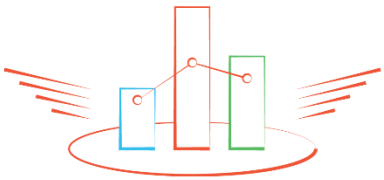
TRACKING ANGEL RETURNS



2016 Report with 2017 update

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Many thanks to the support of:

Ewing Marion KAUFFMAN Foundation

NASDAQ OMX EDUCATION FOUNDATION

Foreword

This research has been a part of an ongoing body of work over the last 15 years; many people have made this possible. The field of angel investing is made up of individuals working together to create a positive impact in addition to creating successful new businesses. We are grateful to those investors who have taken the time to share their data with us. This data doesn't come in a clean and consistent format, and for this study we are really grateful for the work that Katie Hamburg has done organizing and structuring the data for analysis.

Angel investors are private investors, and have no requirement to share their information, which makes this research very challenging. Without the support of the Kauffman Foundation, who also supported the 2007 Returns to Angel Investors in Groups study, and the NASDAQ OMX Education Foundation this work would not have been possible. Lastly, we're grateful for the organizational support of our academic institution, Willamette University, as well as the Angel Resource Institute.

Executive Summary

This study details the outcomes of 245 ventures that completed their cycle from birth to either a successful exit or a shut down. These companies were identified as part of the ongoing market activity research that we report in the HALO report, and from the investment detail from 20 angel funds, all in the United States. 95% of the angel investments were made in these companies between 2001 and 2012, and 91% of them completed between 2010 and 2016.

At the highest level of description, the overall cash on cash multiple is estimated at 2.5X capital. That is, the sum of all cash returned from these companies to their angel investors divided by the sum of all cash invested by those angel investors equaled 2.5. The mean amount of time those investors had their cash locked into those companies was 4.5 years. Modeling the exits and their holding periods, we estimate the gross internal rate of return to be 22%. (Gross means that the return does not account for investment costs, like legal fees.) Overall, this return is somewhat lower than, but quite consistent with, prior research.

Looking more closely at the results, the skew of the data is clear, and is consistent with prior research on both angel investing and formal venture capital. 10% of the exits generated 85% of all cash. Angel investing, like formal VC, is a homerun game, where most investments result in losses, but the occurrence of large homeruns are the key driver of the rate of return.

In this data set, the failure rate (investments that when completed returned less than a 1X multiple to their investors) reached 70% of all investments. Looking at the return distribution in Figure 1, we observe that the percent of exits in the 1X – 5X category is lower in this study than in prior research, with the decline resulting in the increased failure rate we report. We speculate this is a result driven by the 2008 - 2010 recession. Companies which might otherwise have reached a small positive exit were unable to do so during the recession, resulting instead in a higher failure rate than the prior studies.

Homerun exits still represent about 10% of all outcomes which kept the overall multiple at 2.5X. This is the practical effect of the statement that “venture investing is a homerun game.” The other practical implication of that statement is that the distribution of outcomes is highly skewed: the median multiple is below 1X, while the mean is a 2.5X multiple.

In Figure 2, one can observe a very consistent pattern of outcomes across multiple studies (which cover different time frames, economic cycles, geographies, and units of analysis). The stability of these results increases our confidence that the results we report here are representative of outcomes experience by group angel investors in the U.S.

In 2017, we executed a follow-on analysis of data for the ongoing ventures from the data set described above, that were either shut down or had liquidity events during 2016. In this addendum, there were 20 additional outcomes. These outcomes were less attractive as a subset, but the sample is too small (at 20) to generalize to any statement about 'returns in 2016.' However, when aggregated with the results above, we estimate that the set produced a 2.3X multiple, with an IRR of approximately 19.3%

Methodology

This study is designed and executed at the company level of analysis. We use data from each company about its fundraising and ultimate outcome to analyze the returns to their angel investors. As in prior studies, we have a working definition of angel investors as people investing their own money directly into new ventures. Where there is a fund involved, that fund overwhelmingly consists of the members' own cash, and is directed by the members, rather than by general partners in a formal venture capital fund.

The method of this study is significantly different than the 2007 and 2009 studies. The prior studies captured data directly from angel investors about each of their completed angel investments. The primary benefit of the new approach is to enable the tracking of angel returns in a timely and repeatable fashion. The 'cost' of this change is that we are unable to capture more strategically interesting variables, such as the relationship of due diligence and industry expertise to investor outcomes.

