Capitalization

The Art of the Cap Table

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ABSTRACT

This article provides an overview of the impact of raising capital on the equity ownership structure of a biotechnology company. The equity ownership structure as captured in a table of capitalization ("Cap Table") determines how the fruits of success will be divided between founders, management and investors at an exit event such as an acquisition or initial public offering. The evolution of the Cap Table is captured and described through multiple financing events and scenarios and illustrates how value is allocated to the various parties involved in the transactions as the company grows and develops.

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INTRODUCTION

Founders stock is the first stock issued by a new company to those who found it. It is called common stock since the stock has no special rights or preferences — all shares are treated equally. When a company is first incorporated, it has no assets, has a great deal of technical, team and market risk, and hence has very little value. Therefore, the founders' stock is generally sold at its par value (a nominal value printed on the share certificates) of 1¢ or even 0.1¢ per share. The founders of the company will buy the stock from the company in the percentages they've agreed that each would own of the company. The parties, based on their past and expected future contributions to the company, negotiate these percentages. Despite the low price, if, say, 10 million shares were issued to the founders at 0.1¢, the proceeds to the company would be $10,000. This initial capital should be enough to pay the initial legal fees to incorporate the company, set up employment agreements with the founders, etc.

The founders are free to agree on any distribution of ownership they wish. An approach that will maximize teamwork and camaraderie will be to have equal shares, but there may be significant differences in contribution (e.g., bringing IP to the company, providing initial operating funds, etc.), experience, employment circumstances, duration of their planned employment with the company, and so forth that might dictate a different arrangement.

Many companies are incorporated in Delaware, even if their operations are initially going to be in one of the other 50 states, because of the favorable body of corporate law in Delaware. Lawyers and venture capitalists like to deal with a good understanding of how agreements are enforced in a court of law in the event of a problem. Therefore, venture capitalists will normally insist that companies they are going to invest in be incorporated in Delaware, so it is not a bad plan to incorporate there initially.

One of the quirks of Delaware law is that a company's state taxes depend in part on the number of shares the company has issued and outstanding. In order to minimize the tax bite in the early days of a company, entrepreneurs frequently issue a relatively small number of shares upon founding, and then split or reapportion them when it is time to bring in capital financing.

All employees who receive stock in a company, but particularly the founders because of the large amount of stock they receive, should be required to "earn in" their stock by maintaining their employment with the company for a defined period. This is referred to as vesting. Four years is a typical vesting period for founder/employee stock, with perhaps 5 or 10% vesting immediately, and the remainder over time accordingly to an agreed upon monthly or quarterly schedule. That said, to maximize the tax treatment of their stock, the founders will normally buy all their stock up front and the company will have the right to buy the stock back at the same price the founders paid, with the number of shares subject to this buy back decreasing over time. This is called an 83(b) election. A founder who is irrevocably assigning intellectual property (IP) to the company may be exempted from

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part or all of the vesting requirement since the company will now have control of the IP going forward irrespective of the future employment of the founder.

Since many biotechnology companies originate based on university research, we will use as an example a university spin-out company, founded by:

- A professor, who is not planning on leaving the university and joining the company, but who will chair the scientific advisory board and consult for the company for the one day per week that academic employment contracts generally permit;
- Two post-doctoral fellows who worked on the technology in the professor's laboratory, are co-inventors with the professor on the patent applications the university filed on the technology, and who will join the company as chief scientific officer and chief technology officer;
- A CEO, who has resigned from a position as vice president for business development of a major pharmaceutical company; and
- The University, which, while not actually a founder of the company, has agreed to exclusively license the professor's technology to the company and has agreed to accept founders' stock in lieu of a cash license fee.

The founders agree that the professor will get 20%, the CEO 40%, the postdocs 10% each and the university 20% of the founders' stock. The company is incorporated in Delaware, so the company sells a total of 10,000 shares to the founders, at a par value of $1/share.

The Cap Table of the company at the end of the Founders Round is shown in Table 1.

The professor owns 20% of the company and his stake is valued at the price that he paid for it, $1,000.

Table 1: Cap Table after Founders' Round

Price per share: $1.00

	Shares	Raised	%	Value
Professor	2,000	$2,000	20%	$2,000
Postdoc A	1,000	$1,000	10%	$1,000
Postdoc B	1,000	$1,000	10%	$1,000
University	2,000	$2,000	20%	$2,000
CEO	4,000	$4,000	40%	$4,000
Total	10,000	$10,000	100%	$10,000
Issued and outstanding	10,000			
Fully diluted	10,000			
Raised in this round	$10,000			
Cumulative raised	$10,000			

THE SEED ROUND

Once the company is founded, the management team agrees that they need to perform some proof-of-concept experiments before the company can approach venture capitalists for a major financing. They decide to approach their friends and family for funding, plus the CEO agrees to invest. They decide they need to raise $200,000 to do this work.

To get the price per share in the Seed Round to be around $1/share, they first split the shares 250 for 1, so the professor now has 500,000 shares and everyone else is increased proportionately. The company now has a total of 2.5 million shares issued and outstanding.

The company decides to sell 250,000 shares at $0.80/share, raising $200,000.

The value of the company before the financing (the "pre-money value") was $2 million (2.5 million shares each worth $0.80/share), while the value of the company after the financing (the "post-money value") is $2.2 million (the $2 million pre-money value plus the $200,000 raised).

The Cap Table after the Seed Round is shown in Table 2.

As a result of the transaction, the founders are all diluted by about 10%, so the professor now owns 18.2% of the company and the "seed investors" own 9.1% of the company. However, the value of the professor's stake has gone from $2,000 to $400,000, so he is not complaining. We're still dealing with common stock at this point.

