BUSINESS VALUATION ALERT

Quantifying the Private Company Discount: Multiples Approach and Acquisition Approach

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Introduction

Private company valuation is typically performed by BV professionals who regularly estimate the value of nonmarketable interests. In order to develop a valuation estimate, BV professionals review and interpret empirical evidence to support decision making. For example, for the valuation of nonmarketable interests—within the context of a fair market value business valuation—there is typically a valuation consideration related to the discount for lack of marketability (DLOM). That valuation consideration is often based on empirical data as interpreted and applied by a BV professional.

Empirical data is primarily derived from equity studies. Widely used equity studies support DLOM decision making through analysis of restricted stock transactions and initial public offering (IPO) pricing. Empirical data from restricted stock studies is based on a comparison of the price at which a public company issues restricted stock to its publicly traded stock price. Empirical data from IPO studies are based on a comparison of an IPO share price with the price paid for shares in a company before it went public.

Relying on data from public companies to estimate the DLOM related to private companies, while very much relevant and commonly used in practice, has its limitations. That is because restricted stock and IPO studies are based on studies of public company equity pricing, and not on private company equity pricing. Some professionals argue that a more direct method may be appropriate. Of course, in addition to using restricted stock and IPO data, a private company security valuation analysis will typically consider additional methods in order to quantify or qualitatively address DLOM selection.

Additional DLOM support may include the consideration of published studies that rely on data from private companies to derive a private company discount (PCD). Though less

commonly discussed within the valuation profession, PCD studies may provide a more transparent means for estimating the DLOM faced by investors in private companies. These studies suggest that private companies typically sell at lower transaction pricing multiples than similar public companies. Several authors suggest possible reasons as to why private companies sell at lower transaction multiples; however, some authors attribute the reason to the lack of liquidity or lack marketability of private companies.

This article will summarize PCD empirical studies and discuss the merits of the two different approaches used by these studies. If judiciously applied, the PCD may help an analyst support the selection of a discount for lack of marketability. It also stands to reason that an analyst may consider PCD evidence prior to, and in support of, selecting a financial fundamental multiple to use in a guideline publicly traded company market approach analysis.

Private Company Discount Studies

There are two primary methods used to identify PCD evidence: the multiples approach and the acquisition approach. Both approaches are based on a comparison of financial fundamental transaction multiples (FFTM)—such as transaction value as divided by earnings before taxes depreciation and amortization (EBITDA) and transaction value as divided by sales—of private companies to publicly traded companies to derive a PCD.

The main distinction between the two methods is that the multiples approach relies on guideline publicly traded company value (public market-derived trading prices) in order to provide a means for comparison. This approach uses publicly traded company FFTM to compare to private company FFTM based on a private company acquisition transaction. The acquisition approach exclusively relies on FFTM derived by acquisitions. That is, the acquisition approach relies on public company acquisition transaction information as compared to FFTM of private company acquisition transaction information.

The Acquisitions Approach

Several studies and papers document PCD evidence based on the acquisition approach. In this section, I specifically focus on the (1) Koeplin study, (2) Kooli study and (3) Officer study—as described in detail below.

Koeplin Study (2000). One such study titled "The Private Company Discount" was authored by John Koeplin, Atulya Sarin and Alan C. Shapiro (the "Koeplin study").[1] The Koeplin study was conducted to determine if transaction consideration paid for private companies was less than the transaction consideration paid in transactions involving matched publicly traded businesses. The study presented results from two analyses based on (1) domestic transactions, and (2) foreign transactions.

In order to conduct the analyses, Koeplin identified matched pairs (one private company transaction and one public company transaction) based on four-digit industry SIC code analysis, proximity of transaction—within 12 months of one another—and size, based on sales revenue. The search was conducted to identify transactions that occurred between 1984 and 1998. The study identified transactions after removing (1) financial firm acquisitions, (2) regulated utilities business acquisitions and (3) acquisitions involving less than a controlling interest.

The Koeplin study identified 84 domestic company matched pair transactions and 108 foreign company matched pair transactions using the SDC Merger and Acquisition Database (SDC).

After identifying matched pair transactions, Koeplin calculated four Enterprise Value transaction multiples.[2] The PCD calculation was based on the percentage difference between the mean and median indications of the transaction multiples. This calculation was performed for the four transaction multiples of the (1) private company transaction multiples and (2) public company transaction multiples.

