



What gets measured
gets managed

Asset Allocation and Fund Performance of U.S. Defined Benefit Pension Plans (1998-2011)

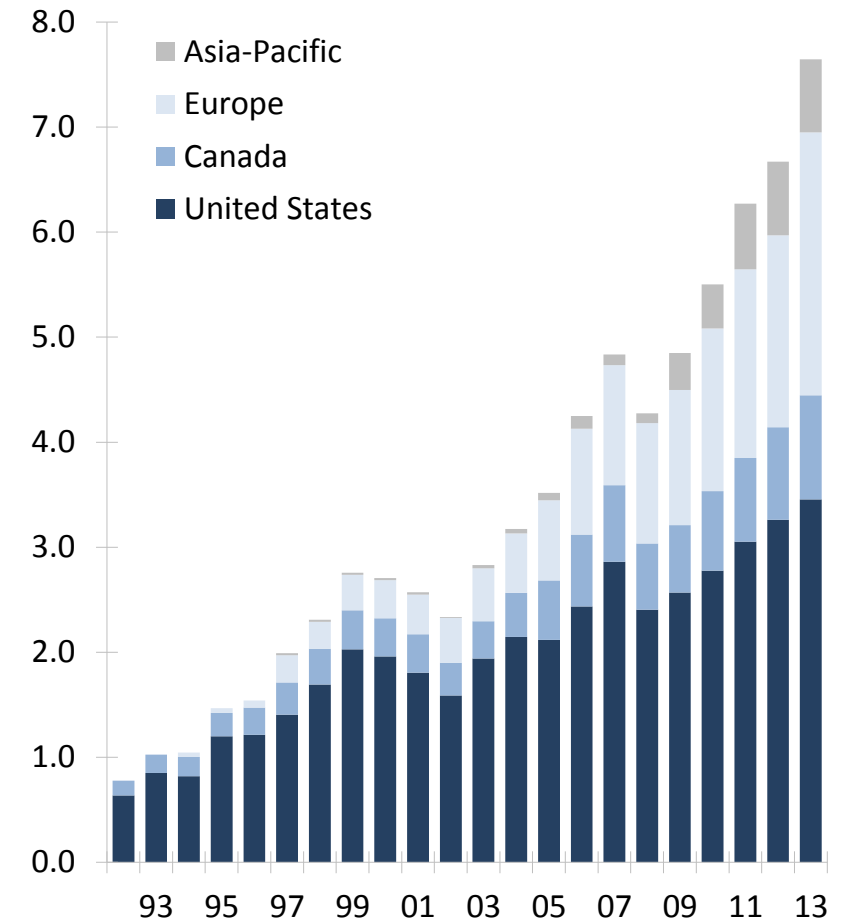
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CEM Benchmarking

About CEM Benchmarking

- Client base of over 500 large institutional investors – DB funds, DC funds, sovereign wealth funds, endowments, etc.
- The database is global – U.S., Canada, Europe, U.K., Australia, China, Middle East etc.
- The database is old – we have been in the business for over 25 years
- We are not consultants – benchmarking is all we do

Data and Conclusions from Our Global Database

- Database exceeds \$8 trillion (USD) in AUM
- Information includes:
 - Holdings by asset class and style (active, passive, internal, external)
 - Returns, net and gross
 - Benchmarks
 - Risk
 - Investment Costs (base fees, performance fees, monitoring fees, internal costs, oversight, etc.)
- Conclusions:
 - Paying more does not give you more
 - Corporate plans outperform
 - Large plans outperform
 - Internal management outperforms external
 - Active beats passive for some asset classes, but not others



Recent Research

- Organizational Design (2011)
- Risk management best practices (2012)
- Illiquid Asset Benchmarking (2013)
- **Asset Allocation and Fund Performance (2014)**
- Performance Targets (2014)
- Hedge Funds (2015)
- Private Equity Full Cost Disclosure (2015)

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ASSET ALLOCATION AND FUND PERFORMANCE OF DEFINED BENEFIT PENSION FUNDS IN THE UNITED STATES BETWEEN 1998-2011

Performance differences among defined benefit pension funds in the U.S. primarily result from differences in the asset allocation decisions they make. Between 1998 and 2011, large corporate sector funds distinguished themselves by having a much higher net return compared to public sector and small and mid-sized corporate sector funds. They achieved this by radically altering their allocations just prior to the Global Financial Crisis. The key decision was a timely increase in their allocation to long duration fixed income funded through a decrease in allocation to U.S. large cap stock. Interestingly, pension funds could have achieved similar results by having a meaningful allocation to equity REITs and/or other real assets (i.e., infrastructure, commodities, etc.) which, on average, they did not have.



Why 1998-2011?

1998

- New asset class, hedge funds (worst performer)
- New asset class, REITs (best performer)

2011

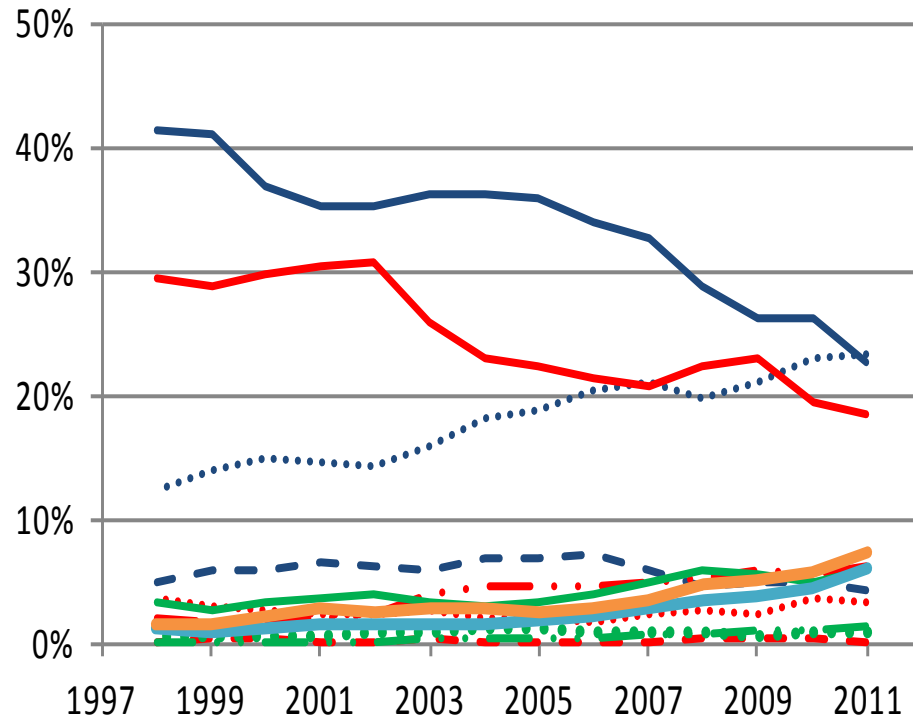
- In 2014 we are collecting 2013 data, so 2012 is the latest and greatest
- 2012 private real estate performance data is actually from 2011 (severe reporting lag in illiquid asset classes)