While in this illustration common shares were issued to the company via a "priced round", it is more common that the company wouldn't actually issue shares to the seed investors, but would issue them convertible notes. In a convertible debt financing the money is borrowed with a promise to repay it, or if certain conditions were met, such as the raising of a Series A Round within a specified time period, to issue shares instead of repaying the loan in cash. It is very difficult to establish the value of a company at the seed stage as we have indicated above, and the result may be a contentious negotiation — not a good thing. If the seed round investors are *friends and family*, they may be unable to place a realistic value on the company. Since the company and the investors probably would not have even agreed on the price of the shares, they agree to leave as part of the terms of the convertible note that the conversion price will be decided by the Series A Round investors. To reward these seed investors for the "use of their money" the price of

Table 2: Cap Table after Seed Round

Price per share $0.80

Split: 250 for 1

	Shares	Raised	%	Value
Professor	500,000		18.2%	$400,000
Postdoc A	250,000		9.1%	$200,000
Postdoc B	250,000		9.1%	$200,000
University	500,000		18.2%	$400,000
CEO	1,000,000		36.4%	$800,000
Seed investors	250,000	$200,000	9.1%	$200,000
Total	2,750,000	$200,000	100.0%	$2,200,000
Issued and outstanding	2,750,000			
Fully diluted	2,750,000			
Raised in this round	$200,000			
Cumulative raised	$210,000			
Pre-Money	$2,000,000			
Post-Money	$2,200,000			

the Seed Round shares will is generally be less than the price of the Series A shares — either by specifying that they will be converted at a lower price per share than the Series A shares, as a discount or by issuing the Seed Round investors warrants to purchase additional shares. In this illustration, the Seed Round investors agree to a 20% discount to the Series A, which is a common level of discount, which will give them a 25% profit when the Series A Round is raised.

SERIES A VENTURE FINANCING

A good outcome is that the proof-of-concept experiments funded by the Seed Round investors are successful and the company decides it is now ready raise its Series A financing withfrom a professionally managed venture capital fund. It decides it needs to raise $3 million to develop its initial product. Two venture funds agree to invest $1.5 million each by buying 1.5 million shares at $1.0/share. They are not prepared to buy common stock but insist on buying a new class of shares, participating preferred, or participating convertible preferred shares. These shares are a type of preferred stock that gives the holder the right to receive dividends equal to the normally specified rate that preferred dividends receive as well as an additional dividend based on some predetermined conditions, such as an acquisition or liquidation (this might be a full return of their capital or with some multiple). Furthermore, in the event of a liquidation or acquisition, the participating preferred shareholders can also have the right to receive the price of their shares as indicated, as well as a pro rata share of any remaining proceeds that the common shareholders receive. Basically they get paid back their investment and then also share in the proceeds with the common shareholders. We'll illustrate this point later in the article.

The issuance of preferred shares at $1.0/share increases the fair market value of the common shares. They will be worth less than the value of the preferred, because of the various preferences that the preferred shares enjoy, but the value will be substantially higher than the par value which the founders paid[1]. If the company were to issue common shares to new employees, they would have to pay income tax on the fair market value of those shares. Therefore, the new investors also agree to allow the company to issue 1 million shares of common stock into an option pool that will issue stock options to new employees that will be hired and paid from the Series A financing, to ensure that the new employees have a financial incentive to see the company succeed. New employees are issued options, not shares, because they would have no way of selling any of the shares to raise the money to pay the ordinary income tax they would owe on the share issuance. An option allows them to get all the benefits if the company is successful without any of the risk if the company is unsuccessful and its shares never achieve any value. There is also a vesting schedule for the shares issued under the option pool.

The Cap Table after the Series A financing is shown in Table 3.

The various shareholders' ownership share of the company now depends on whether the shares from the option pool are included in the calculation or not. The VCs own 52.2% of the shares that are issued and outstanding, a majority, though this will go down to 44.4% when all the options are exercised, i.e. on a fully diluted basis. The professor's ownership share of the company has gone down from 18.2% after the Seed Round to 8.7% of the shares that are issued and outstanding and to 7.4% on a fully diluted basis. However, the value of the professor's shares has gone up a further 25%, to $500,000, so again, he is not complaining and his wife is beginning to think it is worth him being gone that much of the time.

1 The fair market value of the common shares is determined by the board of directors of the company. In the early days of the company, the fair market value of the common shares will probably be about 25% of the value of the preferred. As the company develops, the fair market value of the common shares gets closer and closer to that of the preferred, and has to reach 90% of the value of the preferred 30 days prior to the company's initial public offering. The fair market value is used only for purchases and sales of common shares, not for valuing the company.

Table 3: Cap Table after Series A Round

Price per share: $1.00

	Shares			Raised	%		Value
	Common		Series A		I&O	FD	
	Shares	Options					
Professor	500,000				8.7%	7.4%	$500,000
Postdoc A	250,000				4.3%	3.7%	$250,000
Postdoc B	250,000				4.3%	3.7%	$250,000
University	500,000				8.7%	7.4%	$500,000
CEO	1,000,000				17.4%	14.8%	$1,000,000
Seed investors	250,000				4.3%	3.7%	$250,000
Management Pool		1,000,000				14.8%	$1,000,000
VC Fund A			1,500,000	$1,500,000	26.1%	22.2%	$1,500,000
VC Fund B			1,500,000	$1,500,000	26.1%	22.2%	$1,500,000
Total	2,750,000	1,000,000	3,000,000	$3,000,000	100.0%	100.0%	$6,750,000
Issued and outstanding	5,750,000						
Fully diluted	6,750,000						
Raised in this round	$3,000,000						
Cumulative raised	$3,210,000						
Pre-Money	$3,750,000						
Post-Money	$6,750,000						

The pre-money value of the company was $3.75 million, while the post-money value is $6.75 million.

SERIES B FINANCING

With its product successfully developed and tested and its value proposition supported by hard facts, the company is ready to gear up to have its product manufactured, then to introduce and sell the product to customers. Bringing products to market is an expensive activity, and the company decides it needs to raise $10 million, and because of the great data from testing the product, it is able to justify a doubling of the share price, to $2/share. The two existing VCs would be happy to put in all the money, but if they did, under the rules of the National Venture Capital Association, they couldn't write up the value of their Series A shares to the new, higher share price. However, if a new investor leads the round and agrees to the new, higher price, then they can show an unrealized increase in the value of their earlier investment, which will keep their limited partners (LPs) happy and help them raise their next fund.

