Internet Appendix for:

On the Tax Efficiency of Startup Firms

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Appendix A: Relative tax costs of the different forms.

We use the maximum marginal tax rate from each year in the sample period to calculate the tax cost of each of the two organizational forms.

	Top Marginal			Total Tax Cost of organizational form	
Year	Corporate (t_y)	Capital Gain (t_g)	Personal (t_p)	C-Corp (Δ= 1) (1)	LLC (2)
1997	35.0%	20.0%	39.6%	48.0%	39.6%
1998	35.0%	20.0%	39.6%	48.0%	39.6%
1999	35.0%	20.0%	39.6%	48.0%	39.6%
2000	35.0%	20.0%	39.6%	48.0%	39.6%
2001	35.0%	20.0%	39.1%	48.0%	39.1%
2002	35.0%	20.0%	38.6%	48.0%	38.6%
2003	35.0%	15.0%	35.0%	44.8%	35.0%
2004	35.0%	15.0%	35.0%	44.8%	35.0%
2005	35.0%	15.0%	35.0%	44.8%	35.0%
2006	35.0%	15.0%	35.0%	44.8%	35.0%
2007	35.0%	15.0%	35.0%	44.8%	35.0%
2008	35.0%	15.0%	35.0%	44.8%	35.0%
2009	35.0%	15.0%	35.0%	44.8%	35.0%
2010	35.0%	15.0%	35.0%	44.8%	35.0%
2011	35.0%	15.0%	35.0%	44.8%	35.0%
2012	35.0%	15.0%	35.0%	44.8%	35.0%
2013	35.0%	15.0%	35.0%	44.8%	35.0%
2014	35.0%	15.0%	35.0%	44.8%	35.0%
Mean	**35.0%**	**16.7%**	**36.5%**	**45.8%**	**36.5%**

See section 4 in the text for further detail.

1) C-corp tax cost = $\Delta_i t_y + (1 - \Delta_i t_y) t_g$

2) LLC tax cost = t_p

Appendix B: Estimation of Delta

In this appendix we discuss our estimation of Δ in greater detail. As discussed in section 3, the aim of our estimation to determine the likelihood that a firm in our sample with a Net Operating Loss (NOL) will be able to use the carry-forward to reduce taxable income in future periods.

Why firms won't be able to use the NOL

As defined in the tax law, the deductibility of a NOL will be limited by two factors: 1) expiration of the unused deduction due to lack of future taxable income in the statutorily allowed period and 2) a qualifying ownership change in the firm. The first scenario is self-explanatory. If a firm does not generate sufficient taxable income in the 20 years after the generation of the NOL (for U.S. tax purposes), then it will not be able to recognize a full tax benefit.

The second restriction is much more complicated, and the rules regarding it are defined in Section 382 of the Internal Revenue Code. Broadly speaking, a qualifying change is said to have occurred when:

i) The corporation undergoes a reorganization as per IRC section 368 (with some exceptions). This includes most mergers and acquisitions.

OR

ii) The total change in ownership (either purchases or sales) of stock by all five per cent shareholders of the company over a three-year period amounts to more than 50 per cent of the company's shares outstanding.

The first class of change is straightforward. If a company undergoes a substantial reorganization or is acquired, it will generally be considered to have undergone a qualifying change and the limitation will come into force. In contrast, the second class of change is broader and can be triggered by a variety of events. These could include the issuance of a new class of stock, the conversion of debt to equity, or the liquidation of holdings by existing shareholders on the public market. All of our sample firms are potentially affected by this type of change.

If it is determined that either of these changes has occurred, then the annual amount of the NOL carryforward that can be utilized will be significantly limited, potentially to almost zero, regardless of the

amount of taxable income the firm generates in the future. As a result, many mature public companies include provisions, such as poison pills, in their corporate documents to block qualifying ownership changes from occurring. One purpose of these provisions is to prevent the elimination of the benefit from the NOL carryforward.

To illustrate how these ownership changes might manifest in our sample firms we document the life-cycle for a hypothetical startup in Table A.1. The startup begins with an initial capital contribution from the founders, and then receives venture capital investment for a 40% stake in the company after the first year of operations. Approximately four years later the startup issues new shares representing 20% of the value of the company through an IPO. Since the VC investment and IPO did not occur in the same three year window the event does not trigger a qualifying ownership change, even though the total shift in ownership from inception is over 50%. However, when the VC owners liquidate their holdings on the public market after-expiration of their lock-up agreements six months later, this does trigger a qualifying shift in ownership and the company must determine the limitation.

To determine the amount of the limitation, IRC Section 382(a) (1) states:

The section 382 limitation for any post-change year is an amount equal to:

(A) The value of the old loss corporation, multiplied by

(B) The long-term tax exempt rate

For purposes of this calculation, the IRS publishes the long-term tax-exempt rate each month.[1] To determine the value of the loss corporation, IRC section 382(e)(1) states that the value of the loss corporation is the value of its stock immediately prior to the ownership change (with some exceptions). In practice, this means that a company will typically multiply its fair market value preceding the ownership change by the appropriate long-term rate.

[1] For example, the applicable rate of 4.3 percent for an ownership change in the month of July 2011 was published in Rev. Rul. 2011-14, table 3. This rate represents the highest of the adjusted federal long-term tax exempt rate in effect for any month in the three-month calendar period ending with the calendar month in which the ownership change occurs.

Turning back to our example, the value of the startup is shown to be $51.25 million immediately prior to the qualifying event. If we assume an applicable rate of 4% this results in an annual limitation of $2.05 million on the utilization of the NOL carryforward. If the firm does not generate enough income in a given year to utilize the allowed deduction, the unused portion accrues and carries forward to increase the allowable deduction in the subsequent year. Assuming the firm has 20 years to utilize the NOL carryforward, this means the maximum NOL carryforward deduction that will be allowed in the future is $41 million ($2.05 million * 20 years). As the firm has a carryforward of $75 million at the time of the change, almost half of the NOL will expire unused without providing any benefit to the firm's shareholders, even if the firm generates significant amounts of taxable income in the future.

Our example continues. Like most of the sample firms, the hypothetical startup continues to generate NOLs after IPO. However, it shows enough promise that the value increases and the firm is acquired at a higher price a little over a year after the qualifying ownership change. As this is a complete acquisition, the event will be considered a qualifying ownership change, and the firm must again calculate the annual limitation. Since the market value of the firm has increased this calculation results in a potentially higher annual limitation of $3.28 million ($82 million * 4%). However, the rules require that each qualifying ownership change be evaluated separately and in the case that a pool of NOLs is subject to multiple ownership changes, the lowest limitation applies (Pepper Hamilton 2008). This means that for the NOL carryforward already subject to the previously lower limitation will still be bound by that amount. This is particularly important for our sample firms as they generate substantial NOLs and are subject to multiple rounds of financing, potentially triggering multiple qualifying ownership changes.

Estimation of Δ

In this section we attempt to estimate the likelihood that the firm will not generate sufficient taxable income to utilize the NOL carryforward. This can be a result of a firms ceasing operations without generating profits, or being subject to a binding ownership change limitation.

For our estimate we rely on the observed financial performance in the period after IPO in conjunction with any subsequent delisting events. Specifically, we determine whether the NOL IPO firm

generates sufficient income after the IPO to utilize the accumulated pre-IPO NOL carryforward. Since we do not have access to the firms' tax returns we proxy for this by using the sum of reported pre-tax income (PI) from the income statement starting in the year of the offering to the last year the firm appears in COMPUSTAT. For still active firms this is 12/31/2015. For the firms that delist it is the last fiscal year prior to the delisting date.

After determining the accumulated pre-tax income we then examine the firms' current survival status from the CRSP delisting file and place the firms into the following groups:

Group Number	Number of NOL firms	Status at end of the sample period	Total post-IPO pre-tax Income	Best estimate delta
1	149	Any	Greater than NOL Carryforward	1
2	573	Not Active	Less than Zero	0
3	26	Acquired in a merger	Greater than zero, less than the NOL carryforward	1
4	1	Delisted for reason other than acquisition	Greater than zero, less than the NOL carryforward	See Below
5	18	Active	Greater than zero, less than the NOL carryforward	1
6	272	Active	Less than zero	See below

Group Details

1 – If the firm has total accumulated pre-tax income greater than the pre-IPO NOL carryforward then we assume they fully recognized the tax benefit at the entity level.

