

**ADVANCED CONCEPTS OF DISCOUNTS FOR
MARKETABILITY:
NEW STUDIES**

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ADVANCED CONCEPTS OF DISCOUNTS FOR LACK OF MARKETABILITY: NEW STUDIES*

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INTRODUCTION

The purpose of this paper is to review new research associated with quantifying discounts for lack of marketability. Discounts for Lack of Marketability (DLOM) are often required because of the non-marketable nature of the business or business interest that is part of the marital estate. This should come as no surprise as lack of marketability is endemic to the very nature of a closely held business or business interest. As the off-quoted guideline Revenue Ruling 59-60 indicates:

“Closely held corporations are those corporations, the shares of which are owned by a relatively limited number of stockholders. Often the entire issue is held by one family. The result of this situation is that little, if any, trading in the shares take place. There is, therefore, no established market for the stock and such sales occur at irregular intervals seldom reflect all the elements of a representative transaction as defined by the term “fair market value.”¹

The Discount for Lack of Marketability is conceptually different but related to discounts for minority interest or lack of control. A 1982 estate tax decision: Estate of Woodbury G. Andrews (79 T.C. 938) (1982), discussed the distinction between minority and marketability as follows:

“In their arguments, neither the petitioner nor respondent clearly focuses on the fact that two conceptually distinct discounts are involved here, one

¹ Revenue Ruling 59-60 Section 2, paragraph .03.

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for lack of marketability and the other for lack of control. The minority discount is designed to reflect the decreased value of shares that do not convey control of a closely held corporation. The lack of marketability discount, on the other hand, is designed to reflect the fact that there is no ready market for the shares in a closely held corporation. Although there may be some overlap between these two discounts in that lack of control may reduce marketability, it should be born in mind that even controlling shares in non-public corporations suffer from lack of marketability because of the absence of a ready private placement market and the fact that flotation cost would be incurred if the corporation were to publicly offer its stock.”

While many may dispute the last portion of this comment concerning the lack of marketability of controlling interests, it is clear that discounts for lack of control are different than discounts for lack of marketability.

DEFINITIONS

Before we discuss the application of the DLOM, it would be instructive to review some of the basic terms so as to put our discussion in the proper context.

Marketability is defined as:

“The capability and ease of transfer or salability of an asset, business, business ownership interest, security or intangible asset” and as “the ability to quickly convert property to cash at minimal cost.”²

A Discount for Lack of Marketability is defined as:

“An amount or percentage deducted from the value of an ownership interest to reflect the relative absence of marketability.”³

² American Society of Appraisers, Business Valuation Standards, June 2008.

³ *Ibid.*

A Discount for Lack of Liquidity (DLOL) is defined as:

“An amount or percentage deducted from the value of an ownership interest to reflect the relative inability to quickly convert property to cash.”⁴

While DLOM and DLOL are often used interchangeably they are conceptually different. Marketability deals with the salability of an interest due to the absence of an organized market. It denotes the right to sell an asset and establish an efficient market within a reasonable time with relatively low transaction costs and with minimal effect on that security's public market price. Liquidity denotes the ability to convert an asset into cash without diminishing its value. Liquidity is a spectrum. A block of stock with high liquidity will have low transaction costs, a short liquidation period and minimal discounts. A block with low liquidity will have the opposite characteristic.⁵

APPLICATION OF DISCOUNTS FOR LACK OF MARKETABILITY

A DLOM is often considered when the ownership interest is less marketable and less liquid than shares of publicly traded stock. A DLOM is applied in the following manner.

- (1) Define the level of values starting point, e.g., control value, minority marketable value;
- (2) Evaluate the degree of marketability attributable to the ownership interest;
- (3) Gather and evaluate data concerning marketability discounts; and
- (4) Select and apply the discounts.

While these steps are well-developed, the methods that valuation analysts use to estimate the appropriate DLOM are still evolving. Conceptually, application of a DLOM can be broken down into a traditional view and a more recent view. The more

⁴ *Ibid.*

⁵ Ashook Abbott Business Valuation Conference Summit on Lack of Marketability, University of San Diego Law School, September 18, 2008.

traditional view often relies on market observation of the prices paid for shares with restrictions on their marketability indicates they often sell for less than freely traded shares. A more recent view indicates that marketability is one of several factors affecting the observed discount. Industry practitioners attempt to identify and quantify these factors and separate them from the DLOM.

Another source of DLOM information are discounts on shares of closely held companies as compared to prices reflected in their initial public offering. Lastly, various option models are being used as indicators of DLOMs as well.

It is clear that in recent years courts are looking for more analysis of relevance to the subject interest. The remainder of this paper will briefly discuss how DLOM's are measured using the traditional view and then discuss some of the more recent research into their application as well.

SOURCES USED IN THE APPLICATION OF DLOM

Historically, discounts for lack of marketability have been based on inferences drawn from measuring discounts indirectly. This has been accomplished using two primary classes of data:

- 1) Discounts on sales of restricted shares of publicly traded companies as the required holding period reduces the liquidity of the shares. ("Restricted Stock Studies")
- 2) Discounts on sales of closely held company shares to prices of subsequent initial public offerings of the same company shares as the shares have less liquidity prior to being freely-traded. ("Pre-IPO studies")

Restricted Stock Studies

Restricted stock is stock that is not readily tradable. It is issued for any number of reasons including raising funds for capital projects and as part of executive

compensation plans. Typically, restricted stock is offered at a discount from its publicly traded counterpart. The generally accepted inference is that the discount reflects compensation for lack of marketability. That is, the holder of restricted stock cannot sell the asset and gain the cash flow, and when the restriction period is over, may not be able to sell the asset close to the original price of the unrestricted stock.⁶

The use of observed restricted stock discounts is a well-established principle and recognized in Revenue Ruling 77-287. This revenue ruling has guidelines relating to restricted (Rule 144) securities. It cites the Institutional Investor Study conducted by the Securities and Exchange Commission in 1969 and discusses the factors that should be considered in determining a discount for restricted securities. The methodology embodied in the Securities and Exchange Commission's 1969 study has been updated by a number of practitioners.

