VALUATION CHALLENGES FOR EARLY-STAGE COMPANIES

*The Need for Future Equity or Debt Contributions Introduces
Complexities Into the Business Valuation Process*

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Executive Summary

This white paper offers up a topic for discussion surrounding the issue of how to best reflect the impact of future rounds of equity financings in the valuation of an equity interest in an early stage technology or life sciences company.

Future Equity Contributions for Privately Held Early Stage Companies

The issue of future equity contributions is faced universally by valuation professionals in conducting early stage company valuations. Typical issuers of compensatory stock options are early stage technology or life sciences companies. Such companies find stock options attractive due to their desire to conserve limited cash resources and to align an employee's personal motivations with that of the company. While the timeline to maturity and an ultimate liquidity event can vary significantly, early stage companies generally require multiple rounds of equity (and/or debt) financing until their business model matures.

In most instances when a valuation professional is called in to perform an early stage company valuation, there is the prospect of future rounds of financing that the subject company must secure to fund near term negative cash flows. Therefore the valuation professional must consider the impact of such future rounds on current equity value.

PROBLEM STATEMENT

The need for future equity (or debt) contributions to fund near term negative cash flows provides multiple challenges to valuation professionals in determining the value of an equity interest in early stage companies. Specifically, the following questions need to be addressed:

1] What is the likelihood that the subject company will need additional financing in the future, and if so, when and how much?

2] Will the financing take the form of preferred equity, debt, or some type of hybrid debt/equity security?

3] Will the future financing be dilutive to existing shareholders, at a fair value (neutral), or possibly overpriced (will enhance existing shareholder value)?

4] Are the terms of the future financing known or unknown?

5] Are there any circumstances where the future financing can be ignored in a valuation model?

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6] What is the most appropriate way to model a future financing based on facts and circumstances, and the specific valuation techniques being applied?

RISK AND RETURN THEORY IN FINANCE

Prior to addressing the above questions regarding future capital contributions, it is helpful to illustrate a basic concept in finance regarding risk and return.

A basic premise in finance is that investors require a rate of return on a capital investment that will compensate them for the level of risk involved in that investment. Risk can be defined as the likelihood that actual results will deviate significantly from expected value, also known as volatility of returns. The higher the risk of the investment, the higher the return an investor would expect to compensate for taking that risk.

In the context of equity investments in early stage technology or life sciences companies, the above concept suggests that the present value of returns to new investors should be equal to the amount that they have invested. Why should this be the case? Simply stated, if this property does not hold true, it means that investors will realize a rate of return on their investment that is higher or lower than what they can reasonably expect from other possible investments with similar risk profiles in the marketplace.

Can we assume that investors will, on average, always realize a fair rate of return on new investments? It depends on the circumstances. There may be situations when the negotiating power is highly biased in favor of either the prospective investors or the existing shareholders of a company. Such a situation would likely lead to an expected rate of return and pricing that is above or below market. Under other circumstances, the parties in the negotiations may simply engage in irrational behavior in determining pricing and other terms.

While it is certainly appropriate to consider extenuating circumstances in a future round of financing, absent contrary evidence it appears reasonable to assume that future financings will be negotiated at a fair price. After all, another basic premise of valuation methodology and finance theory is that buyers and sellers engage in rational behavior and consider alternative investment opportunities available in the marketplace. If we abandon this basic premise, we must also abandon the valuation models that are commonly accepted by the valuation community.

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FUTURE FINANCING

Under the default assumption that future financings will be negotiated at a fair price, new investors will pay a price that will be equal to the present value of future cash flows discounted at a risk adjusted market rate of return. Therefore under such circumstances future rounds of financing are *present value neutral* to existing investors. Consider the following example:

Scenario 1: Assume the below free cash flows to equity, and that cost of equity is 20%. Existing shareholders at the valuation date fund and collect all future required cash inflows and outflows.

Cost of Equity: 20%	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Terminal Yr
Free Cash Flow to Equity	($200,000)	($150,000)	$300,000	$360,000	$414,000	$455,400	$478,170	$502,079
Growth Rate				20%	15%	10%	5%	5%
Terminal Value								$2,510,392
Period	0.5	1.5	2.5	3.5	4.5	5.5	6.5	6.5
Present Value Factor	0.9129	0.7607	0.6339	0.5283	0.4402	0.3669	0.3057	0.3057
Present Value	($182,574)	($114,109)	$190,181	$190,181	$182,257	$167,069	$146,185	$767,474
Net Present Value	**$1,346,665**							

Scenario 2: Assume the same investment as above with the same cash flows. New investors contribute $150,000 of equity six months into first year of projections. Their cost of equity is 20%, same as existing investors.

