

# Private Equity Insights

FIFTEENTH EDITION | Q1 2019

## CURRENT QUARTER PERFORMANCE SUMMARY

The State Street Global Exchange® Private Equity Index (GXPEI) posted its second highest quarterly return of the past two years at 4.48% in the first quarter of 2019. Venture Capital funds led the group for the fifth quarter in a row with a 6.43% gain, followed by Buyout funds at 4.03% and Private Debt funds at 3.57%. (See Exhibit 1).

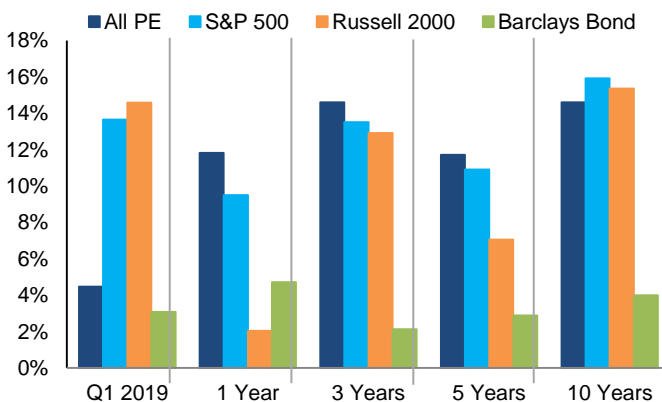
**Exhibit 1. Private Equity Performance by Strategy**

Column1	All PE	Buyout	VC	Private Debt
2019 Q1	4.48%	4.03%	6.43%	3.57%
2018 Q4	-0.96%	-1.29%	0.13%	-0.94%
2018	9.90%	9.09%	16.23%	4.27%

Source: State Street Global Exchange®, as of Q1 2019.

As shown in Exhibit 2, GXPEI outperformed the US public equity market (proxied by the S&P 500 and Russell 2000) and US debt market (proxied by the Barclays US Aggregate Bond Index) over the mid term horizons (1 year – 5 years), but underperformed the US public equity market over quarterly and longer term horizons (10 years) .

**Exhibit 2. Investment Horizon Returns**



Source: State Street Global Exchange®, DataStream, Bloomberg Barclays US Aggregate Bond Index (total returns as of Q1 2019).

## SECOND-TIER PUBLIC MARKETS AND THE GROWTH OF PRIVATE EQUITY

Insights from Harvard University and the Private Capital Research Institute



By Leslie Jeng and Josh Lerner

Well-developed public equity markets have proven instrumental in young and fast-growing companies to fund undertaking R&D and successfully introducing new products as the experiences in the United States in the past several decades, and China more recently, have illustrated. Recognizing the importance of these markets, a major focus of financial policymakers around the world has been the creation of new stock exchanges for young and small-capitalization companies, often characterized by less-restrictive listing requirements. Such exchanges, termed second-tier exchanges or junior markets, have been heralded as a way to promote the creation, financing, and retention of job-creating new ventures. Recent initiatives to create such markets have included nations as diverse as China, India, Saudi Arabia, and Trinidad and Tobago. Anecdotally, while there have been some highly successful second-tier markets (such as NASDAQ in New York, London’s Alternative Investment Market, and the Shenzhen-based ChiNext market), there have been many more failures (such as EASDAQ).

Despite the energy devoted by securities regulators to these efforts, there have been very few systematic empirical explorations of the determinants of the creation and evolution of new exchanges geared towards entrepreneurial firms. The sparseness of this evidence is particularly striking in light of the trends in global equity markets discussed in last quarter’s note, which highlighted that the number of listed companies in the U.S. has dropped by more than half in the past two decades and that the decision by private

Continued on page 4.

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firms to merge rather than go public accounts for much of this decline.

In a recent paper, Shai Bernstein of Stanford University, Abhishek Dev of the Private Capital Research Institute, and Josh Lerner of the Harvard Business School seek to understand the drivers of the creation and success of new second-tier markets, focusing specifically on the role of countries' legal provisions for shareholder protection.<sup>1</sup> To explore this hypothesis, the researchers construct a novel dataset that covers 285 stock exchanges across 115 countries. Their analysis begins in 1990 and ends in 2013 to ensure that they have at least four years of data with which to evaluate the success of the exchanges.

