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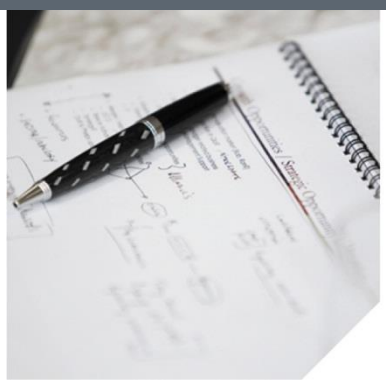

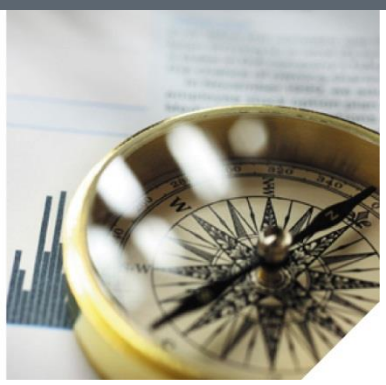

Private company valuations

Discount for lack of marketability and control premium

June 2023

Discount for lack of liquidity/marketability

The discount for lack of marketability ["DLOM"] is defined as an amount or percentage deducted from the value of an ownership interest to reflect the relative absence of marketability as compared with stock exchange-traded shares.

Two general types of empirical studies provide evidence for the existence and magnitude of discounts for lack of marketability, being restricted stock studies and pre-IPO studies.

- *Restricted stock studies* compare the trading prices of a company's publicly held stock sold on the open market with those of unregistered or restricted shares of the same company sold in private transactions. Examples include:
    - The Maher study examined restricted stock purchases made by four mutual funds in the period 1969–73 and concluded that they traded at an average discount of 35.43% on publicly traded stock in the same companies;
    - The Silber study examined restricted stock issues from 1981 to 1988 and found that the median discount for restricted stock was 33.75%;
    - Other studies confirm these findings of a substantial discount, with discounts ranging from 30% to 35%. One study by Bruce Johnson in 1999 found a smaller discount of 20%; and
    - It has been argued that the marketability discounts implied by these studies may be inflated since they are based on small sample sizes, spread out over long time periods, and the standard error of these estimates are substantial. Moreover, the firms that issue restricted stock tend to be smaller, riskier, and less healthy than the typical firm that may warrant discounts for lack of marketability; and

- *Pre-IPO studies* examine the prices of transactions in shares of private entities, compared to the eventual IPO price of the same entities to estimate the premium paid for tradable, marketable shares, and conversely the implied discount for the lack of that marketability. These studies indicate that a range of marketability discounts may be in the order of 32% to 75%. The studies indicate that other factors may affect marketability discounts as well.

The following table and references were obtained from Discount for Lack of Marketability: Job Aid for IRS Valuation Professionals, September 25, 2009.

Empirical Study (citation below)	Time Period Covered	Average Discount %
SEC overall average	1/66 – 6/69	25.8
SEC non-reporting OTC companies	1/66 – 6/69	32.6
Gelman	1/68 – 12/70	33.0
Trout	1/68 – 12/72	33.5
Moroney	1/69 – 12/72	35.6
Maher	1/69 – 12/73	35.4
Standard Research Consultants	10/78 – 6/82	45.0 (median)
Willamette Management Associates	1981 – 1984	31.2 (median)
Silber	1/81 – 12/88	33.8
FMV Opinions, Inc.	1/79 – 4/92	23.0
Bruce Johnson Study	1/91 – 12/95	20.0
Columbia Financial Advisors	1/96 – 4/97	21.0
Columbia Financial Advisors	5/97 – 12/98	13.0

Due to the limitations of these studies summarised above and lack of direct comparability of the companies that form the basis of those studies, marketability discounts in the lower end of those ranges (e.g. 10% to 30%) are often applied to the enterprise value. This range is also supported by the Australian Private Equity and Venture Capital Association guidelines for the valuation of private equity investments, which states:

The Valuer might consider that under specific circumstances the Marketability Discount is not appropriate and should not be applied. When a discount is applied, the Valuer should consider all relevant factors in determining the appropriate Marketability Discount in each particular situation. A discount in the range of 10% to 30% (in steps of 5%) is generally used in practice, depending upon the particular circumstances.

- *Option Pricing Models* - The numerous option pricing models have been designed to address the large amount of "noise" in the restricted stock data and to provide a framework which can be extended over longer than 6 months. The OPM models has two key inputs - volatility of the underlying illiquid stock and the time-period to the liquidity event.

