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Polishing diamonds in the rough: The sources of syndicated venture performance

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Abstract

Using an effort-sharing framework for VC syndicates, we assess how syndication impacts investment returns, chances of successful exit, and the time taken to exit. With data from 1980-2003, and applying apposite econometrics for endogeneity to these different performance measures, we are able to ascribe much of the better return to selection, with the value-addition by monitoring role significantly impacting the likelihood and time of exit. While the extant literature on Venture Capital (VC) syndication is divided about the relative importance of the "selection" and "value-add" hypotheses, we find that their roles are complementary.

Key words: syndication, venture capital, selection, value-add
JEL codes: G24

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1 Introduction

Venture capitalists invested $28.3 billion in 3,808 deals in 2008 [2] , many of these through syndications accounting for two-thirds of all VC investment rounds, making it a significant phenomenon in this industry. Syndicated venture investment in privately held firms is hypothesized to lead to superior venture selection (Wilson (1968), Sah and Stiglitz (1986), Lerner (1994), and Sorenson and Stuart (2001)), to mitigate information asymmetries between the initial venture investor and other later-round potential investors (Admati and Pfleiderer (1994), and Lerner (1994)), to add value by monitoring the performance of portfolio companies (Brander, Amit, and Antweiler (2002) who test both selection and value-add, finding in favor of the latter), and to amplify the value-addition of venture capitalists (Hellmann and Puri (2002), Kaplan and Stromberg (2004), Lindsey (2008), and Hochberg (2008)). While research examining the performance of venture capital-backed firms is abundant, we do not have a complete understanding of the rationale behind VC syndication. Although theories in finance suggest that selection and value-add by monitoring should be different if capital is provided by a syndicate instead of a single VC, there has been limited scrutiny of the multivalent impact of syndication on venture firms' exit performance.

The decision to syndicate by the lead VC and entrepreneur depends on the trade-off between the likely benefits of syndication (coming from selecting better ventures or adding value to the firm) versus relinquishing some value to new syndicate members. [3] We conduct a large-scale study of the determinants of syndication and its impact on exit performance, using 98,068 financing rounds of venture firms in the Thomson Financial's Venture Economics (VentureXpert) database from 1980 to 2003. Rather than only examine returns, we focus on three different dimensions of exit performance (i.e., exit probabilities, time-to-exit, and exit multiples) and thereby reframe the debate as to whether a syndicate selects promising companies and/or adds value to portfolio firms. Employing an analytical framework of effort-sharing under which a syndicate's effort is allocated to ex-ante venture selection and post-selection value-addition activity, and controlling for endogenous treatment effects with apposite econometrics, we are able to determine the relative importance of

[2] See `http://www.pwcmoneytree.com`

[3] In addition to selection and value-add, Lerner (1994) suggests that expected future reciprocity is also a motive for syndication, and this is empirically confirmed in Hochberg, Ljungqvist and Lu (2007). See also evidence in Hochberg, Ljungqvist and Lu (2009) suggesting that syndication may be used as a barrier to entry where networks of VCs aim to control market share.

the selection and value addition roles in VC syndications for each of the three dimensions of venture performance.

Consider a VC syndicated project where any synergy arising from syndication is attributable to selection and/or monitoring effort. Usually, the project is sourced by a lone VC, who conducts the initial due diligence to ensure that the project has potential. This VC then approaches the syndicate to consider the project. An initial effort $e \in (0, 1)$ is expended by the syndicate on project selection. Assume there are two types of projects, high quality (H), and low quality (L). The exit multiple obtained from each respectively will be denoted $\{Y_H, Y_L\}$. Define the relative ratio of multiples to be $\eta = Y_H/Y_L$. The more effort expended on selection increases the chances that the project chosen will be of high quality. Assuming that the efficacy of project choice is linear in effort, the expected multiple of the chosen project will be $eY_H + (1 - e)Y_L$.

Total effort is normalized to unity. Therefore, post-selection effort $(1-e)$ is put into subsequent monitoring by the syndicate to add value to the project. The probability of exit per period then depends on monitoring effort. We define this probability to be $p = (1 - e)$. [4]

The expected multiple on the project is the probability of exit times the expected multiple conditional on exit:

$$E(Y) = (1 - e)[eY_H + (1 - e)Y_L]$$

Taking the derivative of this expression with respect to e, we get the first-order condition:

$$\frac{dE(Y)}{de} = Y_H - 2eY_H - 2(1 - e)Y_L = 0$$

and solving for e results in optimal selection effort

$$e^* = \frac{Y_H - 2Y_L}{2Y_H - 2Y_L} = \frac{\eta/2 - 1}{\eta - 1}$$

[4] In this simple model, we do not assume that good selection feeds into a higher probability of exit, only into a greater multiple on exit. Other specifications of the probability of exit are feasible, such a $p = (1 - e)(1 + e)$, where the second term reflects the benefits to selection on exit probability. Note that with this modification, as effort e on selection increases, the probability of exit does decline, but in a slower (concave) manner, versus a fast (linear) drop as in the simpler case. Qualitatively, the results do not change.

The following comparative statics follow immediately:

$$\eta \uparrow \infty \Longrightarrow e^* \uparrow 1, \quad \eta \downarrow 2 \Longrightarrow e^* \downarrow 0$$

When $\eta = Y_H/Y_L$ increases, the model predicts that more effort of the syndicate will be directed to project selection. That is, as high quality projects become relatively superior to low quality ones (i.e. as η increases), the syndicate naturally finds that it is worth expending more effort on project choice. In other words, when firm quality dispersion is large, syndicates spend more time making sure that the chosen venture is of high quality, translating into higher multiples on exit. And, as the difference between high and low type projects declines, more effort will be directed to value-addition through monitoring, translating into more likely and timely exit. Assessing performance via multiple metrics enables us to assess the role of a syndicate in this framework.

Differential returns from investing in syndicated ventures versus non-syndicated ones may arise directly from the synergies of syndication in monitoring (the value-added hypothesis of Brander, Amit and Antweiler (2002)), or may be the result of selection (Lerner (1994), i.e. syndicates select more promising projects. Endogeneity is posited in the model of Cumming (2001) and in the model of Casamatta and Haritchabalet (2007)). The literature is unclear about the relative importance of *selection* and *value-add*. In our framework they may be complementary in outcome, though competing for the total effort of the syndicate. Both selection and value-addition may increase expected multiples by enhancing the probability of exit, shortening the time-to-exit, and picking firms with greater prospects.

Our departure from the existing literature lies in identifying the extent to which selection and value-addition contribute separately to the *components* (multiple, probability of exit, time-to-exit) of the differential expected performance between syndicated and non-syndicated ventures. What if the benefits of syndication lie purely in selection and not in value-addition? Then, *after* correcting for endogenous selection effects (Greene (1993)), we should find no difference between syndicated and non-syndicated ventures across all three of our performance criteria. On the other hand, if value-addition has a role to play, accounting for selection effects will not suppress the statistical significance of the syndication variable. Thus, our econometric strategy delivers simultaneous benefits: apposite estimation with treatment effects and a separation of the impact of better selection versus value-add by syndicates. It is undertaken in two stages, one, a model of syndication likelihood and two, models of performance assessment across the three metrics.

In order to correct for endogeneity, we first employ an empirical model for the determinants of syndication to understand why some firms are syndicated and others are not. We use this model as a first step in the two-step procedure in estimating the impact of syndication on performance. We find that the probability of syndication is positively related to risk sharing (Wilson (1968), Bygrave (1987) and Tian (2009)), measured by the membership in IT or biotech industries and in early stage rounds, and the VC's skill and specialty (Brander, Amit and Antweiler (2002), Wright and Lockett (2003), and Gompers, Kovner, Lerner, and Scharfstein (2006, 2009)), measured by the industry specialist lead VC, and the number of portfolio companies the lead VC has backed. Syndication is more likely when the size of the round is large, when the lead VC has many portfolio companies, and when the lead VC is California based. Syndication likelihood is inversely associated with the age of the firm (less risk), the capital under management by the lead VC (fewer capital constraints), and the presence of an international lead VC (who is more likely to be already diversified). Location specific variables such as network density and entropy measures developed in Hochberg, Ljungqvist, and Lu (2009) are also associated with the likelihood of VC syndication. We find that the greater the network density and the lower the entropy of the number of investment per zip code area in the market, the higher the likelihood of syndication.

Given the model for the likelihood of a venture being syndicated, we impose endogeneity corrections in the econometric models of performance assessment. Using a probit model, we find that syndication is positively related to a higher probability of successful exit. Likewise, using a hazard model, we find that syndication significantly shortens the time-to-exit of a successful venture. Since these effects of syndication persist even after correcting for selection effects, we conclude that value-addition by the syndicate contributes to a more likely and timely outcome.

While exit multiples for syndicated ventures are significantly higher than those of non-syndicated ventures without endogeneity controls, this significant relation disappears in the second-stage regressions after we control for endogenous treatment effects. This insignificance is robust across exit by either IPO or acquisition. Therefore, value-addition effort does not statistically change the exit multiple for syndicated firms. An implication of our findings is that, conditional on successful exit, selection effort contributes to better multiples, whereas value-addition effort by syndicates materializes in higher probabilities of exit and faster exits over and above the selection effect. Hence, value-addition contributes to success and selection determines the magnitude of the outcome. We liken this to VC syndicates uncovering diamonds in the rough, and then polishing them to success.

Our results are found to be robust irrespective of the stage of investing being considered. This complete characterization of syndication determinants and performance is presented as follows. Section 2 describes the data and sample. Section 3 presents our econometric specification covering models for all three performance metrics and treatment effects. Section 4 presents the empirical results and Section 5 concludes.

2 Data and sample

We obtain our data from Thomson Financial's Venture Economics (VentureXpert) database. VentureXpert reports information on private equity investments of over 6,000 venture capital and private equity firms. Our sample covers all venture financing rounds of U.S. private firms from 1980 to 2003, and includes 98,068 financing rounds in 43,658 unique firms. [5] We follow these firms until there is an exit or until the end of 2003. The information about each exit is available in the VentureXpert database, which is identified by the Thomson Financial Global New Issue database and the Mergers and Acquisitions database. We concentrate solely on U.S. private firms, observing the most disaggregated view of the data, rather than examine performance at the level of the VC fund. Our goal in this paper is to understand how syndication determines the performance of individual round investments of portfolio companies, not its impact on VC funds or their attendant relationships (see Hochberg, Ljungqvist and Lu (2007) for a comprehensive examination of the latter view).

Table 1 reports the frequency of financing rounds over time and across industries. Because exit options for start-up companies are highly cyclical, the frequency of financing rounds shows cycles in private equity financing. Deal flow increases from early 1980 to the late 1980s but declines in the early 1990s. It steadily increases again from 1994 until 2000. The years 1999-2001 show the highest level of financing with an all time high in the year 2000. The increase in the late 1990s is largely a function of increased capital commitments to the so called "new economy" firms, for example, internet, computer software, and communications business in the internet bubble period. Computer software, internet, communications, medical/healthcare, and consumer related industries receive a large portion of available private equity financing. These top five industry groups account for 60% of the total number of investments. Deal flow decreases again in the early 2000s, because, as Giot and Schwienbacher

[5] As Venture Economic's data are somewhat unreliable before 1980, we exclude investments before 1980. See Hochberg, Ljungqvist, and Lu (2007), who also choose their data based on the same considerations.

(2007) note, market conditions dramatically change in 2001 and 2002 as the NASDAQ and other stock indices experience sharp corrections.

We index firms in the data set with the variable i, where $i = 1, \ldots, N$. For each firm there is a set of financing rounds, and these are indexed by variable j. This notation permits us flexibility in creating variables either at the firm level or at the level of each financing round.

3 Econometric specification

We follow Gompers and Lerner (1998, 2000), Brander et al (2002), Sorensen (2007), and Hochberg, Ljungqvist, and Lu (2007) in viewing a successful exit as a representation of the venture's success. Here, we extend the performance metrics to *three* distinct ones, exit probabilities, time to exit, and exit multiples.[6] We anticipate that the role of a VC syndicate in selection versus value-add might be different for each of the metrics. We believe that this is the first time in the literature that the role of the VC syndicate has been examined across different aspects of performance of the venture.

3.1 Probability of exit

Not all venture-backed firms end up making a successful exit, either via an IPO, through a buyout, or by means of another exit route. By designating successful exits as $S_{ij} = 1$, and setting $S_{ij} = 0$ otherwise, we fit a Probit model to the data. We define S_{ij} to be based on a latent threshold variable S^*_{ij} such that

$$S_{ij} = \begin{cases} 1 \text{ if } S^*_{ij} > 0 \\ 0 \text{ if } S^*_{ij} \leq 0. \end{cases} \tag{1}$$

where the latent variable is modeled as (subscripts suppressed)

$$S^* = \gamma' X + u, \quad u \sim N(0, \sigma^2_u) \tag{2}$$

[6] See Cochrane (2005) for an analysis of firm-level rate of return based on an alternative database (VentureOne).

where X is a set of explanatory variables. The estimated model provides us the probability of exit for all financing rounds.

$$E(S) = E(S^* > 0) = E(u > -\gamma' X) = 1 - \Phi(-\gamma' X) = \Phi(\gamma' X), \tag{3}$$

where $\Phi(.)$ denotes the cumulative normal distribution and γ is the vector of coefficients estimated in the Probit model, using standard likelihood methods.