So they find venture fund C, which agrees to invest 40% of the round, and venture capital funds A and B each invest 30% of the new round. Fund C insists on a new class of stock, Series B participating convertible preferred shares. The various preferences of the Series B shares take precedence over those of the Series A shares — the most recent money always takes priority over the previous investments. At $2/share, the company only has to sell 5 million shares to raise $10 million. Nearly all of the 1 million options in the original option pool have been granted to current employees, so the VCs authorize issuance of a further 1 million shares to the option pool so that the company can issue options to the next group of employees who'll be hired. Some of these option shares can also be issued to existing employees, especially those high-performers who are critical to the ongoing success of the company.

The Cap Table after the Series B round is shown in Table 4.

The VCs now own 71.8% of the company on an issued and outstanding basis and 59.6% on a fully diluted basis. The professor's share is down to 5.1% on an issued and outstanding basis and 4.3% on a fully diluted basis but the value of his shares has increased to $1 million. The pre-money valuation for the round was $13.5 million and the post-money value is $23.5 million.

INITIAL PUBLIC OFFERING

The early sales of the company's first product are going extremely well, so with revenues to report from its now validated first product, the company decides it is ready

Table 4 : Cap Table after Series B Round

Price per share: $2.00

	Shares				Raised	%		Value
	Common		Series A	Series B		I&O	FD	
	Shares	Options						
Professor	500,000					4.7%	3.9%	$1,000,000
Postdoc A	250,000					2.3%	2.0%	$500,000
Postdoc B	250,000					2.3%	2.0%	$500,000
University	500,000					4.7%	3.9%	$1,000,000
CEO	1,000,000					9.3%	7.8%	$2,000,000
Seed investors	250,000					2.3%	2.0%	$500,000
Management Pool		2,000,000					15.7%	$4,000,000
VC Fund A			1,500,000	1,500,000	$3,000,000	27.9%	23.5%	$6,000,000
VC Fund B			1,500,000	1,500,000	$3,000,000	27.9%	23.5%	$6,000,000
VC Fund C				2,000,000	$4,000,000	18.6%	15.7%	$4,000,000
Total	2,750,000	2,000,000	3,000,000	5,000,000	$10,000,000	100%	100%	$25,500,000
Issued and outstanding	10,750,000							
Fully diluted	12,750,000							
Raised in this round	$10,000,000							
Cumulative raised	$13,210,000							
Pre-Money	$15,500,000							
Post-Money	$25,500,000							

to file for an initial public offering, or IPO[2]. It finds an investment banker who feels it can underwrite a sale of 8 million shares to the public at $8/share even though the company is not yet profitable (this is typical for biotechnology companies). Immediately before the public offering, all shares of Series A and B participating convertible preferred are converted into common shares, and the holders of the options all exercise their options so that they will be able to sell the shares and obtain long term capital gains tax treatment of their profit.

The Cap Table now looks very different, as shown in Table 5.

The public shareholders now own 40.5% of the company, the VC investors own 35.4%, the seed investors own 1.3% and the founders and management own 22.8%. There is only a single class of stock, common stock. Tje company is now back to where it started, with one class of stock with no preferences. Some companies that enter the public market attempt to maintain some preferred voting preferences but that is seldom done, and is beyond the scope of this article.

The $12 million invested by the 3 VC funds in the Series A and B rounds has increased to $56 million, with VC funds A and B showing a 5x return on the $4 million they each invested in the Series A and B rounds and VC fund C showing a 4x return on the $4 million it invested in the Series B round. The professor's ownership of the company is down to 2.5% of the company, but his shares are now worth $4 million. However, the money is not yet in the bank since hisas shares are not yet "liquid" as we cover in the next section.

LIFE AFTER THE IPO

The VCs, founders and management cannott sell their shares immediately. First, the underwriters will have imposed a "lock-up" of 6 months, during which none of the existing shareholders can sell their stock. The lock-up allows an orderly public market for the company's shares to develop. Second, the existing shareholders own unregistered shares — shares that have not been registered with the SEC. Only the public shareholders own registered stock at this stage and can sell it freely. Before the existing shareholders can sell their shares the shares need to

2 In reality, it is highly unlikely that the company will be able to go public after raising and investing so little. However, we will learn nothing new by going through Series C, D, E etc. rounds of VC financing, except that we would see founders and management getting diluted to the stage that the investors may start to give them options to get their shareholdings back up. VCs like to see the CEO not drop below 5% and the other "C" level members of the management team stay around 2%.

Table 5: Cap Table after IPO

Price per share: $8.00

	Shares	Raised	%		Value
	Common		I&O	FD	
	Shares				
Professor	500,000		2.4%	2.4%	$4,000,000
Postdoc A	250,000		1.2%	1.2%	$2,000,000
Postdoc B	250,000		1.2%	1.2%	$2,000,000
University	500,000		2.4%	2.4%	$4,000,000
CEO	1,000,000		4.8%	4.8%	$8,000,000
Seed investors	250,000		1.2%	1.2%	$2,000,000
Management Pool	2,000,000		9.6%	9.6%	$16,000,000
VC Fund A	3,000,000		14.5%	14.5%	$24,000,000
VC Fund B	3,000,000		14.5%	14.5%	$24,000,000
VC Fund C	2,000,000		9.6%	9.6%	$16,000,000
Public Investors	8,000,000	$64,000,000	38.6%	38.6%	$64,000,000
Total	20,750,000	$64,000,000	100%	100%	$166,000,000
Issued and outstanding	20,750,000				
Fully diluted	20,750,000				
Raised in this round	$64,000,000				
Cumulative raised	$77,210,000				
Pre-Money	$102,000,000				
Post-Money	$166,000,000				

be registered with the SEC. The VCs will have included the right for registration of their shares in their preferences, and hopefully management has negotiated "tag along" rights so that they can register some or all of their shares.