The sampling frames and time frame of the data we report in this study are detailed below.

Time Frame

The investment outcomes of 245 separate companies form the basis for the results of this study. 91% of those companies either shut down, were acquired, or went public between the years of 2010 and 2016. 95% of the angel investments made into these companies took place after 2001. The companies initially entered the sample if, prior to 2012, they:

1. Received an angel investment from group angel investors that was reported to us via the reporting process for the HALO Report™ of the Angel Resource Institute.
   or
2. Received an angel investment from an angel group side car fund, or an angel group that does all of its group investment directly from a fund of its members.

We refer to the first case as the "Halo Report set" as they were identified in the HALO reporting process. We refer to the second case as the "Angel Fund set" as they were identified by angel funds.

The HALO Report Set

This set of companies represents a longitudinal panel of company data reported from U.S. angel investor groups to the HALO report prior to 2012. 356 such firms were identified in this manner. Of those 356 companies, 109 have run their course and become completed investments to their angel investors. The remaining 247 firms will be tracked moving forward in time and will grow the overall data set we use to track returns. Of those 109 companies, 56% of their outcomes occurred between 2013-2016, 36% between 2010-2012, and 8% occurred prior to 2010.

Individual company data was derived from two sources: Pitchbook and Inventurist. Pitchbook runs a large data collection and analysis services across the spectrum of private / alternative classes of investment, particularly venture investing. Their employees search for information about companies, their fundraising, their progress, and their status on a recurring basis from both primary and secondary sources. Ultimate sources include direct company conversations, information submitted by investors, and information found online and in press releases.

For companies that had yet to have a liquidity event, we tracked their social media activity via Inventurist to evaluate their status. This helped us determine if they were still operating. Most databases of the Pitchbook variety underrepresent companies that have ceased to operate because they are harder to identify.

Validity and the HALO report set

There are three primary advantages from a validity perspective using this longitudinal approach. First, it has *no survivor bias*, which is a significant improvement over prior studies. Companies are identified at the point of initial investment, rather than at the time of the execution of the study. As a result, we sample into firms that would have been shut down prior to this 2016 study, avoiding a bias toward only those firms that survived to 2016. In addition, there is *no selection bias* on the outcomes of the companies because all reporting is done at the point of initial investment, when investors are the most optimistic. Lastly, it is repeatable, and enables the data to be aggregated over time with more consistency than the investor survey approach used in the prior studies.

Conversely, until the complete set of 356 companies is fully completed the data will remain *right justified*. We can only report data on companies that have completed as of the time of this study, and therefore it is possible that ongoing companies are systematically different than the companies that are now completed. Because it takes longer to realize winning investments than to realize losses, the ongoing companies may have a higher portion of winners remaining in

that set than the investments already completed. Lastly, the Pitchbook data collection process, in practice, appears to have better visibility of data about companies that also have received formal venture capital investment. In this study two-thirds of companies also took on formal VC investment prior to their completion, compared to one-third of companies in Wiltbank & Boeker 2007.

Angel Fund Set

Complementing the Halo Report set is a group of companies invested in by Angel Funds in the United States. These funds are structured either as side car funds, where a fund co-invests with members as they make individual investment decisions, and group funds, where members pool their money together and invest collectively. The decision rules and polices that trigger investments vary, but in all cases they are making direct investment of their own money into early stage companies.

We requested data from 31 angel funds, and received data from 20. This resulted in information on 136 completed investments. They directly reported their portfolio to us and we only included information from the companies that have completed (shut down or liquidity event). The timing of the data is similar to the HALO Report set, with 65% of the investments completed from 2013-2016, 25% from 2010-2012, and 10% prior to 2010.

This data has high validity because it's reported directly from the GP's of a fund. Funds have a formal structure and as such systematically track their investments more than individual angel investors. In most cases the data that was received is in the same spreadsheets used for their operational portfolio tracking, and they only needed to forward them to us. Because those spreadsheets are continually maintained and used for internal tracking purposes, future studies using ongoing portfolios data is highly replicable and more timely than the methods previously used.

The Angel Fund set is slightly more exposed to *survivor bias* and *self-selection*. While we know we have all of the longest standing angel funds in this study, there may be angel funds that we are unaware of that started and stopped operating prior to this study. We would of course be unable to include them in our study. In addition, not all angel funds shared their data for this research, with 11 funds selecting out of the study. The primary reason given for selecting out was that they were newer funds with no completed investments, but other factors could also be involved that may bias the results. In both cases we believe the possible effect on the results of the study are small.

