

A Primer on Valuing Common Stock per IRS 409A and the Impact of Topic 820 (Formerly FAS 157)

By

Stanley Jay Feldman, Ph.D.
Chairman and Chief Valuation Officer
Axiom Valuation Solutions
May 2010



201 Edgewater Drive, Suite 255
Wakefield, MA 01880
781-486-0100

www.axiomvaluation.com
stan@axiomvaluation.com

Detailed Table of Contents

DETAILED TABLE OF CONTENTS	2
INDEX TO CHARTS AND TABLES	2
INTRODUCTION.....	3
1. WHEN DOES A 409A VALUATION NEED TO BE PERFORMED?	4
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?	4
3. DOES 409A OFFSET THE INCENTIVE BASED NATURE OF HAVING A LOW COMMON SHARE PRICE RELATIVE TO THE LATEST PREFERRED ISSUE PRICE?	4
4. WHEN CONDUCTING A 409A VALUATION, WHICH VALUATION APPROACHES ARE ACCEPTABLE?.....	5
5. WHAT IS THE RELATIONSHIP BETWEEN ENTERPRISE VALUE AND PREFERRED AND COMMON STOCK VALUE?.....	6
6. ARE THE METHODS NOTED ABOVE APPROPRIATE WHEN A NEW FINANCING HAS OCCURRED AROUND THE VALUATION DATE?	8
7. DOES A NEW PREFERRED STOCK FINANCING MEET THE STANDARD OF A NEW FINANCING FOR THE PURPOSE OF VALUING A FIRM’S COMMON STOCK?	8
8. THE AICPA SUGGESTS USING A CONTINGENT CLAIMS MODEL (CCM) TO ALLOCATE TOTAL EQUITY TO THE VARIOUS COMPONENTS OF THE CAPITAL STRUCTURE. WHY?.....	8
9. WHAT IS A CONTINGENT CLAIMS MODEL?	8
10. HOW DOES ONE ACCOUNT FOR ILLIQUIDITY OF THE COMMON AND PREFERRED SECURITIES?	11
CONCLUSION.....	12

Index to Charts and Tables

EXHIBIT 1: VALUATION APPROACHES FOR DIFFERENT STAGES OF BUSINESS DEVELOPMENT	5
EXHIBIT 2: RELATIONSHIP BETWEEN ENTERPRISE AND COMMON STOCK VALUE	6
EXHIBIT 3: CALCULATING THE VALUE OF EQUITY BEFORE LIQUIDITY ADJUSTMENT	6
EXHIBIT 4: THE VALUE OF DEBT	7
EXHIBIT 5: EQUITY ALLOCATION: CONTINGENT CLAIMS MODEL.....	10
EXHIBIT 6: EQUITY VALUE ALLOCATION WITH LIQUIDITY ADJUSTMENT	11

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, Topic 820 formerly 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 a security in lieu of a cash payment, the Board, in most cases, needs to establish the fair value of the grant. When a firm grants common stock and/or common stock options, the firm must determine the fair value of the granted stock which is also the strike price for any option grants.

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)	Management Cash Flow Projections; Weighted Average Cost of Capital; Market Participant Assumptions
	Public Comparables, Private Firm Transactions	
Market Value of Debt (MV of Debt)	Axiom Credit Rating Model	Hedgfundvalue.com Reuters Credit Spread: BondsOnline
	Spread over Treasuries	
Value of Equity before Liquidity Adjustment	EV - MV of Debt	
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
Minority Value of Common Liquidity Adjusted	Value of Common Before Liquidity Adjustment - Put Option for Common	Put Option for Common Stock: 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.

The Exhibit below shows an example of calculating the market value of equity.

Exhibit 3: Calculating the Value of Equity before Liquidity Adjustment

Concept	Value
Enterprise Value (EV)	\$7,000,000
Market Value of Debt (MV of Debt)	\$971,656
Value of Equity before Liquidity Adjustment	\$6,028,344
Value of Convertible Preferred Stock, Common Stock, Employee Stock Options and Warrants	Contingent Claims Model (CCM)

Enterprise value is defined as the market value of equity plus the market value of debt as well as the market value of any other long-term liabilities such as an underfunded company pension plan and/or contingent liabilities related to the cost of environmental cleanup. In our example, there are no other long-term liabilities. Enterprise value represents the value of the on-going enterprise. In this case this value is \$ 7,000,000. Since we are assuming the firm in question is private and generating cash flows, its

enterprise value is calculated based on either discounted cash flow (DCF) and/or the method of multiples. If DCF is used, then the value is based on discounting projected free cash flows and discounting these by the firms weighted average cost of capital (WACC). The cost of capital is based on weighting the cost of equity and the after-tax cost of debt. The projected free cash flows are discounted at the WACC and then summed to obtain the enterprise value.

The method of multiples can be applied using public company and private company comparables. For purposes here, let us consider public company comparable firms only, since use of private firm transaction multiples create several complex valuation issues that are beyond the scope of this Primer. If we assume that the target were to come to market on the measurement date, then the firm might be valued at a multiple of revenue and/or EBITDA. The multiple used depends on facts and circumstances underlying the valuation as well as valuation metrics that would typically be used by a market participant buyer to value a target firm. Since the target firm is likely to be substantively different than the comparable or guideline firms, one can not use guideline multiples directly. Rather, adjustments need to be made so the resulting multiple used reflects the target firm's cost of capital, its after-tax profit margin, and expected growth opportunities. How this is done is beyond the scope of this Primer.¹

Equity value is then calculated as enterprise value less the value of debt. The table below calculates the value of debt by discounting the interest and principal payments by the firm's cost of debt. The cost of debt is developed using a credit model framework where a spread over risk free rate of the same maturity as the debt is calculated. In this case, the cost of debt was determined to be 8.30%.²

Exhibit 4: The 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	\$971,656							
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	\$616,620
Market Value of Debt Before Liquidity Adjustment	\$971,656							
IRR	8.30%							

¹ To understand how these adjustments are made, see Stanley J. Feldman, *Principles of Private Firm Valuation*, Wiley, 2005.

