

Following the Herd: Have Alternative Asset Funds Delivered Superior Risk-Adjusted Returns? No! Funding Ratios and Private Equity Allocations



State retirement systems are under-funded; they have increased their allocation to alternatives, which include private equity, real estate and hedge funds, and have incurred added risk without positive alpha. Will alternative assets, especially real estate value-add and opportunistic investment funds, solve the under-funding problem? Probably not. If not, then why invest in value-add or opportunistic real estate funds? Why did public pension funds increase their allocations to alternative assets? Public pension funds, despite their tilt to alternative assets, have little to show for that effort. Will diminished public services be the result of underfunding. Can alternatives eventually save the day? Are taxpayers prepared for the shearing? Will investment committees, consultants and managers face legal exposure?

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What is Outsourced Research?

I speak truth to capital and energetically critique the received wisdom in a sector that embraces too many stories and eschews evidence-based science. Myths abound and they do so because they increase short-term profits, while too often they sacrifice long-term performance. My aim is not to vilify the managers, who may themselves labor under myths they do not fully comprehend, but, instead, to educate the industry and, above all, protect investors.

Outsourced Research is objective, thought-provoking, non-mainstream real estate research. My research is practical; it focuses on critical investor issues. Managers can read what I tell their clients; these managers may strongly disagree, but passion can kickstart a conversation that unearths a deeper truth. I believe disputation is a process and that the process itself may be even more illuminating than the answers.



This paper. Most public pension funds are underfunded; that is no revelation. This paper reports important findings; it examines why these funds are underfunded, what they are doing to address the underfunding, and how these actions affect asset allocations and ultimately performance. We show that alternative real estate and private fund strategies have failed to deliver positive alpha.

I question whether private equity funds (including value-add and opportunistic real estate funds) and other alternative strategies actually produce a positive alpha. If these approaches do not, then why have pension funds increased their commitment to alternative assets, and especially funds? How are investors pricing the illiquidity of their interests in property and especially in value-add and opportunistic funds? My goal is to help LPs better understand the pernicious effects of leverage and promotes and thereby improve their risk-adjusted returns net of fees. Investors should insist on more candid and accurate manager disclosures through their research and offering documents with regard to risk and returns.

Next. My next paper, call it a tutorial, shall discuss the correct way to calculate private equity alpha, beta, corrected volatility and liquidity premia, and I shall compare and contrast core with opportunistic funds and ask who bears disproportionate risk, the LPs or the GPs. I will include an actual deal to illustrate the salient points. My goal is to help institutional investors avoid some obvious, yet poorly understood, mistakes.

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Following the Herd: Have Alternative Assets Delivered Superior Risk-Adjusted Returns? No! Funding Ratios and Private Equity Allocations

I. Executive summary

- From 2018 to 2023, nearly 70% of new investments were either value-add or opportunistic. Most value-add and opportunistic funds on average produced negative alpha¹, which calls into question the strategy of investing in these kinds of funds.
- Value-add and opportunity funds—not necessarily separate accounts or joint ventures—have net of fees underperformed core funds. LPs have transferred substantial fees to GPs despite GPs' underperformance.
- The portfolio allocation to private equity increased from about 3.5% in 2000 to over 9% in 2022. By contrast, the corporate allocation during this period remained relatively flat.
- State pension funds, which have a 5.8% lower funding ratio than other public funds, have a 3.2 percent higher allocation to private equity. Despite what we hear about large funds, such as CALPERS, larger pension funds have higher funding ratios.
- Teacher pension funds have higher funding ratios unless they are state level teacher retirement systems. How sensitive is the funding ratio to teacher fund status? If the teachers' fund is a non-state fund, the funding ratio is 16.1% higher. However, if the teachers' fund is state-managed, then the incremental funding ratio is -7.4%. What is the sensitivity of the funding ratio to state status? If the fund is not a teachers' fund, then the marginal impact of teachers' fund status on the funding ratio is -5.8%.
- The political red-blue status of the state legislature does not affect the funding ratio.
- The higher the ten-year return, the greater is the funding ratio. The greater is the total return of publicly traded equities, then the lower is the allocation to private equity.
- The greater is the performance of publicly listed equities, the lower is the allocation to private equity. Private equity seems to be a prescriptive cure for poor performance by public equities.
- In contrast to private equity, the funding ratio is positively and significantly related to the allocation of real estate. This allocation increases the higher is the fund's total return.

