PitchBook

PitchBook Data, Inc.

John Gabbert Founder, CEO

Nizar Tarhuni Vice President, Institutional Research and Editorial

Daniel Cook, CFA Head of Quantitative Research

Institutional Research Group

Analysis

Andrew Akers, CFA
Senior Quantitative Research Analyst
andrew.akers@pitchbook.com

pbinstitutionalresearch@pitchbook.com

Publishing

Designed by **Chloe Ladwig**

Published on March 20, 2023

Contents

Gaining an Edge in VC Investment Selection

How the PitchBook VC Exit Predictor can be used to improve the investment selection process

PitchBook is a Morningstar company providing the most comprehensive, most accurate, and hard-to-find data for professionals doing business in the private markets.

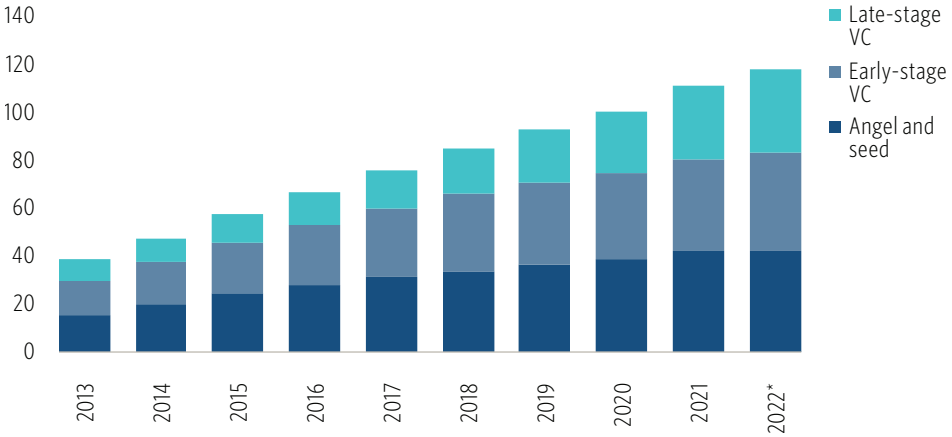
Key takeaways

- The PitchBook VC Exit Predictor—a new tool that leverages machine learning and our vast database of information on VC-backed companies, financing rounds, and investors—provides objective insights into startups' prospects of a successful exit.
- Output from the tool can be used to improve the efficiency and effectiveness of VC investment selection workflows, which have become increasingly time-consuming as the universe of startups has grown rapidly over the past 10 years.
- In a backtest with active VC-backed companies as of February 2018, we found that startups ranked in the top decile based on output from the VC Exit Predictor were 3.1x more likely to exit successfully (via M&A or public listing) than those in the bottom 90%.

Introduction

One of PitchBook's core value propositions is to help investors identify and analyze potential investment opportunities. Investors that use PitchBook often seek to answer the question: Out of all the companies (or funds) in a particular universe, which ones are worth the time it takes to perform due diligence? As the private markets have grown rapidly over the past decade, so too has the breadth and depth of our data on private companies. While these are generally positive developments for private market participants, it has made sifting through the data to identify investment opportunities more challenging and time-consuming. This task is particularly difficult for those focused on VC, as an influx of capital and institutional investor interest has led to an explosion in the number of VC-backed companies. From the end of 2013 to the end of 2022, the total number of active VC-backed companies in the PitchBook database has tripled to nearly 120,000.[1]

Active VC-backed inventory (thousands) by stage



Source: PitchBook | Geography: Global
*As of December 31, 2022

Even after filtering this list for an investor's preferred industry, geography, and stage, there will often be thousands of companies left. In this note, we introduce a new tool PitchBook users can leverage to improve their investment selection process: the VC Exit Predictor.

The PitchBook VC Exit Predictor

The PitchBook VC Exit Predictor leverages machine learning and our vast database of information about VC-backed companies, financing rounds, and investors to objectively assess a startup's prospect of a successful exit. The primary component underpinning the tool is a classification model that predicts the probability a VC-backed startup will ultimately be acquired, go public, or not exit due to failing or becoming self-sustaining.[2] This model has been trained on over 64,000

1: This figure includes angel- and seed-backed companies. A company is considered actively VC-backed if it has received a VC funding round in the past six years and has not exited or gone out of business.
2: If a company has not had any funding activity (including non-VC) in six years, it is deemed to have either failed or become self-sustaining.

observations of startups with a known outcome where each observation includes hundreds of individual data points, on average. The exit probabilities that are generated from the model are then used to calculate a naïve expected return of an investment in the startup's next financing round using historical returns by series derived from capitalization table data. This allows us to produce a single stage-agnostic Opportunity Score that can be used to rank and filter a list of companies. For more detail on methodology and model performance, please see Understanding the VC Exit Predictor in the PitchBook Help Center.