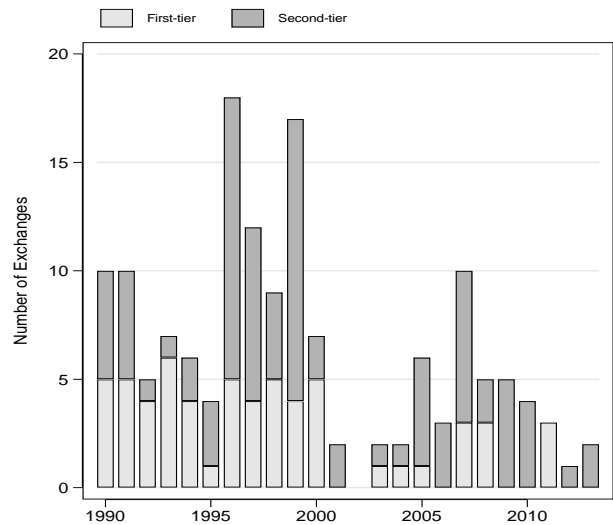
To construct these data, the researchers combine information from the Bloomberg, Capital IQ, and Securities Data Company (SDC) databases with that from the International Encyclopedia of the Stock Market, annual editions of the World Stock Exchange Factbook, and direct contacts with the exchanges and knowledgeable local academics and practitioners. They gather information on the exchanges' formation and listing requirements, as well as the details of any incumbent exchange(s) in these countries. Finally, they supplement these data with information on the exchanges' listed firms.

Using this unique dataset, the researchers first document the proliferation of second-tier stock exchanges around the world over the past three decades. They report that 77 second-tier stock exchanges were introduced in 48 countries between 1990 and 2013 (See Exhibit 3). These second-tier exchanges attracted a significant volume of IPOs (nearly 44% of those on all new exchanges), although much less in terms of value (23%, due to the smaller size of their listed firms), and appeared cyclically. Part of the attraction to listing on these second-tier exchanges is that many of these exchanges have lower listing requirements. According to the researchers' findings, second-tier stock exchanges as compared to first-tier stock exchanges had 1.57 fewer requirements out of the 16 requirements analyzed. On the other hand, lower listing requirements

increase the risk to investors that their investment may be expropriated by the entrepreneur. One possible way to protect against this is shareholder protection laws which can help increase the willingness of investors to invest despite the lower listing requirements. Thus, such exchanges were more likely to be introduced in countries with stronger shareholder protection (See Exhibit 4).

**Exhibit 3. Number of New Exchanges**

*This figure shows the number of exchanges created each year between 1990 and 2013, broken down into first- and second-tier exchanges.*

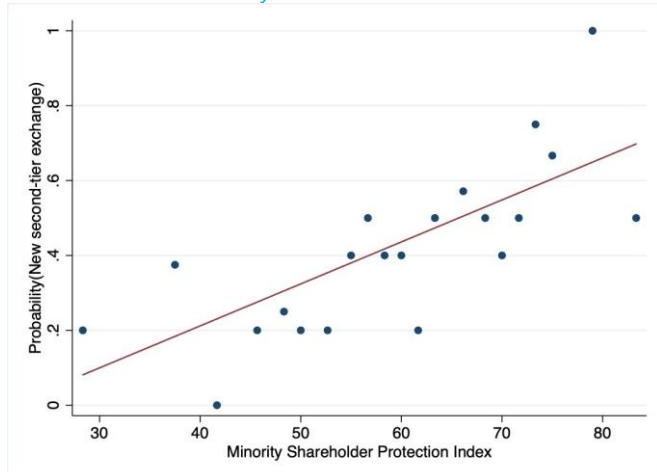


**Source: Bernstein, Shai, Abhishek Dev, and Josh Lerner, "The Creation and Evolution of Entrepreneurial Public Markets," Journal of Financial Economics, forthcoming**

<sup>1</sup> Bernstein, Shai, Abhishek Dev, and Josh Lerner, "The Creation and Evolution of Entrepreneurial Public Markets," Journal of Financial Economics, forthcoming (also [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3303419](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3303419)).

#### Exhibit 4. Introduction of New Second-Tier Exchanges and Minority Shareholder Protection

The bin-scatter plot depicts the mean probability of a nation establishing a new second-tier exchange (that is, exchanges established between 1990 and 2013). The protecting minority investor index ranges from 0 to 100, from lowest to highest economy on this measure. The index was taken from the World Bank's *Doing Business* database for the year 2017.



