ALIGNMENT CAPITAL GROUP, LLC

A Balanced Approach to Private Equity

Persistence in Venture Capital Returns

Andrew Conner, CFA

Alignment Capital Group
6615 Vaught Ranch Road
Suite #101
Austin, TX 78730
512-744-4458 (Phone)
512-744-4496 (Fax)
www.alignmentcapital.com

January 2005

INTRODUCTION

Investors in private equity often value gaining access to the best venture capital firms. Building a portfolio of "top-quartile" funds is a common goal. Both of these ideas implicitly assume that new funds raised by the managers of the previous best funds will themselves be superior.

In this research brief we test the validity of the concept of persistence in venture capital returns. We compare the performance of one-time funds to that of fund families. We answer the question of whether venture capitalists improve their performance in subsequent funds or if they are, in fact, at their best when they are new teams, "hungry" to prove their abilities. Finally, we determine whether successor funds to top-quartile funds are more likely than average to be top-quartile funds themselves.

DATASET

In this brief, we analyzed the funds in the Venture Economics database. Our dataset included mature venture capital funds in the database from vintage years 1980-1995. As we have shown in previous research, funds aged 8 years are sufficiently mature to enable us to draw general conclusions regarding performance. Although from the Venture Economics database it is impossible to discern the identity of individual venture capital funds and/or firms, it is possible to link individual funds to the firms that managed them via a unique identifier. Our dataset included a total of 485 venture capital firms and 645 funds.

METHODOLOGY

We measured the cumulative performance of each fund in our dataset at December 31, 2003, the end of the observation period. We calculated two performance statistics for each fund: the internal rate of return (IRR), the discount rate that sets a fund's net present value of cash flows equal to the present value of its valuation; and the times-money-earned (TME) ratio, the sum of the fund's distributions of capital plus the fund valuation divided by the sum of invested capital.

After calculating performance statistics, we grouped each fund into a performance quartile for each statistic. Funds with performance equal to or above the 75th percentile of funds in the same vintage year were classified as "top-quartile." Those with

performance below the 25th percentile of funds in the same vintage year were classified as "bottom-quartile" and so forth.

We then divided the dataset into two groups of funds. The first group contained those funds that were the only venture capital fund raised by a particular firm (the "single-fund" group) and the second group contained those funds that were one of two or more venture capital funds raised by a single firm (the "multi-fund" group). We compared the average performance of funds from the single-fund group with those of the multi-fund group and further divided the multi-fund group into groups of predecessor and successor funds.

Given the groupings of predecessor and successor funds, we calculated the conditional probability that a successor fund's performance would rank in the same quartile as its predecessor fund or, alternatively, in one of the other three possible quartiles. In other words, we answered the question of whether top-quartile predecessor funds were more likely to have top-quartile successor funds (and whether bottom-quartile predecessor funds were more likely to have bottom-quartile successor funds, etc.).

RESULTS

The majority of venture capital firms in our dataset raised only one fund. A total of 375 firms raised only one fund and 110 raised more than one fund. A histogram of the number of venture capital funds raised by each firm is shown below in Exhibit 1.