Potential Bias: For all firms, particularly the 75 that delist, there may be existing ownership change limitations that prevent the full utilization of the NOL carryforward before it expires. Δ is potentially too high.

2 – If the firm delists for any reason (CRSP delist code not equal to 100-199), and still has not generated a net accumulated profit we assume that the NOL carryforward will not provide any benefit to the entity. Of these 573 firms 382 are acquired (CRSP delist code equal to 200-299) and 191 cease operations.

Potential bias: For the 382 acquired firms the ownership change limitation may not be completely binding and the acquirer may receive some benefit from the NOL carryforward, in that case Δ would be too low.

3 – If the firm has become overall profitable, but at a magnitude less than the NOL carryforward, and is acquired we assume the ownership change limitation will not be binding and the acquiring firm will be able to utilize the NOL carryforward in full.

Potential bias: The ownership change limitation is binding and some of the firms are not able to utilize the full NOL carryforward. Δ is too high.

4 - If the firm has become overall profitable, but at a magnitude less than the NOL carryforward, and delists for a reason other than acquisition (CRSP delist code not equal to 100-299), we assume that the delta is equal to the proportion of the NOL carryforward absorbed by the accumulated post-IPO income (Total Accumulated pre-Tax Income/NOL Carryforward).

Potential bias: The actual accumulated taxable income is higher or lower than the estimated amount from the financial statements. In addition, this does not take into account any existing ownership change limitations that may be in place. Δ could be too high or too low.

5 – For firms that are still active and become profitable, we assume they will continue on that trajectory and generate sufficient taxable income to fully utilize the NOL carryforward.

Potential bias: They may not generate sufficient taxable income. Δ is too high.

6 – For the still active firms that have yet to become profitable we estimate the probability that they will eventually become profitable in the twenty years after their IPO (the maximum allowed carryforward period for U.S. NOLs). To do we examine the sample of all firms that have an initial listing date on CRSP between 1/1/1960 and 12/31/1996 and negative pre-tax income in the fiscal period immediately prior to initial listing. We then run a series of logit regressions to determine the likelihood that, if a firm is still not lifetime profitable *k* years after their IPO, that they will eventually become lifetime profitable (and thus able to utilize the tax losses). We run twenty regressions for each of k =1 to 20, taking variables for the sample of firms that are still not lifetime profitable in $t+k$.

Variables (year t = last fiscal year immediately prior to IPO)

Logit regression, robust SEs

Dependent variable

$LIFETIMEPROFIT_i$ = Dummy variable equal to 1 if firm *i* accumulated pre-tax income in the period after IPO > 0 and zero otherwise.

Independent variables

$LOSSPERC_{i,t+k}$ = percentage of years from *t*+1 to *t*+*k* where firm reports a pre-tax loss.

$\ln(Assets)_{i,t+k}$ = Natural log of ending total assets in year *t*+*k*

$ROA_{i,t+k}$ = Pre-tax return on assets in *t*+*k*

What the regressions provide is that estimated probability that a firm which is still lifetime unprofitable *k* years after an IPO will eventually become lifetime profitable, based on the observed financial characteristics of that year. We then take the coefficients from this regression and use it to come up with the predicted probabilities for our sample firms based on the number of years the firm has been active in the period after IPO.[2]

Potential bias: The predicted probability is just whether the firm will become overall profitable, it can't say anything about whether the magnitude will exceed the NOL carryforward so Δ would be too high. Or, it could overstate the probability that the firm will generate profits because of fundamental differences between the two samples. In which case Δ would be too low.

The main takeaway is that our estimated Δ could biased in both directions. The question for our main analysis is how wrong it would have to be in order to eliminate the tax benefit from the LLC. As shown in Figure 1 panels B-G, the answer is quite a bit. Those results show that while we may be off in our estimation of Δ for any individual firm, on average we would have to be systematically too low by a large amount in order for the substantial tax benefits of the LLC to disappear.

[2] For year 16 in the out of sample regression two of the independent variables predict the outcome perfectly. For those firms in our sample with the last year active being t+k we assign a delta of 0.02 which is equal to the percentage of firms in year 16 of the estimation sample that eventually report lifetime profits.

Appendix C: Other potential issues that might affect our estimation of NTC, and additional sensitivity analysis

In this section we specifically consider issues related to the investor level tax status that may cause our estimate of the relative tax savings from the LLC to change. Specifically we consider the effect of deferral, the potential exclusion of capital gains from sale of C-corporations from taxation, and the most commonly proposed investment structure to accommodate tax-exempt investors. Finally, we estimate one additional tax benefit of LLCs which potentially increases the enhanced purchase price for startup firms acquired prior to a public offering.

Deferral of investor level tax effects

As discussed in section 3, our main analysis assumes that any investor level tax effects will be recognized immediately. However there are several dynamics of the VC investment structure, and tax law that make it likely some or all of the tax effects will be deferred into the future. In this section we consider the effect this deferral, both of payments and benefits, has on our estimate of the payoffs of the different organizational forms.

VC fund portfolio structure

The VC fund itself is generally organized as a limited partnership. All of the individual partners own an interest in the fund, and the fund itself owns equity stakes in the various portfolio companies. Because of the pass-through nature of the limited partnership any income generated by investment in the portfolio companies flows through the partnership to the individual fund partners for taxation. Importantly, whatever character the income has within the fund, it retains that character for the individual partners. So, for example, if a fund's ownership of a particular portfolio company results in a capital gain then the income from the fund is also a capital gain for the individual partners.

Startup Firms organized as C-corporations

For taxable investors, disposition of their interest in a C-corporation results in the recognition of a capital gain/(loss) equal to the difference from the proceeds of the disposition (which can be zero) and the amount the taxpayer invested in the entity. Each tax year the taxpayers will pool all of their capital gains

and losses together to come up with the net taxable position. In the context of the VC fund, the netting occurs first at the fund level with the net amount passed through to the individual fund limited partners. The taxable LPs will then net that amount against any capital gains/(losses) they recognize from other sources to come up with their net taxable amount for the year. If the net position is a gain then the taxpayer pays any tax liability due.[3] If the net position is a loss, an individual taxpayer can use it to offset any capital gains and deduct a net loss of up to $3,000 against other income in a given year.[4] Any unused capital loss can be carried forward indefinitely to be offset against capital gains in future years.

The dynamic from the above discussion that we do not capture in our model is the fact that any tax effects from capital gains and losses are tied to the actual disposition of the interest in the startup firm. This means that taxpayers will defer the tax cost of the increase in capital gains from successful investments until the future, but will also have to defer the tax benefit from the increase in capital losses from unsuccessful investments. Depending on the relative magnitudes of the capital gains and losses in each investor's portfolio this could result in enhanced tax benefits for the C-corporate form as investors are able to avoid the immediate recognition of capital gains. To take this into account we introduce a factor, γ, into the payoff model to reflect the deferral of the capital gain tax effect.

$$PAY_c = \sum_{i=1}^{n} Y_i\left[\left(1 - \Delta_i t_y\right) * \left(1 - \gamma_i t_g\right)\right] \qquad \text{(A. 1)}$$

Where $\gamma_i = 1/(1+i)^n$

n = years active.[5]

[3] For taxable individual the rate applied depends on the character of the gain. If the stock has been held for a longer than 12 months, it is considered long-term capital gain and taxed at a preferential rate. If the disposition occurs less than 12 months from the original purchase than the gain is taxed at the taxpayer's marginal income tax rate. If the taxpayer is a C-corporation then the gains are always taxed at the ordinary marginal rate.

[4] Corporate owners of taxable entities are not allowed to deduct any net capital losses. If they find themselves in a net loss position the loss can be carried back three and forward five years to offset net capital gains. Section 1212(a)(1).