The results of the Koeplin study, for the 84 domestic company and the 108 foreign company-based transaction matched pairs, are presented in Table 1.

The study used a regression analysis to test statistical significance. The study results indicated that earnings multiples provided statistically significant

guidance for estimating the PCD, but revenue multiples did not provide the same level of statistical significance.

The Koeplin study concluded that private domestic companies sold at multiples that were 20-percent to 30-percent lower than the acquisition multiples of guideline public companies. Foreign-based private companies sold at multiples that were lower by 40 percent to 50 percent from the acquisition multiples of guideline public companies.

Kooli Study (2003). The "Kooli study," as published in THE JOURNAL OF PRIVATE EQUITY, provides additional PCD evidence.[3] The Kooli study compared private company transaction multiples, much like the Koeplin study, to public company transaction multiples. One of the primary differences of the Kooli study is the use of a portfolio of guideline public company transactions as the public company comparison metric, and not just a single transaction. According to Kooli, picking one public company transaction for comparison, as the Koeplin did, is a potentially noisy procedure for matching firm risk characteristics. Therefore, the Kooli study developed a portfolio of public companies to use for comparison. This portfolio-approach methodology is credited to the work of Brav, Geczy and Gompers.[4]

Kooli suggested that the Koeplin study had certain weaknesses. For example, private companies in the sample were typically smaller and had different growth rates than the matched public companies. The Koeplin study did not consider differences in employment contracts for key managers due to the acquisition. These differences may be a form of financial consideration provided to entice management to agree/approve a transaction.

TABLE 1 — KOEPLIN STUDY: PRIVATE COMPANY DISCOUNT ESTIMATE STUDY RESULTS FOR TRANSACTIONS OCCURRING BETWEEN 1994 AND 1998						
	Private Company Transaction Multiples		Public Company Transaction Multiples		Private Company Discount Estimate [a]	
Domestic Company Transaction Data	Mean	Median	Mean	Median	Mean	Median
Enterprise Value/EBIT [b]	11.76	8.58	16.39	12.37	28.26	30.62
Enterprise Value/EBITDA [c]	8.08	6.98	10.15	8.53	20.39	18.14
Enterprise Value/Book Value	2.35	1.85	2.86	1.73	17.81	-7.00
Enterprise Value/Sales	1.35	1.13	1.32	1.14	-2.28	0.79
Foreign Company Transaction Data						
Enterprise Value/EBIT	16.26	11.37	28.97	12.09	43.87	5.96
Enterprise Value/EBITDA	11.96	7.10	25.91	9.28	53.85	23.49
Enterprise Value/Book Value	2.41	1.35	3.70	1.68	34.86	19.64
Enterprise Value/Sales	2.63	1.35	4.59	1.63	42.70	17.18

[a] Private Company Discount = 1- (private company transaction multiple ÷ public company transaction multiple).
[b] EBIT = Earnings Before Interest and Taxes.
[c] EBITDA = Earnings Before Interest, Taxes, Depreciation, and Amortization.

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The Kooli study recognized the Koeplin study's weaknesses and attempted to control for these weaknesses. In general, the Kooli study used similar procedures to those used in the Koeplin study with the exception of its matching procedures (*i.e.*, using a portfolio approach for transaction matching).

The Kooli study identified 331 private company transactions using the DoneDeals database and the SDC database. The study focused on private and public company transactions between 1995 and 2002. These transactions were controlling interest transactions for U.S.-based companies.

The Kooli study found that transaction multiples of public companies were typically greater than the transactions multiples of private companies. More specifically, the transactions multiples based on sales, earnings and cash flow were greater by 17 percent, 34 percent and 20 percent, respectively.

The Kooli study used regression analysis to identify contributing factors that may help to explain the variation of PCD observations. The study concluded that the PCD varied due to firm characteristics and industry classification. For example, companies that were classified as large and growing generally had a smaller PCD than small companies with lower growth.

The results of the Kooli study as classified by industry sector, including the identification of statistical significance, are provided in Table 2.

The Kooli study found that private companies operating in the wholesale and retail trade industry and construction industry sectors transacted at greater discounts than businesses operating in most other industries. In general, the results suggest that the PCD varies by industry.

