



Forensic Accounting, Business Valuation and Consulting

Quantifying Discounts for Lack of Marketability

Michael A. Crain, CPA/ABV, ASA, CFA, CFE
and
Michael J. Mard, CPA/ABV/CFF, ASA

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BACKGROUND

Discounts for lack of marketability are a common valuation adjustment when valuing ownership interests of private businesses. Minority interests in unlisted firms have little demand from investors and, thus, they are relatively illiquid investments. Evidence from broad markets shows harder-to-sell investments have lower prices than liquid investments. The main theory to explain these lower prices is that investments with lower liquidity are less desirable than those with higher liquidity and, consequently, demand pressures on liquid investments push prices upward.

In valuing minority ownership interests in privately owned businesses, a discount for lack of marketability is quantified by some estimation methodology. Valuation experts use two general kinds of methodologies.

One general methodology is observational in nature where samples of liquid and illiquid investments are collected and their prices compared. Price differences are attributed to marketability. The application of this general methodology often observes market prices of stocks of listed firms that are unrestricted shares and compares them to the prices of restricted shares in the same company.

The second general methodology is mathematical in nature and often uses option pricing models. The idea is a put option on the illiquid equity interest protects an investor from price declines until the investment eventually sells. The cost of a hypothetical put option is the discount. In investment management where investment portfolios are constructed, portfolio managers can preserve the value of a portfolio from downward price movements by buying protective put options in the markets. Such put options give an investor the right to sell shares at a particular price in the future even if market prices of the shares decline. But acquiring a put option comes at a cost: an investor must pay a price to buy a protective put option. This investment practice has been extended by valuation practitioners as a way to estimate discounts for lack of marketability on minority interests in private firms and other equity interests that are difficult to sell. A put option protects owners of these equity interests from falling prices but still allows them to benefit from rising prices. One estimates the cost of a hypothetical put option from option pricing models. The cost of a protective put provides an estimate for the marketability discount.

In this article, we summarize discounts observed in restricted stock studies and then describe one option pricing model that has been used to estimate discounts for lack of marketability.

RESTRICTED STOCK STUDIES

One source of information on the quantification of valuation discounts for lack of marketability is restricted stock studies. Over the years, investment companies have purchased private placements of restricted stocks. Restricted securities are shares issued and sold by a publicly traded company without prior registration with the Securities and Exchange Commission (SEC). Without such registration,

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Quantifying Discounts (Continued)

these particular shares cannot be freely traded. At the time of these studies, SEC Rule 144 imposed a minimum holding period of two years before these restricted securities could be sold and, thus, they could not be sold on a public exchange immediately.

Investment companies purchase these kinds of restricted securities at prices lower than the price of unrestricted securities in the same company. The difference between the restricted share price and unrestricted share price is taken as a proxy for a marketability discount. The table below is a summary of some of the restricted stock studies and average discounts.

FINNERTY OPTION PRICING MODEL

John Finnerty, Ph.D. with Finnerty Economic Consulting and professor of finance at Fordham University recently presented the results of testing his option pricing model com-

pared to restricted stock studies. He argues that his model performs better than restricted stock studies in quantifying marketability discounts. Finnerty distinguishes marketability discounts from price differences in restricted stocks, which he calls the private placement discount. He claims that lower prices of restricted shares arise from various factors in addition to marketability and presents statistical evidence. He reasons that if these lower restricted stock prices are caused by multiple factors, then restricted stock studies cannot be used to establish marketability discounts because they do not isolate the effect of marketability.

Finnerty offers an alternative to restricted stock studies for quantifying marketability discounts. Using ideas from finance practice in managing investment portfolios, he reasons that the price of a hypothetical protective put option on illiquid shares provides information about the magnitude of a marketability discount. As discussed, portfolio managers use put options to minimize risk of falling stock prices. For

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Summary of Studies of Restricted Securities Transactions

Study	Period of Study	Discount for Lack of Marketability
SEC Institutional Investor	1966 – 1969	25.8%
Silber	1981 – 1988	33.8%
Standard Research Consultants	1978 – 1982	45.0%
Maher	1969 – 1973	35.4%
Gelman	1968 – 1970	33.0%
Moroney	1969 – 1973 (a)	35.6%
Trout	1968 – 1972	33.5%
Management Planning, Inc.	1980 – 1995	27.1%
FMV Opinions, Inc.	1980 – 1997	23.0%
Johnson Study	1991 – 1995	20.0%
Columbia Financial Advisors, Inc.	1996 – 1997	21.0%
Columbia Financial Advisors, Inc. (b)	1997 – 1998	13.0%

- (a) Moroney did not state the exact time period of his study of restricted stocks, but it is within this time frame.
(b) The effect of the SEC Rule 144 change from a two-year waiting period to a one-year waiting period.