Cost of Equity: 20%	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Terminal Yr
Free Cash Flow to Equity of Company	($200,000)	($150,000)	$300,000	$360,000	$414,000	$455,400	$478,170	$502,079
Terminal Value of Company								$2,510,392
Equity Contribution of New Investors	$150,000							
Required Return to New Investors		($30,000)	($30,000)	($30,000)	($30,000)	($30,000)	($30,000)	($150,000)
Net Cash Flows to Existing Investors	($50,000)	($180,000)	$270,000	$330,000	$384,000	$425,400	$448,170	$2,360,392
Period	0.5	1.5	2.5	3.5	4.5	5.5	6.5	6.5
Present Value Factor	0.9129	0.7607	0.6339	0.5283	0.4402	0.3669	0.3057	0.3057
Present Value to Existing Investors	($45,644)	($136,931)	$171,163	$174,333	$169,050	$156,063	$137,014	$721,616
Net Present Value to Existing Investors	**$1,346,666**							

The examples above illustrate that as long as new investors contribute equity with an expected rate of return that matches that of existing shareholders at the time of that contribution, their impact on

existing shareholders is *present value neutral*. For purposes of simplifying the example, we assume for the moment that new investors are purchasing the same class of security as that held by existing investors, and that there is only one security class in the capital structure. Let us look at this example illustrated another way:

Scenario 1, Revisited: Assume Scenario 1 as previously illustrated. Also assume existing shareholders have 250,000 shares of common stock on the valuation date. The implied market value per share is $5.39 without consideration of marketability issues.

Cost of Equity: 20%	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Terminal Yr
Free Cash Flow to Equity Growth Rate	($200,000)	($150,000)	$300,000	$360,000	$414,000	$455,400	$478,170	$502,079
Growth Rate				20%	15%	10%	5%	5%
Terminal Value								$2,510,392
Period	0.5	1.5	2.5	3.5	4.5	5.5	6.5	6.5
Present Value Factor	0.9129	0.7607	0.6339	0.5283	0.4402	0.3669	0.3057	0.3057
Present Value	($182,574)	($114,109)	$190,181	$190,181	$182,257	$167,069	$146,185	$767,474
Net Present Value	**$1,346,665**							
Assume Existing Investors Have	250,000	Shares of Common Stock						
Value Per Share is	$5.39							

Scenario 2, Revisited: Assume Scenario 2 as previously illustrated. However new investors contribute $150,000 of equity on the valuation date, and purchase common stock. We know the market value of common is $5.39 per share, so the new investors receive 27,847 shares (rounded).

Cost of Equity: 20%									
Equity Contribution of New Investors	$150,000								
Total Shares of Common Stock Purchased @ $5.39	27,847								
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Terminal Yr
Free Cash Flow to Equity of Company		($200,000)	($150,000)	$300,000	$360,000	$414,000	$455,400	$478,170	$502,079
Terminal Value of Company									$2,510,392
Cash Inflow of New Investors Contribution	$150,000								
Net Cash Flows to all Investors	$150,000	($200,000)	($150,000)	$300,000	$360,000	$414,000	$455,400	$478,170	$2,510,392
Proportion of Cash Flows Due to New Investors =(27,847 shares)/(27,847+250,000 shares)=10.02%	($15,033)	$20,045	$15,033	($30,067)	($36,080)	($41,492)	($45,641)	($47,924)	($251,599)
Cash Flows to Existing Investors	$134,967	($179,955)	($134,967)	$269,933	$323,920	$372,508	$409,759	$430,247	$2,258,794
Period	0	0.5	1.5	2.5	3.5	4.5	5.5	6.5	6.5
Present Value Factor	1.0000	0.9129	0.7607	0.6339	0.5283	0.4402	0.3669	0.3057	0.3057
Present Value to Existing Investors	$134,967	($164,276)	($102,673)	$171,121	$171,121	$163,991	$150,325	$131,534	$690,555
Net Present Value to Existing Investors	**$1,346,666**								

...as long as new investors contribute equity with an expected rate of return that matches that of existing shareholders at the time of that contribution, their impact on existing shareholders is present value neutral.

We show once again that future rounds of equity at a fair price are *present value neutral* to existing investors. In our examples we assumed that there was only one class of equity (common stock) and that current and future investors would invest into that same class of equity. In the real world, future rounds of financing are generally for new classes of equity and almost always on different terms than prior rounds. However the basic concept we illustrated remains the same.

As a final example, assume that investors on the valuation date hold Series A Preferred stock in the subject company. The next round of financing will be for Series B Preferred stock that is likely at a higher price with a higher liquidation preference. At the time the Series B is funded, a fair price would reflect a lower required return for Series B than Series A stock. This is because the Series B liquidation preference has priority over the Series A liquidation preference and therefore has a lower risk profile. At the time this occurs, the rate of return to Series A holders will also be increased from that point forward. However this would also be expected as the risk profile of the Series A holders just increased (they are no longer in first priority for liquidation preferences). Therefore the cash flows available to Series A change due to the new financing, but the present value to Series A holders does not.