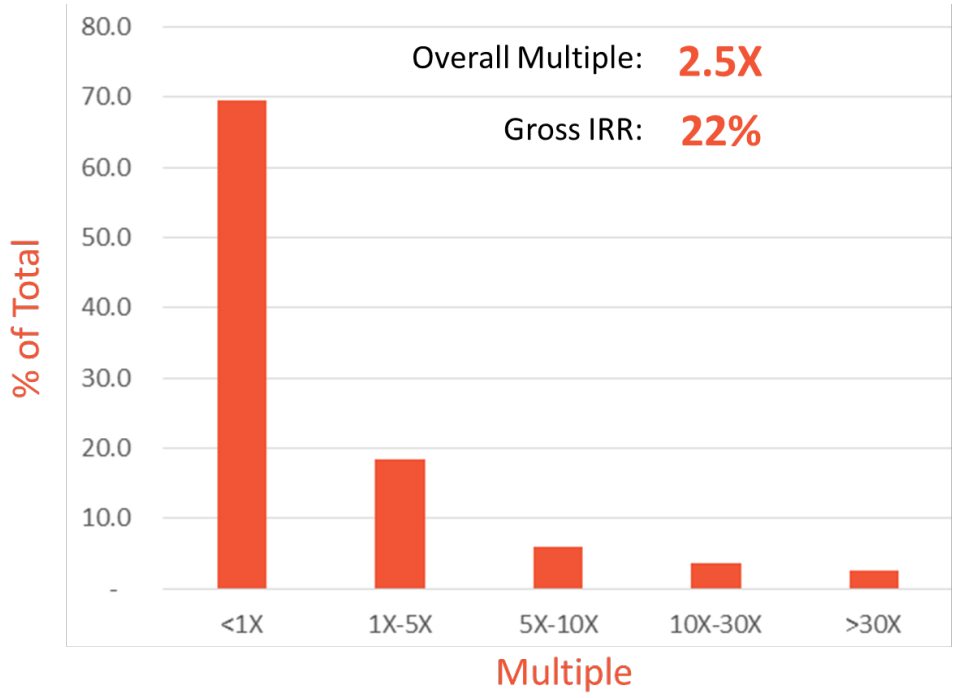
The companies identified in the two approaches above (the HALO Report and the Angel Fund sets) comprise the data set for this Tracking Angel Returns study. For each company, we analyzed the timing and dollar amounts invested by angel investors, as well as the amount and

timing of any cash they received in return from each company. Appendix 1 shows the distribution of outcomes of each set, providing a detailed picture of how similar they are prior to being aggregated.

Results

The overall distribution of returns is shown below in the Figure 1. Just under 70% of outcomes resulted in less than a return of capital, while just under 10% of the completed investments experience returns of 10 times capital or more. The shape of this distribution curve is entirely consistent with earlier studies, with one notable change. In this study, there were fewer outcomes in the 1X-5X category, and more outcomes in the less than 1X category. The right three categories remained quite consistent. We speculate that the shift in mix between the first two categories is a result of the recession in 2008/2009/2010, such that companies that might have otherwise resulted in a small win were instead unable to survive.

Figure 1: Overall Distribution of Investment Outcomes



If one takes the sum of cash returned from these investments and divides it by the sum of cash invested, the angel investors cumulatively experienced an outcome of 2.5 times their investment (i.e. 1 dollar invested resulted in 2.5 dollars returned). The holding period, the amount of time from initial investment to completion of investment averaged 4.5 years. Accounting for the holding period by return category, the gross IRR of these investments was

22%. (Gross IRR = the discount rate required to produce a net present value of zero, without accounting for costs (i.e. legal fees, group membership dues, etc.) incurred by the angels to make the investments.)

Returns are not normally distributed, but are skewed such that 10% of all exits generated 85% of all cash. This concentration of returns is consistent over all studies of venture investing, not only in angel investing, but also in formal venture capital investing. Angel investing, like formal VC, is a homerun game, where many investments result in losses, but the occurrence of large homeruns are the key driver of the rate of return. Central tendency measures like overall multiple and gross IRR tend to understate the reality of that statement. In fact, the median multiple is less than 1X while the mean multiple is 2.5X.