Exhibit 1: Histogram of Number of Funds Raised
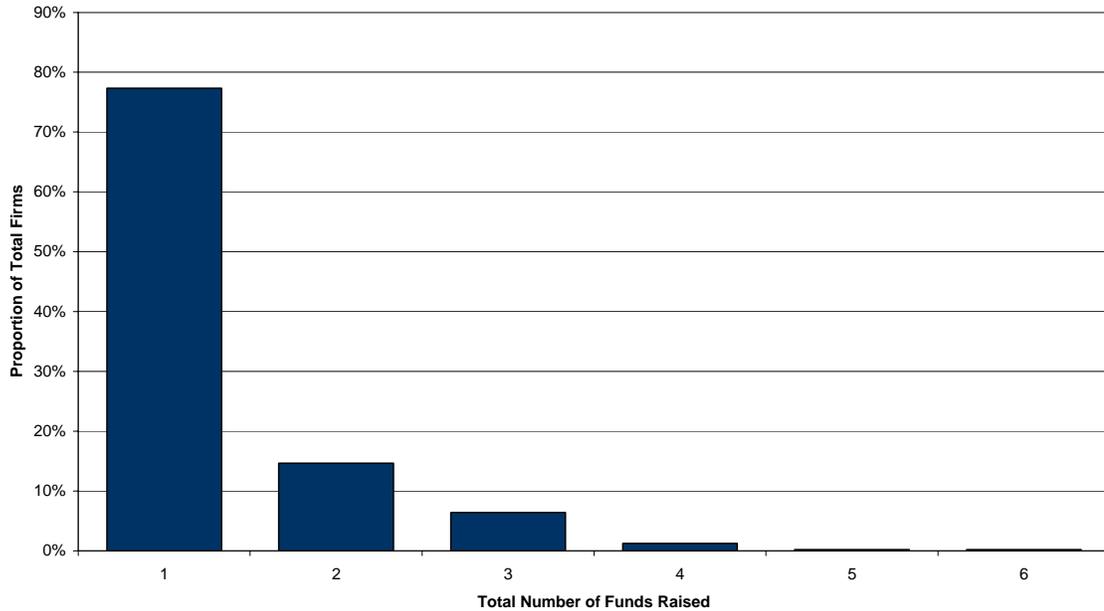
Source: Alignment Capital Group and Venture Economics

However, the 110 firms that raised more than one fund account for 278 or 43% of the 645 total funds in the sample. Those funds that raised a subsequent fund did so an average of 2.9 years after raising the predecessor fund, with nearly half of those funds raising the subsequent fund in years two or three as shown in Exhibit 2.

Exhibit 2: Age When Raising a Follow-On Fund

	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years
Proportion of Funds in Sample	18%	25%	24%	16%	11%	4%	1%	1%

In comparing the entire set of 645 funds to the sub-set of 278 funds in the multi-fund group, we found a counterintuitive result. *Ex ante* we expected that the multi-fund group would outperform the single-fund group, as the market tends to self-select those funds that perform well by allowing them to successfully raise a follow-on fund.

However, this was not the case; the single-fund group actually outperformed the multi-fund group as measured by comparing both the average IRR of funds in the two groups and the average TME. This result could be partially attributable to the dataset's cut-off point for mature funds, by which time many successful venture capital funds from the

late 1990s had not yet raised mature follow-on funds that could be included in this study. Additionally, upon dividing the multi-fund group into 160 predecessor and 160 successor funds, we found that the group of successor funds outperformed the predecessor funds, albeit with greater variability in return, as indicated by the higher mean IRR and TME for that group in Exhibit 3.

Exhibit 3: Summary Statistics of Single and Multi-Fund Groups

|	Mean IRR	Median IRR	Standard Deviation of IRR	Mean TME	Median TME	Standard Deviation of TME
All Funds In Sample (n=645)	13.4%	8.5%	25.6%	2.19	1.68	2.20
Single-Fund Group (n=367)	16.4%	9.3%	31.7%	2.37	1.69	2.72
Multi-Fund Group (n=278)	9.3%	7.8%	13.1%	1.95	1.66	1.19
Predecessor Funds (n=160)	7.4%	7.1%	10.1%	1.82	1.65	1.00
Successor Funds (n=160)	10.5%	7.9%	14.9%	2.03	1.63	1.35

Exhibit 3 supports the idea that venture capitalists become better investors as they gain more experience. As shown in Exhibit 4 below, venture capital firms tend to improve significantly through the first two funds and performance tends to level off in funds three through five.

