STATE STREET.

Global Markets

Private Equity Insights

TWENTY-EIGHTH EDITION | Q4 2022

CURRENT QUARTER PERFORMANCE SUMMARY

The State Street® Private Equity Index (SSPEI) posted an overall return of 1.22% in Q4 2022, a positive turnaround after negative returns in all three prior quarters in 2022. Buyout returns improved to 3.22% from -1.44% in Q3, while Private Debt gained strength at 3.07%, up from 0.68% in Q3, making Q4 the best quarter in 2022 for both strategies. However, Venture Capital (VC) reported a wider loss of -5.49% compared to the previous quarter. Overall, all PE investments remained negative at -5.54% for 2022, the worst annual performance since 2009. VC suffered a -20.47% loss in 2022 after its unsustainable growth in 2020 and 2021 (see Exhibit 1). It is the worst annual performance for VC since the dot-com bubble in early 2000s.

Exhibit 1. Private Equity Performance by Strategy

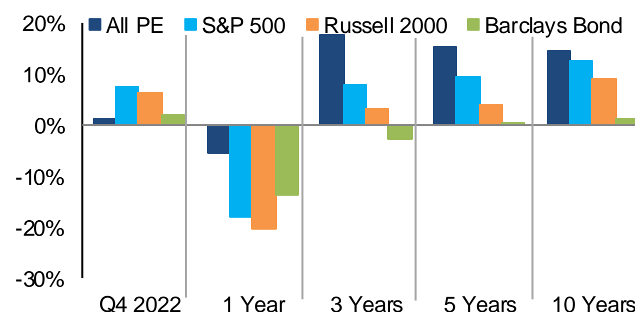
	All PE	Buyout	VC	Private Debt
2022 Q4	**1.22%**	**3.22%**	**-5.49%**	**3.07%**
2022 Q3	-1.36%	-1.44%	-1.99%	0.68%
2022 Q2	-4.71%	-3.22%	-9.83%	-1.99%
2022 Q1	-0.64%	0.53%	-4.40%	1.21%
2022	**-5.54%**	**-1.04%**	**-20.47%**	**3.43%**
2021	37.22%	36.59%	45.71%	21.06%
2020	26.47%	21.08%	55.30%	7.52%

Source: State Street®, as of Q4 2022.

SSPEI underperformed 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) in Q4 2022 but still outperformed them in longer 1-year, 3-year, 5-year and 10-year horizons(see Exhibit 2).

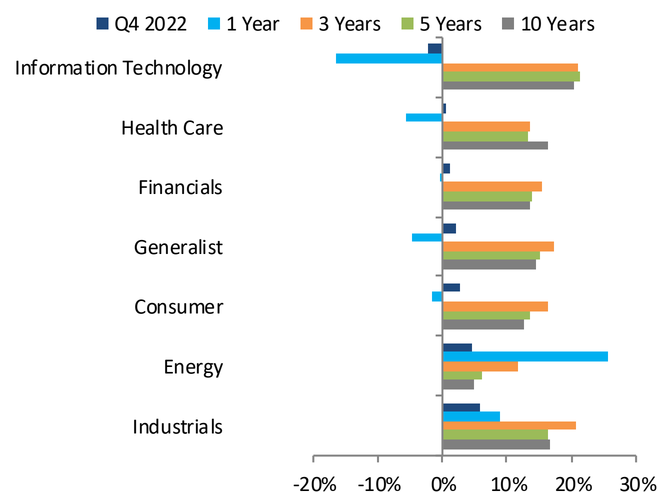
Industrials funds outperformed other sectors in Q4 with a positive return of 5.68%. Energy funds followed closely behind with a quarterly return of 4.47%. However, Information Technology (IT) funds reported a negative return of -2.25%, making it the only sector to generate losses in the quarter. The performance disparity persisted throughout the full year of 2022. Energy and Industrials funds maintained their lead with annual returns of 25.57% and 8.89% respectively, while IT funds suffered a loss of -16.34% in 2022 (see Exhibit 3).

Exhibit 2. Investment Horizon Returns



Source: State Street®, DataStream, Bloomberg Barclays US Aggregate Bond Index (total returns as of Q4 2022).

Exhibit 3. Performance of Sector Focused Funds



Source: State Street®, as of Q4 2022.

Continued on page 5.

INTERIM VALUATIONS: THE ISSUES AND THE TAKEAWAYS

Insights from Harvard University and the Private Capital Research Institute

By Josh Lerner

Introduction: The challenge of valuing the opaque

In last quarter's essay "Volatile markets and the lethargic NAV response," we explored the issue of stale valuations for private market assets and the challenges they create for investors. This essay serves as the second piece in a series covering the important and timely topic of private market asset valuations and investigates how well they actually capture the ultimate value of private equity portfolio companies. The topic has garnered much attention from practitioners and observers alike, and understandably so given its importance in the private equity industry.