[5] For the IPO sample we consider years the difference between the firms' founding year and IPO year from SDC to be the number of years active. We use the founding year as provided by Jay Ritter (Specifically we use the Field-Ritter dataset of company founding dates as used in Laura C. Field and Jonathan Karpoff "Takeover Defenses of IPO Firms."), unless missing in which case we use the founding year as per SDC. For the non-IPO sample we use the first date of financing and current situation date to determine the years active. For firms missing this information

i = discount rate – we assume 4%.

Startup Firms organized as LLCs

When all of the portfolio firms are organized as LLCs, the operating profits and losses each flow through to the fund where they are netted together. Each partner then reports their proportional share of the net profit/(loss) position on their individual tax return.

After the partners receive their proportional allocation from the funds, they each have an additional netting to perform before they can determine the ultimate tax effects of their investment. As the limited partners in the fund are not actively involved in the management of the startup firms, any income or loss from the investments is considered passive. This means that the net profits/(loss) from the fund must be netted together with any passive income the limited partners recognize from other investments to determine the net taxable profits/(loss) for the tax return. If this netting results in profits, than that amount is taxed at the taxpayers' ordinary marginal tax rate. If the netting results in an overall loss, which is highly likely given the results of our main analysis, the taxpayer's ability to recognize the tax benefit may be limited.

The first limitation is that owners are can only deduct losses to the amount of their actual economic involvement – their basis - and more specifically, the amount they have at-risk in the investment.[6] Any losses in excess of their at-risk basis are not deductible in the current period and can be carried forward to subsequent years when the taxpayer has sufficient basis to absorb them. Given that the startup firms are predominantly equity financed this will generally not be a binding limitation for the limited partners of the fund.

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we assume they are active the average number of years for all other firms in the same category with sufficient information to calculate the variable (e.g. defunct).

[6] Sec. 465 establishes the at-risk rules. Items that can increase a taxpayer's at risk basis include: cash & property contributions, debt for which the taxpayer is personally liable, and the taxpayer's share of any income produced by the activity. Items that can decrease it include: taxpayer's share of any loss produced by the activity, and withdrawals of property or cash. Thus the amount at-risk in an investment is similar to a taxpayer's adjusted basis. *Murphy & Higgins (2010, 287)*

The next limitation is related to passive activity losses, and is only applicable to individual, as opposed to C corporate, taxpayers. Losses from an entity in which an owner does not materially participate in its operations (generally the case for non-employee investors in startup firms) can only be offset against passive income from other passive activities (and not below zero). Any non-deductible losses are suspended and can be carried forward and offset against passive income in future years.[7] Additionally, when the investor disposes of the activity, any suspended passive losses are deductible in the year of sale against the taxpayer's active and portfolio income.[8] As a result, the suspended losses are not lost, but merely deferred until disposition. This treatment generates a significant tax benefit for the investor, as he can recognize a deduction up to his at-risk basis in the investment against their other income.[9] This last point is particularly relevant for our analysis since even the owners of the IPO firms, including the VC limited partners, will be able to receive a tax benefit when they dispose of their shares in the entity.[10]

In the context of our main estimation, the biggest effect of these limitations is that it would defer the recognition the tax benefits of the losses, which potentially reduces the incremental tax benefits of the LLC:

$$PAY_{llc} = \sum_{i=1}^{N}(1-\gamma_i t_p)Y_i \qquad \text{(A.2)}$$

And we can restate the relative tax savings of the LLC as:

$$TAX = \sum_{i=1}^{N} Y_i[\left((1-\gamma_i t_p)-(1-\Delta_i t_y)*(1-\gamma_i t_g)\right)] \qquad \text{(A.3)}$$

For the estimation of tax benefits, we assume the taxable investors do not have other passive income against which to offset the net LLC losses passed through from the portfolio. Therefore, as with the capital gains/(loss), we assume any tax benefits from the passed through losses are not recognized until the IPO

[7] Sec. 469(b). For founders, or other employee-owners of the firm, the income will mos tlikely be considered active and any losses can be immediately offset against other income.
[8] Treas. Reg. Sec. 1.469-2T
[9] The passive activity losses limitations do not apply to corporate owners. Any passive losses generated from investments can be offset against the corporate owner's other income in the year incurred.
[10] Per Sec. 7704(a) when a partnership's interests are traded on an established securities market it will be treated as a corporation for tax purposes. Per Sec. 469(k)(2) when a taxpayer disposes of their entire interest in the publically traded entity any disallowed passive losses are allowed as a deduction in the year of disposition.

year (or year of disposition for the non-IPO sample). All other variables are the same as in our main analysis.

($ in millions)

Group	PAY_c	PAY_{llc}	TAX	TAX/Equity
IPO	($35,754.20)	($33,758.50)	$1,995.65	1.98%
Non-IPO	($330,207)	($292,320)	$37,887.20	4.74%
Combined	($365,961.2)	(326,078.50)	$39,882.85	4.44%

The results show that while the deferral of the investor level tax benefits does reduce the relative attractiveness of the LLC, the LLC still delivers a substantial tax savings. This confirms that the majority of the benefits from the LLC come from the ability of the release of the trapped NOLs to provide at least some tax benefits at the investor level.

Qualified Small Business Stock (QSBS) exemption

Shareholders in a qualified C-corporation can potentially exempt up to 100% of the capital gain on sale from taxation. This decreases the relative attractiveness of the LLC as the individual shareholders would not only avoid taxes on the incremental capital gain generated by the entity's business income ($(1-\Delta_i t_y)Y_i$) they would also be exempt for the additional capital gain from that we currently assume is constant across organizational forms. We do not include this dynamic in our main analysis because, as we see subsequently, it is incredibly difficult to estimate which investors will qualify for the exclusion, not to mention the magnitude of the excluded gain, with any sort of precision. However, given that many startup firms may potentially qualify for the exclusion, in this section we attempt to at least provide some sense of how much it potentially effects our main results.

In terms of the model the payoffs and tax saving (TAX) allowing for a possible capital gain exclusion are as follows:

$$PAY_{llc} = \sum_{i=1}^{N}\left(\left(1-t_p\right)Y_i\right) + \left(1-t_g\right)(G_i - B_i) \quad \text{(A.4)}$$

$$PAY_c = \sum_{i=1}^{n}\left(Y_i\left[\left(1-\Delta_i t_y\right) * (1-\theta t_g)\right] + \left(1-\theta_i t_g\right)(G_i - B_i)\right. \quad \text{(A.5)}$$

$$TAX = \sum_{i=1}^{N} Y_i[\left(\left(1 - t_p\right) - \left(1 - \Delta_i t_y\right) * \left(1 - \theta_i t_g\right)\right)] + \sum_{i=1}^{N} (G_i - B_i) * ((1 - t_g) - (1 - \theta t_g))$$

(A.6)

Where $0 \leq \theta_i \leq 1$

G_i = incremental proceeds received from sale of the investment. Assumed constant across organizational forms.

B_i = basis in the investment.

The payoff functions now reflects the total capital gain/(loss) from investment in each of the entity types. Remember the total capital gain/(loss) is equal to the proceeds received from sale of the investment minus the basis in the investment. For the C-Corporation the total proceeds are equal to $\left(G_i + \left(1 - \Delta_i t_y\right) Y_i\right)$, or the residual income/(loss) in the entity plus the incremental proceeds from the sale of investment attributable to the expected future performance of the company. The proceeds for the LLC are equal only to G_i as the business income/(loss) from the investment has already flowed through to the individual investors. We assume that basis in the investment (B_i) is the same across organizational forms.

