STATE STREET.

Private Equity Insights

TWENTIETH EDITION | Q4 2020

CURRENT QUARTER PERFORMANCE SUMMARY

The State Street® Private Equity Index (SSPEI) posted an all-time high quarterly return of 15.19 percent in the fourth quarter of 2020, continuing on the path of post-COVID recovery. Venture Capital funds rallied 27.73 percent, followed by 12.35 percent return from Buyout funds and 7.41 percent return from Private Debt funds (see Exhibit 1).

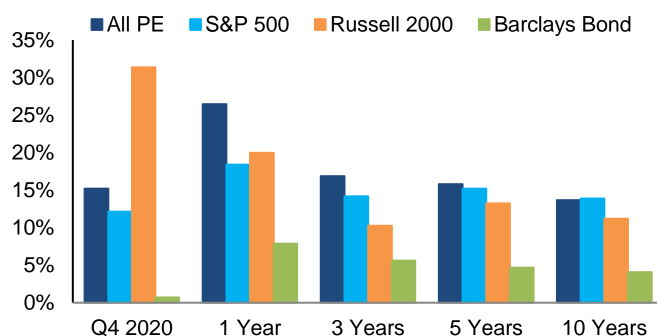
Exhibit 1. Private Equity Performance by Strategy

	All PE	Buyout	VC	Private Debt
2020 Q4	15.19%	12.35%	27.73%	7.41%
2020 Q3	10.56%	10.75%	12.85%	4.51%
2020 Q2	9.55%	9.15%	12.66%	5.73%
2020 Q1	-9.99%	-11.57%	-4.23%	-11.10%
YTD	26.47%	21.08%	55.30%	7.52%

Source: State Street®, as of Q4 2020.

As shown in Exhibit 2, SSPEI outperformed the US public equity market (proxied by the S&P 500) for shorter horizons and outperformed the US debt market (proxied by Barclays US Aggregate Bond Index) at all times; the small-cap stocks (proxied by the Russell 2000) outperformed all in Q4 2020, but underperformed SSPEI in the long run.

Exhibit 2. Investment Horizon Returns



Source: State Street®, DataStream, Bloomberg Barclays US Aggregate Bond Index (total returns as of Q4 2020).

Continued on page 4.

SPACS: THE GOOD, THE BAD, AND THE FUTURE

Insights from Harvard University and the Private Capital Research Institute

By Alex Billias, Leslie Jeng, Josh Lerner

Once a niche financial tool, special purpose acquisition vehicles, or "SPACs," have exploded onto the mainstream financial scene in the last two years. In 2020 alone, nearly 250 SPACs representing over half of the number of IPOs in the US were raised, compared to just 7 SPACs a decade prior.[1] The $75 billion raised by these SPACs exceeded the total amount raised by all IPOs in 2020. This boom continued into Q1 2021, where nearly 480 new SPACs were raised, representing nearly 90% of IPOs during that time and with proceeds totaling $145 billion[2] (see Exhibit 3).

However, academics and practitioners alike have noted serious challenges associated with SPACs, leading many to question whether the recent flurry of SPAC activity – along with the SPAC model itself – is sustainable. These worries have been corroborated by the sharp downturn in activity in the second quarter of 2021, as well as the difficulties that some SPACs are encountering in the market.

SPACs are raised by a sponsor – often a hedge fund, private equity group, or individuals with prior experience raising SPACs. The SPAC is publicly listed via an IPO, with shares (or "units") available for purchase, typically at $10 per share. The sponsor then seeks a private company to take public in a reverse merger, combining with the private company in a process known as a "deSPAC." If the sponsor cannot find a

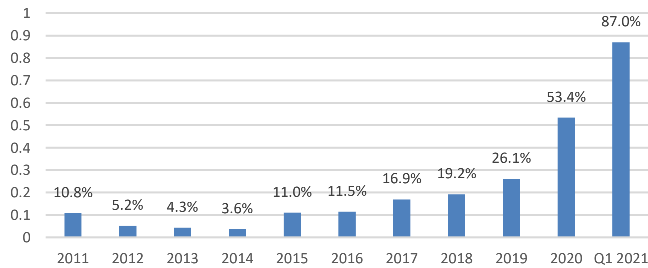
[1] Ritter, Jay R. "Special Purpose Acquisition Company (SPAC) IPOs Through 2020," February 27, 2021. https://site.warrington.ufl.edu/ritter/files/IPOs-SPACs.pdf

[2] Refinitiv, last accessed June 7, 2021.

