MORNINGSTAR Indexes

Harnessing Unicorns: Demystifying the venture capital market with the Morningstar PitchBook Global Unicorn Indexes

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Executive Summary

The explosive growth of private markets has been one of the most significant developments in capital markets in the last two decades. More money is being raised in private markets than in public markets each year with no sign of a change in the trend. Due to this increase in available capital, many young companies are choosing to remain private longer.

One mark of this rapid growth is captured in the burgeoning number of unicorns, or venture capital-backed companies valued at $1 billion or more. As companies have stayed private longer, a growing number have hit key milestones like finding product-market fit and generating meaningful revenues, which is reflected in their often lofty valuations. The ranks of unicorns now exceed 1,200 globally and their collective value is roughly $4 trillion.

Unicorns offer a window into the innovation economy. Today’s unicorns are tomorrow’s industry stalwarts—just look at Amazon, Tesla, or Uber. To understand where markets are going, it helps to understand what is on the horizon. Unicorns are already important players, but their growth, evolution, and impact are largely undocumented. As the lines between public and private markets blur, as venture capital and private equity investments make further inroads into pension plans, public mutual funds, and even private retirement accounts, it’s vital that investors see a more complete picture of the market. Startups remaining in the private arena for longer periods may be convenient for entrepreneurs and profitable for venture capitalists, but it comes at a cost to investors and undermines the principle of equal access to information upon which robust securities markets are based.

Underpinned by data from PitchBook, a leading provider of private-market data and research and an independent subsidiary of Morningstar, the Morningstar® PitchBook® Global Unicorn Indexes™ provide insight into what's happening just over the horizon of the public markets in the late-stage VC market. The indexes employ a statistical model to estimate more frequent valuations for private companies. The first of its kind, the model leverages valuations from the company's last funding round along with private-market and public-market comparable data to determine constituent pricing.

We seek to shine a light on what’s coming next, to paint a more complete picture of today’s investment landscape, and to provide a better sense of where markets may be heading. We think these indexes will be a valuable tool for documenting, monitoring and evaluating the late-stage VC market—and empower better investment decisions.

Growth of Venture Capital

Since the founding of the American Research and Development Corporation in 1946, venture capital has provided a vital source of risk capital to new companies. Pools of equity have helped startups innovate and commercialize new technologies. From the semiconductor pioneers of the 1960s onward, the list of companies backed by venture is long and essential to public markets—Hewlett Packard, Apple, Amazon, Salesforce, Google, Airbnb, and Uber to name a few. For early-stage businesses, venture capital fills a financing gap when bank loans and traditional funding sources are out of reach. For investors, it's a high-risk, high-reward proposition.

Venture capital has helped power a dramatic expansion in private markets in recent decades. The number of public companies in the United States has declined from a peak of more than 8,000 in 1996 to roughly 4,000 today. At the same time, the number of U.S.-based VC-backed companies has ballooned to an estimated 36,000 from a figure less than 5,000 in the year 2000. VC-backed companies are also staying private longer. The median age of a VC-backed company going public—defined as the year of the IPO minus the year of founding—increased from six years in 1980 to 11 years in 2021.[1] Investor activity in venture capital has followed alongside these trends accordingly. In 2021, more than 21,300 unique investors made a deal into a U.S.-based VC-backed company; in 2007 that figure was below 3,500.

[1] Ritter, J. June 17, 2022. *"Initial Public Offerings: Median Age of IPOs Through 2021."* University of Florida.

Several factors in the past decade have contributed to the dramatic growth of venture capital:

Regulatory changes. The JOBS Act, written in 2012, increased the number of maximum shareholders in a private company from 500 to 2,000. This change was instrumental in opening the door for companies to grow to a much larger size under private backing, ironically helping to depress the number of new IPOs.

Strong performance. Venture capital has outperformed other private investment strategies since the financial crisis of 2007-08, with seven of the past 10 fund vintage years leading all other private strategies. As allocators have increased investment in private markets to participate in these returns, VC has benefited from an increase in capital availability that has allowed further growth while remaining private.