3.2 Time to exit

It is widely held that the presence of a venture capitalist (Wang, Wang and Lu (2002)), or the "easy-money" of the internet-bubble period (Giot and Schwienbacher (2007)), shortens the time to exit (Venture Economics suggests that the average time to exit is 4.2 years), but little is known about exit time differentials in syndicated versus non-syndicated ventures. We use a hazard model specification that allows modeling duration data (Allison (1995)). The time to exit starts with the round investment date and ends when the venture exits through an IPO, acquisition or other means. The hazard function is modeled as:

$$h(t, X(t)) = h(t, 0) \exp[\theta' X(t)] \tag{4}$$

where $h(t, X(t))$ is the hazard rate at time t and $X(t)$ is a vector of explanatory variables, including a syndication dummy, that are potentially time varying. We use a Cox proportional hazard model with right-censoring, and time varying covariates. Time to exit is expressed in months. The vector of coefficients in this model is denoted θ.

3.3 Multiples on exit

For the firms that make a successful exit, we are able to compare the exit price with the buy-in price at the financing round. The ratio of exit price to buy-in price is the multiple on exit. This computation is done on a per share basis to correctly account for dilution with each succeeding financing round. Given that the time to exit varies by firm, we annualize the multiple (denoted Y) for each firm so as to make proper comparisons across firms. For the purpose of annualization we follow the procedure outlined in Das, Jagannathan and

Sarin (2003), which is as follows:

$$Y_{annual} = [Y_{raw}]^{1/t}, \quad t = \text{CEIL}(\text{days}/365)$$

where the function CEIL rounds up to the next integer. The "*raw*" multiple Y_{raw} is the ratio of exit value to buy-in value and is adjusted for the dilution effect during the financing path. [7] Further, "*days*" is the number of days to exit in the model above. We regress exit multiples on a syndication dummy and control variables.

3.4 Endogenous treatment effects

A regression of venture performance measures on various firm characteristics and a dummy variable for syndication allows a first pass estimate of whether syndication impacts performance. However, it may be that syndicated projects are simply of higher quality and deliver better performance, whether or not deals are syndicated. It is also possible that non-syndicated deals have better performance if the lead VC includes all obvious winners and there is no need for the synergies of syndication. Given that about two-thirds of all investment rounds are syndicated, despite the non-trivial cost of syndication, we claim that, on average, superior projects are more likely to be syndicated because VC syndicates can identify them better than can single VCs . In this case, the coefficient on the syndication dummy variable might reveal a value-add from syndication, when indeed, there is none. Hence, we correct the specification for endogeneity, and then examine whether the syndication dummy remains significant.

Different methodologies are used across three performance metrics for estimating endogenous treatment effects. For the exit multiple regressions, we follow the two-stage procedure based on the structural model suggested in Greene (1993). We obtain inverse Mill's ratios separately for the syndicated and non-syndicated rounds from the first stage probit for syndication choice, and include them in the second stage regressions. The structural two-stage model for the endogenous treatment effects may result in inconsistent parameter estimates if the second stage specifications are non-linear such as the probit model for the exit probability, and the hazard model for the exit time. Hence, for the exit probability analyses, we estimate a bivariate probit model with two probit equations: a probit model of syndication choice and another probit model for

[7] See Appendix B for a description of how we compute multiples. The approach is identical to the "cash-in, cash-out" approach.

exit probability. Like the seemingly unrelated regression model, the bivariate probit model assumes that the independent, identically distributed errors are correlated. For the exit time analysis, we use three different approaches to estimate endogenous treatment effects. Though it may generate inconsistent parameter estimates, we estimate a two-stage Cox proportional hazard model by including inverse Mill's ratios obtained from the first stage probit of syndication choice. We also estimate two alternate models: a two-stage Tobit model with right censoring and a two-stage ordinary least squares model to confirm that the estimates from the two-stage Cox proportional hazard model are not inconsistent due to the non-linear second stage specification.

4 Empirical analyses

In this section, we assess the performance of syndicated versus non-syndicated venture investments. We define a round as syndicated if at least one investment round including the current one is syndicated.

Since we have three performance metrics (exit probabilities, exit times, and exit multiples), our analyses will be undertaken for each of the metrics. We use different empirical specifications, from the simplest to the most complex, presented in each of the following subsections. We begin with descriptive statistics, examine the raw differences in performance, then provide an explanatory model of syndication, and finally, evaluate performance after correctly accounting for endogenous treatment effects.

4.1 Descriptive performance statistics

4.1.1 Exit probabilities

First, we examine if syndicated ventures are more likely to exit than non-syndicated ones. Three types of exit are considered here: (a) by IPO, (b) by acquisition, and (c) by LBO. The results are presented in Table 2 and show that the probability of exit is higher for syndicated firms, irrespective of the channel through which exit occurs (significant at the 1% level).

Overall, if we take all three exit routes together, the probability of a syndicated deal exiting is around 38% whereas that of the non-syndicated deal is 25%, meaning that there is a 13% higher probability of syndication resulting in an exit. Comparing exit routes, the difference in probability is more marked for

exit by acquisition (10% difference in probabilities) than for exit by IPO (3%).

4.1.2 Exit times

Given the evidence that VC syndication increases the probability of a firm exiting, the interesting question is whether it enhances the speed with which firms exit as well. The answer to this question is provided in Table 3, which presents the mean time to exit (in months).

Overall, if we look at all exit routes (IPO, acquisition, or LBO), the mean time to exit is about 2 months faster for syndicated firms than for non-syndicated firms (significant at the 5% level). However, this result is driven mainly by firms that exit by acquisition (more than 3 months faster, significant at the 1% level). For exits by IPO, there does not seem to be a statistically significant difference in exit times for syndicated and non-syndicated firms, even though syndicated exits are on average 1 month sooner than non-syndicated exits. This suggests that syndicates are likely to cut losses and sell off a new venture when they realize that an IPO is less likely.

4.1.3 Exit multiples

Do syndicated venture investments deliver higher multiples? We begin by examining the exit multiples for syndicated versus non-syndicated round investments using the annualized exit multiple (Y_{annual}) defined earlier. The cumulative distributions of annualized multiple for both syndicated and non-syndicated financing are displayed in Figure 1. (Note also that these distributions are *conditional* ones, i.e. they represent the annualized multiples after conditioning on syndication, or the absence of syndication). We see that the syndicated financing distribution is shifted to the right, and after a multiple level of 2, the exit multiples of syndicated deals' distribution is fatter-tailed, i.e. the likelihood of a large multiple is higher for syndicated deals than for non-syndicated ones.

[Figure 1 about here]

Table 4 presents descriptive statistics for annualized multiples. The annualized multiple for syndicated firms is 2.19 whereas for non-syndicated firms it is 1.79 (the difference is significant at the 1% level), evidence that syndicated firms yield higher exit outcomes from financing round to exit. A comparison of the raw exit multiples (not adjusted for time) reveals that non-syndicated firms provide higher multiples (9.66 versus 6.38, significant at the 5% level).

However, since these firms take much longer to exit, the multiples are lower on an annualized basis. This may also be consistent with the evidence that syndicated deals are more likely to be rushed towards exit, and these results support this decision given that they provide a higher return on invested capital. The standard deviation of exit multiples is also higher for syndicated ventures, suggesting that VC syndicates may be more willing to take on riskier deals.

We transform the conditional distributions of annualized multiples into syndication probabilities using Bayes' theorem, conditional on multiples. We are interested in how the conditional probability of syndication changes as the multiple level changes. We define the probability of the multiple given that the financing was syndicated as $\Pr[Y|S=1]$. Likewise, the probability of the multiple Y given the firm was not syndicated is $\Pr[Y|S=0]$. Each of these may be read from the two probability density functions depicted in the previous subsection. The probability of a financing being syndicated, denoted $\Pr(S=1)$, is simply the ratio of the number of syndicated financings to total financings. We define of course, $\Pr(S=0) = 1 - \Pr(S=1)$.

Using Bayes' theorem, the conditional probability of syndication is as follows:

$$\Pr[S=1|Y] = \frac{\Pr[Y|S=1]\Pr[S=1]}{\Pr[Y|S=1]\Pr[S=1] + \Pr[Y|S=0]\Pr[S=0]}$$

We plot this probability for all values of Y, depicted in Figure 2. We see that the likelihood of syndication increases in the multiple, implying that when multiples are high, there is a greater chance that the firm was financed through syndication. The extent to which this matters is also indicated by the slope of the plot. Since it is rather steep, performance is well discriminated by syndication as an explanatory factor.

[Figure 2 about here]

4.2 Determinants of syndication

The decision to syndicate by the lead VC must arise from the benefits of project selection and value-add through monitoring. There are three types of information that drive this decision. First, variables relating to the risk and return of the venture itself. Second, the characteristics of the involved VCs. Third, the preferences of the entrepreneur. Our data set allows us to focus on the first two but provides relatively little information in examining the en-

trepreneur's motivations for syndication. Casamatta and Haritchabalet (2007) develop a detailed information-based model of the syndication decision. Their model ignores the preferences of the entrepreneur but models the information improvement (for the selection decision) by syndication as a trade-off versus the costs of VC free-riding in the implementation stage and the benefits from engaged VCs.

Our model relies on a Probit analysis of the syndication decision, as follows:

$$\Pr[Syn_{it}|Z_{it}] = \Phi[B'Z_{it}]$$

where Syn_{it} is a dummy variable equal to one if venture investment i is a syndicated venture in year t, and 0 otherwise. Z_{it} is a vector of firm, industry, or market characteristics at the time of firm i's syndication. B is a vector of coefficients.

There are various characteristics of the firm and of the venture capitalist that lead to a venture being syndicated, and we use a large number of variables to model the probability of syndication. Based on the previous literature, we include the following variables as components of Z:

Risk sharing variables

Wilson (1968) and Bygrave (1987) argue that the primary rationale behind VC syndication is risk sharing. To capture this, we use the following variables.

- *Ind*: Since the benefits and related risks of syndication are likely to vary across industries, we include a dummy variable that signifies if the firm lies in the information technology (IT) or bio-technology industries. These two industries are known for higher levels of risk and thus we expect such firms to be syndicated more than those in other industries.
- *Erly_stg*: A dummy variable that takes the value of 1 if the firm is in an early stage or the seed round of financing. Early stage deals are more risky and more likely to be syndicated.
- *Co_age*: The age (in years) of the venture since its founding to the financing round. We would expect that firms that are older will be less risky and less likely to need syndicated financing.
- *Num_stg*: The cumulative number of stages including the current round. As a venture goes through multiple stages of financing, asymmetric information about the venture dissipates, and the venture is likely to obtain syndicated financing.

Diversification, resource and capital constraint variables

Manigart, et al (2002) and Hopp and Rieder (2006) suggest that portfolio diversification and resource-driven motives complement the risk mitigation perspective. Gompers and Lerner (1998) assert that the capital constraints of a single venture capitalist might force the venture to syndicate. We use the following variables to address these motives.

- *VC_intN*: An indicator variable with a value of 1 if the lead VC is an international VC. The probability of syndication would increase with this variable if the VC prefers diversification. An international VC is likely to already be diversified in other markets, and hence the need would be less. Also, an international VC is less likely to have strong syndication relationships in the U.S. market, leading to a lower likelihood of syndication.
- *VC_indF*: A dummy variable with a value of 1 if the lead VC is a generalist and has no specific industry focus. A VC with a broadly diversified portfolio is less likely to seek syndication.
- *Cap_mgt*: This is the capital under management in all ventures for the lead VC. We anticipate that if the total capital under management of the lead VC is small, then the current investment represents a higher proportion of his layout, and such a VC would have a greater incentive to diversify his holdings, and thus syndicate more. Hence, an increase in this variable should result in a decrease in the likelihood of syndication.
- *Rd_ivst*: The total amount invested in the round. The likelihood of syndication grows with the amount of investment, as the lead VC would want to avoid investing too much in a single round.
- *VC_numC*: The number of portfolio companies that the lead VC has invested in. As this increases, the lead VC is more likely to invite other VCs into the syndication, as this would mitigate being over-invested in any one venture.

VC's skill and specialty variables

Brander, Amit and Antweiler (2002), Wright and Lockett (2003), and Gompers, Kovner, Lerner, and Scharfstein (2006, 2009) suggest that VC syndication provides a wide range of skills and networks to portfolio companies.

- *Late_stg*: A dummy variable that is 1 if the stage of financing is late. After controlling for other factors, syndication is less likely to occur in late stages as the set of VCs in place probably do not need additional input for selection or value addition.
- *VC_ind*: This is a dummy variable that takes the value of 1 if the lead VC is an industry specialist whose preferred industry is also the same industry

category in which the venture resides. The lead VC may wish to obtain additional skills that are not industry specific, thereby increasing the chance of a syndication; conversely, the lead VC may not need an another opinion given existing industry expertise.

- *Ivst_bk*: A dummy variable which is 1 if the lead VC is an investment bank, else 0. An investment bank is much more likely to want to syndicate than a pure VC, given the lack of focused expertise. Hence, the likelihood of syndication should increase with this variable.

Strategic stage-based variable

- *Str_stg*: This is a dummy variable that takes a value of 1 if the stage of the financing round is the same as that of the stage preferences of the lead VC. If the stage is one that the lead VC prefers, then it is less likely that the round will be syndicated.