Continued on page 2.

company within 2 years after the SPAC's IPO (or the investor chooses to opt out of the proposed transaction), a shareholder is entitled to receive his or her investment in the SPAC back, plus interest.[3]

Exhibit 3. Number of SPACs by year as a percentage of the total number of IPOs



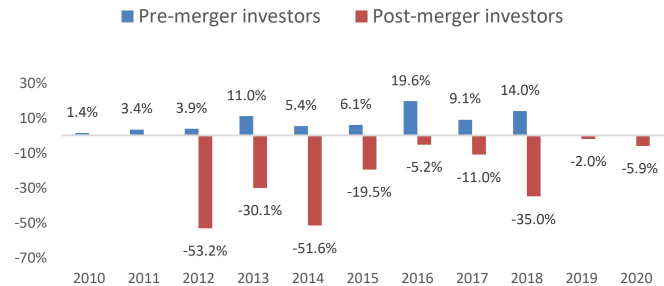
Source: Percentages from 2011 through 2020 obtained from Ritter[1], "SPAC IPOs through 2020." Percentage for Q1 2021 obtained from Refinitiv.

In theory, this process represents a less costly way to take private companies public, gives investors increased access to potentially lucrative investment opportunities in private companies, and offers significant downside protection for investors through redemption rights.[4] Yet in practice, the economics of SPACs are complex and there is much debate between proponents of the model and their critics.

Proponents often cite a favorable risk/return profile for SPACs. A recent study found that between 2010 and 2018, SPAC IPO investors who purchased units in the SPAC IPO and redeemed their shares just prior to a merger saw average annualized returns of 9.3%. Moreover, due to the "money-back guarantee" of SPACs, no investors experienced losses.[5]

However, the story is different for those who invest in the merged company after the deSPAC. On average, between 2012 and 2020, investors who bought shares after the merger saw nominal losses on those shares of -15.6% in the year following the merger, underperforming the market by -24.3%.[6] This finding is shown in the figure below, and might imply that the current SPAC model, touted as a way to access promising private companies, is perhaps a bit misleading[7] (see Exhibit 4).

Exhibit 4. SPAC returns by investment period, pre-merger investors vs. post-merger investors



Source: Chart data obtained from Gahng[3], "SPACs."

These losses are driven in part by the fact that SPAC investments can also be expensive, with many costs borne by investors. Among the largest are underwriting fees, which amount to about 5% of IPO proceeds, and "promote," or a block of shares in the SPAC held by the sponsor that represents about 20% of the post-IPO equity.

A recent study found the median SPAC at the time of a merger holds only $6.67 in cash for an investor's original $10 investment, with the difference being consumed by fees and transaction costs.[8] Yet at the same time, the sponsor still receives the full amount of promote. This structure, where investors appear to bear most of the costs yet suffer the most from price declines in the merged company, has frequently been cited by critics as one of the primary reasons the current SPAC model is unsustainable.

To this end, there has been some discussion around regulatory changes to reform the SPAC model. Recent SEC changes to the accounting treatment of warrants in April 2021 have already slowed the pace of SPAC formations.[9] Others

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[3] Gahng, Minmo, Jay R. Ritter, and Donghang Zhang. "SPACs." *Working Paper*, March 2, 2021. https://site.warrington.ufl.edu/ritter/files/SPACs.pdf.

[4] Klausner, M. D., M. Ohlrogge, and E. Ruan. "A Sober Look at SPACs." *Working Paper,* April 2021.

[5] Gahng, "SPACs."

[6] Gahng, "SPACs."

[7] Chart data obtained from Gahng, "SPACs." Investment returns for investors during the IPO to merger period were only calculated through 2018 because, according to the authors, "if we included SPACs that went public after May 2018, these later samples tend to include only completed business combinations, not liquidated SPACs, overstating the SPAC period returns." There were no SPACs in the authors' dataset for which to calculate post-merger returns prior to 2012, which is why post-merger returns begin in 2012.

