

The Ups and Downs of Venture Capital Syndication: Determinants and Outcomes

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Abstract

Why do venture capitalists syndicate in more than sixty percent of first rounds? Syndication is more likely for larger first rounds, consistent with a diversification motive. Industry and geographic patterns of syndication, as well as variations by stage of the portfolio company, support the view that first-round syndicates also provide vetting, expertise, and networks, and that higher densities of venture capital firms make it easier for syndicates to function. In addition, indicators of lower future returns to venture capital investments are associated with higher rates of syndication, consistent with the use of first-round syndication as a defensive strategy. Empirical evidence further supports this view: first-round syndication of the 1990s, when syndication rates were low and prospects good, is associated with good exit outcomes, while syndication since 2000, when syndication rates were high and prospects poor, is associated with bad exit outcomes.

1. Introduction

A syndicate comprises multiple investors who make a common decision in the hope of receiving a shared payoff (Wilson, 1968). Syndication is particularly common in venture capital; more than 60% of first-round investments between 1975 and 2007 were syndicated, yet the phenomenon remains poorly understood. This study presents key facts surrounding venture capital syndication, examines the underlying forces, and assesses its effect on investment performance through the boom and bust of the last several decades.

The single strongest predictor of first-round syndication is the dollar amount of the investment, consistent with the diversification motive. In a survey of venture capital (VC) firms, Lockett and Wright (2001) find diversification to be the most common reason cited for syndication. Because a VC fund has a fixed amount to invest, syndication allows the fund to invest in more companies, reducing risk. Indeed, the private placement memorandum between general and limited partners often places a limit on the fraction of a fund that may be invested in one firm.¹ Cumming (2006) finds that Canadian VC funds that actively syndicate do manage portfolios with more companies. Our finding that larger deals are syndicated more often is consistent with this diversification motive: should a portfolio company need a large amount of capital, a venture capitalist (VC) will often choose to seek funds from other VC firms rather than overweight that company in its own portfolio.

First-round syndication rates also vary by industry, being greater in high-tech industries like medical devices, biotechnology, and software. This is consistent with two explanations.

¹ In commentary on private equity agreements generally, which include venture capital as a special case: “[T]here is always a restriction on the size of any one investment the GP can make in a specific company. This encourages diversification and can prevent ‘spending good money after bad’.” Note on Limited Partnership Agreements, Tuck School of Business, Case # 5-0019 (2003). See also Metrick and Yasuda (2011), p. 44 (excerpt from private placement memorandum limiting fund investments in any single portfolio company to 25%).

First, high-tech companies are riskier; thus, this may again reflect a diversification motive.

Second, high-tech suffers from greater information asymmetries and a greater range of uncertainties, thus increasing the benefits that come with broader experience and contacts in a syndicate. In fact, first-round investments are actually *smaller* within high-tech industries.

Theoretical work relevant for explanations based on asymmetric information goes back at least to Sah and Stiglitz (1986), who argue that groups are superior to individuals in their capacity to gather, absorb, and process information. Bygrave (1987) finds that larger VC firms syndicate as often as smaller firms, consistent with the view that sharing of information and perspectives is an important motive for syndication. Lerner (1994) posits that gaining second opinions is a primary motive in syndicating investments. These notions provide an explanation for our finding that high-technology companies are syndicated more, despite their lower deal sizes.

Also consistent with the information asymmetry motive, first-round seed stage investments are syndicated more often than first-round expansion stage investments. Many companies receiving seed financing have no revenues, let alone positive cash flows. By definition, these investments involve greater uncertainty and information asymmetries, similarly tipping the balance toward syndicates, which can bring more experience and a larger information set to bear.

The economic geography of new ventures and venture capital also illuminate syndication. Sorenson and Stuart (2001) find that information about potential venture investment opportunities circulates within geographic spaces. This would suggest that syndication is more common in areas with high concentrations of venture capitalists – the likelihood of finding a knowledgeable partner and sharing information is higher. Indeed, we find that companies located in Boston, California, and the Pacific Northwest are more likely to receive a syndicated first

round than companies from other parts of the country. This is true after controlling for deal size, industry, and stage, suggesting that the concentration of venture capitalists in these areas affects syndication rates. Perhaps also, these areas generate or attract more complex businesses, even controlling for industry.

To recap, we find that four company-specific factors play a role in the probability of first-round syndication: investment amount, industry, stage, and geographic region. However, after controlling for these factors, we find that first-round syndication rates still ebb and flow over time; specifically, unexplained or residual syndication declines from the mid-1980s until the dotcom bubble of the late 1990s. It then turns upward and stays at an elevated rate through 2007 (see Figure 1a). Intriguingly, excess syndication is strongly *negatively* correlated with future VC industry internal rates of return. For example, syndication rates bottomed out during the 1990s, a period considered the heyday for venture capital returns. In contrast, syndication rates have increased more recently, while returns have been dismal. (Again, see Figure 1a.) Why did syndication become more prevalent in a more challenging investment environment?

A useful framework comes from Brander, Amit, and Antweiler (2002), who provide two explanations for syndication: the selection hypothesis and the value-added hypothesis. According to the selection hypothesis, which builds on Lerner's (1994) study, VCs syndicate in order to gain a second opinion from a trusted, competent source. Syndication helps with the decision whether to invest. The value-added hypothesis, in contrast, emphasizes the roles played by VCs in subsequent execution as mentors, monitors, and network facilitators (see Cumming, Fleming, and Suchard, 2005, for a breakdown of different value-added activities).²

² Supporting evidence for the idea that good syndication is worth something (whether it is selection or value-added) comes from Hochberg, Ljungqvist and Lu (2007), who find that better-networked syndicates have better fund performance, and Tian (2011), who finds that syndication

Brander et al. (2002) construct two separate formal models, one for each hypothesis. In their model representing the selection hypothesis, venture capitalists only syndicate when they themselves have mixed signals about an investment's prospects, i.e. encounter a lower expected-return project. The willingness of another VC to co-invest provides an additional and sufficient positive signal. In their model representing the value-added hypothesis, venture capitalists syndicate in order to increase the expected return of the investment. Because they find that syndicated investments perform better in their sample, they conclude that the value-added hypothesis is stronger.

The applicability of the two mechanisms plausibly depends on circumstances. When more capital enters the industry, a relatively inelastic supply of managerial talent in the VC community makes it more difficult for venture capitalists to add value (Cumming and MacIntosh, 2004; Kanniainen and Keuschnigg, 2004). Additionally, when capital floods in, the prospects of startups become increasingly problematic. For both reasons, venture capitalists become less sure of their bets, and in line with the selection hypothesis, they are more likely to syndicate deals with lower prospects. Thus, syndicated investments turn out to perform worse. Indeed, we find this is the case post-bubble, where first-round syndication is associated with fewer successful outcomes, adjusting for other factors.

In addition, the overinvestment in venture capital that resulted in low returns for investments made after the late 1990s may have resulted from agency problems between venture

creates both product market and financial market value. Some work reports negative findings. In a study of 200 venture capital funds, Dimov and De Clerq (2006) find that heavier syndication rates are associated with lower performance. Guler and McGahan (2007) examine syndication in an international context, where legal and social norms are often different than in the US and cite (1) social loafing, (2) ownership dilution, and (3) increased risk that the idea will be appropriated as downsides to syndication.

capitalists and their investors (limited partners such as pensions, endowments, foundations, and investment companies). Lerner, Schoar, and Wongsunwai (2007) find limited partners vary considerably in their ability to invest knowledgeably in venture capital funds. Because these institutions often simply choose to invest in a sector (rather than researching and choosing the entrepreneurial companies themselves), they could fall victim to a sentiment-based “dumb money” phenomenon similar to the one Frazzini and Lamont (2008) document for mutual funds. A solution to the quandary faced by VC firms was provided by Keynes (1936): “Worldly wisdom teaches us that it is better for reputation to fail conventionally than to succeed unconventionally.” If, in fact, there was “too much money chasing too few deals” in the industry, venture capitalists may have been hard-pressed to turn down a 2 percent management fee and the remote possibility of a hit if other VCs invested alongside them. “We had reputable syndicate partners” provides cover if and when investments head south.

Our work is most closely related to Gompers (1998) and Gompers and Lerner (2000) who find that VC industry inflows have a positive impact on the valuations of VC portfolio companies. They also examine the effect of industry inflows (but not syndication) on investment performance and unlike our paper, find no statistically significant negative impact. However, their sample does not cover the technology bubble.

Our contribution is threefold: we (1) find stable determinants of venture capital syndication that are consistent with explanations based on diversification, selection, and value-added rationales, (2) establish that after controlling for these factors, syndication rates exhibit a cyclical pattern, and (3) show that high rates of residual syndication are associated with worse outcomes in low expected-return environments, consistent with the selection hypothesis.