The primary goal of the VC Exit Predictor is to objectively score companies at scale based on all relevant and available information in the PitchBook database. These scores can then be used to improve and streamline workflow processes, such as screening a list of potential investments.

The primary goal of the VC Exit Predictor is to objectively score companies at scale based on all relevant and available information in the PitchBook database. These scores can then be used to improve and streamline workflow processes, such as screening a list of potential investments. It is not intended to be used as a quantitative investment strategy or replace the due diligence process. This is primarily because many important factors to a startup's success—both quantifiable and not—are not available to include in the model, such as detailed company financials, the business model, and founder intangibles, to name a few. In the remainder of this note, we demonstrate how investors can leverage the VC Exit Predictor to narrow their focus on a list of startups while improving the baseline odds that an investment will be successful.

Gaining an edge

We conducted a backtest to demonstrate the effectiveness of using the VC Exit Predictor to screen a broad universe of startups. First, we turned the clock back five years to February 2018 and trained a model on companies that had already experienced an exit event at that time.[3] We then used that model to make predictions and calculate Opportunity Scores for eligible startups only using information dated prior to February 2018.[4] This resulted in a prediction set of approximately 26,000 companies. Finally, we separated this list of companies into two groups to compare results: the top decile based on the resulting Opportunity Score and the remaining 90%.[5]

Fast forward five years, and a little less than half of the 26,000 companies that were scored in the backtest had a known outcome at the time this analysis was performed. The most straightforward way to show the effectiveness of screening the overall universe using the Opportunity Score is to look at the outcome differences in terms of merger, public listing, and no exit rates. Companies that were ranked in the top decile in 2018 were 3.8x more likely to successfully exit via a merger or public listing than companies in the bottom 90%. Further, when only considering companies that successfully exited, those ranked in the top decile were 1.5x more likely to exit via the public markets. The full results are shown in the following table.

3: We chose a five-year look-back period to balance two competing goals: First, having a large enough sample of startups with known exit events to train the model, and second, allowing enough time for the startups included in the prediction set to mature and exit.
4: A startup must have had at least two VC funding rounds (including angel or seed rounds) before February 2018 to be eligible for the backtest prediction set.
5: Startups that had not received any funding in more than four years were excluded from the bottom 90% because many of these were unlikely to be actively seeking VC funding or may have already failed.

Share of exit outcomes by Opportunity Score cohort*

	Companies	M&A	Public listing	No exit
Top decile	1,110	62.2%	10.8%	27.0%
Bottom 90%	11,464	37.2%	4.1%	58.7%
Total	12,574	39.2%	4.7%	56.1%

Source: PitchBook | Geography: Global
*As of February 14, 2023

An important caveat to the exit outcome results is that early-stage startups are overrepresented and late-stage ones are underrepresented in the top decile, which potentially muddies their interpretation. This occurs because early-stage companies have a higher possible Opportunity Score due to our methodology reflecting the fact that investing earlier in the VC life cycle has historically produced higher returns on average. Further, the success rate for early-stage companies is relatively high compared to angel, seed and late-stage companies when considering their return potential. To normalize for stage imbalances, we repeated the process of comparing outcomes between the set of top decile companies and the bottom 90% for angel and seed, early-stage, and late-stage companies.