[8] Klausner. "A Sober Look at SPACs."

[9] Coates, John and Paul Munter. "Staff Statement on Accounting and Reporting Considerations for Warrants Issued by Special Purpose Acquisition Companies ("SPACs")." U.S. Securities and Exchange Commission. April 12, 2021.

have called for increased disclosure requirements to bring SPAC regulations more in line with those for IPO. For instance, SPACs and the companies with which they merge currently can take advantage of safe harbor provisions to protect themselves from liability arising from performance projections and other forward-looking statements, unlike IPOs.[10] Were this provision to be changed, interest in SPACs may decline as sponsors might be far more cautious in making optimistic projections.

Market forces may also slow the proliferation of SPACs, a topic recently discussed among a panel of experts at a Private Capital Research Institute roundtable event.[11] The experts noted there have been waves of SPAC activity previously, most notably in the early 1990s and again following the 2007 – 2008 financial crisis. In the current wave, as with many other public market innovations beforehand, investors have flocked to SPACs, leading to sky-high valuations. If history is any guide, we are likely to see a shakeout of investors, followed by more institutionalization in the sector.[12]

There is certainly an interest in and potentially a need for public private equity products. SPACs may be one imperfect solution to this challenge. Whether the lessons, good and bad, from the recent SPAC boom will translate into improved SPAC offerings in years to come remains to be seen.

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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] Klausner. "A Sober Look at SPACs."

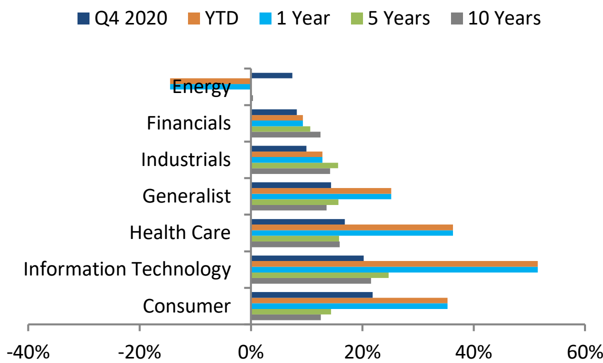
[11] "Riding the SPAC Wave." *Private Capital Research Institute.* March 17, 2021.

[12] "Riding the SPAC Wave."

CURRENT QUARTER PERFORMANCE SUMMARY – CONTINUED FROM PAGE 1

Among sectors, as a result of economy recovery, Consumer focused funds led with a strong quarterly return at 21.84%, which increased by 13.03% from Q3. They were followed by Information Technology funds which posted a 20.23% quarterly return, up from 16.66% in Q3. Albeit Energy funds remained lagging, now or for consecutive seven quarters, they returned 7.43% in Q4, largely up from 0.96% in Q3 (see Exhibit 5).

Exhibit 5. Returns of Sector Focused Private Equity Funds



Source: State Street®, as of Q4 2020.

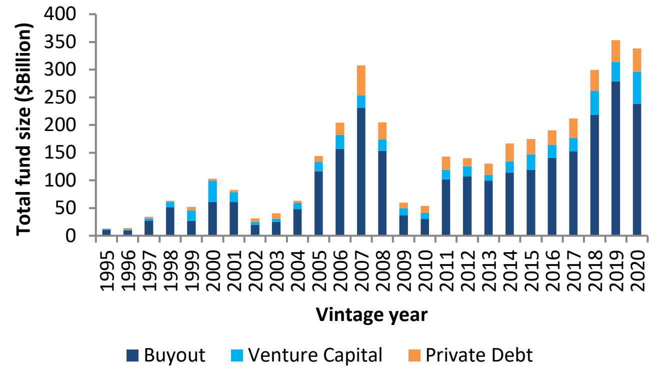
Fund Raising

Fund-raising activities in 2020 were mixed among the three private equity strategies. Venture Capital funds raised more than $57.86 billion in 2020, which was the best year for venture fund raising in the history of SSPEI. On the contrary, activity for Buyout funds has slowed with total $238.03 billion raised, a 14.6% decrease in size compared to 2019. Private Debt funds continue to grow with a steady pace with $42.52 billion raised, exceeding the size in 2019 by 9.1% (see Exhibit 6(A)).