Source: Bernstein, Shai, Abhishek Dev, and Josh Lerner, "The Creation and Evolution of Entrepreneurial Public Markets," *Journal of Financial Economics*, forthcoming.

Given the importance of second-tier exchanges in global IPO markets, the researchers examine more systematically several key questions about these markets. First, they focus on what are the key triggers that lead countries to establish second-tier exchanges. They find that, within a country, increases in demand for entrepreneurial capital—as proxied for by patenting, IPOs, and stock market valuations—led to an increased introduction of second-tier exchanges.

Second, they examine whether a new second-tier exchange diverts the existing flow of IPOs away from established stock exchange(s) in that country. In other words, does a new second-tier exchange serve a different segment of the market, or is there merely a substitution between the new market and the incumbent first-tier exchange(s)? The researchers find no evidence of a substitution effect following the introduction of a second-tier exchange, either in terms of the flow or the composition of IPOs listed on an existing first-tier exchange(s). The newly introduced exchanges seem to cater to a different segment of firms and investors in the economy.

Next, the researchers explore what are the drivers of the success of second-tier exchanges. They find that shareholder protection strongly predicts a robust new market. Even in countries with high levels of venture capital activity, patenting,

broad availability of private credit, and high stock market valuations (all of which are also associated with more successful new exchanges), they find that shareholder protection remains a key predictor of success.

Lastly, the researchers analyze what could be the mechanisms behind the seeming importance of shareholder protection to the success of these second-tier exchanges. They find that new second-tier exchanges in countries with better shareholder protection mitigate the risk of expropriation and thus, attract investors to invest in riskier, younger, and less-profitable companies that would otherwise be unable to list and raise capital on first-tier exchanges. The average firm listed on a second-tier exchange in a country with high investor protection was 23% younger than the average age of all firms that IPO on second-tier markets. Interestingly, the researchers find that the listing requirements of new second-tier exchanges in countries with high and low shareholder protection were similar. Thus, it seems that, regardless of whether a country has lower listing requirements, countries with better shareholder protections are better able to attract offerings from younger firms.

These findings suggest the importance of institutions in enabling the provision of entrepreneurial capital to young companies. Second-tier markets in countries with weaker investor protection seem less able to attract investors in the kind of high-risk, high-growth firms that the markets are intended to promote. Anticipating these difficulties, fewer second-tier exchanges are created under these circumstances.

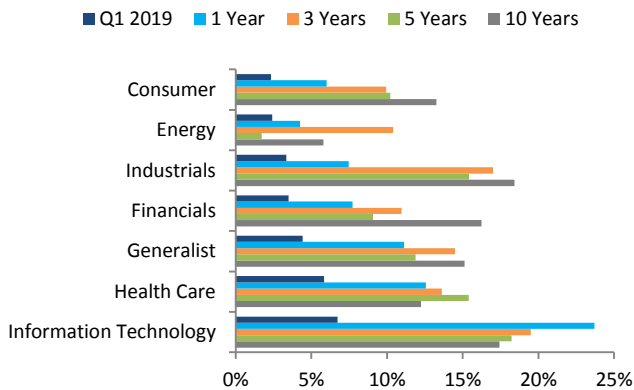
**Josh Lerner** is Director of the Private Capital Research Institute and Jacob H. Schiff Professor of Investment Banking and Head of the Entrepreneurial Management Unit at Harvard Business School. **Leslie Jeng** is Director of Research of the Private Capital Research Institute.

*The Private Capital Research Institute is a not-for-profit 501(c)(3) corporation formed to further the understanding of private capital and its global economic impact through a commitment to the ongoing development of a comprehensive database of private capital fund and transaction-level activity supplied by industry participants. The PCRI, which grew out of a multi-year research initiative with the World Economic Forum, also sponsors policy forums.*

**CURRENT QUARTER PERFORMANCE SUMMARY – CONTINUED FROM PAGE 1**

Across sectors, Information Technology funds led for the fifth straight quarter with a 6.72% quarterly return, up from 1.31% in Q4. These were followed by Health Care funds with a 5.84% quarterly return, up from -2.96% in Q4. Energy funds which experienced the biggest drop in the previous quarter, returned 2.42% in Q1, rebounding from -7.04% in Q4. (Exhibit 5).