¹ Alpha shows how well (or badly) an investment has performed compared to a benchmark index. Alpha is very sensitive to the factors used to construct the benchmark and may not be a good indicator of skill involved in beating the benchmark. A positive alpha under one set of factors can be a negative alpha given a different set of factors.

II. Introduction

Recent research shows that value-add and opportunistic funds on average produce negative alpha. Should pension funds reward managers for incremental returns due to leverage; why pay managers for beta, instead of alpha?

Value-add and opportunity funds—not necessarily separate accounts or joint ventures—have underperformed, net of fees, core investments. LPs have transferred huge fees (economic rents) to GPs despite GPs' underperformance. Not all LPs appreciate the massive underperformance and significant transfer of fees to the GPs, nor do they understand that reported fund performance statistics underestimate risk, thus creating a false sense of investor comfort.

Were the CIOs asleep at the switch? Did the investment committees and boards of directors knowingly take their pension funds to the casino? If the pension fund leadership, in lieu of raising taxes or reducing plan benefits, sought greater risk, was investing through value-add and opportunistic funds appropriate? Why not invest through joint ventures and separate accounts that avoid a double promote? Was there a breach of fiduciary duty? If so, will pension funds, their managers and consultants face legal exposure?

If pension funds seek greater risk, then investing through value-add and opportunistic funds may not only be expensive; it may be inappropriate because funds on average produce negative alpha, according to the research previously reviewed. Other investment approaches may be more attractive.

I first review the relevant academic literature pertaining to asset performance. Next, in order to evaluate funding ratios and allocations to private equity and real estate I rely upon a unique data base: "Public Plans Data", provided by the Center for Retirement Research, Boston College. The under-performance of alternative assets is especially troublesome given the funding shortfalls of practically all public pension funds.

Of even greater concern is the emphasis on total returns and blindness to true—not apparent or fictional—risk. (See next section for more details.) The managing partner of one of the largest real estate fund companies debated me on the panel of a well-attended investor conference; he argued that risk-adjusted returns do not exist because we cannot measure risk. I retorted that the absence of evidence is not evidence of absence. Witness the demise of many properties during the GFC. Was risk present? You decide.

Fund returns are highly smoothed; measured volatility is biased downward. This bias makes manager performance too good to be true. Some pension funds and their consultants understand this systematic downward bias, which they still embrace because doing so provides political cover. As investment committees, in an attempt to increase the funding ratio, take the pension funds to the casino, this political cover is really just a statistical fig leaf which may not be sufficient to stem the advancing funding crisis. Now is the time for greater transparency and appreciation of true risk.

III. Some stylized facts about value-add and opportunistic funds

US institutional investors own about \$2 trillion of alternative assets, which include private equity, private real estate, hedge funds, and other assets. Academics are carefully evaluating the performance of opportunistic and value-add funds.

Alternative assets now account for 60% of the assets of large endowments and 30% of those of large public pension funds. Some studies have shown that from 2001 to 2022, alternative investments had no statistically significant positive impact on returns. Alternative asset strategies are expensive compared with stock and bond funds; the underperformance of pension funds roughly equals the fee differential compared with core funds.

For example, Li and Riddiough report that “RE [real estate] funds perform the worst, with a mean size-weighted IRR of 7.02% and a direct of -4.63%. Even the highest-risk, development-oriented value-Add and opportunistic RE fund strategies—which represent about 70% of RE fund capitalization—return only 7.86% and 7.08%, respectively . . . RE fund performance is seen to deteriorate as a function of the fund sequence number.”² Why, then, do public pension funds continue to invest in these strategies?

Riddiough writes that the chronic underfunding is the result of aggressive retirement benefit promises and poor investment performance. The challenge now is how to fix the underfunding. Investors’ hands are not clean. The underfunding has created powerful incentives for investment committees to take the fund to the casino, or exercise an option that increases in value with market uncertainty and low funding ratios. The greater is the underfunding, the greater is the incentive to invest in alternative assets that include value-add and opportunistic funds. Our empirical work supports this observation.