  The premise of the model is that the cost to purchase a stock option is related to the DLOM i.e. If the illiquid stock in a public company is bundled with a put option, requiring a third party to purchase the stock, then it has the benefits of liquidity. This means that the price of the liquid stock, less the cost of the put option, should equal to the value of the illiquid stock. The cost of the put option should therefore equate to the discount for lack of marketability.

  The following commonly known OPMs have emerged over the years for estimating the DLOM:

  - The Chaffe model – As per AICPA valuation handbook, the protective put method for estimating a discount for lack of marketability was first described by David Chaffe in 1993, and it serves as the foundation for other option-based methods. In this method, the discount is estimated as the value of an at-the-money put with a life equal to the period of the restriction, divided by the marketable stock value. The strength of Chaffe model is that it is based on well-known Black-Scholes-Merton (BSM) option theory; may be more representative of restricted stock studies at lower volatilities than other OPMs.
  - The Finnerty model - Building on these previous models, in 2001, John Finnerty proposed a model that assumes the investor does not possess special market timing ability and would be equally likely to exercise the hypothetical liquid security at any given point of time. There have been various iterations of the Finnerty model: the 2012 model appears to find favour with much of the business valuation community.
  - Ghaidarov Average Strike Model - Ghaidarov developed an average-strike Asian put option model in the course of critiquing the original Finnerty model. Further, this is the first model that complies with all of the expected rules relating to a DLOM Model if no dividends are assumed: (i) it begins at nil% and extends to 100% over time but never exceeds 100%. (ii) It also increases throughout all time periods and volatilities, but at a reducing rate.
  - Ghaidarov Forward Starting Put Option Model - Ghaidarov has built this model using an exotic option in the markets, namely a forward starting put option. Such an option can be priced at the beginning: the option holder is free to choose to select the date at which the strike price is fixed at any time during the period of illiquidity. The strike price of the option is equal to that day's market price of the share. Ghaidarov has stated that liquidity gives the investor the flexibility to respond to the market as it moves from day to day. A lack of liquidity is the absence of that flexibility. This means that illiquidity as a lack of flexibility is fully recognised in the forward starting put option model. The strike price is not the starting price (Chaffe), the highest price (Longstaff) or the average price (Finnerty and Ghaidarov average strike). The option holder is free to choose the day on which the strike price is fixed.

The following table presents the indicated DLOMs estimated from the various option pricing methods assuming dividend rate of 0.0 percent and risk-free rate of 2.0 percent (Chaffe) for 5-year time horizon.

Volatility – 5 years	30%	40%	50%
Chaffe	20.5%	28.3%	35.8%
Finnerty	14.8%	19.0%	22.7%
Ghaidarov Average	15.6%	21.0%	26.6%
Ghaidarov Forward	26.3%	34.5%	42.4%

Control premium

Control premium is defined as an amount or a percentage by which the pro rata value of a controlling interest exceeds the pro rata value of a non-controlling interest in a business enterprise to reflect the power of control.

Peloton has reviewed premium for control studies based on transactions occurring in Australia and internationally.

RSM conducted a control premium study in 2021 based on 605 successful takeovers initiated from 1 July 2005 through to 31 December 2020. The study found that the implied control premium at 20 days pre-bid for the Australian market was:

- An average of 34.7%; and
- A median of 27.5%.

The RSM study found that the industry sector significantly influences the control premium required to complete a successful transaction. Sectors that are traditionally priced and valued on upside potential revealed considerably higher premiums (e.g., health care and telecommunications, IT and software) than those where valuations are more typically limited to asset base (e.g., real estate and financial institutions).

Industry	Number of Transactions	20 day pre-bid
Metals & Mining	161	36.6%
Energy	68	39.6%
Health Care	37	48.6%
Real Estate	39	14.4%
Banks and Diversified Financials	47	26.4%
Industrials	60	36.1%
Telecommunications, IT & Software	64	44.1%
Other	125	29.6%

Further, the RSM study also found that control premiums vary considerably based on the level of existing shareholding in the target, with higher premiums being paid when acquirers have a material stake in the target. When buyers already hold between 20% and 50% of the target's equity, the average control premium is 35.3% and the median is 30.0%. In contrast, when the acquirer has a lesser or no shareholding, the average premium is 33.2% and the median is 25.0%.

Deloitte conducted a study of premiums paid in Australian transactions completed between 1 January 2000 and 31 December 2011. This study was conducted by Deloitte Corporate Finance staff for internal research purposes. The merger and acquisition data were sourced from Bloomberg and Thomson Reuters and yielded 490 transactions that were completed during the period under review. The study found that the implied control premium for the Australian market was:

- An average of 34%; and
- A median of 29%.