2. Sources of data

We construct a sample spanning 1975-2007 using Securities Data Corporation's VentureXpert (formerly Venture Economics). Kaplan, Sensoy, and Strömberg (2002) investigate the completeness of the database and find that it contains roughly 85% of VC financing rounds. Gompers and Lerner (2004) question the data quality for investments prior to 1975, so we exclude them. VC investment picked up considerably after ERISA changed its 'prudent man' rule in 1979 to explicitly allow pension funds to invest in venture capital. As such, excluding investments prior to 1975 is unlikely to make our data set unrepresentative. Finally, we exclude investments in international portfolio companies, also due to data quality concerns. We find that exits of international companies via acquisition are on the order of 5%, suggesting that not all exits are being captured.

We also restrict our analysis to the first round of funding. One reason for this is that VC investors in later rounds have more information to assess the strength of the venture. Also, VC firms often offer late-round investment opportunities to other VC firms hoping that those other VC firms will reciprocate for future ventures (Lerner (1994)). For both of these reasons, later investors are more likely to be passive investors that provide just financing and little advice or monitoring. Thus, their investment is more endogenous to the success of the venture.

We have eliminated leveraged buyouts. The VentureXpert database contains leveraged buyouts as well as VC financings because some VC firms participate in both. We only include portfolio companies that are classified as seed/startup stage, early stage, expansion stage, or later stage.

Finally, we eliminate any portfolio company whose first round of financing is of an unknown amount. In total, the data set contains 23,254 unique portfolio companies that received at least one round of VC financing from 1975 through 2007.

3. Primitive Empirics

3.1. Syndication Trends

Figure 1a displays the percentage of first rounds syndicated over time. The first thing to note is that beginning around the mid-1980s, first-round syndication rates began a slow downward trend that ended roughly at the start of the Internet bubble. In 1984, more than two-thirds of all first-round investments involved two or more venture capitalists. By 1998, just over one-half were syndicated. The syndication environment changed markedly during and after the Internet bubble. First-round syndication rates jumped back up to over two-thirds and have been roughly flat since. Figure 1a also indicates that there is a tight negative correlation between first-round syndication and forward internal rates of return. Contrast that with Figure 1b, where there appears to be a lag in the negative correlation between total VC investment and forward internal rates of return. This is mainly due to the years 1994-1997 when VC investment was rising along with forward internal rates of return.

3.2. Syndication and First-Round Investments

Figure 2a displays real first-round investment amounts from 1975-2007. Deal sizes increased considerably through most of the 1990s and then even more during the Internet bubble. Post-bubble averages are similar to the 1990s. Figure 2b examines syndication trends by amount of the first-round investment in the portfolio company. Not too surprisingly, the more money

required by the portfolio company, the higher the likelihood it will be funded by a syndicate. This stems from the fact that venture capital firms need to diversify their portfolios – if the entrepreneurial company needs more capital, a VC firm will recruit syndicate partners rather than over-weight its own fund’s portfolio. Note, however, that even adjusting for size, syndication rates fluctuated. The upper quartile, middle 50%, and lower quartile of first-round investment amount all exhibit the same syndication trend found globally: declining syndication rates from the 1980s up until the Internet bubble, an increase during the bubble, and then a leveling off. It should be noted, though, that those fluctuations are muted, suggesting that the mix of investment amounts played a role in the syndication spike at the time of the bubble.

3.3 Syndication by Industry

Figures 3a, 3b, and 3c show syndication rates by industry (Figures 3b and 3c use rolling averages to smooth out noise). On average over this period, information technology and medical companies are more likely to be syndicated. This is consistent with the view that those industries have large information asymmetries as well as the view that actual dollar returns are riskier. These industries may provide higher growth opportunities for investors, and they may also provide less liquidation value if the business flops, i.e., higher downside risk. Figure 3c displays a finer breakout (six industries rather than three). All six industries generally follow the same familiar pattern: a downward trend in syndication from the mid-1980s through most of the 1990s. During the Internet bubble at the end of the 1990s (and after), all industries were syndicated more often. Regardless of cohort, all five high-technology industries are consistently syndicated more often than the non-high-technology companies (retail, consumer goods, etc.).

3.4 Syndication by Life-cycle Stage of the Portfolio Company

Figure 4a displays syndication trends by stage of the portfolio company. Companies in the seed/startup stage have a product that is under development but not operational. Early-stage ventures have a product in testing or pilot production. Companies in the expansion stage have a product that is in production and commercially available. Finally, later-stage companies have a product that is widely available and are more likely to be profitable and near the point where they might go public or be acquired. These stages are listed in order of declining information asymmetry between the entrepreneurs and the investors. Roughly speaking, they are also listed in declining order of syndication rates, i.e., companies in the seed/startup stage are more likely to be syndicated while companies in the expansion stage are least likely.³ This ordering is not precise throughout the entire sample (both information asymmetry and dollar investment are a function of stage), but all stages follow the familiar pattern of falling then rising. Given the differences in syndication rates across stage, we include indicator variables in the regressions that follow, being particularly careful to examine any changes in the value of their coefficients over time.

3.5 Syndication by Region

Figures 5a and 5b indicate whether syndication trends were consistent across the geographic regions of the portfolio companies. Like with the industries, they generally were. But also consistent with the industry breakouts, there are differences in the cross section. Figure 5a breaks out coastal vs. interior portfolio companies. We consider companies from Northern

³ A notable exception is later-stage companies, which make up roughly 5% of the sample. They are syndicated more often, but this is likely due to the fact that they need more capital and are likely to attract it from multiple VC firms given they are close to going public or being acquired.

California, Southern California, New England, New York Tri-State, the Pacific Northwest, the Mid-Atlantic, and the Southeast to be coastal companies; the rest we consider interior. As the figure shows, coastal companies are much more likely to be syndicated. This is not particularly surprising given that venture capital firms tend to cluster in coastal areas. A company looking to raise capital from multiple firms would be wise to locate its headquarters in one of these regions. Figure 5b shows that not all coastal regions are alike, though. While Northern California (Silicon Valley) and New England (Boston – Route 128) exhibit quite similar syndication patterns, New York portfolio companies are no more likely to be syndicated than companies from all other regions combined – this despite the fact that New York is the 3rd-largest venue for VC investment. Because syndication rates vary by region, we include indicator variables for sixteen different regions in the regressions that follow.

4. Regression Results

4.1. Baseline Probit Regressions – The determinants of syndication

Table 1 shows multivariate probit regressions that incorporate the variables from the previous four sets of figures. The first column provides results for the entire time period: 1975-2007. The second column covers 1975-1998, while the third covers 1999-2007. The last two columns break the dataset roughly in half, the first being pre-Internet bubble and the second including the bubble and thereafter.

The dollar value of the investment is the single strongest predictor of syndication. Not surprisingly, bigger deals are much more likely to be syndicated. This is the case throughout the sample period, but its coefficient declines in value in the later period (1999-2007).

Turning to industry effects, our base (omitted) case is computer companies (both software and hardware, but excluding semiconductors). These make up 40% of the sample and are fairly representative in terms of syndication rates. In the first sub-period (1975-1998), medical/health/life sciences companies are more likely to be syndicated and non-high tech less likely. For the second sub-period, these two industry influences grew stronger. Moreover, in addition, biotech and semiconductor ventures received more of their first-round funding through syndicates. The consistently low level of syndication for non-high-technology (such as retail and consumer goods) companies is consistent with the view that these enterprises involve fewer information asymmetries, as well as the view that their liquidation values would be higher.

We now turn to stage of the portfolio company and its association with syndication decisions. The base (omitted) case in our regressions is early-stage companies, which are companies farther along than seed stage/startup companies but younger than expansion-stage companies. Overall, we find that seed stage/startup companies are more likely to be syndicated (although this is not statistically significant in the later period), while expansion-stage companies are less likely. This is consistent with the notion that syndication helps out with information asymmetries between the entrepreneur and the investors. Seed stage/startup companies would have the most asymmetry, while expansion-stage companies would have the least, thus requiring fewer syndicate partners. It is worth noting that this relation is clearer in the multivariate setting, which controls for investment size.

Finally, we examine syndication rates by geographic region. The Southeast region (includes the Research Triangle in North Carolina) has fairly representative syndication patterns over time and represents our base (omitted) case. We consistently find that in Northern California (includes Silicon Valley), Southern California, the Northwest, and New England

(includes Route 128 in Boston), first-round deals are syndicated more often. Post-Internet bubble, the Rocky Mountain region and the Great Plains region have experienced higher levels of syndication relative to other regions.

4.2. The Fall and Rise of Unexplained Syndication

It turns out that even after adjusting for size of the financing, stage of the venture, industry, and geography, rates of first-round syndication have undergone some intriguing fluctuations. Figure 6a provides some evidence in the form of predicted vs. actual syndication rates, where the predicted rates are obtained from the baseline regression from the entire time period 1975-2007 (Column 1 of Table 1). Adjusting for baseline factors, syndication rates were high during the 1980s, low during the 1990s, and high again post-bubble. Using the entire sample to estimate residual syndication, it turns out that for 2001-2007 syndication rates were 4.1 percentage points higher than expected. Using the 1975-1998 regression (Column 2 of Table 1) to obtain predicted values, the gap is even larger (see Figure 6b), 6.1 percentage points higher than expected.