The Kooli study also presented a regression analysis to determine statistical significance of explanatory factors that impact the PCD. The regression results indicated that the PCD tends to be smaller for large (as measured by assets) and growing companies. The study results

TABLE 2 — KOOLI STUDY: MEDIAN DISCOUNT INDICATIONS ACROSS INDUSTRY CATEGORIES STUDY RESULTS FOR TRANSACTIONS OCCURRING BETWEEN 1995 AND 2002

Industry Sector	Discount Indication Based on Transaction Multiple Price/Sales (%)	Discount Indication Based on Transaction Multiple Price/Earnings (%)	Discount Indication Based on Transaction Multiple Price/Cash Flow (%)
Agriculture and Mining	-58.6	49.0	31.5
Construction	70.2	59.0	19.1
Manufacturing	36.7	a 30.5	b 21.6
Transportation and Communication	-30.3	18.1	21.6
Wholesale and Retail Trade	60.1	a 55.7	-10.4
Finance, Insurance, and Real Estate	-35.3	b 29.2	a 3.8
Services	15.4	33.6	b 34.1

a. Statistically significant at the 1 percent level.
b. Statistically significant at the 5 percent level.

TABLE 3 — OFFICER STUDY: PRIVATE COMPANY DISCOUNT ESTIMATE STUDY RESULTS FOR TRANSACTIONS OCCURRING BETWEEN 1979 AND 2003

Financial Transaction Metric		Private Company Target Discount/(Premium) to Public Company Target (%)	Unlisted Subsidiary Company Target Discount to Public Company Target (%)
Price to Book Value of Equity	Average	-15.61	27.47
Price to Book Value of Equity	Median	-15.22	35.18
Number of Transactions (in #)		106	145
Price to Earnings Per Share	Average	22.85	28.90
Price to Earnings Per Share	Median	27.82	38.03
Number of Transactions (in #)		148	136
Deal Value to EBITDA	Average	17.18	26.91
Deal Value to EBITDA	Median	20.14	35.07
Number of Transactions (in #)		111	107
Deal Value to Sales	Average	18.15	29.99
Deal Value to Sales	Median	18.72	40.91
Number of Transactions (in #)		308	590
Average Acquisition Discount		17.28	28.31
Median Acquisition Discount		19.51	35.95
Number of Transactions (in #)		364	643

also suggest that there are many unexplained variables that impact the PCD.

Officer Study (2007). The "Officer study," published in the JOURNAL OF FINANCIAL ECONOMICS, provides another perspective of PCD evidence.[5] One of the primary purposes of this study, in addition to calculating the PCD, was to determine if illiquidity of the target company influenced the size of PCDs. To determine if illiquidity influenced PCDs, the Officer study analyzed both (1) private company acquisition pricing multiples and (2) unlisted subsidiary acquisition pricing multiples, to compare to (3) public company acquisition pricing multiples.

The Officer study initially identified 12,716 company acquisition bids (both successful and unsuccessful) using SDC. The search was conducted to find transactions that occurred between 1979 and 2003. The study then actively eliminated transactions in which SDC merger and acquisition transaction data was incomplete.

In order to measure the private company (and unlisted subsidiary) acquisition discounts, the comparable industry transaction method was used. For this method, Officer formed portfolios of publicly traded acquisition targets to compare to each unlisted target, similar to procedures used in the Kooli study.

Portfolio selection was based on finding (1) public targets in the same two-digit standard industrial classification (SIC) code as the unlisted target, (2) deal value excluding assumed liabilities within 20 percent of the unlisted target deal value and (3) acquisitions that were announced within a three-calendar-year window centered on the announcement date of the unlisted acquisition.

The results of the Officer study, including number of observations per financial metric, are presented in Table 3.

Based on the Officer study results, unlisted targets—private companies and unlisted subsidiaries—are acquired at approximately 15-percent to 30-percent lower transaction multiples relative to comparable publicly traded acquisition targets.

According to Officer, and based on other evidence provided in the study, the study results support the hypothesis that acquisition prices are sensitive to the liquidity needs of the target company owners. As such, the study concluded that selling parties are willing to sell assets at a discount because of liquidity needs. The greater the liquidity needs, the greater the discount indications.

Other Acquisition Studies. Other acquisition approach studies not extensively discussed herein include (1) Block and (2) De Franco *et al*.[6] I only mention these studies in passing because these studies are considered to be similar to other PCD studies.