That said, a small amount of shares can be sold under Rule 144, the amount being related to the daily trading volume of the company's publicly traded shares.

ACQUISITION

An attractive alternative to an IPO is to consider selling the company to another, bigger company. The acquisition will either be paid for in cash or in shares of the acquiring company's stock, if the company is already publically traded. Acquisition is attractive because; (a) there is immediate liquidity since the purchase price is either paid in cash or through registered shares of the acquiring company; and. (b) an IPO is an expensive undertaking, and the underwriter commissions and legal and accounting fees will typically consume at least 10% of the funds raised.

However, from the management and founders' viewpoint there is a downside to an acquisition — remember the liquidation preferences associated with the preferred shares? If a company is acquired, the preferred investors will typically first receive their investment, and sometimes a multiple of their investment, out of the purchase price, and the balance will be distributed among all the shareholders, including the preferred shareholders, according to their shareholdings. In other words, the preferred shareholders get a "double dip".

So, our company accepts an acquisition offer at $7.20/share, 10% below the IPO share price, with both the Series A and the Series B round investors having agreed to a 1x liquidation preference as part of their original investments — i.e., they will get their original investment back off the top and then get their ownership percentages of the balance of the proceeds.

The Cap Table and how the proceeds stack up are shown in Table 6, together with how the various constituents' fare compared with the value created in the IPO (i.e., assuming that all the shares are ultimately sold at the IPO price).

The comparison column shows that the holders of common stock receive 77.2% of the amount they would have received in the IPO, while venture funds A and B receive 97.2% and venture fund C comes out ahead, receiving 102.2% of the IPO amount. The common stock holders are hit by the reduced sale price and also by the preferences. However, for venture funds A and B, the

Table 6: Cap Table after acquisition

Acquisition price: $91,800,000
Per share: $7.2

Liquid. Pref.	Price
Series A	1 x $1.00
Series B	1 x $2.00

	Shares				%		Proceeds					
	Common		Series A	Series B	I&O	FD	Preferences	Balance	Total	IPO	Δ	%
	Shares	Options										
Professor	500,000				4.7%	3.9%		$3,090,196	$3,090,196	$4,000,000	($909,804)	77.3%
Postdoc A	250,000				2.3%	2.0%		$1,545,098	$1,545,098	$2,000,000	($454,902)	77.3%
Postdoc B	250,000				2.3%	2.0%		$1,545,098	$1,545,098	$2,000,000	($454,902)	77.3%
University	500,000				4.7%	3.9%		$3,090,196	$3,090,196	$4,000,000	($909,804)	77.3%
CEO	1,000,000				9.3%	7.8%		$6,180,392	$6,180,392	$8,000,000	($1,819,608)	77.3%
Seed investors	250,000				2.3%	2.0%		$1,545,098	$1,545,098	$2,000,000	($454,902)	77.3%
Mgmt Pool		2,000,000				15.7%		$12,360,784	$12,360,784	$16,000,000	($3,639,216)	77.3%
VC Fund A			1,500,000	1,500,000	27.9%	23.5%	$4,500,000	$18,541,176	$23,041,176	$24,000,000	($958,824)	96.0%
VC Fund B			1,500,000	1,500,000	27.9%	23.5%	$4,500,000	$18,541,176	$23,041,176	$24,000,000	($958,824)	96.0%
VC Fund C				2,000,000	18.6%	15.7%	$4,000,000	$12,360,784	$16,360,784	$16,000,000	$360,784	102.3%
Total	2,750,000	2,000,000	3,000,000	5,000,000	100%	100%	$13,000,000	$78,800,000	$91,800,000	$102,000,000	($10,200,000)	90.0%
Issued & Outstanding	10,750,000											
Fully Diluted	12,750,000											

preferences almost compensate for the reduced per share price. With venture fund C, since they only invested in Series B at the higher per share price the preference that they receive on the Series B investment more than compensates for the reduced per share price.

In reality the net proceeds to the company from an IPO at $8/share and an acquisition at $7.20/share are likely to be pretty similar — underwriter commissions are likely to be 7-8% of the proceeds, and the legal costs of an IPO, particularly complying with Sarbanes-Oxley Act, and interacting with the SEC will be substantially higher than for an acquisition, so in reality the common shareholders would receive 85.5% of the IPO gains, the amount they lose to the preferences, while all of the VCs come out ahead; VCs A and B getting 108% and VC C receiving 113.6% of the IPO amount.

THE DARK SIDE — DOWN ROUNDS

The following scenario illustrates what happens when all does not go well for the company. Let us assume that they don't achieve the milestones set by their investors in their Series A financing, and as a result they are in serious danger of running out of money so their bargaining power is not very good. In these circumstances, they will not be able to bring a new investor on board, and the round will be held just with venture funds A and B. venture funds A and B are not happy since they can not mark up their investment and might actually have to mark it down — not a good thing forsomething their LPs will welcome. They still think the company is going to be successful, and are willing to put in more funds, but they extract their revenge. The company is still going to need $10 million to gear up to get to market, but it needs a further $1 million to cover the unexpected difficulties it has encountered in developing the lead product.

Venture funds A and B agree to invest the $11 million[3], but instead of agreeing to a $2/share price, they refuse to pay more than $0.60/share, plus they want a 3x liquidation preference! They will still agree to increase the option pool by 1 million shares. The company has no alternatives available to this offer, so it has to agree.

The Cap Table after the down round Series B is shown in Table 7.

The result is that the company has to issue over 18 million new shares and the professor's share has gone down to 2.2% on an issued and outstanding basis and 2.0% on a fully diluted basis, versus 5.1% and 4.3% in the base case scenario, and the value of his holdings has gone down from $1 million in the original scenario to $300,000. The investors now own 88% of the company on an issued and outstanding basis and 81% on a fully diluted basis. A down round is one reason why venture capitalists get called "vulture capitalists."

