

A Primer on Valuing Common Stock per IRS 409A and the Impact of FAS 157

By

Stanley Jay Feldman, Ph.D.
Chairman and Chief Valuation Officer
Axiom Valuation Solutions



201 Edgewater Drive, Suite 255
Wakefield, MA 01880
781-486-0100
www.axiomvaluation.com
stan@axiomvaluation.com

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Introduction

This Primer is organized in the form of questions that company Boards often ask when considering establishing the value of their common stock for purposes of setting the strike price for employee stock options consistent with the fair value standard, Financial Accounting Standard 157, and the requirements of IRS 409A. 409A generally relates to issues surrounding deferred compensation with the focus on determining whether the compensation received is in fact deferred and therefore not subject to current tax and associated late penalties. In contrast, the 409A valuation issue is related to whether an employee received a stock option award where the strike price is set at a level below fair value so the intrinsic value of the award is greater than zero. To the extent this is the case, the award is no longer treated as deferred compensation since the employee has an immediate gain; the difference between the fair value and the below fair value strike price. Establishing the fair value strike price, as it turns out, is no trivial matter. In most instances the firms needing to have their common stock valued have capital structures that include common stock and one or more series of convertible preferred stock. The essential exercise for valuing the common stock is first to determine the total value of equity and then determine the percentage of equity allocated to the components of the capital structure- various series of preferred, common, warrants and options. The AICPA has established guidance for this allocation based on contingent claims modeling.

1. When Does a 409A Valuation Need to Be Performed?

Answer: When a firm grants stock options, the strike price for these option grants must be at fair value.

2. If the capital structure of the firm includes preferred stock and common, does setting the value of common equal to a percentage of the preferred issue price satisfy the 409A standard?

Answer: The short answer is no. Prior to 409A, early stage firms routinely established the common price at 10% of the preferred issue price. The logic for this formula driven valuation was based on the framework that if the firm were liquidated, most if not all of the proceeds would accrue to the preferred stockholders and there would be little or nothing left for the common. Hence, the common is only worth something at a future liquidity event, which at the valuation date was only known with a high degree of uncertainty. Since the probability of the liquidity event occurring is quite low, the present value of the payoff to common at the valuation date is virtually zero. The IRS concluded that the application of this framework to the valuation of common was not appropriate for at least two reasons. The first related to the liquidation model used. The standard of value is not liquidation but an on-going business. Second, if the business was on-going, and it had a significant growth opportunity, which apparently it had since professional investors were exchanging cash for preferred stock to presumably take advantage of this opportunity, then a portion of this opportunity would potentially accrue to the common stock. Even if the probability of reaching this opportunity is very small but the opportunity itself is very significant, then the value of common is not necessarily very small. However, whether it is or is not is an empirical question that can only be established by going through a substantive valuation exercise performed by a valuation expert. In short, assuming the liquidation model framework and using the 10% rule no longer meets the 409A valuation standard.

3. Does 409A offset the incentive based nature of having a low common share price relative to the latest preferred issue price?

Answer: As a general rule, the percentage of a firm's equity value that is allocated to common will be far less than its ownership percentage. This emerges from the fact that preferred stock has liquidation preferences, typically has a convertibility option, and is ahead of common in the capital structure. While it also the case that in most instances the value of common will exceed the value calculated if the 10% rule is applied, it is the rare case that the strike price is so high that employees would feel that the dollar cost of exercise is prohibitive. From this perspective the objective of aligning interests of employees and management through encouraging the exercise of employee stock options may not be materially affected by 409A.

4. When conducting a 409A valuation, which valuation approaches are acceptable?

Answer: Exhibit 1 below from the AICPA practice aid shows the crosswalk between the stage of business development and valuation methods.