Corporate VC variable

- *CVC*: A dummy variable with a value of 1 if the lead VC is a corporate VC, else the value of this variable is 0. Cumming (2001) suggests that Corporate VCs (CVCs) are more likely to seek syndication in order to get second opinions. In addition, they prefer to diversify their investments, especially if the investment is in the same industry as the one in which the parent firm operates.

Geographical location variables

Sorenson and Stuart (2001) suggest that syndication makes the dissemination of information easier across geographical and industrial boundaries.

- *Co_state*: A dummy variable taking a value 1 if the firm is based in California. Since there is greater access to VCs in California, this makes it more likely to see a syndicated deal in that state.
- *VCstate*: A dummy variable taking the value 1 if the VC is from California. Since there is a greater number of VCs in California, it is easier for VCs to interact. We expect a positive relation between this variable and the probability of syndication.

Network variables

Hochberg, Ljungqvist, and Lu (2009) developed network density variables to the strength of the networks among venture capitalists in local markets. In a tightly networked market, it would be easier to find syndicate partners and expected future reciprocity (Lerner, 1994) is greater and therefore the likelihood of syndication will be higher. Hochberg et. al. (2009) related two measures to network density variables: the entropy of the number of investment per zip code area and the extent of the corporate VC presence in the local market. The entropy variable measures the opportunity for more frequent interaction amongst the VCs in the local market. The higher the entropy (disorder/dispersion), the less the likelihood of syndication. The Corporate VC investment variable captures the link between the role of corporate VCs and the level of networking. We expect that the greater the proportion of Corporate VC investment in the local market, the higher the likelihood of syndication. Corporate VCs have narrower expertise and are more likely to rely on other VCs. Though corporate VCs may also be less likely to syndicate if they invest only in their areas of expertise. Their diversification motive may be weaker than that of stand-alone VCs who do not have corporate hedging.

Following Hochberg et. al. (2009), we define local markets based on six broad industry groups defined by Venture Economics and cross each with either states or metropolitan statistical areas (MSAs). We create four network density measures considering either "directed" or "undirected" network ties, and either states or MSAs as the market definition. We create two entropy measures considering either states or MSAs, and two CVC investment variables again considering either states or MSAs. Therefore we create the total of eight location specific network variables. Details of the calculations of these variables are available in Hochberg et. al. (2009).

- *Asymden_MSA*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from directed networks (i.e., conditioning on lead vs. syndicate participant ties) using metropolitan statistical areas as the market definition.
- *Symden_MSA*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from undirected networks using metropolitan statistical areas as the market definition.
- *Asymden_State*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from directed networks using states as the market definition.
- *Symden_State*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from undirected networks using states as the market definition.

- *Entropy_MSA*: the entropy of the number of investments per zip code area in the market defined based on metropolitan statistical areas. This variable measures the opportunity for more frequent interaction amongst the VCs in the local MSA market.
- *Entropy_State*: the entropy of the number of investments per zip code area in the market defined based on states. This variable measures the opportunity for more frequent interaction amongst the VCs in the local state market.
- *CVC_ivst_MSA*: the fraction of dollars invested by Corporate VCs in the market defined based on metropolitan statistical areas.
- *CVC_ivst_State*: the fraction of dollars invested by Corporate VCs in the market defined based on states.

We report the results with Asymden_MSA, Entropy_MSA, and CVC_ivst_MSA for the purpose of brevity. We find that the results remain unchanged when we use other network density, entropy, and CVC investment variables instead.

Market sentiment variable

- *Hot_mkt*: Based on Table 1, we assign an indicator variable with a value of 1 if the year of the round belongs to the periods 1983-1989 or 1995-2000. Syndication is less desirable in a hot market, as the lead VC bears much less risk. Furthermore, the lead VC may prefer to retain all the gains.

We estimate the probability of syndication using a Probit model. Results are presented in Table 5. We estimate three different models with different sets of explanatory variables, since the data requirement of some explanatory variables reduces the sample size significantly. Progressing from Model (1) to Model (3), we eliminate some of the explanatory variables so as to include more rounds in the analysis.

From Models (1) to (3), we can see that almost all the chosen variables to measure risk sharing, diversification, resources, and capital constraints, VC's skills and other variables such as geographical concerns and market sentiment are highly significant in explaining the probability of syndication. The risk-sharing motive for syndication is important. Firms that are in the IT or biotech space are more likely to be syndicated, as are early stage financings. The likelihood of syndication also increases with the number of stages – it is likely that the reduction in information asymmetry from being in an advanced stage helps in bringing together syndicates.

Diversification and resources matter. Syndication increases if the lead VC seeks a broadly diversified portfolio; it also increases in the number of portfolio

companies the lead VC invests in. As the capital under management by the lead VC increases, there is a lower chance of syndication, since the current investment does not represent a high proportion of the lead VC firm's portfolio and therefore, it is less likely to seek partners to share in the venture. In addition, syndication is less likely if the lead VC is an international VC.

Consistent with Brander, Amit and Antweiler (2002), Wright and Lockett (2003), and Gompers, Kovner, Lerner, and Scharfstein (2006, 2009) who suggest that the VC's skill and specialty are important factors of firm performance, we find that these factors are relevant in determining the likelihood of VC syndication. Syndication propensity increases if the lead VC is an industry specialist. If the lead VC is an investment bank, they tend to syndicate more to get second opinions, and again, the likelihood of a syndication increases.

Variables measuring geographical location and market sentiment are also important. Investments in ventures based in California are more likely to be syndicated, and VCs domiciled in California add to this impetus. The lead VC is less likely to initiate a syndication in a hot venture market, preferring to retain all the gains. We also find that Corporate VCs tend syndicate more. If the financing stage is one that the lead VC prefers then, as expected, the lead VC is less likely to syndicate.

The network variables are also all important determinants of syndication. We expect to find that network density, measured by asymmetric density within an MSA increases the likelihood of syndication, and indeed it does. Next, the higher the entropy (disorder/dispersion), the less the likelihood of syndication. We expect and find that the relationship of this instrument to the likelihood of syndication to be negative. Finally, we find that the greater the proportion of corporate VCs, the higher the likelihood of syndication. We expect this to be the case because corporate VCs are more likely to rely on other VCs given that they may only have niche expertise. On the other hand, it may be that corporate VCs only invest in their areas of expertise and would be less likely to syndicate. They may also need syndication less since their diversification motive may be less than that of stand-alone VCs who do not have corporate backing. Nevertheless, we find that the presence of a corporate VC increases the likelihood of syndication.

Table 5 shows that the results are consistent across all three Probit specifications. All the explanatory variables enter the probit model with the right sign which lends a level of confidence to our specification for syndication choice, and provides a solid basis for using these variables in subsequent endogeneity corrections. Because our third model specification retains the most number of observations, we use this model in the endogeneity corrections in our second

stage performance analysis regressions. Use of other model specifications does not change the results reported in the following performance analysis.

Before we proceed onto the analysis of performance, we note the variables in Table 5 that are employed as instrumental variables: three network variables (network density, entropy, and CVC investment), four diversification, resource, and capital constraint variables (international VC indicator, general list VC indicator, the capital under management, total round investment, and the VC's number of portfolio companies) as well as CVC as a lead VC indicator, and California VC indicator. We included these variables in the information set Z used for the syndication decision, and specifically excluded them in the information set X used for assessing syndication performance, so as to satisfy the exclusion restrictions for the two-stage model employed in our syndication and performance analysis.

Variables that proxy portfolio diversification and resource driven motives for syndication as well as variables related to VC's capital constraints are not likely related to exit performance variables and therefore these instruments are likely to satisfy the exclusion restriction. Though better-networked VCs experience significantly better fund performance (Hochberg, Ljungqvist, and Lu, 2007), it is hard to see that the location specific density measures and entropy measures as well as Corporate VC investment proportion are related to exit performance. We see wide variations of exit performance in the same local market that share the same location specific network characteristics. Therefore network density measures are also likely to satisfy the exclusion restriction.

The instruments are not weak. We conduct a log-likelihood ratio test and find that our instruments are collectively strong in all three models.

4.3 Syndication performance

Several studies document that VC syndication is designed for risk sharing and is a natural mechanism to reduce inherent uncertainty (Wilson (1968), Bygrave (1987); Chemmanur and Loutskina (2009) assert that uncertainty affects firm performance in their study of IPOs). Brander, Amit and Antweiler (2002) and Wright and Lockett (2003) suggest that VC syndication provides additional monitoring through syndicate members' wide range of skills, alliances, and networks to the portfolio companies. Many studies, such as Lerner (1995), Kaplan and Schoar (2005), and Gompers, Kovner, Lerner, and Scharfstein (2006, 2008, 2009) maintain that VC's monitoring, skills, and experience are

important drivers of firm performance. Kaplan, Martel, and Stromberg (2007) even suspect that the performance-enhancement of VC networking is simply experience. Lerner (1995) argues that VCs act as intense monitors of managers when the need for oversight is higher.

Having developed a robust model for explaining syndication choice, we now move on to an examination of the impact of syndication on performance. We control for variables that explain exit performance. Inclusion of these variables also reduces mis-specification from correlated omitted variables. All variables are summarized in Appendix A.

We include control variables that proxy for risk (Ind, Erly_Stg, Num_Stg), VC's skill and specialty (Late_stg, VC_ind, Ivst_bk), as well as monitoring (Mntrfee) which takes a value of one if the lead VC receives monitoring fees. We include a strategic stage-based variable (Str_stg), a geographical location variable (Co_state), and a market sentiment variable (Hot_mkt). Gompers and Lerner (1998) suggest that the performance of ventures with corporate backers are as successful as independent VCs when there are similarities between the VC firm's and portfolio company's line of business. Thus, we include a dummy variable for an independent lead VC (IndpnVC). We also include a dummy variable if the venture's business is internet-related (Internet) to measure the impact of internet-related "easy-money" ventures on exit performance.

4.3.1 Exit probabilities

Syndication has a positive impact on the probability of exit. We examine whether the higher exit probabilities of syndicated ventures come from selection or better monitoring by VC syndicates, by comparing the results with and without controlling for endogenous selection. Estimation with endogeneity controls is undertaken by means of a bivariate probit, one probit for syndication choice and another for exit probability. The results are presented in Table 6. There are four sub-panels in the table, breaking out the results for exit by different routes. If higher probabilities of exit come strictly from selection, the impact of syndication on exit probabilities should disappear after controlling for endogenous treatment effects. We observe, however, that the impact remains intact after the endogeneity correction. Hence, the likelihood that a syndicated venture will exit depends on selection, as well as on monitoring by the syndicate.

Based on Table 6, we evaluated the increase in exit probability due to syndication by holding other independent variables at their mean values and looking at the impact of the syndication variable. Because the Probit model

is non-linear, the increase in probability attributed to syndication versus non-syndication (i.e., the effect of the coefficient on the syndication dummy) is dependent on the values of other predictors and the starting values of other predictors. For exits by acquisition, IPO, or LBO, the increase in exit probability on account of syndication is 6.22% (we use the estimated coefficient for regressions without the Mills ratio) after controlling for the effect of other variables on exit time.

We find higher exit probabilities if ventures are in the IT or bio-tech space, are in California, and are not in internet-related activities, suggesting that risk concerns, industry, and spatial location are important to the successful exit of startups. Exit probabilities are higher for financings in later stages, for firms that go through a multiple number of financing stages, and for ventures receiving financing in a hot venture market, implying a role for conditions in the financing and product markets. Exits are also more likely when the lead VC is an investment bank or an independent VC, meaning that the type of VC matters.

For IPOs, syndication and exit probability are negatively (but insignificantly) correlated without endogeneity control, but positively correlated with endogeneity control. It seems that the value-add impact of syndication is greater for an IPO. While coefficients on the other explanatory variables for IPOs and acquisitions have the same sign and similar significance, the coefficients on the early stage variable, monitoring fee variable (Mntrfee), and independent lead VC (IndpnVC) variable are negative (positive) in IPOs (acquisitions), suggesting that differences in the role of the VC may lead to disparate value-add outcomes.

4.3.2 Exit times

As already shown in Table 3, the time to exit when a venture investment is syndicated is less than when it is not syndicated, primarily for exits by acquisition. We examine this effect with a multi-variate analysis controlling for all other variables. Using a Cox proportional hazard model, we also compare the results with and without controlling for endogenous treatment effects. [8] Results are provided in Table 7. The coefficients as well as hazard ratios are reported. A hazard ratio of an independent variable greater (less) than 1 in-

[8] Recently, some researchers (Earle et al (2001), Brooks et al (2003)) have used instrumental variables analysis to evaluate alternative treatments in cancer in the hazard model context. As a robustness check, we estimate an instrumental variable model (unreported) and find the same results.

dicates a shorter (longer) time-to-exit (the ratio is proportional to the speed of exit). The evidence clearly shows that syndication impacts the time to exit significantly, with and without the endogeneity correction. Consistent with the results reported in Table 3, where the time to exit was shorter for syndicated ventures, the hazard ratio for syndication is greater than 1, implying that after applying various controls, syndicated ventures are 21% more likely to exit at any given time, taken across all types, though the faster rate of exit is not significant for IPO exits without endogeneity control.

Ventures tend to have a faster time-to-exit if they are in the IT or bio-tech space, the internet space, and are in the late stage, showing that type of firm and stage matter. As expected, the type of VC matters too – exits take shorter time if the lead VC is independent and take longer when the lead VC receives monitoring fees, a symptom of lower engagement levels. It is important that the VC be aligned with the industry as well. Ventures also exit faster when they receive multiple financing rounds, but not necessarily in hot venture markets.

