

**Improving Innovation by Rationalizing IRC Section 351 –  
Licensing vs. Assignment of Founders' IP in VC Backed Start-ups**

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ABSTRACT

This Article questions the conventional wisdom of the US practice of early assignment of founder intellectual property to the venture capital backed startup-company. The Article shows that certain US tax treatments may motivate the founders to rush to assign their individually owned intellectual property to the startup-company rather than license it to the company. This tax enhanced distortion of the founders' choice may have socially inefficient effects that under certain circumstances hinder innovation by decoupling the intellectual property from those who are most apt to exploit it. Thus, this Article offers for consideration, proposals to reform the current tax treatment of intellectual property transfers. The proposed reform will level the playing field from a tax perspective and prevent distorting the choice between intellectual property assignment and intellectual property licensing.

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## **I. The Theory**

The conventional wisdom and common practice require that founders assign to the startup-company all intellectual property rights that they individually own and that the company uses, at a very early stage. Without such assignment, the argument goes, the founders will not be able to secure venture capital funding.<sup>1</sup> Delaying the transfer of founder intellectual property to the startup-company may later prove to be expensive also because of negative tax implications. Thus, start-up founders typically assign to the startup company their rights to the intellectual property upon the formation of the company in exchange for founder stocks.

Anecdotally, however, this is not a complete description of the spectrum of technology startup intellectual property allocation. There are exceptions to the generalization of the rush to assign intellectual property to the corporation. Most notably,

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<sup>1</sup> See, e.g., Philip Mendes, *To License a Patent – or, to Assign it: Factors Influencing the Choice* (“raising investment capital... is perceived by capital raising professionals to be more easily done when the start up company owns its major asset, namely the patent, rather than just has licensed rights to it.”)

[http://www.wipo.int/sme/en/documents/license\\_assign\\_patent.htm](http://www.wipo.int/sme/en/documents/license_assign_patent.htm)

the Skype-eBay case provides an example of a success story in which the founders retained individual rights to the intellectual property. The founders of Skype Technologies S.A., a voice-over-IP software and service provider, have retained individual rights to a significant portion of the technology used by their startup-company. The startup-company did not own full rights to the intellectual property it used, it only owned rights to use the technology through a license agreement, and yet the company was able to raise funding and eventually was sold for a very lucrative consideration of a few billion dollars paid by eBay Inc., the online auction and commerce site, in 2005. After the acquisition of Skype by eBay, the founders still continued to own the technology separately. While, subsequently, the retained separate ownership rights to the technology caused disputes, regarding the scope of eBay's rights under the license agreement, it did not prevent the founders of Skype from ripping the monetary fruits of the company they had created.<sup>2</sup>

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<sup>2</sup> Brad Stone, EBay Plans Public Offering for Skype (“One problem for eBay in selling Skype is an escalating intellectual property dispute between eBay and the Skype founders. Joltid, a company founded by Mr. Zennstrom and Mr. Friis, retained ownership of the peer-to-peer technology used in Skype and licensed it back to eBay.”)

<http://www.nytimes.com/2009/04/15/technology/companies/15skype.html>

The Skype story, however, is an example involving a foreign start-up. This fact raises the question of whether different custom and legal rules explain the different practice. Of more concern is the question whether there are constraints in the US market that make it less lucrative to retain IP rights by the founders of a startup-company, thereby negatively effecting innovation and social welfare. Thus, this Article explores the US practice of early founder assignment of IP in the context of VC backed startup-companies, the motivations for this practice and potential inefficiencies and suboptimal effects on innovation.

A significant incentive to assign the founders' IP to the startup-company at an early stage, before VC funds invest, is provided by the US tax rules, which encourage founders to transfer the IP as soon as the startup is formed lest the founders forgo a favorable tax exemption. Even if the founders initially decide to retain their individual ownership in the IP, they may later change their minds and wish to assign the IP to the company after the VCs already invested in the company. At this later time, however, the assignment of the founders' IP to the company, which takes the form of an exchange of technology for stock, is viewed as a disposition of investment and is subject to tax payment. The founders will incur a tax liability at the time of the IP disposition

transaction, even though they receive illiquid stocks of a private company with no established market for those stocks.<sup>3</sup>

However, if the founders choose to transfer their IP to the company before the VCs invest in the company, they can take advantage of Section 351 of the Internal Revenue Code which allows for a tax free exchange of IP for stock. In this case, the transfer of the founders' IP is viewed as an investment changing form, rather than a disposition of an investment.<sup>4</sup> This choice, to transfer the intellectual property to the company at an early stage, allows for a deferral of tax payment. The tax will be due only when the stocks, received in exchange for the founders' IP, are ultimately sold. The

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<sup>3</sup> The transfer will constitute a taxable exchange under 26 USC § 1001, and the founders will be required to recognize gain on it.