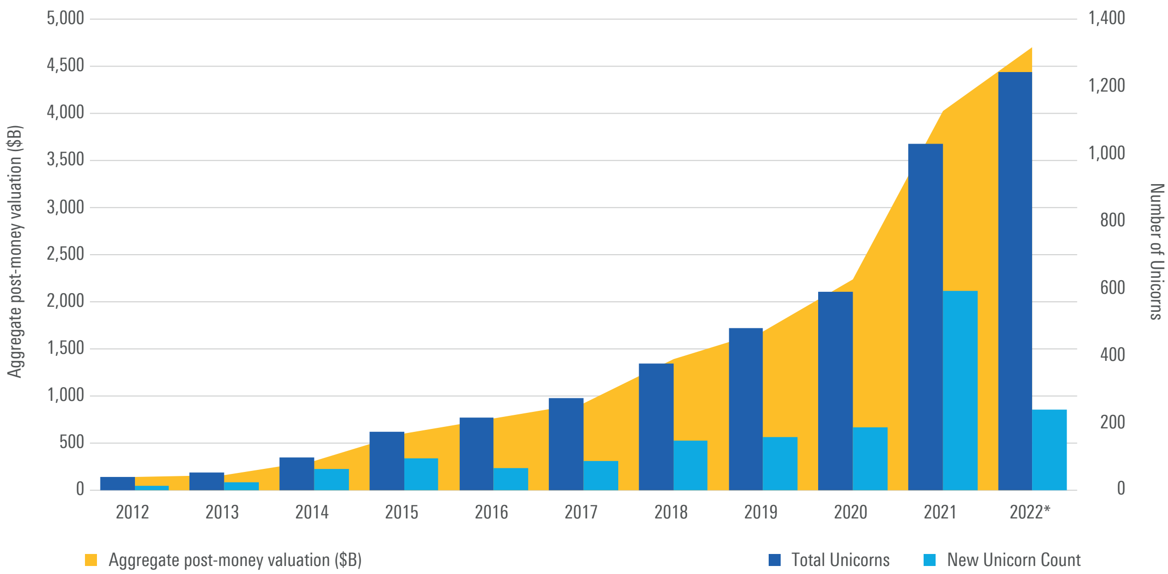
Growth of nontraditional investors. A significant amount of capital has come from "nontraditional" investors, which is an umbrella term for all other market participants outside of VC firms. The key types of investors in this nontraditional bucket include corporate venture capital groups, hedge funds, mutual funds, and sovereign wealth funds.

The Dawn of Unicorns

"Unicorn," a term associated with startups valued at $1 billion or more, was coined in 2013. Facebook (now Meta) went public in 2012 and became a gold standard for VC returns. The era of "move fast and break things" and "blitzscaling" was launched.

Beyond simply a level of valuation, "unicorn" has symbolized the venture ecosystem's potential, innovation, and returns. Unicorns and what they symbolize are important for investors across both private and public markets. Late-stage and crossover investors look to unicorns as the opportunity to invest in the next public tech giant that is still in the early stages of growth.

Exhibit 1: Growth of Unicorns by Number and Assets

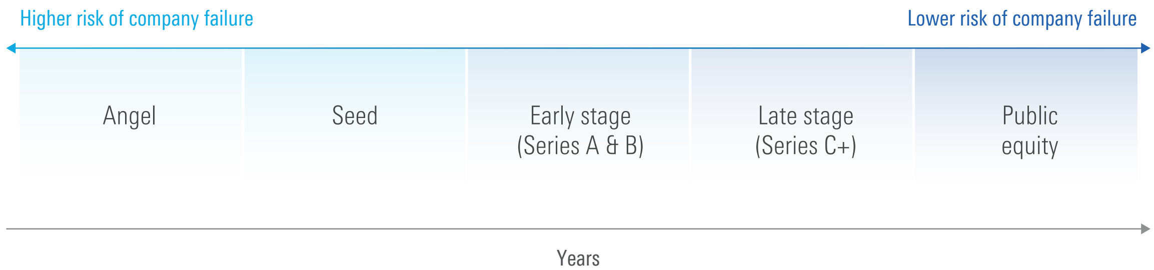


*Data as of 6-30-2022
Source: PitchBook

The unicorn explosion, which began in earnest around 2017, saw a niche group of category-defining companies transition into a massive cohort of well-capitalized startups pursuing high growth, financed by a mix of public and private investors. Until 2021, unicorn deals accounted for less than 2% of completed VC financings in the U.S., highlighting how small of an opportunity set they are. However, unicorns have captured roughly one third of all dollars invested into VC during that time, changing not only the investment activity of VC firms, but also how public market participants interact with venture capital.

As companies stay private longer, naturally the valuations of private companies also increase. The median valuation of a company at the time it enters the public market has now reached unicorn status—in 2021 that figure surpassed $1.4 billion. In order to capture this growth and increase returns, we have seen a higher number of traditionally public-market investors making investments into VC, largely into unicorns. Globally, more than 1,200 private companies are valued at $1 billion or more, representing $4 trillion in aggregate market value.

