



MICHAEL J. ROBERTS

## Funding New Ventures: Valuation, Financing, and Capitalization Tables

Funding a new venture in a private financing raises a variety of issues. Assuming investors can be found, a key issue often relates to valuation—i.e., what percentage of the company will a given amount of money buy? This is called the “valuation” question because the valuation of a company can be mathematically derived from such a financing event: If I buy 10% of your company for \$1 million, then I have implicitly valued the business at \$10 million.

Entrepreneurs care about this because the lower the percentage of the company they have to relinquish to raise a given sum (called “dilution” because their proportional equity stake is diluted), the more equity they can keep for themselves and the management team. Entrepreneurs also care about valuation because a higher equity stake in a company (i.e., holding more of its shares) means greater control.

### Understanding the Role of Inherent Rate of Return

The basic economic attractiveness of a business plays a vital role in driving the implicit valuation in financings. To describe a simple example: If you are starting a business that will earn a 25% return on equity, what percentage of that business do you have to give up if your investors want a 25% Internal Rate of Return (IRR) on their investment? The answer is 100%. It is simply true that the proportion of the business the founding team gets to keep is related to the ratio of the inherent return in the business to the investor’s required IRR. Of course, the inherent return is impossible to predict before the actual operation of the business. Nonetheless, investors make tacit assumptions about this when they negotiate for the slice of the business ownership they want. The best thing investors can do to keep a high proportion of equity for themselves and their team is to develop a business with outstanding economic returns, i.e., outstanding return on equity.

The principal ways to achieve this are as follows:

- Start a business that requires low amounts of equity capital, either because it is not capital intensive or because it can generate the capital required to grow with its own cash flow.
- Start a business that requires large amounts of capital but little equity, because it is capable of being financed with debt (e.g., real estate).

---

Senior Lecturer Michael J. Roberts prepared this note as the basis for class discussion.

Copyright © 2005 President and Fellows of Harvard College. To order copies or request permission to reproduce materials, call 1-800-545-7685, write Harvard Business School Publishing, Boston, MA 02163, or go to <http://www.hbsp.harvard.edu>. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of Harvard Business School.

- Start a business that may require significant amounts of equity, but that earns extraordinary rates of return on that equity by virtue of its durable competitive advantage in the marketplace.

## Implied vs. “Bottom-up” Valuation

As described above, when venture capitalists (or other providers of financing) invest, they may or may not do so based on a view of what the firm is worth. For example, they may simply feel that getting 40% of a new venture in exchange for \$1 million is “fair” given other deals they have participated in. Nonetheless, it is always possible to assign an “implied” valuation to the business *after* the investment has been made. When people talk about valuation in the context of a new venture financing, they are typically talking about this kind of *implied* valuation, rather than any more fundamental, bottom-up valuation of the business (such as a valuation based on cash flow, earnings or assets).

The mathematics of such implied valuations is fairly simple:

If you divide the amount of money raised in the financing by the slice of ownership purchased, you get the “post-money” valuation of the firm. It is called post-money because it is the value *after* the money has been invested. So, for example, if I invest \$1 million to buy a 10% share, the post-money valuation is  $\$1,000,000 / 10\% = \$10,000,000$ .

The pre-money value is simply the post-money minus the pre-money. That is, if the firm is worth \$10,000,000 after the injection of \$1 million, then it must have been worth \$9 million before that investment. So, the general formulas are:

- Post-money – new money = pre-money; and
- Pre-money + new money invested = post-money.

### Where Do Valuations Come From?

Of course, you may ask how venture capitalists (VCs)—and other investors—come to a point of view on a valuation. Such “bottom-up” valuations may arise from a more fundamental analysis of the business and its prospects. For instance, suppose investors believe that the company will hit its business plan, and that in six years, it will have profits, after tax, of \$5 million. And further suppose that the investors believe that such companies will be valued by the public markets at a 30 times price to earnings ratio (P/E) for a total valuation of \$150 million. Now, further suppose that the venture capitalist requires an internal rate of return of 40%. Thus, \$1 invested in year 1 will need to be worth \$7.53; the general formula is:

**Future Value =  $(1+r)^n \times I$** , where **r** is the required IRR, **n** is the number of years in the holding period, and **I** is the amount of the investment.

Thus, if the VC invests \$4 million, the company will need to be worth \$30.1 million six years later; if the total company is worth \$150 million, then the VC will need to own 20% of the business. If everything transpires as hoped, this 20% stake will be worth \$30 million, delivering the required IRR. Note that this assumes that no further financing—nor the consequent dilution of the VC’s stake—will occur.

The nature of this exercise underscores why it is so difficult to do a bottom-up valuation. It depends on so many assumptions about events so far in the future that the valuation becomes very difficult, and potentially meaningless. Nonetheless, bottom-up valuations do offer some insight on the key variables that affect perceived valuation.