Exhibit 1: Valuation Approaches for Different Stages of Business Development

Valuation Approach	Stages or Circumstances For Which Approach Is Typically Appropriate or Not Appropriate
Market	The market approach typically increases in applicability and feasibility as an enterprise progresses through the middle stages and enters later stages of its development (for example, as an enterprise passes through Stages 3 through 6). It is unlikely that comparable enterprises with readily determinable fair values will be identified during earlier stages. Investments by friends, family, or angels in shares of the enterprise's stock, which typically occur during earlier stages, are unlikely to be reliable indicators of fair value. All investments in shares of the enterprise's stock should be examined to determine any synergistic value that may be associated with those investments (which would ordinarily be factored out of a fair value determination; see paragraph 59).
Income	The income approach typically is applied to later-stage enterprises (for example, Stages 3 through 6) as opposed to early-stage enterprises because there is a greater likelihood at later stages of there being a financial history on which to base a forecast of future results.
Asset-based	<p>Historically, the asset-based approach (using replacement cost) has been applied primarily to enterprises in Stage 1 and some enterprises in Stage 2. The asset-based approach would typically be applied under any of the following circumstances:</p> <ul style="list-style-type: none"> • There is a limited (or no) basis for using the income or market approaches. That is, there are no comparable market transactions, and the enterprise has virtually no financial history and consequently is unable to use past results to reasonably support a forecast of future results. • The enterprise has not yet developed a product, although a patent application may be pending. • A relatively small amount of cash has been invested. <p>The use of the asset-based approach is generally less appropriate once an enterprise has generated significant intangibles and internal goodwill. The generation of these intangibles often starts to gain momentum in the middle stages of the enterprise's development and continues to build through the later stages.</p>

409A valuations are typically done in three steps: 1) calculate the enterprise value at the valuation date, 2) subtract debt and other long-term liabilities from the enterprise value to obtain the value of equity, and 3) allocate the resulting equity to each component of the firm's capital structure. For most firms, an enterprise valuation based on an income method, discounted cash flow for example, and /or a comparable firm method, multiples of revenue or cash flow, is most commonly applied. For very early stage firms that have little or no revenue, R&D intensive and biotech firms that are effectively development companies developing new products to satisfy a large commercial market well into the future, an option pricing model is likely to be the most suitable model to use. In the case of biotech firms, there are many that are public that still lose money and are expected to do so for some time. Many of these firms have commercial businesses or close to having one along with R&D intensive operations. Using these firms as guideline companies for valuation purposes will generally yield enterprise values that are too large and not consistent with the higher risk profile of the firm being valued.

5. What is the relationship between enterprise value and preferred and common stock value?

Answer: Exhibit 2 shows the relationship between enterprise value and the value of preferred and common equity.

Exhibit 2: Relationship between Enterprise and Common Stock Value

Concept	Valuation Methods	Comment
Enterprise Value (EV)	Discounted Cash Flows (DCF) Public Comparables, Private Firm Transactions	Management Cash Flow Projections; Weighted Average Cost of Capital; Market Participant Assumptions
Market Value of Debt (MV of Debt)	Axiom Credit Rating Model Spread over Treasuries	Hedgefundvalue.com Reuters Credit Spread: BondsOnline
Value of Equity before Liquidity Adjustment	EV - MV of Debt	
Value of Illiquidity for Equity	Put Option for Equity: Discount for lack of liquidity when DCF & Public Comps are used; Value based on private firm transaction does not need to be adjusted for lack of liquidity but does have to be adjusted for control so a minority value results.	
Minority Equity Value Liquidity Adjusted	EV - MV of Debt - Put Option for Equity	
	↓	
Value of Convertible Preferred Stock, Common Stock, Employee Stock Options and Warrants	Contingent Claims Model (CCM)	AICPA Practice Guide: Valuation of Privately-Held Equity Securities Issued as Compensation

