Global Markets

STATE STREET.

Private Equity Insights

TWENTY-FIFTH EDITION | Q1 2022

CURRENT QUARTER PERFORMANCE SUMMARY

The State Street® Private Equity Index (SSPEI) posted an overall return of -0.64 percent in Q1 2022, a sharp decrease from the 5.74 percent in Q4 2021. Private Debt funds led the group for the first time since 2014 with 1.21 percent return, followed by 0.53 percent return from Buyout funds and -4.40 percent return from Venture Capital funds (Exhibit 1).

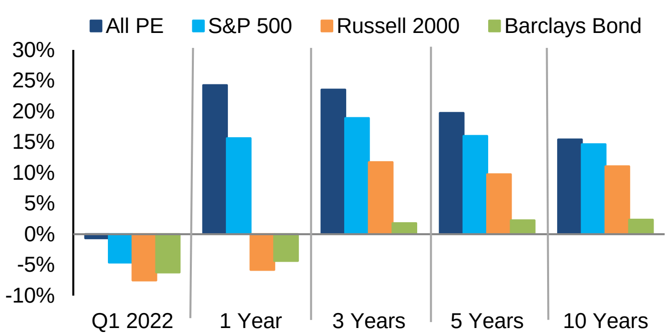
Exhibit 1. Private Equity Performance by Strategy

	All PE	Buyout	VC	Private Debt
2022 Q1	-0.64%	0.53%	-4.40%	1.21%
2021 Q4	5.74%	6.05%	5.86%	3.13%
2021	37.22%	36.59%	45.71%	21.06%

Source: State Street®, as of Q1 2022.

As shown in Exhibit 2, SSPEI outperformed the US bond market (proxied by Bloomberg Barclays US Aggregated Bond Index), small-cap stocks (proxied by Russell 2000) and the US public equity market (proxied by S&P 500) at all horizons. While SSPEI experienced a marginally negative return in Q1 2022, the other three public indexes had drastically negative quarterly returns, ranging from -4.60 percent to -7.53 percent.

Exhibit 2. Investment Horizon Returns



Source: State Street®, DataStream, Bloomberg Barclays US Aggregate Bond Index (total returns as of Q1 2022).

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RISING INTEREST RATES AND PRIVATE EQUITY RETURNS

Insights from Harvard University and the Private Capital Research Institute

PCRI The Private Capital Research Institute

By Leslie Jeng, Josh Lerner, and TzuHwan Seet

Introduction

In an effort to reign in soaring inflation, the Federal Reserve has turned hawkish and is aggressively raising interest rates after nearly two decades of rates hovering close to zero. The Fed has already twice raised rates by 75 basis points in 2022, and it is likely to do so again after its next meeting.

While the impacts of rising interest rates on the overall economy are often discussed, the impact on private equity has been given relatively less attention. This essay surveys existing research on how two of private equity's most common strategies – buyouts and venture capital – have performed through rising interest rate environments in the past, and what these findings indicate for the industry today.

Buyouts

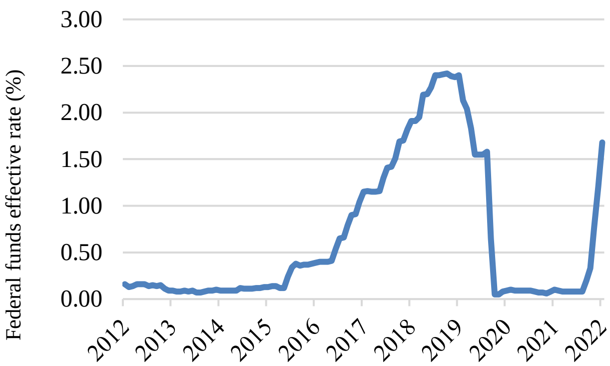
A buyout transaction refers to a private equity deal wherein a private equity fund seeks to fully acquire a company (often mature, with a proven product or service) typically using significant levels of borrowed money (leverage) to finance the deal. As far as these transactions are concerned, one would posit that the potential effects of changing interest rates on returns associated with these deals are likely dramatic due to the elevated levels of debt involved.

Earlier work by Phalippou and Zollo (2005) finds that private equity funds that invested during periods of high interest rates

Continued on page 2.

and credit spreads underperformed.[1] Their finding is consistent with the theory that private equity fund performance is pro-cyclical and positively correlates with the returns of the public stock-markets.

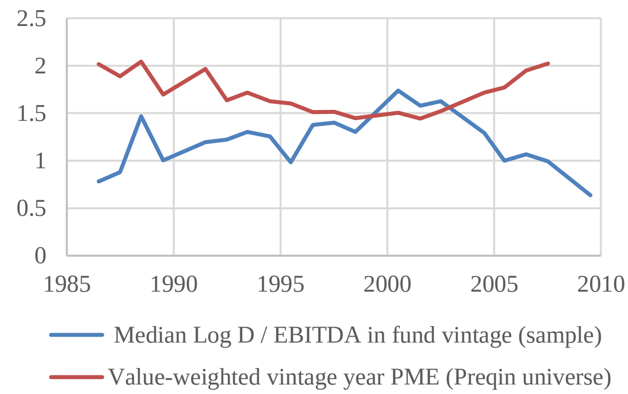
Exhibit 3. Interest Rates Are on the Rise, Again[2]



However, more recent studies present the opposite result. Axelson et al. (2013) investigate this question and explore the impact that credit conditions have on the financial structure of buyout deals and their subsequent performance. The authors find that when debt financing is easily available (i.e., when interest rates are low), the amount of leverage used in buyout deals increases, and the increased availability of borrowed capital leads to higher deal valuations – hence the paper's title, "Borrow Cheap, Buy High?"[3]. Perhaps unsurprisingly, this inflated deal valuation environment leads to lower subsequent buyout returns.