<sup>4</sup> *Cf. Portland Oil Co. v. Commissioner*, 109 F.2d 479, 488 (1st Cir. 1940), cert. denied, 310 U.S. 650 (1940). (“It is the purpose of [§ 351] to save the taxpayer from an immediate recognition of a gain, or to intermit the claim of a loss, in certain transactions where gain or loss may have accrued in a constitutional sense, but where in a popular and economic sense there has been a mere change in the form of ownership and the taxpayer has not really "cashed in" on the theoretical gain, or closed out a losing venture.”)

basis, for the purpose of calculating the tax liability at the time of the sale of the stock, will be the basis of the IP exchanged for the stock.<sup>5</sup>

In order to qualify for this lucrative 351 tax free exchange of IP for stock, the founders, who transfer their IP, have to be in control of the corporation that receives the IP immediately after the exchange takes place. Being in control of the corporation, for the purpose of the 351 exchange tax deferral, is defined in Section 368(c) of the Internal Revenue Code as owning at least 80% of the voting power of the corporation as well as at least 80% of the non-vote stock.<sup>6</sup> Thus, waiting to assign the IP to the company after the VCs invest will result in forgoing the advantage of a tax deferral under a 351 exchange. This is because once the VCs invest, the founders generally no longer own 80% of the company. Thus, mid-stream assignments, assignments that take place after the VCs have invested in the company, assuming VCs agreed to invest despite the fact that the founders own the technology individually, cannot take advantage of the tax deferral. Without the tax deferral, the assignment of the IP to the company is likely to be economically

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<sup>5</sup> 26 USC § 358(a)(1).

<sup>6</sup> For determining the existence of control following the transfer for purposes of Section 351 the rules allow to group all the transferors and aggregate their equity interests provided that the transferors participated in the same transaction and subject to further requirements, *see* 26 C.F.R. § 1.351-1.

prohibitive, especially if it is delayed since with time the value of the technology will increase and so will the associated tax liability for its sale.

This Article argues that the US tax rules, and in particular Section 351, potentially distort founders' decisions by motivating them to assign their IP rights to the startup-company at an early stage. Seeking to avoid negative tax consequences, ex-ante, founders are incentivized to transfer the technology to the company rather than to keep the ownership of the IP separated from the business entity. The Article further argues that under certain situations, the premature assignment of IP may result in inefficient use of innovation and reduction of the total social welfare.

However, if, contrary to current common practice, the IP is kept separately from the startup-company, and the company receives only a license to use the technology, then the use of the founders' IP may be more efficient. For example, should the company end up in bankruptcy, the founders can continue to develop and exploit the technology with no delay despite of the bankruptcy procedure since the IP is not the property of the bankrupt company. On the other hand, if the technology is transferred to the company instead of being merely licensed to the company, bankruptcy proceedings can keep the technology hijacked in a lengthy liquidation process. Until the bankruptcy procedures are resolved the technology may not be put to use.

The effect of bankruptcy procedures on the reduced use of the technology may be exacerbated by the separation of the founders from the technology. This Article argues

that founders may be better positioned to continue and explore the IP. The founders, being most familiar with the technology and having the strongest sentiment towards the technology, as they are emotionally and actively invested in its development and creation, may be best positioned to utilize the technology going forward. Instead, bankruptcy proceedings may leave the technology in the hands of third parties, including patent trolls<sup>7</sup> who may acquire the technology from the bankrupt company in the hopes of using it to sue unsuspected users rather than with the intent to develop it further. Even if the founders value the technology more than third parties who are interested in getting it from the bankrupt company, liquidity constraints may prevent the founders from competing for the technology.

The benefit to the founders from keeping their intellectual property separate from the VC backed company is clear: the founders can maintain the technology protected in case of bankruptcy. On the other hand, there is no bankruptcy risk on the part of the licensee, the VC backed company, if the licensors, the founders, become bankrupt. Since the bankruptcy code explicitly protects licensees of intellectual property allowing them to

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<sup>7</sup> See, e.g., John M. Golden, *'Patent Trolls' and Patent Remedies*, 85 Texas L. Rev. Vol. 2111, 2112 (2007) (“the “patent troll” – apparently one of a class of patent owners who do not provide end products or services themselves, but who do demand royalties as a price for authorizing the work of others.”)



retain their rights under the license agreement even if the trustee attempts to reject the license as an executory contract.<sup>8</sup> Thus, if the founders license the intellectual property to the VC backed company, the rights under the license are protected under the bankruptcy code even in case the founders become bankrupt.