**Exhibit 5. Returns of Sector Focused Private Equity Funds**



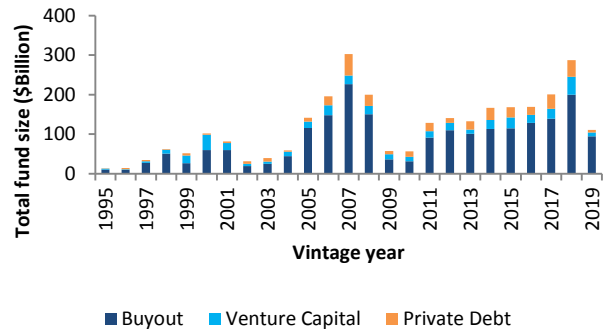
Source: State Street Global Exchange®, as of Q1 2019.

**Fund Raising**

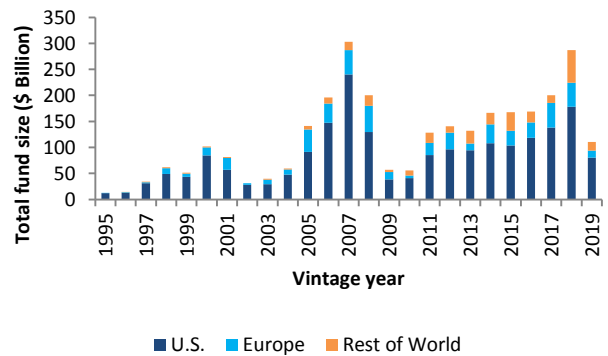
Continuing the momentum of fund raising in 2018, Buyout funds raised more than 90 billion in the first quarter of 2019, nearly half of the funds raised throughout all of last year. However, we saw a little slow down in fund raising activity from the Venture Capital and Debt Related strategies, raising only about \$9 billion and \$6 billion respectively, only 20% and 15% relative to last year (see Exhibit 6 (A)). Across regions, the U.S. is particularly strong with around \$80 billion raised, which is 45% of last year's total. Europe and the Rest of World raised \$13 billion and \$16 billion respectively, counting for 28% and 26% of the totals from last year (see Exhibit 6 (B)).

The average fund size continued to rise. In the first quarter of 2019, the average size of Buyout funds was 5.26 billion compared to the 2.43 billion of the 2018 vintage year; the average size of Venture Capital funds was \$0.72 billion, up from the \$0.65 billion from 2018; and the average size of Private Debt funds was \$3.14 billion, up from \$1.44 billion from 2018. (See Exhibit 7)

**Exhibit 6. Total Fund Size (USD Billion) (A) By Strategy**

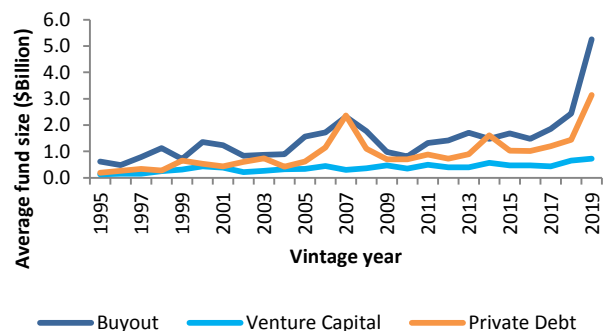


**(B) By Region**



Source: State Street Global Exchange®, as of Q1 2019.

**Exhibit 7. Average Fund Size (USD Billion)**

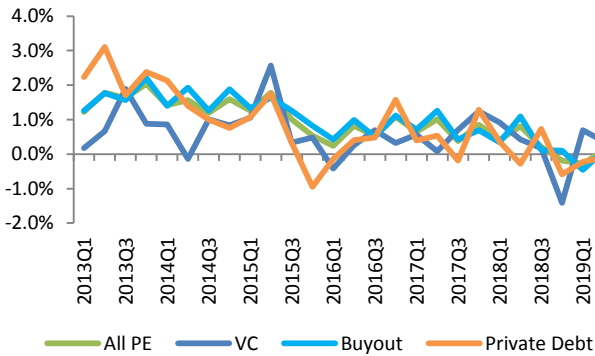


Source: State Street Global Exchange®, as of Q1 2019.

