Business valuations using the Backsolve Method

Valuation Advisory

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Backsolve Method: The silver bullet for valuing a startup's common stock

Valuation of startups has always been vexing, especially when most valuations are based on future cash flows and the companies lack a concrete business plan or operational history. In the absence of these building blocks and veritable theoretical concepts, an appraiser looks for other quantifiable metrics such as competitive advantage, on-paper revenue growth and scalability, and eventual profitability.

The Backsolve approach, a recent solution on the horizon, seems to address several concerns of appraisers. It is an objective method, using which they can conduct a reliable valuation of the common stock.

The method is considered the most dependable indicator of current value since it benchmarks the original issue price (OIP) of the company's latest funding transaction. This is based on the premise that the OIP is a result of rational negotiations and comprehensive due diligence by sophisticated financial investors, inherently making it a fair market valuation.

It is rightly called the "Backsolve" method as it first computes the value that can be allocated to each security (including the issuances of the latest round) such that the allocated value per share (new issuance/latest preferred round) is exactly equal to the OIP. The equity value derived as a result of this iterative process to match the allocated value to the OIP is the implied equity value of the company as of the valuation date.

How does the method work?

The Backsolve method works on the principles of the Option Pricing Model (OPM).

Capital Structure Analysis

The first step entails detailing securities that are a part of the company's capital structure, such as preferred shares, common stock, options, warrants, convertible notes, and SAFE notes.

Each security comes with unique rights and preferences. These rights and preferences can be economic or non-economic. Economic rights such as liquidation preference, participation rights and conversion rights affect the value of the security. Non-economic rights, including voting rights, board seat, and access to financial statements, do not affect the value directly but have an impact on the company's functioning.

Some of the key economic rights are:

Liquidation preference: It helps in determining who gets priority and to what extent in terms of payment when the company is liquidated.

Participation rights: Security holders with participation rights receive their full liquidation preference amount and then participate in the residual proceeds that are distributed to shareholders (such as common stock holders) on pro rata basis.

Conversion rights: Preferred/convertible debtholders may have the right to convert their stock to common stock at a pre-determined price.

These rights help determine the value attributable to each class of shares.

Example: Say a startup with an equity value of $100 mn has a total of 20 mn shares outstanding (10 mn preferred and 10 mn common). Going by basic mathematics, it seems that each share is worth $5 (100/20), but that is not really the case in almost all venture stage companies. This is primarily because preferred shareholders may have a liquidation preference (LP) that gives them priority economic rights over other shareholders. With an LP right, common shareholders would see any return only and only if preferred shareholders receive their LP. Considering the differential claims held by different securities on a company's cash flows, it would be detrimental to assume all securities have the same value. This fundamental concept of allocating the equity value among various classes of securities is extremely important with regard to value allocations.

Waterfall Analysis

The rights and preferences of outstanding securities determine various "breakpoints" for the Valuation.

What are **breakpoints**?

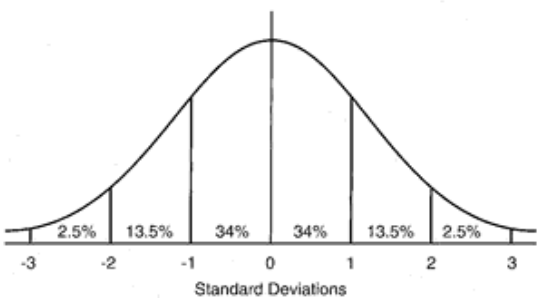
At any given time, a venture capital company faces either of the two scenarios: Liquidation or Going Concern. **Liquidation** assumes imminent dissolution (unsuccessful exit) where there is really no value left for the common stock, whereas **Going Concern** assumes normal operations in the hope of a futuristic M&A/IPO (successful exit) which might generate returns for all shareholders. In such cases, the company's equity value is computed by capturing multiple futuristic scenarios (breakpoints) that represent the equity value at that point in time under various circumstances. Essentially, Breakpoints represent different equity values of the company when different classes of shares start deriving value.

For example, in the scenario below, until the company's equity value is $5,873 or below, only Series B preferred shareholders would get any value due to their LP over other classes of securities. Alternately, a Series A shareholder would consider converting to common stock only when the equity value surpasses $8,805.

	Event description	Participating Class	Participating shares	Break Point
1	Enterprise Value is zero	None	-	0
2	Liquidation Preference – Series B	Series B	2,000	5,873
3	Liquidation Preference – Series A	Series A	1,000	6,988
4	Exercise of options issued @$0.2	Common Stock	1,000	7,188
5	Exercise of options to be issued @$0.3	Common Stock, Options @$0.2	1,500	7,388
6	Conversion of series A	Common Stock, Options @$0.2, Options to be issued at $0.3	1,800	8,805
7	Conversion of series B	Common Stock, Options @$0.2, Options to be issued at $0.3, Series A	2,800	13,906
8	Thereafter	All Classes	4,800	-

Option Pricing Model

OPM is a commonly used method for allocating equity value between different classes of shares such as common and preferred. OPM, a forward-looking approach, is appropriate for use when the range of future possible outcomes is so difficult to predict that forecasts would be highly speculative.