Many startup-companies that fail do not go through bankruptcy procedures, but simply cease to operate. Even if the company just ceases to exist, the uncertainty about

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<sup>8</sup> Executory contracts are contracts in which both parties still have to perform material obligations thereunder, *see, e.g.*, *In re Murexco Petroleum, Inc.*, 15 F.3d 60 (5th Cir. 1994). Founders licensing their IP to the company are likely to receive stock from the licensee corporation as full consideration for the license, at the time the license is granted, with no continued royalty rights. Thus, a trustee's attempt to classify such a license agreement as executory is unlikely to succeed. Furthermore, 11 U.S.C. § 365(n) specifically protects licensees of IP from the general power of trustees to reject executory contracts subject to court approval, ("If the trustee rejects an executory contract under which the debtor is a licensor of a right to intellectual property, the licensee under such contract may elect... to retain its rights (including a right to enforce any exclusivity provision of such contract, but excluding any other right under applicable nonbankruptcy law to specific performance of such contract)" )

the rights to the IP complicates further development and use of the IP and may deter the founders from taking advantage of it once they have relinquished their right to the IP and assigned it to the VC backed startup-company.

Yet, while the rights of both the licensee and licensor are protected under bankruptcy law, the VCs investing in the startup-company have no incentive to replace assignment of the founders' IP with mere licensing rights. The VCs do not directly benefit from the continued separate development of the technology by the founders in case the startup-company fails. The potential increase in innovation and, in turn, in social welfare in case the founders retain the rights to develop the IP is not internalized by the VC investors.

Anecdotally, however, entrepreneurs who have used a certain technology in one venture were able to apply the same technology in an innovative way in different unrelated ventures. Their special familiarity with the technology may well have played a major role in the continued innovation. The case of the spinning-technology is one example that supports and helps illustrate the argument that under certain situations, preventing the founders from continuing to pursue new innovative uses of their original IP, separately from the startup-company, may be inefficient.

John Osher, a serial entrepreneur, ran Cap Toys, a company that developed the Spin Pop, which is a spinning lollipop, a candy connected to a stick that swirls. After selling Cap Toys to Hasbro in 1997, Osher used the same technology behind the Spin Pop

in a new product developed in his new company, Dr. Johns Products. This time the technology was used to create an inexpensive electric toothbrush named the Spinbrush. Dr. Johns Products was acquired by Procter & Gamble in 2001 for \$475 million.<sup>9</sup> The ability to use the same technology that was developed in his old company, also in his new company, helped Osher find an innovative solution to a problem in a different market. The familiarity and close understanding of the technology was catalytic to the continued innovation and increased social welfare. Thus, maintaining rights to the IP in the hands of the founders, separately from the VC backed company, may be important to promoting innovation, because the founders may be better positioned to exploit the IP further.

In addition, licensing rather than assigning the IP may increase the risk tolerance of the founders. For example, the founders may be more willing to step aside earlier and allow the VC fund to replace them with professional management if they can maintain property rights to the technology. In such a case, the founders know that even if the company chooses to take, what they believe to be, the wrong course, they can continue to explore individually other options for the technology. On the other hand, if the founders assign the IP to the company, they may delay approaching potential VC investors until a

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<sup>9</sup> Toys and Spinning Brushes: How John Osher Found His Way to Profits:

Knowledge@Wharton

(<http://knowledge.wharton.upenn.edu/article.cfm?articleid=870>)

time when the course of the company is more secure. This decision, however, may be inefficient because the experienced VCs could add valuable input earlier on.

The founders' concerns could be mitigated by allowing them to retain licensing rights to the IP. Yet, negotiating in order to reach this result may be difficult. Not only that VCs do not directly benefit from the continued development of the IP by the founders after the company fails, but the licensing of the founders' IP rights is less attractive to the VCs than assignment of the IP. Licensing entails the risk of future disputes between the company and the founders about the scope of the license, as was the case in the eBay-Skype acquisition.

Should the founders be willing to trade for the right to maintain individual separate rights to the IP, there is not much that they can offer the VCs in exchange for these rights. The capital needs of the venture do not permit the VCs to invest less in the company even if the IP is only licensed and not assigned, since the company uses the VC funds for its growth. Diluting the founders more, by giving the VCs a larger stake in the equity of the company in exchange for leaving the IP rights in the founders' hands may also prove inefficient. The VCs are interested in keeping the founders motivated to work hard for the company and the founders' equity interest in the company helps achieve this.

On top of all that, because of the tax distortion, the VCs may well face a done deal: the founders will already transfer the IP to the company prior to the VCs investing in order to take advantage of Section 351. Thus, in order to allow the founders to decide

efficiently if and when to assign their individually owned intellectual property to the startup-company, Section 351 should be amended. The founders' decision should not be further complicated by potential tax liability consequences. The tax code should allow the founders to decide whether or not to assign the intellectual property to the company independently and without risking potential adverse tax consequences. Hence, this Article argues that the same tax treatment should apply to all transfers of technology to startup-companies in exchange for stock of the receiving company regardless of the percentage the transferring founders end-up owning in the company following the transfer: whether the founders own 10% of the company immediately after the transfer or 100% should not affect their tax liability.