In simple terms, performance may be broken into three components:

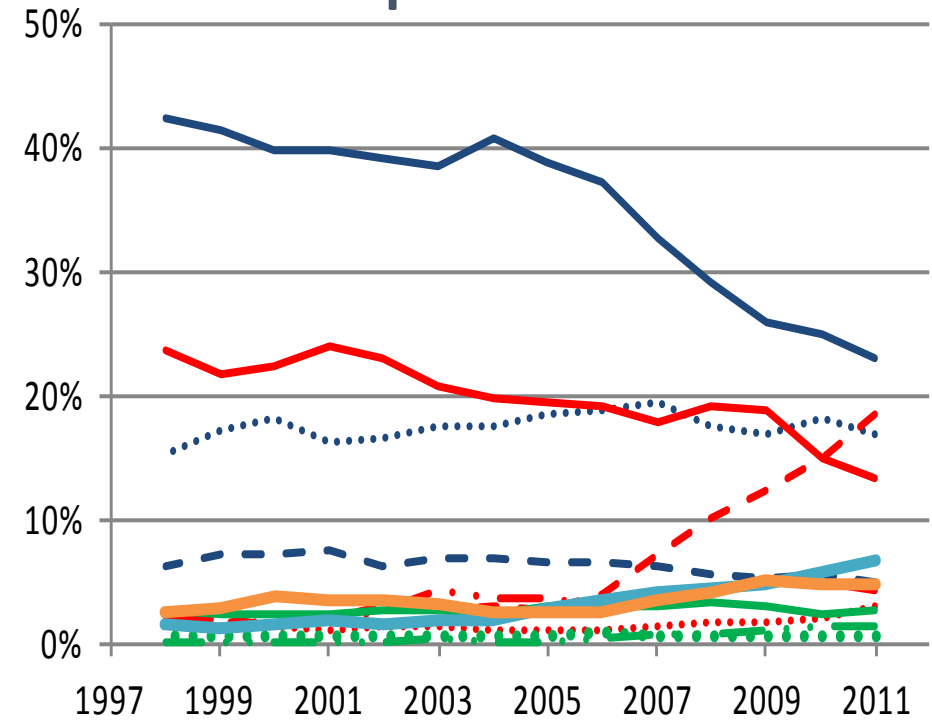
1. Asset allocation
2. Out-performance / under-performance of asset classes (beta)
3. Out-performance / under-performance within asset classes (alpha)