Following the Institutional Investor Study, Milton Gelman⁷ and Robert R. Trout⁸ performed studies of restricted stock as well. Gelman studied purchases of restricted stock in some 89 companies by closed end mutual funds. In his 1970, study Gelman concluded the average and median discount of all 89 stock purchases was 33.0 percent.

Robert Trout looked at the purchases of restricted stock by six closed end mutual funds during the 1968-1972 time period. Trout used this data to construct a financial model that attempted to isolate variables that would impact the discount. Using multiple regression analysis, Trout concluded at a mean discount of 33.5 percent.

In 1973, Robert E. Moroney updated the study by reviewing prices paid by ten registered investment companies reflecting 146 purchases of restricted stock.⁹ The

⁶ Barenbaum and Shubert Modern Financial Engineering and Discounts; The Collar Message Business Valuation Review, March 2004.

⁷ Milton Gelman, "An Economist-Financial Analyst's Approach to Valuing Stock of a Closely Held Company," *Journal of Taxation*, June 1972, pp. 353-354.

⁸ Robert R. Trout, "Estimation of the discount Associated with the Transfer of Restricted Securities," *Taxes*, June 1977, pp. 381-385.

⁹ Robert E. Moroney, "Most Courts Overvalue Closely Held Stocks", *Taxes*, March 1973.

conclusion of the Moroney study was a mean discount of 35.6 percent and a median discount of 33 percent for lack of marketability.

In 1976, J. Michael Maher published another study that utilized methodologies similar to the Institutional Investor Study and the Moroney study comparing prices paid for sales of restricted stock to unrestricted stock. Maher's study resulted in the conclusion that a mean discount for lack of marketability was approximately 35.4 percent.¹⁰

Standard Research Consultants studied 28 restricted stock transactions from October 1978 through June 1982 and found a median discount of 45 percent.

A study by Willamette Management Associates reviewed restricted stocks for the period January 1, 1981 through May 31, 1984. They identified 33 transactions in restricted stock, primarily in 1983. The conclusion of this study was that an average discount was 31.2 percent.¹¹

William L. Silber examined discounts on restricted stocks offered through 69 private placements of common stock from 1981 through 1988. Silber's study showed an average discount of 33.75 percent.¹²

A study of restricted shares was done by Lance Hall and Timothy Polacek over the period 1979 through April 1992. They identified over 100 transactions in restricted stock with a mean discount for lack of marketability of 23.0 percent.¹³

¹⁰ J. Michael Maher, "Discounts for Lack of Marketability for Closely Held Business Interests", *Taxes*, September 1976, pages 562-571.

¹¹ Shannon P. Pratt with Alina v. Niculita, *Valuing a Business: The Analysis and Appraisal of Closely Held Companies*, 5th Edition, (The McGraw-Hill Companies, 2008), page 425.

¹² William L. Silber, "Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices", *Financial Analysts Journal*, July/August 1991.

¹³ Lance S. Hall and Timothy C. Polacek, "Strategies for Obtaining the Largest Valuation Discounts", *Estate Planning*, January/February 1994, pages 38-44.

Management Planning, Inc. completed a study of restricted stock transactions from 1980 through 1996. This study found that smaller companies generally have larger discounts and the average overall discount for lack of marketability was 27.7 percent.¹⁴

A study completed by Bruce Johnson on restricted stock transactions from 1991 through 1995 found an average discount of 20.0 percent.¹⁵

The preceding studies indicate that an average discount for lack of marketability is between 20 percent and 45 percent. In addition, these studies were prior to the reduction in the required holding period which was usually from two years to one year for restricted stock.

Kathryn Aschwald studied purchases of restricted stock subject to a one-year holding period. Ms. Aschwald concluded that for the 1997-1998 periods, the purchases of restricted stock had an average discount of lack of marketability of 13 percent and a mean of 9 percent. This tends to suggest, all else being equal, that there is a relationship between discount and holding period.

The following is a summary of the relevant studies referred to in the previous text.

¹⁴ Robert Oliver and Roy Meyers, "Discounts Seen in Private Placements of Restricted Stock: The management Planning, Inc. Long-Term Study (1980-1986)" (Chapter 5) in Robert F. Reilly and Robert P. Schweihs, eds. *The Handbook of Advanced Business Valuation*, (New York: McGraw-Hill, 2000).

¹⁵ Bruce Johnson, "Restricted Stock Discounts, 1991-1995," *Shannon Pratt's Business Valuation Update*, March 1999, pages 1-3. Also, Quantitative Support for Discounts of Lack of Marketability," *Business Valuation Review*, December 1999, pages 152-155.

SUMMARY OF RESTRICTED STOCK STUDIES

<u>Study</u>	<u>Years Covered in Study</u>	<u>Average Discount (%)</u>
SEC Overall Average ^a	1966-1969	25.8
SEC Nonreporting OTC Companies ^a	1966-1969	32.6
Gelman ^b	1968-1970	33.0
Trout ^c	1968-1972	33.5 ⁱ
Moroney ^d	^h	35.6
Maher ^e	1969-1973	35.4
Standard Research Consultants ^f	1978-1982	45.0 ⁱ
Willamette Management Associates ^g	1981-1984	31.2 ⁱ
Silber Study ^j	1981-1988	33.8 ⁱ
FMV Study ^k	1979-April 1992	23.0 ^k
FMV Restricted Stock Study ^l	1980-2001	22.1 ^l
Management Planning, Inc. ^m	1980-1995	27.7 ^m
Bruce Johnson ⁿ	1991-1995	20.0 ⁿ
Columbia Financial Advisors ^o	1996-February 1997	21.0 ^o
Columbia Financial Advisors ^o	May 1997-1998	13.0 ^o