Figure 2 below shows the results of this study in comparison to the two earlier studies, from 2007 (US) and 2009 (UK), and includes a comparison to early stage formal venture capital investing.

Figure 2: Comparative Outcome Data Across Studies

	Multiple	Hold	IRR	<1X	10% of exits to $
2016 TRACKING ANGEL RETURNS	**2.5X**	**4.5yrs**	**22%**	**70%**	**85%**
2007 Returns to Angel Investors in Groups	2.6	3.5	27%	52%	90%
2009 Siding with the Angels – Business angel investing – promising outcomes and effective strategies	2.2	3.6	22%	56%	80%
CAMBRIDGE C|A ASSOCIATES Early stage VC '05-'11	2.1		29%		

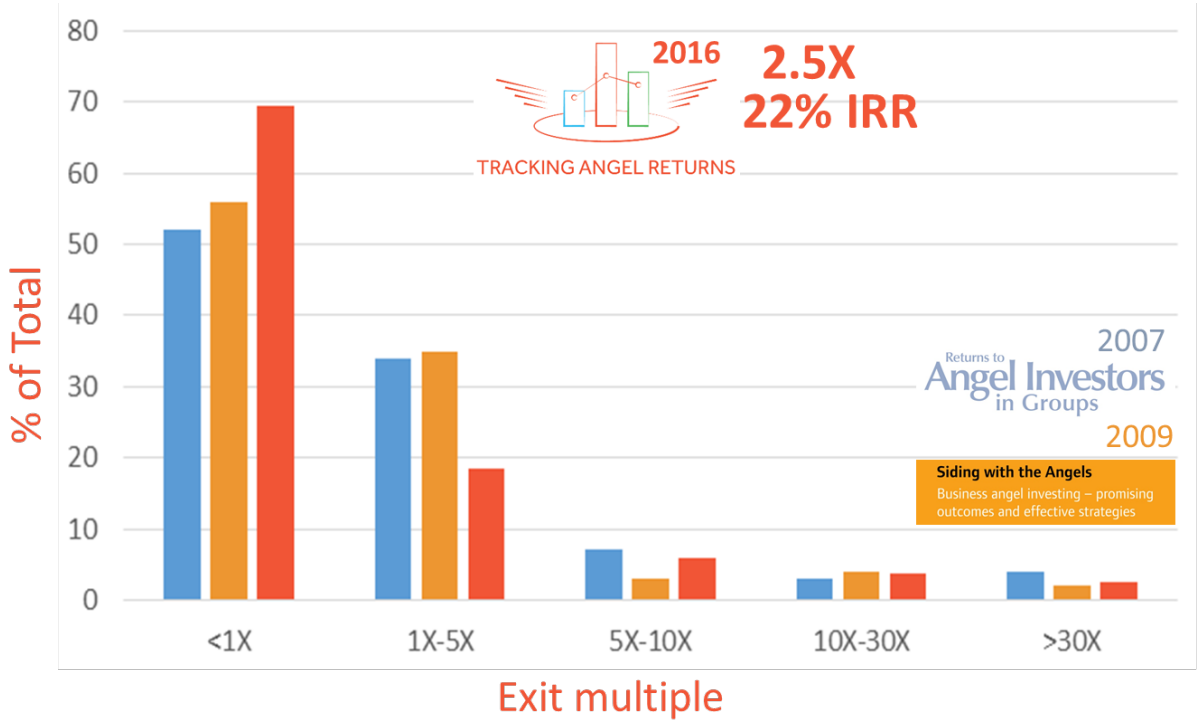
Gross TVPI & includes carried value

In Figure 2 one gets a sense of the consistency of the pattern of outcomes from early stage investing shown across these different data sets. The overall multiple is in the 2X to 2.5X range, and the IRR percentages are in the 20%'s, while the concentration of returns remains in the

80%-90% range (the right most column is percentage of cash produced by the top 10% of outcome).

In this current study, you can see the higher failure rate, at 70% up from the mid 50% range, but because angel investing is a homerun game that doesn't have much of an effect on the overall return (the multiple is nearly identical to the 2007 U.S. study). The IRR at 22% is lower than the 2007 U.S. study primarily because of the longer holding periods observed in this study. We speculate that the longer holding periods resulted from the timing of this sample through the recession period.