Syndicated investments take a shorter time to exit through acquisitions with or without correcting for endogenous treatment effects. For exit through IPOs, the impact of syndication on time-to-exit is insignificant before controlling for endogeneity but becomes significant after accounting for endogenous treatment effects. Overall, in exits through IPOs, it is value-add through monitoring that reduces time-to-exit.

To ensure that the results from the two-stage Cox proportional hazard model are not inconsistent, we also estimate a two-stage Tobit model with right censoring, and a two-stage ordinary least squares (OLS) model. In the Tobit and OLS estimations, the signs of parameter estimates will be the opposite of those in the hazard model estimation. The negative coefficient on the syndication variable in Tobit and OLS estimations represent shorter times to exit. The results are reported in Panels B and C of Table 7 respectively and are consistent with those from the Cox proportional hazard model estimation. Bootstrap estimation (not reported) of standard errors with 10,000 iterations also provides results consistent with those reported in Table 7. All our tests confirm that syndicated deals exit faster.

4.3.3 Exit multiples

In Table 8, we examine if the higher annualized exit multiples achieved by syndicated ventures shown in Table 4 remain significant after controlling for other factors, and if these high multiples come from selection or from value-add by the syndicate. We regress the exit multiple on a syndication dummy and

various other explanatory variables. We conduct this first without correcting for endogeneity, and then repeat the exercise with the endogeneity correction. We find that the variable for syndication is significant (the multiple is greater by 0.72 before adjusting for industry returns and 0.50 after adjustment) when no endogeneity correction is imposed, and then becomes insignificant with the correction. This suggests that better exit multiples come from the selection of better projects by VC syndicates, and not from value-addition effort.

Exit multiples are lower for ventures with multiple stages of financing. Multiples are higher if ventures pay monitoring fees to VCs and if the venture's business is internet related. Multiples are higher for firms in IT and bio-tech and during hot markets.

In order to make sure that we control for differential performance across industry sub-sectors, we expanded our assessment of performance (exit multiples) to using industry adjusted abnormal multiples. Industry adjusted abnormal multiples (abn_ann_mltp) are calculated as annualized exit multiple for a round investment minus industry average of exit multiples over the sample period. There are six different industry classifications in the Venture Economics database. The first (second, third, fourth, fifth, sixth) definition classifies firms into three (6, 10, 18, 69, 575) big industry groups. We use the fifth definition with 69 industry groups because the last classification with 575 industry groups reduces usable observations significantly. The results are also shown in Table 8 and support the results obtained from using the unadjusted multiples.

In Table 9, the effect of selection is examined by exit route. We compare annualized exit multiples both with and without the endogeneity correction, for exit by acquisition and IPO. Multiples for exit by acquisition are significantly related to the presence of syndication (Syn), but after correcting for endogeneity, the coefficient on the syndication dummy is insignificant, implying that higher exit multiples on acquisition come from better project choice by VC syndicates and not from value added after selection. This evidence is consistent with the finding reported in Table 8. Multiples for exit by IPO closely mirror those by acquisition, implying that VC syndicates do not impact the exit multiple for IPOs after correcting for endogeneity. This evidence also is consistent with the finding reported in Table 8. Multiples for exit by IPO closely mirror those by acquisition, implying that VC syndicates do not impact the exit multiple for IPOs after correcting for endogeneity. To the extent that our sample of annualized exit multiples from the VentureXpert database properly represents the entire population of exit multiples, the evidence based upon the endogeneity adjustment is consistent with the selection hypothesis rather than the value-add one.

To gauge the representativeness of our sample, we conduct out-of-sample forecasts of exit multiples. We use out-of-sample data for firms that did not report exit valuations, but for which the fact of syndication or non-syndication is reported. We applied the estimated models to the variables of these firms to see whether the expected (forecast) annualized multiples of these firms is higher for ventures that were syndicated relative to those that were not. The results shown in Table 10 imply that syndicated firms have a forecast multiple that is much higher. The mean annualized multiple is 1.98 versus 1.35 for non-syndicated firms, and the difference is highly significant.

4.4 Robustness test

As a robustness check we examine the same questions as we asked before, but restrict the sample to first round financings. We rerun the probit analysis for the determinants of syndication to see if the coefficients on the explanatory variables that we used change with the first round only sub-sample in comparison to the full sample containing all financing rounds. In the first-round only sub-sample analysis, Erly_stg, Late_stg, and Num_stg are not included. Since no investment bank is a lead underwriter for the first round investment, Ivst_bk is also not included in the first round analysis. The result is reported in Table 11, Panel A, and correspond to the model (3) estimated in Table 5. We can see that the selection model is a robust specification that applies to first-round financings. Though positive, we find that the coefficient on the network density is insignificant. The coefficient on entropy and corporate VC investment proportions are significant with the same signs as in Table 5.

Next, we also evaluate the models for syndication performance for first-rounds, redoing the analyses for all three performance metrics, i.e. exit probability, time-to-exit, and exit multiple. Table 11, Panel B presents the signs of the coefficients on the syndication dummy for these analyses, that relate to the models estimated in Tables 6, 7, 8 and 9. The results are consistent irrespective of whether we estimate the models for all rounds, or the first round only. Insignificant coefficients in the exit multiples regressions with industry adjusted abnormal multiples are most likely on account of the smaller sample sizes.

5 Conclusions

Using an effort-sharing framework, we undertake a comprehensive examination of 98,068 financing rounds of U.S. venture firms from Thomson Finan-

cial's Venture Economics (VentureXpert) database (1980-2003). Risk sharing, portfolio diversification, resources, capital constraints, and VC's skills, and specialty are found to be important rationales behind VC syndication. We complement and extend the existing literature by analyzing the performance of syndicated ventures not only using returns (i.e. exit multiples), but also using exit likelihood and the speed of exit. Hence, we provide a three-way metric for assessing the benefits of syndication. Our results attribute improved multiples to the selection efforts of the syndicate, and more likely and timely exit to value-addition along with selection effort. Therefore, using multiple metrics of performance shows that the two canonical hypotheses in the literature overlap and that the role of VC syndicates is multifaceted.

One caveat is that a significant relation between syndication and our performance metrics does not necessarily imply that any VC who chooses not to syndicate is behaving irrationally. A majority manager of a private venture firm or a VC firm can rationally measure private benefits of syndication vs. related costs of syndication. A future study with better data may be able to examine the choice against syndication.

Our endogeneity controlled evidence suggests that in general, syndicated ventures have higher exit probabilities, faster time-to-exit, and indifferent exit multiples. While the previous literature is not definite about the relative importance of the selection explanation or the value-added hypothesis in explaining syndicated venture performance, our results show that selection contributes to the magnitude of exit multiples and value-add after selection contributes to the probability and speed of success. We liken this to VC syndicates uncovering diamonds in the rough, and then polishing them to success.

Appendix

A Variable definitions

We present here the variables used in all the analyses in the paper, so as to make referencing the Tables easier.

- ann_mltp = annualized multiples
- Cap_mgt = the lead VC's capital under management in all ventures
- Co_age = the age (in years) of the venture since its founding to the financing round.
- Co_state = A dummy variable taking a value of 1 if the firm is based in California, and 0 otherwise.
- CVC = A dummy variable taking a value of 1 if the lead VC is a corporate VC, and 0 otherwise
- Erly_stg = A dummy variable taking a value of 1 if the company is in 'early' or 'seed' stage, and 0 otherwise
- Exit_1 = A dummy variable taking a value of 1 if exited through IPO, Acquisition, or LBO, and 0 otherwise
- Exit_2 = A dummy variable taking a value of 1 if exited through IPO or Acquisition, and 0 otherwise
- Exit_ACQ = A dummy variable taking a value of 1 if exited through Acquisition, and 0 otherwise
- Exit_IPO = A dummy variable taking a value of 1 if exited through IPO, 0 otherwise
- Hot_mkt = A dummy variable taking a value of 1 if the year of the financing round belongs to 1983-1999 or 1995-2000, and 0 otherwise
- Ind = A dummy variable taking a value of 1 if the company is in information technology or biotech industry, and 0 otherwise
- IndpnVC = A dummy variable taking a value of 1 if the lead VC is independent VC, 0 otherwise.
- Internet = A dummy variable taking a value of 1 If the venture's business is internet-related, 0 otherwise
- Ivst_bk = A dummy variable taking a value of 1 if the lead VC is an investment bank, and 0 otherwise
- lambda = inverse Mill's ratio estimated from the first stage probit model of syndication choice, separately for syndicated and non-syndicated rounds
- Late_stg = A dummy variable taking a value of 1 if the stage of financing is late stage, 0 otherwise
- Mntrfee = A dummy variable taking a value of 1 if there exist monitoring

fee or advising fee for lead VC, 0 otherwise

- Num_stg = The cumulative number of stages including the current round
- Rd_ivst = The total amount invested in the round
- Str_stg = A dummy variable taking a value of 1 if the stage of the financing round is the same as that of the stage preferences of the lead VC, and 0 otherwise
- Syn = A dummy variable taking a value of 1 if at least one round including the current round is syndicated, and 0 otherwise
- VC_ind = A dummy variable taking a value of 1 if the lead VC is an industry specialist whose preferred industry is also the same industry category in which the firm resides, and 0 otherwise. The lead VC is the investor whose cumulative investment including the current round is the greatest.
- VC_indf = A dummy variable taking a value of 1 if the lead VC is a generalist and has no specific industry focus, and 0 otherwise
- VC_intN = A dummy variable taking a value of 1 if the lead VC is an international VC, and 0 otherwise
- VC_numC = The number of companies that the lead VC has invested in.
- VCstate = A dummy variable taking the value of 1 if the VC is from California, and 0 otherwise
- *Asymden_MSA*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from directed networks (i.e., conditioning on lead vs. syndicate participant ties) using metropolitan statistical areas as the market definition.
- *Symden_MSA*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from undirected networks using metropolitan statistical areas as the market definition.
- *Asymden_State*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from directed networks using states as the market definition.
- *Symden_State*: the proportion of all logically possible ties among incumbents that are present in the market, calculated from undirected networks using states as the market definition.
- *Entropy_MSA*: the entropy of the number of investments per zip code area in the market defined based on metropolitan statistical areas. This variable measures the opportunity for more frequent interaction amongst the VCs in the local MSA market.
- *Entropy_State*: the entropy of the number of investments per zip code area in the market defined based on states. This variable measures the opportunity for more frequent interaction amongst the VCs in the local state market.
- *CVC_ivst_MSA*: the fraction of dollars invested by Corporate VCs in the market defined based on metropolitan statistical areas.
- *CVC_ivst_State*: the fraction of dollars invested by Corporate VCs in the

market defined based on states.

B Calculating multiples

Our approach to calculating multiples is best explained with a simple example. We assume that the first round investors start the firm with an investment of 10. Then there is a second round where the new investment is 20, with an ex-post valuation of 50. And finally, there is an IPO round at which new money of 30 is invested and the valuation at IPO is 120. The sequence of rounds is depicted in the following table:

Round	New Investment Investment	Post-Money Valuation	Investor in Round 1	Investor in Round 2	Investor in Round 3
1st	10	10	100%	-	-
2nd	20	50	60%	40%	-
3rd/IPO	30	120	45%	30%	25%
Cash In			10	20	30
Cash Out			54	36	30
Multiple			5.4	1.8	1.0

(1) The first-round investment is 10, and so, the first-round investors own 100% of the company at the end of the first round.
(2) The second-round financing is 20 with a post-money valuation of 50. The second-round investors paid in 20 and their stake is $20/50 = 40\%$. Therefore, the shares of ownership at the second round are 60% (first-round investors) and 40% (second-round investors).
(3) At IPO, the company raised extra capital of 30 from third-round investors. The IPO is sold at 120. Therefore, the third-round investors own $30/120 = 25\%$ of the company. The remaining 75% of the firm is shared by the first-round and second-round investors in the ratio of 60:40, respectively. Hence, the share of the first-round investors at IPO is $60\% \times 75\% = 45\%$. The share of the second-round investors is $40\% \times 75\% = 30\%$. The total shares of investors in the first, second and IPO rounds is 45%, 30%, and 25%, respectively. In cash terms, their shares are 54, 36, and 30, respectively.
(4) Finally, the multiples may be computed on a "cash-in, cash-out" basis,

i.e., divide the cash-out amount for each investor by the amount invested. This is shown in the table above and leads to multiples of 5.4, 1.8, and 1.0, respectively, for the three rounds of investors.