Notes:

- a) From "Discounts Involved in Purchases of Common Stock (1966-1969)", *Institutional Investor Study Report of the Securities and Exchange Commission*. H.R. Doc. No. 64, Part 5, 92d Cong., 1st Sess. 1971, pp. 2444-2456.
- b) From Milton Gelman, "An Economist-Financial Analyst's Approach to Valuing Stock of a Closely Held Company," *Journal of Taxation*, June 1972, pp. 353-354.
- c) From Robert R. Trout, "Estimation of the Discount Associated with the Transfer of Restricted Securities," *Taxes*, June 1977, pp. 381-385.
- d) From Robert E. Moroney, "Most Courts Overvalue Closely Held Stocks," *Taxes*, March 1973, pp. 144-154.
- e) From J. Michael Maher, "Discounts for Lack of Marketability for Closely-Held Business Interests," *Taxes*, September 1976, pp. 562-571.
- f) From "Revenue Ruling 77-287 Revisited," *SRC Quarterly Reports*, Spring 1983, pp. 1-3.
- g) From Willamette Management Associates study (unpublished).
- h) Although the years covered in this study are likely to be 1969-1972, no specific years were given in the published account.
- i) Median discounts.
- j) From William L. Silber, "Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices," *Financial Analysts Journal*, July-August 1991, pp. 60-64.
- k) Lance S. Hall and Timothy C. Polacek, "Strategies for Obtaining the Largest Discount," *Estate Planning*, January/February 1994, pp. 38-44. In spite of the long time period covered, this study analyzed only a little over 100 transactions involving companies that were generally not the smallest capitalization companies. It supported the findings of the SEC *Institutional Investor Study* in finding that the discount for lack of marketability was higher for smaller capitalization companies.
- l) Espen Robak, "FMV introduces detailed restricted stock study," *Business Valuation Update*, November 2001, pp. 1-3.
- m) Robert P. Oliver and Roy H. Meyers, "Discounts seen in private placements of restricted stock: the Management Planning, Inc., long-term study (1980-1996)", published in Chapter 5 of Robert F. Reilly and Robert P. Schweih, Eds. *The Handbook of Advanced Business Valuation* (New York: McGraw Hill, 2000).
- n) Bruce Johnson, "Restricted Stock Discounts, 1991-1995," *Shannon Pratt's Business Valuation Update*, March 1999, pp. 1-3. Also, "Quantitative Support for Discounts of Lack of Marketability," *Business Valuation Review*, December 1999, pp. 152-155.
- o) Kathryn Aschwald, "Restricted Stock Discounts Decline as a Result of 1-Year Holding Period," *Shannon Pratt's Business Valuation Update*, May 2000, pp. 1-5. This study focuses on the change in discounts as a result of the holding period reduction from two years to one year.

Source: *Guide to Business Valuations*, 17th Edition, (Practitioners Publishing Co., 2007), pages 8-29 and 8-30.

In June 1993, Michael Hertz and Richard Smith had an article published in the *Journal of Finance* titled "Market Discounts and Shareholder Gains for Placing Equity Privately".¹⁶ Hertz/Smith analyzed 106 private placements from January 1, 1980 through May 31, 1987. The mean discounts were 20.14 percent and median discounts were 13.25 percent. They suggest that portions of the discounts represent other factors in addition to liquidity including monitoring costs, information costs and changes in ownership structure.

There was also a study performed by Dr. Mukesh Bajaj, et al.,¹⁷ which analyzed discount on both registered and unregistered private placement issues. Bajaj attempted to improve on the Hertz/Smith study. Bajaj attributed the observed discounts to four factors: (1) the fraction of the total shares offered in the placement, (2) business risk, as measured by the volatility in the issuer's publically traded shares, (3) financial distress and (4) the total proceeds from the private placement. Bajaj concluded that the difference between registered and unregistered shares was 22.2 percent, but only 7.23 percent was attributable to illiquidity.

Restricted Stock Studies-Summary

For many years valuation practitioners have relied on generalized studies of observed discounts between the price of restricted stock issued through private placements and their publicly traded counterparts as the benchmark from which they determined the appropriate DLOM for the subject business interest. Starting with the mean or median discounts, the practitioners would adjust these measures up or down depending on specific characteristics of the subject block. Many have used the factors delineated in

¹⁶ Michael Hertz and Richard L. Smith, "Marketability Discounts and Shareholder Gains for Placing Equity Privately" *Journal of Finance*, June 1993.

¹⁷ Bajaj, Mukesh; Denis, David; Ferris, Stephen; Sarin, Atulya; "Firm Value and Marketability Discounts"; *Journal of Corporation Law*; Fall 2001; 27, 1.

Mandelbaum et al v. Commissioner as the starting point in making adjustments to the restricted stock data. Those factors are as follows:¹⁸

¹⁸ Mandelbaum et al v. Commissioner, T.C. Memo 1995-255. Appealed and affirmed, 91 F.3d 124, 1996 U.S. App. LEXUS 17962, 96-2 U.S. Tax Cas. (CCH) P60, 240, 78 A.F.T.R. 2d (RIA) 5159.

Financial statement analysis

- Dividend policy
- Nature of the company, its history, its position in the industry, and its economic outlook
- Management
- Amount of control in the transferred shares
- Restrictions on transferability
- Holding period for the stock
- Company's redemption policy
- Costs associated with a public offering

While the above are not all inclusive and many of the delineated factors may even be duplicative, they have been used by practitioners as a framework in adjusting the benchmarks derived from the studies.