Exhibit 3 plots the average value-weighted vintage year public-market-equivalent (PME)[4] – a measure of private equity returns compared to public market indices – against the median deal-level leverage used for funds of a given vintage year in the authors' sample.[5] From the chart, it seems that leverage used is inversely related to returns; indeed, the authors' regression results show that a unit increase in leverage corresponds to a decrease of 0.74 in PME at the 1% level of statistical significance.[6] Further, Axelson et al. estimate that an increase in the leverage used in a fund from the bottom quartile to the top quartile decreases buyout fund PMEs by approximately 10 percentage points over the life of the fund, controlling for other factors.[7]

Exhibit 4. Fund Performance by Vintage vs. Leverage[8]



Nevertheless, an important question remains: when access to leverage for buyout firms becomes constrained due to rising interest rates, how do buyout firms respond? A related work by Steven J. Davis and his co-authors shows that in costly credit environments (i.e., periods with higher interest rates), buyout firms place greater emphasis on generating returns through making productivity gains and operational improvements in portfolio companies, and less on financial engineering.[9] Under conditions like these, buyout firms turning from financial engineering to creating long-term value help position portfolio companies for success, which in turn may contribute to strong returns for funds operating in tight credit markets found by Axelson and co-authors.

Applying the findings above to the current state of the economy, a drop in buyout transaction volume and deal valuations appears likely, as credit gets more costly with rising rates. But this presents an opportunity for buyout firms to create value through operational interventions; and if history is

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[1] Ludovic Phalippou and Maurizio Zollo, "What Drives Private Equity Fund Performance?," Unpublished working paper, 2005, https://www.empirical.net/wp-content/uploads/2014/12/Phalippou-What-Drives-Private-Equity-Fund-Performance.pdf, p. 12.

[2] Board of Governors of the Federal Reserve System (US), Federal Funds Effective Rate [FEDFUNDS], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/FEDFUNDS, accessed August 1, 2022.

[3] Ulf Axelson, Tim Jenkinson, Per Stromberg, and Michael Weisbach, "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts," *Journal of Finance*, 68 (2013): 2223-2267.

[4] First developed by Austin Long and Craig Nickels, this methodology compares the proceeds generated by investing in the private equity fund with those generated by investing the same amount in a chosen public market index. A value greater than 1 indicates that the private investment generate higher returns than public investment, vice versa. The index used in this study is the CRSP NYSE/Amex/NASDAQ Value-Weighted Market Index.

[5] Deal-level leverage measured by the log of debt to earnings before interest, tax, depreciation, amortization.

[6] Axelson *et al., op. cit.*

[7] Axelson *et al., op. cit.*

[8] Axelson *et al., op. cit.*

[9] Steven J. Davis, John Haltiwanger, Kyle Handley, Ben Lipsius, Josh Lerner, and Javier Miranda, "The (Heterogenous) Economic Effects of Private Equity Buyouts,", University of Chicago, *Becker Friedman Institute for Economics Working Paper No. 2019-122*, July 2021, pp. 23.

any guide, this could lead to strong returns for firms able to successfully make these changes.

Unlike buyouts, venture capital deals generally do not rely on leverage. Without debt in the capital structure, the impact of rising interest rates on venture capital performance is more muted. However, venture fundraising and entrepreneurial access to these funds may be affected. On the one hand, rising interest rates can increase the returns of other traditional asset classes such as bonds. Some limited partners might divert their investments away from venture capital into less risky alternative investment classes, particularly when market conditions are volatile.[10] Investors may also be more skeptical about high-risk start-up during periods of macroeconomic uncertainty.

On the other hand, higher interest rates have been shown to increase the demand for venture capital. In a study that models the determinants of venture capital supply and demand, Romain and Pottelsberghe (2004) provide evidence that rising short-term and long-term interest rates have a significant positive effect on demand: when the cost of debt capital increases, entrepreneurs are more likely to switch from the banking sector to venture capital.[11]

In summary, rising interest rates influence the performance of buyout and venture capital funds differently, owing to the capital structure of their respective deals. Academic evidence suggests buyout firms certainly should be more concerned than venture capitalists, though both types of firms face challenges. Nevertheless, for the fund managers who can weather the current market volatility through nut-and-bolt operational improvements and back well-disciplined companies, lower valuations and promising returns may await.

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.

TzuHwan Seet is a Data Analyst at Bella Research Group.

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.

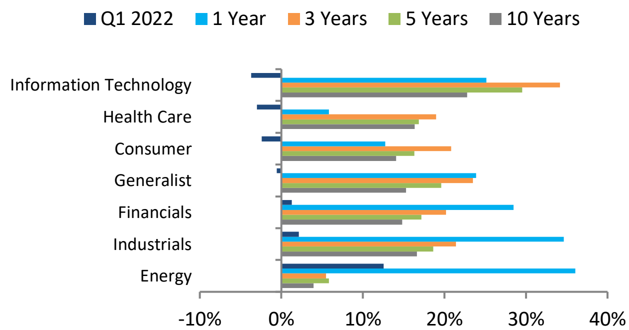
[10] Bruno Van Pottelsberghe de la Potterie and Astrid Romain, "The Determinants of Venture Capital: Additional Evidence," *Bundesbank Series 1 Discussion Paper No. 2004*, 2004, pp.15.

[11] *Ibid*., pp. 19.

CURRENT QUARTER PERFORMANCE SUMMARY – CONTINUED FROM PAGE 1

Among sectors, Energy funds outperformed all other sectors with a strong quarterly return of 12.55%, followed by Industrials funds with a quarterly return of 2.14% and Financials funds with a quarterly return of 1.27%. While the remaining sectors swung back to losses after recovering from the COVID crisis in Q1 2020, Information Technology funds lagged behind other sectors for the first time since 2012 with -3.71% in Q1 2022 (see Exhibit 5).

Exhibit 5. Returns of Sector Focused Private Equity Funds



Source: State Street®, as of Q1 2022.

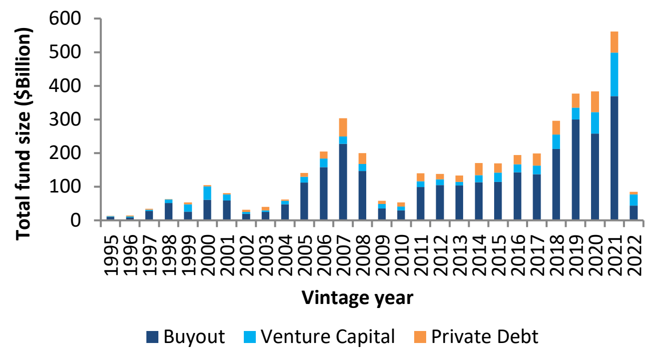
Fund Raising and Dry Powder

The total capital raised in Q1 2022 was $85 billion, signaling a slowdown in fund raising following the record breaking year of 2021. As in prior years, the distribution of capital across different strategies was not uniform. While Buyout and Venture Capital funds raised $44 billion and $33 billion in Q1 2022 respectively, Private Debt funds only raised $8 billion. This capital allocation per quarter is consistent with the fund raising performance of Venture Capital funds in the prior year, while it implies a much lower trajectory for Buyout and Private Debt funds (see Exhibit 6(A)). Across regions, the US and the Rest of World funds collected $64 billion and $17 billion respectively, which were at a slower pace than the previous year. Europe funds only received $4 billion in the first quarter of 2022 (see Exhibit6(B)).