Exhibit 4: Venture Capital Fund Performance by Roman Numeral

	I	II	III	IV	V	VI
Average Fund IRR	7.7%	8.4%	15.0%	16.3%	16.3%	0.9%
Average Fund TME	1.83	1.89	2.32	2.54	2.30	1.10
n	118	110	39	8	2	1

Finally, we assessed the probability of a successor fund having performance in the top quartile given that the predecessor fund had been top quartile. If there were no persistence in the performance of venture capital firms, we would expect to see that a successor fund had around a 25% chance of being in a given quartile *regardless* of the predecessor fund's quartile. However, as Exhibit 5 shows, this was not the case for fund IRRs.

Exhibit 5: Frequency of Successor Fund Quartile Given Predecessor Fund Quartile (Internal Rate of Return)
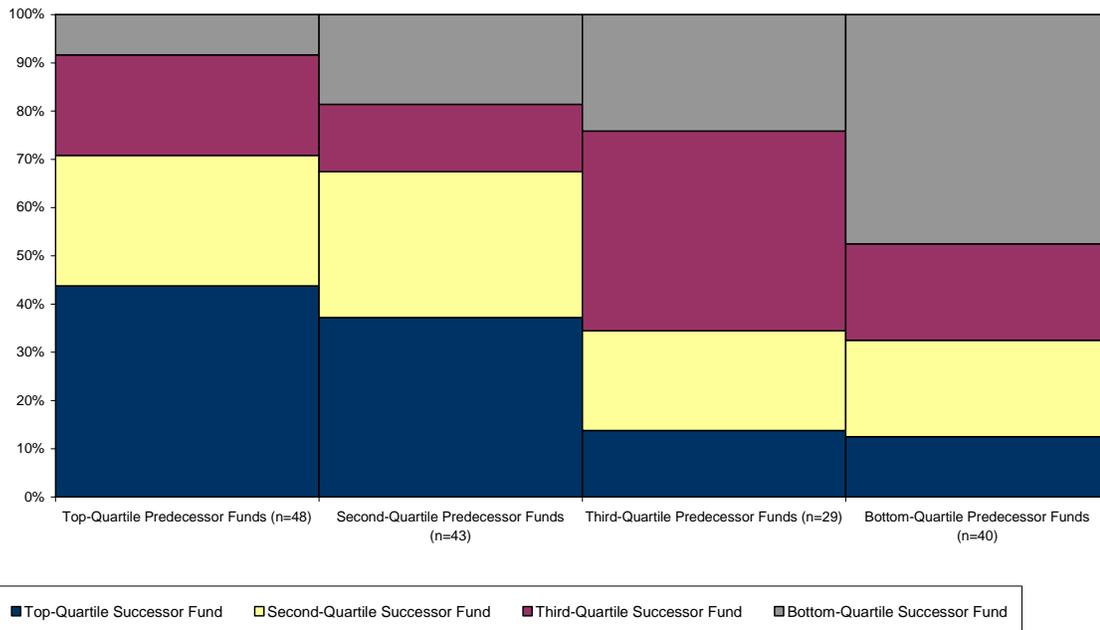
Source: Alignment Capital Group and Venture Economics

As shown by the blue area in the left-most vertical bar in Exhibit 5 above, funds following a top-quartile predecessor had a 44% probability of being top-quartile themselves. This statistical result is very strong; the probability that random variation could produce such a high incidence of repeat top-quartile performance is less than 1%.[1] Successor funds to top-quartile predecessors had a 71% probability of performing above the median fund from the same vintage year.

Additionally, funds following bottom-quartile-ranked predecessor funds (shown by the grey area in right-most bar in Exhibit 5) had a 48% probability of being in the bottom quartile (also supporting persistence with greater than 99% statistical confidence) and a 68% probability of being below the median. These results suggest strong persistence in both good and poor performance in venture capital funds. Interestingly, nearly as many bottom-quartile funds (40) raised a follow-on fund as top-quartile funds (48).