Restricted stock studies were also used in attempts to provide empirical support for DLOM discounts. Specifically Trout, Silber and, to some extent, Hertz/Smith have used regression models derived from restricted stock studies to provide estimates of DLOM. These formula based methods have initial appeal in that their output is purportedly based on some empirical support. However, many have been critical of these models as they consider only a limited number of factors and may be subject to forecast errors.¹⁹

Another set of studies (Hertz/Smith and Bajaj) attempt to isolate the components of the observed restricted stock studies into marketability and other factors. They too have been criticized as of limited use due to small sample size, the possible presence of attributes of control in the private placement, and differences in risk profile between the subject block and those in the studies.²⁰

In recent years, the focus of the appraisal profession has been to search the data for restricted stock discounts from comparable companies or comparable securities as

¹⁹ "Current Controversies Regarding Discount for Lack of Marketability Analyses", Authored by: Rotkowsky, Aaron, Co-authored by: Cobb, Scott, 11/1/2007 by Willamette Management Associates.

²⁰ *Ibid.*

opposed to using an overall average or benchmark. This has been called by one commentator as the so called “Restricted Stock Comparative Analysis Model.”²¹

Appendix A of this paper presents an example of the application of this method in determining a DLOM for a hypothetical block of stock in a closely held business.

Pre-IPO Studies

The other studies that are typically used to estimate a discount for lack of marketability are studies relating to the discounts on sales of closely held company shares compared to the price of subsequent initial public offerings of the same company shares (Pre-IPO studies). The Pre-IPO studies are only DLOM studies that look directly at closely held companies’ transactions.

A group of studies was started by John D. Emory, Sr., when he was with Robert W. Baird & Company, and continue to be updated periodically by Emory Business Valuations. Mr. Emory prepared a series of studies called “The Value of Marketability as Illustrated in Initial Public Offerings of Common Stock.” These studies looked at the relationship between a company’s “marketable” stock price at the time of its IPO (Initial Public Offering) and its “non marketable” stock price in private transactions immediately preceding the IPO.

In the studies conducted from 1980 through 2000, over 4,000 IPO prospectuses were reviewed and 543 qualifying transactions were found. From 1980 through 2000, implied median and mean marketability discounts were 47 percent and 46 percent, respectively, as summarized below:

²¹ Hall, Lance “Determining Discounts for Lack of Marketability” FMV Opinions, Inc.

**THE VALUE OF MARKETABILITY AS ILLUSTRATED IN
INITIAL PUBLIC OFFERINGS OF COMMON STOCK**

<u>Study</u>	<u># of IPO Prospectuses Reviewed</u>	<u># of Qualifying Transactions</u>	<u>Mean Discount</u>	<u>Median Discount</u>
1997 – 2000	1,847	266	50%	52%
1995 – 1997	732	84	43%	41%
1994 – 1995	318	45	45%	47%
1991 - 1993	443	49	45%	43%
1990 - 1992	266	30	34%	33%
1989 - 1990	157	17	46%	40%
1987 - 1989	98	21	43%	43%
1985 - 1986	130	19	43%	43%
1980 – 1981	97	12	59%	68%
1980 - 2000	4,088	543	46%	47%

SOURCE: Presentation, by John Emory, at the Institute of Business Appraisers' Annual National Conference, Orlando, Florida, June 3, 2003.

Valuation Advisors has compiled a database of pre-IPO transactions with approximately 3,200 transactions. Studies from this database breakdown the discounts over various timeframes and are searchable on-line through bvmarketdata.com and valuationpros.com.²² The study considers transactions in the company's stock within two years of the IPO and includes stock, convertible preferred, and options. The transaction summary results for the years 1999 through 2008 are as follows:

²² Valuation Advisors Discount for Lack of Marketability Database. Database access is available at www.bvmarketdata.com.

Time of Transaction before IPO	1-90 Days	91-180 Days	181-270 Days	271-365 Days	1-2 Years
1999 Median Discount	30.8%	53.9%	75.0%	76.9%	82.0%
2000 Median Discount	28.7%	45.1%	61.5%	68.9%	76.6%
2001 Median Discount	14.7%	33.2%	33.4%	52.1%	51.6%
2002 Median Discount	6.2%	17.3%	21.9%	39.5%	55.0%
2003 Median Discount	28.8%	22.3%	38.4%	39.7%	61.4%
2004 Median Discount	16.7%	22.7%	40.0%	56.3%	57.9%
2005 Median Discount	14.8%	26.1%	41.7%	46.1%	45.5%
2006 Median Discount	20.7%	20.8%	40.2%	46.9%	57.2%
2007 Median Discount	11.1%	29.4%	36.3%	47.5%	53.1%
2008 Median Discount	20.3%	19.2%	45.8%	40.4%	49.3%

Lastly, studies were also conducted by Willamette Management Associates. These studies reviewed 1,080 transactions over the 1975-2002 period. The trimmed mean range was 22.9 percent to 56.8 percent. There were very few transactions in 2001 and 2002. The underlying transaction data has generally not been made available.²³

Pre-IPO Studies: Summary

Some valuation analysts believe that pre-IPO DLOM studies provide the most relevant empirical data with regard to the DLOM for privately owned companies. The reason for this is that companies in the pre-IPO DLOM studies more closely resemble more privately held companies to which the DLOM is being applied. As a general proposition, the DLOMs derived from the Pre-IPO studies are in a larger range than the Restricted Stock studies.

²³ See www.willamette.com.

The Pre-IPO studies came under significant criticism by the Tax Court in *McCord v. Commissioner*²⁴ as producing implausibly large discounts. While the McCord case has been overturned, it nonetheless focused the valuation community's attention on the use of these studies.

There are three specific criticisms that to us have some traction. The first is that some of the Pre-IPO transactions involved service providers and other insiders thereby including in the Pre-IPO price some elements of compensation or "equity kicker" that has little to do with marketability. Secondly, there may be selection bias as the studies only include those companies that went public and going public is a indication of improving performance and brighter prospects.