LIQUIDATION PREFERENC

FUTURE ROUNDS OF FINANCING IN THE OPTION PRICING METHOD

Allocation of Value to the Capital Structure

The Option Pricing Method[1] (OPM) is a value allocation model only. Such a model distributes equity value, or invested capital value between different classes of equity and debt claims in a company's capital structure. Therefore before such a model can be applied, the valuation professional must first determine the value of a company's equity or invested capital through other valuation techniques.

One characteristic of an OPM is that risk neutral assumptions must be applied in the implementation of that model. Such models move forward and backward in time at a risk neutral (risk-free) rate of return. Applying real world assumptions into such a model compromises the validity of the model.

In considering how to integrate future rounds of financing into application of the OPM, consider modeling future rounds *directly* into the OPM. This would require estimating the amount of new shares of preferred stock that would be issued at a future date as well as pricing and other terms. The additional shares would then be added to the current capital structure modeled by the OPM.

While the technique above of integrating future financing into the OPM seemed attractive initially, ultimately it was not conceptually sound. The first problem with this technique is that shares issued

> *We show once again that future rounds of equity at a fair price are present value neutral to existing investors.*

in future rounds would be integrated into the OPM model based on estimated real-world terms. As mentioned prior, option models must move forward and back in time at risk neutral rates of return. Events that occur within the timeframe of an option pricing model cannot be integrated at real world terms. Further, the above technique does not consider the new capital that would flow into the company along with the new shares issued at a future date. The new capital cannot be simply added into beginning equity or invested capital value in the OPM because it would again introduce a real-world event into the middle of the OPM model, and would also not consider the time value of money.

Given the limitations above of the closed-form OPM, and that the valuation professional must first determine an aggregate equity or invested capital value prior to implementing an OPM, *the impact of future rounds of financing should be included in that initial aggregate value determination*.

CAPITAL STRUCTURE

Valuation Technique to Determine Aggregate Equity or Invested Capital Value

As discussed above, rather than using the OPM to directly model the future round, the issue should be dealt with in the early stage company valuation models. It must be determined whether future rounds of financing will be required, and if so, what the terms might look like. In circumstances where the future terms of financing were known or pre-determined they must be explicitly considered in the valuation technique. This includes situations where a round is imminent and the terms and price can be projected with some certainty and there can be an assumption of fair value. However, under circumstances where pre-determined terms exist, the terms are likely not fair as the buyers and sellers have already agreed to pricing when the future value of the company at the time the financing will occur is not known with certainty. Other considerations that would indicate unfair pricing are a pattern of past dilutive rounds or a company that is facing a near term liquidity crisis with very limited financing options.

While the above technique of integrating future financing into the OPM seemed attractive initially, ultimately it was not conceptually sound.

If the terms of a future financing are known, the most straight-forward approach to modeling this would be to include the additional new shares in the company's capital structure and treat the future investment proceeds as a receivable on the company's balance sheet. This method can be implemented whether the valuation professional is using an income or market approach.

If the terms of a future financing are unknown but estimated to be unfair, one method for applying this in an income approach would be to bifurcate cash flows between existing and future investors. Another method would be to deduct the net present value of the future investment (positive or

negative) from the cash flows available to existing shareholders. Market approaches are particularly difficult to implement under such circumstances, as it is unclear to what extent comparables reflect an assumption of future financings at unfair terms.

Absent evidence to the contrary, future financings can be assumed to occur at a fair price. As explained prior, such financings are present value neutral to existing investors. As such, the easiest course of action in implementing an income approach would be to ignore such future financings in the valuation model. Similarly, with market approaches, comparables can be assumed to reflect an assumption that future capital is secured at fair terms.

FUTURE ROUNDS OF FINANCING IN THE PROBABILITY WEIGHTED EXPECTED RETURN METHOD

Unlike the OPM which is purely a value allocation model, the Probability Weighted Expected Return Method[2] (PWERM) is implemented as both a valuation and allocation model. As such, the issue of future rounds of financing must be considered differently than in the OPM.

One of the common criticisms of the OPM is that it assumes a lognormal, or bell shaped dispersion of possible future value outcomes for a company. For early stage technology and life sciences companies, this often does not reflect reality, which is an asymmetric dispersion of outcomes. For such companies, the typical scenario is a low probability of success leading to a very high value outcome, and a high probability of failure leading to a zero or near zero value outcome.

For these reasons, the PWERM is the preferred method to apply to valuing early-stage companies. Since the PWERM is essentially a form of decision tree, the probabilities can be adjusted to reflect more accurate real world asymmetric value outcomes. However the limitation of the PWERM is that determination of probabilities of future outcomes can be highly subjective and difficult to estimate, particularly when a company faces many hurdles to achieving a liquidity event.