3 This is probably an unrealistic scenario — the company is much more likely to receive the $1 million in the next round to see if it can catch up, and then to get the $10 million in a subsequent round if it does. I assume it all comes in in one round to provide more of an "apples-to-apples" comparison and to magnify the impacts.

Table 7: Cap Table after down round Series B

Price per share: $0.60

	Shares				Raised	%		Value
	Common		Series A	Series B		I&O	FD	
	Shares	Options						
Professor	500,000					2.2%	2.0%	$300,000
Postdoc A	250,000					1.1%	1.0%	$150,000
Postdoc B	250,000					1.1%	1.0%	$150,000
University	500,000					2.2%	2.0%	$300,000
CEO	1,000,000					4.3%	4.0%	$600,000
Seed investors	250,000					1.1%	1.0%	$150,000
Management Pool		2,000,000					8.0%	$1,200,000
VC Fund A			1,000,000	9,166,667	$5,500,000	44.0%	40.5%	$6,100,000
VC Fund B			1,000,000	9,166,667	$5,500,000	44.0%	40.5%	$6,100,000
Total	2,750,000	2,000,000	2,000,000	18,333,333	$11,000,000	100%	100%	$15,050,000
Issued and outstanding	23,083,333							
Fully diluted	25,083,333							
Raised in this round	$11,000,000							
Cumulative raised	$14,210,000							
Pre-Money	$4,050,000							
Post-Money	$15,050,000							

IPO AFTER A DOWN ROUND — THE REVERSE SPLIT

Let us assume the company solves its problems with R&D, successfully develops its lead product, and starts sales. The investment bankers again feel they can take the company public and sell shares to individual investors. They want to price the shares at $8/share, but feel that the company has too many shares outstanding — over 25 million, versus less than 12 million in the original scenario. They therefore tell the company that they are going to have to do a 1:2 reverse split — i.e., shareholders surrender their share certificates to the company, and for every two old shares owned, they recieve one new share. The bankers tell the company that if they perform a reverse split, they will be able to sell 8 million shares to the public at $8/share, just as in the original scenario. The company wants to go public so that the investors and management can achieve liquidity, so they agree.

The Cap Table after the IPO with reverse split is shown in Table 8, together with a comparison with the outcome of the base case IPO.

The professor's shareholding is down to 1.2% vs. 2.5% in our base case scenario, and the value of his equity holding is now down to $2 million versus $4 million in the base case.

Figure 1 shows the build up in value of the company over time. Clearly the bulk of the value is created at the end of the process.

ACQUISITION AFTER A DOWN ROUND

The next scenario illustrates what happens if the company is acquired after a down round rather than going public. The key difference between this and the previous acquisition case that we considered is that as part of the punitive Series B financing, when the share price dropped

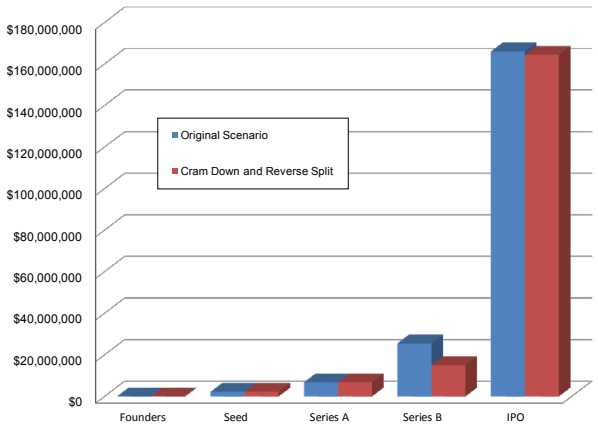

Figure 1: Build-up in company value over time

Table 8: Cap Table after IPO with reverse split

Price per share: $8.00
Reverse split: 1 for 2

	Shares	Raised	%	Value		Original Scenario Value	Diff
	Common Shares		I&O				
Professor	250,000		1.2%	$2,000,000		$4,000,000	($2,000,000)
Postdoc A	125,000		0.6%	$1,000,000		$2,000,000	($1,000,000)
Postdoc B	125,000		0.6%	$1,000,000		$2,000,000	($1,000,000)
University	250,000		1.2%	$2,000,000		$4,000,000	($2,000,000)
CEO	500,000		2.4%	$4,000,000		$8,000,000	($4,000,000)
Seed investors	125,000		0.6%	$1,000,000		$2,000,000	($1,000,000)
Management Pool	1,000,000		4.9%	$8,000,000		$16,000,000	($8,000,000)
VC Fund A	5,083,333		24.7%	$40,666,667		$24,000,000	$16,666,667
VC Fund B	5,083,333		24.7%	$40,666,667		$24,000,000	$16,666,667
VC Fund C						$16,000,000	($16,000,000)
Public Investors	8,000,000	$64,000,000	38.9%	$64,000,000		$64,000,000	$0
Total	20,541,667	$64,000,000	100%	$164,333,333		$166,000,000	($1,666,667)
Issued and outstanding	20,541,667					20,750,000	($208,333)
Fully diluted	20,541,667					20,750,000	($208,333)
Raised in this round	$64,000,000					$64,000,000	$0
Cumulative raised	$78,210,000					$77,210,000	$1,000,000
Pre-Money	$100,333,333					$102,000,000	($1,666,667)
Post-Money	$164,333,333					$166,000,000	($1,666,667)

by 40% to $0.60 per share rather than doubling to $2.00 per share, the investors also demanded and received a 3x liquidation preference. Since each venture fund invested $5.5 million in this round, they will each receive $16.5 million off the top of the acquisition proceeds, in addition to the 1x multiple of their $1 million investments in the Series A.

The Cap Table after the acquisition is shown in Table 9, together with a comparison with our acquisition base case.