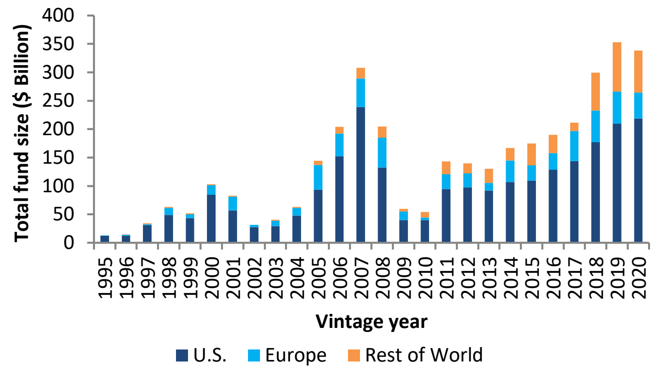
Across regions, US funds collected $218.66 billion in 2020, approaching the historical high of $239 billion in 2007. European and the Rest of World raised $45.60 billion and $74.15 billion respectively, both decreased from last year by 19.0% and 44.6% respectively (see Exhibit 6(B)).

The average fund size continued to rise for Venture Capital funds and reached $0.79 billion at the end of 2020, up by 28% from 2019. Average Buyout fund size has slightly slipped down from $2.6 billion peak in 2019 to $2.51 billion in 2020, and the average Private Debt funds size also decreased to 1.42 billion compared to 1.77 billion from 2019 vintage year (see Exhibit 7).

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

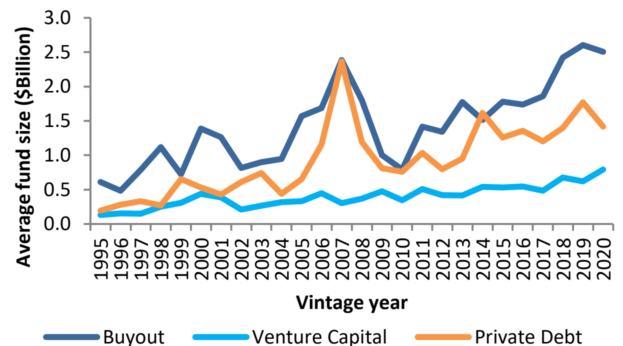


(B) By Region



Source: State Street ®, as of Q4 2020.

Exhibit 7. Average Fund Size (USD Billion)



Source: State Street®, as of Q4 2020.

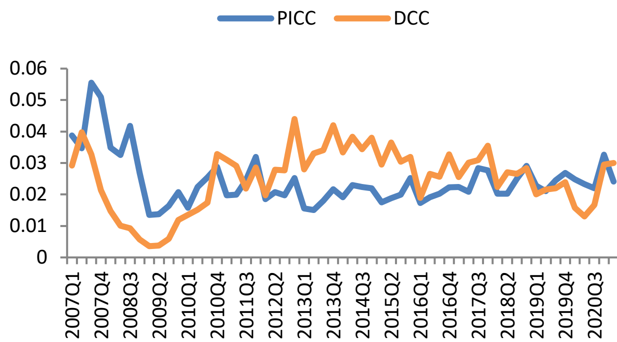
Cash Flow Activity

During the pandamic, capital distribution was hit harder than contribution for private equity funds. In the first quarter of 2021, we observed slower cash flow recovery than the second half of year 2020 (see Exhibit 8(A)).

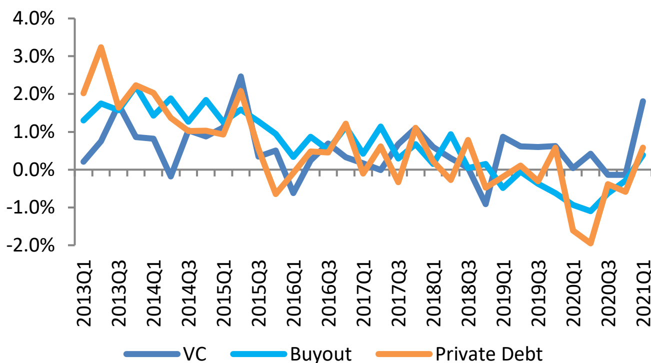
Nevertheless, the net cash flow continued to increase in 2021 Q1 after its return to positive territory in 2020 Q4. Venture Capital funds had the highest net cash flow of 1.8% since 2015 Q2, and the largest rebound among all strategies comparing to Buyout and Private Debt funds, of which the net cash flows are 0.4% and 0.6% respectively (see Exhibit 8(B)).