Limited partners (LPs) rely on general partners (GPs) to correctly assess and report the value of fund investments, usually on a quarterly basis, applying "fair market value" standards[1]. LPs use interim valuations to manage their current portfolio and to make future PE allocation decisions. GPs, who rely on reputation and performance to raise capital for additional funds, need interim valuations for the purposes of calculating returns to report to existing and prospective investors. This raises the question: exactly how important are interim valuations for calculating and reporting performance?

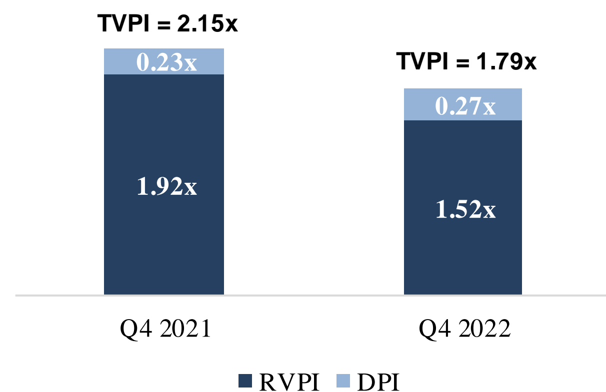
The importance of interim valuations and reported performance

One only needs to review changes in recent venture capital (VC) multiples to grasp the significance of interim valuations when calculating performance. Using State Street data, **Figure 1** displays the following three performance multiples for global VC funds formed between 2016 to 2020:

1. Residual-value-to-paid-in-capital (RVPI), which captures the value of unrealized investments[2];
2. Distributions-to-paid-in-capital (DPI), which captures the value of realized investments;[3] and
3. Total-value-to-paid-in-capital (TVPI), which captures the value of both realized and unrealized investments.[4]

The sample of global VC funds had a pooled TVPI of 2.15x as of the end of 2021.[5] This was largely driven by the run-up in venture valuations that defined the industry in 2021, demonstrated by the elevated 1.92x RVPI (a measure relying on interim valuations) and lower 0.23x DPI (a measure relying on actual distributions paid to investors). Unfortunately, the 2022 VC market did not experience the same level of exuberance, and the TVPI of the same cohort of funds slumped to 1.79x by the end of the year. The fall in TVPI was fully attributable to the decrease in interim valuations. The DPI actually increased to 0.27x, but the RVPI fell by 0.4 to 1.52x. The decline in RVPI was ten times greater than the increase in the DPI. The drastic shift in performance in only a single year, wholly caused by interim valuation changes, underscores the need for investors to understand interim valuations and how well they actually capture the true value of a fund's investments.

Figure 1. Change in multiples, Q4 '21 to Q4 '22



Source: State Street.

[1] "Fair Value Measurement (Topic 820)," FASB Accounting Standards Update, No. 2022-03 (June 2022).

[2] RVPI measures unrealized value (using fund interim values) divided by the fund's invested capital.

[3] DPI measures realized value paid to investors divided by the fund's invested capital.

[4] TVPI is RVPI + DPI and captures realized and unrealized value divided by the fund's invested capital.

[5] The analysis uses State Street data on global venture capital funds formed between 2016 to 2020.

As a result, a number of academic papers have studied the issues surrounding interim valuations in some depth. In particular, the research investigates whether biases (conservative or aggressive) are present in valuations, how well valuations can predict eventual fund performance, and if GPs tend to massage valuations over the life of a fund. While the research approaches the topic from various viewpoints, the general conclusion is that interim valuations, despite occasionally being subject to manipulation, may be used by investors as a fairly reliable tool for estimating a fund's true value—when analyzed with a discerning eye.

Interim valuations: Conservative or aggressive?

One of the earlier papers to explore issues surrounding interim valuations is Jenkinson et al. (2013).[6] The authors explore three primary questions:

1. Are valuations more aggressive (overvalued) or conservative (undervalued)?
2. Do valuations fluctuate around the time of fundraising for follow-on funds?
3. Are interim performance measures useful predictors of a fund's final performance?

The authors find that the average PE fund reports conservative valuations over the life of the fund. Their methodology compares interim valuations to the distributions eventually paid out from the fund, finding that the interim valuations understated distributions by 35% on average. The authors also explore whether buyout and VC interim valuations behave differently. Interestingly, they find that conservative bias is larger for buyouts, with valuations understating distributions by 39%, and only by 17% for VC.

Like Jenkinson et al. (2013), Brown et al. (2016)[7] investigates if interim valuations demonstrate any biases over a fund's life. Consistent with Jenkinson et al. (2013), they also find that interim valuations are, in general, conservatively biased. They are the most conservative during the first two years of a fund's life. This bias begins to decrease around year four of the fund, suggesting that interim valuations increase in accuracy and become a better predictor of the fund's ultimate performance as it ages. According to the authors, this finding makes intuitive sense. They posit that GPs often invest in companies where they believe they can add value, and part of that value comes simply from investing in companies viewed as underpriced. Therefore, the conservative bias in valuations "will decline as investments are made and then properly valued" over time.