One way to achieve this result could be to eliminate the control requirement completely. Founders, under the proposal, will be allowed to defer tax payment in connection with the assignment of IP until the time of sale of the stock that is received in exchange for the IP, even if they do not control the company that receives the rights to the IP and even if they own only a diminutive percentage of the company, which is substantially less than the current requirement of 80% of the company.

Alternatively, to eliminate the distortion regarding the timing of the assignment of the intellectual property caused by the current requirements for qualifying as a tax deferred transfer, the tax code can be amended so that the founders incur tax liability upon such transfer regardless of the percentage of their ownership following such

transfer. While this amendment will eliminate the tax incentive to rush to transfer the intellectual property to the startup-company, before the venture capitalist invests and before the founders no longer control the startup-company, this is not a desirable amendment. The undesirable result of such an amendment will be a premature tax on the founders that may well deter efficient transactions by making them economically prohibitive. This is because assignment of the founders' intellectual property rights to the startup-company may be more efficient than merely licensing those rights to the company, in certain situations.

It should be noted that tax planning that attempts to circumvent the current control requirement of Section 351 is likely to fail as the IRS may well see through such schemes and treat them as sham transactions<sup>10</sup> or step transactions.<sup>11</sup> Even though the transaction

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<sup>10</sup> See, e.g., *Rice's Toyota World Inc. v. Commissioner*, 752 F.2d 89, 92 (4th Cir. 1985). (“To treat a transaction as a sham, the court must find that the taxpayer was motivated by no business purposes other than obtaining tax benefits in entering the transaction, and that the transaction has no economic substance because no reasonable possibility of a profit exists.”)

<sup>11</sup> See, e.g., *Penrod v. Commissioner*, 88 T.C. 1415, 1428 (1987) (“The step transaction doctrine is in effect another rule of substance over form; it treats a series of formally separate "steps" as a single transaction if such steps are in substance integrated, interdependent, and focused toward a particular result.”)

may take the form of an exchange or of reorganization, the IRS is likely to conclude that in substance it is a sale and thus does not qualify for tax deferral.<sup>12</sup> The transaction may well be viewed as a disposition of the property and thus will not qualify for a 351 tax deferral nor will it qualify for a Section 368 tax deferral, which covers reorganizations.<sup>13</sup>

For example, if the founders form a separate corporation and transfer the technology to it, and down the road follow on with a stock-for-stock merger in which the VC backed startup-company is the acquirer, the founders are likely to incur a tax liability upon the merger, and the merger will not qualify as an exempt reorganization. While a stock-for-stock merger can generally qualify as a tax free transaction, Section 368 of the Code requires that the merger transaction serves a valid business purpose rather than

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<sup>12</sup> See, e.g., <http://www.irs.gov/pub/irs-ccdm/merge.pdf> (“Section 351 is meant to cover mere changes in form of doing business, not what is effectively a sale of the asset transferred.”)

<sup>13</sup> See, e.g., IRC§ 1.368-1(b) (“The purpose of the reorganization provisions of the Code is to except from the general rule certain specifically described exchanges incident to such readjustments of corporate structures made in one of the particular ways specified in the Code, as are required by business exigencies and which effect only a readjustment of continuing interest in property under modified corporate forms... a sale is nevertheless to be treated as a sale even though the mechanics of a reorganization have been set up.”)

merely accomplishes tax avoidance.<sup>14</sup> Rather than an intention to reorganize, or readjust the corporate structure, the sale of the IP to the company is the obvious motivation for the transaction.

Another example of a tax planning that is likely to fail, focuses on the ability to aggregate investors' equity stakes in the company for the calculation of control following the transfer. If the founders postponed the assignment of their IP to the startup-company and later decide to transfer the IP to the company, at a time when they no longer satisfy the control requirement, they may transfer the IP simultaneously with a new round of VC financing transaction. Following the new transaction, the founders along with the VC investors should own at least 80% of the company on an aggregate basis in order to try and satisfy Section 351 requirements. To be sure, it may not be practical to secure such a high investor participation in the new round. More importantly, the IRS may well

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<sup>14</sup> See, e.g., IRC§ 1.368-1(c) (“A plan of reorganization must contemplate the bona fide execution of one of the transactions specifically described as a reorganization in section 368(a) and for the bona fide consummation of each of the requisite acts under which nonrecognition of gain is claimed... A scheme, ...such as a mere device that puts on the form of a corporate reorganization as a disguise for concealing its real character, and the object and accomplishment of which is the consummation of a preconceived plan having no business or corporate purpose, is not a plan of reorganization.”)



conclude that the stock of the VCs should not be taken into account for determining whether or not the control requirement was satisfied since the IRS may view the primary purpose of their participation as accommodating the use of Section 351.<sup>15</sup>

The model developed in the following Part of the Article frames the scope and conditions for the incidence of inefficient early assignment of IP rights in startup companies and the possibility of waste created by the premature assignment.

## **II The Model**

### **1.1 General Assumptions**

At time  $t_0$  the company is formed and the founders transfer the IP rights, either by assigning or by licensing it, in exchange for 100% of the stock in the company.