GASB Statement Number 25 establishes accounting rules for states and local governments and these rules encourage pension funds to embrace riskier investments. GASB 25 links the liability discount—inappropriately and perversely in my opinion³—to investment returns. The higher is the investment return, the greater is the liability discount rate, which in turn artificially depresses the present value of the liability stream. Since the liability stream is not very volatile, the liability discount should be close to the risk-free rate or at least the rate at which states and municipalities can borrow from the capital markets. However, a lower discount rate decreases the funding ratio. The 2022 10-year municipal bond yield was 2.85%; by contrast, value-add and opportunistic investment target returns are in the range of 16% to 18%. (Realized returns have lately been lower.) This accounting standard creates a powerful incentive to tilt the pension fund portfolio toward much riskier and opaque alternative asset funds, in particular toward value-add and opportunistic real estate fund investment. Consequently, the pension fund pays higher management fees, disguises risk, earns lower risk-adjusted returns, receives negative alpha, pays, but does not receive, a liquidity discount, and, according to Riddiough, enters into a “gamble for resurrection”⁴, all for the privilege of not knowing a true mark-to-market prices or return. In other words, the pension fund assumes greater risk and receives lower returns; this is not what most people learned in school. If you are an alternative real estate fund manager, what is there not to like here?

² Da Li and Timothy J. Riddiough. “Persistently Poor Performance in Private Equity Real Estate”, working paper, May 2023.

³ There is no theoretical link between the liability discount rate and asset returns.

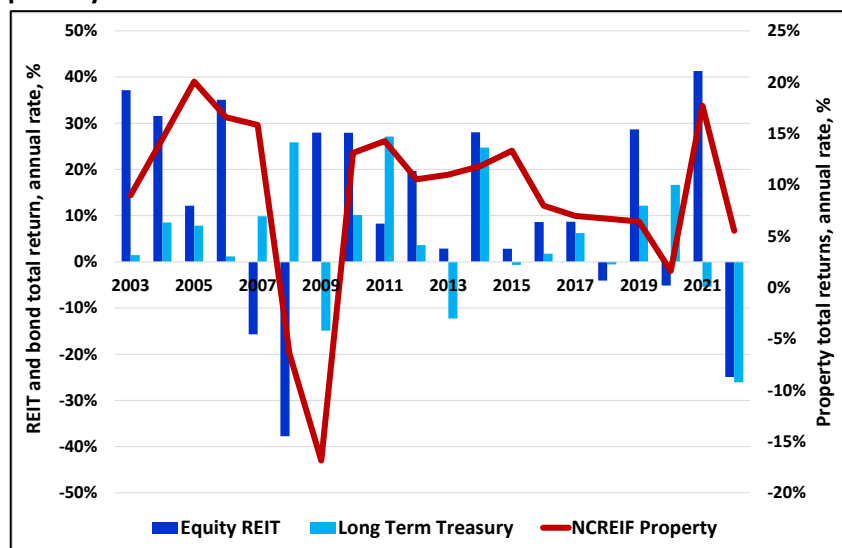
⁴ See Riddiough, “Pension Funds and Private Equity Real Estate: History, Performance, Pathologies, Risks”.

Li and Riddiough conclude that “There are a host of agency problems that contribute to this outcome, including incentives associated with volatility laundering. In the end, public pension funds . . . seem to be maximizing something other than investment return, which is behind our main finding that private real estate fails to conform to the ‘survival of the fittest’ PE paradigm.” They add, “There is no significant relation between the IRR on a prior RE fund and the probability of raising a new fund.” The academic literature notes fund diseconomies of scale, negative sequencing effects, poor manager selection and the absence of skill-based persistence. The authors report that “RE fund managers with five or more liquidated funds . . . underperform less experienced fund managers.” Compared to buyout funds and venture capital, real estate fund managers displayed the worst performance, had the highest survival rates, and exhibited worsening fund performance as a function of management experience.

Public pension funds underreport the risks of their private equity investments and many poorly performing fund managers do not report at all or they do so selectively. If corrected for downward bias, the risks of their private equity investments could be 40% higher. The reason is that returns exhibit low volatility due to statistical smoothing. Most private equity investments reduce measured portfolio liquidity and fund managers report subjective valuations that do not reflect current market prices.

I have shown with the late Professor Stephen Ross of MIT that after removing the statistical smoothing of private real estate returns, the volatility of property is equivalent to the volatility of public REITs.⁵ To this date, money managers claim that property volatility is significantly less than public REIT volatility. This conclusion is wrong. They are either misinformed in matters that directly affect their investors, or they are well informed and are intentionally misleading their investors. In either case, are they fulfilling their fiduciary duties? I do not think so. Charts such as Exhibit 1, which may serve managers’ short-term tactical objectives well, confuse the investors and depict the statistically anomalous smoother property return series compared with more volatile equity REITs and long-term Treasury bonds:

Exhibit 1. Uncorrected property total returns are less volatile than publicly traded REITs and bonds.



