

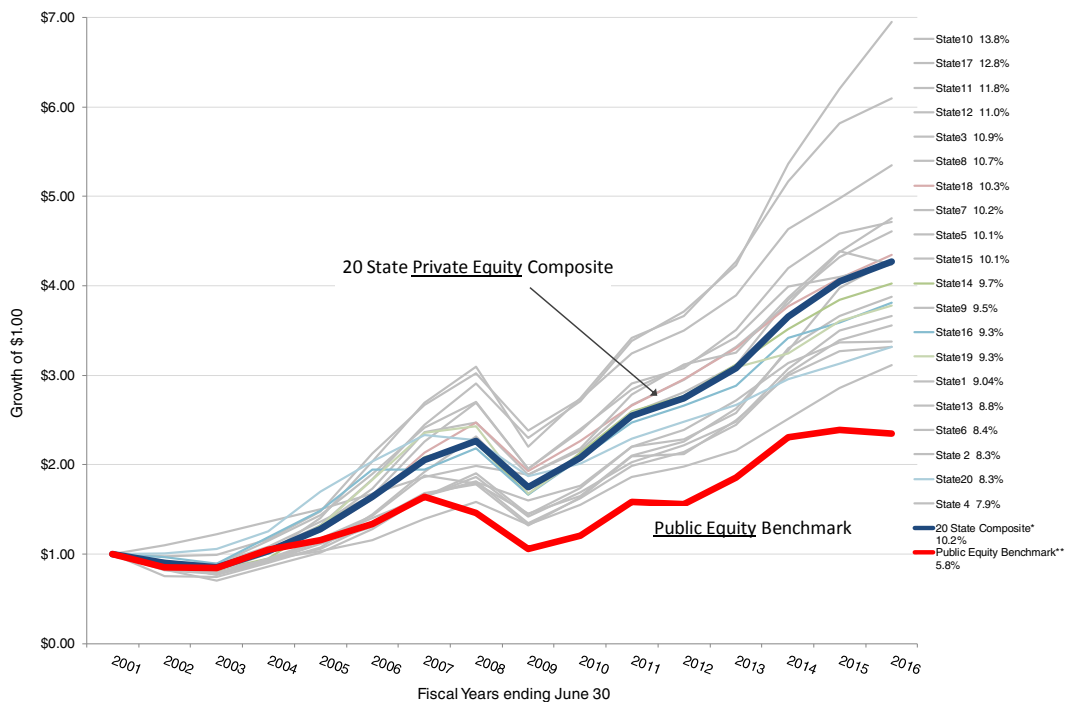
An Examination of Private Equity Performance among State Pensions: Evidence for a Systemic Asset Allocation Underweight

(Covering the 15-year period ending June 30, 2016)

August 10, 2017

*Our study finds that private equity produced a **10.2%** annualized return across state pensions for the 15-year period covering June 30 fiscal years 2002 through 2016, or **4.4%** above the **5.8%** annualized return earned by a public equity benchmark. All state pensions that operated private equity portfolios over the entire period outperformed public stocks but individual private equity returns ranged from 7.9% to 13.8%, signaling the importance of implementation. The success state pensions have had with their private equity portfolios is at odds with low single digit allocations to this asset class. Underestimated expected return and overestimated risk in asset allocation studies are possible explanations.*

Exhibit 1: Private Equity Performance among State Pensions
Covering 15 Years ending June 30, 2016
Growth of \$1.00



* A composite comprised of the private equity portfolios of 20 state pensions for June 30 fiscal years 2002-2016.

** A public equity benchmark weighted 70% to the Russell 3000 Index (6.1% annualized return) and 30% to the MSCI ACWI ex US Index (5.0% annualized return), with assigned weights reflecting Cliffwater's judgment of the U.S. and non-U.S. content of a diversified private equity portfolio.

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Study Data and Design

We draw our findings from data provided in the Comprehensive Annual Financial Reports (“CAFRs”) published by 93 state pension systems.¹ This list of 93 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 46 state systems that reported private equity returns for all or part of the fiscal years from 2002 to 2016. Twenty (20) of the 46 state systems operated private equity portfolios for all 15 fiscal years while 26 state systems operated private equity portfolios for a subset of years.²

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 2010-16). Over the entire study period, the Russell 3000 Index of U.S. stocks returned an annualized 6.1% return and the MSCI ACWI ex US Index of non-U.S. stocks returned an annualized 5.0% return.

We create two composite performance series from this data. The first is a “20 State Composite” return series, which represents a hypothetical investment at the beginning of FY 2002 in an equal weighted portfolio of the 20 state systems operating private equity portfolios at that time. The 20 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 20 to 46.

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.³ 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%). 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.

All return calculations presented in our study are *time-weighted*, consistent with the time-weighted returns reported by state systems in their CAFRs. An *internal rate of return* calculation is often used in measuring private equity in part because it represents a better measure of return when cash flows are very large in relation to portfolio values. This does not apply as much to measuring the performance of large state system private equity portfolios where aggregated private equity cash flows (both inflows and outflows) tend to be modest relative to the size of the overall portfolio.