According to the Paglia study (which is discussed below), the Block study is an extension of the Koeplin study using more current dates—that is, it was conducted over the 1999–2006 time period. The De Franco study is considered to be similar to the Officer study. That is, it uses similar two-digit SIC code matching procedures.

The Block study, as published in 2007, reported PCD indications of 14 percent based on enterprise value-to-book value multiple analyses and 24 percent based on enterprise value-to-revenue multiple analyses. The De Franco study, as published in 2007, reported PCD indications of between 21 percent to 37 percent.

Another acquisition approach study not specifically addressed herein is the James A. DiGabriele study ("DiGabriele study").[7] The DiGabriele study presents a statistical analysis used to investigate the impact of the Sarbanes-Oxley Act of 2002 (SOX) on private company valuation.

According to the DiGabriele study, transaction data suggests that the PCD is greater post SOX than it was pre SOX. Therefore, valuations of private companies were adversely impacted by SOX. According to the study, this impact is generally due to SOX compliance costs. These costs include increased due diligence costs that a public company typically incurs after acquiring a privately held company in order to comply with SOX.

The Multiples Approach

The John K. Paglia and Maretno Harjoto study ("Paglia study") attempted to determine if a PCD can be quantified based on a multiples approach analysis.[8] According to the Paglia study, acquisition multiples studies have weaknesses. The most significant weakness is lack of good matches between private company transactions and public company transactions. In certain acquisition multiples studies, the sample sizes were less than 100 in total count. In certain other studies, the matching criteria employed cast a relatively wide net based on industry classification to establish matches—*e.g.*, relying on two-digit SIC code matching. Another noted weakness is that it is unknown if any of the transactions used for comparison incorporate strategic value.

The Paglia study attempted to address weaknesses of the acquisition multiples approach by (1) identifying a larger group of comparable transactions, and (2) identifying better private company and public company matches using a multiples approach instead of the acquisition approach. This study compares the value multiples derived by (1) public market pricing of publicly traded stocks and (2) private company acquisition transaction pricing.

Paglia Study (2010). The Paglia study's quantification of the PCD is subject to the presumption that publicly traded market prices approximate controlling interest values. This condition is based on the premise presented by Eric Nath.[9] If true, then the merger and acquisition (M&A) transaction values of private companies represent a similar level of value to publicly

traded company values since each value indication is based on control-level pricing indications.

In order to quantify the PCD, or DLOM as Paglia refers to it, the Paglia study relied on the following four analytical procedures.

First, screening criteria were developed to identify privately held company M&A transactions. The Paglia study used the following methodology and screening criteria.

1. Privately held company M&A transactions, as provided in the Pratt's Stats database, occurring between 1993 to 2008
2. M&A company targets with annual net revenues of at least $10 million
3. M&A company targets located in the United States
4. Companies classified as utilities, financial services and other service related companies were excluded

Second, matching criteria were developed to identify publicly traded guideline companies to match to the privately held companies involved in M&A transactions. The Paglia study identified publicly traded companies listed on the AMEX, NYSE and NASDAQ and matched them to privately held companies based on a two-step procedure.

1. First, matching was performed based on industry classification, as represented by six-digit North American Industrial Classification System (NAICS) code matching.
2. Second, financial fundamentals of net sales and EBITDA were used to identify matches.

Based on the matching criteria, the Paglia study identified 674 matched pairs based on annual net sales and 635 matched pairs based on EBITDA.

Third, market value of invested capital (MVIC) pricing multiples to (1) net sales and (2) EBITDA pricing multiples were calculated for the matched pairs.

Fourth, the study compared the matched pairs based on MVIC-to-sales and MVIC-to-EBITDA pricing multiple indications. The differences between the matched pairs yielded DLOM estimates. In general, the Paglia study found that all measures of market multiples—including MVIC/Sales, MVIC/Gross Profit, *etc.*, for private companies were significantly less than the same multiples for publicly traded companies. That finding is generally consistent with the acquisition approach studies. In contrast, the study found that mean and median profitability measures—*i.e.*, return on equity, net profit margins, *etc.*—for private companies were generally equal to or greater than the matched publicly traded businesses.