A more granular look at the data provides a second story. As previously mentioned, GPs often depend on past performance when raising capital for a new fund. The performance they report to perspective investors often relies on interim valuations of unexited investments. A natural next question might then be whether interim valuations display an aggressive bias around the time a GP begins the fundraising process. According to Jenkinson et al. (2013), there is a clear aggressiveness in interim valuations around the time a firm begins the marketing and fundraising for a follow-on fund; however, valuation aggressiveness dissipates over the quarters subsequent to the close of the new fund.

These findings naturally led the authors to explore how well, if at all, performance figures based on interim valuations predict future returns of a fund. The researchers focus on three industry-standard performance metrics: internal rate of return (IRR),[8] public market equivalent (PME),[9] and TVPI. Ultimately, IRR's sensitivity to the timing and size of cashflows in and out of a fund make it highly susceptible to fluctuations in a fund's interim value. The authors, therefore, conclude that the metric has limited power to predict a fund's eventual performance, especially when calculated using valuations reported during fundraising periods. TVPI and PME, however, are less sensitive to the timing of changes in a fund's valuations and serve as more reliable indicators of a fund's final performance.

While the above findings illuminate much of the opaqueness associated with interim valuations, many questions remain. Among them is whether there is a divergence in how well-established, high-performing GPs report interim valuations relative to lesser-established and poorer-performing GPs.

---

6 Tim Jenkinson, Miguel Sosa, and Rüdiger Stucke, "How Fair are the Valuations of Private Equity Funds?" SSRN working paper, February 2013, https://ssrn.com/abstract=2229547.

7 Gregory Brown, Oleg Gredil, and Steven Kaplan, "Do Private Equity Funds Manipulate Reported Returns?," *Journal of Financial Economics, 132 (2019), 267-297.*

8 The annualized effective compounded return rate that can be earned on the invested capital. It is the investment's yield.

9 A methodology for calculating returns to investing in a PE fund relative to those from investing the same amounts and at the same times in a public index.

Do different types of managers treat interim valuations differently?

Brown et al. (2016) expands on the work of Jenkinson et al. (2013) by separating GPs into two groups: under-performers and top-performers. They then examine whether the two groups approach interim valuations differently. The authors conclude that under-performing funds do tend to report aggressive valuations, especially around the time of fundraising. On the other hand, top-performing GPs tend to be more conservative in their interim valuations. Moreover, LPs appear to punish GPs that they believe report overly aggressive valuations during fundraising periods. Their findings show that GPs—top-performers and under-performers alike—are generally unsuccessful in raising additional funds when it becomes apparent to LPs that they manipulated interim valuations. In fact, they further add that top-performing GPs work to avoid being labeled a valuation "manipulator" as demonstrated by their more conservative valuations.

Barber and Yasuda (2017)[10] build on Brown et al. (2016) and investigate if there is a difference in how high-reputation and low-reputation GPs manage interim valuations. The authors find that aggressive interim valuation markups do occur, especially around fundraising. They further add that the finding is completely attributable to low-reputation GPs that do not have prior exits to leverage when fundraising. In the authors' opinion, more established GPs do not need to worry themselves with timing exits or manipulating valuations because their reputational capital with LPs is well-established. The low-reputation GPs, conversely, may aggressively value companies as they have no tangible evidence of good performance to report to prospective investors.

Conclusion: Understanding interim valuations requires nuance

The academic research outlined above delves into many issues surrounding interim valuations from distinct points of view. Interestingly, the authors coalesce around a number of general conclusions:

1. Interim valuations tend to be conservative over the life of a fund.
2. Aggressive valuation practices can occur around the time some GPs begin fundraising for a follow-on fund, but this tends to be the work of poorer-performing and lower-reputation GPs.
3. The aggressive bias ultimately disappears once fundraising finishes.
4. It is best to use a "toolbox" of performance metrics (IRR, DPI, RVPI, TVPI, and PME) in tandem with interim valuations when analyzing a fund's interim performance.

In the end, some issues around interim valuations remain. However, when evaluated with care and some nuance, interim valuations can be used effectively to estimate the eventual performance of a fund.

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.

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.

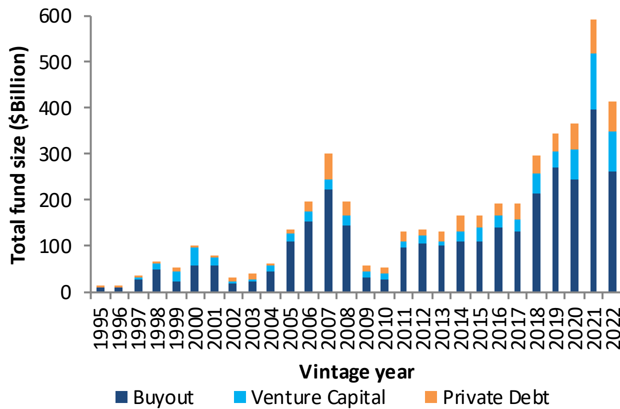
[10] Brad Barber and Ayako Yasuda; "Interim Fund Performance and Fundraising in Private Equity," *Journal of Financial Economics, 124 (2017), 172-194.*