1. Asset allocation – corporates went LDI in 2008

Public Plans



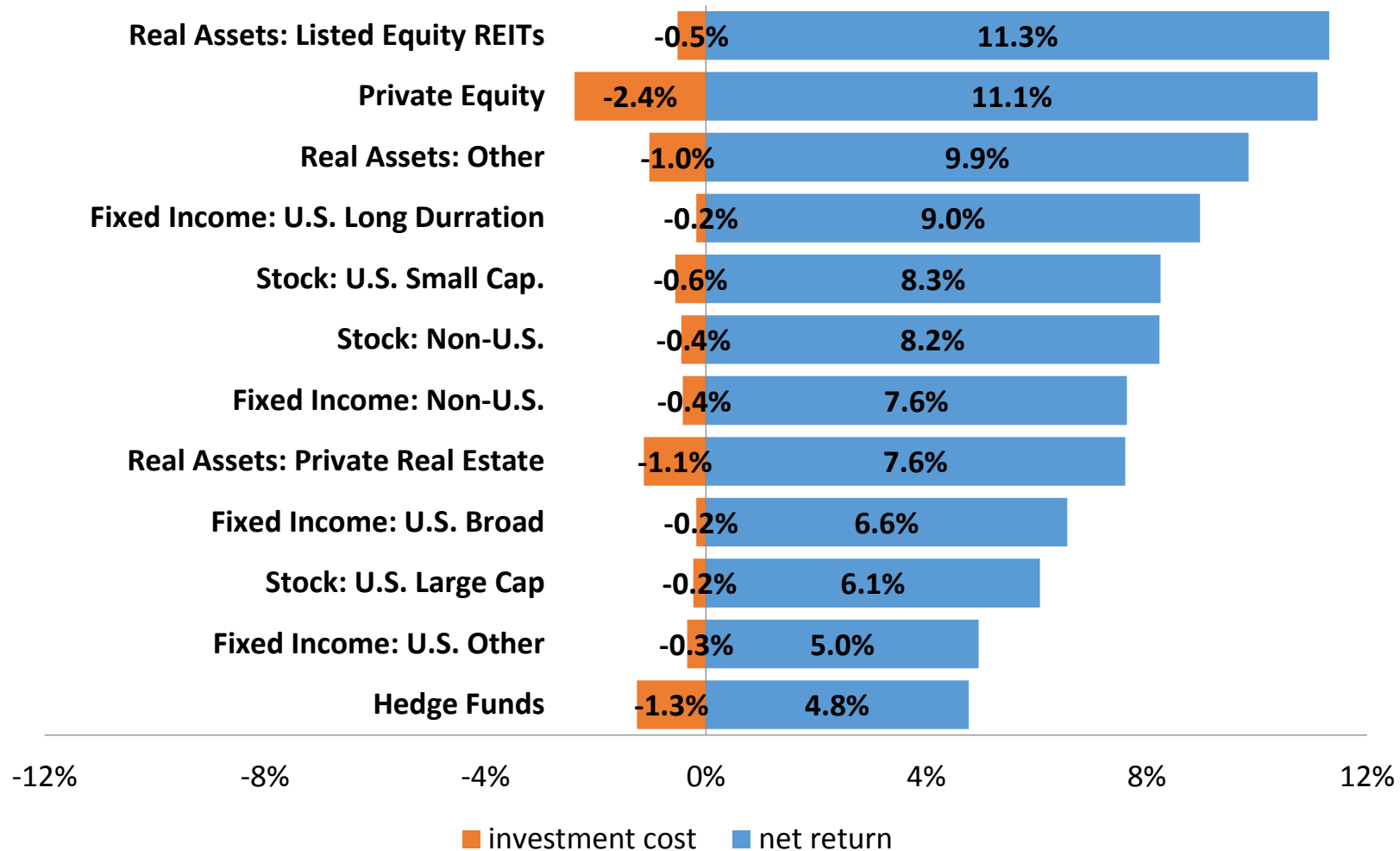
Corporate Plans



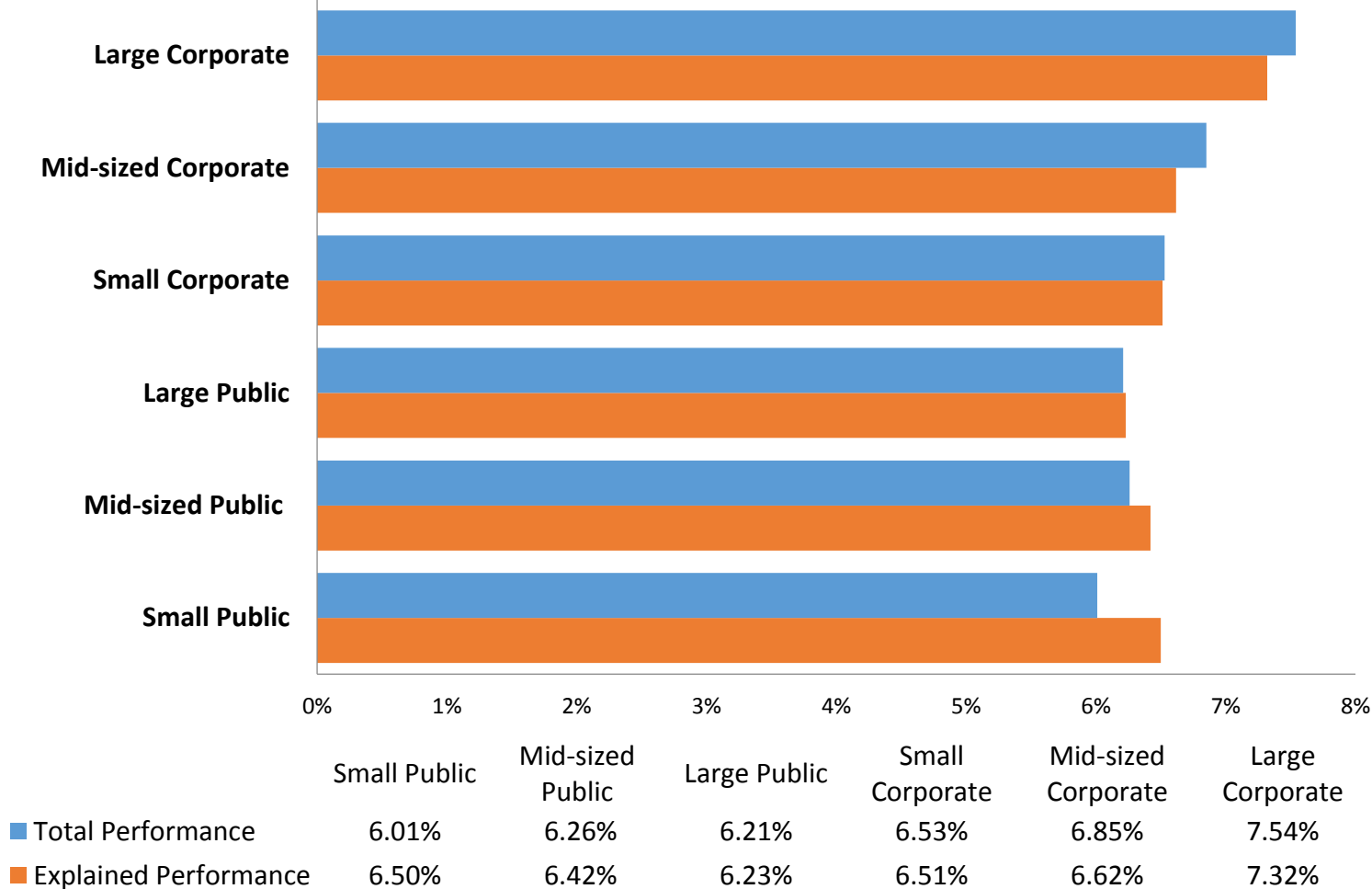
- Stock: U.S. Large Cap
- - - Stock: U.S. Small Cap
- - - Fixed Income: U.S. Long Bonds
- . . Fixed Income: U.S. Other
- . . . Real Assets: REITs
- . . Real Assets: Other

- . . . Stock: Non U.S.
- . . Fixed Income: Non U.S.
- Real Assets: Private Real Estate
- TAA/Hedge Funds
- Private Equity

2. Asset class performance – REITs performed the best, hedge funds the worst



The two (allocation and performance) explains *most* of fund performance



Small public sector plans should have been average, but weren't? Why?

- Small public sector funds should have earned on average 6.5%
- Instead, they earned 6.0%
- Difference is caused by *underperformance* in illiquid asset classes *caused almost entirely by excess cost* (private equity and private real estate)
- Was there an alternative?

Are REIT based benchmarks valid for real estate?