⁵ Stephen Ross and Randall Zisler. “Risk and Return in Real Estate,” *Journal of Real Estate Finance and Economics*, 4, 175-190.

Fund investments are often speculative, arcane, opaque, highly leveraged, and subject to nonlinearities that favor the GP. These deals at the fund and underlying property levels are replete with embedded real options. The traditional deterministic methods that managers of funds use cannot properly evaluate the value of these options with regard to market volatility. The usual investment software fails to deliver! By ignoring risk, these fund managers leave value on the table and assume uncompensated risk, a good portion of which the LPs bear while the fund GPs contribute a very small percentage of the equity. The GPs are richly compensated through incentive fees.

Private equity fund fees are typically two percent annual management fees and 20% performance fees. By contrast, stock and bond index fund managers typically charge one tenth of one percent, and the risk-adjusted returns of these index funds are often greater. Additionally, private equity managers are generally insulated from fund losses even though their equity contribution is insignificant.

Mitchell Bollinger and Professor Joe Pagliari, Jr. of the University of Chicago report that “investors [during the period 2000 through 2017] would have been better served by merely placed additional leverage on their core investments. . . value-add funds have on average generated a negative alpha of -3.26%; similarly, opportunistic funds have generated a negative alpha of -2.85% . . . Had investors in core funds used more leverage (loan-to-value ratios of 55% to 65%), they would have saved approximately \$7.5 billion per year in unnecessary investment management fees.”⁶ Essentially, public pension funds are willing to accept a three to four percent discount on their rate of return for the “privilege” of investing through a fund. Why pay a premium to invest in an illiquid, opaque vehicle that has not proven that it can deliver positive alpha?

Most pension funds use the wrong benchmarks, often self-serving benchmarks of their own devising. These benchmarks are opaque and hypothetical, and they put the active manager in an unjustifiably attractive light by setting the bar too low. Many CIOs have a financial incentive in adopting inappropriate benchmarks, and the pension consultants, whom the CIOs and their investment committees hire, never seem to object. What should pension funds do? One approach is to create large, passive investment portfolios with negligible fees. The sovereign fund of Norway is an excellent example.⁷

An alternative approach is creating synthetic benchmarks especially suitable for funds and constituent assets that reflect leverage, waterfalls and other nonlinearities.⁸ NCREIF, while a superb index for what it represents, is cynically misused by many managers; it is too low a bar.⁹ Much as all children who live in Lake Wobegon, a fictional town, where “all the children are above average”. That just about every manager’s performance exceeds the NCREIF Index is no coincidence; it is almost a given. Managers are aware of this disconnect but do nothing to correct the benchmark bias.

Richard Ennis reports that the low-volatility reputation of alternative assets, especially private equity, as well as value-add and opportunistic real estate investments, is a “creative myth”, unsupported by the data once appropriate statistical adjustments are made. Alternative assets are not “volatility dampers”, they

⁶ Mitchell A. Bollinger and Joseph L Pagliari, Jr. “Another Look at Private Real Estate Returns by Strategy”. **The Journal of Portfolio Management**. Special Real Estate Issue 2019.

⁷ See Richard Ennis, “Excellence Gone Missing, report, May 12, 2023.

⁸ Zisler Capital Associates routinely created synthetic benchmarks using risk-based analytics.

⁹ Many of the managers who unjustly criticize the NCREIF Index are the same managers who benefit from the NCREIF index. If they properly adjusted the NCREIF index for leverage and promotes or adopted a proper synthetic index, would their measured performance improve or decline?

hide or disguise volatility. Ennis further emphasizes that alternative asset returns are highly correlated with US equities, not exactly a powerful diversifier.¹⁰ Alternative assets do not have a meaningful risk-adjusted portfolio impact. The average returns of alternative assets underperformed stock and bond portfolios; the underperformance matched the fee differential.