Exhibit 8. Quarterly Cash Flow Ratios Normalized by Commitment

(A) Contribution and Distribution of All PE



(B) Net Cash Flow By Strategy (2013Q1 – 2021Q1)



Source: State Street ®, as of Q1 2021.

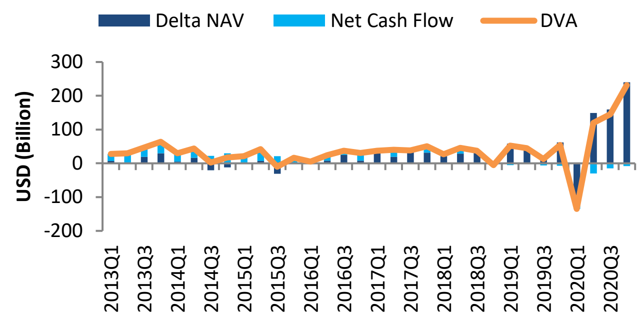
Valuations

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 2020, we saw the most dramatic fluctuation in valuations in the past decade. After being hit by the COVID panic in Q1, SSPEI recouped all its DVA losses in Q2 and posted stronger growth in Q3 and Q4 (see Exhibit 9).

Exhibit 9. Dollar Value Added (2013 Q1 – 2020Q4)



Source: State Street ®, as of Q4 2020.

DISCUSSION – PRIVATE EQUITY CUSTOMIZED BENCHMARK

Private equity investors have been struggling to find the best benchmark for their asset allocation, risk management, and performance attribution needs for decades. One of the challenges is the scarcity of high quarlity transaction and valuation data in private markets. Most sources of private equity data depend on surveys and GP's voluntary reporting, which could have some common biasis embeded, such as selection bias (a.k.a. cherry picking in reporting) and survivorship bias. Another challenge is the lack of consensus among academia and industry on the metrics of private equity performance. Some performance measures for public equity may not be suitable for private equity due to its limitations.

State Street Private Equity Index (SSPEI) is built to help with those challenges. It is a peer performance benchmark based on a proprietary dataset from clients of State Street custody and fund admistration services. In this dataset, GP reported valuations are not voluntary but required as part of the accounting and fund administration process. The aggregated SSPEI is a representative benchmark for broad private equity market, but it may not be perfectly aligned with the investment style and capital allocation of a specific PE portfolio. To provide a solution for customized index, State Street provides a custom index based on fund characteristic selections (e.g. vintage year, investment strategy and region, etc.) on its Private Equity portal.

As the **first stage**, the above custom index matches the investment style and vintage year selections with the PE investor's portfolio. However, this custom index may have very different commitment weights compared to PE investor's portfolio. Assuming an investor's portfolio invests 35% commitment in three 2010 Buyout funds and 65% in another three 2013 Buyout funds, it would only be fair to benchmark with a portfolio that has the same asset allocation. The **second stage** of customization rescales the index constituent funds' cash flows and valuations according to PE investor's portfolio weights. In this hypothetic case, we could rescale the cash flows and valuations of 2010 and 2013 Buyout funds to reflect the same commitments as in the investor's portfolio. The weighted index is marked in the yellow circle in Exhibit 10 and better aligned with the portfolio return than the custom index, which only matches investment style and vintage year (orange square in Exhibit 10). Besides commitment weights, NAV weights and total exposure weights can also be considered in weighted index construction.