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Table 1
Frequency of Financing Rounds

1980-1991

Industry sector	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Agr/Forestr/Fish	1	9	13	13	10	12	11	9	9	12	6	10
Biotechnology	25	46	58	72	64	80	112	145	157	155	150	147
Business Serv.	23	24	40	39	37	34	55	68	81	68	65	41
Communications	52	124	150	217	260	260	273	321	274	279	243	223
Computer Hardware	114	193	300	375	392	304	290	278	257	250	197	136
Computer Other	1	2	3	3	4	4	3	3	7	9	9	10
Computer Software	20	55	126	238	283	279	296	295	272	315	355	337
Construction	5	11	3	16	10	15	18	16	24	31	19	14
Consumer Related	54	70	118	139	137	178	214	279	388	384	301	191
Financial Services	19	20	37	27	23	36	58	84	89	106	93	143
Industrial/Energy	106	181	206	181	174	171	212	231	240	253	228	160
Internet Specific	1	2	3	10	6	6	17	20	25	21	24	22
Manufact.	16	27	67	57	65	34	64	85	116	155	99	68
Medical/Health	50	67	102	160	202	222	224	314	278	338	317	247
Other	3	9	17	10	7	6	7	2	5	11	7	12
Semiconductor/Electr	82	116	129	163	231	215	208	229	210	203	179	129
Transportation	16	13	23	20	24	23	36	45	54	51	41	33
Utilities	1	0	1	0	1	1	1	2	5	7	6	6
Total	589	969	1396	1740	1930	1880	2099	2426	2491	2648	2339	1929

1992-2003

Industry sector	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Agr/Forestr/Fish	6	11	15	17	19	22	57	21	38	35	26	31	413
Biotechnology	192	187	203	217	293	321	372	314	550	523	427	553	5363
Business Serv.	45	47	51	78	123	129	215	295	481	372	200	244	2855
Communications	315	287	314	382	562	582	753	837	1567	1140	708	771	10894
Computer Hardware	156	107	120	155	198	192	218	256	513	329	213	258	5801
Computer Other	13	8	3	7	5	10	13	17	31	33	11	20	229
Computer Software	402	345	369	523	847	1009	1238	1646	2636	1869	1351	1425	16531
Construction	10	12	18	27	52	53	71	61	88	85	47	101	807
Consumer Related	235	240	284	376	540	550	696	574	774	659	427	568	8376
Financial Services	113	134	148	170	386	252	306	268	485	525	243	353	4118
Industrial/Energy	191	153	168	215	362	335	414	347	466	419	312	476	6201
Internet Specific	36	32	62	175	428	606	943	2876	5468	2390	1143	929	15245
Manufact.	75	76	76	104	140	132	196	181	286	220	147	187	2673
Medical/Health	371	295	328	392	610	663	726	668	854	788	670	845	9731
Other	12	13	9	28	35	31	92	56	60	66	53	166	717
Semiconductor/Electr	155	139	132	175	234	276	352	374	787	594	457	562	6331
Transportation	36	36	39	63	83	98	143	123	185	167	92	157	1601
Utilities	5	6	3	6	6	10	15	10	23	22	18	27	182
Total	2368	2128	2342	3110	4923	5271	6820	8924	15292	10236	6545	7673	98068

Notes. This table reports the frequency of financing rounds over time and across industries. The frequency of financing rounds shows cycles in private equity financing.

Table 2
Exit Probabilities for Syndicated and Non-syndicated Rounds

Panel A: Descriptive Statistics

	Variable	N	Mean	Std Dev
Non-syndicated Rounds	Exit by IPO, Acq, or LBO	32801	0.2477	0.4317
	Exit by IPO or Acq	32801	0.2367	0.4250
	Exit by Acq	32801	0.1160	0.3202
	Exit by IPO	32801	0.1207	0.3258
Syndicated Rounds	Exit by IPO, Acq, or LBO	63743	0.3791	0.4852
	Exit by IPO or Acq	63743	0.3716	0.4832
	Exit by Acq	63743	0.2203	0.4145
	Exit by IPO	63743	0.1513	0.3583

Panel B: Test for difference in means of syndicated vs. non-syndicated rounds

Variable	t value	Pr>|t|
Exit by IPO, Acq, or LBO	-42.92	<0.0001
Exit by IPO or Acq	-44.56	<0.0001
Exit by Acq	-43.26	<0.0001
Exit by IPO	-13.34	<0.0001

Notes. We consider three types of exits: by IPO, by Acquisition or by LBO. The table shows the proportion of rounds exiting by means of these routes. Syndicated rounds are those that have at least one round syndicated including the current round. A T-test is used to test the difference of means between syndicated and non-syndicated rounds.

Table 3
Exit Times for Syndicated and Non-syndicated Rounds

Panel A: Descriptive Statistics

	Variable	N	Mean	Std Dev
Non-syndicated Rounds	Time to Exit	2770	43.87	35.69
	Time to Exit by IPO	641	37.52	32.82
	Time to Exit by Acq	1937	47.14	35.51
Syndicated Rounds	Time to Exit	10539	42.22	36.72
	Time to Exit by IPO	2544	36.64	32.52
	Time to Exit by Acq	7704	44.03	37.04

Panel B: Test for difference in means of syndicated vs. non-syndicated rounds

Variable	t value	Pr>|t|
Time to Exit	2.15	0.0318
Time to Exit by IPO	0.61	0.5398
Time to Exit by Acq	3.42	0.0006

Notes. Firms can exit in three routes: by IPO, by Acquisition, and by LBO. We consider all exits, and exits by IPO, or by Acquisition separately. The table shows the time to exit (in months) of rounds exiting by means of these routes. Syndicated rounds are those that have at least one round syndicated including the current round. A T-test is used to test the difference of means between syndicated and non-syndicated rounds.

Table 4
Exit Multiples of Syndicated and Non-Syndicated Rounds

Panel A: Descriptive Statistics

	Variable	N	Mean	Std Dev	Minimum	Maximum
Non-syndicated Rounds	Raw multiple	142	9.66	16.97	0.01	91.38
	Annualized Multiple	142	1.79	1.43	0.21	9.39
Syndicated Rounds	Raw multiple	1305	6.38	12.67	0.00	91.38
	Annualized Multiple	1289	2.19	2.48	0.09	15.82

Panel B: Test for difference in means of syndicated vs. non-syndicated rounds

Variable	t value	Pr>|t|
Raw multiple	2.24	0.0264
Annualized Multiple	-2.92	0.0039

Notes. This table shows the payoff to all rounds depending on whether they were syndicated or not. The statistics are presented for raw multiples as well as annualized multiples. The raw multiple is the value at exit divided by the value at investment. Annualized multiples are computed as the raw multiple taken to the *n*-th root, where *n* is the rounded up number of years from the time of investment to exit. Multiples are rounded at the 1 percent and 99 percent levels. Syndicated rounds are those that have at least one round syndicated including the current round. A T-test is used to test the difference of means between syndicated and non-syndicated rounds.

Table 5
The Determinants of Syndication

		Model (1)			Model (2)			Model (3))	
Independent variables	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	Chi-square	Pr > Chi-square
Intercept	-2.9584	2308.49	<.0001	-2.7979	3157.24	<.0001	-3.2199	6212.38	<.0001
Ind	0.3904	504.97	<.0001	0.3170	435.37	<.0001	0.3757	903.40	<.0001
Erly_stg	0.1385	59.90	<.0001	0.1574	104.66	<.0001	0.1826	213.55	<.0001
Ln(1+ Num_stg)	1.9069	3145.27	<.0001	1.9195	4151.53	<.0001	2.0125	5802.08	<.0001
VC_intN	-0.2816	169.37	<.0001	-0.2884	216.79	<.0001	-0.2615	252.26	<.0001
VC_indF	-0.1281	39.07	<.0001	-0.0700	22.76	<.0001	-0.0547	18.94	<.0001
Ln(1+ Rd_ivst)	0.2049	2177.49	<.0001	0.1817	2555.41	<.0001	0.1926	3990.52	<.0001
Ln(1+VC_numC)	0.1891	483.15	<.0001	0.0772	523.12	<.0001	0.0871	900.40	<.0001
Late_stg	-0.0579	7.56	0.0060	-0.0239	1.66	0.1979	0.0098	0.38	0.5371
VC_ind	0.0427	3.73	0.0535	0.0753	12.46	0.0004	0.0765	17.27	<.0001
Ivst_bk	0.7713	528.92	<.0001	0.7746	659.76	<.0001	0.7798	869.01	<.0001
Str_stg	-0.1494	48.80	<.0001	-0.1732	69.88	<.0001	-0.1205	45.37	<.0001
CVC	0.0951	5.72	0.0168	0.1588	27.92	<.0001	0.1918	52.14	<.0001
Co_state	0.1895	92.23	<.0001	0.1119	45.93	<.0001	0.1369	89.27	<.0001
VCstate	0.1070	27.13	<.0001	0.1909	100.25	<.0001	0.1539	87.08	<.0001
Asymden_MSA	0.0600	11.08	0.0009	0.0448	0.01	0.0017	0.0419	12.61	0.0004
Entropy_MSA	-0.0416	32.43	<.0001	-0.0460	0.01	<.0001	-0.0515	94.64	<.0001
CVC_ivst_MSA	0.7141	44.96	<.0001	0.5697	0.09	<.0001	0.7900	96.23	<.0001
Hot_mkt	-0.1478	96.36	<.0001	-0.1813	188.33	<.0001	-0.1505	182.46	<.0001
Ln(1+ Co_age)	-0.0224	8.39	0.0038	-0.0179	7.01	0.0081			
Ln(1+ Cap_mgt)	-0.0912	260.93	<.0001						
Log Likelihood		-20,815			-27,404			-37,614	
Wald Chi-square		9,236			11,383			16,788	
Pr > Wald Chi-square		<.0001			<.0001			<.0001	
Cox and Snell R-square		0.2382			0.2209			0.2563	
Nagelkerke Max-rescaled R-square		0.3561			0.3352			0.3669	
Number of observations		49,963			66,327			83,309	
	Syndicated	37,904	75.9%	Syndicated	51,142	77.1%	Syndicated	59,387	71.3%
	Non-syn	12,059	24.1%	Non-syn	15,185	22.9%	Non-syn	23,922	28.7%

Notes. This table presents probit regressions to explain the likelihood of syndication. A coefficient of *x* for an independent variable indicates that a one-unit increase in the independent variable results in a *x* standard deviation increase in the predicted probit index. Multiplying the probit estimates by 1.6 gives the rough estimates of the logit slope estimates. The odds ratio in the logit model independent variable is calculated as exp(the logit slope estimates). See the definitions of variables in Appendix A.

Table 6
The Effect of Syndication on Exit Probabilities

	Depvariable = Exit_1 (IPO, ACQ, LBO)						Dep variable = Exit_2 (IPO,ACQ)					
	without Endogeneity control			with Endogeneity control – biprobit estimation			without Endogeneity control			with Endogeneity control – biprobit estimation		
Independent variables	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	t-value	Pr > t-value	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	t-value	Pr > t-value
Intercept	-1.0946	2619.64	<.0001	-1.1295	-53.94	<.0001	-1.1745	2978.75	<.0001	-1.2068	-57.23	<.0001
Syn	0.1707	226.08	<.0001	0.8124	30.37	<.0001	0.1636	205.66	<.0001	0.7830	28.54	<.0001
Ind	0.2469	416.35	<.0001	0.1414	11.11	<.0001	0.2772	518.32	<.0001	0.1748	13.58	<.0001
Erly_stg	-0.1314	134.31	<.0001	-0.1559	-13.93	<.0001	-0.1208	112.93	<.0001	-0.1452	-12.93	<.0001
Ln(1+ Num_stg)	0.3377	322.08	<.0001	0.0219	0.96	0.3355	0.3800	405.95	<.0001	0.0743	3.22	0.0013
Late_stg	0.1668	174.24	<.0001	0.1397	11.19	<.0001	0.1015	63.61	<.0001	0.0785	6.24	<.0001
VC_ind	-0.0032	0.04	0.8391	0.0115	0.75	0.4543	-0.0040	0.0664	0.7967	0.0102	0.66	0.5091
Ivst_bk	0.1943	162.54	<.0001	0.1152	7.46	<.0001	0.1883	152.06	<.0001	0.1124	7.25	<.0001
Str_stg	-0.0574	11.17	0.0008	-0.0076	-0.45	0.6558	-0.0708	16.71	<.0001	-0.0222	-1.29	0.1977
Co_state	0.1899	326.19	<.0001	0.1314	12.30	<.0001	0.1960	346.81	<.0001	0.1398	13.05	<.0001
Hot_mkt	0.2525	687.92	<.0001	0.2574	27.15	<.0001	0.2580	712.43	<.0001	0.2628	27.58	<.0001
Mntrfee	-0.0312	5.40	0.0201	-0.0189	-1.47	0.1417	-0.0405	8.98	0.0027	-0.0287	-2.20	0.0276
IndpnVC	0.0254	5.30	0.0213	0.0129	1.21	0.2261	0.0364	10.77	0.0010	0.0243	2.26	0.0237
Internet	-0.3986	1484.40	<.0001	-0.4003	-40.12	<.0001	-0.3999	1486.93	<.0001	-0.4024	-40.12	<.0001
Number of observations		81,989			81,989			81,989			81,989	
Log Likelihood		-50,639			-87,425			-50,197			-87,008	
Wald Chi-square		5,132						5,235				
Pr > Wald Chi-square		<.0001						<.0001				
Cox and Snell R-square		0.0632						0.0646				
Nagelkerke Max-rescaled R-square		0.0869						0.0891				

Table 6 (*continued*)