Why not invest in REITs instead of funds? Research shows that the estimated value of property, which sells infrequently, is heavily influenced by appraisals, which, unlike REIT prices, are not forward-looking. This valuation process impairs price discovery and smooths returns by imposing an autoregressive return structure that biases volatility, or measured risk, downward. Apparently institutional investors are willing to accept on their illiquid properties lower net-of-fee returns that are significantly less than they would realize on a well-diversified portfolio of tradeable, liquid REITs. Maybe institutional investors value not having to mark their assets to market, especially given the underfunding problem. If that be the case, then the value-add or opportunistic liquidity premium is negative. Combined with low measured, and not true, volatility and low property drawdowns, maybe investment committees and their CIOs can sleep better. Riddiough¹¹ characterizes this psychological state of mind as “paying for a veil” that intentionally hinders price discovery. How valuable is this veil? Is it worth giving up a 4% to 5% annual return?

Risk comes in all shapes and sizes. We call them risk factors. Managers and their clients typically do not understand these factors and, not surprisingly, they do not use these factors in the acquisitions, asset management or dispositions processes.

A neglected risk factor is MSA risk. I have shown elsewhere that MSA market rental volatility is inversely related the office property elasticity of supply with regard to price.¹² Rents are more volatile in cities such as New York and San Francisco. There is clearly a tradeoff between leverage and MSA rental and return volatility. When we add a promote, the risk to the LP increases. Most institutional property investments are found in the larger MSAs, especially the gateway cities. Managers prefer large cities because it is easier to deploy large amounts of capital, especially since the properties themselves are typically large.¹³

Not all MSAs are the same. Most managers would agree, but for the wrong reason. For example, the natural vacancy rate, which is that rate at which rents are neither rising nor falling, varies by MSA. An 8% vacancy rate may indicate a soft market in one MSA but a tight market in a growing MSA, where there is a higher transactional demand for vacancies. The difference can critically affect underwriting.

Another example is liquidity. Liquidity, which I proxy as the percentage of the inventory represented by annual sales, is highly variable across MSAs, except during downturns, when there is little if any liquidity. (Liquidity, like diversification, is never available when you need it the most.) The more liquid markets, such as large MSAs, exhibit less return serial correlation. However, their rental rates and returns are more volatile. Note, however, that liquidity is also greater in smaller, growing MSAs. MSAs with greater liquidity have lower total returns. Investors should demand a higher liquidity premium in low liquidity MSAs.

¹⁰ Cambridge Associates used 12 years of data ending June, 2020.

¹¹ Timothy Riddiough, “Pension Funds and Private Equity Real Estate: History, Performance, Pathologies, Risks”, mimeo.

¹² The price elasticity of supply is the change in supply given a one percent increase in price. A demand shock has a greater impact the more inelastic is the supply elasticity. An elasticity of zero is perfectly inelastic.

¹³ When I am in a playful mood, I like to tell managers about some research I completed on manager MSA selection. I found that there is a large correlation between MSA preferences and the number of restaurants with Michelin stars. This research seldom elicits myrth.

These examples illustrate how investors and their managers sometimes misunderstand risk. Clearly, they should take a more holistic view of risk. To say that a city is less risky just because it appears to have a diversified economy (without analyzing the interdependencies of its economic sectors) constitutes underwriting malpractice. Investors should demand better.

IV. Our data set¹⁴

Public pension funds consist of a variety of formats that include state retirement systems, teachers’ funds, municipal systems, police and fire, and university.

We included a “RED States” variable in our multiple regressions to test whether or not the state party affiliation was important in affecting state pension funding ratios or performance. It was not.

We culled 94 public pension fund observations from a data base of 183 observations. Excluded observations were those with missing data.

The pension funds that seem to garner the most headlines, such as CALPERS and CALSTRS, represent a small percentage of pension assets. 20% of public funds had assets exceeding \$42 billion. By contrast the total assets of CALPERS and CALSTRS are \$477 billion and \$258 billion as of 2022.

Following CALPERS and CALSTRS, the next eight largest pension funds and their total assets (\$ billion) are as follows:

- New York State (\$220)
- Texas Teachers Retirement (\$194)
- Florida Retirement System (\$179)
- New York State Teachers (\$130)
- Virginia Retirement System (\$91.2)
- University of California (\$85.7)
- Oregon PERS (\$85.0)
- North Carolina Teachers (\$83.1)

Exhibit 2. State pension funds dominate the database.