Since the equity in question does not trade in a liquid market, its value must be discounted for lack of liquidity. To the extent there are restrictions on transfer, a discount for lack of marketability may also be added. The size of this discount depends on the type and extent of these restrictions. A liquidity discount is best measured using option pricing theory where the value of an at-the-money put is the price of illiquidity. The determinants of the liquidity option are term and volatility. Term of the option is the expected time it would take to sell the security in a normal financial environment. Being able to access the professional market- hedge and private equity markets for example- results in an expected time to sale to be far shorter than if access were not possible. Volatility is best measured using the median or average volatility of comparable public firm comparable stock return data. The volatility measure for each firm should be de-levered, the unlevered volatility calculated, and the average or median of the firm unlevered volatilities calculated. This value should then be re-levered using the firm's optimal capital structure used to calculate the weighted average cost of capital. The example below indicates the relationship between enterprise value, the market value of debt, and the liquidity adjusted value of equity.

Exhibit 3: Calculating the Liquidity Adjusted Value of Equity

Concept	Value	
Enterprise Value (EV)	\$7,000,000	
Market Value of Debt (MV of Debt)	\$911,618	
Value of Equity before Liquidity Adjustment	\$6,088,382	
Value of Illiquidity for Equity	\$1,145,176	
Minority Equity Value Liquidity Adjusted	\$4,943,206	
↓	↓	
Value of Convertible Preferred Stock, Common Stock, Employee Stock Options and Warrants	Contingent Claims Model (CCM)	

Market Value of Debt								
Principal		\$1,000,000						
Interest Rate		7.75%						
Years to Maturity		7 Years						
Cost of Debt		8.30%						
Year	0	1	2	3	4	5	6	7
Cash Flows		\$77,500	\$77,500	\$77,500	\$77,500	\$77,500	\$77,500	\$1,077,500
PV Index		0.92	0.85	0.79	0.73	0.67	0.62	0.57
PV of Cash Flows		\$71,560	\$66,076	\$61,012	\$56,336	\$52,019	\$48,032	\$616,621
Market Value of Debt Before Liquidity Adjustment								
Put Option	\$60,039							
Market Value of Debt After Liquidity Adjustment	\$911,618							

Year	0	1	2	3	4	5	6	7
Cash Flows		\$77,500	\$77,500	\$77,500	\$77,500	\$77,500	\$77,500	\$1,077,500
PV Index		0.91	0.83	0.76	0.69	0.63	0.58	0.53
PV of Cash Flows		\$70,752	\$64,591	\$58,967	\$53,832	\$49,145	\$44,866	\$569,465
Market Value of Debt After Liquidity Adjustment	\$911,618							
IRR	9.54%							

Since debt is illiquid, we have discounted its value for lack of liquidity. The discount is developed using option pricing theory as before but in this case the strike price and the value of the underlying are set equal to the debt's liquid market value. Using market participant assumptions about return volatility of the return on debt, the value of the put is the price a market participant would be willing to pay to protect its decline in value, i.e. the price of illiquidity.

6. Are the methods noted above appropriate when a new financing has occurred around the valuation date?

Answer: Financial Accounting Standard 157 establishes a valuation hierarchy. FAS 157 guidance indicates that the primary determinant of value is a recent fair value transaction (not a distressed sale) at or around the valuation date for an equivalent or like security or entity. If the financing round in question is a flat round and there are no new investors, then this may be a capital call that does not reflect fair value. For example, a capital call

often emerges when benchmarks are not met and existing investors are putting more capital in at the last transaction price. If new investors come to the table, the likelihood is that they would want a better deal. Hence, transactions like these generally do not reflect fair value but one needs to understand the facts and circumstances underlying the transaction to make the proper judgment. These comments notwithstanding, values emanating from valuation models or other valuation metrics yield results that are inferior to a fair value transaction. In cases where an acquisition or IPO is a high probability event but the short-term timing is uncertain, then this information is the primary determinant of value. If the value is driven off an IPO scenario then the calculated equity needs to be reduced for lack of liquidity. In the case of an acquisition, the value should reflect the firm's fair value reduced for lack of control, lack of marketability and liquidity since it is the illiquid minority equity value one needs to calculate for 409A purposes. Issues of illiquidity, lack of marketability and control are complex and subject to much debate. Peer reviewed research appears to suggest that liquidity and marketability discounts are not likely to exceed 20%. Calculating discounts for lack of control are likely to be even more complex since one needs to calculate what a market participant would pay for being able to control how the assets of the firm are deployed. One way to get a handle on this is to calculate the value of a call option on the firm's equity. This is the additional value an informed market participant would be willing to pay to obtain control of the firm. The expected acquisition price less the control premium, the value of debt and other long-term liabilities yields the minority value of the firm's equity prior to adjustment for lack of liquidity.