REITs

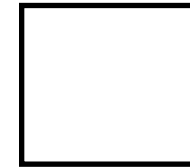
Private Real Estate



Exposure to Real Estate



Leverage



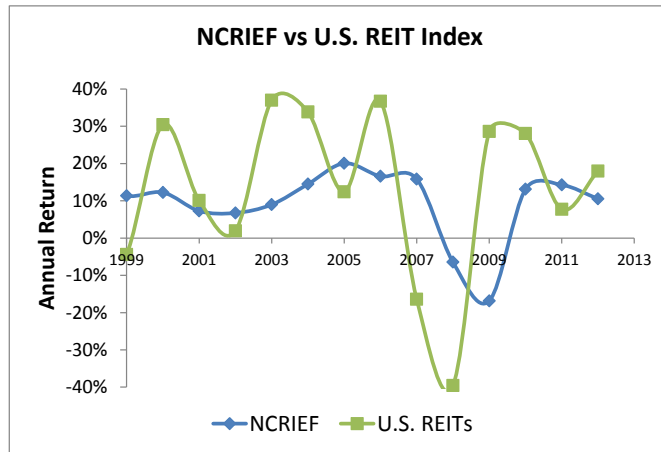
Smoothing



Reporting Lag

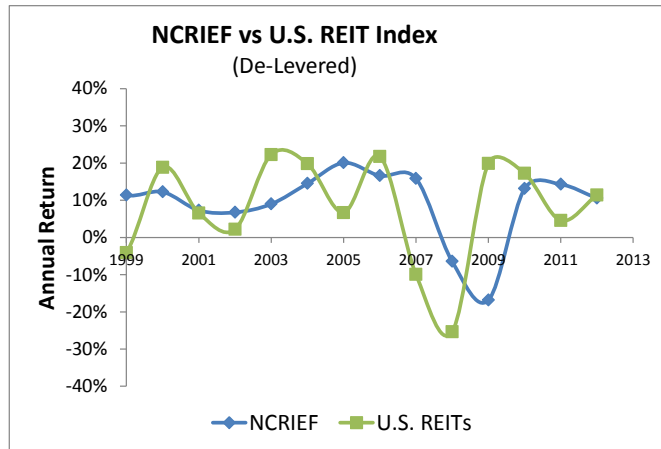
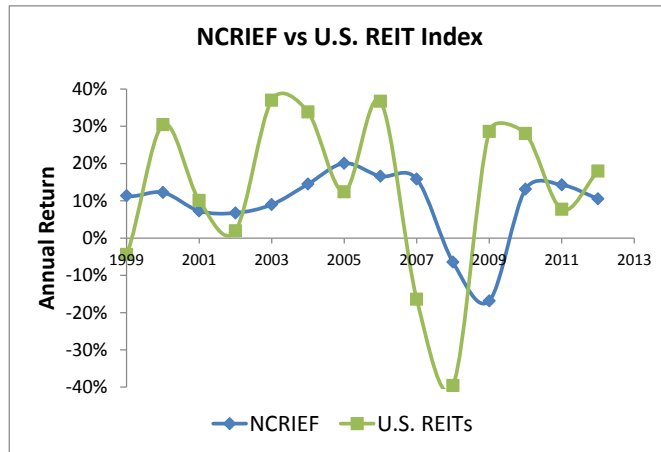


The real estate component of REITs and private real estate are highly correlated (a simple demonstration)



Start with REIT index and private real estate index returns

The real estate component of REITs and private real estate are highly correlated (a simple demonstration)

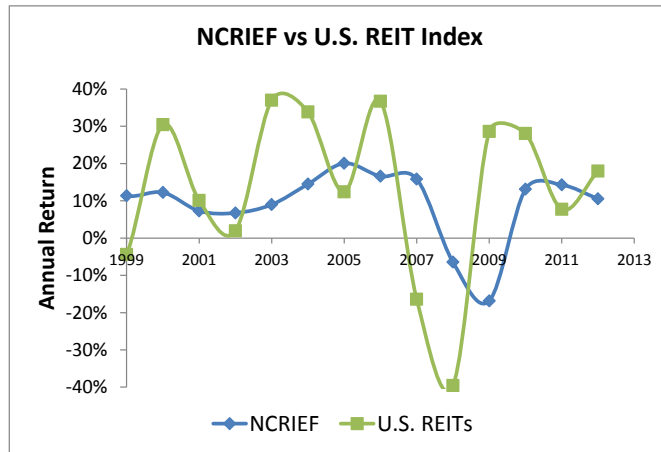


Step #1:

Either:

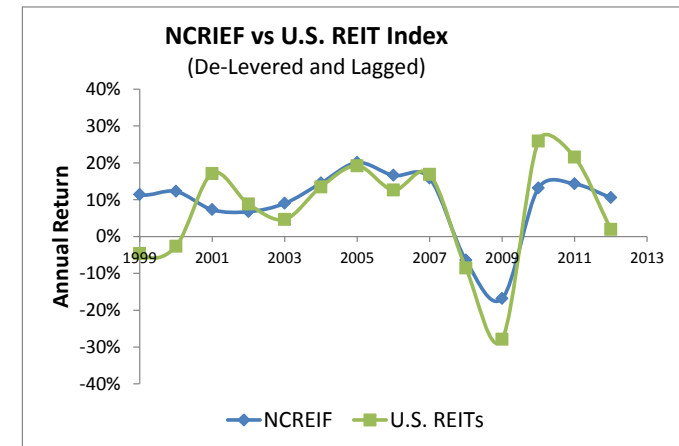
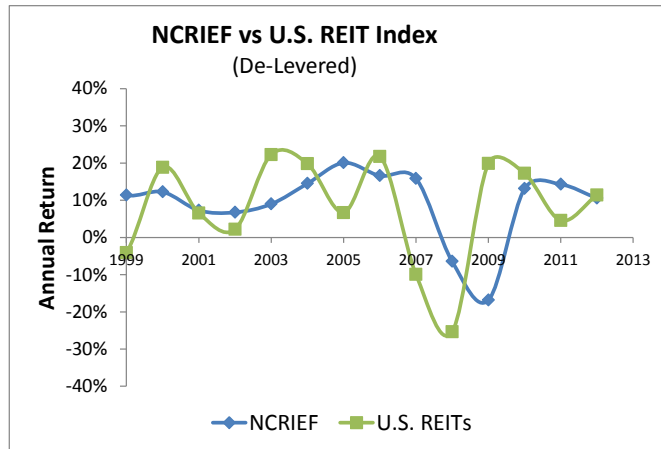
- a) Leverage private real estate or,
- b) De-lever REITs

The real estate component of REITs and private real estate are highly correlated (a simple demonstration)