The third problem with the use of this data is that its results are circular. Someone who is trying to establish the value of a stock that is privately traded in a pre-IPO situation would undoubtedly look at the pre-IPO studies to determine what are the appropriate discounts applicable to the subject shares. Therefore, the discounts reflected in the pre-IPO transactions are discounts that are further reflected in the pre-IPO studies, thereby closing the loop.

Marketability Discounts and Derivative Instruments

Modern financial theory and practice has begun to provide both insight and practical advice into the measurement of marketability discounts. As we know, the marketability discount captures the reduction in asset price due to inability to convert an asset into cash in a short time period without any loss of value.

Hedging instruments perform this function in many markets. Here we will provide an overview of how hedging instruments remove the lack of marketability in financial markets and briefly discuss how this logic can be applied to the determination of marketability discounts for business interests.

²⁴ *McCord v. Commissioner*, 120 TC No. 13 (May 14, 2003).

In recent years, a number of hedging strategies using option pricing models have been proposed as providing a basis for a discount for lack of marketability. In 1993, David B.H. Chaffe, III, proposed using such hedging vehicles as a proxy for discounts for lack of marketability in private company valuations.²⁵ Chaffe indicated that a holder of restricted stock can create liquidity by buying options to sell the shares (Option at Market price). Using the Black-Scholes model with an estimated range of volatility of between 60 percent and 90 percent, Chaffe determined that a DLOM of 28 percent to 41 percent was applicable when there was a two year holding period, while a DLOM of 32 percent to 49 percent was applicable when there was a four year holding period. He indicates that “these put prices, expressed as percentages of the market price (strike price), offer us an estimate of the discount for lack of marketability. The discount ranges of 28% to 49% are quite similar to those developed using data for market evidence studies for marketability such as the SEC Institutional Investor Study, the Robert E. Moroney studies and the John D. Emory data.”²⁶

In 1995, Francis Longstaff published an article using option pricing theory to set the upper bound on the value of marketability.²⁷ Longstaff’s hedge strategy made use of a lookback put. A lookback put allows the purchaser the right to sell the underlying asset at the best price available over the contract period. Using this strategy, Longstaff calculated that the maximum DLOM with restriction periods between one day and five years and volatility between 10 percent and 30 percent, produced discounts ranging between 8.2 percent to 65.8 percent, depending on which combination of restriction period and volatility was used.

²⁵ Chaffe, David B.H. “Option Pricing as a Proxy for Discount for Lack of Marketability and Private Company Valuations”, Business Valuation Review, December 1993.

²⁶ *Ibid* 184.

²⁷ Longstaff, Francis, “How much can marketability affect security values”, the Journal of Finance, Vol. 15, No. 5, December 1995.

Finnerty²⁸ attempted to extend the Longstaff Study but without the use of a lookback put option. He sampled 101 private placements of letter stock and indicates that the discount is dependent upon, in part, stocks volatility, length of restriction period, the riskless rate, and the stock's dividend yield. In the Finnerty model, stocks that have dividends and shorter restriction periods command lower discounts for lack of marketability. Finnerty indicates that when stock price volatility is under 30 percent, the appropriate discount is smaller than the customary discount range of about 25 percent to 35 percent. For example, when volatility is between 20 percent and 30 percent and there is a two year restriction period, the proper discount is in the range from 15.76 percent to 20.21 percent for non-dividend paying stock and in the range of 11.0 percent to 15.96 percent for stocks yielding three percent.

DLOM and Derivatives: An Example

The following is an example of the application of a hedge strategy to estimate the DLOM.

In financial markets, Put Options provide investors the ability to hedge against the falling price of a financial asset. The cost of a put option is called the option premium.

Put Options

A put option is defined as a contract giving the owner the right, but not the obligation, to sell a specified amount of an underlying security at a specified price within a specified time. In other words, if you own the stock of a public company with publicly traded options, you can buy a put option which gives you the right to sell at a set price until the option expires. The right to sell at a set price effectively eliminates the downside risk. If the stock goes down in price below your put option price, you would exercise (sell at a fixed price) the put option. If the stock goes up in price, you would let the option expire and sell your stock in the market. In effect, the cost of a put option is the price you are willing to pay to guarantee marketability; however, the put option only protects you

²⁸ Finnerty, John D., "Impact of Transfer Restrictions on Stock Prices", Analysis Group, June 2003.

from downward price pressure. In a real sense put options are a type of insurance. Put options insure against receiving less than the market price of a security.

Here is an example of a put option:

You own 100 shares of Acorda Therapeutics, Inc. (ACOR) stock which is trading at \$20.00.

You wish to sell the stock in the next 6 months. For example, the shares could be restricted from being sold for any number of reasons. Of course, you hope the price increases but you are concerned about the stock price falling, so you look at the put options for Acorda.

A review of the option market indicates that there are Acorda put options available that expire in April 2009, May 2009, July 2009, October 2009, January 2010 and January 2011. Since you have a 6 month window, you select the October 2009 options. You look for a put option with a strike price close to the current share price; you look for an in-the-money option. For a put option with a strike price (same as exercise price) of \$20, the most recent trade was at \$3.60. That means you pay \$3.60 for the right to sell your stock at \$20 anytime between today and October 16, 2009. Because you can't buy options at exactly your price plus there is a cost to pay, you buy more options in order to lock in today's price.

So, let's look at what can happen:

Pay \$3.60 for **100** put options with a strike price of \$20 (\$360)

Stock price has fallen to \$15 by the time you have to sell.

So, you exercise your 100 put options and sell your shares for \$20 \$ 2,000

Net Cash Flow \$1,940

Price Received per Share **\$19.40**

The cost of insuring that you receive \$20 per share, the marketability discount, would be defined as the price of the put divided by the stock price when the option is purchased. The marketability discount would be \$3.60 divided by \$20.00 or 18.0%.

