CLIFFWATER LLC

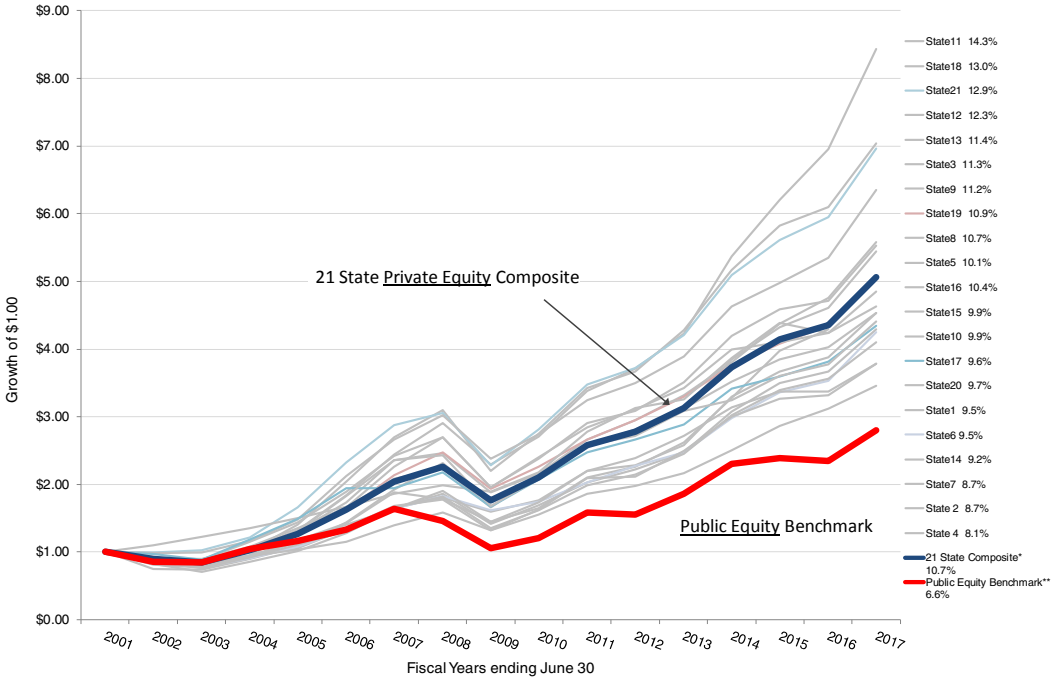
An Examination of Private Equity Performance among State Pensions

(Covering the 16-year period ending June 30, 2017)

Updated May 2018[1]

*Our updated study finds that private equity produced a **10.7%** annualized return across 21 state pensions reporting returns for the 16-year period covering June 30 fiscal years 2002 through 2017, or **4.0%** above the 6.6**%** annualized return earned by a public equity benchmark. All state pensions that operated private equity portfolios over the entire 16-year time period outperformed public stocks, but individual state private equity returns ranged from 8.1% to 14.3%, signaling the importance of fund selection. This study also examines whether private equity excess returns have compressed over time. We find some evidence of this, but the results are not statistically significant.*

Exhibit 1: Private Equity Performance among State Pensions
Covering 16 Years ending June 30, 2017
Growth of $1.00



* An equal-weighted average of all 21 state funds who reported private equity returns in annual CAFRs for June 30 fiscal years 2002-2017.
** A public equity benchmark weighted 70% to the Russell 3000 Index (6.8% annualized return) and 30% to the MSCI ACWI ex US Index (5.9% annualized return), with assigned weights reflecting Cliffwater's judgement of the US and non-US content of a diversified private equity portfolio.