The result is a massive shift of the proceeds from the common shareholders to the preferred. The founders receive less than a third of what they got in the base case, while the two venture funds receive double what they received in the base case (though, in fairness, they also each invested over 50% more — $6.5 million each versus $4 million.) This outcome again illustrates why venture capitalists are sometimes called "vulture capitalists."

ANTI-DILUTION

One of the emotive issues that always arises in negotiations with start-ups is that of anti-dilution. Everyone would like anti-dilution protection, but of course someone has to be diluted if new employees are to be hired or new investors brought into the company.

It is important to distinguish between two types of anti-dilution:

- The anti-dilution included in preference terms to protect early investors against down rounds; and
- The anti-dilution equity-ownership model frequently employed by universities.

INVESTOR PROTECTION AGAINST SUBSEQUENT DOWN-ROUNDS

One of the preferences that will be in the preferred share investments will be anti-dilution protection. Anti-dilution protection comes in two flavors:

- Full Ratchet anti-dilution protection; and
- Weighted Average anti-dilution protection

Table 9: Cap Table after acquisition after down round

Acquisition price: $91,800,000
Per share: $7.2
Liquidation Preferences
Series A 1 x $1.00
Series B 3 x $0.60

	Shares				%		Proceeds					
	Common Shares	Options	Series A	Series B	I&O	FD	Preferences	Balance	Total	Base Case	D	%
Professor A	500,000				2.2%	2.0%		$1,132,226	$1,132,226	$3,090,196	($1,957,970)	36.6%
Postdoc B	250,000				1.1%	1.0%		$566,113	$566,113	$1,545,098	($978,985)	36.6%
Postdoc C	250,000				1.1%	1.0%		$566,113	$566,113	$1,545,098	($978,985)	36.6%
University	500,000				2.2%	2.0%		$1,132,226	$1,132,226	$3,090,196	($1,957,970)	36.6%
CEO	1,000,000				4.3%	4.0%		$2,264,452	$2,264,452	$6,180,392	($3,915,940)	36.6%
Seed investors	250,000				1.1%	1.0%		$566,113	$566,113	$1,545,098	($978,985)	36.6%
Management Pool		2,000,000				8.0%		$4,528,904	$4,528,904	$12,360,784	($7,831,881)	36.6%
VC Fund A			1,000,000	9,166,667	44.0%	40.5%	$17,500,000	$23,021,927	$40,521,927	$23,041,176	$17,480,750	175.9%
VC Fund B			1,000,000	9,166,667	44.0%	40.5%	$17,500,000	$23,021,927	$40,521,927	$23,041,176	$17,480,750	175.9%
VC Fund C										$16,360,784	($16,360,784)	
Total	2,750,000	2,000,000	2,000,000	18,333,333	100%	100%	$35,000,000	$56,800,000	$91,800,000	$91,800,000	$0	100.0%
Issued and outstanding	23,083,333											
Fully diluted	25,083,333											

The way these anti-dilution measures actually operate is that the conversion price of the preferred stock into common stock prior to an acquisition or IPO — which is normally set up as 1.0 to 1.0 is adjusted to a lower figure. So if the anti-dilution mechanism lowered the conversion rate of a round to say 0.8 to 1.0, the preferred shareholder would get 25% more common shares than they would otherwise have received.

Full ratchet anti-dilution protection

Full ratchet anti-dilution protection is draconian and it should be fairly easy to negotiate it away. In full ratchet anti-dilution protection, the price of earlier purchased shares is adjusted down to the latest price, and the number of shares is increased to the number that the earlier round investment would have purchased at this lower price. In our case, the Series B was priced at $0.60 per share, so the price of the Series A would be adjusted to convert at 0.60 shares per share of common stock. At a conversion ratio of 0.60 per share, Venture Fund A and B's original $1 million investments would each have been converted into 1,666,667 shares of stock, so an additional 666,667 shares would have been issued to both Venture Fund A and B. Table 10 shows the Cap Table after a Down Round Series B with full ratchet anti-dilution protection. The effect is to lower each common shareholders' ownership of the company by 10% (e.g., the professor goes from 2.2% to 2.0%), while venture funds A and B each increase 1%, from 44.0% to 44.4%.

Weighted average anti-dilution protection

Weighted average anti-dilution protection is less punitive to common shareholders, and it adjusts the price of earlier purchasers at a higher price by weighting the decrease in price by the amount of money raised at the higher and lower prices.

So, in our example, the conversion price of the Series A shares would be multiplied by:

number of shares actually issued / number of shares that would be issued at new lower price
or
(18,333,334+2,000,000) / (18,333,334+3,333,334)
or,
0.9385 shares per share of common stock

1,000,000 shares of preferred stock would convert into 1,065,557 shares at a conversion ratio of 0.941 to 1. Therefore 65,557 additional shares would be issued to each of venture funds A and B, a far cry from the 666,667 they would each receive under full ratchet anti-dilution.

Impact of anti-dilution protection

The effect of anti-dilution protection is to shift ownership from the common shareholders to the preferred. The case can be made that management deserves to be punished in this way, since they are responsible for the failure to achieve the agreed upon milestones, but the university may feel aggrieved to be punished in this way — after all, their technology is still the core of the company and they were not involved with the company's operations and hence failure to meet milestones.