Exhibit 2: VC-Backed Company Lifecycle

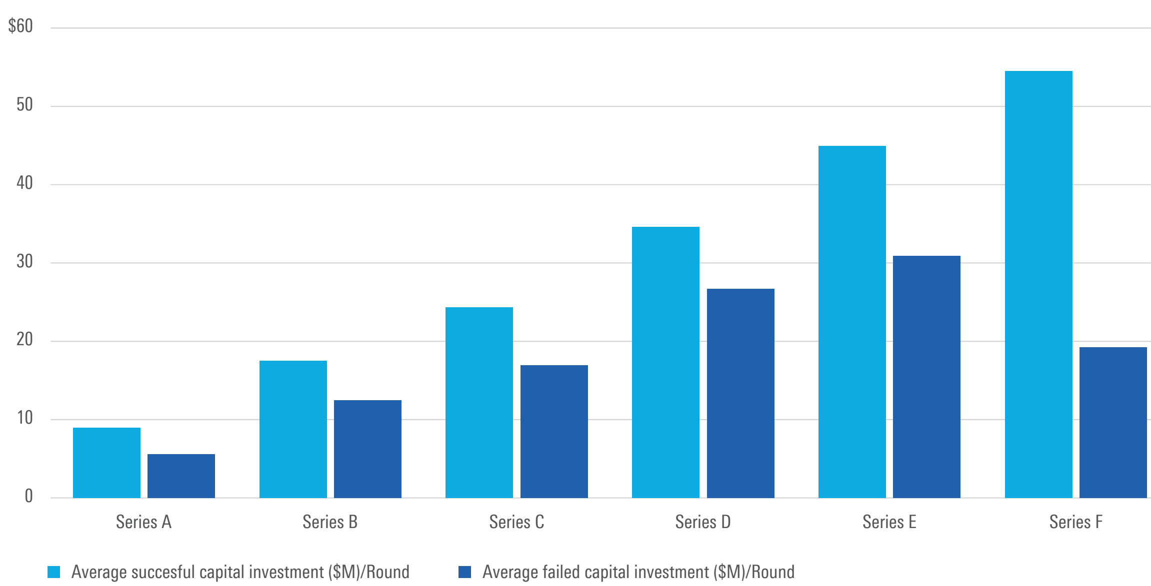


Source: PitchBook

VC has long been partitioned into stages. The companies working through the venture capital cycle typically follow a clear path from founding, with a mixture of support from accelerators, pre-seed, and seed funding before moving into named series of stock sales beginning with Series A and moving through the alphabet with each subsequent funding round. The risks of a seed investment differ greatly from a Series D round, which also varies from the risk of a Series F and pre-IPO round.

Unicorns, though not a particular stage, have tended to be much later in the venture life cycle, with a majority falling into the late stage of VC. These companies generate more revenues and, generally, have a product-market fit that is much more developed than a more-traditional startup. This has allowed investors the opportunity for proper due-diligence practices, in theory helping to de-risk the investment in certain areas. This change in risk as companies move later into the company life cycle has manifested in prior PitchBook research, which highlighted returns among companies classified as late stage. Series F+ investments seldom failed in whole. And looking at the adjusted annualized returns (adjustment made to account for company failure rates), these investments show a higher return than any other series, by a significant margin.

Exhibit 3: Success Rates of Late-Stage VC-Backed Companies Are Significantly Higher



Source: PitchBook

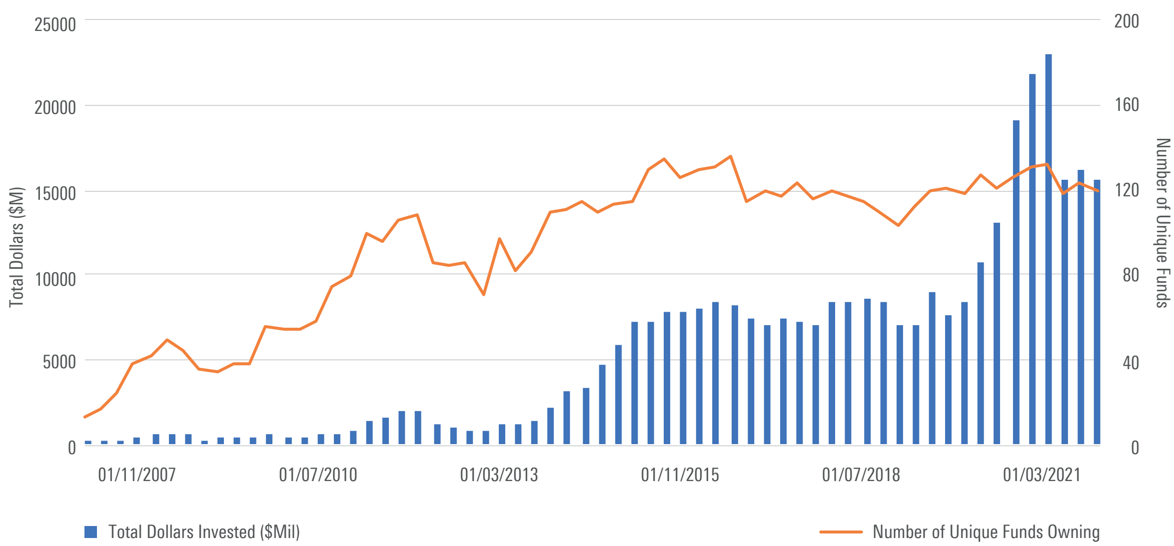
VC Investors Need Tools for Understanding Market Structure