Fund Raising and Dry Powder

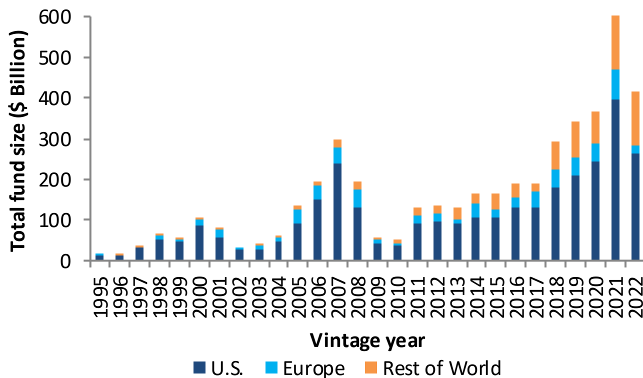
SSPEI constituent funds raised $413 billion in 2022, representing a 30.3% decrease from the all-time peak of $593 billion raised in 2021. Buyout, Venture Capital, and Private Debt funds all slowed down its fund raising pace in 2022, with a fund size decrease of 33.9%, 27.2%, and 16.2% from 2021 respectively (see Exhibit 4A). Across regions, in 2022, the US and Rest of World funds raised $266 billion and $128 billion respectively, while Europe funds experienced a significant decrease of over 70% from 2021, with a total fund size of $20 billion (see Exhibit 4B).

Exhibit 4. Total Fund Size (USD Billion)

(A) By Strategy



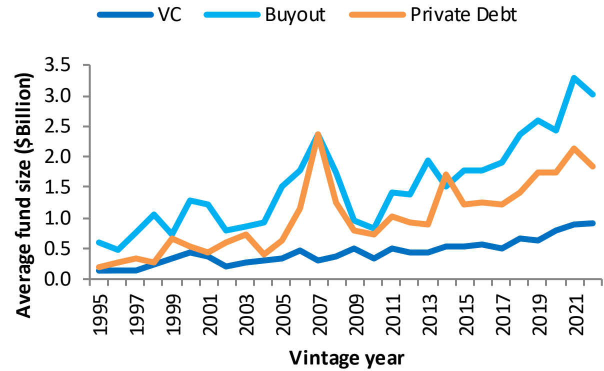
(B) by Region



Source: State Street®, as of Q4 2022.

The average fund size decreased for Buyout funds and Private Debt funds, but continued to rise slightly for Venture Capital funds in 2022. As of Q4 2022, Venture Capital funds posted their highest record of $0.91 billion, which is 4% higher than that in 2021. The average fund size of Buyout funds decreased by 8% to $3.02 billion while the average funds size of Private Debt funds decreased by 14% from its 2021 average of $2.14 billion to $1.85 billion (see Exhibit 5).

Exhibit 5. Average Fund Size (USD Billion)

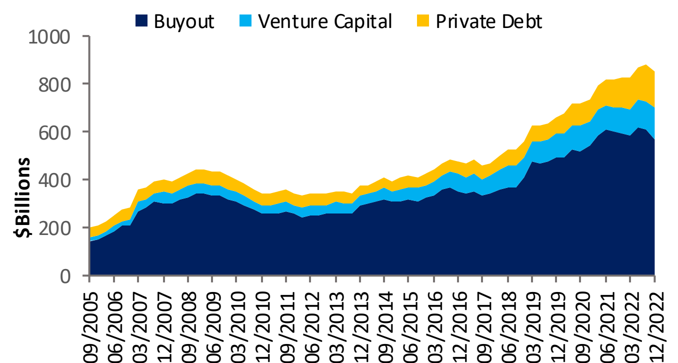


Source: State Street®, as of Q4 2022.

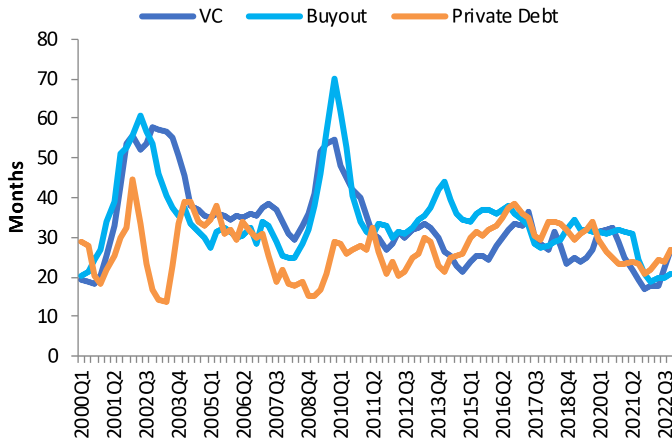
Dry powder is the part of the fund's committed capital that has not yet been called by the fund manager. It represents the amount of capital that can be used for future investment opportunities. By the end of 2022, the total dry powder of SSPEI constituent funds was at $851 billion, slightly lower than its all-time high of $887 billion reach in July 2022 (see Exhibit 6A). The quarterly dry powder normalized by the monthly 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, increased for all three strategies in Q4 2022 (see Exhibit 6B), indicating a slower pace of capital deployment by the GPs.