4.3. Syndication and Market Conditions

Figure 7 graphs unexplained syndication (the residuals from Figure 6a) with industry-wide internal rates of return for a given cohort. Periods of apparent excess syndication take place for cohorts that subsequently turn out to have low internal rates of return.

On the assumption that venture capitalists have a roughly accurate idea of future rates of return for venture capital, why would syndication rates increase as expected rates decline? One explanation comes from Brander, Amit, and Antweiler (2002), who construct two separate

models, one for the selection hypothesis and one for the value-added hypothesis. Under the selection hypothesis, a VC firm will be *less* likely to seek out a second opinion (and thus, less likely to syndicate) for projects with high returns because it would prefer to keep the profits from the project to itself. Under their value-added hypothesis, a VC firm will be *more* likely to syndicate opportunities with low expected returns in order to get reassurance from a second informed player.⁴

Sorensen (2007) uses a two-sided matching model to explain returns – rather than syndication – and finds in empirical work that both factors matter but that selection is twice as important as value-added in explaining returns. It should be noted that Sorensen’s model assumes a single venture capitalist rather than a syndicate. Given the large swings in returns to venture capital, including sizeable ebbs and flows of exit opportunities like the IPO market, it seems plausible that the relative influence of these two forces will shift over time.

Cumming and MacIntosh (2004) provide some clues as to why. They argue that during a boom cycle (a period marked by a rapidly increasing inflow of funds and seemingly promising projects), the short-run inelasticity of VC managerial talent prevents the VC community from adequately adjusting to the flood of new money. Venture capitalists possess substantial pragmatic skills, experience, and specialized industry knowledge that cannot be quickly acquired; the industry is not instantly scalable as more money flows in. This means VC firms must manage more deals per partner, as Cumming (2006) empirically finds. Given the fact that there are only 24 hours in a day, this necessarily means that each VC is adding less value to any

⁴ Given that the syndicated investments in their sample perform better, they conclude that the value-added hypothesis is better supported by the data. It’s important to note that their sample is based on Canadian VC firms during the highest-performing period in the history of venture capital: the early-to-mid-1990s.

given portfolio company, as predicted theoretically by Kannianen and Keuschnigg (2003) and found empirically by Cumming and Johan (2007) and Cumming and Walz (2009). Consistent with this, Kortum and Lerner (2000) and Lerner (2002) find that venture capitalists contribute 15% less to innovation during boom periods. All of these findings indicate that venture capitalists add less value during a boom period. So if we were to see an upward spike in syndication during a rapid increase in the supply of venture capital, then we would expect the value-added hypothesis to lose its explanatory power. At the same time, Brander et al.'s (2002) selection hypothesis predicts that problematic or uncertain deals are more likely to be syndicated. Thus, an increase in capital and decline in the average prospect of new ventures would be associated with higher rates of syndication.

4.4. Does the Efficiency of Syndication Change over Time?

It is important to note that the inverse relationship between aggregate syndication rates and subsequent returns does not imply that syndication is uniformly ineffective. Periods of low syndication can still be periods of effective syndication. In fact, Table 2 provides evidence that on average, syndication adds value. It contains probit regressions where the dependent variable is *Portfolio Company Success?*, which takes the value 1 for an IPO or acquisition, and 0 otherwise. There is no publicly available, comprehensive database of specific VC fund performance due to the fact that VC firms are hesitant to disclose their funds' return data. Thus, the VC literature is forced to rely on noisy proxies of fund performance, i.e., exits. Following Gompers and Lerner (1999), we denote success as the occurrence of one of the two most profitable exits, IPOs and acquisitions. Of course, these proxies don't incorporate investment costs or ownership stakes, but

Cochrane (2005) and Kaplan and Schoar (2005) examine proprietary return data and conclude that most of the returns are comprised of the returns from these two exits.

Table 2 contains all the same control variables as Table 1, but also includes the main variable of interest: *First Round Syndicated?*, which takes the value 1 if the first round of investment involves two or more financiers, and 0 otherwise. A positive coefficient would indicate better performance by syndicated investments. We find that on average, syndicated investments have a 3.3 percentage-point higher probability of succeeding. This is based on Column 1, which covers first rounds from 1975 through 1997, for which we have outcomes over the usual ten-year horizon. The other columns include first rounds after 1997, but with outcomes truncated at 2007. Thus, Columns 2, 3, and 4 only allow 7, 5, and 3 years to exit, respectively. The incremental effect of first-round syndication on success seems to decline substantially, though the declining base rates of success means these results are only suggestive. We analyze this in more depth in Table 3.

Table 3 displays *First Round Syndicated?* coefficients from the specification in Table 2, but on a 5-year rolling basis. This allows tracking of the effect of first-round syndication on outcomes over time. Figure 8 shows the coefficient graphically. The results indicate that syndication added value in the 1990s (the only period with statistically significant positive coefficients), a time when *aggregate* syndication rates were relatively low. In contrast, first-round syndication is associated with less successful outcomes for five-year periods beginning in 2000. This is consistent with the view that declining expected returns and less certain prospects from the post-2000 cohorts led venture capitalists to adopt syndication for an increasingly problematic pool of startups, in line with the underlying mechanism proposed by Lerner (1994) and elaborated by Brander et al. (2002).

4.5. Syndication and Financial Market Conditions

The regression results above have focused on the likelihood of syndication likelihood as a function of factors specific to an individual portfolio firm. Plausibly, a spectrum of financial market indicators also affect syndication, arguably through channels that influence the terms under which venture capitalists ultimately exit from their investments.

The typical successful strategy entails an initial public offering (IPO) or acquisition, with IPOs having been the preferred exit strategy. Cumming, Flemming, and Schwienbacher (2005) argue that more liquid exit markets mean lower investment risk and thus, less need to syndicate for other risk-reducing reasons such as screening (Lerner, 1994) or adding value (Brander, Amit, and Antweiler, 2002). Hence, the overall number of IPOs may serve as an indicator of exit opportunities going forward.

Another possible exogenous factor is the amount of money invested in venture capital as a whole. While venture capitalists invest their own money in entrepreneurial companies, the vast majority of their capital comes from other investors: pensions, endowments, foundations, insurance companies, financial institutions, wealthy individuals, etc. If these investors increase their allocation to high-risk, high-reward investments through venture capital funds, this represents an increased demand for entrepreneurship. If the supply of entrepreneurial opportunities remains relatively constant, then at the margin, the vetting of new opportunities, a function of syndication described by Lerner (1994) and Brander et al. (2002), becomes more problematic.

We also include the level of the Nasdaq index and the subsequent internal rate of return on a given year's investments. Both of these serve as proxies for expected returns.

Table 4 builds on the specification from Table 1, adding these four new factors: number of IPOs, total VC inflows, NASDAQ levels, and realized IRR. We find that good current liquidity (proxied by IPOs) has a negative effect on syndication. This is consistent with Cumming, Flemming, and Schwienbacher (2005), suggesting that venture capitalists are more likely to syndicate when they are worried about exiting their investments. It appears this can partially explain the excess syndication exhibited by the VC community post-bubble.

The most consistent finding is that excess syndication is strongly negatively correlated with subsequent venture capital industry returns. This is consistent with the view that poor prospects cause venture capitalists to seek more diversification or a second opinion. In addition, after controlling for liquidity conditions and investment conditions, the total amount invested by the VC community is positively correlated with syndication, though the results are confined to the early years, 1981-1998. This is consistent with the notion that an inflow of money leads to greater syndication. A greater inflow may be related to lower expected returns and less certainty about a company's prospects. Additionally, a greater inflow may mean that venture firms find themselves in uncharted territory, again increasing the likelihood of seeking a second opinion.

5. Conclusion

Venture capital syndication is a response to a spectrum of forces. The most common survey response given by venture capitalists is that they syndicate to diversify their portfolios. For a sample of over 23,000 first-round financings, we find in fact that larger investments are more likely to be syndicated.

Other evidence is consistent with the view that VCs also syndicate to reduce information asymmetries. Thus, investments in seed-stage and high-tech companies are more likely to be

syndicated, even though they typically receive less capital in the first round than other types of investments. Finally, we find that syndication rates are negatively related to proxies for future rates of return. This does not mean that syndication is ineffective on average. In fact, we find that syndicated first-rounds from the 1990s had better outcomes – consistent with Brander et al.’s (2002) value-added hypothesis. Much of this superior performance occurred at the same time capital flooded the industry, starting around 1994-5. Later, when exit options and returns deteriorated after 2000, first-round syndication (after adjusting for other factors), is associated with lower success rates. Plausibly, low, judicious syndication is a symptom of good prospects, a healthy balance between money flowing in, good portfolio companies, and a healthy exit market. On the other hand, when the venture capital industry becomes stressed by a combination of money flooding in and poor exit opportunities, at least some syndication becomes a strategy for dealing with problematic investment opportunities.