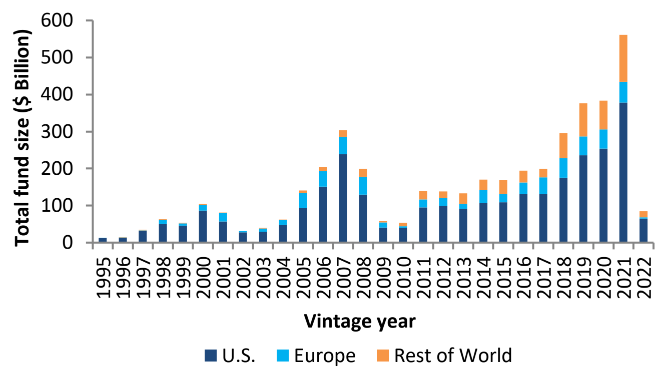
The average fund size continued to rise for Buyout and Venture Capital funds. As of Q1 2022, both Buyout and Venture Capital funds posted their highest records of $3.98 billion and $1.10 billion respectively. Average fund size of Private Debt funds was $1.57 billion, lower than $1.84 billion in 2021 and 1.71 billion in 2020 (see Exhibit 7).

Exhibit 6. Total Fund Size (USD Billion)

(A) By Strategy

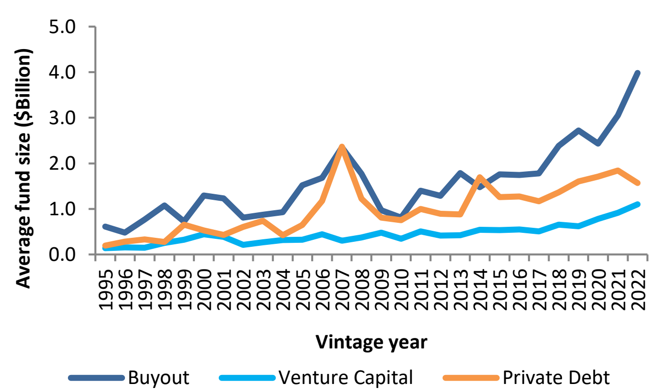


(B) by Region



Source: State Street®, as of Q1 2022.

Exhibit 7. Average Fund Size (USD Billion)

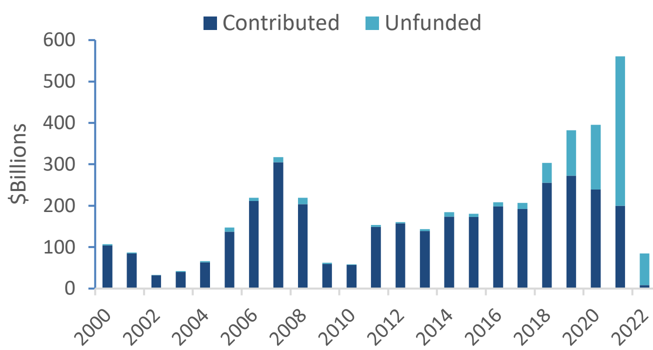


Source: State Street®, as of Q1 2022.

Dry powder is the part of the fund's committed capital that has not yet been called by the fund manager. It represents the amount of capital that can be used for future investment opportunities. As of the first quarter of 2022, SSPEI posted a dry powder of $838 billion, decreased from $850 billion in Q4 of 2021. Exhibit 8(A) shows that majority of the committed capital from earlier vintage years, except for 2021, has been called, while funds from the most recent five vintage years contributed to the most of the current unfunded dry powder. Although the dollar amount of dry powder decreased in Q1 2022, the quarterly dry powder normalized by the average contribution of the past 12 months, which measures how long the current dry powder inventory can last at the recent average capital call rate without new fund raising activities, marginally increased for Venture Capital and Private Debt strategies in Q1 2022. On the other hand, the dry powder inventory of Buyout strategy posted an all-time low of 18 months (see Exhibit 8(B)). An increase in dry powder inventory is likely if the trend of slowing down fund raising and capital calls continues (see Exhibit 6A and 9A).

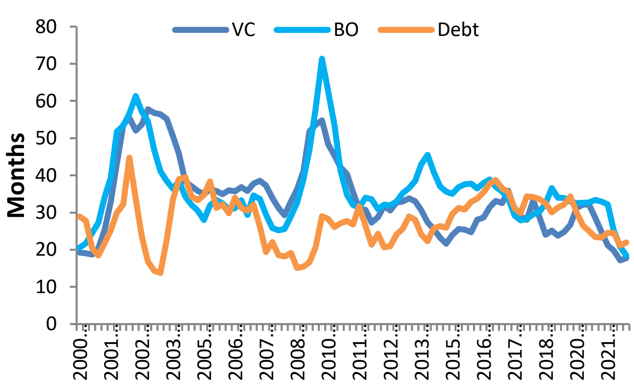
Exhibit 8. Dry Powder

(A) Dry Powder by Vintage Years (2000 – 2022)



Source: State Street ®, as of Q1 2022.

(B) Quarterly Dry Powder Normalized by Average Contribution



Source: State Street ®, as of Q1 2022.