### Cash Flow Activity

Net cash flows are still lingering around zero, driven by the fact that the cash flow distributed to investors is at a historically low point of around 2% quarterly normalized by commitment. Exhibit 8 shows a general trend of diminishing net cash flow since Q1 2013.

**Exhibit 8. Quarterly Net Cash Flow Normalized by Commitment (2013Q1 – 2019Q2)**



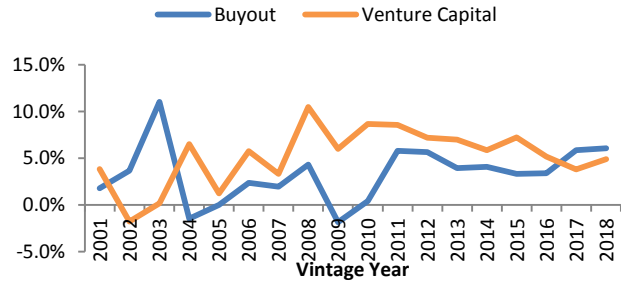
Source: State Street Global Exchange®, as of Q1 2019.

### Valuations

During Q4 2018 and Q1 2019, the public market experienced high volatility. However, on the private side, the swings in quarterly returns were less extreme due to the smoothed nature of PE valuations. In terms of the relative performance and based on public market equivalent measures, the SSGX PE index generated roughly 5% excess return over S&P500 across these two quarters.

Venture Capital funds have outperformed Buyout funds for five quarters in a row. This outperformance seems widely spread across Venture Capital funds in all investment stages. As shown in Exhibit 9, Venture Capital funds outperformed Buyout funds across all vintage years between 2004 and 2016 in the first quarter of 2019. In the funds that focus on Information Technology and Health Care, the two best performing sectors lately, Venture Capital also outperformed Buyout.

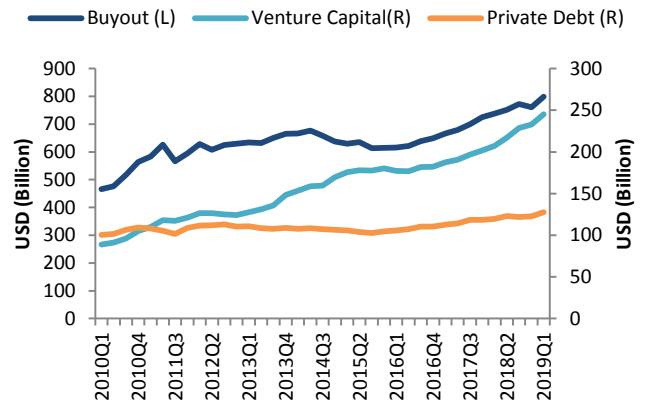
**Exhibit 9. Q1 2019 Quarterly IRR by Vintage Year and Strategy**



Source: State Street Global Exchange®, as of Q1 2019.

The remaining value (NAV) of Venture Capital funds has doubled over the past decade to \$245 billion. Buyout funds hold the most PE remaining values, which also increased to a historical high of \$800 billion. The remaining value of Private Debt held stable at \$128 billion as of Q1 of 2019. ( See Exhibit 10)

**Exhibit 10. Net Asset Value by Strategy ( 2010Q1 – 2019Q1)**



Source: State Street Global Exchange®, as of Q1 2019.

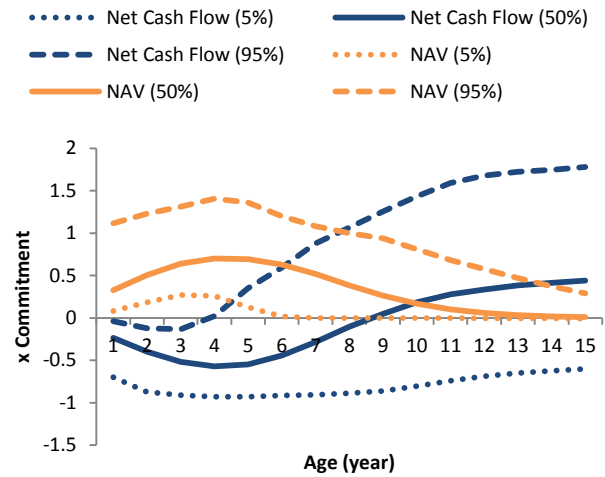
**DISCUSSION – VALUE-AT-RISK AND CASHFLOW-AT-RISK FOR PRIVATE EQUITY INVESTMENT**

As private equity has become a popular asset class for institutional investors and wealthy individuals, there is an increasing demand for understanding and quantifying the risks related to these assets. Many academic researchers and practitioners have studied the risk management framework of private equity. One work is Buchner (2017)<sup>2</sup> where the author defines three risk measures -- value-at-risk (VaR), Liquidity-adjusted VaR (LVaR) and cashflow-at-risk (CFaR). He builds a stochastic model and calculates the risk measures using Monte Carlo simulations.