We also incorporate a term, θ_i, that captures the fact that when there is a capital gain a portion of it may qualify for exemption from taxation. The higher θ_i is, the less of the gain qualifies for exclusion, and the lower payoff from the C-corporation. When $\theta_i = 1$ no gains qualify for exemption and the relative payoffs are the same as before:

$$TAX = \sum_{i=1}^{N} Y_i[\left(\left(1 - t_p\right) - \left(1 - \Delta_i t_y\right) * \left(1 - t_g\right)\right)]$$

When $\theta_i = 0$ all of the gains are excluded from taxation and the tax savings from the LLC is restated as:

$$TAX = \sum_{i=1}^{N} Y_i[\left(\left(1 - t_p\right) - \left(1 - \Delta_i t_y\right)\right)] + \sum_{i=1}^{N} (G_i - B_i) * ((1 - t_g) - 1)$$

In the latter situation several dynamics become obvious. First, in the case where the startup generates accumulated profits ($Y_i > 0$), the C-corporation will strictly dominate the LLC because $t_y \leq t_p$ for the

entire sample period. Second, In the case of losses, it will come down to whether the higher loss tax benefit for the LLC investors, will offset the increased tax liability from the differential recognition of capital gains. The closer θ_i is to zero the bigger the incremental loss benefit will have to be in order to offset the reduced capital gain tax on the C-corporation.

What qualifies for the QSBS exemption?

Before estimating the required parameters ($\theta_i, G_i, and\ B_i$), we begin with a discussion of the rules regarding the QSBS exemption which are contained in Section 1202 of the internal revenue code. The law states that to even qualify for an exemption the investment in the startup must meet the following requirements:

1) The startup must be a domestic C-corporation, with

2) Total assets below $50 million in assets immediately before and after the stock issuance and

3) At least 80% of the assets in the startup must be involved in an active trade or business.

4) In addition, the startup cannot be in a disqualified industry: i) health, law, performing arts, engineering, architecture, accounting, actuarial science, consulting, athletics, financial services, brokerage services, or any trade or business where the principal asset is the reputation or skill of one of its employees, ii) banking, insurance, financing and similar businesses, iii) farming, iv) mining and other natural resources, and v) operation of a hotel

5) On the investor level, the stock acquired must be issued in exchange for money, property (other than corporate stock), or services, and

6) Must be acquired at the original issuance from the corporation itself, and

7) The investment must be held for at least five years.

If the investment meets those seven requirements, the investor then must determine the amount of the gain that is eligible for the exclusion. The tax rules rule is that the maximum amount of a gain the can be excluded for any individual investment is limited to the greater of i) $10 million dollars, or ii) 10x's the investors basis in the investment. Any amount in excess of the cap will be taxed as a regular capital gain.

After determining how much of the gain is eligible for the exclusion, the investor must determine how much can be excluded. As shown in the table below this will be based on when the investment was originally purchased.

Acquisition period	**Amount of gain eligible for exclusion**	**AMT preference**
8/11/93-2/17/09	50%	Yes
2/18/09-9/27/10	75%	Yes
9/28/10 - present	100%	no

The exclusion has become more generous over the sample period. Not only has the percentage of the gain that is excluded increased to 100%, but the amount is no longer considered a preference item for calculation of the alternative minimum tax (AMT). This is particularly important for hi-net worth taxable individuals, because many of them would have previously had to add back a portion the excluded gain in their determination of AMT, substantially reducing the potential tax benefit.

For purchases that only qualify for a partial exclusion (those before 9/28/2010), the non-excluded gain is then subject to tax at a 28% rate – substantially higher than the maximum long-term capital gains rate during the same period. For tax-payers subject to the AMT, seven percent of the excluded gain is added back in the determination of alternative minimum taxable income which is then taxed at the AMT rate (maximum of 28% for our sample period). Because of the three limitations: i) cap on the amount of allowable qualifying gain, ii) non-excluded eligible gain subject to a higher tax rate, and iii) excluded capital gain being treated as a preference item for AMT, the incremental benefit of the capital gain exclusion for C-corporations will be substantially reduced for our sample firms.

To see how this would work in practice consider a hypothetical company SMALLCO. Investment in the company follows the following pattern:

Date	**Event**
1/1/2010	Company established by a single founder
12/31/2010	A VC fund purchases an 60% interest in the company for $8,000,000
12/31/2014	The same VC fund purchases an additional 20% interest for $2,000,000
12/31/2016	100% of the interests in the company is sold for $100,000,000

We can see right away that a portion of the VC investment will not qualify for the exclusion because it was purchased less than 5 years prior to the liquidation of the investment. We therefore assume that only 80% of the VC investment is potentially eligible ($8/$10 million). In addition we assume the investment otherwise qualifies for the QSBS exclusion, and the founder and investors are all high-net worth individual subject to AMT upon disposition. The total tax liability will then be determined as follows:

	Founder	**VC Investors**	**Total**
Proceeds from sale of company (A)	20,000,000	80,000,000	100,000,000
Less Basis (B)	-	10,000,000	10,000,000
Total Capital Gain (C)	20,000,000	70,000,000	90,000,000
Total Eligible for exclusion (D)	20,000,000	56,000,000	76,000,000
Cap on total eligible capital gain (E)	10,000,000	100,000,000	
Qualify for QSBS (F)	10,000,000	70,000,000	80,000,000
Eligible gain in excess of cap (G)	10,000,000	-	10,000,000
Excluded Capital gain - 75% (H)	7,500,000	52,500,000	60,000,000
Non-Excluded eligible capital gain (I)	2,500,000	17,500,000	20,000,000
Tax Liability			
Regular LTCG taxed at 15%:		-	-
Non-Eligible capital gain (D-C)	-	2,100,000	2,100,000
Gain in Excess of Cap (F)	1,500,000	-	1,500,000
Non-Excluded Eligible gain (I X 28%)	700,000	4,900,000	5,600,000
AMT ((H X 7%) X 28%	147,000	1,029,000	1,176,000
Total Tax	2,347,000	5,929,000	8,276,000
Effective tax rate (ETR)	11.7%	8.5%	9.2%

As the example illustrates while there is a tax savings, it is severely reduced by the limitations and higher tax rate on non-excluded gains.

Estimating θ_i

In order to operationalize all of this into a tractable estimate of θ_i we begin by restating the C-corporation payoff in the following manner:

$$PAY_c = \sum_{i=1}^{n}(Y_i\left[\left(1-\Delta_i t_y\right)*(1-\theta_i t_g)\right]+\left(1-\theta_i t_g\right)(G_i - B_i) = \sum_{i-1}^{n}(1-\theta_i t_g)CG_i \quad \text{(A.7)}$$

Where:

$$CG_i = \left(G_i + Y_i\left(1 - \Delta_i t_y\right)\right) - B_i \quad \text{(A.8)}$$

We the restate this payoff to take into account all of the different tax effects (written just for one firm for simplicity):

$$PAY_c = CG_i - [t_g \lambda_i CG_i + t_g[(1-\lambda_i)CG_i - \min\left((1-\lambda_i)CG_i, CAP_i\right)] + 0.28(1-E_i) * \min\left((1-\lambda_i)CG_i, CAP_i\right) + 0.28 * 0.07 * E_i * \min\left((1-\lambda_i)CG_i, CAP_i\right)] \qquad (A.9)$$

Where:

λ_i = the percentage of total capital gain that is not eligible for the exclusion

CAP_i = the maximum total exclusion

E_i = percentage excluded

- The first term ($t_g \lambda_i CG_i$) in the brackets reflects the tax on amount of the capital gain that doesn't qualify for exclusion consideration. So, for example, if the firm is in a disqualified industry λ_i = 1.
- The second term ($t_g[(1-\lambda_i)CG_i - \min\left((1-\lambda_i)CG_i, CAP_i\right)]$ reflects the tax on any eligible capital gain in excess of the statutory cap.
- The third term ($0.28(1-E_i) * \min\left((1-\lambda_i)CG_i, CAP_i\right)$ reflects that any eligible capital gain in excess of the allowable exclusion will be taxed at 28%.
- The fourth term ($0.28 * 0.07 * E_i * \min\left((1-\lambda_i)CG_i, CAP_i\right)$ captures the incremental AMT tax on exclusions that are considered an AMT preference item.