7. Does a new preferred stock financing meet the standard of a new financing for the purpose of valuing a firm's common stock?

Answer: When a firm undertakes a new financing of any type, including a debt financing, it has direct implications for the value of common equity. When a firm issues preferred stock, one can use its financing price to both determine the value of total equity implied by the financing and how much of the equity is allocated to previously issued securities including various rounds of preferred and common stock.

8. The AICPA suggests using a contingent claims model (CCM) to allocate total equity to the various components of the capital structure. Why?

Answer: The basic idea is that the fair value of common should both reflect the growth opportunity and the probability of achieving it. A contingent claims model allows for this.

9. What is a contingent claims model?

Answer: CCM treats the value of each component of a firm's capital structure as having a claim on an entity's expected future cash flows. Let us assume, based on what we know today, that there is a set of probabilities associated with future liquidity events at various take-out prices. Assume that the capital structure only contains non-dividend paying convertible preferred stock and common equity which does not pay a dividend. At

each take out price, funds received by common shareholders are equal to the equity value less proceeds to the preferred shareholders. These proceeds will vary depending on the size of the liquidation preference and cash received based on preferred shareholders converting. Preferred shareholders will only convert if what they receive exceeds their liquidation preference. If we multiply each probability times the take-out price and subtract distributions to preferred shareholders, what results is the residual distribution to existing common shareholders. If we then discount these residual payments by the risk free rate and sum the expected payments to common shareholders, we then arrive at the value of common. This common stock payoff matrix is equivalent to the pay off from an option that the common shareholders have on the equity of the firm with a strike price equal to the preferred liquidation preference less the value of the preferred shareholders convertibility option, which is the value that common shareholders have to give up to the preferred shareholders when the latter convert. The convertibility option's strike price is equal to the preferred stock issue price which implies that preferred shareholders will convert to common when the common value per share is equal to or greater than the issue price. Hence CCM implies the following relationships:

- a. $\text{Equity value} - \text{common call value} = \text{Value of Preferred liquidation preference}$
- b. $\text{Common call option} - \text{Preferred conversion option} = \text{Value of common}$
- c. $\text{Value of preferred} = \text{Value of liquidation preference} + \text{Preferred conversion value}$
- d. $\text{Value of equity} = \text{value of common} + \text{value of preferred} = \text{Common call option} - \text{Preferred conversion option} + \text{value of liquidation preference} + \text{Preferred conversion value} = \text{Common call option} + \text{value of liquidation preference}$

In the example below, the capital structure includes two series of convertible preferred in addition to common stock and previously issued employee stock options.

Demo Equity Allocation: Contingent Claims Model

Valuation Date: 12/31/2008

Capital Structure

Row	Column	A	B	C	D	E	F	G
	Share Name	Share Number	Exercise Price	Liquidation Preference	Conversion	Liquidation Order	Time to Maturity (Days)	Risk Free Rate
1	Common Stock	1,354,528					1826	1.55%
2	Preferred Series A	422,073	\$2.25	\$2,104,028	1:1	1	1826	1.55%
3	Preferred Series B	557,796	\$5.00	\$5,935,866	1:1	1	1826	1.55%
4	\$5.26 Options	16,000	\$5.26				1826	1.55%
5	Total	2,350,397		\$8,039,894				
6	Source	Case Demo	Case Demo	Case Demo	Case Demo	Case Demo	Case Demo	Treasury rate for corresponding TTM