Given our information set of PE cash flows, we calculate VaR and CFaR using the GXPEI data. Instead of using the stochastic model described in Buchner (2017), we use our Cash Flow Pacing Model to simulate cash flow and net asset value of the funds. A pool of 1625 private equity funds with sufficient cash flow history are used to calibrate the model.

Let  $C_t$  be the cash holding of a private equity investor at time  $t$ . Then  $C_t$  is equal to the investor's commitment  $C_0$  plus any cumulative distribution back to investors  $R_t$  and minus any cumulative capital drawdown  $D_t$ , i.e.  $C_t = C_0 + R_t - D_t$ . Let  $V_t$  be the net asset value of the private equity investment, then  $P_t$  -- the investor's total position at time  $t$  -- is the sum of net asset value and the cash holding, i.e.  $P_t = V_t + C_t$ . Exhibit 11 illustrates the trajectory of the cumulative net cash flow and the net asset value normalized by commitment through a fund's life time (assumed to be 15 years) simulated from the Cash Flow Pacing Model. The cumulative net cash flow starts from a value close to 0 and follows a J-shaped curve. The net asset value of a private equity fund gradually builds up in the first 5 years as the committed capital is deployed, and starts to decrease after 5 years as investments are liquidated and the harvested values are distributed back to investors.

**Exhibit 11. 5%, 50% and 95% Percentile of Modeled Cash Holding and Total Position.**



Source: State Street Global Exchange®, as of Q1 2019.

Value at Risk measures are calculated using the simulated cash flow and net asset values. VaR measures market risk. It is defined as  $\alpha$ , the probability of the loss of a portfolio exceeding VaR over a given time horizon  $h$ . The mathematical formula for VaR is  $\Pr(P_t - P_{t+h} \leq VaR_{t,h}(\alpha)) = 1 - \alpha$ , where  $\alpha$  is between 0 and 1. Another risk measure is Cashflow-at-risk (CFaR). It measures the uncertainty in cash flow positions. Private equity investors are obligated to make payments at capital calls, but the timing of the cash flows are unpredictable. Thus CFaR helps investors decide the cash reserves they need to hold to fulfill their obligations. Here the CFaR is defined as  $\alpha$ , the probability of a change (loss) in the investor's cash position exceeding CFaR over a given time horizon  $h$ . The mathematical formula is  $\Pr(C_t - C_{t+h} \leq CFaR_{t,h}(\alpha)) = 1 - \alpha$ , where  $\alpha$  is typically chosen between 1% to 10%.

Exhibit 12 illustrates the risk measures over a fund life cycle. (A) shows the VaR of different horizons starting from fund inception. The VaR rises as the horizon increases. The 5% VaR over typical PE fund lifespan (i.e. 15 years) is about 40% of the commitment value. (B) illustrates the VaR over the fund life at a fixed horizon of one year. The fixed-horizon VaR peaked in the middle of the life cycle, with a 7% maximum annual loss at the 5% confidence level. (C) illustrates CFaR from fund initiation. CFaR increases quickly at the beginning because fund starts to draw down commitment at this stage.

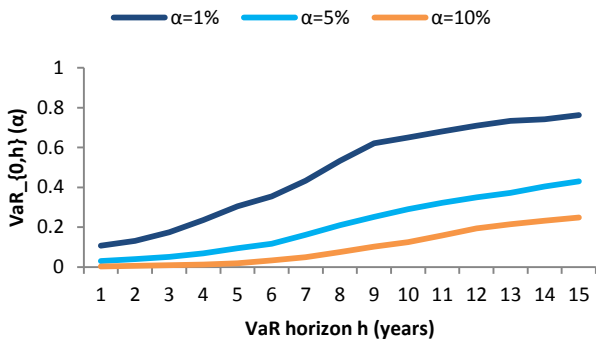
<sup>2</sup> Axel Buchner, 2017, "Risk Management for Private Equity Funds", *Journal of Risk*, vol 19.