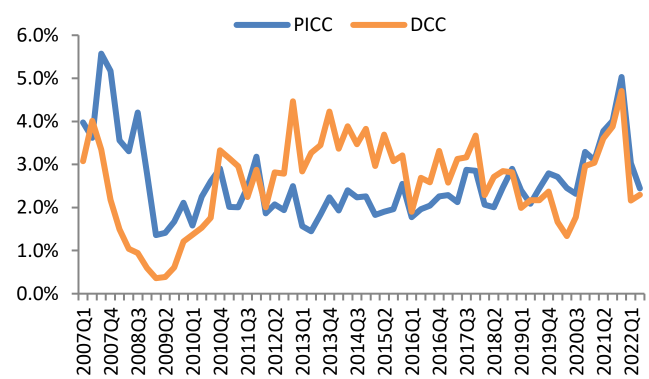
Cash Flow Activity

Exhibit 9(A) indicates that the downward trend of quarterly Paid-in Capital over Committed Capital (PICC), which was initiated in Q1 2021, continued in Q2 2022. On the other hand, the quarterly Distribution over Committed Capital (DCC) marginally rebounded after its sharp fall of 2.5 percentage points in the previous quarter. These opposing dynamics implied a negative net cash flow of -0.15% for all PE in Q2 2022, a rate which is much smaller in absolute magnitude than its counterpart of -0.87% in the previous quarter.

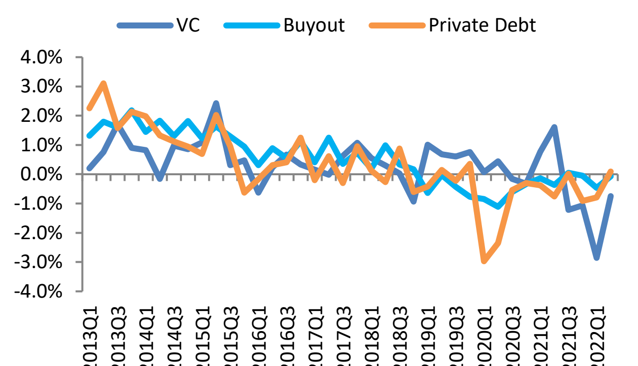
Exhibit 9(B) provides a closer look of the net cash flow among strategies. The net cashflow of Private Debt funds turned marginally positive at 0.1%, for the first time since Q4 2019, while Buyout funds stayed marginally negative at -0.1%. Although the net cashflow of Venture Capital funds was still negative, it was much smaller in absolute magnitude at -0.7% due to lower capital contribution per commitment.

Exhibit 9. Quarterly Cash Flow Ratios Normalized by Commitment

(A) Contribution and Distribution for All PE



(B) Net Cash Flow By Strategy



Source: State Street ®, as of Q1 2022.

The significant reduction of cash flow activities in the first two quarters of 2022 deserves a closer look, as seasonal patterns have been observed in the historical cash flows. How much of this reduction can be attributed to the seasonality and how much came from true reduction in activity?

We apply an additive model to divide raw monthly cash flow activity into three components: the sum of a trend component, a monthly seasonality component, and a residual component. And seasonality-adjusted cash flow activity is defined as raw cash flow activity subtract by seasonality component. The seasonality-adjusted cash flow activities will reflect underlining economic drivers more accurately.

Exhibit 10 shows raw cash flow activity, seasonality component, and seasonality-adjusted cash flow activity for different strategies (Buyout, Venture Capital, Private Debt) and measures (DCC, PICC). The slowdown of the cash flow activities in 2022 remains significant after adjustment of cash flow seasonality (see Exhibit 10 gray lines). To measure the contribution of seasonality component to the total variance of raw cash flow activity, we define the variance contribution ratio of the i-th component as:

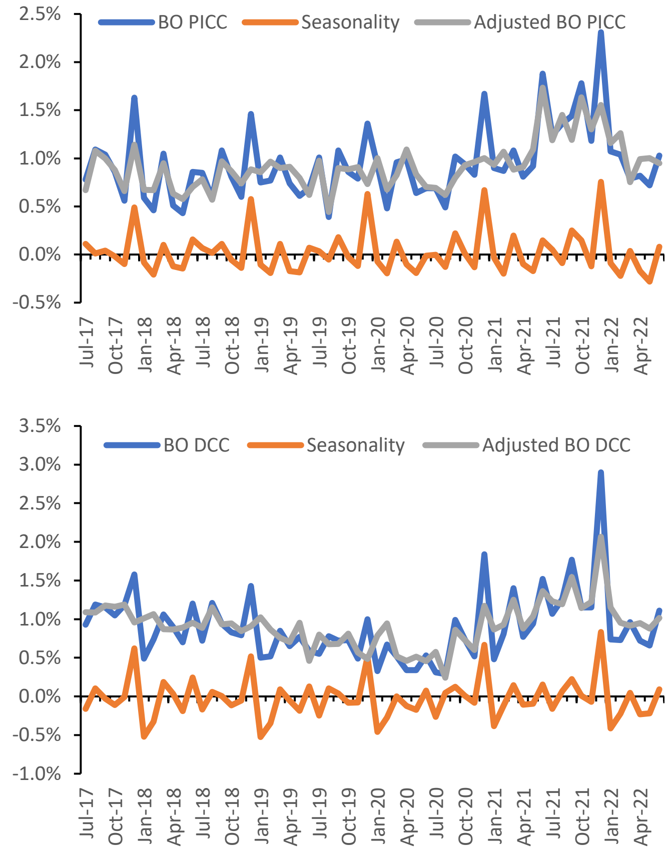
$$Variance\_Contribution_i = x_i \frac{(\Sigma x)_i}{x'\Sigma x}$$

Here, x_i is the 3-d unit vector with the i-th element equal to 1 and all else 0. Σ is the covariance matrix of trend, seasonality and residual. By definition, sum of variance contribution of three components is 1. The Exhibit 11 below shows the variance contribution of seasonality as of Q2 2022.