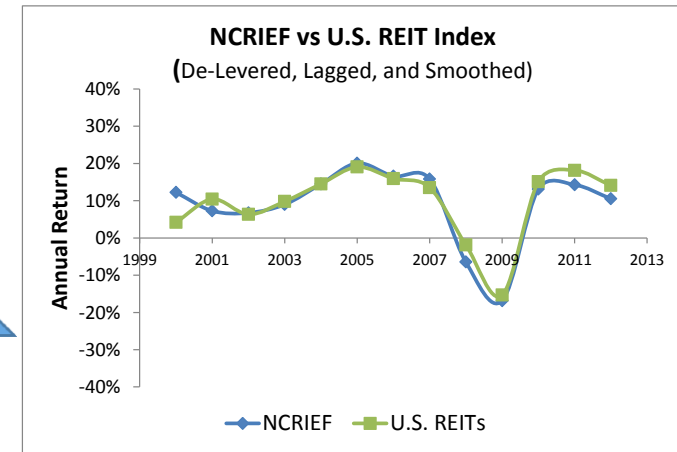
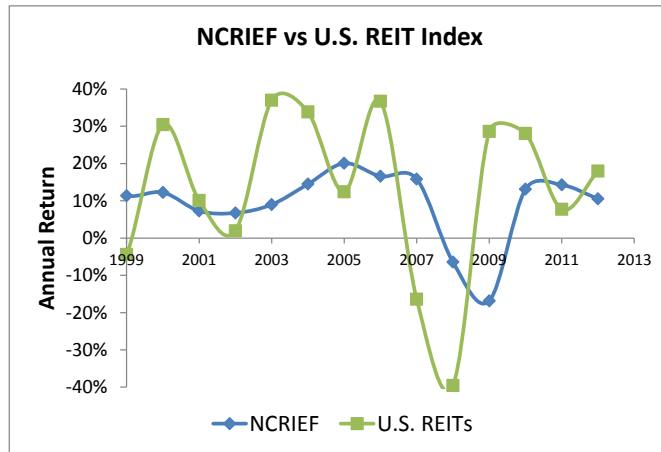


Either:

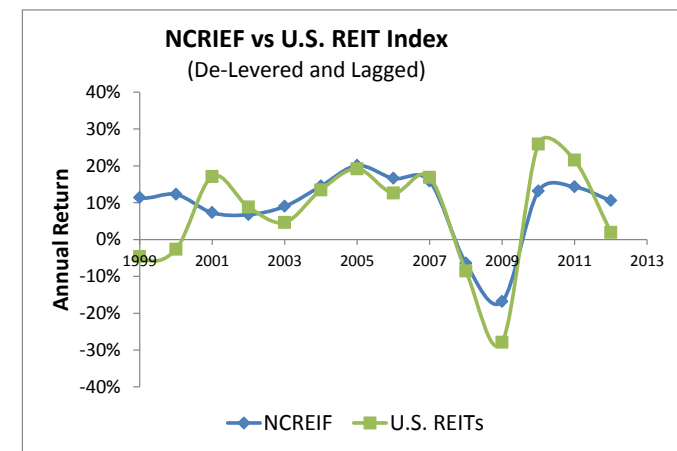
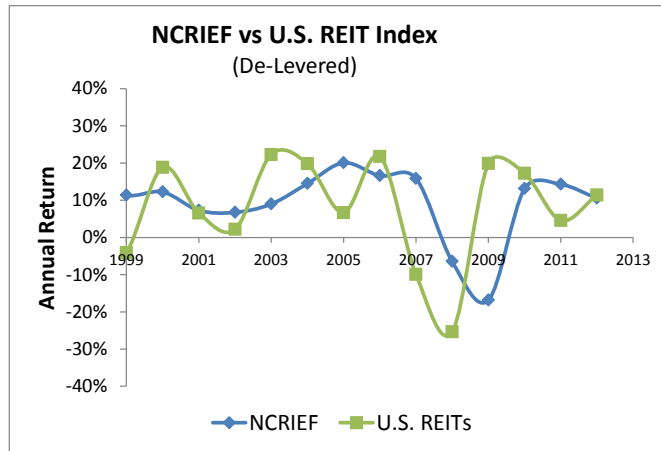
- a) Lag REIT returns or,
- b) Correct private real estate returns for reporting lag



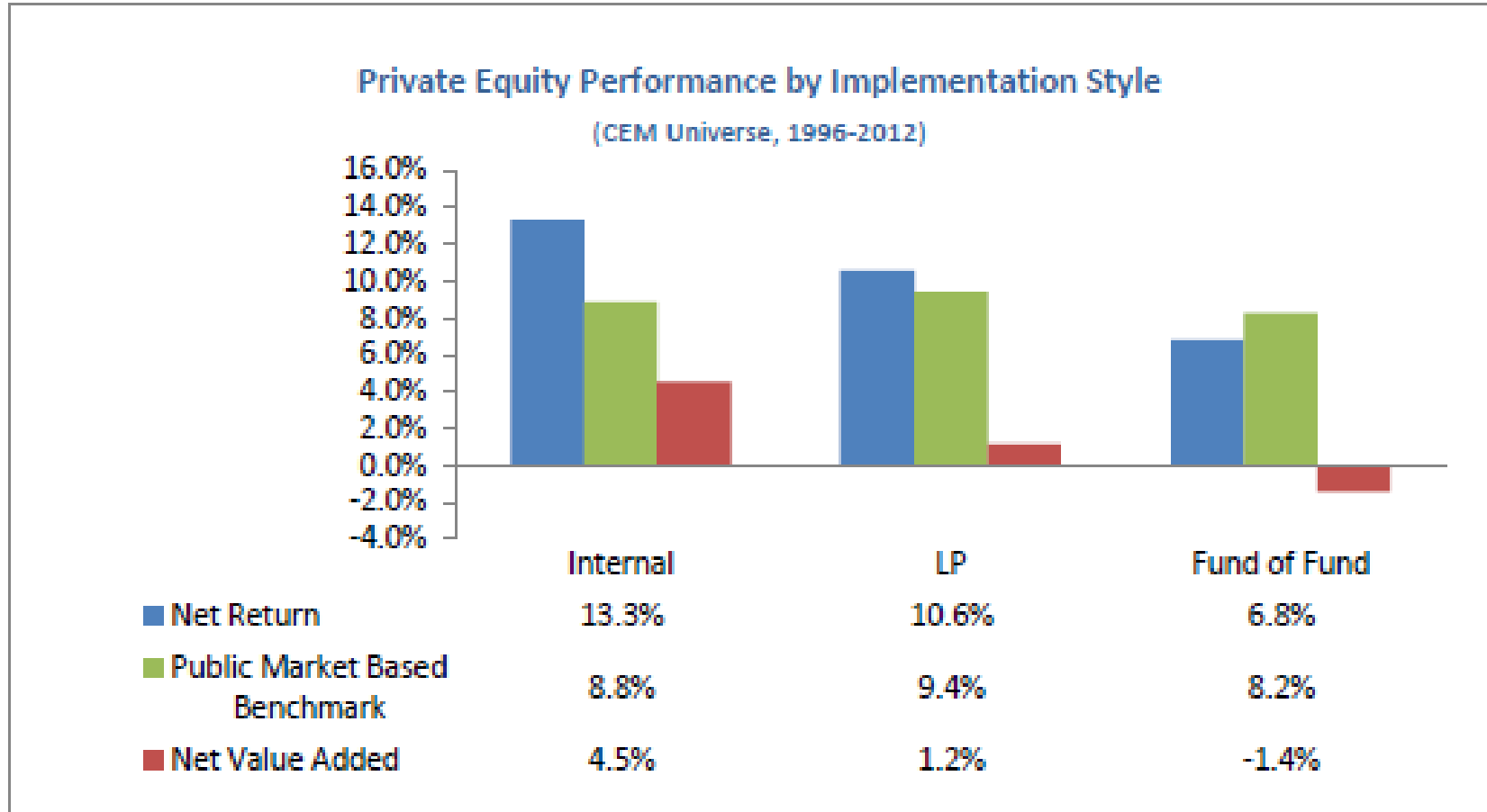
The real estate component of REITs and private real estate are highly correlated (a simple demonstration)