Table 10: Cap Table after down round Series B with full ratchet anti-dilution protection

Price per share: $0.60

	Shares				Raised	%		Value
	Common		Series A	Series B		I&O	FD	
	Shares	Options						
Professor	500,000					2.0%	1.9%	$300,000
Postdoc A	250,000					1.0%	0.9%	$150,000
Postdoc B	250,000					1.0%	0.9%	$150,000
University	500,000					2.0%	1.9%	$300,000
CEO	1,000,000					4.1%	3.8%	$600,000
Seed investors	250,000					1.0%	0.9%	$150,000
Management Pool		2,000,000					7.6%	$1,200,000
VC Fund A			1,666,667	9,166,667	$5,500,000	44.4%	41.0%	$6,500,000
VC Fund B			1,666,667	9,166,667	$5,500,000	44.4%	41.0%	$6,500,000
Total	2,750,000	2,000,000	3,333,334	18,333,333	$11,000,000	100%	100%	$15,850,000
Issued and outstanding	24,416,667							
Fully diluted	26,416,667							
Raised in this round	$11,000,000							
Cumulative raised	$14,210,000							
Pre-Money	$4,850,000							
Post-Money	$15,850,000							

Universities have started including "anti-down round" protection clauses in their license agreements to address this issue.

University Anti-Dilution Model

An alternative to the university being treated as a co-founder and receiving a significant equity stake — 20% in our base case — an approach universities frequently take is to say: "I don't care how much of the company I own now, I care how much I own after serious investors have valued the company by investing in it, so give me 5% and keep me at 5% until $5 million has been raised."

The advantages to the university are:

- It sounds less to the other founders and so is an easier sell; and
- The university doesn't have to worry about the company issuing additional Founders shares before investors come in and strictly limit the company's ability to issue additional shares.

Venture capitalists are familiar with these arrangements and as long as there is a clearly defined endpoint to the anti-dilution protection and the percentage ownership that is being protected is reasonable — e.g., 5% rather than 20% — such provisions will not be a barrier to the company raising funding.

Tables 11-13 show what the Cap Table would look like through Series A if the university negotiated to receive 10% with anti-dilution protection on a fully diluted basis to $3 million raised excluding the Seed Round.

The university would receive only 885 shares in the pre-split founders round, rather than the 2,000 shares in our base case.

These would become 221,250 shares following the 250 for one split prior to the Seed Round, plus a further 27,000 shares would need to be issued to bring the university back up to 10% after the Seed Round.

After the Series A, an additional 445,000 shares would need to be issued to bring the university back up to 10% on a fully diluted basis. At this point the anti-dilution protection is exhausted and the university will undergo the same dilution as other shareholders going forward.

The university therefore owns 693,250 shares, a 10% stake, after the Series A, versus 500,000 shares, a 7.4% stake, in our base case, and it is clear that 10% with anti-dilution protection to $3 million raised is worth considerably more than 20% of the founders round.

Tables 14-17 show what the Cap Table would look like through Series B if the university instead negotiated to receive 5% with anti-dilution protection on a fully

diluted basis through $5 million raised excluding Seed Round.

The university would only receive 425 shares in the pre-split founders round.

These would become 106,250 shares after the split preceding the Seed Round, plus it would receive a further 11,000 shares to bring it back to 5% after the Seed Round.

The university would receive a further 210,000 shares to bring it back up to 5% after the Series A.

Table 11: Cap Table after founders round, 10% anti-dilution protection till $3 million raised

Price per share: $1.00

	Shares	Raised	%	Value
Professor	2,000	$2,000	22.5%	$2,000
Postdoc A	1,000	$1,000	11.3%	$1,000
Postdoc B	1,000	$1,000	11.3%	$1,000
University	885	$885	10.0%	$885
CEO	4,000	$4,000	45.0%	$4,000
Total	8,885	$8,885	100%	$8,885
Issued and outstanding	8,885			
Fully diluted	8,885			
Raised in this round	$8,885			
Cumulative raised	$8,885			

Table 12: Cap Table after Seed Round, 10% anti-dilution protection till $3 million raised

Price per share: $0.80
Split: 250 for 1

	Shares	Raised	%	Value
Professor	500,000		20%	$400,000
Postdoc A	250,000		10%	$200,000
Postdoc B	250,000		10%	$200,000
University	221,250		8.9%	$198,600
Anti-Dilution Shares	27,000	$108	1.1%	$221,600
CEO	1,000,000		40%	$800,000
Seed investors	250,000	$200,000	10%	$200,000
Total	2,498,250	$200,108	100%	$2,220,200
Issued and outstanding	2,498,250			
Fully diluted	2,498,250			
Raised in this round	$200,108			
Cumulative raised	$208,993			
Pre-Money	$2,020,092			
Post-Money	$2,220,200			

Table 13: Cap Table after Series A Round, 10% anti-dilution protection till $3 million raised

Price per share: $1.00

	Shares			Raised	%		Value
	Common		Series A		I&O	FD	
	Shares	Options					
Professor	500,000				8.4%	7.2%	$500,000
Postdoc A	250,000				4.2%	3.6%	$250,000
Postdoc B	250,000				4.2%	3.6%	$250,000
University	248,250				4.2%	3.6%	$693,250
Anti-Dilution Shares	445,000			$1,780	7.5%	6.4%	$695,000
CEO	1,000,000				16.8%	14.4%	$1,000,000
Seed investors	250,000				4.2%	3.6%	$250,000
Management Pool		1,000,000				14%	$1,000,000
VC Fund A			1,500,000	$1,500,000	25%	22%	$1,500,000
VC Fund B			1,500,000	$1,500,000	25%	22%	$1,500,000
Total	2,943,250	1,000,000	3,000,000	$3,001,780	100%	100%	$7,638,250
Issued and outstanding	5,943,250						
Fully diluted	6,943,250						
Raised in this round	$3,001,780						
Cumulative raised	$3,211,780						
Pre-Money	$4,636,470						
Post-Money	$7,638,250						

The $10 million raised in the Series B Round blows through the anti-dilution limit of $5 million, so to calculate how many shares the University should receive, we break the transaction down into two transactions — a $2 million investment to get to the $5 million anti-dilution limit and an $8 million investment to complete the round. Now, the option pool increases from 1,000,000 to 2,000,000 shares as part of the Series B Round, and the original agreement requires that the 5% be calculated on

Table 14 Cap Table after founders round, 5% anti-dilution protection till $5 million raised