Sophisticated investors have long participated in venture capital. Pension funds, endowments, sovereign wealth vehicles, and insurance companies have allocated trillions to the asset class. But venture capital-backed companies are increasingly making inroads into individual portfolios—through individual retirement plans and ownership of "crossover" mutual funds.

Morningstar has tracked mutual fund ownership of private-market securities in the U.S. as it has skyrocketed over the last 15 years. The bulk of the investments are concentrated in larger, late-stage pre-IPO investments. Despite SEC limits on illiquid investments, the total market value of private-market holdings in mutual funds reached nearly $23 billion in late 2021, up from $110 million in 2007. Driving this burgeoning growth are some of the industry's largest fund families, including Fidelity and T. Rowe Price.[2]

[2] Shannon, J. and Reichart, K. September 2022. "*Tracing Unicorn Companies in Mutual Funds.*" Morningstar Direct.

Exhibit 4: Mutual Fund Assets Invested in Private Equities Have Grown Steadily



Source: Morningstar Direct Data as of 6/30/2022.

Despite growing interest in private markets, benchmark index development has not kept pace. Indexes serve as indispensable tools for understanding market structure and risks, benchmarking investments, and making asset-allocation policy decisions. Long before they underpinned passive investment strategies, traditional market indexes were defining the opportunity set for investors, reflecting market composition, measuring performance, highlighting risk and return drivers, and facilitating portfolio assembly. Indexes can improve transparency and broaden access in the burgeoning private-market space.

However, private-market investing presents some unique challenges for indexers:

Company-level disclosure. Private companies are not required to file periodic reports or make disclosures about their business operations.

Lack of standards. Even when private company information is available, it is unstructured and difficult to collect, organize, and manage. There are no common universal security identifiers like CUSIPS, ISIN, or SEDOLS. There are no standard industry and sector taxonomies that allow comparability across different segments of the market. And there is a lack of consensus on the investable universe.

Lack of mark-to-market pricing. Private companies are difficult to value because they are not actively traded. Pricing is a key input to index value calculation. For an index to be a reasonable proxy of the market or the asset class, it should reflect the best available pricing of the underlying securities. The lack of regular valuations in private companies also creates the potential for illusions in private company returns when compared with public equity returns. Transparency of process and consistency of application are critical.

Introducing the Morningstar® PitchBook® Global Unicorn Indexes™

The Morningstar PitchBook Global Unicorn Indexes track privately held, late-stage VC-backed companies globally with post-money valuations of $1 billion or more. Index constituents are derived from PitchBook's global database of VC-backed companies.

The Morningstar PitchBook Global Unicorn Index is the broad, all-encompassing parent benchmark, from which several narrower indexes are carved out. The range of indexes include:

Global

- Morningstar PitchBook Global Unicorn Index
- Morningstar PitchBook Global Unicorn 500 Index

United States	Europe	Asia
Morningstar PitchBook US Unicorn Index	Morningstar PitchBook Europe Unicorn Index	Morningstar PitchBook Asia Unicorn Index
Morningstar PitchBook US Unicorn 100 Index	Morningstar PitchBook Europe Unicorn 50 Index	Morningstar PitchBook Asia Unicorn 100 Index
	Morningstar PitchBook UK Unicorn 20 Index	Morningstar PitchBook China Unicorn 50 Index
		Morningstar PitchBook India Unicorn 25 Index

Outlined below are the key features of the index methodology:

Clearly defined eligibility rules. PitchBook's global database of VC-backed companies forms the starting point for the unicorn indexes. Unicorns are defined as privately held, VC-backed companies (located in the relevant region), with post-money valuations of at least $1 billion.

Global coverage. The index family consists of 11 indexes that represent the global markets through a combination of broad-based and more narrowly focused fixed-count indexes. Broad indexes include every eligible unicorn in the respective region, while the fixed-count indexes, like the US Unicorn 100, are representative samples of the market that have high correlations with the broader markets.