	Dependent variable = Exit_ACQ						Dependent variable = Exit_IPO					
	without Endogeneity control			with Endogeneity control – biprobit estimation			without Endogeneity control			with Endogeneity control – biprobit estimation		
Independent variables	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	t-value	Pr > t-value	Coefficient estimates	Chi-square	Pr > Chi-square	Coefficient estimates	t-value	Pr > t-value
Intercept	-1.7747	5208.40	<.0001	-1.7897	-73.02	<.0001	-1.1969	2359.56	<.0001	-1.2193	-50.21	<.0001
Syn	0.2390	330.30	<.0001	0.7560	22.76	<.0001	-0.0018	0.0187	0.8912	0.4575	13.08	<.0001
Ind	0.2658	367.69	<.0001	0.1826	12.34	<.0001	0.1232	75.61	<.0001	0.0536	3.60	0.0003
Erly_stg	0.0443	12.21	0.0005	0.0207	1.64	0.1007	-0.2437	317.95	<.0001	-0.2609	-19.30	<.0001
Ln(1+ Num_stg)	0.3571	299.88	<.0001	0.0991	3.70	0.0002	0.1445	43.52	<.0001	-0.0830	-2.96	0.0031
Late_stg	0.1076	58.44	<.0001	0.0922	6.61	<.0001	0.0349	5.78	0.0162	0.0189	1.31	0.1897
VC_ind	-0.0344	3.87	0.0492	-0.0225	-1.30	0.1937	0.0326	3.14	0.0764	0.0427	2.35	0.0190
Ivst_bk	0.0628	14.38	0.0001	0.0022	0.13	0.8965	0.1839	115.65	<.0001	0.1244	7.04	<.0001
Str_stg	-0.0287	2.17	0.1410	0.0109	0.56	0.5755	-0.0801	14.52	0.0001	-0.0458	-2.18	0.0290
Co_state	0.1796	246.53	<.0001	0.1348	11.52	<.0001	0.0852	47.27	<.0001	0.0473	3.75	0.0002
Hot_mkt	0.2119	383.64	<.0001	0.2177	20.38	<.0001	0.1493	172.32	<.0001	0.1572	13.97	<.0001
Mntrfee	0.0261	3.02	0.0821	0.0345	2.35	0.0186	-0.0915	32.05	<.0001	-0.0815	-5.15	<.0001
IndpnVC	0.0888	50.01	<.0001	0.0778	6.32	<.0001	-0.0419	10.68	0.0011	-0.0479	-3.80	0.0001
Internet	-0.2952	659.52	<.0001	-0.3048	-27.13	<.0001	-0.2758	496.00	<.0001	-0.2854	-23.57	<.0001
Number of observations		81,989			81,989			81,989			81,989	
Log Likelihood		-38,874			-75,800			-33,946			-70,900	
Wald Chi-square		3,253						1,699				
Pr > Wald Chi-square		<.0001						<.0001				
Cox and Snell R-square		0.0404						0.0209				
Nagelkerke Max-rescaled R-square		0.0644						0.0366				

Notes. In this table we present a model to explain the exit probabilities. The table contains two regressions. First, we provide the results without the endogeneity correction, and second, with the endogeneity correction. The results with the endogeneity correction are obtained through biprobit estimation of the syndication determination equation and the exit probabiilty esquation. The log liklihood in the biprobit estimation is the log likelihood of the system. The variable "Syn" is the dummy variable for whether the venture is syndicated or not. Syn in the analysis with endogeneity control is the predicted probability of syndication estimated by a first stage probit. Results are provided broken down by IPO and by ACQ (acquisition) routes. See the definitions of variables in Appendix A.

Table 7
The Effect of Syndication on Time-to-exit

Panel A: Hazard Model analysis

	Time-to-Exit through IPO, Acquisition, or LBO						Time-to-Exit through IPO or Acquisition					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square
Syn	1.211	150.97	<.0001	3.796	880.63	<.0001	1.207	141.78	<.0001	3.771	850.44	<.0001
Ind	1.360	380.26	<.0001	1.162	81.51	<.0001	1.405	448.27	<.0001	1.201	116.72	<.0001
Erly_stg	0.742	397.64	<.0001	0.704	541.22	<.0001	0.749	367.64	<.0001	0.711	505.25	<.0001
Ln(1+ Num_stg)	1.428	235.35	<.0001	0.873	21.65	<.0001	1.480	280.79	<.0001	0.906	11.07	0.0009
Late_stg	1.119	53.71	<.0001	1.102	39.78	<.0001	1.077	22.12	<.0001	1.061	14.22	0.0002
VC_ind	1.060	8.14	0.0043	1.069	10.80	0.0010	1.058	7.70	0.0055	1.068	10.25	0.0014
Ivst_bk	1.093	24.78	<.0001	0.970	2.74	0.0981	1.085	20.67	<.0001	0.965	3.72	0.0536
Str_stg	1.083	11.23	0.0008	1.151	34.96	<.0001	1.073	8.59	0.0034	1.142	30.18	<.0001
Co_state	1.018	1.94	0.1635	0.951	14.87	0.0001	1.024	3.31	0.0690	0.956	11.47	0.0007
Hot_mkt	0.975	3.41	0.0649	1.001	0.00	0.9492	0.980	2.12	0.1455	1.006	0.18	0.6686
Mntrfee	0.943	11.37	0.0007	0.958	5.87	0.0154	0.928	17.75	<.0001	0.943	10.86	0.0010
IndpnVC	1.134	76.48	<.0001	1.117	58.92	<.0001	1.149	91.41	<.0001	1.132	72.53	<.0001
Internet	1.947	2001.60	<.0001	1.886	1799.98	<.0001	1.960	2012.25	<.0001	1.899	1813.07	<.0001
lambda				0.473	762.62	<.0001				0.474	740.14	<.0001
Number of observations		81,716			81,716			81,716			81,716	
Percent censored		64.65%			64,65%			65.26%			65.26%	
Wald Chi-square		5,114			5,652			5,270			5,780	
Pr > Wald Chi-square		<.0001			<.0001			<.0001			<.0001	

Table 7 (*continued*)

	Time-to-Exit through Acquisition						Time-to-Exit through IPO					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square	Hazard ratio	Chi-square	Pr > Chi-square
Syn	1.429	261.63	<.0001	4.401	554.50	<.0001	0.998	0.01	0.9427	3.190	307.10	<.0001
Ind	1.545	380.76	<.0001	1.325	143.57	<.0001	1.266	103.03	<.0001	1.078	9.25	0.0024
Erly_stg	0.914	20.81	<.0001	0.869	49.63	<.0001	0.573	559.94	<.0001	0.542	666.52	<.0001
Ln(1+ Num_stg)	1.706	296.22	<.0001	1.059	2.13	0.1442	1.242	36.80	<.0001	0.746	43.17	<.0001
Late_stg	1.131	33.54	<.0001	1.119	27.97	<.0001	1.012	0.25	0.6200	0.992	0.13	0.7198
VC_ind	1.004	0.02	0.8963	1.014	0.26	0.6134	1.134	16.65	<.0001	1.141	18.26	<.0001
Ivst_bk	1.013	0.28	0.5983	0.910	14.70	0.0001	1.187	40.90	<.0001	1.041	2.15	0.1424
Str_stg	1.099	8.88	0.0029	1.175	25.67	<.0001	1.042	1.25	0.2644	1.101	6.70	0.0096
Co_state	1.077	19.00	<.0001	1.007	0.17	0.6830	0.955	5.25	0.0220	0.890	32.15	<.0001
Hot_mkt	1.018	0.91	0.3393	1.042	5.11	0.0239	0.940	9.28	0.0023	0.967	2.76	0.0965
Mntrfee	0.989	0.23	0.6295	1.003	0.02	0.8950	0.854	32.98	<.0001	0.870	25.56	<.0001
IndpnVC	1.263	136.71	<.0001	1.244	119.11	<.0001	1.026	1.43	0.2314	1.011	0.27	0.6066
Internet	1.807	899.33	<.0001	1.751	798.68	<.0001	2.176	1140.97	<.0001	2.109	1043.39	<.0001
lambda				0.478	378.86	<.0001				0.467	363.29	<.0001
Number of observations		81,716			81,716			81,716			81,716	
Percent censored		80.39%			80.39%			84.87%			84.87%	
Wald Chi-square		3,374			3,568			2,525			2,845	
Pr > Wald Chi-square		<.0001			<.0001			<.0001			<.0001	

Table 7 (*continued*)

Panel B: Tobit analysis

	Time-to-Exit through IPO, Acquisition, or LBO						Time-to-Exit through IPO or Acquisition					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square
Intercept	5.5838	51060.00	<.0001	5.7329	50754.70	<.0001	5.6544	51643.30	<.0001	5.8024	51255.30	<.0001
Syn	-0.1682	163.85	<.0001	-1.1103	873.62	<.0001	-0.1632	152.81	<.0001	-1.0974	844.86	<.0001
Ind	-0.2653	371.82	<.0001	-0.1347	86.25	<.0001	-0.2943	451.61	<.0001	-0.1648	127.54	<.0001
Erly_stg	0.2964	518.39	<.0001	0.3414	679.82	<.0001	0.2874	487.75	<.0001	0.3322	643.81	<.0001
Ln(1+ Num_stg)	-0.2965	200.66	<.0001	0.1160	20.28	<.0001	-0.3283	244.86	<.0001	0.0810	9.83	0.0017
Late_stg	-0.1221	75.58	<.0001	-0.0967	47.71	<.0001	-0.0782	30.52	<.0001	-0.0538	14.52	0.0001
VC_ind	-0.0509	8.20	0.0042	-0.0666	14.11	0.0002	-0.0489	7.56	0.006	-0.0650	13.42	0.0002
Ivst_bk	-0.1036	39.07	<.0001	-0.0031	0.03	0.8521	-0.0977	34.51	<.0001	0.0011	0.00	0.9472
Str_stg	-0.0266	1.75	0.1865	-0.0840	17.23	<.0001	-0.0176	0.76	0.3837	-0.0747	13.45	0.0002
Co_state	-0.0514	19.24	<.0001	0.0132	1.24	0.2652	-0.0556	22.57	<.0001	0.0082	0.48	0.4874
Hot_mkt	0.1848	272.62	<.0001	0.1657	219.89	<.0001	0.1776	250.16	<.0001	0.1590	201.16	<.0001
Mntrfee	0.0410	7.12	0.0076	0.0266	3.01	0.0829	0.0529	11.66	0.0006	0.0388	6.32	0.0120
IndpnVC	-0.0491	15.29	<.0001	-0.0380	9.17	0.0025	-0.0613	23.52	<.0001	-0.0505	16.10	<.0001
Internet	-0.3796	1032.70	<.0001	-0.3482	865.66	<.0001	-0.3811	1040.16	<.0001	-0.3501	874.31	<.0001
lambda				0.6217	723.87	<.0001				0.6163	704.58	<.0001
Number of observations		81,716			81,716			81,716			81,716	
Percent censored		64.65%			64,65%			65.26%			65.26%	
Log likelihood		-65,861			-65,497			-64,874			-64,520	

Table 7 (*continued*)

	Time-to-Exit through Acquisition						Time-to-Exit through IPO					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square	Estimate	Chi-square	Pr > Chi-square
Intercept	6.7201	35025.50	<.0001	6.8826	34096.00	<.0001	5.9521	29334.90	<.0001	6.0825	29072.40	<.0001
Syn	-0.2854	247.22	<.0001	-1.2712	576.28	<.0001	-0.0113	0.38	0.5391	-0.9059	305.99	<.0001
Ind	-0.3686	373.28	<.0001	-0.2334	134.94	<.0001	-0.2060	116.80	<.0001	-0.0814	16.48	<.0001
Erly_stg	0.1203	48.36	<.0001	0.1632	88.11	<.0001	0.4816	651.23	<.0001	0.5277	771.73	<.0001
Ln(1+ Num_stg)	-0.4399	247.37	<.0001	-0.0138	0.16	0.6929	-0.1694	32.51	<.0001	0.2273	39.08	<.0001
Late_stg	-0.1054	30.36	<.0001	-0.0858	20.28	<.0001	-0.0408	4.32	0.0376	-0.0145	0.55	0.4575
VC_ind	-0.0339	2.04	0.1529	-0.0489	4.26	0.0390	-0.0672	6.96	0.0083	-0.0827	10.64	0.0011
Ivst_bk	-0.0069	0.09	0.758	0.0892	15.57	<.0001	-0.1831	62.90	<.0001	-0.0815	12.04	0.0005
Str_stg	-0.0569	4.46	0.0346	-0.1193	19.38	<.0001	0.0238	0.66	0.4183	-0.0258	0.76	0.3828
Co_state	-0.0940	37.24	<.0001	-0.0278	3.18	0.0746	0.0079	0.22	0.6393	0.0681	16.01	<.0001
Hot_mkt	0.1267	70.61	<.0001	0.1102	53.64	<.0001	0.2111	177.00	<.0001	0.1896	143.30	<.0001
Mntrfee	-0.0181	0.78	0.3771	-0.0341	2.77	0.0958	0.1389	38.69	<.0001	0.1259	32.01	<.0001
IndpnVC	-0.1554	81.16	<.0001	-0.1443	70.30	<.0001	0.0397	5.11	0.0238	0.0501	8.20	0.0042
Internet	-0.4459	808.01	<.0001	-0.4123	685.89	<.0001	-0.3498	414.51	<.0001	-0.3205	347.96	<.0001
lambda				0.6477	400.14	<.0001				0.5909	344.60	<.0001
Number of observations		81,716			81,716			81,716			81,716	
Percent censored		80.39%			80.39%			84.87%			84.87%	
Log likelihood		-46,205			-46,004			-37,269			-37,096	

Table 7 (*continued*)