Strike Prices

Row	Strike Price	Breakpoint	Concept	Source
7	\$0	0	Preferred A and B claim the whole equity	Axiom
8	\$8,039,894	1	Payoff Liquidation Preference of A and B	Cell 2C + Cell 3C
9	\$9,933,218	2	Preferred Series A exercise	Cell 3C + Cell 2B * Sum of Cell (1A to 2A)
10	\$11,671,983	3	Preferred Series B exercises	Cell 3B * Sum of Cell (1A to 3A)
11	\$12,363,086	4	\$5.26 Options exercise	Cell 4B * Sum of Cell (1A to 4A)

Black Scholes Models

Row	Column	A	B	C	D	E	
	Concept	Preferred A and B Liquidation Preference	Common Call Option	Preferred Series A exercise	Preferred Series B exercises	\$5.26 Options exercise	Source
1	Breakpoints	0	1	2	3	4	
2	Equity Value Liquidity Adj.	\$4,943,206	\$4,943,206	\$4,943,206	\$4,943,206	\$4,943,206	
3	Strike Price	\$0	\$8,039,894	\$9,933,218	\$11,671,983	\$12,363,086	
4	Volatility	48%	48%	48%	48%	48%	
5	Term (days)	1826	1826	1826	1826	1826	
6	Risk Free Rate	1.55%	1.55%	1.55%	1.55%	1.55%	Treasury Rate for Corresponding TTM
7	Dividend Yield	0%	0%	0%	0%	0%	
8	Call Value	\$4,943,206	\$1,464,247	\$1,194,073	\$1,005,628	\$942,575	
9	Value between calls	\$3,478,959	\$270,174	\$188,445	\$63,053	\$942,575	Differences between Adjacent Call Values

Ownership % Allocation

Row	Share Name	Value % Allocation at Each Breakpoint				
10	Common Stock	0%	100%	76%	58%	58%
11	Preferred Series A	26%	0%	24%	18%	18%
12	Preferred Series B	74%	0%	0%	24%	24%
13	\$5.26 Options	0%	0%	0%	0%	1%
14	Total Ownership	100%	100%	100%	100%	100%
15	Source	Value % based on preferred A and B's liquidation preference	100% allocated to common stock	Ownership % between common and preferred A	Ownership % among common, preferred A and B	Ownership % among all outstanding securities

Value Allocation

Row	Share Name	Value Ownership Allocation at Each Breakpoint (Row 9 * Value % Allocation)					Value	Value/Share
15	Common Stock	\$0	\$270,174	\$143,675	\$36,586	\$543,204	\$993,640	\$0.73
16	Preferred Series A	\$910,438	\$0	\$44,769	\$11,400	\$169,283	\$1,135,871	\$2.69
17	Preferred Series B	\$2,568,521	\$0	\$0	\$15,066	\$223,692	\$2,807,279	\$5.03
18	\$5.26 Options on an As Converted Basis	\$0	\$0	\$0	\$0	\$6,416	\$6,416	\$0.40
19	Total Value	\$3,478,959	\$270,174	\$188,445	\$63,053	\$942,575	\$4,943,206	

The analysis starts with the firm's equity value which is shown in Exhibit 3. This value is then allocated among the components of the capital structure. For example, if the value of equity represents the total of all capital structure claims, then the difference between this total and the call option with an exercise price equal to the liquidation preference of preferred A and B belongs to the preferred A and B shareholders. This call option is owned by the common shareholders. The value of the common call less the value of preferred A's convertibility option, represents the portion of value that is split between the common (76%) and preferred A shareholders (24%). The example above shows how the remainder of the equity pie is split.

The table above also indicates the sources of value for each component of the capital structure. Preferred B receives most of its value from its liquidation preference, while preferred A receives a relatively larger share of its value from the fact it can convert to common when the value of equity rises sufficiently. In contrast, common's value emanates only from the firm's growth opportunity.