Index membership. The indexes are rebalanced on a quarterly basis in March, June, September, and December. All companies attaining unicorn status in the preceding quarter are eligible for inclusion. Companies are removed from the index on the day they go public or get acquired.

Weighting methodology. Index constituents are weighted using their latest post-money valuation or estimated worth after the latest round of outside financing.

Index calculation. Index values are calculated once a day at the close of public markets in the U.S. All index values are calculated in U.S. dollars and include the impact of corporate events, like dividend distributions and buybacks.

Back history. Index back histories extend to 2014 for the US Unicorn Index and 2015 for the Global Unicorn Index.

Unicorn pricing. The unicorn indexes leverage a proprietary mark-to-model pricing methodology[3] that brings transparency and timeliness to private company valuation. The model estimates private company prices based on three inputs:

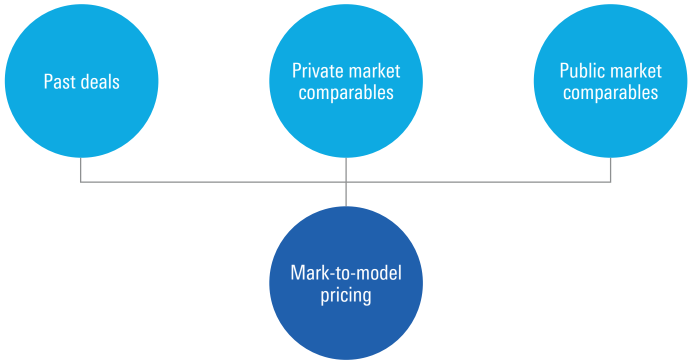
- Past Deals (post-money valuation) Factor: The past deals factor is arguably the most important data point used to value the unicorns because it reflects real-world deals and valuations. However, investors cannot rely solely on the past deals data, especially if the transaction happened long ago. The older the deal, the more "stale" or potentially irrelevant it becomes.

- Private Comparable Factor: VC deals of privately owned companies similar to the subject company contribute to price discovery. These comparisons are based on market intelligence provided by PitchBook industry analysts, who identify several comparable companies based on deal type, location, product mix, industry vertical, and size of the company.

- Public Comparable Factor: Unicorns are mapped to public market industries, and a Morningstar index representing the performance of the global industry peer group is utilized in the model. Research shows that private company valuation tends to lag public company valuation (Kaplan and Schoar, 2005).

[3] For more information on Morningstar's proprietary pricing methodology, see *What Are Unicorns Worth? A new approach to estimating the daily values of venture capitalbacked companies*

Exhibit 5: Three-Factor Mark-to-Model Valuation Methodology

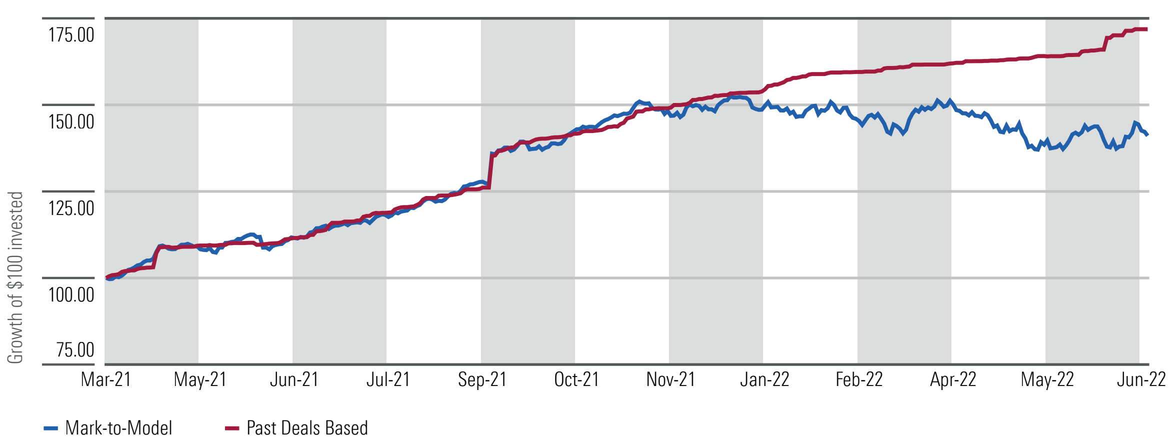


Source: Morningstar

The model runs daily and dynamically changes parameter weights based on the time elapsed since the last deal as well as when the observed correlation deviates between private comparable deals and public market proxies. The model prioritizes a company's most recent VC deal to estimate its value. As time passes, the model shifts weight to the recent performance of private-market comparables and public market comparables. This has the intended effect of anchoring to the most recent deal valuation but allowing the implied valuation of the company to fluctuate with the performance of its nearest proxies. This also introduces volatility in the time series of private company returns. To estimate the current valuation of each company, a numerical optimization routine is employed to determine factor weights.