Exhibit 6. Dry Powder

(A) Monthly Dry Powder



(B) Quarterly Dry Powder Normalized by Average Contribution



Source: State Street ®, as of Q4 2022.

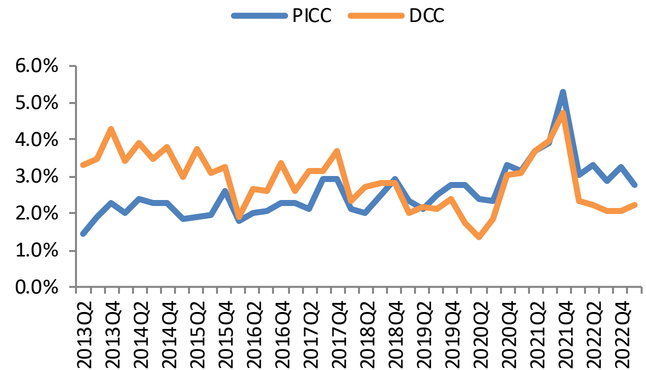
Cash Flow Activity

After a sharp decline in Q1 2022, the trend of quarterly Paid-in Capital over Committed Capital (PICC) has been roughly flat over the past four quarters. After experiencing a similar fall in Q1 2022, the quarterly Distribution over Committed Capital (DCC) also remained roughly stable over the past year. Although PICC stayed much higher than DCC in 2022, the gap between the two dropped to half a percentage point in Q1 2023. This translates into a negative net cash flow for all PE strategies, which is attributable to Buyout and Venture Capital funds (see Exhibit 7A, 7B).

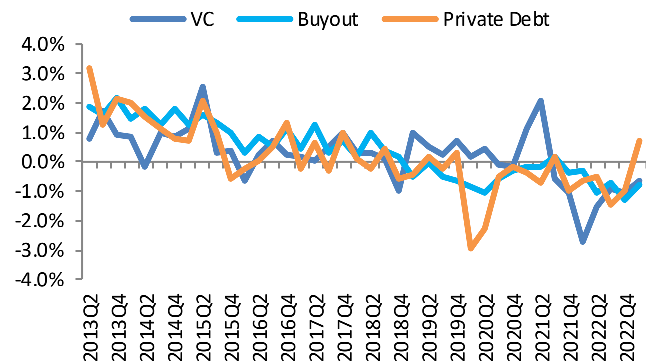
Exhibit 7B provides a closer look at the net cash flows among different PE strategies. While the net cash flows of Buyout and Venture Capital funds remained negative, which is consistent with their recent behavior, they have slightly rebounded from their previous trough in Q4 2022, due to lower PICC and higher DCC levels. Private Debt funds, on the other hand, experienced a positive cash flow, for the first time since Q3 2021 and their highest positive cash flow since Q4 2017, due to a drastic jump in their DCC.

Exhibit 7. 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 Q4 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.

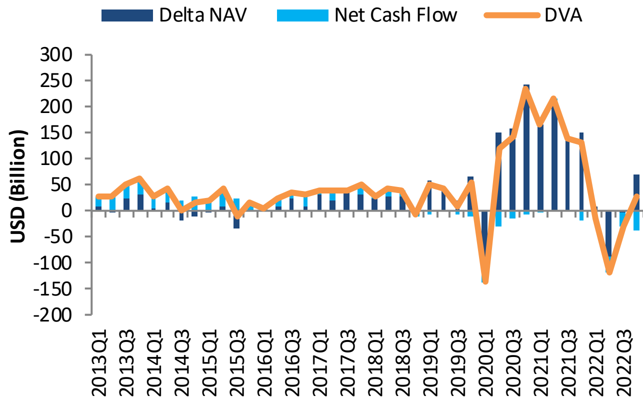
$$DVA = EndingNAV - BeginningNAV + Distribution - Contribution$$

The quarterly DVA of all PE funds continued to rebound and turned positive by jumping from -$120 billion in Q2 2022 to $29 billion in Q4 2022. The positive DVA in Q4 2022 is due to the increase in NAVs being larger than the negative net cash flows (see Exhibit 8A). As shown in Exhibit 8D, the increase in NAVs is attributable to Buyout and Private Debt strategies. Venture Capital funds continued to observe a fall in their NAVs. Exhibit 8B shows that Europe funds experienced a significant jump in DVA in USD in Q4 2022. However, contrary to the previous quarter, this jump in the DVA is driven by the relative

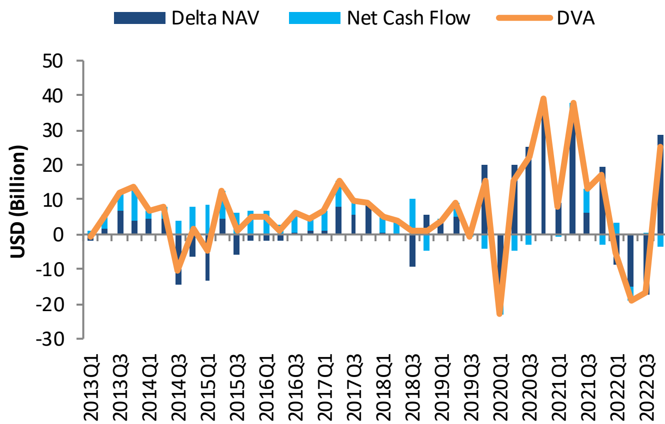
depreciation of the US dollar against the Euro in Q4 2022. Exhibits 8C shows that Europe funds had marginally negative DVA driven by negative net cash flows in Euro in Q4 2022.