The hypothetical weighted index matches the style and vintage year, as well as asset allocation weights with investor's portfolio. However, it typically includes a lot more funds and therefore is much more diversified than investor's portfolio[1]. This leads to the **third stage** of customization, simulating a large set of peer potfolios, not only matching the investment styles and asset allocation weights, but also the program breadth (i.e. number of funds) of the investor's portfolio. Exhibit 10 shows the cumulative distribution function (CDF) of IRR and TVPI of those simulated peer portfolios. Each of these simulated peer portfolios has three randomly selected 2010 buyout funds and three randomly selected 2013 buyout funds with rescaled cash flows matching the commitment weights of the hypothetical invetor's portfolio. This simulation provides the distribution of random fund selection outcomes by an average portfolio manager given the same investment style, asset allocation weights and program breadth.

By using three stages of customization, we could decompose the performance difference between an investor's portfolio and the broad SSPEI into investment style difference, portfolio weight difference and fund selection difference (see Eq. 1-3). Furthermore, using the peer portfolio simulation, we are able to estimate the probability of the PE investor's fund selection skill is better than an average investor who shares the same investment style, asset allocation weights and diversification level(Eq. 4).

$$\Delta_{Investment\ Style} = R_{Custom\ Index} - R_{Broad\ SSPEI}\ (Eq. 1)$$

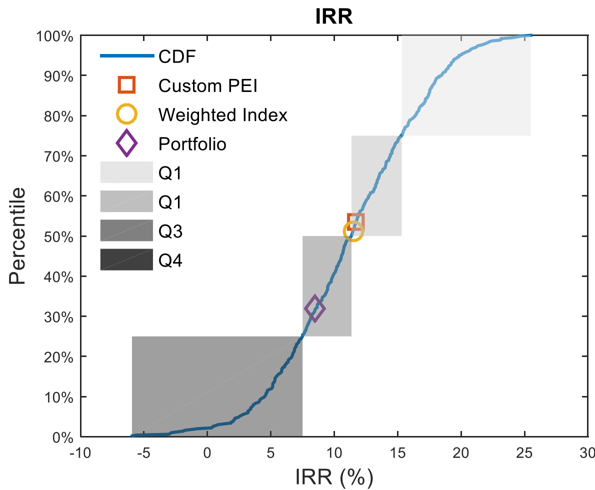
$$\Delta_{Portfolio\ Weights} = R_{Weighted\ Custom\ Index} - R_{Custom\ Index}$$

$$\Delta_{Fund\ Selection} = R_{Portfolio} - R_{Weighted\ Custom\ Index}\ (Eq. 3)$$

$$Probability\ of\ the\ Portfolio's\ fund\ selection\ is\ better\ than\ average = P(R_{Portfolio} > R_{Simulated\ Breadth-matched\ Weighted\ Custom\ Index})\ (Eq. 4)$$

[1] Private Equity Program Breadth and Strategic Asset Allocation, Alexander Rudin, Jason Mao, Nan R. Zhang and Anne-Marie Fink, The Journal of Private Equity Spring 2019, 22 (2) 19-26;

Exhibit 10. Three Stages of Custom Index



Source: State Street ®, DataStream, as of Q4 2020.

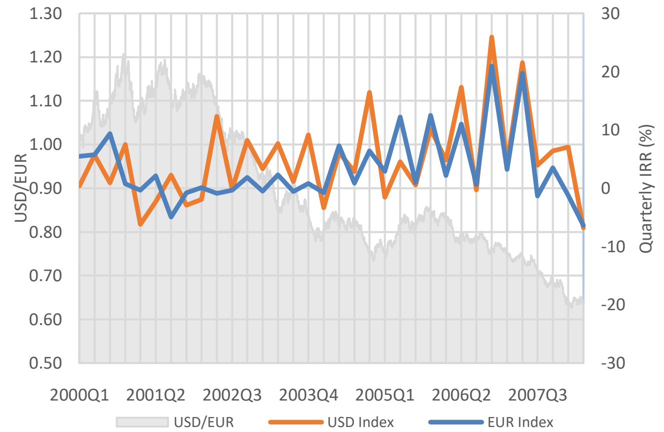
Besides custom metrics mentioned above, there are other custom benchmarks frequently requested by State Street clients.