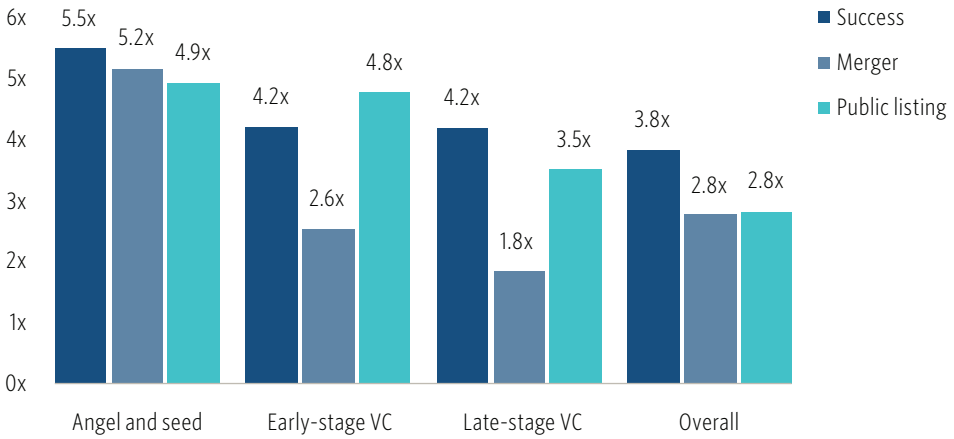
Share of exit outcomes by Opportunity Score cohort and stage*

		Companies	M&A	Public listing	No exit
Angel and seed	Top decile	302	57.9%	2.0%	40.0%
	Bottom 90%	2,712	21.0%	0.4%	78.6%
Early-stage VC	Top decile	607	64.4%	12.7%	22.9%
	Bottom 90%	5,458	41.5%	2.9%	55.6%
Late-stage VC	Top decile	350	57.4%	23.4%	19.1%
	Bottom 90%	1,647	42.2%	8.0%	49.8%

Source: PitchBook | Geography: Global
*As of February 14, 2023

The key prior result, that companies in the top decile were more likely to exit successfully than those in the bottom 90%, held at every stage. Additionally, successful exits were more likely to come via a public listing at every stage, especially at the early stage. Early-stage startups in the top decile were 4.8x more likely to exit via a public listing than those in the bottom 90%. The following chart summarizes the relative outcome odds for the top decile versus the bottom 90% for the overall universe and each stage.

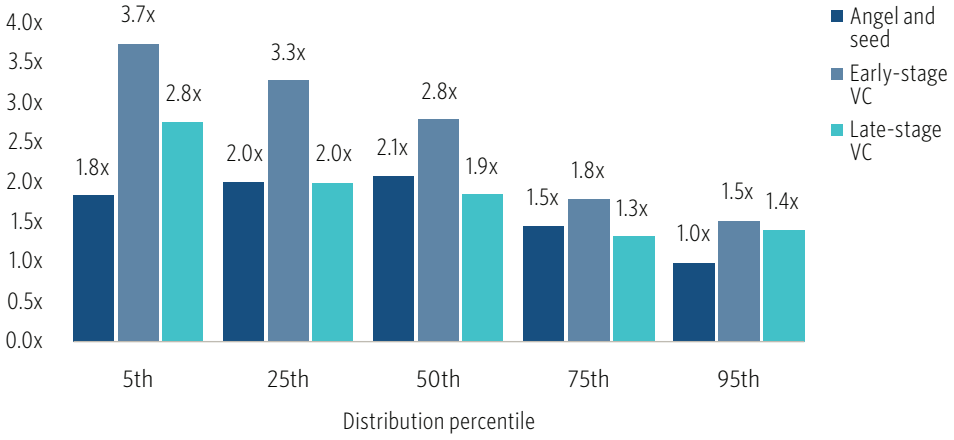
Relative odds of outcomes by stage: top decile versus bottom 90%*



Source: PitchBook | Geography: Global
*As of February 14, 2023
Note: Success is the combined probability of M&A and public listing exits.

Although the model does not explicitly differentiate between exits of different sizes, we also found that startups ranked in the top decile tended to have larger exit valuations compared to those in the bottom 90%. Median exit valuations were 2.1x, 2.8x, and 1.9x larger for angel and seed, early-stage, and late-stage companies, respectively. The following chart shows these ratios for additional points on the distribution.

Ratio of exit size valuations by percentile and stage: top decile versus bottom 90%*



Source: PitchBook | Geography: Global
*As of February 14, 2023

The results presented above are incomplete as a little more than half of the companies in the backtest were excluded because they are still VC-backed. For these companies, one possible way to evaluate the relative strength of the top decile is to update expectations based on new information from the past five years. To achieve this, we updated the exit predictions using the current version of the VC Exit Predictor and all presently available information.

Before getting to a summary of the updated predictions, it is important to note that the sample in the previous analysis was more likely to include startups with a "no exit" outcome. This is due to the fact that companies that exit via an M&A or public listing typically take longer to do so. Differences in the timing of exit realizations between companies that have a known outcome and those that do not also lead to expected differences in success rates. Because the prior results only included companies with a known outcome, this means that although the key conclusions are still valid, they are moderately optimistic.