We then set A.9 equal to $(1-\theta_i t_g)CG_i$ allows to solve for θ_i.

$$\theta_i = \begin{cases} 1 - \left(1 - \lambda_i - \dfrac{0.28(1-\lambda_i)(1-0.93E_i)}{t_g}\right) * \min\left(\dfrac{CAP_i}{(1-\lambda_i)CG_i}, 1\right) & if\ E < 1 \\ 1 - (1-\lambda_i) * \min\left(\dfrac{CAP_i}{(1-\lambda_i)CG_i}, 1\right) & if\ E = 1 \end{cases} \qquad (A.10)$$

Importantly θ_i captures two things. The amount of the gain that will not be eligible for any exclusion, and the increased taxes paid for eligible gains that are not actually excluded. If the QSBS election simply

resulted in a 100% exclusion from capital gains taxation for the eligible gain, then θ_i would just be the percentage of the total gain that is ineligible for exclusion. However, because of the different tax effects for non-excluded, potentially eligible gains, we include them in our estimate of θ_i in order to keep the model parsimonious.

Estimating the total tax savings for our sample

After defining θ_i we now need to estimate $\lambda_i, E_i, CAP_i, and\ CG_i$. However, in order to do that accurately we need the following information about each individual startup's owners in the period leading up to IPO:

i) The number of individual owners in the firm – including all individual limited partners in VC funds.

ii) The proportion owned by each individual owner- which will tell us how much of the proceeds will flow through to them.

iii) Amount invested by each individual owner and when the investment was made.

iv) The date each individual owner sold their stock and exact proceeds received.

v) The tax situation of each owner at the time of sale.

Obviously, this data is unavailable for these firms, and the assumptions required to estimate the relevant parameters are considerably more uncertain than in the main analysis. The point of the exercise is to document that even using our best assumptions the LLC will still generate incremental tax savings, as opposed to claiming a precise dollar amount. We use the following steps:

Step 1: Determine total capital gain (CG_i)

Recall that, as discussed above, the total capital gain from the sale of the investment will be equal to the proceeds less the basis (B_i). In order to determine the proceeds, we rely on the fact that all of our sample firms are C-corporations, any that proceeds received from liquidation of the ownership interests will be equal to the residual income in the corporation plus any increase in valuation due to expected future cash flows.

$$PROCEEDS_i = G_i + (1 - \Delta_i t_y) Y_i \quad \text{(A.11)}$$

So if we can estimate the total proceeds received by investors in the C-corporation, we can then determine the total proceeds that they would have received if the firm were an LLC (G_i).

$$G_i = PROCEEDS_i - \left(1 - \Delta_i t_y\right) Y_i \quad \text{(A.12)}$$

We first estimate the total investor basis in the firm (B_i). As these firms are almost exclusively financed with outside equity, we assume the basis of the investors in the firm is equal to the total cash they contributed to the firm. For the IPO sample, this is equal to the total equity reported on the firms' balance sheet in the period immediately prior to IPO. For the non-IPO sample this is equal to the total known invested in the firm as reported in VentureXpert.

We next estimate the proceeds for each of the IPO and Non-IPO groups. As noted in Hall & Woodward (2007, 2010), most venture-backed companies cease operations without returning any significant return to the owners. The largest returns are generated by the IPO firms, but the authors note that some acquired firms can provide high returns as well, with the remainder of the acquisitions being 'effectively liquidations.' Consistent with this, Hall and Woodward (2007) estimate that 70% of the firms in their sample provide less than $1 million to the founders, and an additional 20% less than $10 million. Hall and Woodward (2010) find that 75% of entrepreneurs receive zero from the exit from the company. We assume that 25% our sample, including all IPO firms, generate positive proceeds for the shareholders. This results in a total of 6,684 firms (1,128 IPO, and 5,556 non-IPO) generating proceeds with the remainder being set to zero.

To estimate total proceeds for sale of interest in the C-corporation we assume that, for the IPO sample, the liquidation price per share is equal to the price 180 days after IPO. The majority of pre-IPO shareholders will be subject to lock-up provisions that typically last six months, so this represents their first opportunity to divest their shares and diversify their portfolio. We then multiply this price times the total

shares outstanding immediately prior to the offering to determine the total proceeds received by the pre-IPO shareholders upon liquidation of their ownership interest.[11]

For the non-IPO firms we assume that any firms with current situation indicating failure generate zero proceeds. For the 5,556 firms that we assume generate a positive proceeds we rely on Hall & Woodward (2007). They estimate that venture capital funds earn an average of $21.15 million per company invested.[12] This is the net return after deduction for amounts invested and taking into account all firms that fail. We therefore assume that the total sample will generate this average return for the investors. That is, the average CG_i for a C-corporate will equal $21.15 million. Given that the total sample is composed of 26,792 (1,128 IPO and 25,664 non-IPO) firms this implies a total net payoff of $566,650 million for the VC investors. As we discuss subsequently, we estimate the 20% of any returns from these firms will vest with the founders. This means that the Hall and Woodward number understates the true amount as it only reflects the net return to VC investors. We therefore gross up our estimate by 20% to get a total estimated net return of $708,312 million ($566,650/80%). We then subtract our estimated CG_i for the IPO firms from this total and assign the remainder equally to the 5,556 non-IPO firms randomly chosen to generate a positive return.

The below table summarizes our approach:

	IPO Sample	**Non-IPO Sample**
$PROCEEDS_i = G_i + (1 - \Delta_i t_y) Y_i$	Shares Outstanding Prior to IPO X's Share price 180 days after IPO.	0 for all firms where current situation indicates failure. For all other firms, randomly assign total proceeds to 5,556 firms such that the average CG_i = $21.15 million for the entire sample.

[11] In order to determine the shares outstanding immediately prior to the IPO we take the shares outstanding at the end of the first day of trading from CRSP (SHROUT) and subtract the total shares offered as indicated in SDC. For firms missing the shares offered variable we set shares offered before the offering to the shares outstanding at the end of the first day of trading. This causes the estimated proceeds to higher than what the pre-IPO shareholders would actually receive if we had the full information.

[12] Hall and Woodward indicate that the general partners in their sample recognized income on average of 5.5 million. This represents 26%, on average, of the total earnings. Therefore $5.5 million/26% = $21.15 million average exit value per venture funded company.

B_i	Total equity per the balance sheet in the last period immediately prior to the issue date	Total known investment as per VentureXpert

Stats for IPO sample (*$ in Millions)*

Variable	Mean	Std	Min	Median	Max
$PROCEEDS_i$	$550.22	$1,245.67	0.003	220.57	21,638
G_i	585.03	1,248.6	0	261.14	21,618
B_i	72.58	128.85	0.008	44.24	3,299

Stats for no-IPO sample (*$ in Millions)*

Variable	Mean	Std	Min	Median	Max
$PROCEEDS_i$	$42.558	$130.526	$(15,979.8)	$(1.29)	$10,643.3
G_i	$56.9266	$108.312	$0	$0	$263
B_i	$31.19	$118.93	$0.0009	$10.50	$96,12.61

Step 2: Determine portion of firms that will not qualify for any exclusion regardless of investor type or magnitude of the capital gain (λ_i)

We next identify firms where the total gain will be disqualified for exclusion regardless of the amount, or individual investor tax situation. We do so in the following manner:

1) If the firm is in a disqualified industry we assume it does not qualify for the exclusion.
2) If the startup is less than five years old at the time it ceases operations none of the capital gains will qualify for the exclusion. For IPO firms this is the amount of time between founding and delisting.

For non-IPO firms it is the amount of time between founding (or the date the first investment received) and current situation date if not active.

As shown below this eliminates almost 40% of the sample from eligibility for the exclusion before even getting to the additional limitations.

		IPO sample	Non-IPO Sample
i)	Firm in is excluded industry[13]	85	1,244
ii)	Firm ceases operations less than five years after the founding date/(date of first investment)	322	7,658
	Total	407	8,902

For these firms we set λ_i = 1. All of the capital gain will be ineligible for the exclusion.