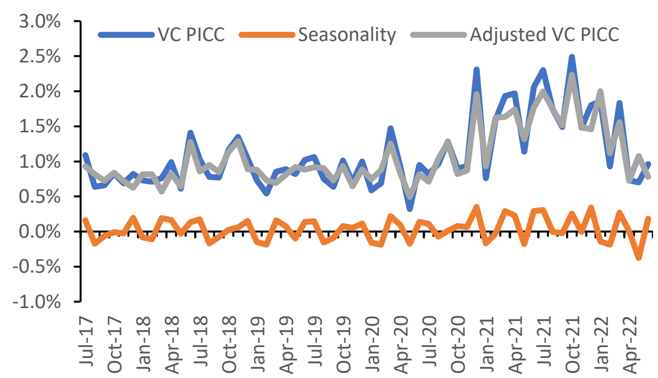
Additional insights can be informed from our results. Firstly, quarter-end months (i.e. March, June, September) and year-end month (i.e. December) tend to have the strongest cash flow activities than other months, probably driven by the quarterly/annual reporting cycle of private equity funds. Moreover, seasonality significance varies among different strategies: Buyout shows the strongest seasonality with around 45% of variance in monthly cash flows attributable to seasonality; while only 20-25% of variance in Venture Capital cash flows are attributable to their seasonality (see Exhibit 11).

Exhibit 10. Monthly Cash Flow Seasonality Decomposition (2017July – 2022June)

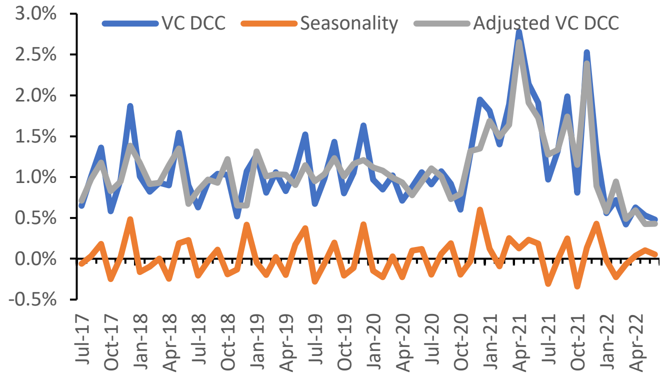
(A) Seasonality Decomposition of Buyout funds (PICC and DCC)



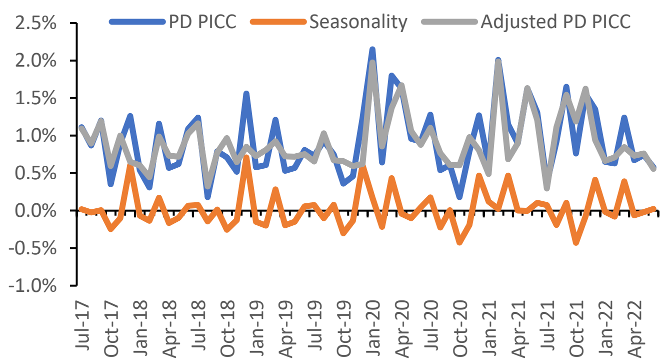
(B) Seasonality Decomposition of Venture Capital funds (PICC and DCC)

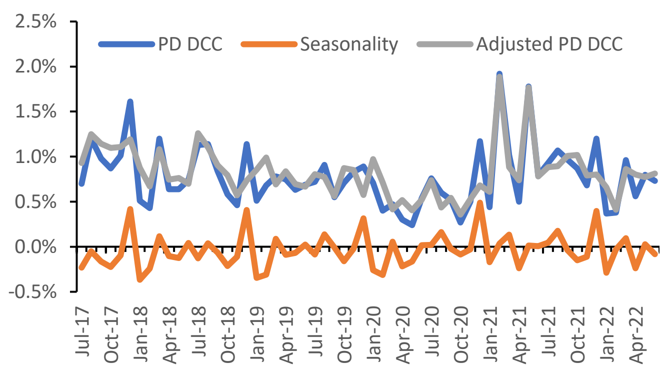


Source: State Street ®, as of Q2 2022.



(C) Seasonality Decomposition of Private Debt funds (PICC and DCC)





Source: State Street ®, as of Q2 2022.

Exhibit 11. Variance Contribution of Seasonality in Monthly Cash Flow

	Buyout	VC	Private Debt
PICC	44.03%	20.40%	32.41%
DCC	46.41%	25.77%	30.26%

Source: State Street ®, as of Q2 2022.

Valuations

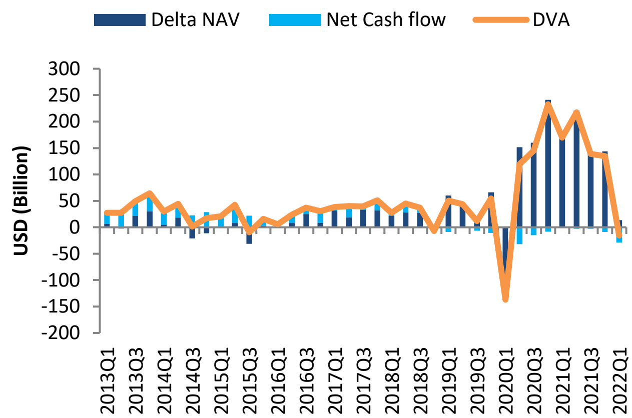
The Dollar Value Added (DVA) is the sum of NAV changes and net cash flows. It measures the realized and unrealized gain and loss in dollar amounts.

$$DVA = EndingNAV - BeginningNAV + Distribution - Contribution$$

In Q1 2022, the quarterly DVA of overall PE dropped below zero for the first time in two years, decreasing from $135 billion in the previous quarter to -$16 billion. While the change in market value remained positive, a larger decrease in the net cash flow is responsible for the negative DVA in Q1 of 2022 (see Exhibit 12A)). As shown in Exhibit 12(B), this negative overall DVA value is contributed by Venture Capital funds. Besides a -$14 billion net cash flow in Q1, Venture Capital funds experienced -$13 billion change in NAV while the NAV of Buyout and Private Debt funds increased in Q1 2022.