Let us define a binary variable

$$y = \begin{cases} 0 & \text{if IP rights are licensed;} \\ 1 & \text{if IP rights are assigned.} \end{cases}$$

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<sup>15</sup> See, e.g., Joseph W. Bartlett, *Equity Finance: Venture Capital, Buyouts, Restructurings and Reorganizations*, Part I Ch. 5, § 5.3 (“the IRS is sensitive to preexisting shareholders coming into the syndicate only as “accommodation” investors, for purposes of meeting the § 351.”)

At time  $t_1 > t_0$  the VCs move in, and the founders step down. At that time the VCs invest  $I_1$  in the company.

The company is valued at  $V_1$  at time  $t_1$  which is immediately before the VCs invest, and is known as the pre-money valuation, and therefore the founders get a fraction  $f \equiv V_1/(I_1+V_1)$  of the stocks of the company, and the VCs get the remaining  $1-f = I_1/(I_1+V_1)$ .

The value  $V_1$  that the VCs assign to the company at time  $t_1$  is actually a function of  $y$ . So  $V_1 \equiv V_1(y)$ .

If the founders assigned the IP rights (and assuming they hold 100% of the company at times  $t_0 < t < t_1$ ), the founders do not have to pay any taxes at time  $t_0$ , in accordance with Section 351. The founders only have to pay capital gains tax when they ultimately sell the stock.

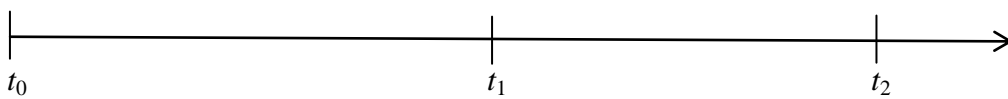
If the founders assign the IP rights later, they will have to pay capital gains tax (CGT) on the difference between their basis in the IP and the value of the stock received. On the other hand, if the founders license the IP in exchange for stock, they do not receive royalties for the IP, but rather the license is considered a paid-up license. The value of the stock paid in exchange for the license may be considered license fees and has to be recognized as ordinary income. This is another reason why it may be preferable for the founders to assign the IP so that the transaction will qualify for capital gains treatment. However, if the company enters into an IP license agreement with the

founders immediately following the formation of the company and enough time before the VCs invest in the company, then the value of the ordinary income recognized upon the payment of the license fees, in the form of stock of the company, can be low and thus give rise to only a relatively low ordinary income tax liability.

At time  $t_2 > t_1$  the company either goes bankrupt with probability  $\beta$  or survives with probability  $(1 - \beta)$ . If it survives it is sold at price  $V_2$  to investors. The probability of going bankrupt  $\beta$  is a function  $\beta(y, V_1, I_1)$  of the three parameters  $y$ ,  $V_1$ , and  $I_1$ . I assume that it is a decreasing function of  $I_1$  (the more money invested, the less likely the company is to go bankrupt).

## 1.2 Timeline

- $t_0$  Founders start the company.
- $t_1$  VCs invest and take control of the company (founders take a back seat).
- $t_2$  There is an exit (an IPO or an acquisition of the company) or the company goes bankrupt.



## 2 The General Idea

The IP may not be efficiently used because the founders' ability to use the IP and their choice regarding licensing or assigning of the IP may be restricted and distorted by the following factors:

- Taxes;
- Bankruptcy court and patent trolls;
- The VCs calculate  $V_1$  based on how much they expect to receive at the exit (the ultimate liquidation of their contemplated investment in the company through an IPO or an acquisition of the company) and not based on how much the company is actually worth. To be more precise, the VCs calculate an expected target price  $X$  and require that  $[I_1/(I_1 + V_1)]X \geq mI_1$ , where  $m$  is some predetermined multiplier they set for their investment.

### 2.1 The Founders, the VCs, and the Company's Outlook

At time  $t_0$  the founders decide if  $y = 0$  or  $y = 1$  (whether to license or assign). At time  $t_1$  the VCs decide to invest  $I_1$  in the company.  $I_1$  is the amount the company needs to operate until the next round of financing, until it reaches its next milestone, and often this takes about a year. Since I assume, for simplicity, only one round of VC financing,  $I_1$  will be the funds the company needs until exit at  $t_2$ . Because I assume a fixed time of exit  $t_2$ , and one instance of investment  $t_1$ , I can look at the multiplier of the

VCS' investment rather than a calculation of the IRR that takes into account the time value of the investment.

After time  $t_1$  the company continues to grow or shrink. Eventually, there is a probability of bankruptcy  $\beta$ , and also a probability of an exit (IPO or acquisition of the company) with a company valuation of  $X$ . So, let's say that there is a probability distribution  $f(X)$  so that  $f(X)dX =$  probability that the company will be valued between  $X$  and  $X + dX$ .