Step 3: Determine how much of the investment was held for the minimum time period (λ_i)

We next consider the percentage of any capital gain attributable to each investor groups is potentially eligible for the exclusion. Keeping in mind that if $\lambda_i = 1$ for the startup as a whole it is also equal to 1 for each investor group regardless of the subsequent discussion. To do so we estimate when the investment was actually made, and how long it was held. For the founder group we use the formation date as the investment date. If the difference between the formation date and lockup expiration date is less than five years we assume the capital gain is not eligible for the exclusion.

For the non-founder group we look at the financing round dates and determine the percentage of total outside investment that was raised less than five years from the lockup expiration/(event) date for the IPO/(non-IPO) sample. We then multiply any capital gain by that percentage to determine the amount eligible for the exclusion.

[13] For the IPO sample we use 2-digit SIC codes from SDC to determine if the firm is in a disqualified industry. The excluded industries are: Agriculure (01, 02, 07), Mining (10, 12, 14), Finance (60, 61, 62, 63, 64, 65,67), Hotel (70), Personal Services (72), Motion Pictures (78), Health Services (80), Legal Services (81), and Enginering, Accounting, Research, or Management (87.

For the Non-IPO sample we use industry information from VentureXPert. All Non-Hi Tech Firms with the following Industry Sub-Group 1/Industry Sub-group 2 combinations are considered as not qualifying for the exclusion: Consumer Related/Entertainment and liesure, Financial Services/Financial Services, Industrial Energy/Enegery-Coal, Industrial Energy/Oil and Gas exploration.

		IPO Sample	Non-IPO sample
i)	Lockup expiration date is less than five years from the founding date	308	N/A
ii)	A portion of the investment received is less than five years from the lockup expiration date or 'event' date as per venturexpert.	711	25,664
iii)	Results in a capital loss for the non-Founder investors	134	21,296

i) $\lambda_i = 1$

ii) $\lambda_i = \frac{Total\ Invested\ less\ than\ five\ years\ of\ Lock{-}Up\ Expiration\ date/(current\ situation\ date)}{Equity/(Total\ Known\ invested)}$

iii) $\lambda_i = 1$

After steps 2 and 3 the estimated average $\lambda's$ for each group are as follows:

	IPO Sample	Non-IPO sample
Founders	0.43	0.99
Non-Founders	0.76	0.92

Unsurprisingly almost all of the non-IPO sample are ineligible for the gain. This is because the vast majority of these firms are less than five years old at the 'current situation' date and all of them have received at least a portion of their investment within the previous five years. In addition, because only 5,556 of the firms are assumed to generate a payoff, the fact that the vast majority will then have a capital loss biases the λ_i towards 1. Therefore the incremental benefit will come from the IPO firms, who also generate the largest proceeds upon exit.

Step 4: Determine total eligible capital gain for each investment group (CG_i, CAP_i)

Since founders and other employee owners are likely to have received their ownership interests in exchange for nominal capital contributions, they are likely to be subject to the total cap on eligible gains of

$10 million. The VC limited partners and other outside shareholders that supply the capital on the other hand will most likely be subject to the cap of ten times invested capital.

Ideally we would like to know the total number of founders and employee owners and when they received their interest, but this data is not readily available. However, Hall and Woodward (2010) report the founder information in their on-line appendix for a sub-sample of VC backed IPO firms. The average firms in that sample reports two founders that retain approximately 20% of the firms' ownership at the time of the offering. We assume the same proportion for all firms in our sample. In addition we assume that the founders will have no basis in their investment so their total capital gain will be equal to 20% of the estimated proceeds, and the total eligible gain will be capped at $20 million.

For the remaining 80% we assume the cap is 10x's the total equity/(known invested) for the IPO/(Non-IPO) sample. This likely overstates the eligible gain as this group will include numerous employee owners who also have minimal basis in the firm, and will thus be subject to a hard cap of $10 million.

	Founders	***Non-Founders***
Proceeds	$PROCEEDS_i$ X 20%	$PROCEEDS_i$ X 80%
Basis (B_i)	*0*	*As above*
Total Capital Gains (CG_i)	$PROCEEDS_i$ X 20%	$PROCEEDS_i$ X 80% − B_i
Total Capital Gains Potentially Eligible for Exclusion	$(1-\lambda_i)CG_i$	$(1-\lambda_i)CG_i$
Cap on total eligible capital gains (CAP_i)	$20 million	10x's basis
Total eligible capital gains	$\min\{(1-\lambda_i)CG_i, CAP_i\}$	$\min\{(1-\lambda_i)CG_i, CAP_i\}$

IPO Sample – Average ($ in millions)

	Founders	**Non-Founders**
Total Capital Gains (CG_i)	110.04	367.6
Total Capital Gains Potentially Eligible for Exclusion	52.69	85.00
Total eligible capital gains	10.05	49.03

Non-IPO Sample (Non-Capital loss firms only) – Average ($ in millions)

	Founders	**Non-Founders**
Total Capital Gains (CG_i)	45.49	178.45
Total Capital Gains Potentially Eligible for Exclusion	45.58	86.91
Total eligible capital gains	0.01	67.94

Step 5: determine amount excluded from tax (E_i)

We finally determine the amount of any exclusion for each firm, using the exclusion percentage based on the assumed date of purchase discussed above.

IPO Firms

	Founders	**Non-Founders**
Fifty Percent Exclusion	858	729
Seventy-Five Percent Exclusion	268	391
One hundred percent exclusion	2	8

Non-IPO firms

	All investors
Fifty Percent Exclusion	6,640
Seventy-Five Percent Exclusion	16,006
One hundred percent exclusion	3,018

Step 6: Calculate θ_i

We then use the estimated parameters to estimate θ_i using Equation A.10 above. As you can see from the stats below, a significant portion of any capital gain will not be excluded from taxation. In addition, the high $\theta_i's$ reflect the higher tax rate on non-excluded capital gains for firms that did not fall under the 100% exclusion regime.

Group	**Mean**	**Std**	**Min**	**P25**	**Median**	**P75**	**Max**
IPO sample	0.93	0.115	0.42	0.89	0.99	1	1
Non-IPO Sample	0.99	0.035	0.00	1	1	1	1

Step 7: Calculate payoffs

We now can calculate the payoffs under each organizational form using equations A.4 and A.5.

($ in Millions)

Group	**PAY_c**	**PAY_{llc}**	**TAX**	**TAX/Equity**
IPO	464,629	466,194	1,565	1.55%
Non-IPO	250,981	299,213	48,231	6.04%
Combined	715,610	765,407	49,796	5.53%

As expected, the incremental tax benefit of the LLC decreases as the net capital gain for the C-corporation is excluded. However, there is still a substantial benefit from organizing as the LLC. This shows that the ability of taxable investors to obtain some benefit from the business losses, offsets the ability to exclude capital gains from the small number of successful firms from taxation.

It is important to note that any benefit from the QSBS exclusion is reduced by the presence of tax exempt investors. This is because these investors are already de-facto exempt from all capital gains taxes. So if our estimate of the percentage of firms that qualify from the QSBS, and our assumptions about the percentage of investors that are tax exempt are too low, than these two affects will offset to some degree.

Presence of tax exempt and foreign investors

One of the most common objections to use of the LLC is that two groups of venture capital limited partners, tax-exempt and foreign investors, will actively avoid holding interests in VC funds that own LLCs

(e.g. Fleischer 2003). To see why consider the investor level tax effects of each organizational structure. When the startups are organized as C-corporations investors only recognize income in the form of capital gains upon disposition of their interest in the investment, which are specifically exempted from tax either by treaty, for non-U.S. investors, or statute, for tax-exempt entities. Conversely, if the startups are organized as LLCs all investors are treated as pro-rata owners of the business. This means that the share of business income passed through to the investors for tax will be deemed "effectively connected income (ECI)" for the foreign investors, or unrelated business taxable income (UBTI)" for the tax exempts.[14] Unlike capital gains both of these are subject to tax at ordinary rates, and the after-tax payoff from the LLC will be potentially lower than the C-corporation for these investors. In addition, even if the result of investing in a portfolio of LLCs is that there is no net taxable income (the most likely outcome in our setting) and hence no actual tax liability, the tax exempt and foreign entities are still required to file an additional U.S. tax return as a result of their ownership. This not only increases the direct time and legal costs that have to be spent on compliance, but may also increase the regulatory scrutiny of other tax positions taken by these investors.[15]

The simplest way to get around these issues is the formation of a blocker corporation. There are a multiple variations, but the basic structure is that the tax exempt or foreign investors own the blocker corporation, which in turn owns the interests in the LLCs (either through the VC fund, or parallel to it). Any tax effects from the pass-through of LLC income or loss is then taxed at the blocker level, and any after-tax net proceeds distributed by the blocker to the tax-exempt and non-U.S. investors are considered non-UBTI, non-ECI, distributions (Axelrad et al 2007). Besides avoiding the incremental tax effects in the

[14] Any income generated by non-profits that is unrelated to its 'exempt function' (as defined in Sec. 512(B)) is subject to income tax. Any profits passed through to them by an LLC would constitute UBTI. As a result many tax exempt entities require the funds in which they invest make a commitment to 'use its best efforts' to avoid UBTI generation (Lion 2003).