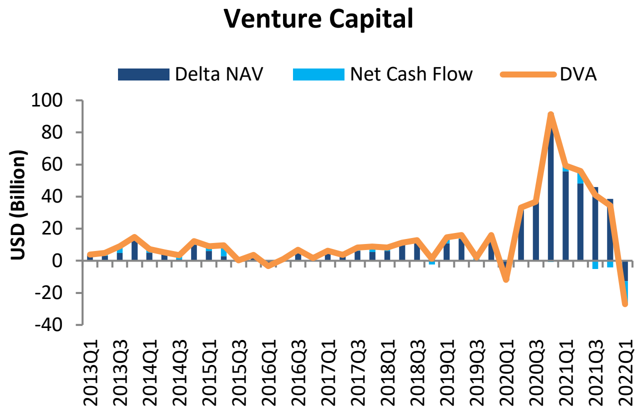
Exhibit 12. Dollar Value Added

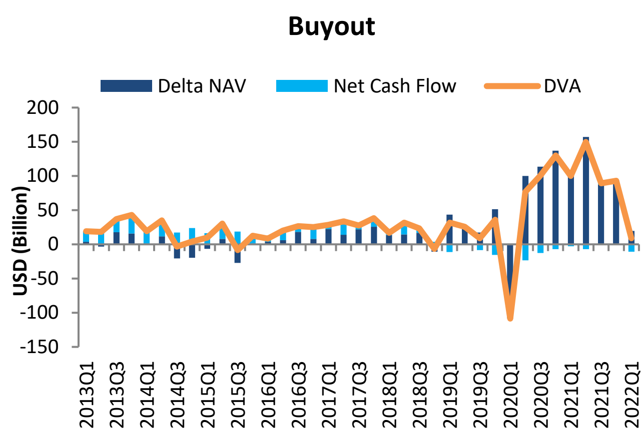
(A) For All PE

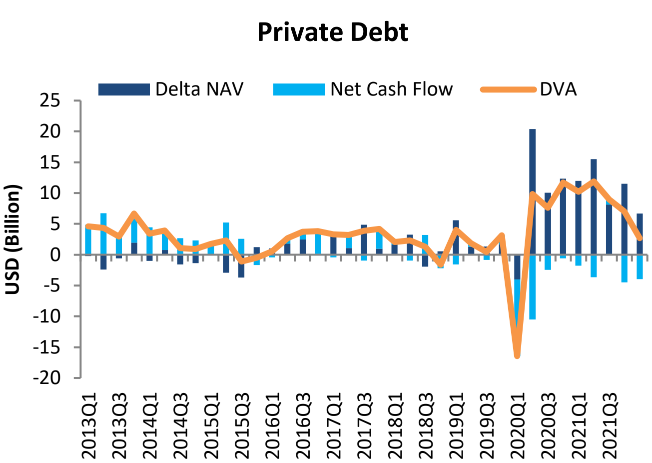


Source: State Street ®, as of Q1 2022.

(B) For Venture Capital, Buyout and Private Debt







Source: State Street ®, as of Q1 2022.

NEXT QUARTER PERFORMANCE FORECAST

Nowcasting

Inspired by the concept of Nowcasting, SSPEI research team developed a model, aspiring to estimate the concurrent performance of private equity market, of which the reporting is otherwise delayed at least by one quarter. We hereby only share the model predictions for Q2 2022 without going into theoretical background. For model details, please refer to State Street Private Equity Insights Q3 2021 publication [12]. Nowcasting results are out-of-sample predictions based on the regression coefficients from the past 5 year rolling window and the observed public market returns and private market cash flows.

For Q1 2022, we find relatively large divergences between realized PE returns and nowcasting model predicted returns, as the model tracking error increases compared to last quarter. The realized quarterly IRRs of All PE, Buyout, Venture Capital, and Private Debt are -0.64%, 0.53%, -4.40% and 1.21%, while the corresponding nowcasted returns for Q1 are 12.33%, 13.76%, -0.17%, and 7.82%. All realized returns are lower than the nowcasting model predicted returns. In Q1 2022, the commodity prices skyrocketed as a consequence of high inflation due to Covid, and oil and gas supply constraints due to geopolitical tension. The high commodity prices then overshadowed other factors with negative performances in the nowcasting model and spiked up the Q1 2022 model predictions of all strategies except for Venture Capital, of which commodity is not an input variable by design. The uncertain economy shocks like these impose challenges to our nowcasting model.

Looking forward, our nowcasting model expects the Q2 2022 returns of all strategies continue to decline further, with predicted quarterly IRRs as -4.79% for All PE, -5.64% for Buyout, -13.56% for Venture Capital, and -0.24% for Private Debt. Nowcasted returns of all strategies enter the negative zone. Among them, Venture Capital, of which NASDAQ composite is the only input to the nowcasting model, has the lowest predicted return due to two consecutive quarters of strongly negative stock market returns. NASDAQ composite decreased 22.44% in Q2 2022 and 9.10% in Q1 2022. For other markets, commodity lost momentum and moved lower at the end of Q2 2022 as the dollar index rose, a significant factor

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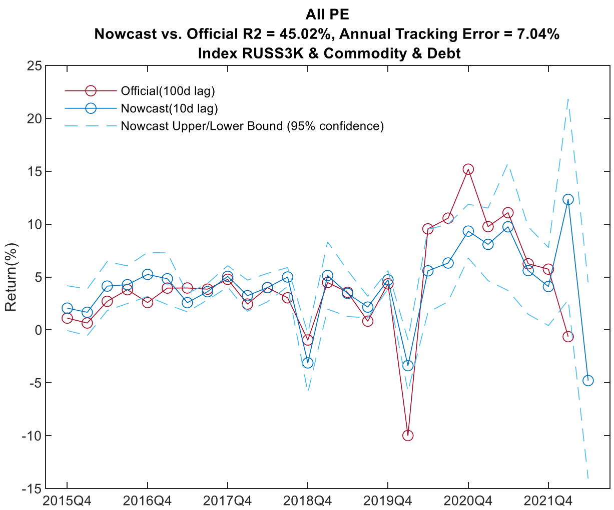
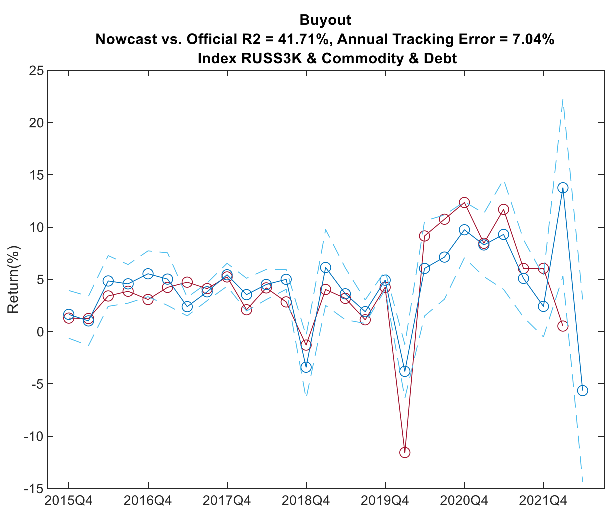
[12] State Street Private Equity Insights Q3 2021
https://globalmarkets.statestreet.com/portal/peindex/pe-insights/