² A description of Axiom's credit model is available at www.axiomvaluation.com.

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

Answer: Topic 820 (formerly Financial Accounting Standard 157) establishes a valuation hierarchy. Topic 820 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 in more capital at the previous issue 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.

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 at fair value, 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. If we multiply each probability times the difference between the take-out price and 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 that has the same maturity as time to payoff, and then sum these payments to common shareholders, we then arrive at the value of common. This common stock payoff matrix is equivalent to the payoff 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. The table below shows that most of the value of the enterprise is allocated to its preferred stock. The value of the enterprise allocated to common is far less than its ownership percentage. This occurs because upon a future liquidation event, the preferred shareholders receive their liquidation preference before the common shareholders receive anything.

Exhibit 5: Equity Allocation: Contingent Claims Model

Capital Structure

Column	A	B	C	D	E	F	G	
Row	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 exercises	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

Column	A	B	C	D	E		
Row	Concept	Preferred A and B Liquidation Preference	Common Call Option	Preferred Series A exercises	Preferred Series B exercises	\$5.26 Options exercise	Source
1	Breakpoints	0	1	2	3	4	
2	Equity Value Before Liquidity Adjustment	\$6,028,344	\$6,028,344	\$6,028,344	\$6,028,344	\$6,028,344	
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	\$6,028,344	\$2,117,848	\$1,764,600	\$1,511,913	\$1,426,070	
9	Value between calls	\$3,910,495	\$353,249	\$252,687	\$85,843	\$1,426,070	Differences between Adjacent Call Values

Ownership % Allocation

Row	Share Name					
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	Value Ownership Allocation at Each Breakpoint (Row 9 * Value % Allocation)	Value	Value/Share	Value %					
16	Common Stock	\$0	\$353,249	\$192,655	\$49,810	\$821,841	\$1,417,555	\$1.05	23.51%
17	Preferred Series A	\$1,023,371	\$0	\$60,032	\$15,521	\$256,087	\$1,355,010	\$3.21	22.48%
18	Preferred Series B	\$2,887,125	\$0	\$0	\$20,512	\$338,435	\$3,246,071	\$5.82	53.85%
19	\$5.26 Options on an As Converted Basis	\$0	\$0	\$0	\$0	\$9,708	\$9,708	\$0.61	0.16%
20	Total Value	\$3,910,495	\$353,249	\$252,687	\$85,843	\$1,426,070	\$6,028,344		100.00%

The analysis shows that the fair value of common is \$1.05. Note that its ownership percentage is 58% (Row 10) while the value percentage is 23.51% (Row 16). This occurs because of the liquidation preference of preferred and the value of its convertibility to common. **The difference between common's ownership and its value percentage shown here is the type of result that would ordinarily occur for firms that have capital structures similar to that of the example target firm.**

10. How does one account for illiquidity of the common and preferred securities?

Answer: 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. Given time to sell, the put option measures the value of the right to sell a security some time in the future at today's liquid price. The 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 that is likely to be far shorter than if access to the professional market 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 table below summarizes the results adjusted for liquidity.

Exhibit 6: Equity Value Allocation with Liquidity Adjustment

Row	Concept	Total Value	Share Number	Value per Share	Source
1	Enterprise Value	\$7,000,000			Exhibit 3
2	Less: MV of Debt	\$971,656			Exhibit 4
3	Value of Equity before Liquidity Adjustment	\$6,028,344			R1 - R2
4	Value of Common Stock before Liquidity Adjustment	\$1,417,555	1,354,528	\$1.05	Exhibit 5
5	Liquidity Adjustment for Common Stock	\$190,553	1,354,528	\$0.14	
6	Value of Common Stock after Liquidity Adjustment	\$1,227,002	1,354,528	\$0.91	R4 - R5
7	Value of Preferred Series A before Liquidity Adjustment	\$1,355,010	422,073	\$3.21	Exhibit 5
8	Liquidity Adjustment for Preferred Series A	\$182,145	422,073	\$0.43	
9	Value of Preferred Series A after Liquidity Adjustment	\$1,172,864	422,073	\$2.78	R7 - R8
10	Value of Preferred Series B before Liquidity Adjustment	\$3,246,071	557,796	\$5.82	Exhibit 5
11	Liquidity Adjustment for Preferred Series B	\$436,349	557,796	\$0.78	
12	Value of Preferred Series B after Liquidity Adjustment	\$2,809,723	557,796	\$5.04	R10 - R11
13	Value of \$5.26 Options on an As Converted Basis before Liquidity Adjustment	\$9,708	16,000	\$0.61	Exhibit 5
14	Liquidity Adjustment for \$5.26 Options on an As Converted Basis	\$1,305	16,000	\$0.08	
15	Value of \$5.26 Options on an As Converted Basis after Liquidity Adjustment	\$8,403	16,000	\$0.53	R13 - R14

Conclusion

The Primer is designed to answer some of the more common questions about the IRS 409A valuation process. The AICPA has established specific guidelines for how 409A valuations are to be done. These guidelines are based on the application of option pricing theory and they are designed to capture the explicit growth options that are embedded in a firm's expected future performance. The use of "rules-of-thumb" no longer meets the standards established by the IRS. Auditors now scrutinize 409A valuations very closely to insure that AICPA guidelines are met. Axiom's work product has been vetted by all major audit firms and it has been found to be robust and accurate.