[15] This UBTI exposure may be irrelevant to one substantial class of tax-exempt investors – governmental pension funds. As Johnson & Aprill (2010) document, pension funds for state and local employees can claim immunity from the unrelated business income tax ("UBIT") under IRC section 115.15 As a result they should be indifferent to the generation of UBTI, and be most concerned with which organization form generates the greatest potential benefit. Since all investors, regardless of tax status, will benefit from the netting of loss and profit firms in a venture portfolio, the use of an LLC increases an investment's appeal to pension funds and should not reduce their likelihood of investment.

unlikely event that there are net profits, this structure will keep them from the additional filing requirements required in the absence of a blocker.[16]

Now, there is the possibility of the blocker reducing the after-tax returns of these investors when any fund investments are sold at a gain. This is because the blocker entity will be required to pay any capital gains taxes that would previously have been avoided when the gains were recognized directly by the tax-exempt and non-U.S. investors. To avoid this outcome the blocker itself is organized as a foreign corporation in a low-tax jurisdiction. Other work discusses the dynamics of this structure in detail (Dougherty 2013, Taylor 2010), but by placing the blocker outside the U.S., the incremental capital gains tax from sale of the LLC can be avoided, keeping the estimated after-tax payoffs the same across organizational forms. Then only difference from our previous analysis is then that this structure will incur additional administrative costs, raising the non-tax costs of the LLC for tax-exempt and foreign investors, and reducing their after-tax payoffs.

We acknowledge that tax-exempt investors are particularly sensitive to these increased administrative costs. For example Marx (2012) finds that non-profits will report lower income in order to avoid IRS reporting requirements. In that case it still raises the question as to why tax-exempt investors are the ones investing in these firms.

Tax benefit upon acquisition of the LLC

To this point we have considered omitted dynamics that bias against the LLC. They either reduce the relative payoff from investing in the form, or increase its non-tax costs. However there are several non-tax benefits of the LLC which could increase the after-tax benefits of the form. Some of these are softer in

[16] As an example of this practice consider the investor dynamics of the private equity or LBO market. These funds also receive investments from governmental and non-profit investors [Morgan Lewis (2012a] and make direct investment into LLC entities. Admittedly, there are differences between the LBO and venture capital markets such as LBO funds' focus on control positions in mature firms. In addition, LBO funds generally have administrative infrastructure that can support the increase in workload and costs from investing in an LLC. However, the fact that LBO firms accommodate tax-exempt investors, while investing in LLCs, supports the idea that it is technically possible for venture capitalists to do so as well.

that the form allows for more flexibility in corporate governance structures,[17] but the main benefit comes from the potential for an enhanced purchase price for the startup firms acquired prior to acquisition.

Erickson and Wang (2007) discuss the mechanics of this enhancement in detail, but simply stated it results from the difference in treatment of an acquisition structured as an asset or stock sale. If the purchase is structured as an asset sale, the acquiring company can 'step-up' their basis in the start-up's assets to their fair market value. This will increase the future depreciation deductions available to the buyer which reduces their taxable income and attendant tax liability. If, on the other hand, the purchase is structured as a stock sale, the acquirer will record the assets at their carry-over tax basis from the startup, which is generally significantly lower than the fair market value. This means that the future deductions will be lower, and taxable income higher, under a stock sale. Because of this, there is evidence that acquirers will pay a premium for sales structured as an asset sale (Erickson and Wang 2007).

For the seller, there will also be differences in tax effects. If the startup is organized as a C-corporation, assets sales require a double tax on the sale as the firm has to record a gain/(loss) on the sale of the assets and the shareholder records a tax on the disposition of their interest in the startup as well. Alternatively, if the sale is organized as a stock stale, there is no entity level gain or loss and the shareholder simply pays any capital gains tax liability due.

An LLC, on the other hand, provides the best of both worlds. If the LLC makes an election under section 754, the sale will be treated as an asset sale by the buyer, and retain the character of a stock sale for the startup's owners. Therefore, if the buyer is willing to pay a premium for an LLC asset sale it will not be offset by the increased entity level tax as would be the case if the startup is organized as a C-corporation. In the context of our model, this means that the capital gain on disposition will be higher for the LLC than the C-corporation. This premium can be substantial, as Erickson and Wang (2007) find that the S-

[17] The increased relative flexibility of the LLCs governance extends from the fact that ownership, control, and other governance dynamics will be determined exclusivel by the agreed upon membership agreement. The C-corporations are subject to more formal rules like the requirement to hold annual meetings, elect a board of directors, and designate officers that will handle the day to day management of the entity.

corporation structure delivers tax benefits between 12-17 percent of deal value, and that their owners receive a higher price upon acquisition than similar C-corporations.

In the context of our sample, the firms where this potential premium would manifest are non-IPO firms that are acquired in a private acquisition. We start with our estimate of proceeds documented in the QSBS portion of the appendix. We then increase the proceeds (G_i) recognized by the non-IPO sample for under the LLC organization. Because Erickson and Wang focus on a very specific sub-set of more successful firms we do not use their exact estimate of the enhancements. Rather, we conservatively assume the average enhancement to the purchase price is a more modest 2%.

($ in Millions)

Group	**PAY_c**	**PAY_{llc}**	**TAX**	**TAX/Equity**
IPO	462,132	466,194	4,062.3	4.03%
Non-IPO	246,678	324,100	77,422	9.69%
Combined	708,810	790,294	81,484.3	9.06%

As expected the estimated payoff from the Non-IPO sample increases with this enhancement. The reason the increase is so large in dollar amounts is because there is such a large number of non-IPO firms. Therefore even this modest enhancement to LLC proceeds greatly increases the dollar amount of tax savings. The greater point is that any increase in proceeds recognized as a result of the ability of purchasers to step up their basis in the investment will increase the relative after-tax payoff of the LLC.

Putting this all together

Finally we combine all of these dynamics together into one model in order to see how they affect our estimated payoffs:

$$PAY_{llc} = \sum_{i=1}^{N} ((1 - \gamma_i t_p)Y_i) + (1 - \gamma_i t_g)(G_i - B_i) \; (A.13)$$

$$PAY_c = \sum_{i=1}^{n} (Y_i[(1 - \Delta_i t_y) * (1 - \gamma_i \theta_i t_g)] + (1 - \gamma_i \theta_i t_g)(G_i - B_i) \quad (A.14)$$

$$TAX = \sum_{i=1}^{N} Y_i[\left(\left(1-\gamma_i t_p\right) - \left(1-\Delta_i t_y\right) * \left(1-\gamma_i \theta_i t_g\right)\right)] + \sum_{i=1}^{N} (G_i - B_i) * (\left(1-\gamma_i t_g\right) - \left(1-\gamma_i \theta_i t_g\right)) \quad \text{(A.15)}$$

All variables defined as above. We also include the enhanced payoff to acquired non-IPO firms, and our base-line estimate of tax-exempt investors.