Since the function of syndication seems to depend on circumstance and because most research has focused on the benefits of syndication, future work may fruitfully focus on syndicates gone bad, or at least the factors involved in less successful syndicates.

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Table 1 - Baseline Probit Regressions

The following table displays results from a probit regression where the dependent variable is *First Round Syndicated?*, defined as the portfolio company receiving venture capital from two or more unique financiers in the first round. The sample period is first-round investments that occurred in 1975-2007. All coefficients are marginal effects. $\ln(\text{Total 1st-Round Investment})$ is the natural logarithm of the total amount invested by the first-round partners. Five indicator variables are used for the six different industries of the portfolio companies (the omitted base case is *Computer-Related*). *Startup/Seed* is an indicator variable that takes the value 1 if the portfolio company has a product under development. The omitted base case stage is *Early*, when the portfolio company has a product in testing or pilot production. *Expansion* is an indicator variable that takes the value 1 if the portfolio company has a product that is in production and commercially available. *Later* is an indicator variable that takes the value 1 if the portfolio company has a product that is widely available. Fifteen indicator variables are used for the sixteen geographic regions of the portfolio companies (*Southeast* is the omitted base case).

Dependent Variable: First Round Syndicated?			
	(1)	(2)	(3)
	<u>1975-2007</u>	<u>1975-1998</u>	<u>1999-2007</u>
Ln(1st-Round Inv't - 2007 \$)	0.149*** [50.24]	0.156*** [35.14]	0.135*** [33.71]
<u>Industry of Portfolio Company</u>			
Biotechnology	0.045*** [3.02]	0.005 [0.21]	0.085*** [4.43]
Comms and Media	-0.023** [2.23]	-0.022 [1.36]	-0.020 [1.59]
Medical/Health/Life Science	0.043*** [3.76]	0.029* [1.71]	0.066*** [4.21]
Non-High-Technology	-0.065*** [6.76]	-0.054*** [4.02]	-0.073*** [5.18]
Semiconductors/Other Electronics	0.030** [2.15]	0.008 [0.38]	0.055*** [3.05]
<u>Stage of Portfolio Company</u>			
Startup/Seed	0.054*** [6.47]	0.107*** [8.73]	0.010 [0.87]
Expansion	-0.130*** [14.77]	-0.104*** [7.69]	-0.132*** [11.43]
Later	-0.059*** [3.19]	0.002 [0.09]	-0.108*** [4.00]
<u>Region of Portfolio Company</u>			
Alaska/Hawaii	-0.037 [0.34]	0.116 [0.74]	-0.090 [0.72]
Great Lakes	0.014 [0.70]	0.042 [1.44]	-0.013 [0.46]
Great Plains	0.039* [1.74]	0.018 [0.56]	0.073** [2.36]
Mid-Atlantic	0.021 [1.11]	0.023 [0.73]	0.012 [0.52]

N. California	0.094***	0.113***	0.078***
	[6.71]	[5.26]	[4.33]
New England	0.081***	0.103***	0.063***
	[5.26]	[4.43]	[3.08]
New York Tri-State	-0.008	-0.018	-0.001
	[0.48]	[0.71]	[0.03]
Northwest	0.075***	0.066**	0.081***
	[3.73]	[2.10]	[3.16]
Ohio Valley	-0.007	0.007	-0.019
	[0.34]	[0.25]	[0.74]
Rocky Mountains	0.041**	0.036	0.051*
	[1.97]	[1.14]	[1.88]
S. California	0.058***	0.077***	0.043**
	[3.57]	[3.13]	[2.00]
South	0.000	0.038	-0.048
	[0.01]	[1.09]	[1.22]
Southwest	0.018	0.048*	-0.008
	[1.02]	[1.87]	[0.35]
US Territories	-0.199**	-0.405***	-0.028
	[2.06]	[2.91]	[0.24]
Observations	23,254	10,969	12,285
Pseudo R-squared	0.131	0.132	0.122

Robust z statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2 - Probit Regressions - Syndication Effectiveness

The following table displays results from a probit regression where the dependent variable is *Portfolio Company Success?*, defined as the portfolio company either going public or being acquired. The sample period is first-round investments that occurred in 1975-2007. All coefficients are marginal effects. *First Round Syndicated?* is an indicator variable that takes the value 1 if the portfolio company receives venture capital from two or more unique financiers in the first round. *Ln(Total 1st-Round Investment)* is the natural logarithm of the total amount invested by the first-round partners. Five indicator variables are used for the six different industries of the portfolio companies (the omitted base case is *Computer-Related*). *Startup/Seed* is an indicator variable that takes the value 1 if the portfolio company has a product under development. The omitted base case stage is *Early*, when the portfolio company has a product in testing or pilot production. *Expansion* is an indicator variable that takes the value 1 if the portfolio company has a product that is in production and commercially available. *Later* is an indicator variable that takes the value 1 if the portfolio company has a product that is widely available. Fifteen indicator variables are used for the sixteen geographic regions of the portfolio companies (*Southeast* is the omitted base case).

Dependent Variable: Portfolio Company Success (IPO or Acquisition)?				
	(1)	(2)	(3)	(4)
	1975-1997	1975-2000	1975-2002	1975-2004
First Round Syndicated?	0.033*** [2.90]	0.031*** [3.53]	0.023*** [2.78]	0.013* [1.68]
Ln(1st-Round Inv't - 2007 \$)	0.053*** [12.57]	0.024*** [7.72]	0.024*** [8.03]	0.024*** [8.39]
<u>Industry of Portfolio Company</u>				
Biotechnology	0.113*** [4.79]	0.149*** [7.80]	0.097*** [5.57]	0.067*** [4.13]
Comms and Media	0.003 [0.17]	0.008 [0.70]	-0.001 [0.13]	0 [0.02]
Medical/Health/Life Science	0.001 [0.06]	0.070*** [4.99]	0.054*** [4.12]	0.033*** [2.65]
Non-High-Technology	-0.178*** [12.87]	-0.077*** [7.19]	-0.078*** [7.68]	-0.078*** [8.10]
Semiconductors/Other Electronics	0.019 [0.89]	0.062*** [3.74]	0.033** [2.20]	0.006 [0.40]
<u>Stage of Portfolio Company</u>				
Startup/Seed	-0.013 [1.04]	0.033*** [3.45]	0.051*** [5.60]	0.071*** [8.13]
Expansion	0.026* [1.86]	0.061*** [6.02]	0.068*** [7.17]	0.081*** [8.89]
Later	0.106*** [4.19]	0.163*** [7.68]	0.168*** [8.32]	0.163*** [8.53]

Region of Portfolio Company

Alaska/Hawaii		-0.344**	-0.194	-0.199*
		[2.26]	[1.50]	[1.65]
Great Lakes	-0.059*	-0.045*	-0.026	-0.019
	[1.93]	[1.94]	[1.20]	[0.91]
Great Plains	-0.028	-0.024	-0.015	-0.016
	[0.85]	[0.94]	[0.63]	[0.72]
Mid-Atlantic	-0.034	-0.021	-0.009	-0.022
	[1.02]	[0.94]	[0.44]	[1.09]
N. California	0.024	0.01	0.022	0.01
	[1.02]	[0.58]	[1.41]	[0.67]
New England	0.036	0.040**	0.044**	0.039**
	[1.42]	[2.14]	[2.50]	[2.33]
New York Tri-State	-0.012	-0.03	-0.017	-0.019
	[0.44]	[1.60]	[0.99]	[1.15]
Northwest	0.017	0.005	0.02	0.006
	[0.51]	[0.19]	[0.88]	[0.30]
Ohio Valley	-0.038	-0.036	-0.025	-0.023
	[1.26]	[1.60]	[1.17]	[1.15]
Rocky Mountains	0.021	0.023	0.040*	0.039*
	[0.64]	[0.94]	[1.74]	[1.78]
S. California	-0.002	-0.015	0.005	0.007
	[0.07]	[0.80]	[0.28]	[0.43]
South	0.006	0.004	0.021	0.022
	[0.17]	[0.15]	[0.76]	[0.81]
Southwest	-0.037	-0.022	-0.012	-0.01
	[1.36]	[1.12]	[0.63]	[0.57]
US Territories	-0.246*	-0.256**	-0.256***	-0.242**
	[1.72]	[2.44]	[2.61]	[2.55]
Observations	9569	16550	18469	20024

Robust z statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3 - First-Round Syndication Efficiency Trends

The following table displays results from probit regressions where the dependent variable is *Portfolio Company Success?*, defined as the portfolio company either going public or being acquired. The sample periods are 5-year rolling windows from 1975-2007. All coefficients are marginal effects. *First Round Syndicated?* is an indicator variable that takes the value 1 if the portfolio company receives venture capital from two or more unique financiers in the first round. The rest of the control variables are identical to Table 2 and are omitted for brevity. As detailed in Table 2, investments made after 1997 are susceptible to censored outcomes and should be interpreted with caution.