Price per share: $1.00

	Shares	Raised	%	Value
Professor	2,000	$2,000	23.7%	$2,000
Postdoc A	1,000	$1,000	11.9%	$1,000
Postdoc B	1,000	$1,000	11.9%	$1,000
University	425	$425	5.0%	$425
CEO	4,000	$4,000	47.5%	$4,000
Total	8,425	$8,425	100%	$8,425
Issued and outstanding	8,425			
Fully diluted	8,425			
Raised in this round	$8,425			
Cumulative raised	$8,425			

Table 15 Cap Table after Seed Round, 5% anti-dilution protection till $5 million raised

Price per share: $0.80
Split: 250 for 1

	Shares	Raised	%	Value
Professor A	500,000		21.1%	$400,000
Postdoc B	250,000		10.6%	$200,000
Postdoc C	250,000		10.6%	$200,000
CEO	1,000,000		42.2%	$800,000
University	106,250		4.5%	$93,800
Anti-Dilution Shares	11,000	$44	0.5%	$208,800
Seed investors	250,000	$200,000	10.6%	$200,000
Total	2,367,250	$200,044	100%	$2,102,600
Issued and outstanding	2,367,250			
Fully diluted	2,367,250			
Raised in this round	$200,044			
Cumulative raised	$208,929			
Pre-Money	$1,902,556			
Post-Money	$2,102,600			

Table 16: Cap Table after Series A Round, 5% anti-dilution protection till $5 million raised

Price per share: $1.00

	Shares			Raised	%		Value
	Common		Series A		I&O	FD	
	Shares	Options					
Professor A	500,000				9%	8%	$500,000
Postdoc B	250,000				4%	4%	$250,000
Postdoc C	250,000				4%	4%	$250,000
CEO	1,000,000				18%	15%	$1,000,000
University	117,250				2.1%	1.8%	$327,250
Anti-Dilution Shares	210,000				3.8%	3.2%	$460,000
Seed investors	250,000				4%	4%	$250,000
Management Pool		1,000,000				15%	$1,000,000
VC Fund A			1,500,000	$1,500,000	27%	23%	$1,500,000
VC Fund B			1,500,000	$1,500,000	27%	23%	$1,500,000
Total	2,577,250	1,000,000	3,000,000	$3,000,000	100%	100%	$7,037,250
Issued and outstanding	5,577,250						
Fully diluted	6,577,250						
Raised in this round	$3,000,000						
Cumulative raised	$3,210,000						
Pre-Money	$4,037,250						
Post-Money	$7,037,250						

a fully diluted basis, so does the university get its 5% of the extra 1,000,000 shares in the option pool or not? This is a business issue, not a legal matter, and the university should specify in the term sheet that an increase in the option pool is considered to occur before the preferred shares are issued to remove any ambiguity on this issue.

In our case, I have assumed that the university did include this issue in the term sheet. Table 17 shows the Cap Table after the complete Series B. The university receives an extra 100,000 shares to get it to 5% on a fully diluted basis after the option pool is increased and $2 million of Series B Preferred is issued. The remaining $8 million investment takes the university's ownership down to 3.4% on a fully diluted basis at the end of the round.

Table 18 shows how the three approaches compare. Although the initial ownership percentages sound very different — 20%, 10% and 5% — the end results are not that different. 10% protected to $2 million results in the university ultimately owning almost 40% more shares than in the case of an unprotected 20%, while 5% protected to $5 million results in an ownership that is only 15% less than an unprotected 20%.

SUMMARY

This article has shown how the relative ownership shares of a start-up company evolve over time. It has also shown that the ultimate ownership by the various parties is going to be determined by the success of the company, and by careful management of the fund raising strategy — achieving value added milestones prior to major rounds of financing will preserve value for common shareholders.

The article also shows the value of non-dilutive funding — grants or partnerships where another party contributes services in kind. Suppose the initial $3 million product development phase had been funded by a grant from the federal government or a foundation — rather than through the Series A Round — then the common shareholders would not have suffered that particular 50% dilution and if the subsequent rounds of financing had remained the same, the founders' ultimate ownership share would have been double what it actually was.

Many company founders instead spend an inordinate amount of time worrying about dilution. Their energy would be more effectively used in focusing on value creation and the amount of money that can be made if the company is successful rather than trying to negotiate anti-dilution protection for themselves.

Table 17: Cap Table after Series B Round, 5% anti-dilution protection till $5 million raised

Price per share: $2.00

	Shares				Raised	%		Value
	Common		Series A	Series B		I&O	FD	
	Shares	Options						
Professor A	500,000					4.7%	3.9%	$1,000,000
Postdoc B	250,000					2.3%	2.0%	$500,000
Postdoc C	250,000					2.3%	2.0%	$500,000
CEO	1,000,000					9.4%	7.9%	$2,000,000
University	327,250					3.1%	2.6%	$854,500
Anti-Dilution Shares	100,000					0.9%	0.8%	$700,000
Seed investors	250,000					2.3%	2.0%	$500,000
Management Pool		2,000,000					16%	$4,000,000
VC Fund A			1,500,000	1,500,000	$3,000,000	14%	12%	$3,000,000
VC Fund B			1,500,000	1,500,000	$3,000,000	14%	12%	$3,000,000
VC Fund C				2,000,000	$4,000,000	19%	16%	$4,000,000
Total	2,677,250	2,000,000	3,000,000	5,000,000	$10,000,000	72%	76%	$20,054,500
Issued and outstanding	10,677,250							
Fully diluted	12,677,250							
Raised in this round	$10,000,000							
Cumulative raised	$10,210,000							
Pre-Money	$10,054,500							
Post-Money	$20,054,500							

Table 18: Comparison of university shareholdings under 3 negotiating models

	Negotiating Model		
Shares held by Univ after		**Anti-Dilution**	
	20%	10%/$3 mm	5%/$5mm
Founders	2,000	885	425
Seed	500,000	248,250	117,250
Series A	500,000	693,250	327,250
Series B	500,000	693,250	427,250