I will assume that if the company is not bankrupt then it is sold, so

$$\int_0^{\infty} f(X)dX = 1 - \beta.$$

To proceed I will assume that in general  $\beta(y, I_1, V_1)$  is some unknown function and  $f(X, y, I_1, V_1)$  is some unknown function. So, the average sale proceeds are

$$A(y, I_1, V_1) \equiv \int_0^{\infty} X f(X, y, I_1, V_1)dX.$$

## 2.2 The Threat of a Lawsuit

The reason why  $A$  (the expected value of the company when it is sold to an acquirer at time  $t_2$ ) depends on  $y$  is that the acquirer is worried about the founders suing for breach of license agreement if  $y = 0$ . Let  $L$  be the expected loss to the company from a lawsuit by the founders. Then, in this simple model,

$$A(0, I_1, V_1) = A(1, I_1, V_1) - L.$$

I will not develop an elaborate model for  $L$  in this paper, but it may be noted that the simplest assumption is that  $L$  is a fraction of  $A$ , say  $L = \lambda A$  for some constant  $\lambda$ , which means that the value of a claim by the founders of breach of the license agreement by the company, increases in proportion to the value the acquirer pays for the company.

### 2.3 The VCs' Investment Decision

Let's assume that the VCs are willing to buy at time  $t_1$  for any  $I_1, V_1$  as long as

$$\left(\frac{I_1}{I_1 + V_1}\right)A(y, I_1, V_1) \geq mI_1.$$

The VCs will choose that  $I_1^*$  for which the multiplier

$$\mu(I_1^*) \equiv \frac{A(y, I_1^*, V_1)}{(I_1^* + V_1)}$$

is maximal, provided that  $\mu(I_1^*) \geq m$ . So  $I_1^*$  is the solution to the equation

$$0 = \mu'(I_1^*) \rightarrow 0 = \left(\frac{1}{I_1^* + V_1}\right) \frac{\partial A}{\partial I_1^*} - \frac{A}{(I_1^* + V_1)^2} \rightarrow (I_1^* + V_1) \frac{\partial A}{\partial I_1^*} = A.$$

I will assume that the VCs invest  $I_1^*$  so that

$$(I_1^* + V_1) \frac{\partial A}{\partial I_1^*} = A \rightarrow 1 = (I_1^* + V_1) \frac{1}{A} \frac{\partial A}{\partial I_1^*} = (I_1^* + V_1) \frac{\partial \ln A}{\partial I_1^*}$$

Thus I find that

$$1 = (I_1^* + V_1) \frac{\partial \ln A}{\partial I_1^*} \tag{1}$$

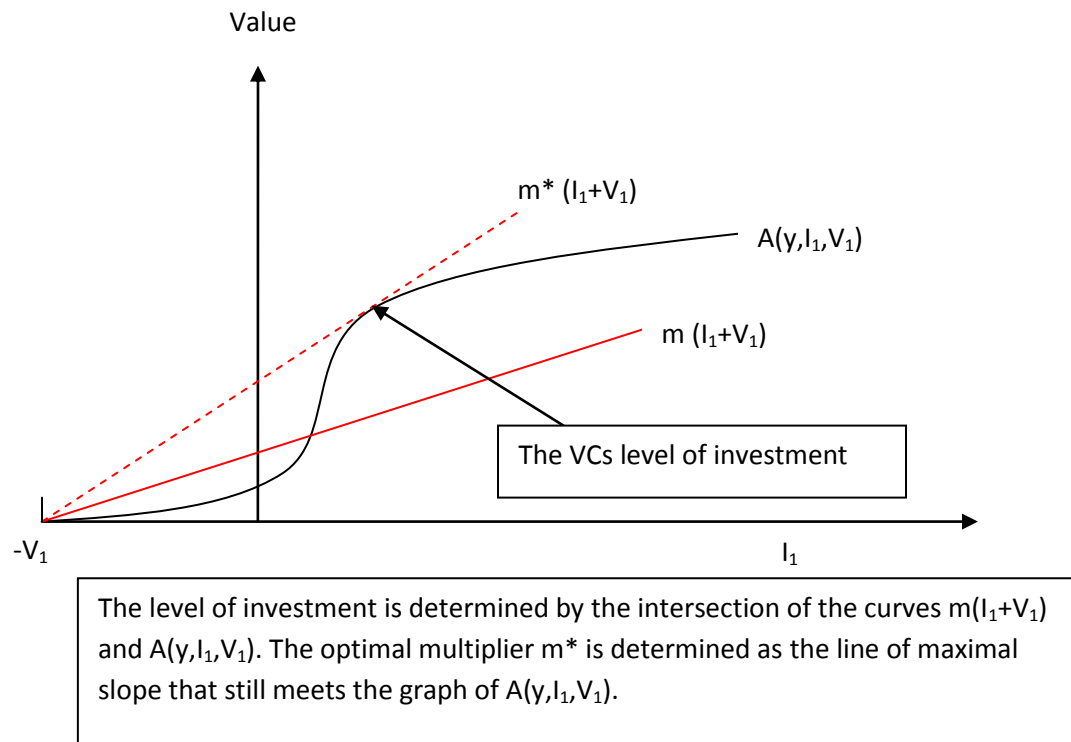
The multiplier is

$$m^* \equiv \mu(I_1^*) \equiv \frac{A(y, I_1^*, V_1)}{(I_1^* + V_1)} . \quad (2)$$