Panel C: OLS with treatment effects

	Time-to-Exit through IPO, Acquisition, or LBO			Time-to-Exit through IPO or Acquisition			Time-to-Exit through Acquisition			Time-to-Exit through IPO		
Independent variables	Estimate	t-value	Pr > t-value	Estimate	t-value value	Pr > t-square	Estimate	t-value value	Pr > t-square	Estimate	t-value value	Pr > t-square
Intercept	4.3240	154.59	<.0001	4.3647	154.31	<.0001	4.4435	109.27	<.0001	4.2173	107.07	<.0001
Syn	-0.4940	-11.44	<.0001	-0.4899	-11.21	<.0001	-0.4317	-6.76	<.0001	-0.4828	-8.10	<.0001
Ind	0.0473	2.87	0.0040	0.0283	1.70	0.0895	0.0324	1.40	0.1615	0.0201	0.85	0.3967
Erly_stg	0.2546	17.00	<.0001	0.2517	16.78	<.0001	0.2328	11.97	<.0001	0.3246	13.88	<.0001
Ln(1+ Num_stg)	0.0974	3.49	0.0005	0.0847	3.01	0.0027	0.0308	0.81	0.4199	0.1408	3.40	0.0007
Late_stg	-0.0281	-1.86	0.0631	-0.0102	-0.67	0.5056	-0.0058	-0.28	0.7793	-0.0410	-1.80	0.0714
VC_ind	-0.0460	-2.34	0.0194	-0.0438	-2.22	0.0266	-0.1049	-4.01	<.0001	0.0244	0.82	0.4109
Ivst_bk	0.0617	3.50	0.0005	0.0627	3.53	0.0004	0.0819	3.48	0.0005	0.0170	0.64	0.5231
Str_stg	-0.0595	-2.57	0.0103	-0.0514	-2.19	0.0288	-0.0968	-3.16	0.0016	0.0302	0.84	0.4015
Co_state	0.0739	5.72	<.0001	0.0733	5.66	<.0001	0.0816	4.89	<.0001	0.0649	3.22	0.0013
Hot_mkt	0.1894	15.24	<.0001	0.1798	14.37	<.0001	0.1585	9.60	<.0001	0.2071	11.01	<.0001
Mntrfee	0.0350	2.04	0.0410	0.0409	2.36	0.0183	0.0126	0.56	0.5737	0.0961	3.59	0.0003
IndpnVC	-0.0289	-2.05	0.0402	-0.0362	-2.55	0.0108	-0.1002	-5.21	<.0001	0.0434	2.09	0.0367
Internet	-0.6401	-47.96	<.0001	-0.6444	-48.11	<.0001	-0.8375	-47.77	<.0001	-0.3781	-18.52	<.0001
lambda	0.3149	11.92	<.0001	0.3139	11.76	<.0001	0.2940	7.56	<.0001	0.3111	8.54	<.0001
Number of observations		28,887			28,388			16,026			12,362	
F-value		234.04			234.15			208.18			62.02	
Pr > F		<.0001			<.0001			<.0001			<.0001	
Adjusted R-square		0.1015			0.1031			0.1533			0.0646	

Notes. In this table we present a model to explain exit times The table contains two regressions. First, we provide the results without the endogeneity correction, and second, with the endogeneity correction. The variable "Syn" is the dummy variable for whether the venture is syndicated or not. “Syn” in the analysis with endogeneity control is the predicted probability of syndication estimated by a first stage probit. Results are provided broken down by IPO and by ACQ (acquisition) routes. See the definitions of explanatory variables in Appendix A.

Table 8
The Effect of Syndication on Exit Multiples

	Dependent variable = ann_mltp						Dependent variable = abn_ann_mltp					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t
Intercept	0.6255	1.53	0.1259	0.6979	1.34	0.1790	-0.5105	-1.32	0.1860	-0.3498	-0.71	0.4757
Syn	0.7164	3.26	0.0012	0.5503	0.72	0.4731	0.4952	2.38	0.0173	0.1264	0.17	0.8615
Ind	0.5107	1.95	0.0518	0.5299	1.92	0.0549	0.0199	0.08	0.9361	0.0625	0.24	0.8105
Erly_stg	0.2407	1.43	0.1521	0.2422	1.44	0.1501	0.2177	1.37	0.1704	0.2209	1.39	0.1645
Ln(1+ Num_stg)	-0.6981	-2.63	0.0086	-0.6492	-1.90	0.0581	-0.5335	-2.13	0.0336	-0.4250	-1.31	0.1889
Late_stg	0.0836	0.50	0.6156	0.0812	0.49	0.6266	0.0013	0.01	0.9932	-0.0040	-0.03	0.9800
VC_ind	-0.4815	-2.35	0.0189	-0.4824	-2.35	0.0188	-0.6435	-3.32	0.0009	-0.6454	-3.33	0.0009
Ivst_bk	-0.0964	-0.54	0.5859	-0.0858	-0.47	0.6397	-0.0384	-0.23	0.8183	-0.0148	-0.09	0.9321
Str_stg	0.4774	1.62	0.1045	0.4723	1.60	0.1095	0.3143	1.13	0.2578	0.3028	1.09	0.2772
Co_state	0.2263	1.76	0.0779	0.2318	1.77	0.0761	0.0701	0.58	0.5633	0.0822	0.67	0.5051
Hot_mkt	0.8240	5.17	<.0001	0.8224	5.15	<.0001	0.6046	4.02	<.0001	0.6008	3.98	<.0001
Mntrfee	0.3898	1.80	0.0716	0.3860	1.78	0.0753	0.3615	1.77	0.0769	0.3532	1.72	0.0849
IndpnVC	0.1544	0.91	0.3630	0.1555	0.92	0.3600	0.0961	0.60	0.5489	0.0986	0.61	0.5391
Internet	0.3013	2.36	0.0184	0.3030	2.37	0.0180	-0.0576	-0.48	0.6329	-0.0538	-0.45	0.6561
lambda				0.0971	0.23	0.8211				0.2155	0.53	0.5951
Number of observations		1,407			1,407			1,407			1,407	
F-value		6.83			6.35			3.95			3.68	
Pr > F		<.0001			<.0001			<.0001			<.0001	
Adjusted R-square		0.0512			0.0505			0.0265			0.0260	

Notes. In this table we present a model to explain the annualized multiple from exit, to assess if syndication adds value. The table contains two regressions. First, we provide the results without the endogeneity correction, and second, with the endogeneity correction. The variable "Syn" is the dummy variable for whether the venture is syndicated or not. “Syn” in the analysis with endogeneity control is the predicted probability of syndication estimated via a first stage probit. The dependent variables are the annualized exit multiple (ann_mltp) and industry-mean-adjusted abnormal multiples (abn_ann_mltp). See the definitions of explanatory variables in Appendix B.

Table 9
The Effect of Syndication on Exit Multiples by Exit Route

	Dependent variable = ann_mltp for Acquisition						Dependent variable = abn_ann_mltp for Acquisition					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t
Intercept	0.1361	0.19	0.8510	0.3334	0.38	0.7027	-1.1217	-1.64	0.1017	-0.7490	-0.91	0.3639
Syn	0.9858	2.37	0.0181	0.4525	0.33	0.7431	0.7728	1.97	0.0496	-0.2347	-0.18	0.8571
Ind	0.3861	0.75	0.4516	0.4753	0.85	0.3948	-0.2665	-0.55	0.5821	-0.0980	-0.19	0.8525
Erly_stg	0.6881	2.42	0.0158	0.6925	2.43	0.0153	0.5833	2.17	0.0302	0.5916	2.20	0.0281
Ln(1+ Num_stg)	-0.4811	-1.06	0.2896	-0.3223	-0.54	0.5913	-0.2875	-0.67	0.5026	0.0125	0.02	0.9824
Late_stg	-0.1594	-0.52	0.6015	-0.1659	-0.54	0.5874	-0.1649	-0.57	0.5671	-0.1773	-0.61	0.5391
VC_ind	-0.4496	-1.31	0.1896	-0.4493	-1.31	0.1902	-0.6609	-2.04	0.0414	-0.6603	-2.04	0.0416
Ivst_bk	-0.1307	-0.41	0.6810	-0.0893	-0.27	0.7893	-0.1542	-0.51	0.6075	-0.0760	-0.24	0.8097
Str_stg	0.3753	0.82	0.4123	0.3543	0.77	0.4422	0.1414	0.33	0.7435	0.1017	0.23	0.8152
Co_state	0.2234	1.01	0.3119	0.2403	1.07	0.2856	0.1811	0.87	0.3854	0.2129	1.00	0.3161
Hot_mkt	1.1365	4.34	<.0001	1.1301	4.30	<.0001	0.9316	3.76	0.0002	0.9196	3.71	0.0002
Mntrfee	0.1923	0.59	0.5525	0.1761	0.54	0.5898	0.2163	0.71	0.4795	0.1854	0.60	0.5475
IndpnVC	0.2533	0.78	0.4329	0.2581	0.80	0.4249	0.3076	1.01	0.3133	0.3166	1.04	0.2997
Internet	-0.2106	-0.96	0.3396	-0.2037	-0.92	0.3574	-0.3713	-1.78	0.0749	-0.3583	-1.72	0.0866
lambda				0.3400	0.41	0.6854				0.6423	0.81	0.4176
Number of observations		610			610			610			610	
F-value		3.93			3.66			3.19			3.01	
Pr > F		<.0001			<.0001			0.0001			0.0002	
Adjusted R-square		0.0589			0.0576			0.0447			0.0441	

Table 9 (*continued*)

	Dependent variable = ann_mltp for IPO						Dependent variable = abn_ann_mltp for IPO					
	without Endogeneity control			with Endogeneity control			without Endogeneity control			with Endogeneity control		
Independent variables	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t	Coefficient estimates	t-value	Pr > t
Intercept	1.2525	2.65	0.0083	1.3645	2.18	0.0294	0.1293	0.29	0.7737	0.2446	0.41	0.6807
Syn	0.4488	1.83	0.0671	0.2096	0.23	0.8171	0.2522	1.08	0.2786	0.0060	0.01	0.9944
Ind	0.4836	1.70	0.0902	0.5054	1.71	0.0883	0.1224	0.45	0.6515	0.1449	0.51	0.6068
Erly_stg	-0.1565	-0.78	0.4346	-0.1560	-0.78	0.4363	-0.0937	-0.49	0.6225	-0.0932	-0.49	0.6245
Ln(1+ Num_stg)	-0.7843	-2.48	0.0133	-0.7151	-1.77	0.0775	-0.6497	-2.16	0.0309	-0.5785	-1.50	0.1329
Late_stg	0.1235	0.66	0.5093	0.1198	0.64	0.5235	0.0229	0.13	0.8977	0.0190	0.11	0.9151
VC_ind	-0.4254	-1.72	0.0850	-0.4279	-1.73	0.0836	-0.5728	-2.44	0.0148	-0.5754	-2.45	0.0144
Ivst_bk	-0.0384	-0.19	0.8505	-0.0254	-0.12	0.9032	0.0734	0.38	0.7046	0.0867	0.44	0.6627
Str_stg	0.4546	1.20	0.2308	0.4497	1.18	0.2367	0.3926	1.09	0.2761	0.3876	1.07	0.2832
Co_state	0.1478	0.97	0.3314	0.1554	1.00	0.3153	-0.0871	-0.60	0.5469	-0.0793	-0.54	0.5897
Hot_mkt	0.4152	2.12	0.0340	0.4132	2.11	0.0351	0.2227	1.20	0.2311	0.2206	1.19	0.2361
Mntrfee	0.7657	2.55	0.0108	0.7664	2.55	0.0108	0.6618	2.32	0.0204	0.6625	2.32	0.0204
IndpnVC	0.0803	0.43	0.6670	0.0825	0.44	0.6589	-0.0488	-0.28	0.7833	-0.0465	-0.26	0.7935
Internet	0.7737	5.08	<.0001	0.7755	5.09	<.0001	0.2765	1.91	0.0562	0.2784	1.92	0.0550
lambda				0.1330	0.27	0.7840				0.1369	0.30	0.7665
Number of observations		797			797			797			797	
F-value		5.32			4.94			2.10			1.95	
Pr > F		<.0001			<.0001			0.0124			0.0188	
Adjusted R-square		0.0659			0.0648			0.0176			0.0165	

Notes. In this table we present a model to explain the annualized multiple from exit, to assess if syndication adds value. The table contains two regressions. First, we provide the results without the endogeneity correction, and second, with the endogeneity correction. The variable "Syn" is the dummy variable for whether the venture is syndicated or not. “Syn” in the analysis with endogeneity control is the predicted probability of syndication estimated by a first stage probit. The dependent variables are the annualized exit multiple (ann_mltp) and industry-mean-adjusted abnormal multiples (abn_ann_mltp). See the definitions of explanatory variables in Appendix A. Results are provided broken down by IPO and by ACQ (acquisition) routes.

Table 10
Out-of-sample forecasts of exit multiples for syndicated and non-syndicated firms.