Daily values for private companies are estimated based on the mark-to-model valuation methodology. These are aggregated to estimate historical levels of the Morningstar PitchBook Global Unicorn Index. The graph below compares index levels based on mark-to-model valuation with a theoretical approach that relies exclusively on past deals. The mark-to-model approach produces more realistic levels of volatility and returns.

Exhibit 6: Global Unicorn Index: Mark-to-Model vs. Deal-Based Valuations



Source: Morningstar

Exhibit 7: Index Construction Process

Starting universe	Eligibility screens	Security selection	Index maintenance	

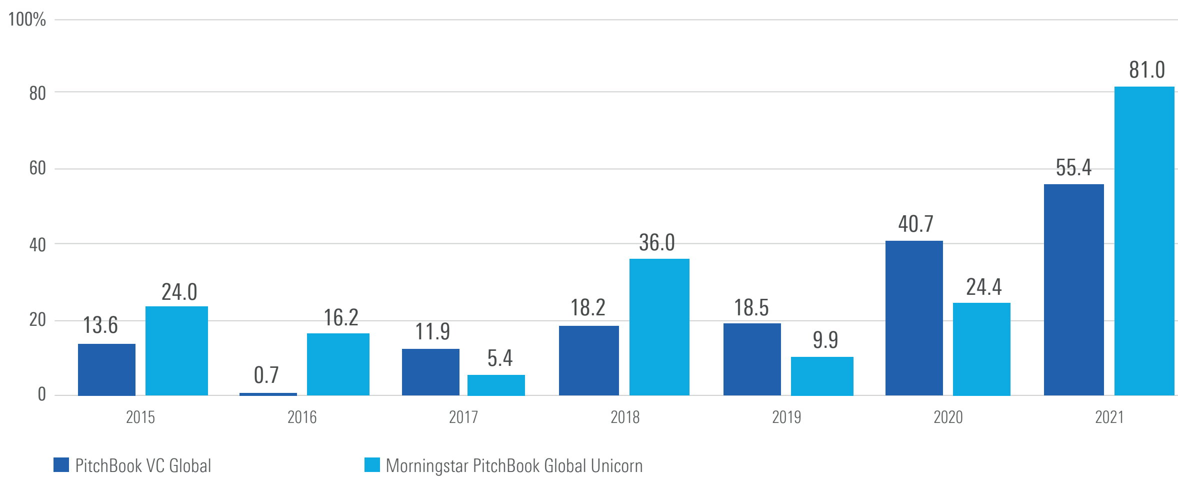
• PitchBook universe of global venture capital-backed companies*	• Companies must have a post-money valuation of at least $1 billion USD**
	• Companies must have had a venture capital round in the last 10 years
	• Companies must be late-stage venture capital
	• Shell companies are excluded
		• Broad indexes: All eligible companies in the geographical region are included
		  • Weighted by post money valuations
		• Fixed count indexes: Largest companies in the geographical region are included
		  • Weighted by post-money valuations with a security cap of 10%
			• Quarterly reconstitution
			• Corporate actions are reflected daily
			• Companies remain in the index until they complete exit rounds***
				Morningstar PitchBook Global Unicorn Indexes

* There are 92,000+ venture-backed companies as of September 30, 2022.
** A $1B qualifying round is either a VC round or a PE round that follows a VC round. Companies are excluded if their 1st 1 billion USD+ rounds come before their first VC rounds.
*** Exit rounds include going public via IPO/reverse merger, M&A, buyout/LBO, investor buyout by management, or bankruptcy/going out of business.

Index Performance and Portfolio Attributes

Examining the historical behavior and composition of the Morningstar PitchBook Global Unicorn Index tells the story of booming private markets and the innovation economy they represent.