Step #3:
Either:
a) Smooth REITs or,
b) De-smooth private
real estate



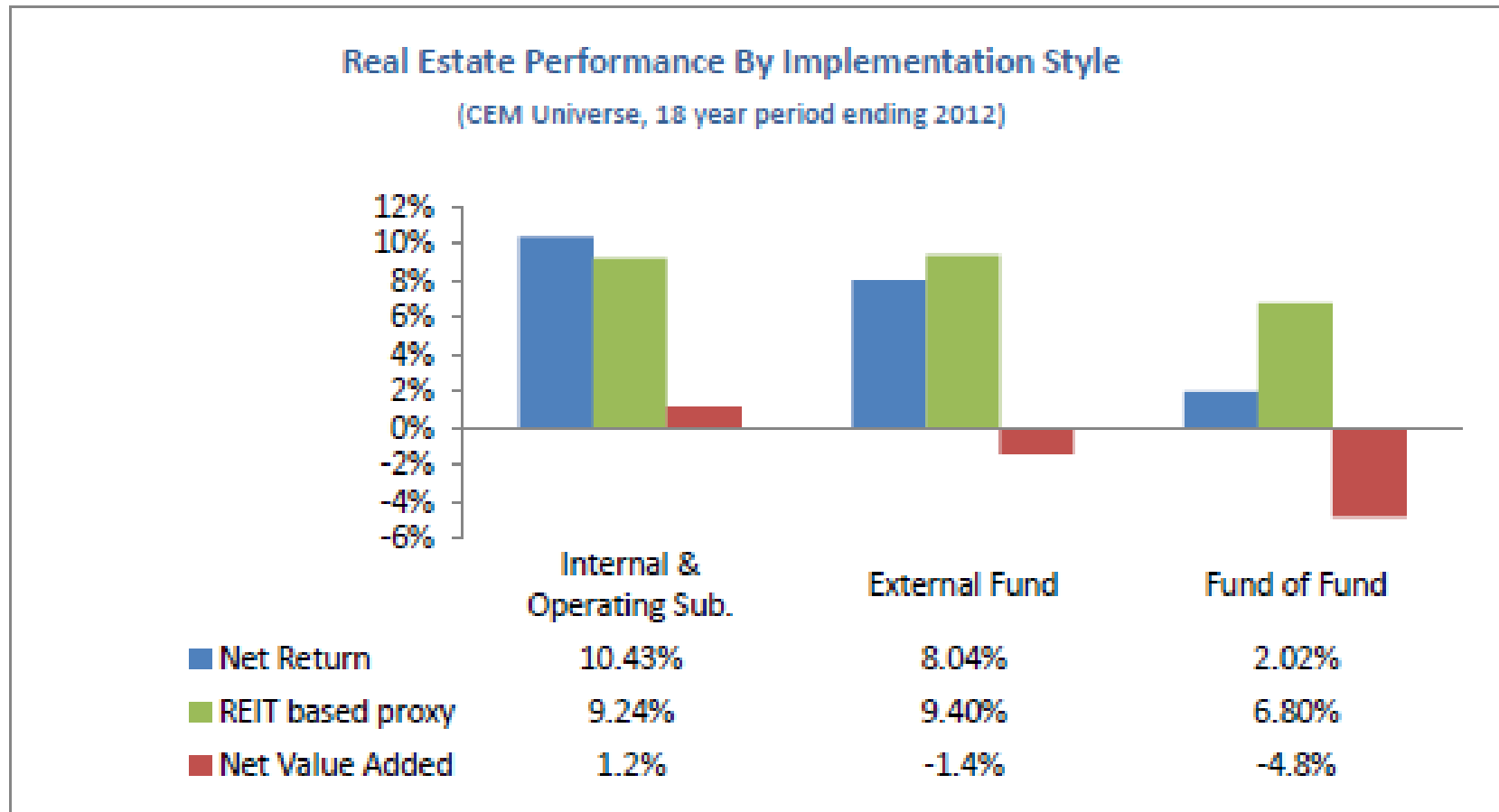
Value added from illiquid assets depends on style (cost)



1) Returns are the average of all observations for which CEM could calculate a benchmark with a provided return. A single observation is a given fund, in a given year. There were 154 internal, 1492 LP and 822 fund of fund observations.