Figure 3: Distribution of returns detail from 3 group angel studies



Lastly, in Figure 2 above, using data from Cambridge Associates, we estimated the early stage VC returns through the same time frame, as best as the data can align. We used their 2015 report, looking at funds' TVPI (Total value divided by paid in capital) results from 2005-2011, in order to match the time frame of investments in our sample. The data was "grossed up" (meaning that we increased the returns estimates by the fees, assuming a standard 2% annual fee) in order to make it more comparable to the angel investment data we've collected. This TVPI number includes carried value estimates of not yet realized exits from existing portfolio companies, which we do not include in our angel data sets as it consistently over estimates the value of unrealized investments. From that, the overall multiple is estimated to be 2.1 times

capital, with an IRR of 29%. The IRR at 29% in spite of the lower cash on cash multiple is the result of significantly shorter holding periods for formal VC's.

The angel investment data compares favorably to the formal venture capital estimates, though certainly the measurement error is higher in the angel investing estimates given the smaller sample size. However, the angel investment data includes no carried value estimates for ongoing portfolio companies which is definitely beneficial from a validity perspective. The evidence supports the statement that group angel investors experience an overall return that is at least as good as that of early stage formal venture capital.

Conclusions & Future Research

We primarily observe the consistent pattern in Figure 3 of outcomes across multiple studies (which cover different time frames, economic cycles, geographies, and units of analysis). This increases our confidence that these results are representative of outcomes to U.S. group angel investing, and possibly even early stage venture investing more broadly.

General outcome expectations to group angel investing are:

1. Highly concentrated returns: 10% produce 80%-90% of cash returns
2. Highly risky: in any 1 investment the most likely outcome is a loss of capital
3. Illiquid investment: more than 4 year minimum hold times before liquidity is achieved
4. Overall return expectation if one persists is very attractive: 2.2 – 2.6 times capital

The primary differences in this research study were an increase in the failure rate and the holding period, which resulted in decline of the gross IRR; all of which are consistent with the time frame of the study occurring through a very deep recession.

Our primary interest with future research will be to track the outcomes of the remaining portfolio in both the HALO Report™ and Angel Fund sub-sets.

Addendum

Tracking Angel Returns 2017

2016 additional outcomes

A perpetual challenge to investigating returns to angel investors is capturing the ongoing flow of investment outcomes. As part of this research, we report our extended effort to track additional outcomes from the data collection described earlier in this paper. Specifically, we tracked all of the 247 investments from the Halo Report Set (detailed in the main body of this report) that were still ongoing in 2016.

The status at the start of 2017 of the 247 companies was determined using data from Pitchbook. Pitchbook employs analysts that use an array of approaches, from entirely automated to direct contacting, in order to capture as complete and current data as exists on these early stage companies. As described earlier, this dataset has an inherent bias toward venture capital backed new ventures because those ventures tend to be more "visible" to their data collection efforts. We chose this method, as opposed to direct contacting of the ventures, in a direct attempt to create a feasible, rather than Herculean, process for sustaining ongoing returns research.

All research choices involve trade-offs. In this case, while the approach is the only currently feasible way to sustain ongoing longitudinal data, it does limit the depth of the research questions one might ask about these companies and their investors. (For example, best practices used to make investment decisions, and how they relate to the outcomes.) As in the larger effort described earlier, we are also able to avoid survivor bias using the Halo Report Set, and minimize self-selection biases using the mix of data collection efforts employed by Pitchbook.

One final point to emphasize is that the 'sample size' for any given year based on this set is very small, certainly too small to generalize in any sense. Therefore, attempting to generalize the outcomes described below to represent returns looked for angel backed firms in the U.S. during 2016 would be misguided. It is the opinion of the authors that the aggregated set is the current best estimate of angel investment outcomes for angel investors associated with Angel investment groups making early stage investments in startup companies.

At this point we can describe the outcomes that have occurred over the past year from among the Halo Report Set. As of 2017, 20 of the 247 ongoing ventures had reached their conclusion and are no longer ongoing.

These 20 had raised a total of $67.5M from angel investors, a mean of $3.4M and median of $1.7M. This skew (the large difference between the mean and median) is normal for data in this field, with just a few having raised $10M+ while most ventures raised approximately $1M - $2M from angel investors. The companies that either shut down or had a liquidity event in 2016 had raised double the capital as those that completed prior to 2016. In fact, the median capital raised in the aggregated sample is $600K compared to the $1.7M median value of this set of 20.