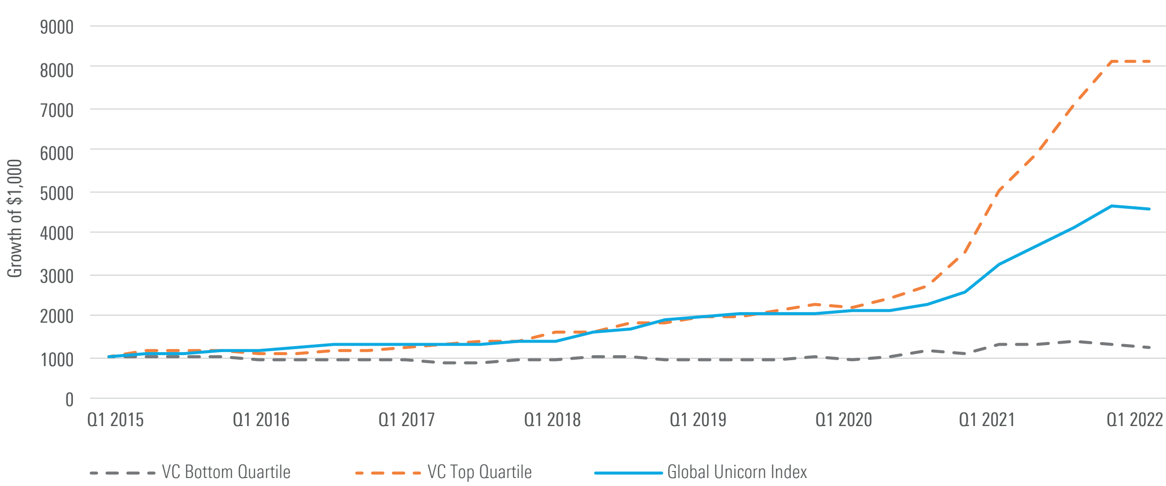
Exhibit 8: Annual Returns: Morningstar PitchBook Global Unicorn Index vs. PitchBook VC Global Benchmark



Source: Morningstar, PitchBook

When compared with PitchBook VC Global Benchmark—an index that represents the performance of VC-backed funds across all vintage years and is designed to help LPs and GPs better understand fund performance relative to the broader asset classes—the Global Unicorn Index trends similarly and roughly splits the years during which it out- and underperforms.

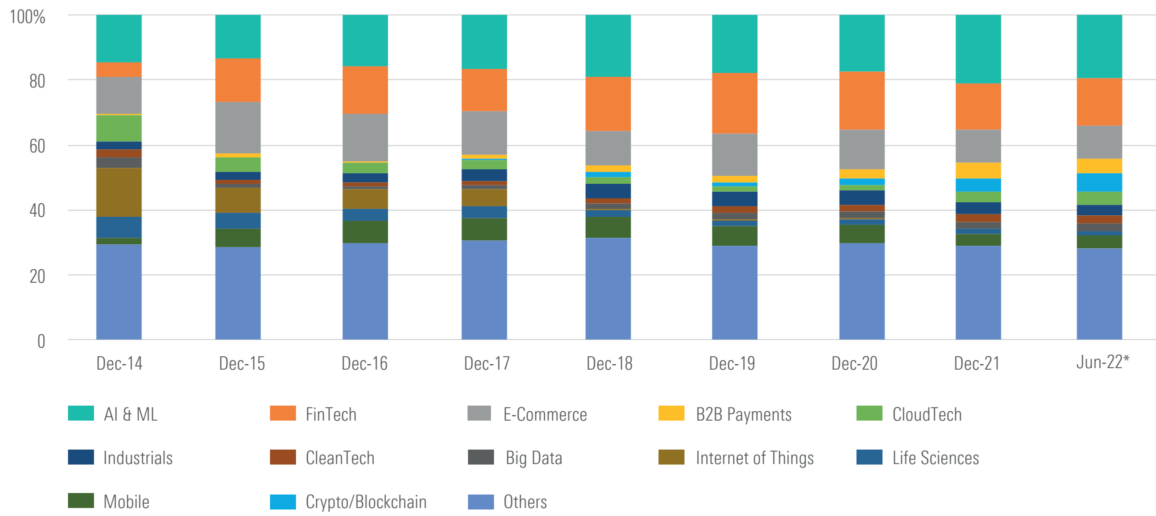
Exhibit 9: Morningstar PitchBook Global Unicorn Index vs. PitchBook VC Global Benchmark Top and Bottom Quartiles



Source: Morningstar, PitchBook

A good benchmark is representative of a strategy's investment universe and is therefore representative of its risk and return characteristics. The graph above shows that the performance of the Global Unicorn Index falls within the top and bottom quartile VC funds—indicating that the index is generally tracking the pool of investments tracked by VC fund managers.