2) The public market benchmark has been custom-lagged for each fund, and adjusted for an assumed regional mix. Differences in the public market benchmark between implementation styles reflect differences in the average regional mix of the funds and average years of history.

Private Real Estate shows the same behavior

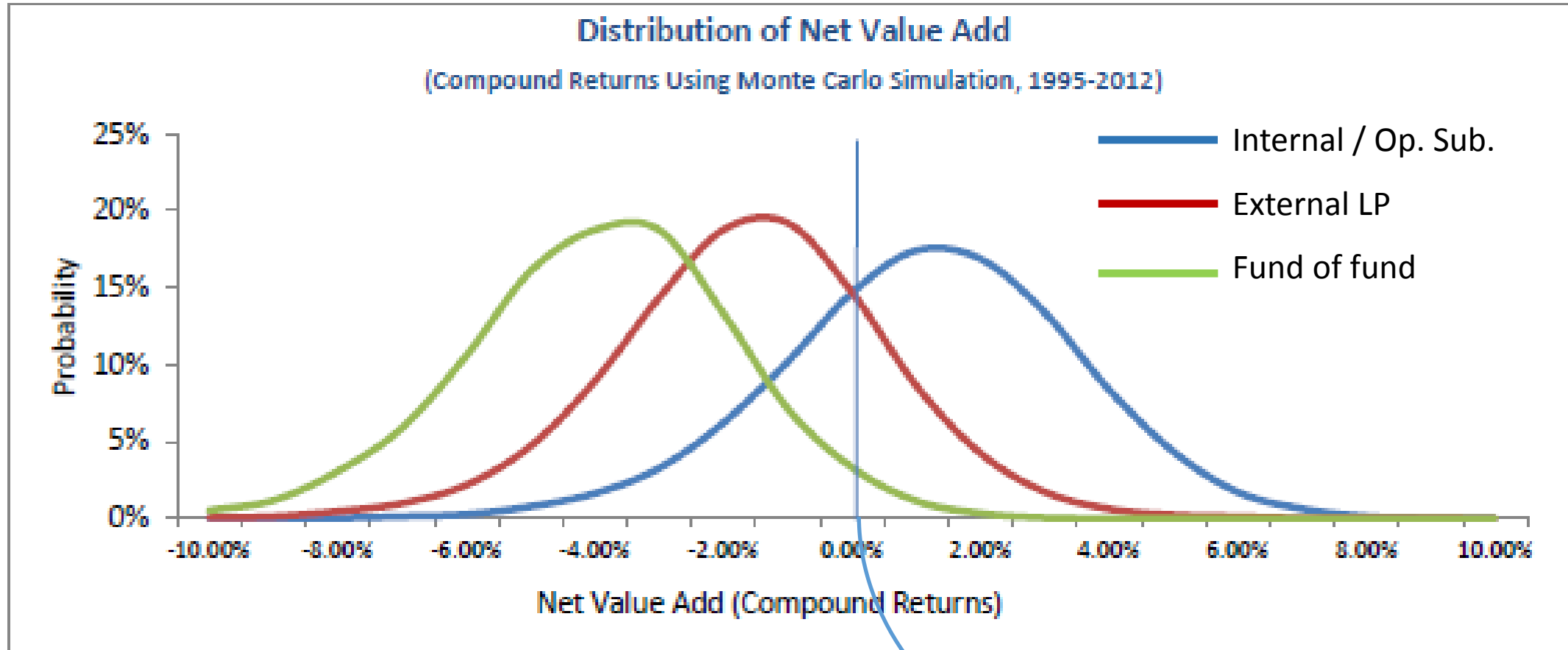


1) Returns are the average of all observations for which CEM could calculate a benchmark with a provided return. A single observation is a given fund, in a given year. There were 627 Internal & Operating Subsidiary, 2655 External fund and 139 Fund of Fund observations.

2) The public market benchmark has been custom-lagged for each fund, and adjusted for an assumed regional mix. Differences in the public market benchmark between implementation styles reflect differences in the average regional mix of the funds and average years of history.

Returns for illiquid assets are disperse

(here private real estate, private equity shows the same behavior)



