (i.e. the option is “at the money”). For this case, we will simply use a pro rata 10 percent of the \$20 million in adjusted book value net equity to yield \$2,000,000. For this exercise we will ignore any other discounts or premiums.

Fourth, we derive our estimate of volatility. The public comparable we choose is American Realty Investors, Inc. (ticker: ARL), which owns and operates a mix of residential and commercial real estate holdings across the United States. Using publicly available pricing data from a data compilation source (for example, Yahoo! Finance will work), we look at periodic, historical stock prices for ARL.

In performing this analysis, we can select days, weeks, or months as the appropriate periodic measurement for the stock price, depending on the level of granularity desired. It is customary to “look back” over a period equal to the selected term. The stock prices either need to be adjusted for

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the payment of dividends if any, or you will need to manually add them to the stock prices. Table 1 show the first several months of the look back period for ARL on a monthly periodic basis.

Month	Monthly Price	Dividends	ln(p+d)	Change
12/31/08	8.95	0.00	2.1916535	-0.005571
11/30/08	9.00	0.00	2.1972246	0.0316053
10/31/08	8.72	0.00	2.1656192	0.0462361
09/30/08	8.33	0.00	2.1193831	0.0468403
08/31/08	7.95	0.00	2.0725428	-0.0509156
07/31/08	8.36	0.00	2.1234584	-0.1257259

Table 1: Sample Inputs for Volatility Calculation

The first column of Table 1 shows the month-end dates counting backwards from the valuation date. The closing prices at month-end are in second column. Because the stock prices are not adjusted for dividend expectations, we need to adjust for any dividends paid during the observed period (none in this case). The fourth column shows the calculation of the natural log of the total adjusted closing stock prices (stock price plus dividend). The last column is the change in the natural log of the stock prices between each period.

To convert this series of changes of the trading price into an annualized volatility figure, we take the standard deviation of the changes multiplied by the square root of the number of periods in a year. The result in this case is 29.96 percent.

To summarize the estimated variables, we have these inputs:

- Subject company value (S) = \$2,000,000
- Strike price of put option (X) = \$2,000,000
- Risk-free rate, continuous compounding ($r_{\text{continuous}}$) = 1.51%
- Time (T) = 5 years
- Volatility (V) = 29.96%

Using these inputs in a standard Black-Sholes calculator gives you a put cost of \$436,130. Compared to the original pre-discount value of \$2,000,000 (i.e., the amount you are insuring), we note that the cost of the put represents 21.8 percent of the undiscounted value. The valuator may use this indicated discount as a data point to consider when determining the final DLOM.

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Conclusion

The purchase of a put option is the cost to insure against the downside risk on an already liquid security. Therefore, the estimation of the cost of a put option in calculating a DLOM is only a proxy for the hedge against a decrease in the price of the asset during the holding period, and does not inherently (without adjustment) account for the fact that a private company has no public market for its securities. An investor in a private REHE could hypothetically gain liquidity by entering into a put option contract; but that assumes there is a hypothetical buyer or buying market available to purchase the put. For a privately held REHE, that is not the case.

For a privately held REHE, the discount estimated by POA based in part on public company data may or may not reflect the correct amount of DLOM. To reiterate, the final determination of DLOM still lies in the hands of the valuator. Adjustments must still be made for qualitative and other factors. Analysis of facts and circumstances is not obsolete; Mandelbaum analysis is far from irrelevant. Using POA, we can effectively build a quantitative basis upon which to construct the total DLOM for a privately held real estate holding entity.

¹ David Chaffe, “Option Pricing as a Proxy for Discount for Lack of Marketability in Private Company Valuations,” *Business Valuation Review*, December 1993.

² Presented at DLOM Summit II, held by Business Valuation Resources, NACVA, and Valuation Products and Services. Quotes as reported in *Business Valuation Update*, November 2009.

³ The following discussion relates to a European option rather than a Longstaff analysis or an average price put analysis.

⁴ “At the money” means that the strike price is equal to the value of the underlying asset.

⁵ There are a number of assumptions inherent in using a Black-Scholes calculation, but we only focus on a few major ones here.

⁶ *Mandelbaum v. Commissioner*, 1995.

⁷ Federal Reserve Board, yield on constant maturity Treasury Bills at December 31, 2008.

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