Mergerstat conducted a study of transactions in the United States of America and internationally where 50.01% or more of a company was acquired. Transactions were analysed for the 12 months ending 31 December 2012. The study found that the implied control premiums were:

- An average of 55.8%; and
- A median of 37.1%.

The Mergerstat control premium findings are higher than the Australian studies conducted by RSM and Deloitte. This may be due to the exclusion of transactions that had negative premiums. Further, transaction studies potentially include 'special value' that a specific acquirer may pay due to synergies that are not available to other market participants. Accordingly, the Mergerstat study may overstate the control premium.

A summary of these studies is included in the table below.

Study	Average control premium	Median control premium
RSM	34.7%	**27.5%**
Deloitte	34.0%	**29.0%**
Mergerstat	**55.8%**	**37.1%**

Peloton also reviewed independent expert reports issued by valuation firms over the three years to 2013.

Based on our research, the typical control premium ranges quoted in the independent expert reports are summarised below.

Independent Expert	Control premium range	Control premium midpoint
PwC	20%-40%	**30%**
KPMG	25%-40%	**32.5%**
Ernst & Young	20%-40%	**30%**
Deloitte	20%-40%	**30%**
Grant Samuel	20%-35%	**27.5%**
Lonergan Edwards & Associates	30%-35%	**32.5%**
BDO	25%-35%	**30%**
Grant Thornton	20%-40%	**30%**

Annexure 1 – DLOM Sensitivities

The range of various DLOM model outputs based on varying term and volatilities are shown below.

Chaffe Model - Indicated DLOM Based on the Chaffe Put Option Model based on dividend yield of 0.00% and Risk-free rate of 2.00%.

Holding Period (T, Years)	Volatility (σ)			
	25%	**50%**	**75%**	**100%**
0.25	4.6%	9.5%	14.4%	19.2%
0.50	6.2%	13.1%	19.9%	26.6%
0.75	7.3%	15.7%	23.9%	31.8%
1.00	8.2%	17.8%	27.1%	36.0%
2.00	10.5%	23.6%	35.9%	47.1%
3.00	11.9%	27.2%	41.3%	53.6%
4.00	12.8%	29.8%	45.0%	57.7%
5.00	13.4%	31.7%	47.6%	60.2%

Finnerty Put Option - Indicated DLOM Based on the Finnerty Average-Strike Put Option Model based on dividend yield of 0.00%.

Holding Period (T, Years)	Volatility (σ)			
	25%	**50%**	**75%**	**100%**
0.25	2.9%	5.7%	8.5%	11.2%
0.50	4.1%	8.0%	11.9%	15.5%
0.75	5.0%	9.8%	14.4%	18.5%
1.00	5.7%	11.2%	16.3%	20.9%
2.00	8.0%	15.5%	21.8%	26.6%
3.00	9.8%	18.5%	25.3%	29.5%
4.00	11.2%	20.9%	27.5%	30.9%
5.00	12.5%	22.7%	29.1%	31.7%

Ghaidarov Average Strike Model - Indicated DLOM Based on the Ghaidarov Average-Strike Put Option based on dividend yield of 0.00%.

Holding Period (T, Years)	Volatility (σ)			
	25%	**50%**	**75%**	**100%**
0.25	2.9%	5.8%	8.7%	11.6%
0.50	4.1%	8.2%	12.3%	16.5%
0.75	5.0%	10.0%	15.1%	20.4%
1.00	5.8%	11.6%	17.5%	23.7%
2.00	8.2%	16.5%	25.2%	34.2%
3.00	10.0%	20.4%	31.2%	42.7%
4.00	11.6%	23.7%	36.5%	50.1%
5.00	13.0%	26.6%	41.3%	56.5%

Ghaidarov Forward Starting Put Option Model - Indicated DLOM Based on the Ghaidarov Forward Starting Put Option based on dividend yield of 0.00%.

Holding Period (T, Years)	Volatility (σ)			
	25%	**50%**	**75%**	**100%**
0.25	5.0%	9.9%	14.9%	19.7%
0.50	7.0%	14.0%	20.9%	27.6%
0.75	8.6%	17.1%	25.5%	33.5%
1.00	9.9%	19.7%	29.2%	38.3%
2.00	14.0%	27.6%	40.4%	52.0%
3.00	17.1%	33.5%	48.4%	61.4%
4.00	19.7%	38.3%	54.7%	68.3%
5.00	22.0%	42.4%	59.8%	73.6%

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