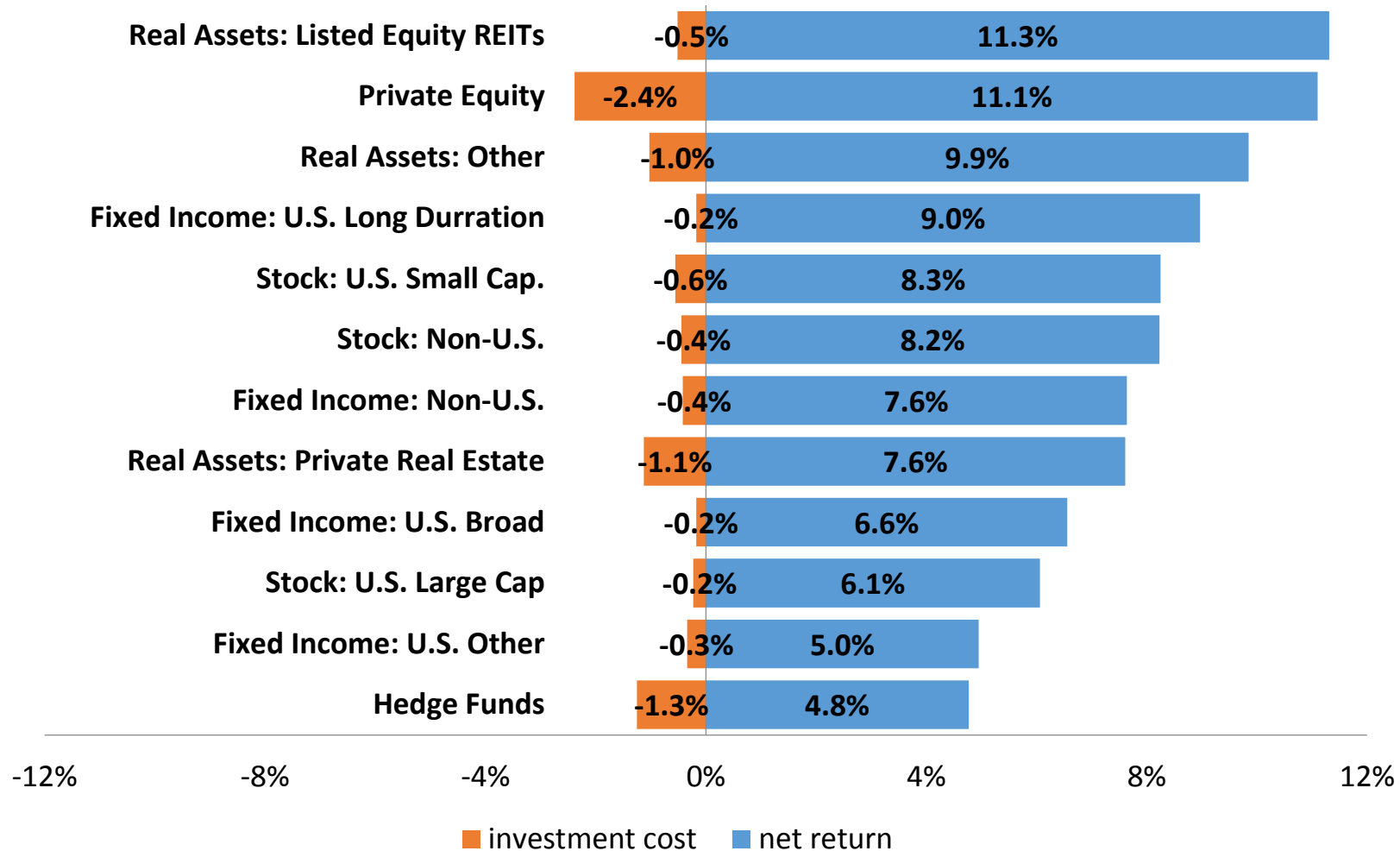
Passive equity REITs

The difference in performance is cost

(example using private equity costs)

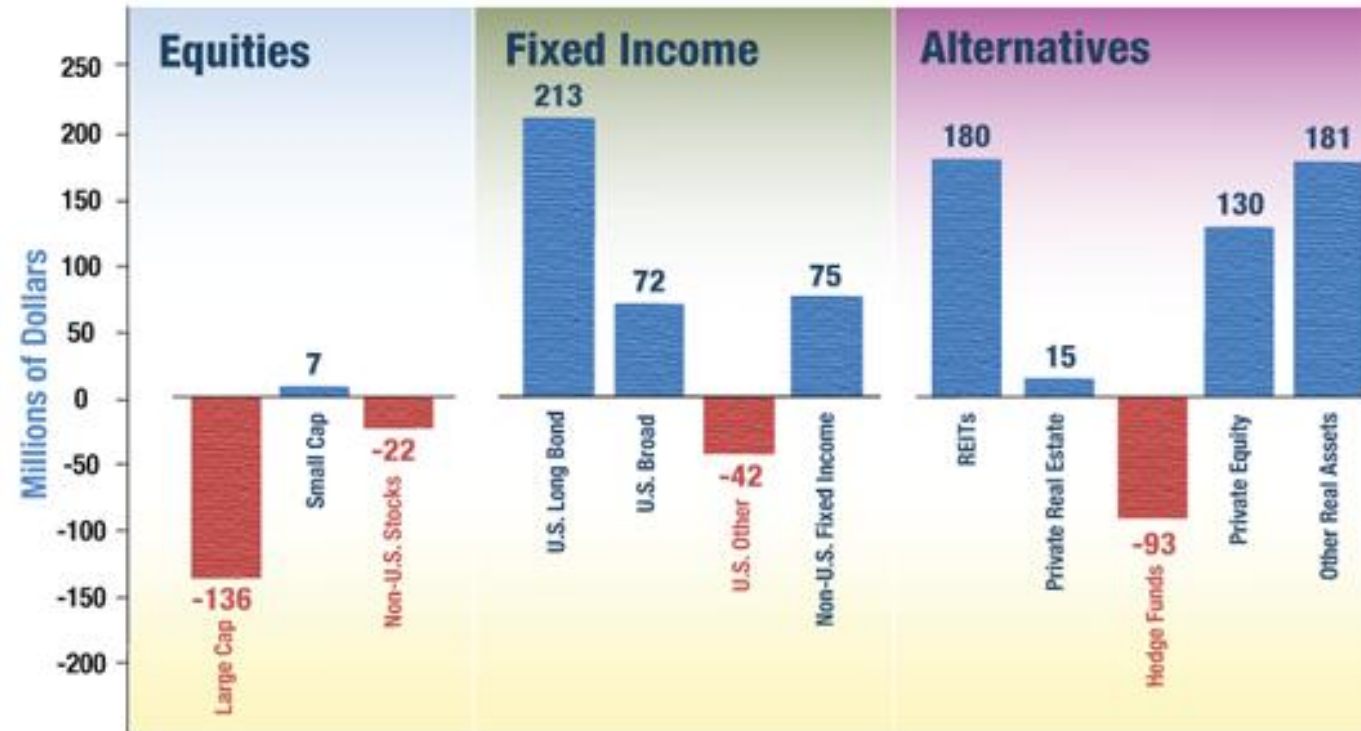
| Cost Category | Median Cost as a % of Net Asset Value |
|--|--|
| Internal monitoring costs | 0.12 |
| Management Fees | 1.66 |
| Carry / performance fees | 1.10 |
| Transaction costs | 0.15 |
| Total Direct LP (or external) costs | 3.03 |
| Fund of fund management fees | 1.14 |
| Fund of fund carry | 1.40 |
| Implied total fund of fund costs | 5.56 |

Back to returns – difference in fund performance is (i) allocation and (ii) cost



What is the impact of a 1% change in allocation?

Impact of a 1-percentage point increase in portfolio allocation on total assets, 1998-2011.



Conclusions

- Large corporate DB funds out-performed (average return 7.5%) because:
 - Lower allocation to large cap U.S. equities,
 - Greater (and timely) allocation to long duration fixed income.
- Small public sector funds under-performed (average return 6.0%) because:
 - Costly implementation (and thus under-performance of) illiquid assets.
- Listed equity REITs best performing asset class, hedge funds the worst
- Greatest asset allocation impacts for a typical \$15 billion fund (14 years compound) :
 - \$213 million – long duration fixed income
 - \$181 million – other real assets (infrastructure, commodities)
 - \$180 million – listed equity REITs