Returning to the updated predictions, we found that the currently VC-backed startups that were ranked in the top decile in 2018 are still expected to successfully exit at a higher rate compared with those that were ranked in the bottom 90%. However, the expected difference in success rates has narrowed slightly over the past five years. The current percentage of expected outcomes by stage (with respect to the original backtest date) are presented in the following table.

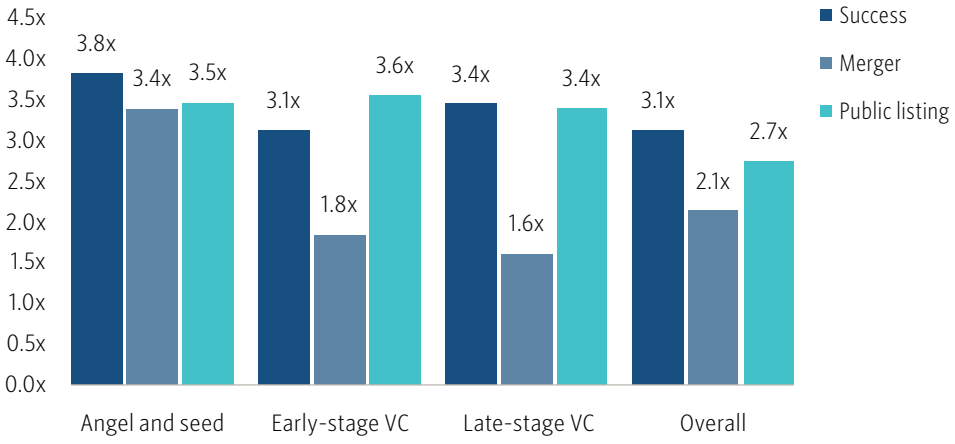
Current exit predictions for the remaining backtest sample by stage*

		Companies	M&A	Public listing	No exit
Angel and seed	Top decile	323	68.9%	7.5%	23.6%
	Bottom 90%	2,899	41.4%	1.9%	56.7%
Early-stage VC	Top decile	643	67.4%	16.4%	16.2%
	Bottom 90%	5,784	58.4%	4.8%	36.9%
Late-stage VC	Top decile	324	64.9%	23.1%	12.0%
	Bottom 90%	2,917	58.8%	8.0%	33.2%

Source: PitchBook | Geography: Global
*As of February 14, 2023
Note: Only includes companies that are currently VC-backed. Stage assignment is as of the original backtest date.

The most holistic and fair way to evaluate the backtest, given the exit timing differences between companies that have a known outcome and those that do not, is to blend the actual outcomes with the expected ones. This can be achieved by multiplying the average exit probabilities from the updated predictions with the number of companies that have not exited and adding the results to the number of known outcomes. For example, there are 1,512 companies in the overall top decile yet to exit with an average public listing exit probability of 13.4%, leading to approximately 203 (1,512 multiplied by 13.4%) expected public listing events from this cohort. Adding this figure to the public listings that have already occurred over the past five years from the same cohort yields a blended estimate of 314 public listings, or a rate of 12.4%. The following chart displays the relative odds by stage and overall using this blended approach. In general, the results are slightly less optimistic, as expected, but the main conclusions hold: Startups ranked in the top decile have better odds of success and better odds that those successful exits will be public listings compared to those in the bottom 90%.

Blended relative odds of outcomes by stage: top decile versus bottom 90%*



Source: PitchBook | Geography: Global
*As of February 14, 2023

Conclusion

In this research, we introduced one of the core use cases of the newly released PitchBook VC Exit Predictor, which is now available to all PitchBook users. As the universe of potential investment opportunities continues to grow exponentially, VC investors can use this tool to improve the efficiency and effectiveness of their investment selection process by quickly filtering for startups that have better odds of exiting successfully. Users can easily incorporate this into their current workflows by adding the exit predictions and Opportunity Score to an advanced search or saved company list in the PitchBook Platform. To illustrate, licensed PitchBook users can view this list of VC-backed startups currently ranked in the top decile. Additionally, exit predictions will be shown on individual company profiles alongside a peer-to-peer comparison to help contextualize them. Please contact your account manager for more information on how you can take advantage of the VC Exit Predictor.