### *Alternatives*

Investors can get to the same answers on valuation using a variety of different paths. Suppose there are 900,000 shares outstanding before the investment, and the new investors want to own 10% of the company for their \$1 million investment. Well, if they buy 100,000 shares at \$10 per share, the company will have \$1 million and the investors will have 10% ownership. If we simply take the newly established per-share price of \$10 and multiply it by the 900,000 shares outstanding before the new investment round, we get the \$9,000,000 pre-money, and can get the \$10,000,000 post-money by multiplying the 100,000 shares outstanding after the financing by the \$10 per share figure. So, one can get to these valuations through either the “proportional ownership” approach or the “per share” approach.

### *Complications*

There are a few complications to this seemingly simple approach to valuation.

**Stock options** One complication is stock options. Companies create a pool of stock options (or even stock itself) to use as part of their compensation to employees to incent and reward them. The creation of a pool of options naturally dilutes any shareholder who was an owner before that pool was created. Imagine that you and I start a company and we each give ourselves 1,000 shares, so we each own 50%. If we decide to create an option pool of 500 shares and reward current and future employees out of that pool, we have just diluted our percentage ownership stakes by 10 percentage points each, to 40% each. (This assumes that the options are issued and exercised—this is called the “fully diluted” ownership because it assumes the impact of events that dilute ownership.) Note that in theory, the negative consequences of this dilution are more than offset by the positive impact on the firm’s performance and thus, on the ultimate valuation that these option grants will promote.

Consequently, if a potential investor believes that a company needs more options in its arsenal of resources to attract and maintain employees, then it will request that the company create that pool of options before its investment in the company. So, if an investor offers to invest \$4 million at a \$20 million post-money valuation, the investor wants to own  $4/20^{\text{th}}$  or 20% of the business, and does not want to be diluted the following day by the creation of a new option pool.

**Investor “preference”** Another complication (which we will not compute precisely) is the impact of investor preferences on these calculations. For instance, if the security purchased by the investor is a preferred stock, in which the investor gets back her investment, plus a small return, before any funds are distributed to management, and then the remainder is distributed “pro-rata,” then the investor really has a claim on more than X% of the value, even if the investor owns only x% of the stock (counting both common and preferred stock as the stock base). It is important to recall the math of implied valuation, which assumes that the investor is putting in a certain amount of money in return for a claim on a certain proportion of the value. The presence of a preference—or other terms that may allocate a higher proportion of value to the investor—distorts this simple math and makes it difficult to determine the true value in any precise mathematical way. And often, the simpler and less precise valuation numbers are still used. Nonetheless, the impact of stock preferences and other terms should not be overlooked.

## Capitalization Tables

Capitalization Tables (or “cap” tables) are the tables that are used to keep track of all this data in an understandable way, particularly as financing unfolds over multiple rounds, and because some investors may buy stock in more than one round. **Exhibit 1** is an example of a cap table from the financing of a hypothetical company, Apex Technologies.

At the company’s founding, on January 1 of 2004, the founders buy two million shares at \$0.01 each, for a total investment of \$20,000. After making considerable progress, they successfully raise a first round of financing from Starburst Ventures: \$1 million at \$1 per share, for a total number of shares issued of 1,000,000. This dilutes the founders’ ownership stake to 66.66%, and Starburst owns 33.33% of the company. Note that the post-money valuation can be calculated as either \$3,000,000 (the total number of shares outstanding)  $\times$  \$1 (the price paid per share); or, it can be figured as  $\$1,000,000 / 33.33\% = \$3$  million. The pre-money valuation is simply \$3 million – \$1 million = \$2 million.

Note also that the founders’ stake is now worth \$2 million (i.e., 2 million shares  $\times$  \$1 per share), or a paper gain of \$1.98 million. This is a measure of the value created in the venture as a result of the founders’ efforts and the company’s progress since the founding.

In the cap table, we see how this data is organized so that these calculations can be easily done.

In the second round of investment, we see that a new firm, Nova Ventures, has invested \$3,750,000 for a 33.33% ownership stake. Obviously, this dilutes both the founders’ and Starburst Ventures’ ownership stakes. Nonetheless, the increase in the value of their shares more than offsets the negative impact of dilution.

**Exhibit 1** Illustrative Capitalization Tables for Apex Technologies

	Initial Founding Capitalization 1/1/2004				First Round Investment 1/1/2005				Second Round Investment 1/1/06			
	# of Shares	\$ per Share	Total \$ Investment	% Ownership	# of Shares	\$ per Share	Total \$ Investment	% Ownership	# of Shares	\$ per Share	Total \$ Investment	% Ownership
Founders	2,000,000	0.01	20,000	100.00%	2,000,000			66.67%	2,000,000			44.44%
Starburst Ventures					1,000,000	1.00	1,000,000	33.33%	1,000,000			22.22%
Nova Ventures									1,500,000	2.50	3,750,000	33.33%
Eclipse Ventures												
Total	2,000,000		20,000	100.00%	3,000,000		1,000,000	100.00%	4,500,000		3,750,000	100.00%

Source: Casewriter example.