If the price of shares increased over time then the cost of put \$360 represents what you have paid to make sure you receive no less than \$20 per share. Again, the marketability discount at the time of buying the put would be 18%.

The problem with using the put option is that it represents insurance; that is, it protects one from downside price risk through the term of the option. Marketability discounts represent the cost of not receiving fair market value at a point time, not just less than fair market value. Upside price risk should also be protected through the term of the option. An at-the-money option collar strategy is appropriate. An equity collar consists of both a put option and a call option.

A call option is defined as an option that gives the holder the right, but not the obligation, to buy a specified amount of an underlying security at a specified price within a specified time in exchange for paying a premium. If you sell (write) a call option, then you have the obligation to sell a specified amount of an underlying security at a specified price within a specified time in exchange for receiving a premium. If the stock goes down in price below your written call option price, the option will expire unexercised. If the stock goes up in price, the call option would be exercised.

By combining the put and call options into a collar, one sets their price upon construction of the collar. This concept is illustrated in the example below.

As shown previously, Acorda has options available that expire in April 2009, May 2009, July 2009, October 2009, January 2010 and January 2011. Since you have a 6 month window, you select the October 2009 options. You look for options with a strike price close to the current price; you look for in-the-money options. As shown previously, for a put option with a strike price of \$20, the last trading price was \$3.60. That means you

pay \$3.60 for the right to sell your stock at \$20 anytime between today and October 16, 2009. For a call option with a strike price of \$20, the last trading price was \$4.00. That means you will receive \$4.00 for the obligation to sell your stock at \$20 anytime between today and October 16, 2009. The difference between the price of the put and call is \$0.40 (\$4.00 - \$3.60). We assume that the transaction costs absorb this difference. This is not an unreasonable assumption.

So, let's look at what happens:

Pay \$3.60 to buy 100 puts	(\$360.00)
Receive \$4.00 to sell 100 calls	\$400.00
Transaction costs to execute	<u>(\$40.00)</u>
Net transaction costs	\$0.00

Stock price decreases to \$15

Exercise put options – sell 100 puts at \$20	\$2,000
Call options expire	<u>\$0</u>
Net Cash Flow	\$2,000
Price per share	\$20.00

Stock price increases to \$25

Put options expire	\$0
Call options are exercised – sell at \$20	<u>\$2,000</u>
Net Cash Flow	\$2,000
Price per share	\$20.00

You have locked in your strike price of \$20. Therefore, a collar eliminates all marketability risk.

If you are using a collar strategy to eliminate marketability risk on restricted stock, you will be exposed to price risk due to the time value of money over the duration of the collar. Therefore, you may have a small marketability discount due to this issue.

At this point in time, collars can only be executed easily in the public markets for certain publicly traded securities. In addition, there are publicly traded securities that do not have any traded options. For these companies, it might be possible to find a bank to structure a collar for you. For private companies, the current research is working to determine if and how a portfolio of comparable company options may provide an effective hedge of marketability discounts.

APPENDIX A

Assume that one is valuing a 20% minority block of stock in a closely held business that produces vaccines. As it is a closely held business, assume that the appraiser has determined that a discount for lack of marketability is appropriate but must now determine the amount of discount.

First, the appraiser begins by searching the FMV Restricted Stock Study database for transactions under SIC code 2836 – Biological Products, Except Diagnostic Substances. The initial search was over the entire database with no restrictive criteria. The transaction results were as follows:

	Company	Holdin g Period (Yrs.)	Transac- tion Month	Total Revenues (\$000s)	Net Income (\$000s)	Market Value (\$000s)	MTB Ratio	Transac- tion Month Discount
1	Onyx Pharmaceuticals Inc	1	2/2003	\$2,715	(\$45,787)	\$122,875	4.269	20.30%
2	Novavax Inc	1	2/2003	\$15,005	(\$22,697)	\$79,264	9.818	-1.61%
3	Neose Technologies Inc	1	9/2003	\$4,813	(\$26,417)	\$135,075	1.911	7.69%
4	Medarex Inc.	1	1/2005	\$12,474	(\$186,509)	\$926,989	8.632	9.41%
5	LXR Biotechnology, Inc.	2	1/1996	\$0	(\$6,316)	\$12,554	-21.459	57.89%
6	IGI, Inc.	2	2/1992	\$22,009	\$45	\$130,596	10.200	46.67%
7	Genitope Corp	1	12/2004	\$0	(\$30,463)	\$235,564	8.196	9.72%
8	Connetics Corp	1	2/2004	\$75,331	(\$4,100)	\$639,135	13.969	10.67%
9	Cerus Corporation	1	8/2000	\$2,408	(\$22,628)	\$723,974	25.894	11.60%
10	Avant Immunotherapeutics	1	2/2004	\$4,633	(\$12,669)	\$211,272	7.567	11.72%
11	Aquila Biopharmaceuticals, Inc	1	3/2000	\$5,597	(\$14,600)	\$50,042	3.197	26.72%
12	Aphthon Corporation	2	4/1994	\$125	(\$2,094)	\$228,481	81.981	4.48%
13	Aphthon Corporation	1	4/2000	\$0	(\$11,193)	\$566,198	46.948	-15.79%

The Transaction Summary information was as follows:

Statistic	Count	Range	Mean	Median	Coefficient of Variance
Transaction Month	13	2/1992 – 1/2005	N/A	N/A	N/A
Total Revenues (\$000s)	13	\$0 - \$75,331	\$11,162	\$4,633	N/A
Net Income (\$000s)	13	(\$186,509) - \$45	(\$29,648)	(\$14,600)	N/A
Market Value (\$000s)	13	\$12,554 - \$926,989	\$312,463	\$211,272	N/A
MTB Ratio	13	-21.459 – 81.981	15.471	8.632	1.624
Marketability Discount for Prior Month (2 Yr. Holding Period)	3	17.95% - 35.53%	25.52%	23.08%	0.35
Marketability Discount for Prior Month (1 Yr. Holding Period)	10	-8.86% - 19.75%	7.10%	7.27%	1.29
Marketability Discount for Transaction Month (2 Yr. Holding Period)	3	4.48% - 57.89%	36.35%	46.67%	0.77
Marketability Discount for Transaction Month (1 Yr. Holding Period)	10	-15.79% - 26.72%	9.04%	10.20%	1.27
Marketability Discount for Subsequent Month (2 Yr. Holding Period)	3	0.00% - 80.95%	37.04%	30.16%	1.1
Marketability Discount for Subsequent Month (1 Yr. Holding Period)	10	-42.70% - 38.91%	-1.47%	2.34%	-16.74
Operating Profit Margin	10	-1,686.45% - 3.24%	-689.17%	-404.52%	-0.988
Net Profit Margin	10	-1,686.45% - 0.20%	-703.62%	-411.16%	0.981
Volatility	13	37.30% - 135.40%	74.81%	73.60%	N/A
Z-Score	8	-3.09 – 2,971.50	741.41	6.53	N/A

Note that the mean and median marketability discounts are 9.04% and 10.20% for the transaction month with a one year holding period but the discounts are within a range from -15.79% to 26.72%.

Next, the appraiser should apply appropriate restrictive criteria to the results.

Assuming the valuation date is in 2005, the appraiser will only want transactions with a one year holding period comparable to the restricted stock requirements at the time.

The appraiser may also limit the transactions to those in the past five years, 2001 through 2005. In addition, assuming the subject company has sales, the appraiser should eliminate any companies with no revenues. There are now six transactions. The new transaction results were as follows:

	Company	Holdin g Period (Yrs.)	Transac- tion Month	Total Revenues (\$000s)	Net Income (\$000s)	Market Value (\$000s)	MTB Ratio	Transac- tion Month Discount
1	Onyx Pharmaceuticals Inc	1	2/2003	\$2,715	(\$45,787)	\$122,875	4.269	20.30%
2	Novavax Inc	1	2/2003	\$15,005	(\$22,697)	\$79,264	9.818	-1.61%
3	Neose Technologies Inc	1	9/2003	\$4,813	(\$26,417)	\$135,075	1.911	7.69%
4	Medarex Inc.	1	1/2005	\$12,474	(\$186,509)	\$926,989	8.632	9.41%
5	Connetics Corp	1	2/2004	\$75,331	(\$4,100)	\$639,135	13.969	10.67%
6	Avant Immunotherapeutics	1	2/2004	\$4,633	(\$12,669)	\$211,272	7.567	11.72%

The new transaction summary information was as follows:

Statistic	Count	Range	Mean	Median	Coefficient of Variance
Transaction Month	6	2/2003 – 1/2005	N/A	N/A	N/A
Total Revenues (\$000s)	6	\$2,715 - \$75,331	\$19,162	\$8,644	N/A
Net Income (\$000s)	6	(\$186,509) – (\$4,100)	(\$49,697)	(\$24,557)	N/A
Market Value (\$000s)	6	\$79,264 - \$926,989	\$352,435	\$173,174	N/A
MTB Ratio	6	1.911 – 13.969	7.694	8.100	0.551
Marketability Discount for Prior Month (1 Yr. Holding Period)	6	-8.86% - 19.75%	7.79%	10.17%	1.46
Marketability Discount for Transaction Month (1 Yr. Holding Period)	6	-1.61% - 20.30%	9.70%	10.04%	0.73
Marketability Discount for Subsequent Month (1 Yr. Holding Period)	6	-14.11% - 38.91%	9.38%	7.02%	1.92
Operating Profit Margin	6	-1,686.45% - - 1.73%	-670.13%	-398.48%	-1.049
Net Profit Margin	6	-1,686.45% - - 5.44%	-693.44%	-411.16%	-1.039
Volatility	6	37.30% - 115.00%	72.17%	74.50%	N/A
Z-Score	4	-1.95 - 8.64	2.80	2.25	N/A

Note that the mean and median marketability discounts were 9.70% and 10.04% for the transaction month with a one year holding period, similar to all of the transactions but with a tighter range from -1.61% to 20.30% and a lower coefficient of variation.

The appraiser might continue refining the restrictive criteria such as eliminating negative discounts, reviewing business descriptions and eliminating any non-similar companies, or additional financial criteria.

JAY E. FISHMAN, FASA

FINANCIAL RESEARCH ASSOCIATES

EDUCATION & EMPLOYMENT EXPERIENCE

Jay E. Fishman is a Managing Director of Financial Research Associates, a firm providing Business Valuation, Forensic Accounting, and Litigation Consulting Services, with offices in Bala Cynwyd, Pennsylvania, Edison, New Jersey, and New York, New York. Prior to forming Financial Research Associates, Mr. Fishman was a principal of Kroll, Inc., an international forensic accounting and business valuation firm headquartered in New York. Preceding joining Kroll, Mr. Fishman was the Founder and President of Financial Research, Inc. (FRI), a regional business valuation firm. He functions as a Project Manager specializing in the valuation of closely held enterprises, professional practices, publicly traded securities and intangible assets.

Mr. Fishman has been actively engaged in the appraisal profession since 1974. His valuations have been used for many purposes including estate and gift tax, dissenting shareholder and oppression matters, marital dissolution cases and the purchase and sale of business enterprises.

Prior to founding Financial Research, Inc. in 1981, Mr. Fishman was a Senior Financial Analyst at Marshall & Stevens, Inc., an international multi-discipline appraisal company. From 1974 to 1979, Mr. Fishman was employed by The Manufacturers' Appraisal Company in their financial and intangible asset valuation division.