Source: Shannon P. Pratt, Business Valuation Discounts and Premiums, 2nd edition, John Wiley & Sons, Inc., 2009, p. 89.

Quantifying Discounts (Continued)

instance, if a portfolio holds 10 stocks and its portfolio manager seeks to preserve the value of the portfolio by minimizing the risk of falling market prices, the manager can buy put options on the stocks in the markets to provide protection from downside risk. From this practice, Finnerty argues the price of a put option on illiquid shares, even minority shares in a private firm, can be estimated from an option pricing model and the results used to quantify a marketability discount.

Finnerty's option pricing model appears below, which assumes the Black-Scholes price equation. Like the famous Black-Scholes option pricing model, this model is cryptic to those not mathematically inclined. $D(T)$ is the amount of the marketability discount, T is the restriction period, q is the percent of earnings paid out to equity holders as dividends, s is the volatility of the stock's price, and V_0 is the current stock price. In plain English, this model predicts the discount rises when the time to sale is longer, the dividend payout ratio is lower, and the stock's price volatility is higher.

$$D(T) = V_0 e^{-qT} \left[N\left(\frac{v\sqrt{T}}{2}\right) - N\left(-\frac{v\sqrt{T}}{2}\right) \right]$$

$$v\sqrt{T} = \left[\sigma^2 T + \ln\left(2\left\{e^{\sigma^2 T} - \sigma^2 T - 1\right\}\right) - 2\ln\left(e^{\sigma^2 T} - 1\right) \right]^{1/2}$$

For options on publicly-traded stocks, these variables are estimated from analysis and then they are used in the Black-Scholes model or another option pricing model. (The Black-Scholes model estimates prices of European options, which can be exercised only at the end of an option's life. Finnerty's model makes no such assumption.) In private firms, these variables are also estimated from analysis.

CONCLUSION

Currently, observational studies tend to be used by valuation experts in tax matters. Perhaps this is a result of decades of this practice and, consequently, the Tax Court and IRS agents expect to see them used. Further, case law in the tax area has vetted these kinds of studies. In contrast, auditors tend to expect valuation experts to use option pricing models rather than observational studies when marketability discounts arise in financial reporting. Perhaps auditors believe using average discounts derived from observational studies are too crude for financial reporting and that option pricing models are better. Moreover, different philosophical positions of the judiciary and auditors might also account for these different expectations.

Announcements or Events:

Don Wischart –

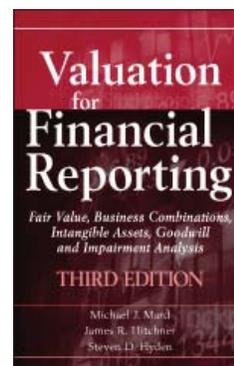
- * Scheduled to present a 2-hour webinar on “Case Studies in BV—Facts to Conclusion” on 4/24

Mike Mard –

- * Appointed to International Academy of Collaborative Professionals (IACP) Standards Committee representing financial professionals (see collaborativepractice.com).
- * Spoke recently at the Marketing Accountability Standards Board of the American Marketing Association on fair value and recognizing brand value.

Mike Crain –

- * Recently taught corporate finance to global MBA students for Manchester Business School, University of Manchester, UK.



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Three Uses For An Analysis of Initial Public Offering Transactions

LuAnne Anderson
Deanna Muraki and
Michael J. Mard, CPA/ABV/CFF, ASA

Fair market value is traditionally determined through an analysis involving three approaches to value: Income Approach, Market Approach, and Asset Approach. We have found that an additional analysis of companies at the time of their initial public offerings (IPOs) can be used to support (1) traditional Market Approach methodology, (2) a valuation conclusion, and (3) an estimate of marketability.

An IPO analysis can supplement the Market Approach by considering such real-world issues as:

- * Informational and emotional factors of investing
- * Purposes of going public such as
 - ◆ cheaper and more diversified access to capital

- ◆ increased exposure
- ◆ competitive position in the market
- ◆ competitive position in acquiring and maintaining strong management
- ◆ facilitating acquisitions
- * Costs and requirements of going public

In applying this methodology, we begin with Internet searches of the SEC and Yahoo!Finance websites. Development stage companies are excluded from our analysis. We analyzed over 150 IPO transactions over a five-year period in a particular SIC.