[1] Updated from August 2017

Study Data and Design

We draw our findings from data provided in the Comprehensive Annual Financial Reports ("CAFRs") published by 94 state pension systems.[2] This list of 94 consolidates state pension systems that use common investment staffs. We select this data source because, unlike commonly used commercial universes, it is a closed group with no selection biases, and represents results for large institutional investors. The list is narrowed to 65 state systems that use the same June 30 fiscal year-end date to achieve consistent performance measurement periods. The list is again reduced to 51 state systems that reported private equity returns for all or part of the fiscal years from 2002 to 2017. Twenty (21) of the 51 state systems operated private equity portfolios for all 16 fiscal years while 30 state systems operated private equity portfolios for a subset of years.[3]

The study period was selected partly because of the ease of data collection. But, the study period also covers two full market cycles, encompassing two bear markets (fiscal years 2002-03 and 2008-09) and two bull markets (fiscal years 2004-07 and 2010-17). Over the entire study period, the Russell 3000 Index of U.S. stocks returned an annualized 6.8% return and the MSCI ACWI ex US Index of non-U.S. stocks returned an annualized 5.9% return. These public equity returns represent risk premiums of 5.4% and 4.5%, respectively, after deducting the 1.4% annualized 3-month T-bill return earned over the same time period, and are representative of current long-term stock return forecasts.

We create two composite performance series from this data. The first is a "21 State Composite" return series, which represents a hypothetical investment at the beginning of FY 2002 in an equal weighted portfolio of the 21 state systems operating private equity portfolios at that time. The 21 State Composite assumes no rebalancing. The second is the "Private Equity Composite" return series calculated by taking the average of all state systems reporting private equity portfolio returns for that fiscal year. The number of state systems included in the yearly average grew steadily over the study period from 21 to 51.

Most state systems have a private equity objective to outperform public equity by some percentage point amount, a common amount being 300 basis points (3%), net of all fees. The 3% incremental return is intended to compensate investors for the added risk, loss of liquidity, and complexity associated with private equity. Different investors have different expectations for the appropriate return spread for private equity over public equity. The equity index used to represent public equity varies as well and we find some state systems targeting a U.S. benchmark like the S&P 500 or Russell 3000 Index and others using a global equity index like the MSCI ACWI ex US Index.[4] We create our own "Public Equity Benchmark" by calculating a weighted average of the Russell 3000 Index (70%) and the MSCI ACWI ex US Index (30%), rebalanced annually. The 70% and 30% weights are, in our judgment, reflective of the typical mix of U.S. and non-U.S. private equity investments in large diversified portfolios.

The return calculations presented in our study follow the reporting practices of state pension systems as described in most CAFRs. Reported fiscal year private equity returns are typically *internal rates of return*, which are then linked in a *time-weighted* fashion to create multiperiod returns. The *internal rate of return* calculation is often used in measuring private equity performance in part because it represents a better measure of return when cash flows are very large in relation to portfolio values and because managers control the timing of cash flows. These two conditions are less relevant for state private equity portfolios that aggregate many underlying private equity funds. First, aggregated private equity cash flows (both inflows and outflows) tend to be modest relative to the size of the overall portfolio**.** Second, at the aggregate

[2] The terms "state pensions", "state pension systems", and "state systems" are used interchangeably throughout the report.

[3] These are state systems that began private equity allocations during the study period. Because of J-curve effects, some states do not report private equity returns until they believe the returns are meaningful. In other cases, Cliffwater did not include early year private equity returns that in its judgment were not reflective of a mature portfolio. States represented in the 21 private equity portfolios covering the entire 16 fiscal years are: AK, CA, CT, DE, HI, ID, IL, IA, KS, MA, MN, NY, OH, OR, PA, RI, TX, VA, WA, and WI. One plan which has had a private equity portfolio since at least 2002 was excluded from the composite because it has not yet released FY 2017 financials.

[4] MSCI ACWI ex US Index represents all global public equity markets excluding the U.S. equity market. "ACWI" is an acronym for All Country World Index.

level the timing of cash flows is also controlled by the pension system itself through its "capital budgeting". For example, a fund manager's eagerness to distribute cash proceeds may be offset by increased new fund commitments by the pension system to preserve "vintage diversification".

Private Equity Performance

Exhibit 1 plots the cumulative returns[5] for the 21 individual state system private equity portfolios as well as our 21 State Composite and Public Equity Benchmark.[6] Annualized returns for the entire 16-year period are reported in the legend.