As the fund matures and is gradually harvesting, cash is distributed and therefore there is less risk in the cash holdings. At the 5% confidence level, the maximum loss is around 90% of the initial commitment which means the investor does not need to reserve all their commitment in cash. However, at the high confidence level ( $\alpha = 1\%$ ) it is necessary for the investor to reserve almost their entire commitment in cash in case of capital calls. (D) illustrates the annual CFaR. The risk in cash holdings is high at the beginning then gradually decreases as all the commitment has been drawn and fund starts to liquidate investments.

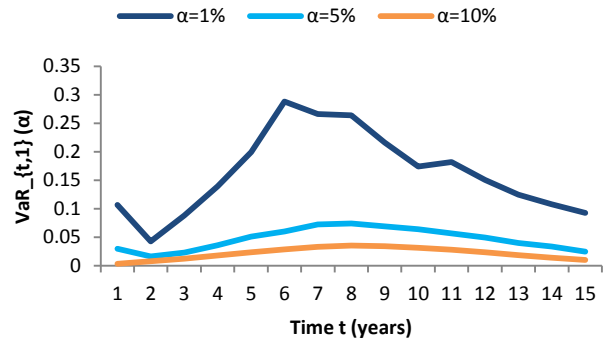
To summarize, we have shown the value-at-risk and cashflow-at-risk measures over a fund life cycle using the cash flow pacing model calibrated with historical data of private equity funds. This model can be further tailored to specific investment strategies in order to provide more precise risk measures.

**Exhibit 12. Risk Measures Over The Fund Life Cycle.**

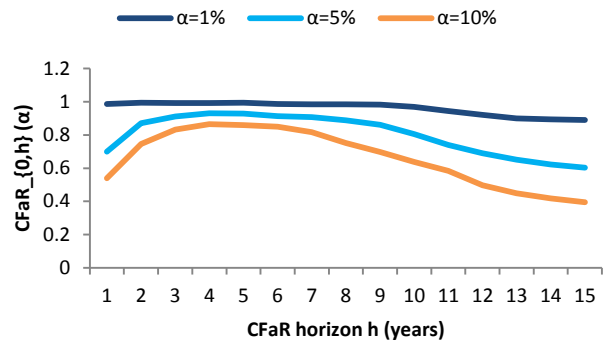
(A)



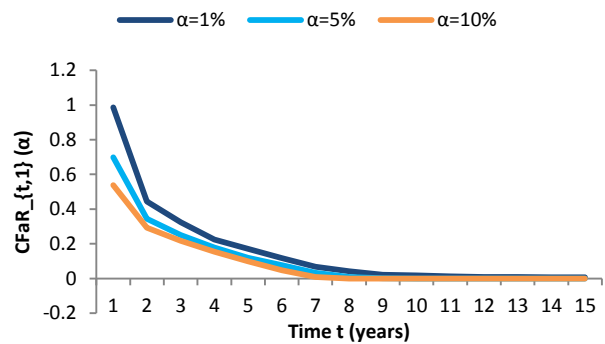
(B)



(C)



(D)



Source: State Street Global Exchange®, as of Q1 2019.

## ABOUT THE GX PRIVATE EQUITY INDEX

Participants in private capital markets need a reliable source of information for performance and analytics. Given the non-public nature of the private equity industry, collecting comprehensive and unbiased data for investment analysis can be difficult. The GX Private Equity Index (“GXPEI”) helps address the critical need for accurate and representative insight into private equity performance.

Derived from actual cash flow data of our Limited Partner clients who make commitments to private equity funds, GXPEI is based on one of the most detailed and accurate private equity data sets in the industry today. These cash flows, received as part of our custodial and administrative service offerings, are aggregated to produce quarterly Index results. Because the GXPEI does not depend on voluntary reporting of information, it is less exposed to biases common among other industry indexes. The end result is an index that reflects reliable and consistent client data, and a product that provides analytical insight into an otherwise opaque asset class.

- Currently comprises more than 3,000 funds representing around \$3 trillion in capital commitments as of Q1 2019.
- Global daily cash-flow data back to 1980.
- The Index has generated quarterly results since Q3 2004.
- Published approximately 100 days after quarter-end.

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