---

[1] From Wolfram research:

The binomial distribution gives the discrete probability distribution of obtaining more than *n* successes out of *N* Bernoulli trials (where the result of each Bernoulli trail is true with probability *p*) equals:

$$\sum_{i=n+1}^{N} \frac{N!}{n!(N-n)!} p^i (1-p)^{N-i} ,$$

which follows the incomplete Beta distribution:

$$\beta(p; n+1, N-n)$$

In this case, random variability (no persistence) would dictate that a top-quartile fund be followed by a top-quartile fund with 25% probability. Given that 21 successors of our 48 top-quartile predecessors were also top quartile, we have the probability of greater than 20 successes equals:

$$\beta(.25; 21, 28) = 0.0035$$

Exhibit 6 below shows that similar conclusions can be drawn using TME ratios as a performance metric.

Exhibit 6: Frequency of Successor Fund Quartile Given Predecessor Fund Quartile (Times-Money-Earned ratio)
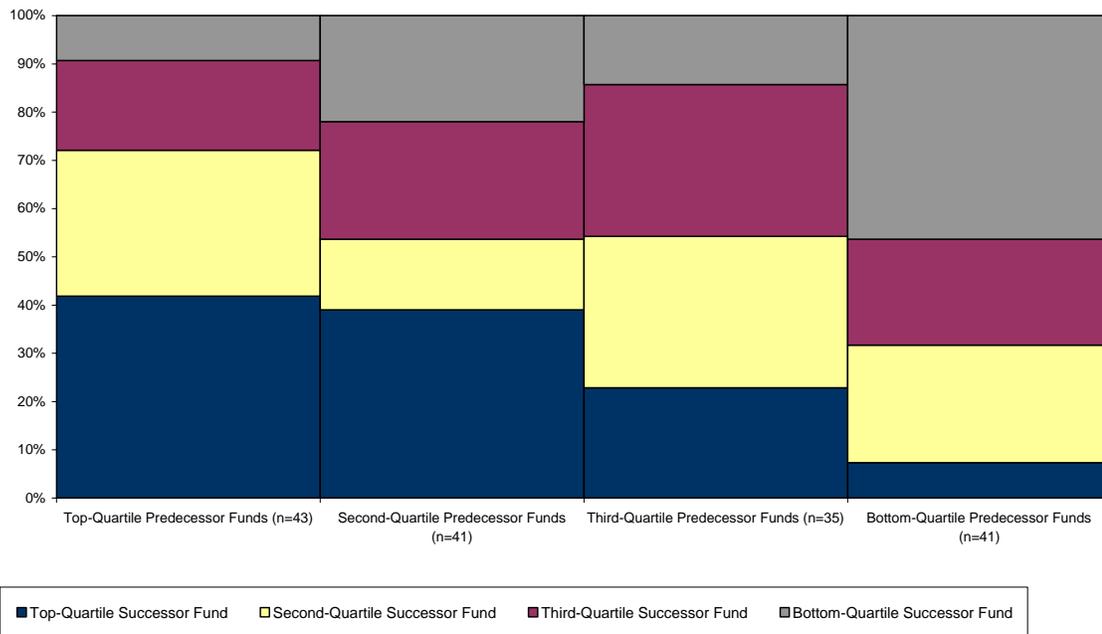
Source: Alignment Capital Group and Venture Economics

CONCLUSION

In this research brief we study persistence in venture capital returns. Our results show that stand-alone funds perform fairly well and that first-time funds that raise follow-on funds tend to improve their performance in successive funds. Additionally, exceptional performance in a predecessor fund tends to be a useful indicator of similar performance in a successor fund. Follow-on funds raised by fund managers whose prior fund had a top-quartile IRR had a 44% chance of achieving a top-quartile IRR and those with a bottom quartile successor fund had a 48% chance of repeating their bottom quartile IRR, two statistical results that support the existence of persistence in the returns of venture capital funds with greater than 99% confidence.

Alignment Capital Group is a full-service private equity consulting firm based in Austin, Texas. The firm's mission is to understand private equity as an asset class in a portfolio context, and thus to assist our clients in making optimal investment decisions.

Andrew Conner is an Associate with Alignment Capital Group. His responsibilities include performing due diligence on investment managers, providing strategic portfolio management advice, and conducting original research.

www.alignmentcapital.com