Panel A: Expected Annualized Multiples calculated with parameter estimates obtained from regressions without treatment effect control

Variable	N	Mean	Median	Std Dev	25th Pctl	75th Pctl	t Value	Pr > |t|	t-test t-value syn=0 vs. 1	t-test p-value syn=0 vs. 1
Non-syndicated	23,782	1.3472	1.3608	0.6370	0.9206	1.8571	326.16	<.0001	-129.14	<.0001
Syndicated	58,120	1.9781	1.9902	0.6338	1.5232	2.4348	752.46	<.0001		

Panel B: Expected Annualized Multiples calculated with parameter estimates obtained from treatment effect controlled regressions

Variable	N	Mean	Median	Std Dev	25th Pctl	75th Pctl	t Value	Pr > |t|	t-test t-value syn=0 vs. 1	t-test p-value syn=0 vs. 1
Non-syndicated	23,782	1.3822	1.4048	0.6386	0.9517	1.8776	333.76	<.0001	-123.01	<.0001
Syndicated	58,120	1.9859	2.0009	0.6350	1.5322	2.4476	753.94	<.0001		

Notes. We applied our estimated model for exit multiples to firms for which we did not have exit multiples, but for whom we had knowledge of whether they were syndicated or not. Since we have already established that firms with syndication generate higher annualized (return) multiples, we expect that the expected multiples from our model should be higher for syndicated firms that we did not use in the original model. We verified these results for models with and without endogeneity corrections.

Table 11
First round only results

Panel A: Determinants of Syndication

Independent variables	Coefficient estimates	Chi-square	Pr > Chi-square
Intercept	-2.3042	2427.13	<.0001
Ind	0.3980	597.72	<.0001
VC_intN	-0.2319	118.23	<.0001
VC_indf	-0.0140	0.68	0.4104
Ln(1+ Rd_ivst)	0.2436	2953.96	<.0001
Ln(1+VC_numC)	0.0772	402.48	<.0001
VC_ind	0.0643	6.50	0.0108
Str_stg	-0.0772	11.83	0.0006
CVC	0.1538	19.03	<.0001
Co_state	0.1347	43.95	<.0001
VCstate	0.1696	53.30	<.0001
Asymden_MSA	0.0093	0.51	0.4732
Entropy_MSA	-0.0518	50.01	<.0001
CVC_ivst_MSA	0.8603	66.02	<.0001
Hot_mkt	-0.0973	38.92	<.0001
Log Likelihood		-20,723	
Wald Chi-square		5,301	
Pr > Wald Chi-square		<.0001	
Cox and Snell R-square		0.1616	
Nagelkerke Max-rescaled R-		0.2155	
Number of observations		34,267	

Table 11 (*continued*)

Panel B: Coefficient on "Syn" in performance analyses

Exit probability		
Exit_1	without endogeneity control	+
	biprobit	+
Exit_2	without endogeneity control	+
	biprobit	+
ACQ	without endogeneity control	+
	biprobit	+
IPO	without endogeneity control	insignificant
	biprobit	+
Time-to-exit		
Hazard model analysis		
Exit_1	without endogeneity control	>1
	w/ endogeneity control	>1
Exit_2	without endogeneity control	>1
	w/ endogeneity control	>1
ACQ	without endogeneity control	>1
	w/ endogeneity control	>1
IPO	without endogeneity control	>1
	w/ endogeneity control	>1
Tobit analysis		
Exit_1	without endogeneity control	-
	w/ endogeneity control	-
Exit_2	without endogeneity control	-
	w/ endogeneity control	-
ACQ	without endogeneity control	-
	w/ endogeneity control	-
IPO	without endogeneity control	-
	w/ endogeneity control	-
OLS analysis		
Exit_1	w/ endogeneity control	-
Exit_2	w/ endogeneity control	-
ACQ	w/ endogeneity control	-
IPO	w/ endogeneity control	-
Exit Multiples		
ann_mltp as a dependent variable		
all	without endogeneity control	+
	w/ endogeneity control	insignificant
ACQ	without endogeneity control	+
	w/ endogeneity control	insignificant
IPO	without endogeneity control	+
	w/ endogeneity control	insignificant
abn_ann_mltp as a dependent variable		
all	without endogeneity control	+
	w/ endogeneity control	insignificant
ACQ	without endogeneity control	insignificant
	w/ endogeneity control	insignificant
IPO	without endogeneity control	insignificant
	w/ endogeneity control	insignificant

Table 11 (*continued*)

Notes. In order to assess the robustness of our results, we rerun all the empirical analyses with first round venture investment only. We report results for the first pass of the regression in which the determinants of syndication are established in Panel A, and results for the second pass, wherein performance metrics for (a) exit multiples, (b) time to exit, and (c) probability of exit are assessed, in Panel B. For compactness of exposition in Panel B, we report the signs of the coefficients on Syn, so that ease of comparison across models is also enhanced. Panel A relates to the empirical results in Table 5. Panel B relates to the results in Tables 6, 7, 8, and 9. In the first round only analyses, Erly_stg, Late_stg, and Num_stg are not included. Ivst_bk is also not included because no investment bank is a lead underwriter for the first round investment.

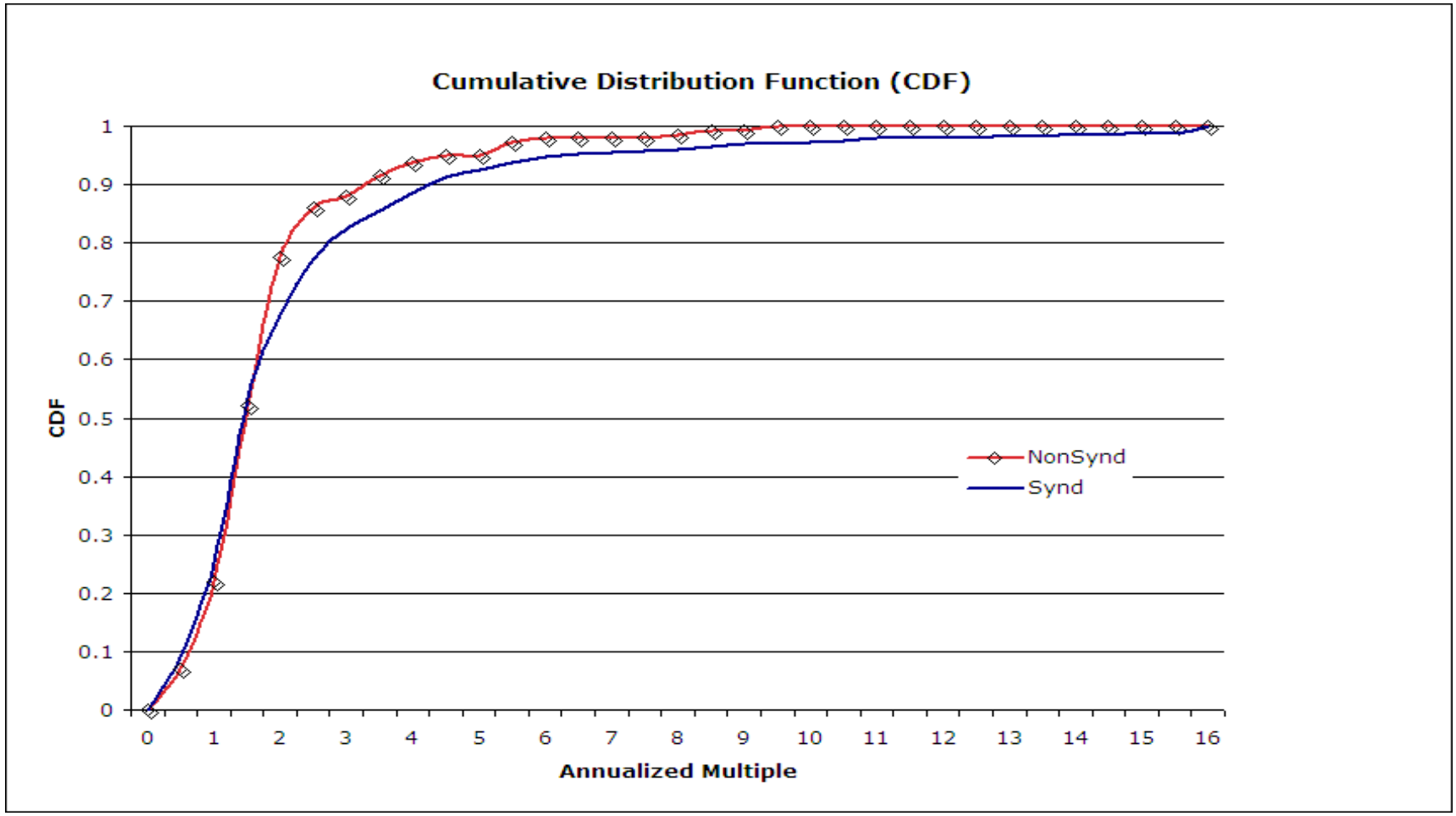

Fig. 1. CDFs of multiples
This figure presents the cumulative distribution function of annualized multiples for syndicated and non-syndicated firms. The plot shows that after a multiple level of 2, the syndicated firms demonstrate a much fatter tail, i.e. the likelihood of a large multiple is higher for syndicated firms than for non-syndicated ones.

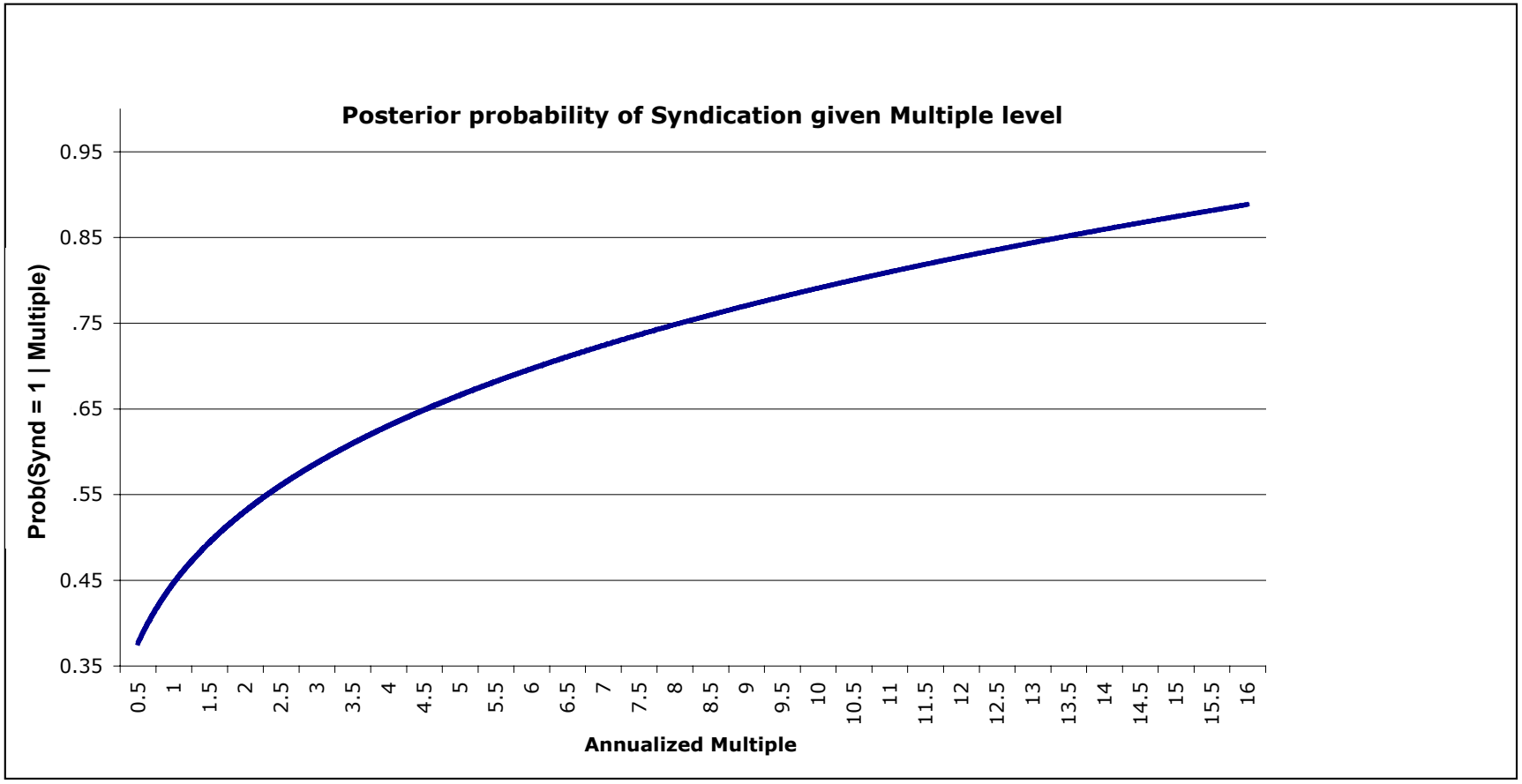

Fig. 2. Probability of syndication given a level of multiple
This figure shows the results of a Bayesian analysis of the distribution functions in Figure 1 to compute the posterior probability of the venture being syndicated for each level of annualized multiple. Instead of assuming the prior probabilities of syndication to be the actual proportions in the data, we assumed them to be diffuse, i.e. half each. For each level of multiple (Y) we calculated the posterior Prob(Synd|Y) = Prob(Y|Synd)/[Prob(Y|Synd)xProb(Synd)+Prob(Y|NoSynd)x Prob(NoSynd)]. We then smoothed this probability function and plotted it as above. We can see that the posterior probability of the venture being syndicated rises as the multiple increases. When the annualized multiple is greater than 2, the Prob(Synd|Y)>0.5.