SAMPLE COMPANY IPO ANALYSIS SUMMARY - COMPARISON AS OF DATE

	Revenues (\$000s)	1-Yr Hist. Rev Growth	5-Yr Hist. Ann Rev Growth	5-Yr. Fore- casted Earnings Growth	EBITDA (\$000s)	1-Yr Hist. EBITDA Growth	5-Yr Hist. EBITDA Growth	EBITDA Margin
Companies in IPO Analysis:								
Percentile: 25	\$270,309	2.7%	(1.3%)	7.0%	\$12,935	5.2%	(3.4%)	6.0%
Median	846,614	8.4%	1.0%	16.0%	135,818	10.7%	(3.3%)	12.9%
Percentile: 75	2,490,711	12.8%	16.8%	20.0%	378,387	13.7%	2.8%	17.2%
SAMPLE COMPANY	\$154,200	13.3%	8.1%	9.0%	\$14,100	7.9%	6.1%	10.8%
<i>Rank</i>	<i>10</i>	<i>2</i>	<i>4</i>	<i>8</i>	<i>8</i>	<i>7</i>	<i>2</i>	<i>6</i>

	Current Ratio	Accounts Receivable Turnover	Inventory Turnover	Sales/ Assets	Assets to Equity	Total Debt to Assets	Total Debt to Equity
Companies in IPO Analysis:							
Percentile: 25	1.5	4.9	4.7	1.0	1.8	9.1%	14.5%
Median	2.1	5.5	5.6	1.1	1.9	19.9%	30.2%
Percentile: 75	2.7	6.5	6.5	1.7	2.2	21.6%	39.0%
SAMPLE COMPANY	3.1	5.2	5.8	1.8	2.6	7.1%	29.5%
<i>Rank</i>	<i>1</i>	<i>7</i>	<i>5</i>	<i>3</i>	<i>2</i>	<i>2*</i>	<i>4*</i>

* For debt ratios, a low ratio is more favorable than a high ratio.

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Three Uses (Continued)

For each IPO transaction, we observe market prices and determine multiples of Market Value of Invested Capital (MVIC)/Revenues and MVIC/EBITDA, for the reporting period immediately following the IPO. Market Value of Invested Capital of each offering company is calculated using:

* The first observed (close) price received by the offering company;

* The number of common shares outstanding as of the reporting period immediately following the offering; and

* Total debt as of the reporting period immediately following the offering.

We use annual or trailing twelve months revenues and operating EBITDA as of the reporting period immediately following the IPO to develop the multiples. Outliers are excluded from the sample.

In our application of this analysis, we determine the percentile of concluded fair market value multiples of the subject company to the multiples of the IPO group. This reveals that our overall value conclusion for the subject company is or is not conservative in comparison to the value of companies at the time of their IPOs.

Further, the subject company's value multiples, financial ratios, size, historical and forecasted growth, market share, and managerial strength can be compared to those of the IPO group to determine whether the subject company is a candidate for a public offering. This comparison can help the valuation expert determine the level of marketability of the subject company, regardless of its size or similarity to the public companies, thus providing additional information for determining the appropriate discount for lack of marketability to apply.

SAMPLE COMPANY IPO ANALYSIS SUMMARY - MULTIPLES AS OF DATE

	<u>MVIC/Revenues</u>	<u>MVIC/EBITDA</u>
Sample Company Calculated Multiples	1.20	9.90
SIC 3000-3999	<u>MVIC/Revenues</u>	<u>MVIC/EBITDA</u>
<i>Number of IPOs with Selected Multiple</i>	58	42
<u>IPO Percentile Multiples</u>		
Minimum	0.44	3.98
25th Percentile	1.36	9.84
Median	2.46	13.41
75th Percentile	3.73	19.51
Maximum	4.93	29.43
Sample Company Percent Rank	21%	27%
SIC 3600-3699	<u>MVIC/Revenues</u>	<u>MVIC/EBITDA</u>
<i>Number of IPOs with Selected Multiple</i>	22	16
<u>IPO Percentile Multiples</u>		
Minimum	0.44	4.52
25th Percentile	1.44	11.84
Median	2.89	19.21
75th Percentile	4.13	23.18
Maximum	4.93	29.43
Sample Company Percent Rank	20%	12%
SAMPLE COMPANY AVERAGE PERCENTILE RANK, ROUNDED		20%

Ft. Lauderdale, FL Tampa, FL
Kingston, RI



Return address:

The Financial Valuation Group
8074 North 56th Street
Tampa, FL 33617

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