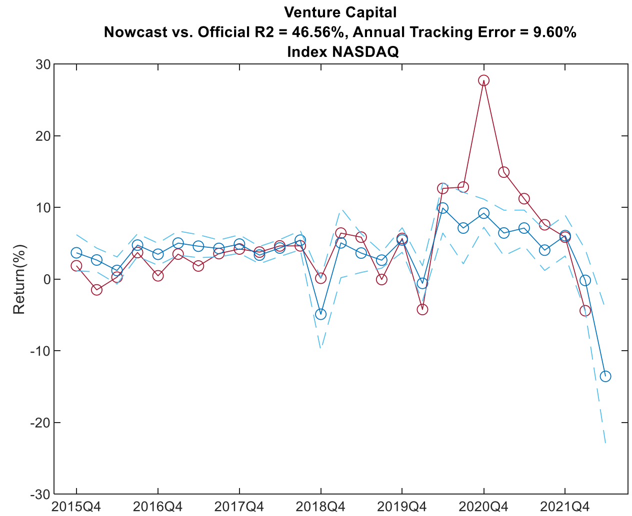
that inversely affects commodity prices[13]; Dow Jones-UBS Commodity Index drops 5.66% in Q2 2022; Bloomberg U.S. Aggregate Bond Index drops 4.92% in Q2 2022 given the high inflation and increasing interest rates. These factors all lead to negative predicted returns for PE strategies, among which Private Debt is the least negative one because of the relative better performance in the bond market.

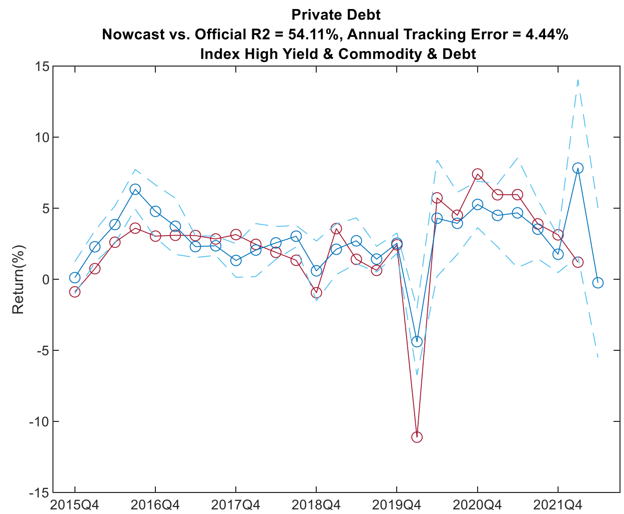
Exhibit 13. Actual vs. Out-of-sample Nowcast IRRs





Source: State Street ®, as of Q1 2022.





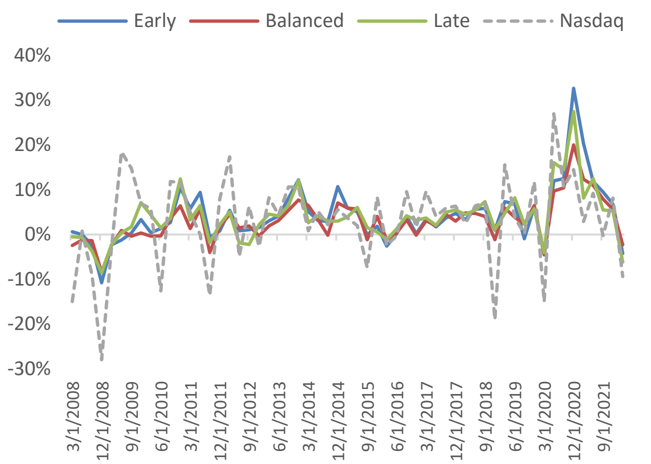
Source: State Street ®, as of Q1 2022.

[13] Strong Dollar Fuels Pullback in Commodity Markets, JUL 19, 2022, WSJ
https://www.wsj.com/articles/strong-dollar-fuels-pullback-in-commodity-markets-11658223085

DISCUSSION – VENTURE CAPITAL AT THE TURNING POINT

In Q1 2022, after almost two years of tremendous expansion, Venture Capital funds are standing at a turning point: their valuations dropped (Exhibit 12B), investment activities slowed (Exhibit 10B), and net cash flows became negative (Exhibit 9B). In this section, we are going to take a closer look at Venture Capital's performance at its sub-strategy level.

Exhibit 14. Venture Capital Sub-strategy Returns (Quarterly Rolling IRRs)



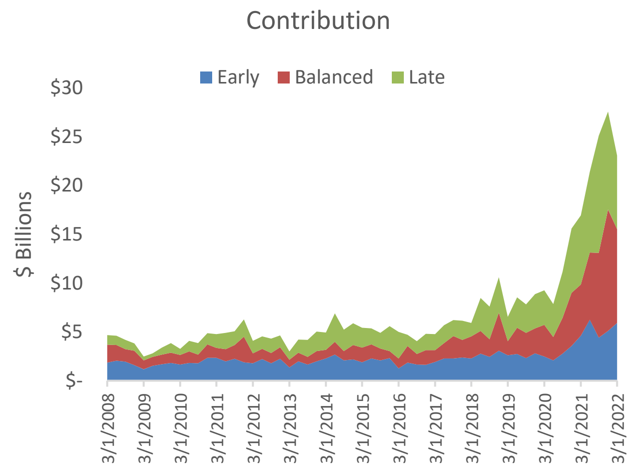
Quarter End	Early	Balanced	Late
3/31/2021	20.3%	12.3%	8.1%
6/30/2021	11.8%	11.0%	12.5%
9/30/2021	9.5%	7.9%	5.5%
12/31/2021	6.8%	5.6%	5.3%
3/31/2022	-4.3%	-2.3%	-6.2%