Key findings include:

1. The private equity portfolios of all 21 state systems outperformed public equities.
2. The magnitude of private equity outperformance is substantial, equaling 4.0% per year over the measurement period.
3. There is a considerable range in private equity return outcomes over the study period, suggesting that state systems vary widely in their implementation.

Exhibit 2 shows return and risk (standard deviation) for private equity over the entire study period and during bull and bear sub-periods. We show two measures of private equity performance: the 21 State Composite (a composite of 21 state systems managing private equity portfolios over the entire 16 fiscal years) and the Private Equity Composite (a composite of all 51 state systems managing private equity portfolios over all or part of the study period).

Exhibit 2: Private Equity versus Public Equity Performance

	Annualized Return			
	Fiscal Years 2002 - 2017	Bull Markets*	Bear Markets*	Standard Deviation
21 State Composite	10.7%	17.5%	-7.5%	14.0%
Public Equity Benchmark	6.6%	14.6%	-14.1%	16.5%
Excess Return	4.0%	2.9%	6.6%	
Private Equity Composite	10.2%	17.0%	-7.7%	13.4%
Public Equity Benchmark	6.6%	14.6%	-14.1%	16.5%
Excess Return	3.6%	2.3%	6.5%	

* Bull Markets is defined as fiscal years 2004-07 and 2010-17. Bear Markets is defined as fiscal years 2002-03 and 2008-09

Key findings include:

4. Private equity performance, relative to public equities, is better in bear market periods compared to bull market periods, though strong excess returns occur in both. This finding runs contrary to the notion of many that private equity is simply levered public equity. If this was so, private equity

[5] Cumulative returns are presented in Exhibit 1 using a "Growth of $1.00" scale, measuring how an initial $1.00 investment would have grown if invested in any individual state system private equity portfolio, our 21 State Composite, or the Public Equity Benchmark.

[6] Individual state systems are not identified.

would perform better than public equity in bull markets and worse than public equity in bear markets.

5. The 21 State Composite performed slightly better than the all 51 state Private Equity Composite, perhaps suggesting that a long legacy of private equity investing is beneficial to return outcomes. It could also simply be that despite our screening out of start-up performance there remains some residual J-curve impact in the Private Equity Composite return series.

Are Private Equity Returns Compressing?

A current investor concern is whether the historical excess return from private equity over public equity can continue. One fact often cited is the failure of private equity to outperform public equity in recent years. We test this specific question through a multiple regression where our fiscal year Private Equity Composite return is the dependent variable and we include three independent variables: (1) concurrent public equity benchmark, (2) the public equity benchmark one year lagged, and (3) time, measured in years. A lagged public equity benchmark is added because we (and others) have found that private equity valuations exhibit a lag, which in our sample extends back one year.

Our regression results show a negative, but statistically insignificant coefficient[7] associated with the passage of time, suggesting that compression in private returns should remain a concern but any conclusion now would be very premature. Importantly as well is that these results apply to averages and not any individual state pension performance.

Private equity is often characterized as levered public equity.[8] We have shown in past research that, statistically, this is an unproven claim. If the characterization was accurate, one would expect that private equity returns would exhibit a beta above one. Our regression coefficients on the concurrent and one-year lagged public equity benchmark equals 0.66 and 0.27, respectively. Both coefficients are statistically significant. Adding these two coefficients together gives a composite public equity beta equal to 0.93, which is consistent with our past reports.

Conclusion

Our study focuses on the private equity performance actually achieved by large state pension systems over a 16 fiscal year period from 2002 to 2017. This data is different from the large amount of universe return data available on individual private equity funds – such universe return data ignores the selections, weightings, co-investments, and other decision factors that state pensions make in managing a private equity portfolio.

We find that private equity has produced a significant 4.0% annualized excess return over public equity of similar geographic composition. We test for gradual diminution of excess return over time, a current topic of interest given very strong public equity returns. We measure a decline in excess return for private equity but one that is not statistically significant and applies to averages only.

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[7] T-stat equal to -1.45.

[8] See, for example, *Benchmarks for Private Market Investments*, Stephen L. Nesbitt and Hal W. Reynolds, Journal of Portfolio Management, Summer 1997, for a discussion of private equity risk and leveraged public equity.