<u>5-Year Rolling Window</u>	<u>First Round Syndicated? Coefficient</u>
1975-1979	0.063
1976-1980	0.066
1977-1981	-0.02
1978-1982	0.018
1979-1983	0.027
1980-1984	0.017
1981-1985	-0.004
1982-1986	0.016
1983-1987	0.004
1984-1988	-0.008
1985-1989	-0.01
1986-1990	-0.011
1987-1991	-0.03
1988-1992	-0.029
1989-1993	0.006
1990-1994	0.045
1991-1995	0.049**
1992-1996	0.053***
1993-1997	0.050***
1994-1998	0.042***
1995-1999	0.027**
1996-2000	0.005
1997-2001	0.005
1998-2002	-0.005
1999-2003	-0.015
2000-2004	-0.022*
2001-2005	-0.025**
2002-2006	-0.029***
2003-2007	-0.016**

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 - Additional Explanatory Variables

The following table displays results from a probit regression where the dependent variable is *First Round Syndicated?*, defined as the portfolio company receiving venture capital from two or more unique financiers in the first round. The sample period is first-round investments that occurred in 1981-2006 (due to incomplete IRR data), and the 2nd and 3rd blocks split this. All coefficients are marginal effects. *Annual # of IPOs / 100* is the number of companies that went public in a given year, divided by 100. *Nasdaq Level / 100* is the average value of the Nasdaq index in a given year, divided by 100. *Ln(Annual Total VC Investment)* is the natural logarithm of the total amount invested by the VC community in a given year. *Annual VC Industry IRR* is the annual internal rate of return realized by investors in the venture capital industry. The rest of the control variables are identical to Table 1 and are omitted for brevity.

Dependent Variable: First Round Syndicated?	(1)	(2)	(3)	(4)	(5)
1981-2006					
Annual # of IPOs / 100	-0.026*** [13.10]				-0.005** [1.98]
Nasdaq level / 100		-0.003*** [7.81]			-0.009*** [5.47]
Ln(Annual Total VC Investment - 2007 Dollars)			-0.027*** [8.08]		0.039** [2.50]
Annual VC Industry IRR				-0.128*** [11.73]	-0.191*** [11.28]
Observations	21,501	21,501	21,501	21,501	21,501
1981-1998					
Annual # of IPOs / 100	-0.029*** [9.74]				-0.005 [1.22]
Nasdaq level / 100		-0.013*** [15.06]			-0.019*** [6.76]
Ln(Annual Total VC Investment - 2007 Dollars)			-0.107*** [14.38]		0.077*** [3.12]
Annual VC Industry IRR				-0.197*** [12.95]	-0.142*** [6.53]
Observations	10,412	10,412	10,412	10,412	10,412
1999-2006					
Annual # of IPOs / 100	-0.024*** [7.89]				-0.025** [2.46]
Nasdaq level / 100		-0.006*** [7.70]			-0.001 [0.20]
Ln(Annual Total VC Investment - 2007 Dollars)			-0.054*** [7.04]		-0.011 [0.35]
Annual VC Industry IRR				0.783*** [2.90]	-1.059*** [2.62]
Observations	11,089	11,089	11,089	11,089	11,089

Robust z statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1a. VC Syndication Rates vs. VC Industry Rates of Return

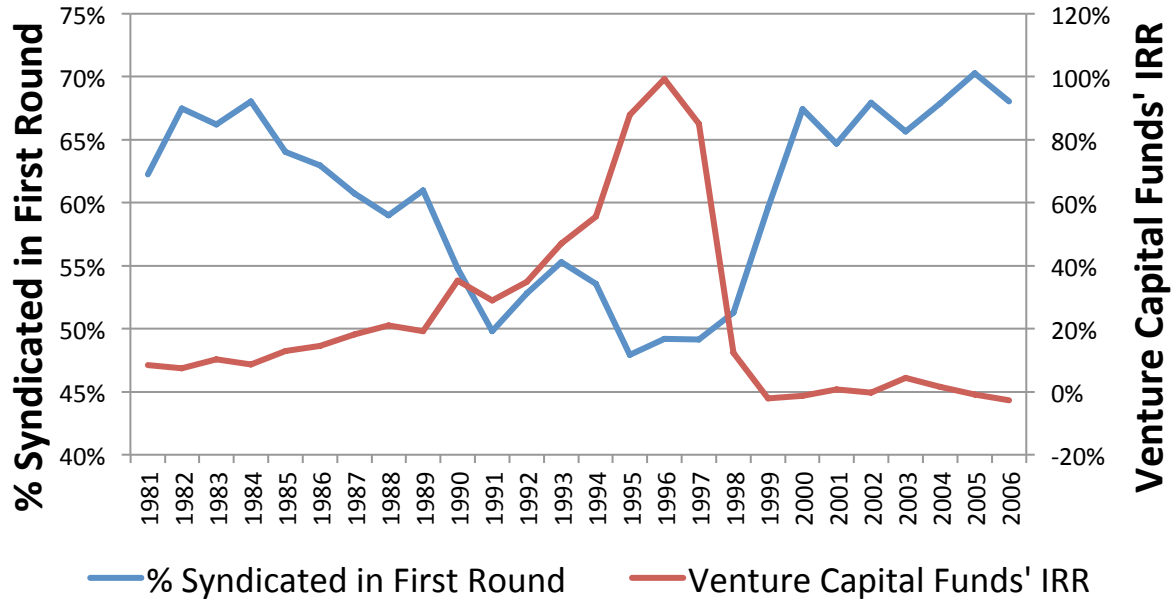
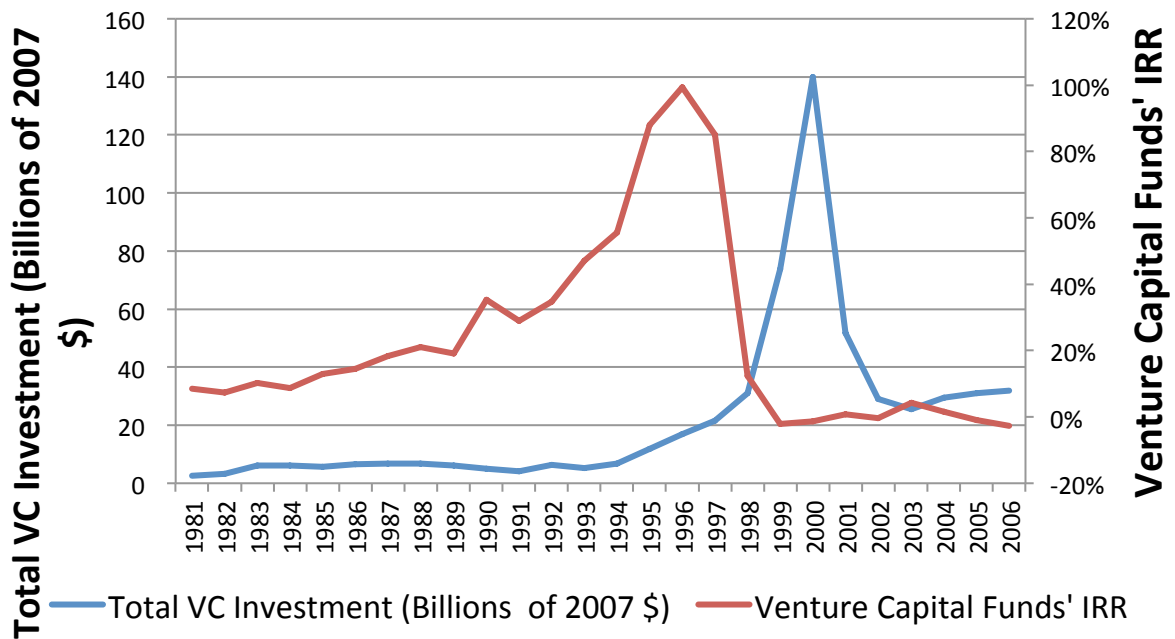
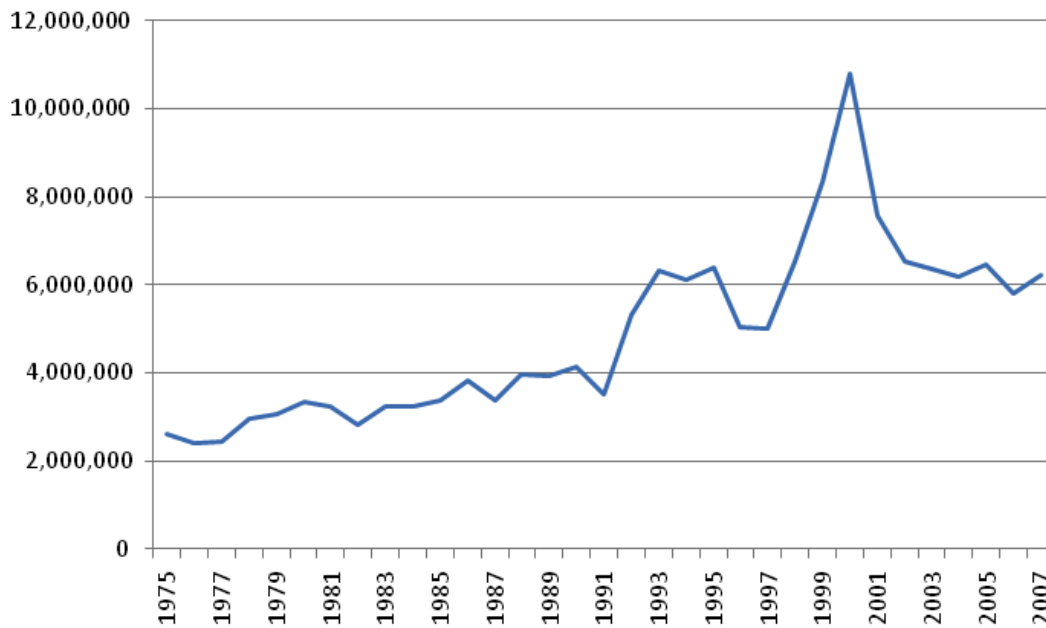