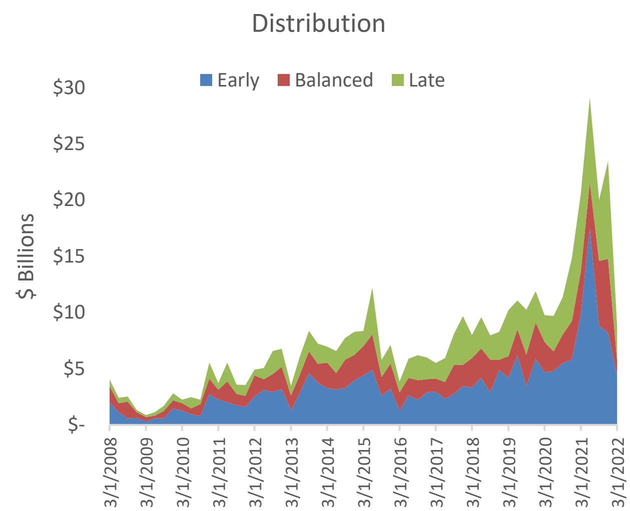
Source: State Street ®, as of Q1 2022.

The quarterly returns of early stage, balanced stage and late stage venture capital funds all turned negative in 2022 Q1 (see Exhibit 14). Late stage VC funds even reached its lowest performance level (i.e. -6.2%) since the Great Financial Crisis in 2008.

The cash flow patterns in Exhibit 15 reveal some interesting differences among VC sub-strategies in recent quarters. The significant increase of contributions in the last two years were largely made by the balanced stage and late stage VC funds, while the peak of distribution seen around Q2 2021 was mostly driven by early stage VC funds. As valuations continue to feel pressured from the rising interest rates, late stage and balanced stage funds who increased their bets at the recent valuation peak could suffer more in the coming quarters.

Exhibit 15. Quarterly Cash Flows of Venture Capital Sub-strategies

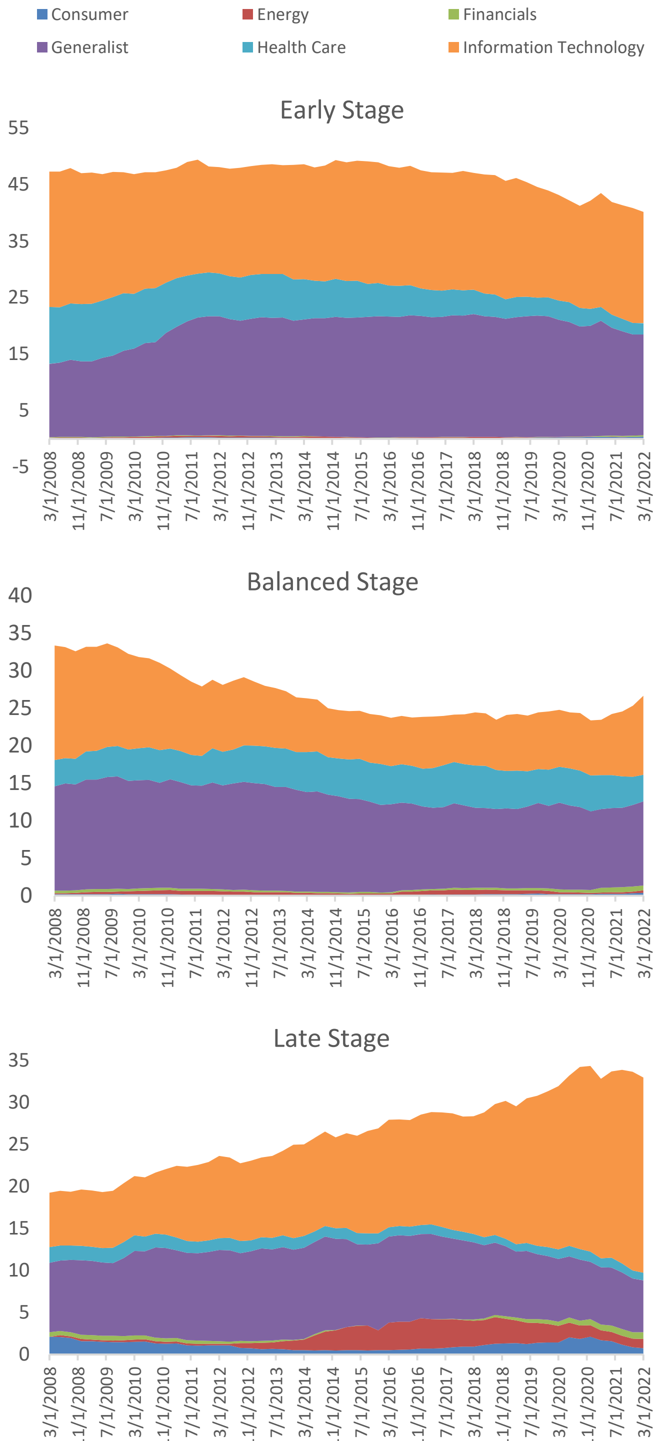




Source: State Street ®, as of Q1 2022.

Information technology and health care are the two favourite sectors of venture capitalists. However, there are still some differences in sector exposures among VC sub-strategies. Late stage funds' exposure to information technology sector almost quadrupled from 6.5% to 23% of total VC NAVs; early stage and balanced stage funds' IT exposure maintained relatively stable (see Exhibit 16). The heightened exposure to IT sector made late stage funds more sensitive to shocks to technology sector as we saw in the first half of 2022.

Exhibit 16. Sector NAV Exposures of Venture Capital Sub-Strategies (%)



Source: State Street ®, as of Q1 2022.

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Derived from actual cash flow data of our Limited Partner clients who make commitments to private equity funds, SSPEI 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 SSPEI does not depend on voluntary reporting of information, it is less exposed to biases common among other industry indexes. The 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 3,700 funds representing more than $4.35 trillion in capital commitments as of Q1 2022
- Global daily cash-flow data back to 1980.
- The Index has generated quarterly results since Q3 2004.
- Published approximately 100 days after quarter-end.

AUTHORS

Derin Aksit, PhD daksit@statestreet.com

Maggie Miao, CFA gmiao@statestreet.com

Boyu Wang, bwang13@statestreet.com

Yaoyun Zhang yzhang50@statestreet.com

Nan R. Zhang, CFA, PhD nzhang2@statestreet.com

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