Exhibit 8. Dollar Value Added

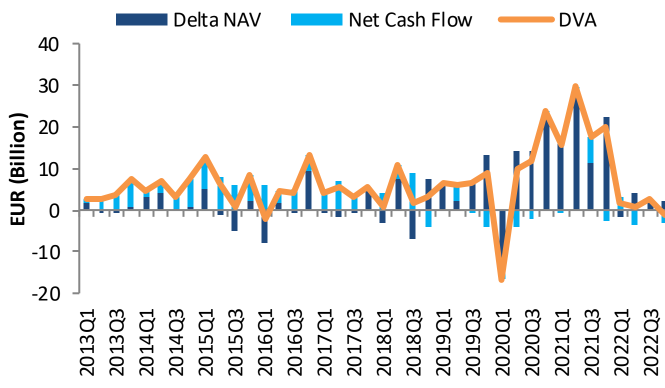
(A) All PE



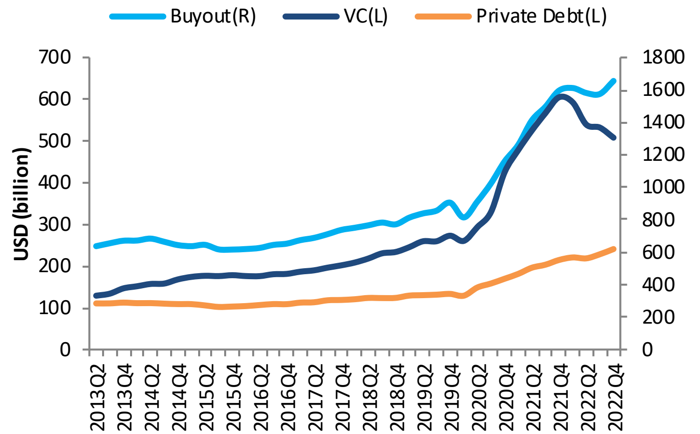
(B) Europe (USD)



(C) Europe (EUR)



(D) NAV by Venture Capital, Buyout, and Private Debt



Source: State Street ®, as of Q4 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 Q1 2023 without going into theoretical background. For model details, please refer to State Street Private Equity Insights Q3 2021 publication.[11] 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.

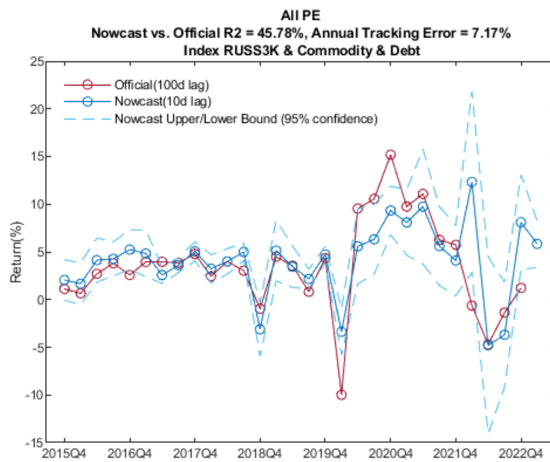
In Q4 2022, the nowcasting model over-predicted the realized PE returns across all strategies. As shown in Exhibit 12, the actual Q4 2022 returns of all PE, Buyout, Venture Capital and Private Debt were 1.22%, 3.22%, -5.49% and 3.07% respectively. Correspondingly, the nowcasting model predicted returns were 8.11%, 7.86%, 1.47% and 3.96. The actual returns were within the 95% confidence intervals of the predicted returns for Buyout and Private Debt, but for All PE and for Venture Capital, the actual returns fell slightly outside the lower bound of the 95% confidence intervals. Strong public market performance resulted in overpredictions for Q4 2022

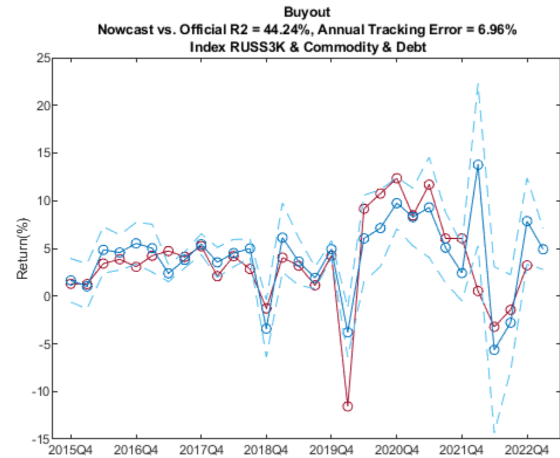
[11] State Street Private Equity Insights Q3 2021
https://globalmarkets.statestreet.com/portal/peindex/pe-insights/