($ in Millions)

Group	**PAY_c**	**PAY_{llc}**	**TAX**	**TAX/Equity**
IPO	478,174	478,702	528.152	0.52%
Non-IPO	253,140	316,693	63,552.4	7.95%
Combined	731,314	795,395	64,080.552	7.12%

As we show here, even after taking all of these different dynamics into account, the LLC still delivers a higher incremental after-tax payoff. As before, we acknowledge that the estimated magnitudes of the payoffs, particularly for the non-IPO sample, are sensitive to the assumptions used to generate them. As such, we consider the major takeaway from these results as indicating that even taking into account the major proposed changes to the pay-off functions that we do not include in our main analysis, the LLC still consistently generates a higher after-tax return. In addition, even if one disagrees with some of the assumptions that we make, the implied magnitudes of tax savings are large enough that we would have to be significantly off in order for the C-corporation to ever come out ahead.

Appendix D: Proofs of Propositions 1 and 2

Proof of Proposition 1:

We need to show that the following equation is positive:

$$PAY_{LLC} - PAY_C = \sum_{i=1}^{N} \left[\Delta_i t_y (1 - t_g) - (t_p - t_g)\right] Y_i > 0$$

Rearranging yields:

$$\sum_{i=1}^{N} \Delta_i t_y (1 - t_g)\, Y_i > \sum_{i=1}^{N} (t_p - t_g)\, Y_i$$

Simplifying further results in:

$$\frac{\sum_{i=1}^{N} \Delta_i Y_i}{\sum_{i=1}^{N} Y_i} > \frac{(t_p - t_g)}{t_y (1 - t_g)}$$

Numerically:

$$\frac{t_p - t_g}{t_y (1 - t_g)} < 1$$

Therefore, we need to show that:

$$\frac{\sum_{i=1}^{N} \Delta_i Y_i}{\sum_{i=1}^{N} Y_i} > 1$$

which is the same as showing:

$$\sum_{i=1}^{N} (\Delta_i - 1) Y_i > 0$$

Note that for firms with $Y_i > 0$, $\Delta_i = 1$, therefore:

$$\sum_{Y_i > 0} (\Delta_i - 1) Y_i = 0$$

Whereas, firms with $Y_i < 0$ have $\Delta_i \leq 1$, therefore:

$$\sum_{Y_i < 0} (\Delta_i - 1) Y_i > 0$$

which implies that $\sum_{i=1}^{N} (\Delta_i - 1) Y_i > 0$ is true. Therefore, $PAY_{LLC} - PAY_C > 0$ is true as well.

Proof of proposition 2:

We need to show the conditions for which:

$$PAY_{LLC} - PAY_C > 0 \qquad (1)$$

From the prop 1 proof we know this happens when:

$$\frac{\sum_{i=1}^{N} \Delta_i Y_i}{\sum_{i=1}^{N} Y_i} < \frac{(t_p - t_g)}{t_y(1 - t_g)} \qquad (2)$$

where the flipped inequality is the result of the fact that $\sum_{i=1}^{N} Y_i < 0$.

If $\Delta_i = \Delta \; \forall$ i, then (1) is true when:

$$\Delta < \frac{(t_p - t_g)}{t_y(1 - t_g)}$$

Otherwise note that:

$$\sum_{i=1}^{N} Y_i = \sum_{Y_i > 0} Y_i + \sum_{Y_i \leq 0} \Delta_i Y_i$$

Suppose that we define $\overline{\Delta}$ as the average delta in the sample. Then:

$$If\ \overline{\Delta} = 1 \rightarrow \sum_{i=1}^{N} \Delta_i Y_i = \sum_{i=1}^{N} Y_i \Rightarrow (2)\ does\ not\ hold \qquad (3)$$

$$If\ \overline{\Delta} = 0 \rightarrow \sum_{i=1}^{N} \Delta_i Y_i = \sum_{Y_i > 0} Y_i > 0 \Rightarrow (2)\ holds \qquad (4)$$

Suppose there is a function $G_i(\cdot)$, that takes $\overline{\Delta}$ as an argument and gave the firm's Δ_i as a result, such that: $G_i(\overline{\Delta}) = \Delta_i$. Additionally, suppose that:

$$\frac{\partial G_i(\overline{\Delta})}{\partial \overline{\Delta}} \geq 0$$

which states that increasing the average delta means some deltas increase and no deltas fall. From here it is fairly straightforward to show that:

$$\frac{\partial \sum_{i=1}^{N} G_i(\overline{\Delta}) Y_i}{\partial \overline{\Delta}} \leq 0 \qquad (5)$$

Equations (3), (4), and (5) imply that there is an average delta ($\widetilde{\Delta}$), such that:

$$If\ \overline{\Delta} < \widetilde{\Delta}\ then\ PAY_{LLC} - PAY_C > 0$$

$$If\ \overline{\Delta} \geq \widetilde{\Delta}\ then\ PAY_{LLC} - PAY_C \leq 0$$

Table A.1

Timeline of Events

Event #	Date	Equity Event	# of shares (thousands)	'Market' Price Per Share	Market Value immediately before event ($Millions)	Accumulated NOL carryforward ($ millions)	Annual Limitation ($ millions)	Maximum potential utilization of the NOL	
1	1/1/2009	Initial Capitalization	1,000	0	0	0			
2	3/1/2010	Venture Capital Investor	650	$10	17	5			
3	2/1/2014	Public Offering	400	20	41	50			
4	8/31/2014	Sale by VC shareholders	650	25	51.25	75	2.05	41	
5	12/31/2016	Acquired by another company	2,050	40	82	100	3.28	66	**

Event 1 - Initial Capitalization

5% S/Hs	*# of shares*	*Ownership %*	*Low ownership %*	*Shift in ownership %*
Founder	1,000	100%	100%	0%
Total	1000	100%	100%	0%

Event 2-Venture Capital Investor

5% S/Hs	*# of shares*	*Ownership %*	*Low ownership %*	*Shift in ownership %*
Founder	1,000	60.6%	60.6%	0.0%
Venture Capitalist	650	39.4%	0.0%	39.4%
Total	1650	100.0%	60.6%	39.4%

Event 3 -Public Offering and Preferred Conversion

5% S/Hs	*# of shares*	*Ownership %*	*Low ownership %*	*Shift in ownership %*
Founder	1,000	48.8%	48.8%	0.0%
Venture Capitalist	650	31.7%	31.7%	0.0%
Public Group 1	400	19.5%	0.0%	19.5%
Total	2050	100.0%	80.5%	19.5%

Event 4 -Sale By Venture Capitalists

5% S/Hs	*# of shares*	*Ownership %*	*Low ownership %*	*Shift in ownership %*
Founder	1,000	48.8%	48.8%	0%
Venture Capitalist	0	0.0%	0.0%	0%
Public Group 1	400	19.5%	0.0%	19.5%
Public Group 2	650	31.7%	0.0%	31.7%
Total	2050	100.0%	48.8%	51.2%

Event 5 - Complete Acquisition by new company

5% S/Hs	*# of shares*	*Ownership %*	*Low ownership %*	*Shift in ownership %*
Founder	0	0.0%	0.0%	0%
Venture Capitalist	0	0.0%	0.0%	0%
Public Group 1	0	0.0%	0.0%	0%

Public Group 2	0	0.0%	0.0%	0%
New Company	2,050	100.0%	0.0%	100%
Total	2,050	100.0%	0.0%	100.0%

Column headings are defined as follows:

Title	Description
5% S/Hs	Ownership group
# of shares	Shares held at the testing date
Ownership %	Percentage of ownership at the testing date
Low ownership %	The lowest percentage owned by the ownership group in the previous three years
Shift in ownership %	Change in ownership interest over the three year testing window. Equal to the difference between the testing date ownership percentage and lowest percentage owned in the three year testing window.

Notes:

i) The testing period begins on the day the NOL is initially incurred, and then rolls forward until a qualifying change occurs.

ii) The shift in ownership percentage is based on the difference between the ownership percentage at the testing date, and the lowest ownership percentage at any point in the three year testing window.

iii) The value of each share is assumed to be equal

Calculation Notes:

** = assume the incremental NOL of $25 million will be utilized as $3.83 million a year for 20 years.

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