The following two equations were used to calculate the private company DLOM estimates:[10]

1. DLOMSALE (%) = [1− (MVIC/Sale for private firm) / (MVIC/Sale for public firm)] x 100
2. DLOMEBITDA (%) = [1− (MVIC/EBITDA for private firm) / (MVIC/EBITDA for public firm)] x100

Based on DLOMSALE calculations, private company transaction multiples were 67-percent lower, on average, than the similar publicly traded companies, and 73-percent lower than similar public companies based on median transaction multiple indications.

Based on DLOMEBITDA calculations, private company transaction multiples were 66-percent lower, on average, than the similar publicly traded companies, and 72-percent lower than similar public companies based on median transaction multiple indications.

The Paglia study presented two-digit NAICS industry category sector PCD indications. This information is presented in Table 4.

As presented in Table 4, companies in informa-

NAICS Code - Industry Sector	2 Digit NAICS code (#)	Number of Businesses (#)	PCD DLOM Based on MVIC/Sales (%)	Number of Businesses (#)	PCD DLOM Based on MVIC/ EBITDA (%)
TABLE 4 — PAGLIA STUDY: PRIVATE COMPANY DISCOUNTS ACROSS INDUSTRY SECTORS STUDY RESULTS FOR TRANSACTIONS OCCURRING BETWEEN 1993 -2008					
Mining	18	18	70.40	22	67.00
Construction	22	22	58.97	35	52.37
Manufacturing	31-33	257	71.79	245	76.46
Wholesale Trade	42	46	65.73	47	64.28
Retail Trade	44-45	58	66.65	44	57.43
Transportation	48-49	17	51.81	25	37.42
Information	51	92	88.91	65	83.65
Professional Services	54	84	81.20	51	88.70
Staff Support & Waste Management	56	34	74.10	19	71.43
Healthcare	62	26	43.79	35	80.22
Art & Entertainment	71	4	59.12	4	58.81
Accommodation & Food Service	72	15	62.82	18	76.01
Total Number of Companies		673		610	

tion and professional services sectors had the largest PCD indications. In contrast, companies in the transportation sector had the lowest PCD indications.

In addition to the matched-pairs analysis, the Paglia study examined factors that influence the DLOM. More specifically, the study investigated the influence of size, profitability, financial distress, purchase and purchaser characteristics, market liquidity, market volatility, time period and industry affiliation on observed PCD. In order to study these influential factors, the Paglia study developed the following hypotheses:

1. Larger firms have lower discounts.
2. Private firms with positive profits have lower discounts.
3. Private firms that are bought by strategic buyers have lower discounts compared to those that are bought by financial buyers.
4. Firms exhibiting greater risk of financial distress have higher discounts than those with lower levels of financial risk.
5. Discounts are larger due to decreased liquidity of public markets.
6. Discounts are larger when public markets are more volatile.

A multivariate regression analysis was used to test the Paglia study hypotheses. In general, the regression results support several of the Paglia hypotheses. The results indicated that private firms with (1) a larger book value of assets, (2) positive net income and (3) lower probability of financial distress (that is, firms with higher Altman's Z scores) had significantly lower PCD indications.

In contrast, the regression results indicated that (1) the buyer type (publicly traded company buyer or private company buyer), (2) the transaction type (asset purchase or stock purchase) and (3) the organization type (C corporation or pass-through entity) do not influence PCD indications. Furthermore, the regression results (1) did not support the hypothesis that greater discounts are observed when market volatility increases, and (2) indicated only mild support for greater discounts when market liquidity decreases.

Summary and Conclusion

All studies discussed herein provided evidence of PCDs. These studies identified PCD evidence using the acquisition approach and the multiples approach. Of the listed studies, only the Paglia study employed a multiples approach to estimate the PCD.

As published in 2000, the Koeplin study identified 84 domestic company matched-pair transactions and 108 foreign company matched-pair transactions that occurred between 1984 and 1998. These transactions provided evidence of PCDs of 20 percent to 30 percent for domestic company transactions and 40 percent to 50 percent for foreign company transactions.

As published in 2003, the Kooli study identified 331 private company transactions that occurred between 1995 and 2002.

These transactions provided evidence of PCDs of 17 percent using revenue-based transaction multiple comparisons, 34 percent using earnings-based multiple comparisons and 20 percent using cash flow-based multiple comparisons.