Figure 1b. VC Industry Total Investment vs. VC Industry Rates of Return



**Figure 2a. First-Round Investment Amount
(2007 Dollars)**



**Figure 2b. First-Round Syndication by
Investment Amount**

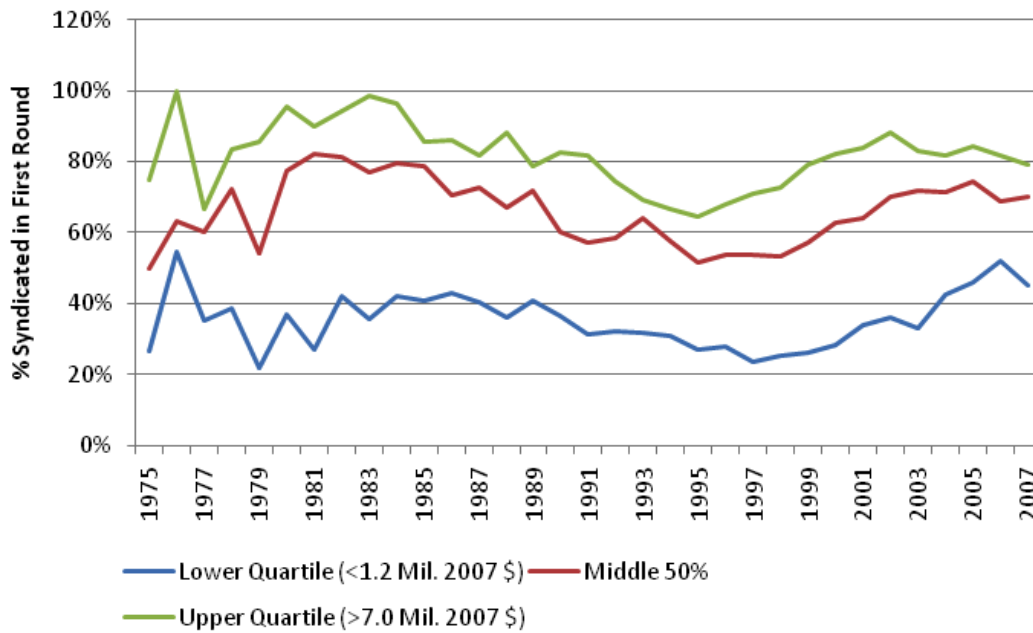


Figure 3a. First-Round Syndication by Major Industry

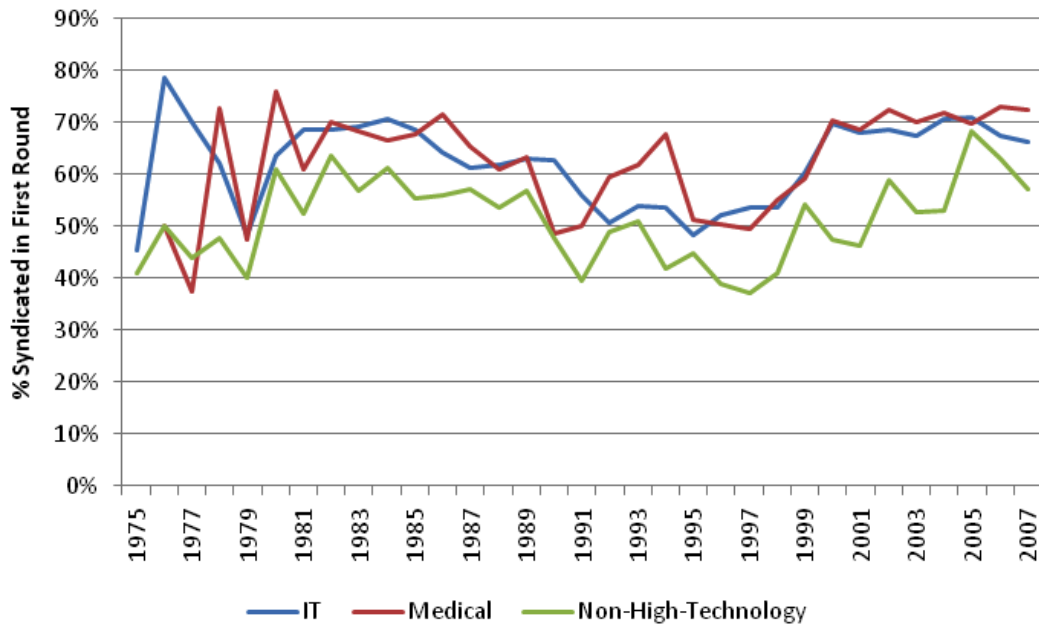


Figure 3b. First-Round Syndication Rates by Major Industry, 5-Year Rolling

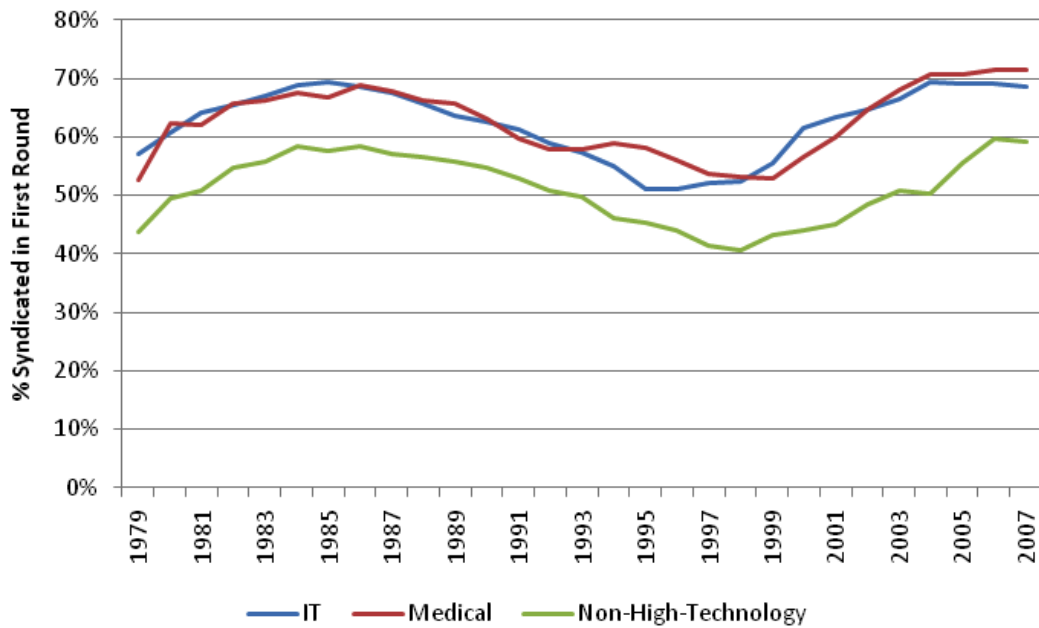


Figure 3c. First-Round Syndication Rates by Industry, 5-Year Rolling

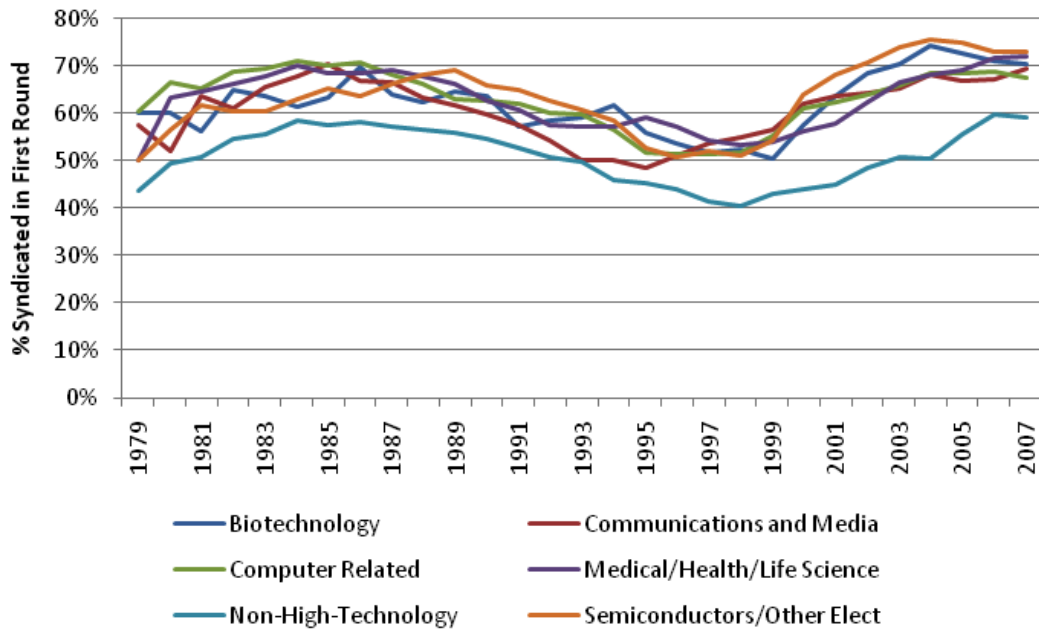


Figure 4a. First-Round Syndication by Stage of the Portfolio Company, 5-Year Rolling