Mr. Fishman has a Master of Business Administration degree from LaSalle University with specialties in finance and accounting. Mr. Fishman received a Master's and Bachelor's degree from Temple University. He has also participated in various seminars for continuing appraisal education.

Representative assignments:

- ◆ Closely held businesses
- ◆ Lost profits/economic damages
- ◆ Intangible assets
- ◆ Publicly traded securities
- ◆ Corporate finance
- ◆ Professional practices

PROFESSIONAL AFFILIATIONS

American Society of Appraisers (Senior Member – Business Valuation) awarded designation in 1979 (re-certified through 2019); Elected to College of Fellows in August 2005 (FASA); Elected Life Member in February 2012; Member - Business Valuation Committee 1984-1994. Elected Member Emeritus, (1995-), Lifetime Volunteer Service Award 2008; Chairman 1991-1993, Vice Chairman 1989-1991, Developer of Business Valuation Course IV – Advanced Topics - Member ASA Board of Examiners. Chairman, Government Relations Committee (1997- 2013). Editor,

Business Valuation Review (2002- 2007).

American Academy of Matrimonial Lawyers Foundation, Forensic & Business Valuation Division, Charter Member.

PROFESSIONAL AFFILIATIONS (CONT'D):

The Appraisal Foundation - Trustee (1998-2003); Secretary (2002-2003); The Appraisal Foundation - Issues Resource Panel Business Valuation Focus Group (1997-2001); Chair: Task Force – Best Practices for Valuation for Financial Reporting (2006 -); Appraisal Standards Board (2009 - 2010); Vice Chair –

Appraisal Practices Board (2010 -12). Chairman - Appraisal Practices Board (2013). Vice Chairman – Appraisal Practices Board (2014 -).

Elected Fellow of the Royal Institution of Chartered Surveyors (FRICS).

International Valuation Standards Committee – Task Force on Intangible Assets.

Internal Revenue Service Advisory Committee (2008 - 2010).

COURT APPOINTMENTS

Mr. Fishman has been appointed by judges in Pennsylvania, New Jersey, New York, California, Ohio Utah and Rhode Island to value closely held enterprises.

EXPERT TESTIMONY EXPERIENCE

Mr. Fishman has qualified as an expert witness and provided testimony in Federal District Court, United States Tax Court, and in the following state courts: Pennsylvania, New Jersey, New York, Texas, Delaware, Illinois, Montana, Florida, Maryland, Louisiana, Ohio, California, Arizona, South Carolina and in binding arbitration proceedings in a number of states, including North Carolina.

SELECTED PRESENTATIONS

Mr. Fishman has been invited to address numerous professional organizations on valuation of business and professional enterprises including: American Bar Association, American Institute of Certified Public Accountants, Judiciary of Delaware, Houston Family Law Trial Institute, Pennsylvania Bar Institute, Family Law Section of the Florida Bar, Internal Revenue Service (Estate and Gift Tax Group), New Jersey Institute of Continuing Legal Education, Association of the City Bar of New York, New York State Judicial Institute, New Jersey Judicial Family Law Retreat, Ohio Judicial Retreat, New York State Bar Family Law Section, Judicial Matrimonial Seminar – New York, Judicial College – New Jersey, Colorado Academy of Matrimonial Lawyers, Institute of Business Appraisers, Institute of Business Brokers, American Academy of Matrimonial Lawyers, and Pennsylvania Trial Lawyers Association, Florida Academy of Matrimonial Lawyers, Delaware Family Law Section, Pennsylvania State Trial Judges, ALI-

ABA, Financial Consulting Group, AICPA National Tax Conference, University of San Diego School of Law, Georgetown Law Center, Pan Pacific Property Congress in Bali, Indonesia and Florida 36th Annual AAML Institute. International Academy of Matrimonial Lawyers – papers presented in Barcelona, Spain and Budapest, Hungary. Mr. Fishman was recently a keynote speaker at the AAML/AICPA Conference on Divorce in Las Vegas, Nevada.

COURSES TAUGHT AND DEVELOPED

He is the author, with Stacy Preston Collins, of *Data Research and the Market Approach to Valuation (NBV3)* for the Business Valuation Certificate of Educational Achievement (CEA) Program sponsored by the Illinois CPA Foundation and AICPA.

Mr. Fishman is the author, with Stanton L. Meltzer, CPA, of an American Institute of Certified Public Accountant's Course: *Developing Your Business Valuation Skills: An Engagement Approach* (AICPA/PPC-CPE).

He is the author, with Carla Glass, FASA, of the *On Demand 7 hour USPAP Course for Business Valuation*.

Mr. Fishman has also created and taught courses on the valuation of business enterprises to the following organizations: Internal Revenue Service, National Judicial College, Ernst & Young, Deloitte & Touche, American Society of Appraisers (Advanced Business Valuation Course), American Academy of Matrimonial Lawyers, and Temple University.

Mr. Fishman taught a course in St. Petersburg, Russia, to Russian appraisers on behalf of The World Bank's Economic Development Institute. He has also taught courses on business valuation to The Hong Kong Society of Accountants in Hong Kong; Peoples Republic of China on behalf of Kwinto Management in Moscow, Russia and for the Slovenian Institute of Auditors in Ljubljana, Slovenia.

Mr. Fishman was an adjunct member of the Graduate Business faculty of the Department of Finance at LaSalle University.

PUBLICATIONS

BOOKS

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CHAPTERS

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MEDIA APPEARANCES

Featured in Philadelphia Inquirer and Forbes on Valuing Celebrity.

Mr. Fishman has been quoted in Wall Street Journal, USA Today,
Entertainment Weekly, In Touch, Reuters and The Deal.

Featured on E! Entertainment and AM Philadelphia.