As published in 2007, the Officer study identified various private company transactions that occurred between 1979 and 2003. These transactions provided evidence of PCDs of 15 percent to 30 percent. The Officer study also presented evidence suggesting that the PCD is sensitive to the liquidity needs of the target private company owners. That is, the greater the need for liquidity, the larger the PCD.

The Kooli study and the Officer study were different than the Koeplin study primarily due to company matching (private to public) procedures. That is, the Kooli study and the Officer study used a portfolio matching approach in order to match private companies to a portfolio of public companies.

According to these studies, this matching approach was performed to lessen the potential noise that is often created by relying on only one statistical point of reference. In other words, by relying on only one public company as a reference point, certain differences between the public and private companies can result in unintended analysis indications.

As published in 2010, the Paglia study identified 674 matched pairs based on sales revenue and 635 matched pairs based on EBITDA between 1993 and 2008. These transactions provided evidence of PCDs of 66 percent to 73 percent. The Paglia study used multivariate regression analysis to test certain hypotheses related to the level of PCD. The study found that larger and profitable private firms generally had lower PCD indications.

Collectively, these studies provide evidence that private companies often sell at lower multiples than their public counterparts. These lower multiples are likely influenced by the lack of liquidity/marketability of private company ownership as compared to public company ownership.

Therefore, when valuing a private company, by reference to an otherwise-similar but public company, a DLOM should typically be considered when the public company multiples are not otherwise adjusted. In general, study research suggests that transaction multiples are influenced by subject company size and profitability.

In addition to citing PCD evidence as a factor used to support DLOM decision making, another practical use of the PCD evidence, and more specifically the Paglia study data, is in the context of a market-based valuation approach—primarily the guideline publicly traded company method.

A valuation analyst might consider citing PCD data as means to support the selection of a guideline pricing

multiple to apply to a subject private company financial fundamental. In other words, if guideline publicly traded companies are trading at an average of 10 times EBITDA, an analyst might consider citing the Paglia study as a reference to support a lower-than-average market-based valuation analysis conclusion. ◆

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ENDNOTES

[1] John Koeplin, Atulya Sarin, and Alan C. Shapiro, "The Private Company Discount," JOURNAL OF APPLIED CORPORATE FINANCE, Volume 12 Number 4, Winter 2000.

[2] Enterprise value = number of targeted shares multiplied by offering price plus the book values of (1) short-term debt, (2) straight debt, (3) convertible debt, and (4) preferred stock less marketable securities.

[3] Maher Kooli, Mohamed Kortas, and Jean-Francois L'Her, "A New Examination of the Private Company Discount: The Acquisition Approach." THE JOURNAL OF PRIVATE EQUITY, Summer 2003.

[4] Brav, A., C. Geczy, and P. Gompers. "Is the Abnormal Return Following Equity Issuance Anomalous?" JOURNAL OF FINANCIAL ECONOMICS, 56 (2000), pp. 209–249.

[5] Micah S. Officer, "The price of corporate liquidity: Acquisition discounts for unlisted targets," JOURNAL OF FINANCIAL ECONOMICS, 83, (2007), 571–598.

[6] Stanley Block, "The Liquidity Discount in Valuing Privately Owned Companies." JOURNAL OF APPLIED FINANCE, Fall Winter 2007.
Gus De Franco, Ilanit Gavious, Justin Jin, and Gordon D. Richardson, "Do Private Company Targets that Hire Big4 Auditors Receive Higher Proceeds?" University of Toronto Working Paper, December 19, 2008.

[7] James A. DiGabriele, "The Sarbanes-Oxley Act and the private company discount: An empirical investigation," CRITICAL PERSPECTIVES ON ACCOUNTING, Volume 19 Issue 8, December 2008.

[8] John K. Paglia and Maretno Harjoto, "The Discount for Lack of Marketability in Privately Owned Companies: A Multiples Approach," JOURNAL OF BUSINESS VALUATION AND ECONOMIC LOSS ANALYSIS 5, n. 1 (2010): Article 5.

[9] Nath, Eric W., "Control Premiums and Minority Interest Discounts in Private Companies." *Business Valuation Review*, June 1990, 39–46.

[10] The Paglia study excluded outlier DLOM indications. That is, the study only relied on DLOM indications that fell between zero percent and 100 percent.