When investing in funds denominated in foreign currencies, investors face FX exposures that can change their risk-return profile. We observe such impact on funds performance from State Street's data by comparing the USD return index with the local currency return index. Taking EUR-denominated funds as an example for this analysis, it's shown in Exhibit 11 altogether that the volatility for USD index is higher than local currency EUR index due to added FX risks. Another interesting fact observed from data is during the USD depreciation period, the USD returns are inflated by the FX risk premium (from the perspective of a US based LP). In other words, investors are compensated for bearing the FX risks. Vice versa, USD appreciation would suppress the USD returns as exchanging USD from EUR results in less USD received by LPs.

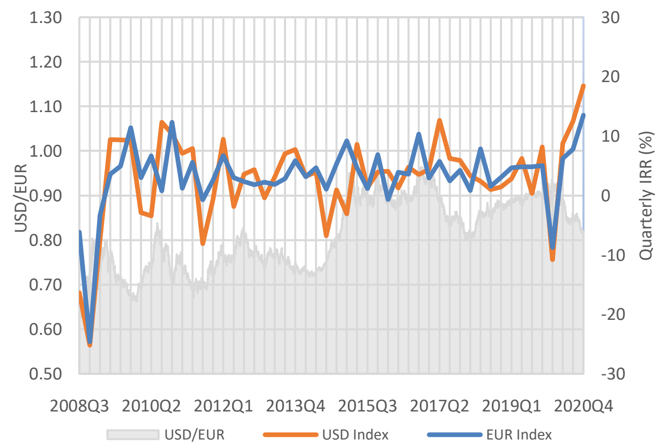
Another popular custom benchmark regarding FX risks is forward FX-adjusted index – a mark-to-market treatment to better align the FX impact on the lagged PE performance with the impact on other asset classes. The common practice is to apply current quarter end's FX spot rates to replace the spot rates used in currency conversion of fund valuations from prior quarter end (which is indeed the latest available valuation, due to the reporting lag in PE), and recalculate the index return. By comparing the forward FX-adjusted USD return with the standard point-in-time USD return, the investor would be able to evaluate the impact of the most recent quarter's FX rate movement to their one quarter lagged PE custom benchmark.

Exhibit 11. Quarterly Rolling IRR Time Series of SSPEI Euro-denominated Funds

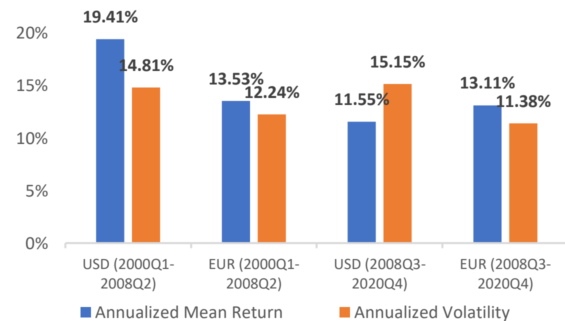
(A) USD Depreciation Cycle (Q1 2000 – Q2 2008)



(B) USD Appreciation Cycle (Q3 2008 – Q4 2020)



(C) USD vs EUR Index Risk-Return in FX Cycles



Source: State Street ®, DataStream, as of Q4 2020.

In the public market, high frequency mark to market prices are available for Time Weighted Return calculation. However, it is not possible to calculate true Time Weighted Return for the illiquid private investments. A common practice in private

equity is to link short-term (usually quarterly) Modified Dietz or IRR to generate a longer horizon Time Weighted Return. This method has the advantage of easiness and convenience. However, it faces additional challenges when there are reporting lags in the latest valuation, which is not uncommon for alternatives, and when large cash flows or volatile valuations during the quarterly periods. We will discuss this in more details in our next publication.

Exhibit 12. Comparison of Various Custom Indexes

Method	Reflective of client's investment opinions	Simplicity	Specified in Advance	Unambiguous
Broad SSPEI	☆	★	★	★
Custom PEI	⯨	⯨	★	★
Weighted Index	★	☆	★	★
Simulated Peer Portfolios	★	☆	☆	☆
FX-adjusted	⯨	⯨	★	★
Linked Return	☆	★	★	⯨

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 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 3,300 funds representing more than $3.5 trillion in capital commitments as of Q4 2020
- 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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