OPM is based on quantitative technique and specifically relies on the Black-Scholes-Merton model. It assumes normal distribution as indicated in the figure below. Under this method, we calculate the value of different securities based on their rights and preferences in the overall company, assuming a liquidation event some years from now.

OPM takes into account the different rights discussed earlier: LP, participation beyond liquidation preference, and conversion. The method considers common stock as a call option on the equity value, as the common stock only receives returns if the firm's value exceeds the LP of the preferred series. A call option is the right to buy the underlying security (the company's equity) on a future date at a predetermined price. The call option has two important components: the **Strike**/**Exercise** price (the predetermined price at which the underlying can be purchased) and the **Spot** price (the current price of the underlying security in the market).

A call option receives a positive payoff only when the spot price exceeds the strike price. In simple terms, if you have entered a call option to buy the security at a predetermined price of $9 and the security is currently priced at $10, you have a positive payoff of $1. This payoff represents the intrinsic (actual) payoff of the call option. Along with the intrinsic payoff, the call option also derives value by the virtue of time. This is primarily driven by

the “possibility” that the underlying security may increase in value over time. The OPM accurately captures the intrinsic as well as speculative value associated with holding the option.

Under OPM, breakpoints (future events: Participation, Conversion) act as the Strike price, while the company’s equity value as of today is the Spot price.

The **Black-Scholes OPM** values a security based on five factors: value of the underlying asset (equity value as of today), strike price (breakpoints), volatility, dividend yield, and time to liquidation (years).

Black Scholes Option Pricing	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Value of the underlying Asset (£)	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Strike Price (£)	0	5,873	6,988	7,188	7,388	8,805	13,906
Volatility	60%	60%	60%	60%	60%	60%	60%
Dividend yield	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Time to liquidation (years)	2	2	2	2	2	2	2
Risk-free Rate	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Value as an option on EV	10,000	5,228	4,630	4,531	4,459	3,824	2,335
Incremental value of options	**4,772**	**598**	**98**	**72**	**636**	**1,488**	**2,335**

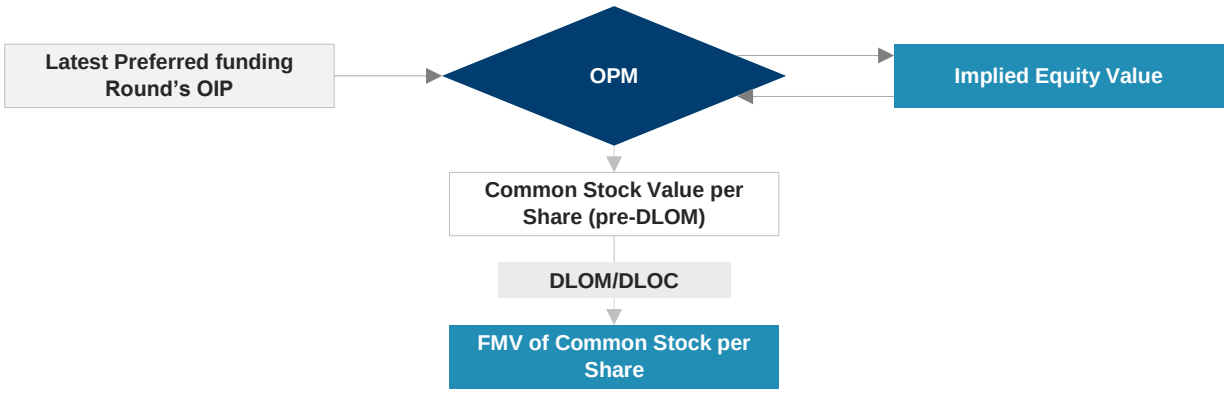
The value derived for each break point is allocated among the various equity classes participating in that break point to arrive at the total value attributable to each security.

Classes	# of shares		Value	Per Share (£)	% of EV
Series A Preferred Stock	1,000	$	1,616	1.62	16.16%
Series B Preferred Stock	2,000	$	5,745	2.87	57.45%
Class A Common Stock (With Voting Rights)	600	$	911	1.52	9.11%
Class B Common Stock (Without Voting Rights)	400	$	607	1.52	6.07%
Options @$0.2	500	$	710	1.42	7.10%
Options to be issued @$0.3	300	$	411	1.37	4.11%
Total	**4,800**		**10,000**		**100.00%**

Implied Equity Value

The final step in the process is to Goal Seek the company’s equity value such that the value arrived at for the latest funding preferred stock is equal to the actual OIP of the funding round. Private company common stock may also be subject to additional discounts for lack of marketability (DLOM) and lack of control (DLOC), both of which can be quantified using a set of assumptions specific to the company and its minority shareholders.

The Backsolve Approach



Given its objectivity, it is no surprise that Backsolve approach is the preferred appraisal method used by auditors and tax authorities for financial reporting and tax assessments (option grants). As a market-based approach, it has proven to be the most reliable indicator of fair value for companies that do not have defined quantifiable metrics for traditional valuation.

About Aranca

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