The solution to (1) depends on  $y$  and  $V_1$ :

$$I_1^* \equiv I_1^*(y, V_1), \quad m^* \equiv m^*(y, V_1) . \quad (3)$$

Above I assume that  $I^*$  is a function of  $y$ , but it is not hard to see that in the simplified model ( $L = \lambda A$ ),  $I_1^*$  is independent of  $y$ . This is also the case in practice since the VCs invest as much as the company needs for its operation.



Thus the optimal multiplier depends on whether  $y = 0$  or  $y = 1$ , and I indicate that by a subscript as follows:

$$m_y^* \equiv \frac{A(y, I_1^*, V_1)}{(I_1^* + V_1)} .$$

(In the equation above  $V_1$  is a function of  $y$  as I will elaborate on later.)

In the VC industry, there will not always be VCs willing to invest, especially if the multiplier  $m^*$  is low. I therefore define a monotonically increasing function  $0 \leq \phi(\mu) < 1$  as  $\phi(\mu) = \text{Prob}\{ \text{There exists a VC willing to accept multiplier } \mu \}$ .

Because a company with full rights to the IP it needs, has a higher expected value at the time of exit, the founders' decision about whether or not to assign their IP to the company affects the multiplier:  $m_1^* > m_0^*$  and thus  $\phi(m_1^*) > \phi(m_0^*)$ , and so it will be more difficult to find VCs who are willing to invest if  $y=0$ .

## 2.4 The Founders' Decision

The founders take the following points into consideration when they decide at time  $t_0$  on whether  $y = 0$  (to license) or  $y = 1$  (to assign):

- They wish to maximize the multiplier  $m^*$  from (2), not only for the obvious reason of increasing their ultimate gain at time  $t_2$ , but also in order to increase the probability of finding a VC willing to invest in the company.



- If possible, they also want to maintain control over the IP, so that they can reuse it, especially if the company goes bankrupt.

So, I proceed to investigate their decision process in more detail.

- I denote by  $W$  the expected extra gain that the founders can realize from another independent venture using the same IP. But they can only realize it if  $y = 0$ .
- For simplicity, I assume that whether the founders realize  $W$  or not has no effect on the valuation of the original company or its probability to go bankrupt.
- If  $y = 0$  the founders stand to gain  $m_0^* V_1(0) + W$ , whereas if  $y = 1$  the founders stand to gain  $m_1^* V_1(1)$ .

I also need to consider two more factors:

- In the VC industry, there will not always be VCs willing to invest, especially if the multiplier  $m^*$  is low.
- There are tax benefits to choosing  $y = 1$ , i.e., to assigning IP rights at time  $t_0$  rather than waiting.

At this point I add the following assumptions to the model:

- At time  $t_1$ , if  $y = 0$  and the founders cannot find any VCs to invest in their company, [which happens with probability  $1 - \phi(m_0^*)$ ], the founders will assign the IP rights at that time, in the hope of attracting VCs. (This is somewhat of a simplification since VCs

invest in several rounds of financing, and future VC investors may require assignment even if the previous ones did not.)

- Assigning IP rights at time  $t_1$  is costly because the founders now have to pay capital gains tax (CGT) on the gain of transferring the IP to the company. This is because at this time I assume the founders no longer own at least 80% of the company, because employees, service providers, and initial investors, such as angels and VCs investing in the first, seed, round of financing, diluted the founders' stake below the 80% floor.
- I assume that assigning the IP at time  $t_1$  is part of the negotiations with the prospective VCs, so if the founders still never find any VCs to invest, they don't assign and they don't have to pay any CGT.
- If the founders do find VCs, they have to pay right away CGT on their gain. I denote the cost basis by  $B$  and the tax-rate by  $\tau$ . So the founders have to pay  $\tau (V_1 - B)$ , and they have to pay it right away.
- The founders would have had to pay  $\tau (V_1 - B)$  even if  $y = 1$ , but they would not have had to pay it right away, they could defer payment until they sell the stock. In addition, if  $V_2 < V_1$  at time  $t_2$  they only need to pay  $\tau (V_2 - B)$ . Thus, the actual cost to the founders is not the whole tax liability  $\tau (V_1 - B)$  but rather the cost of not deferring it. I assume that this extra cost is a certain fraction  $0 < \nu < 1$  of the liability. (In addition there are implications resulting from the length of the holding period of the rate being either short or long term capital gain tax rate.)