¹ The terms “state pensions”, “state pension systems”, and “state systems” are used interchangeably throughout the report.

² 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 20 private equity portfolios covering the entire 15 fiscal years are: AK, CA, CT, DE, ID, IL, IA, KS, MA, MN, NY, OH, OR, PA, RI, TX, VA, WA, and WI.

³ 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.

Private Equity Performance

Exhibit 1 plots the cumulative returns⁴ of the 20 individual state system private equity portfolios as well as our 20 State Composite and Public Equity Benchmark.⁵ Annualized returns for the entire 15-year period are reported in the legend.

Key findings include:

1. The private equity portfolios of all 20 state systems outperformed public equities.
2. The magnitude of private equity outperformance is substantial, equaling 4.4% 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 strategy and 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 20 State Composite (a composite of 20 state systems managing private equity portfolios over the entire 15 fiscal years) and the Private Equity Composite (a composite of all 46 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 - 2016	Bull Markets*	Bear Markets*	Standard Deviation
20 State Composite	10.2%	17.3%	-7.6%	14.3%
Public Equity Benchmark	<u>5.8%</u>	<u>14.2%</u>	<u>-14.1%</u>	16.8%
Excess Return	4.4%	3.1%	6.5%	
Private Equity Composite	9.7%	16.9%	-7.8%	13.7%
Public Equity Benchmark	<u>5.8%</u>	<u>14.2%</u>	<u>-14.1%</u>	16.8%
Excess Return	4.0%	2.7%	6.3%	

* Bull Markets is defined as fiscal years 2004-07 and 2010-16. 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 would perform better than public equity in bull markets and worse than public equity in bear markets.
5. The 20 State Composite performed slightly better than the all 46 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.

⁴ 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 20 State Composite, or the Public Equity Benchmark.

⁵ Individual state systems are not identified.

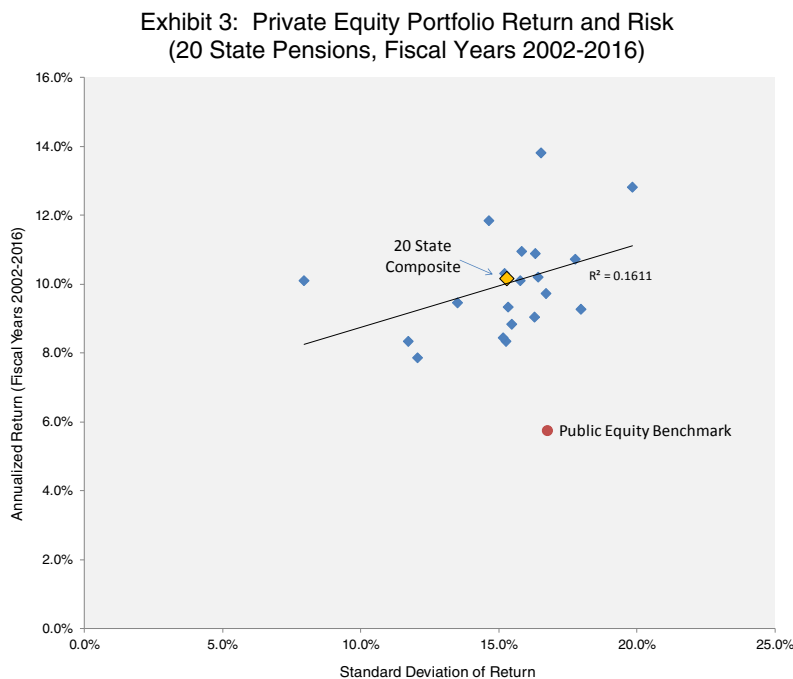
6. Excess returns do not exhibit compression over the 15 fiscal year study period. In fact, we find a small positive, though statistically insignificant, relationship between fiscal year and excess return.⁶

Cliffwater has consistently used a long term return forecast for private equity that equals 3 percentage points above its return forecast for publicly traded stocks. Our study findings suggest that, historically, our methodology has been reasonable, if conservative, and that looking ahead there is little reason to alter it.

A recent survey of 35 investment advisors offering capital market assumptions reported an average long term expected return for private equity equal to 9.2%, with an excess return equal to 2.3% above an average public equity expected return equal to 6.9%.⁷ Like Cliffwater's 3.0% expected excess return for private equity over public equity, the average 2.3% excess expected return in the survey is even more conservative compared to the 4.4% actual excess return found in our study.

Private Equity Risk and Correlation

Exhibit 3 plots the 20 individual state system private equity portfolio return and risk, covering the 15 year study period. Shown at the center is the 10.2% average return and 15.3% average risk for the 20 state group.⁸ As a comparison, the 5.8% return and 16.8% risk for the Public Equity Benchmark is provided as well.



⁶ We conduct a multiple regression with fiscal year excess return for the Private Equity Composite as the dependent variable and time and the Public Equity Benchmark as independent variables. Including the Public Equity Benchmark corrects for the bull/bear effect on Private Equity Composite excess returns as noted in Exhibit 2.