Exhibit 10: Morningstar PitchBook Global Unicorn Index – Distribution by Industry Verticals

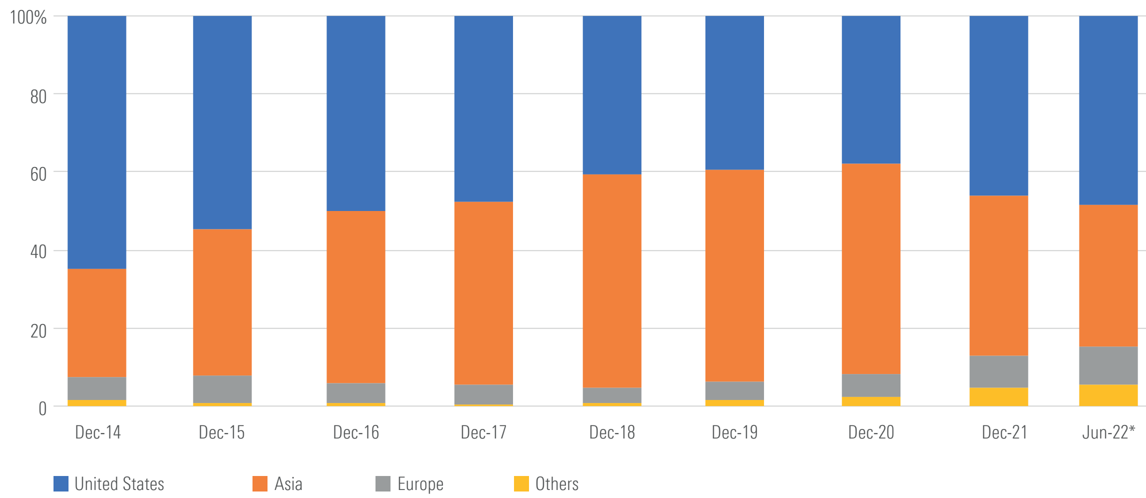


* Data as of 6-30-2022
Source: Morningstar, PitchBook

The composition of the unicorn index provides a window into the innovation economy. PitchBook defines more than 50 industry "verticals," which describe groups of companies that focus on a shared niche or specialized market. Industry verticals include innovative areas of focus such as clean tech and crypto/blockchain. Unicorns concentrate in technology-driven verticals that receive coverage from PitchBook's Emerging Technology Research. Emerging Tech Research defines the product categories experiencing the highest pace of innovation and allocates unicorns to their respective segments of the market, enabling the comparison of similar products.

Distribution of vertical weights within the index has changed over time. Artificial intelligence and machine learning has become a more significant portion of the unicorn landscape, increasing from 13% of index weight at the end of 2015 to 22% as of June 2022. FinTech, B2B Payments, and Cryptocurrency and Blockchain have gained share as well. On the flipside, among more conventional verticals, E-Commerce has declined from 17% of the universe in 2015 to 10% in 2022, while Mobile and Life Sciences have also declined.

Exhibit 11: Morningstar PitchBook Global Unicorn Index – Distribution by Geography



* Data as of 6-30-2022
Source: Morningstar, PitchBook

From a geographical perspective, the U.S. continues to be the primary home for unicorns. But other regions have seen phenomenal growth in recent years. Asia, especially China and India, represented 39% of index weight in 2022. Europe has doubled its share from 5% in 2015 to 10% in 2022.

Convergence Between Public and Private Markets

The growth and maturation of private markets has dramatically expanded the spectrum of opportunities for investors. Crossover funds are a signal that investors see late-stage private companies as prime high-growth candidates. Conversely, institutional investors are converting private fund vehicles with a fixed life of seven to 10 years to an open-end structure that allows them to hold portfolio companies until their exit and beyond.

The time has come for investors to recalibrate the yardstick of performance measurement that allows them to straddle public and private markets. Accordingly, the next generation of benchmarks will need to offer holistic exposure to public and private markets.

Final Word

The public markets are the best-lit playing field in finance and afford investors of all sizes equal access to vital information. Private markets obscure much of that information, leaving most investors at a disadvantage. Unicorns have come to define the intersection or the convergence of the public and private markets. The Morningstar PitchBook Global Unicorn Indexes are designed to bring structure and transparency to private markets and paint a more complete picture of today’s investment landscape.

About Morningstar Indexes

Morningstar Indexes was built to keep up with the evolving needs of investors—and to be a leading-edge advocate for them. Our rich heritage as a transparent, investor-focused leader in data and research uniquely equips us to support individuals, institutions, wealth managers and advisors in navigating investment opportunities across all major asset classes, styles and strategies. From assessing risk and return with traditional benchmarks to helping investors effectively incorporate ESG objectives into their investment process, our range of index solutions spans an investment landscape as diverse as investors themselves. We help investors answer today's increasingly complex questions so that they can more easily reach tomorrow's goals. For more information, visit indexes.morningstar.com.

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