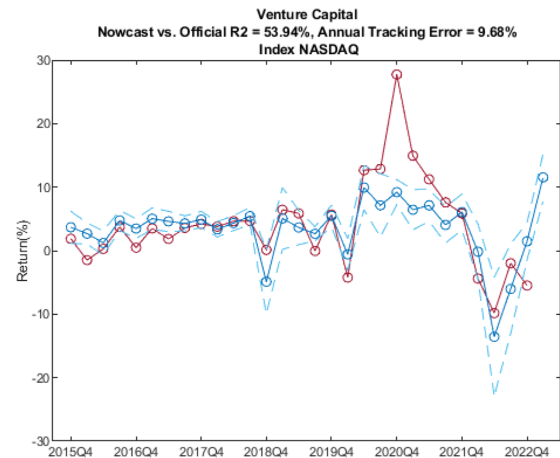
across all strategies. Sluggish performance than predicted implies slow adjustments for the private market.

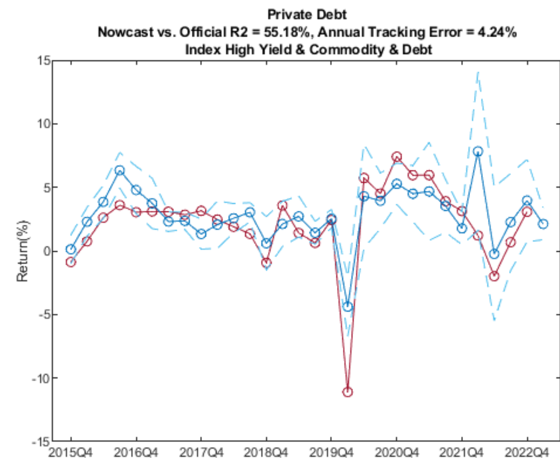
Looking forward, our nowcasting model expects the Q1 2023 returns of all strategies to remain at positive levels but we expect to see decreasing returns for All PE, Buyout, and Private Debt and a rebound in returns for Venture Capital. All PE predicted return is 5.84% in Q1 2023 while the predicted strategy returns are 4.91%, 11.54% and 2.11% for Buyout, Venture Capital and Private Debt respectively. Predicative values remained high due to strong public market performance. As the only public market input to the prediction of Venture Capital, NASDAQ composite index increased 17.0% quarter-to-quarter for Q1 2023, a drastic increase comparing to -0.79% in Q4 2022, which results in a predicted continuous increase for venture capital. The decline in All PE, Buyout, and Private Debt can be attributed to a sharp decline in commodity prices which is a common input to these predictions. Bloomberg Commodity Index decreased by 7.8 percentage points comparing to the last quarter.

Exhibit 12. Actual vs. Out-of-sample Nowcast IRRs









Source: State Street ®, as of Q4 2022.

ABOUT THE STATE STREET 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 State Street Private Equity Index ("SSPEI") 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, 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 3,800 funds representing more than $4.6 trillion in capital commitments as of Q4 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

Boyu Wang, bwang13@statestreet.com

Yuou Wu, ywu20@statestreet.com

Yaoyun Zhang, yzhang50@statestreet.com

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

Disclaimers and Important Risk Information [2023.01]

This communication is provided only to professional clients or eligible counterparties or their equivalent by State Street Bank and Trust Company or, where applicable and permissible, its bank and non-bank affiliates ("State Street"). State Street Bank and Trust Company is authorized and regulated by the Federal Reserve Board, registered with the Commodity Futures Trading Commission as a Swap Dealer, and is a member of the National Futures Association. State Street Bank International GmbH ("SSBI") is regulated by the European Central Bank ("ECB"), the German Federal Financial Supervisory Authority ("BaFin") and the Deutsche Bundesbank. Details about the extent of SSBI's regulation by the ECB, the BaFin and Deutsche Bundesbank are available from us on request. Products and services described herein may not be available in all jurisdictions or through all State Street entities. Activities described herein may be conducted from offshore. Information provided is of a general nature only and has not been reviewed by any regulatory authority.

This communication is intended for general marketing purposes, and the information contained herein has not been prepared in accordance with legal requirements designed to promote the independence of investment research. It is for clients to determine whether they are permitted to receive research of any nature. Market commentary provided by trading desks is not investment research. This communication is not intended to suggest or recommend any transaction, investment, or investment strategy, does not constitute investment research, nor does it purport to be comprehensive or intended to replace the exercise of an investor's own careful independent review and judgment regarding any investment decision.

This communication is not intended for retail clients, nor for distribution to, and may not be relied upon by, any person or entity in any jurisdiction or country where such distribution or use would be contrary to applicable law or regulation. This communication or any portion hereof may not be reprinted, sold or redistributed without the prior written consent of State Street. This communication and the information herein does not constitute investment, legal, or tax advice and is not a solicitation to buy or sell securities or any financial instrument nor is it intended to constitute a binding contractual arrangement or commitment by State Street of any kind. The information provided does not take into account any particular investment objectives, strategies, investment horizon or tax status.