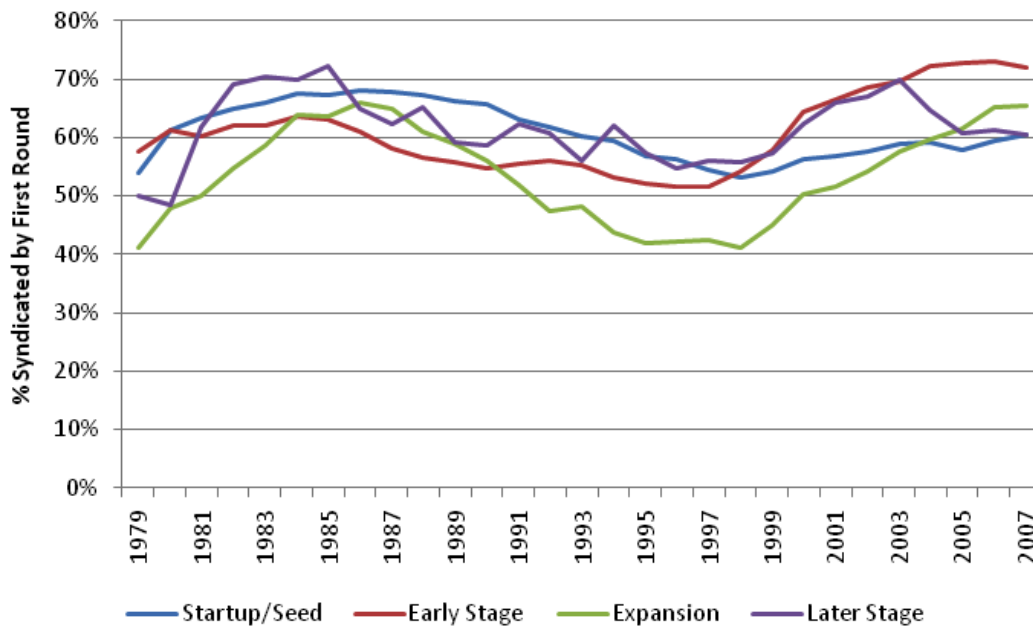


Figure 4b. First-Round Investment Amount by Stage of the Portfolio Company

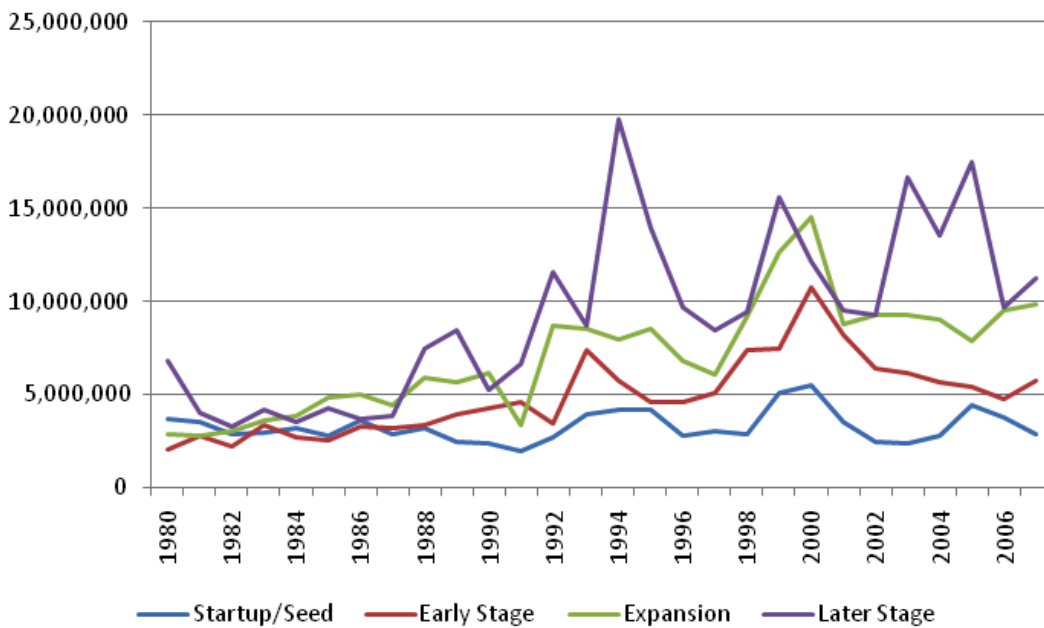


Figure 5a. First-Round Syndication by Region of the Portfolio Company, 5-Year Rolling

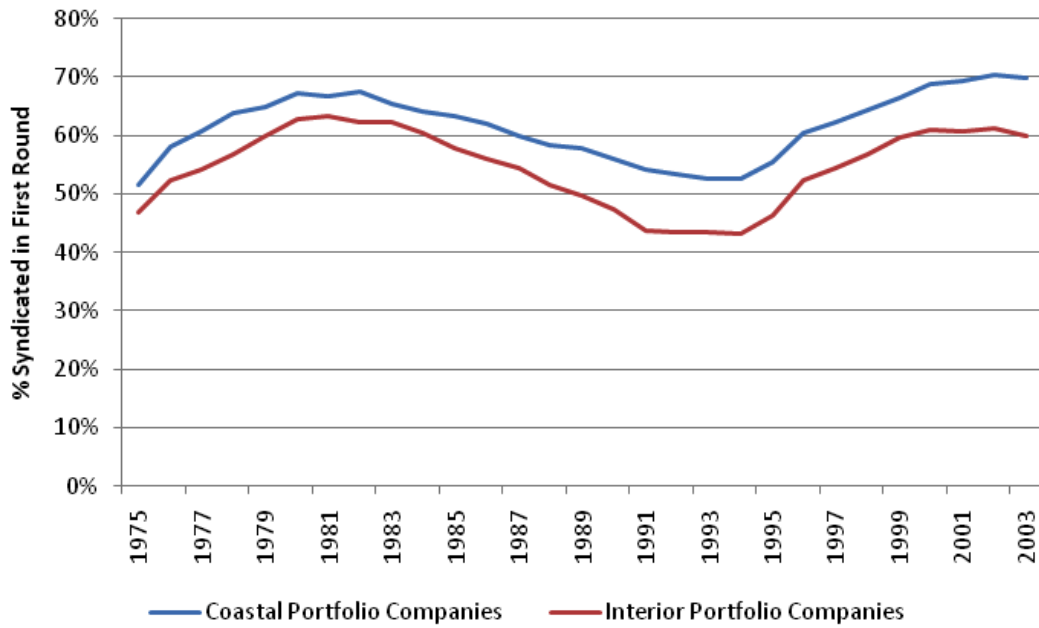
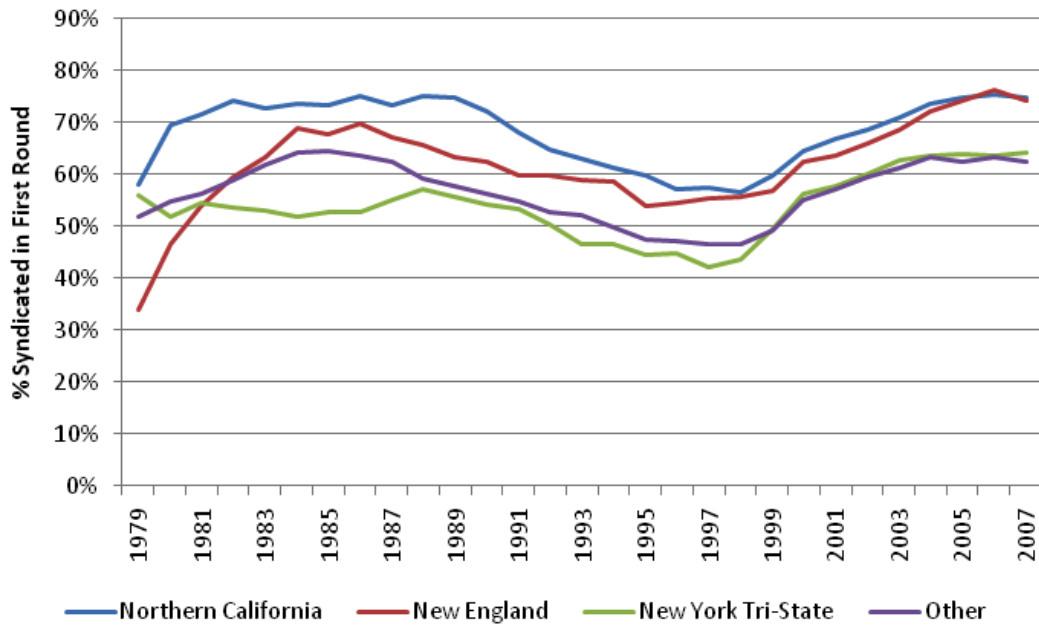