Implementation of a PWERM model requires estimating the nature of, timing of, and value outcome associated with future liquidity events for the subject company. The typical spectrum of future events considered is sale of the company, initial public offering, dissolution, or continued operation as a private going-concern business. Each possible outcome is assigned a probability of occurring, an estimated time frame, and a value outcome. Under each outcome, the future value realized at the exit event is distributed to the future capital structure and the distributions to each equity class are then present valued.

In circumstances where the future terms of financing were known or pre-determined they must be explicitly considered in the valuation technique.

For these reasons some valuation professionals prefer to apply the PWERM to value early-stage companies.

Since the PWERM approach essentially "fast forwards" to future liquidity events past the valuation date, the impact of future financing rounds must be explicitly considered in this model irrespective of whether future financing occurs at a fair price or not. If a company requires additional capital before a liquidity event can be achieved, today's investors cannot get a free ride until the liquidity event is realized and also claim all of the liquidity event proceeds. After all, someone must fund the additional capital requirements in the interim.

Ignoring future capital requirements in a PWERM model is akin to developing a discounted cash flow model and assuming the current shareholders can realize the terminal value without having to fund the negative cash flows that will occur between the valuation date and the end of the forecast horizon. Unfortunately, the current AICPA practice aid fails to explicitly address this issue in the PWERM implementation examples that it provides. Not including the impact of future capital contributions would result in a significant analytical error in applying the PWERM.

Not including the impact of future capital contributions would result in a significant analytical error in applying the PWERM.

Given that future financing must be modeled in a PWERM, the following methods are typically applied to do so. One method is to assign an estimated rate of return to each future financing that will occur prior to the liquidity event. The future value of that investment (initial capital contribution plus required returns) would then be deducted from the exit value. This would represent the portion of the exit value that would be claimed by investors that are not yet part of the capital structure on the valuation date. The residual exit value would be allocated to the current capital structure. Another method is to estimate the additional shares and terms associated with each future financing and include all of these additional shares in the current capital structure. The exit value proceeds are allocated to the adjusted capital structure that includes future and current investors.

Both of the above methods are acceptable ways to address future capital contributions in the PWERM. Preference for one over the other is based on the individual valuation professional, although most prefer assigning a rate of return to future capital contributions. This is due to the inherent challenges with estimating the terms of future rounds. The exception is the valuation of life sciences companies, where some express a preference for estimating future financing terms based on observable data in the marketplace that provides sufficient credibility to model changes based on milestone achievements.

One final topic regarding the PWERM is the possibility that debt financing could be secured to fund future capital contributions. To the extent that this might be possible, existing shareholders could retain their claim to all future equity proceeds. The ability to secure debt however does not absolve

the valuation professional from having to consider the impact on exit value. In an exit scenario that involves sale of a business for example, the buyer is typically negotiating a debt free sales price. Therefore any debt obligations including interest expense accumulated to fund operating losses prior to the exit would detract from the ultimate proceeds to the equity holders.

INVESTORS

The exit value proceeds are allocated to the adjusted capital structure that includes future and current investors.

FINAL RECOMMENDATIONS

The primary recommendations on addressing future equity contributions to the valuation of early-stage companies are as follows:

• If an OPM is applied to allocate value to the capital structure, the issue of future equity contributions is best addressed in the valuation models applied to initially derive an equity or invested capital value rather than in the OPM.

• If future capital contributions are assumed to be at a fair price, which is the default assumption, the impact of those contributions are present value neutral to existing shareholders, and can be left out of the valuation models.

• If the future capital contributions are assumed not to be at a fair price or the terms are known, they should be explicitly modeled in the valuation technique.

• If a PWERM is applied to determine and allocate value to the capital structure, the impact of future capital contributions must always be explicitly modeled, regardless of whether they are assumed to occur at a fair price or not.

• The most common methods for doing so are either to assign a rate of return to future equity contributions and deduct their future value from the exit value(s), or to estimate the terms of future financings and include the additional shares in the capital structure to which the exit value proceeds are allocated.

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[1] As illustrated in the AICPA practice aid titled, "Valuation of Privately-Held-Company Equity Securities Issued as Compensation."
[2] As illustrated in the AICPA practice aid titled, "Valuation of Privately-Held-Company Equity Securities Issued as Compensation."

About BPM and the Author

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Carl Saba is a Partner and in charge of BPM's Consulting group. He advises companies on valuation issues for financial reporting, tax applications, mergers and acquisitions, and litigation matters. His valuation expertise includes businesses, intellectual property, options, and other derivatives. Carl is on the board of the Valuation Round Table of San Francisco. He is also a founding member and on the Executive Committee of the Fair Value Forum, in which this white paper was originally developed.

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