⁷ Horizon Actuarial Services LLC, *Survey of Capital Market Assumptions, 2016 Edition*. All expected returns are geometric. The 6.9% expected return for public stocks cited above is a Cliffwater composite calculation of four surveyed public equity expected returns: U.S. Equity-Large Cap (6.64%), U.S. Equity-Small/Mid Cap (7.00%), Non-U.S. Equity-Developed (7.12%), and Non-U.S. Equity-Emerging Market (8.48%), with weights of 56%, 14%, 24%, and 6%, respectively, to approximately mirror index weights in our Public Equity Benchmark return series.

⁸ The 15.3% standard deviation in Exhibit 3 represents the average of standard deviations for the individual 20 state system private equity portfolios. This is a different calculation than the 14.3% standard deviation reported in Exhibit 2 which is a single calculation based upon yearly composite returns of the 20 state system private equity portfolios. We believe the 15.3% calculation is a better representation of expected private equity risk because it reflects the actual volatility experienced by individual diversified private equity portfolios rather than a combination of multiple private equity portfolios which is impractical.

Like the wide range of individual state system private equity returns shown in Exhibit 1, individual state system private equity risk levels also vary considerably from 8.0% to 19.8%. Interestingly, the average 15.3% risk for the group falls below the 16.8% risk for the Public Equity Benchmark, a finding that is contrary to the predominate view by allocators that private equity volatility is greater than for public equity⁹ and which is often derived from the notion that private equity simply represents a levered form of public equity.¹⁰ In the same survey of 35 investment advisors, the average expected risk used for private equity was 23.1% versus 18.7% for public stocks.¹¹

One explanation for advisors' higher expected private equity risk levels is a concern that actual measured risk, as in our study, possibly understates true private equity risk due to a "smoothing" of returns thought to be the consequence of periodic valuations that are more cost-based and "sticky" from period to period. However, the introduction of fair value accounting under FAS 157 (2007) has changed the valuation process for private equity, making measured risk a more reliable proxy for future risk.

The actual presence of smoothing can be discovered statistically by measuring serial correlation of periodic returns. Despite concerns, we find little or no evidence of serial correlation (smoothing) in the annual private equity returns reported by the 20 states managing private equity portfolios for all 15 fiscal years.¹²

Another explanation for higher private equity risk forecasts is that advisors conceive of higher allocations to venture capital in making forecasts of risk than what is present in the private equity portfolios of state pensions. This explanation, even if it is true, is unlikely to explain such a large discrepancy in advisors' risk forecasts and actual risk levels experienced by state pensions, which are often restricted in allocating to venture capital due to their asset size or disclosure rules.

Some advisory firms assume roughly equivalent Sharpe Ratios for private and public equities. This leads one to use a substantially higher expected risk for private equity given the higher expected return for private versus public equity. This could be called "Sharpe Ratio Equivalence". Others use the Black-Litterman model where expected return and risk are derived from actual market weights rather than the other way around. In this model the low market allocation to private equity dictates that either expected return is low or risk is high.

A final important risk statistic is the correlation between private and public equity. We find a 0.80 average correlation between the private equity returns for state systems included in the 20 State Composite and our Public Equity Benchmark return. Correlations for these individual state system private equity portfolios with the Public Equity Benchmark range between 0.67 and 0.89.¹³ These high measured historical correlations are modestly below the expected correlations used by advisors.¹⁴

Our findings suggest that private equity investors and advisors understate return and overstate risk in their long term expectations for private equity relative to the historical experience of large private equity investors. These misestimations, if correct, produce lower, suboptimal private equity portfolio weights in asset allocation studies. Advisors should engage in a closer inspection of their private equity return and risk forecasts in light of this evidence.

⁹ See footnote 7, above.

¹⁰ 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.

¹¹ As with the surveyed private equity expected return (see footnote 7), we take a weighted average of expected risk for public equity components to derive an overall public equity expected risk consistent with the Public Equity Benchmark. This calculation does not take into account correlations among public equity components, which are not included in the survey report.

¹² We measure the correlation between annual private equity returns and the prior year private equity returns. The average correlation is 0.19 with values ranging between a low of -0.06 to a high of 0.46. By comparison, the Public Equity Benchmark displayed a serial correlation equal to 0.10 for the same period.

¹³ These fairly high correlations are also inconsistent with the smoothing of returns.

¹⁴ Expected correlations are not provided in the Horizon survey. JPMorgan and BlackRock expected long term correlations between private equity and global public equity for 2017 are 0.84 and 0.85, respectively.

Conclusion

Our study focuses on the private equity performance actually achieved by large state pension systems over a 15 fiscal year period from 2002 to 2016. 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 4.4% annualized excess return over public equity of similar geographic composition. Equally important to asset allocation, the return volatility of private equity portfolios has been roughly the same as that of public equity. Both our return and risk findings suggest higher allocations to private equity than generally found in most large institutional portfolios. One possible explanation for low private equity allocations is that advisors' expected returns and risks for private equity are considerably less favorable than what our data suggests they ought to be. Other possible explanations include private equity illiquidity, complexity, and implementation challenges.

Stephen L. Nesbitt
snesbitt@cliffwater.com