Figure 5b. First-Round Syndication by Region of the Portfolio Company, 5-Year Rolling



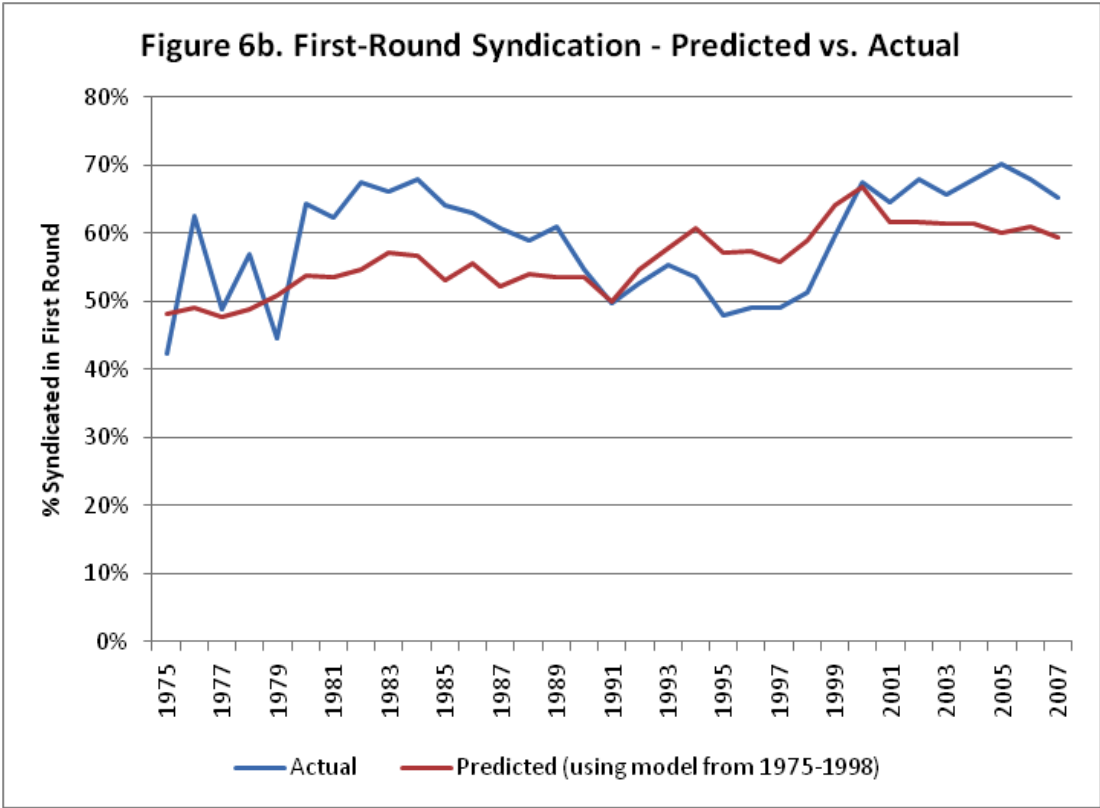
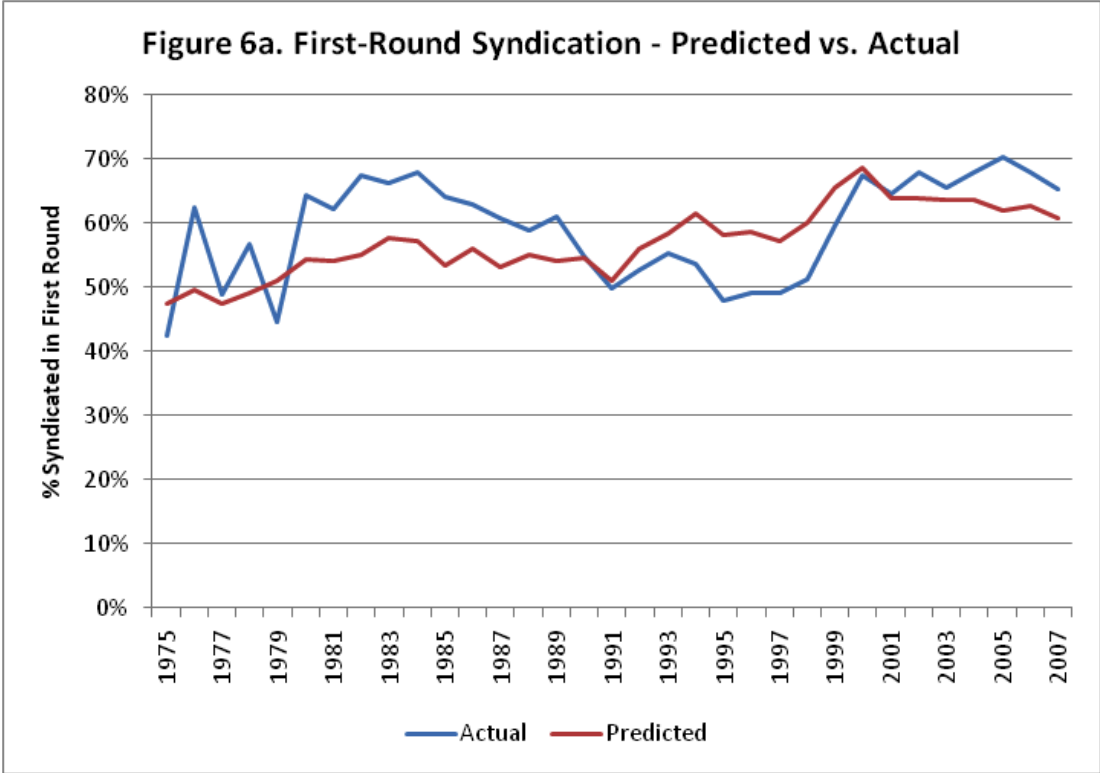


Figure 7. Unexplained Syndication vs. Internal Rates of Return

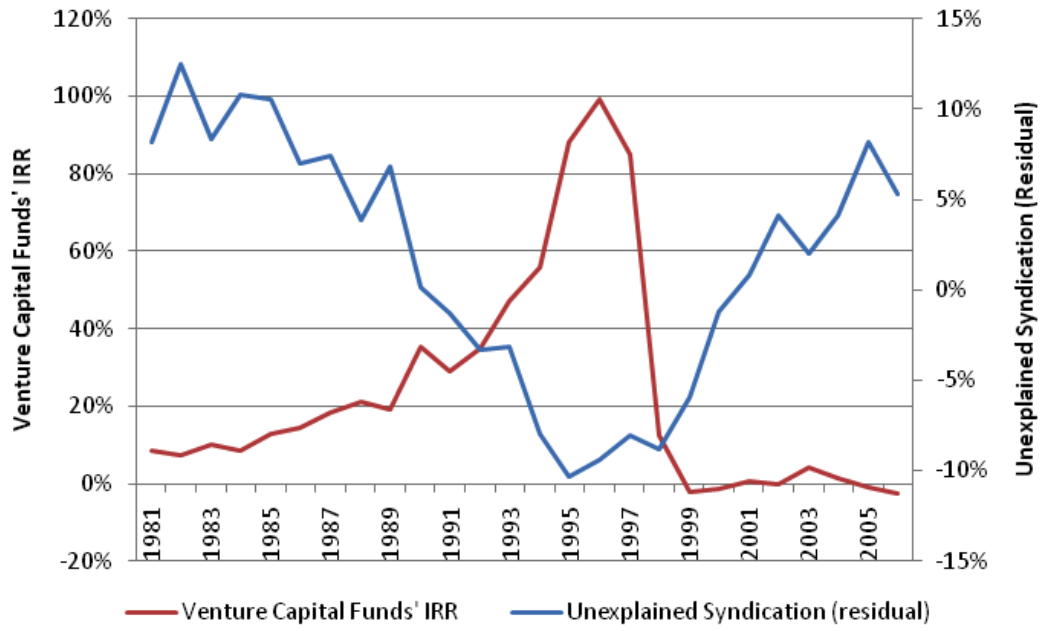


Figure 8. Coefficient of *First Round Syndicated?*, 5-year Rolling