So the net cost of delaying the assignment of IP rights is

$$C = v\tau (V_1 - B). \tag{6}$$

Note that I consider this scenario as part of the  $y = 0$  case (since IP rights were not assigned at  $t = t_0$ ) but I have to set  $V_1 = V_1(1)$  in (6), since from the perspective of the VCs it is as if  $y = 1$ .

I now turn to calculate the expected value of the founders when  $y=0$ . I first list the various scenarios and their respective probabilities in the table below.

Probability	Description	Founder Value
$\phi(m_0^*)$	Founders found a VC that is willing to accept a licensed IP	$m_0^* V_1(0) + W + L$
$1 - \phi(m_I^*)$	Founders did not find a VC willing to invest even if the IP is assigned (and certainly not if the IP is only licensed)	$W$
$\phi(m_I^*) - \phi(m_0^*)$	Founders can find a VC only if the IP is assigned, but not if it is licensed.	$m_I^* V_1(1) - v\tau V_1(1)$

So the expected value of the founders (if  $y=0$ ) is:

$$Y_0 \equiv \phi(m_0^*) [m_0^* V_1(0) + W + L] + (1 - \phi(m_I^*)) W + (\phi(m_I^*) - \phi(m_0^*)) [m_I^* V_1(1) - v\tau V_1(1)]$$

On the other hand, if the founders assign IP at  $t_0$  their expected value is:

$$Y_1 \equiv \phi(m_I^*) [m_I^* V_1(1)] + (1 - \phi(m_I^*)) \cdot 0.$$

Now, the decision is based on

$$y^* = \begin{cases} 0 & \text{if } Y_0 > Y_1 \\ 1 & \text{if } Y_1 > Y_0 \end{cases} \quad (9)$$

## 2.5 The Benefit to Society

I get the benefit to society by adding to  $Y_y^*$  the expected gain to the VCs  $(m_y^* - 1)I_1^*$  as well as the cost of not deferring the taxes.

I argue that if  $v\tau > 0$  there exist cases where  $Y_1 > Y_0$  but  $S_1 < S_0$ , for suitable ranges of parameters. This means that under such cases the founders choose to assign the IP to the company even though from the perspective of society as a whole it would be preferable that the founders only license the IP to the company.

For example, consider the extreme case in which  $W$  is created only if the founders maintain rights to the IP and license it to the company, so that the other costs, such as  $L$ , are but a zero sum game transfer from the VCs to the founders.

So I get, in this case

$$\begin{cases} S_0 \equiv \phi(m_1^*)A(1, I_1, V_1) + W(1 - \phi(m_1^*) + \phi(m_0^*)) & \text{if } y = 0 \\ S_1 \equiv \phi(m_1^*)A(1, I_1, V_1) & \text{if } y = 1 \end{cases}$$

Thus, whenever  $W(1 - \phi(m_1^*) + \phi(m_0^*)) > 0$  it follows that  $S_1 < S_0$ .

[The next step in the model: adding L as a waste to society; relaxing the assumption that litigation is just a zero sum game distribution from VCs to founders, thus adding a force in the opposite direction of  $W$  and examining what we can learn from this new model.]

*Appendix*

For convenience, I collect the notation used in this Article in the following table.

<b>Notation</b>	<b>Description</b>
$A(y, I_1, V_1)$	Average expected value of the company when VCs exit.
$B$	The cost basis for tax purposes (for the founders).
$C$	The net cost of tax for the founders.
$I_1$	The investment of the VCs at time $t_1$ .
$L$	Expected loss to the VCs from a lawsuit by the founders.
$m^*$	Optimal multiplier expected by the VCs.
$m_y^*$ or $m^*(y)$	Optimal multiplier (expected by the VCs) for a given choice $y$ .
$S_0, S_1$	The total expected value of “society” (depending on whether $y=0$ or $y=1$ ).
$t_0$	The time when founders transfer the IP rights to the company. At that time they have to decide whether to license or assign the rights.
$t_1$	The time when the VCs enter.
$V_1$	The valuation of the company (as estimated by the VCs) at the time of investment $t_1$ .

W	Expected extra value of use of the licensed IP by the founders on another venture.
y	Binary variable that takes the value $y=0$ if founders license the IP rights at time $t_0$ and $y=1$ if they assign the IP rights at that time.
$Y_0, Y_1$	The total expected value of the founders (depending on whether $y=0$ or $y=1$ ).
$\beta$	Probability of bankruptcy.
$\phi(\mu)$	The probability to find a VC willing to settle for multiplier $\mu$ .
v	The cost of tax deferral, per dollar of tax liability.
$\tau$	Tax rate
$\lambda$	In a simplified model, the loss L from a lawsuit is proportional to the expected value A, and the proportionality constant is $\lambda$ .
$\mu$	An arbitrary multiplier (when used as a variable)