2016 Additional Outcomes

20 investments completed
7 acquired, 13 went out of business

Capital raised: $67.5M
2X higher capital intensity

Holding period: 6.5 vs. 4.5 years
Same time for wins as for losses

Added to overall sample results:
2.3X multiple, 19.3% IRR

The investment holding period of this 2016 group from the Halo Report Set was longer, obviously, than the holding period of the investments that finished prior to 2016. The mean holding period for these 20 companies was 6.5 years, compared to the 4.5 years of the pre-2016 group, and this was the case for both the successful and unsuccessful exits. This is merely an artifact of the choice to track only the ongoing investments from the Halo Report Set described earlier in this paper for a fixed time window (2016). The overall sample has a mean holding period of 4.8 years; definitely longer by more than a year, compared to the 2007 and 2009 return studies.

The outcomes of these 20 companies tracked to completion through 2016 were not as attractive as the larger group reported earlier. 7 were acquired (35%), and 13 went out of business (65%), which is on par with the earlier group. However, the longer holding period, the increased capital amount raised by the group, and a few low value acquisitions lead to a multiple of just 1.2X, with an IRR of approximately 4%. With just 20 investment outcomes, however, it's not realistic to make any sort of generalized statement about returns to angel investors overall during 2016.

Rather than generalize from this small 2016 set, we can add these outcomes to the group of completed investments prior to 2016. This increases the N of the company outcomes to angel investors from 245 to 265 companies. The aggregated outcomes generate an overall multiple of 2.3X (vs 2.5X) and an overall IRR of 19.3% (vs. 22%), pulled down because of the less attractive set of outcomes that occurred in 2016.

One of the interesting details of this 2016 group from the Halo Report Set is that the ***un***successful outcomes raised nearly twice the amount of capital as those that exited successfully. This points toward a key challenge in venture investing, the tension between diminishing marginal returns to investing additional capital and time and several decision-making biases. Investors need to carefully consider their risk of escalation of commitment, the tendency to avoid realizing losses by investing into situations trending downward, and social pressure to be loyal to co-investors and entrepreneurs in whom they've invested. In addition to the 2007 and 2009 studies that observe the negative relationship between returns and follow-on investments, we point to two academic studies specifically relating those ideas to new venture investing.

> Throwing Good Money after Bad?, published in Administrative Science Quarterly (2007 52: 248-285). By I Guler.
>
> Investment and Returns in Successful Entrepreneurial Sell-outs, published in the Journal of Business Venturing Insights (2015 3:16-23). By N.Dew, S.Read, and R. Wiltbank.

With all of that said the single most dominant factor, and this can't be reiterated often enough, is the occurrence of unusually large homerun liquidity events in whatever set is being tracked. Overall returns to early stage venture investing, by Angels or VC funds, are driven by unusual and very large liquidity events. When those outcomes are in your portfolio, or in a dataset, the returns tend toward the overall norms of those "asset classes." When those homeruns aren't in any particular subset, the returns will be unattractive, particularly on a risk adjusted basis. Angel investors that systematically invest in ventures that aren't plausibly scalable to large wins are unlikely to reach the returns described throughout this research.

Overall, the empirical evidence aggregated and described in our research suggests that Angel investors, associated with angel groups, who invest in a relatively larger set of new ventures, each of which seem to hold the potential to dramatically grow have experienced outcomes at least as attractive as formal venture capital investors, and probably somewhat more attractive.

In 2018, if this research were to continue, 227 ventures from the Halo Report Set would be tracked via Pitchbook once again looking for shut downs or liquidity events. One of the challenges to this effort is that of the 7 acquisitions reported in 2016, only 2 of them publicly reported the value of their liquidity event. We overcame this challenge by directly contacted investors in these companies through personal relationships and confidentially collected information regarding the cash returned from those events. This is not sustainable as a method, obviously, and points again to the challenge of tracking investment return data in this private market, with no LP/GP reporting requirements.

One of the motivating factors for the comparison to the Cambridge Associates data in figure 2 of the main body of this research report is to consider the practicality of using seed stage venture capital investment returns as a proxy for the returns to angel investing. If this were pursued, one must explicitly account for the challenge of carried values hiding true returns, as well as the geographic concentration of venture investing. But if those could be effectively handled, the practical improvement in estimating returns to angel investing would be significant.

Appendix 1

Outcome distribution prior to aggregation

Black = Halo Report Set
Blue = Angel Fund Set
Number on each column = Mean years investment held