The views expressed herein are the views of State Street as of the date specified and are subject to change, without notice, based on market and other conditions. The information provided herein has been obtained from sources believed to be reliable at the time of publication, nonetheless, we make no representations or assurances that the information is complete or accurate, and you should not place any reliance on said information. State Street hereby disclaims any warranty and all liability, whether arising in contract, tort or otherwise, for any losses, liabilities, damages, expenses or costs, either direct, indirect, consequential, special, or punitive, arising from or in connection with any use of this document and/or the information herein.

State Street may from time to time, as principal or agent, for its own account or for those of its clients, have positions in and/or actively trade in financial instruments or other products identical to or economically related to those discussed in this communication. State Street may have a commercial relationship with issuers of financial instruments or other products discussed in this communication.

This communication may contain information deemed to be forward-looking statements. These statements are based on assumptions, analyses and expectations of State Street in light of its experience and perception of historical trends, current conditions, expected future developments and other factors it believes appropriate under the circumstances. All information is subject to change without notice.

Participating in trading any financial instrument, including but not limited to foreign exchange, equities, futures, fixed income or derivative instruments, or investments in non-liquid or emerging markets, or digital assets, or participating in securities lending, repurchase transactions or other collateral services present risks, which may include but are not limited to counterparty, collateral, investment loss, tax, and accounting risks. Where applicable, returns may increase or decrease as a result of currency fluctuations. Derivatives may be more volatile than the underlying instruments. Certain foreign exchange business, including spot and certain forward transactions, may not be regulated in all jurisdictions. Past performance is no guarantee of future results.

Please contact your State Street representative for further information.

To learn how State Street looks after your personal data, visit: https://www.statestreet.com/utility/privacy-notice.html.

© 2023 State Street Corporation – All Rights Reserved

Global Markets Research Disclaimer Supplement [2023.01]

Australia: This communication is provided to wholesale clients by State Street Bank and Trust Company (Australian Business Number 70 062 819 630, Australian Financial Services License 239679).

Brazil: The products in this marketing material have not been and will not be registered with the Comissão de Valores Mobiliários - the Brazilian Securities and Exchange Commission ("CVM"), and any offer of such products is not directed to the general public within the Federative Republic of Brazil ("Brazil"). The information contained in this marketing material is not provided for the purpose of publicly soliciting investments from investors residing in Brazil and no information in this marketing material should be construed as a public offering or unauthorized distribution of the products within Brazil, pursuant to applicable Brazilian law and regulations.

Israel: State Street Bank and Trust Company is not licensed under Israel's Regulation of Investment Advice, Investment Marketing and Portfolio Management Law, 1995. This communication may only be distributed to or used by investors in Israel which are "eligible clients" as listed in the First Schedule to Israel's Regulation of Investment Advice, Investment Marketing and Portfolio Management Law 1995.

Japan: This communication is made available in Japan by State Street Bank and Trust Company, Tokyo Branch, which is regulated by the Financial Services Agency of Japan and is licensed under Article 47 of the Banking Act.

Oman: State Street Bank and Trust Company is not a bank or financial services provider registered to undertake business in Oman and is not regulated by the Central Bank of Oman or the Capital Market Authority.

Qatar: The information in this communication has not been reviewed or approved by the Qatar Central Bank, the Qatar Financial Markets Authority or the Qatar Financial Centre Regulatory Authority, or any other relevant Qatari regulatory body.

Singapore: This communication is made available in Singapore by State Street Bank and Trust Company, Singapore Branch ("SSBTS"), which holds a wholesale bank license by the Monetary Authority of Singapore. In Singapore, this communication is only distributed to accredited, institutional investors as defined in the Singapore Financial Advisers Act 2001 ("FAA") and its regulations. Note that SSBTS is exempt from Sections 27 and 36 of the FAA. When this communication is distributed to overseas investors as defined in the FAA, note that SSBTS is exempt from Sections 26, 27, 29 and 36 of the FAA. This advertisement has not been reviewed by the Monetary Authority of Singapore.

South Africa: State Street Bank and Trust Company is authorized in South Africa under the Financial Advisory and Intermediary Services Act, 2002 as a Category I Financial Services Provider; FSP No. 42671.

United Arab Emirates: The information contained within this communication is not intended to lead to the conclusion of any contract of whatsoever nature within the territory of the United Arab Emirates.

United Kingdom: State Street Bank and Trust Company is authorised and regulated by the Federal Reserve Board of the United States, authorised by the Prudential Regulation Authority ("PRA") and subject to regulation by the Financial Conduct Authority and limited regulation by the PRA. Details about the extent of our regulation by the PRA are available from us on request.

State Street Bank International GmbH is authorised and regulated by the European Central Bank and the BaFin, deemed authorised by the Prudential Regulation Authority, and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details of the Temporary Permissions Regime, which allows EEA-based firms to operate in the UK for a limited period while seeking full authorisation, are available on the Financial Conduct Authority's website.