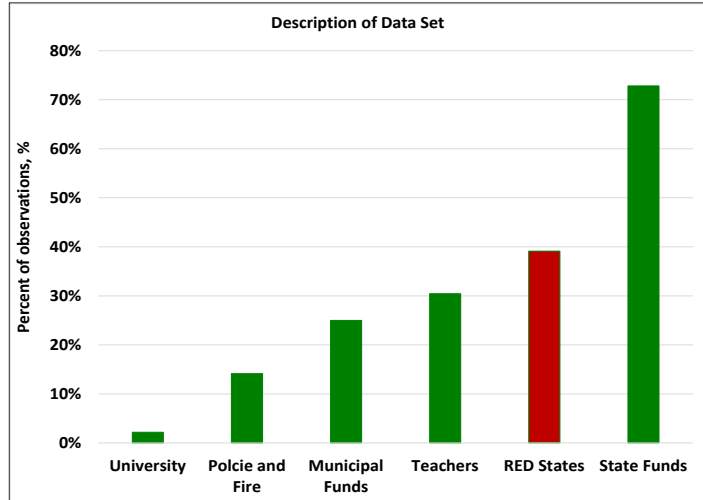
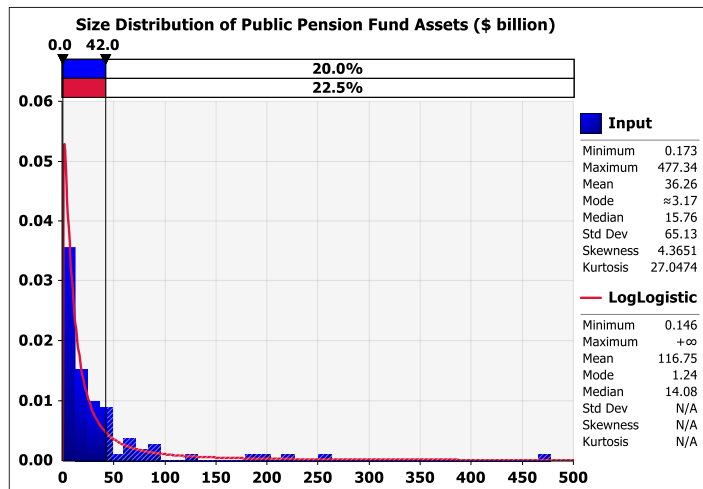


Exhibit 3. 80% of public pension funds own \$42 billion or less of AUM.



¹⁴ Public Plans Data (<https://publicplansdata.org>), Center for Retirement Research at Boston College

V. Fund level performance

Funds that perform better over the long-term are more likely to perform relatively better over the short-term. A bivariate regression shows that 10- and one-year performances of all public funds are highly correlated. At the margin, the 10-year return has a greater positive impact on the one-year performance of state funds. Using multiple regression and holding all other variables constant, state systems' one-year performance is 4.2% less than other public systems' performance. (Statistically significant coefficients are reported in red.)

$$\begin{aligned}
 TR_{1YR} = & \mathbf{-22.308} + \mathbf{0.693} * STATE * TR_{10YR} \\
 & (-4.124) \quad (0.861) \\
 & + \mathbf{2.059} * TR_{10YR} - \mathbf{4.157} * STATE \\
 & (3.020) \quad (-0.642)
 \end{aligned}$$

Mean dependent variable: -4.567
Adjusted R² = 0.362
Observations: 94

One-year performance is highly correlated with 3- and 1-year performance.

$$\begin{aligned}
 TR_{1YR} = & \mathbf{-12.088} + \mathbf{1.065} * TR_{3YR} \\
 & (-9.960) \quad (6.949)
 \end{aligned}$$

Mean dependent variable: -4.282
Adjusted R² = 0.363
Observations: 94

Exhibit 4. 10- and 1-year returns

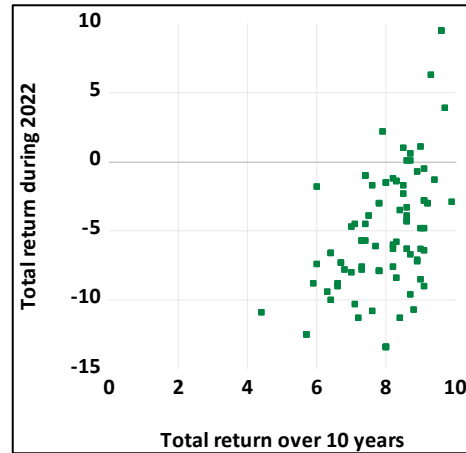
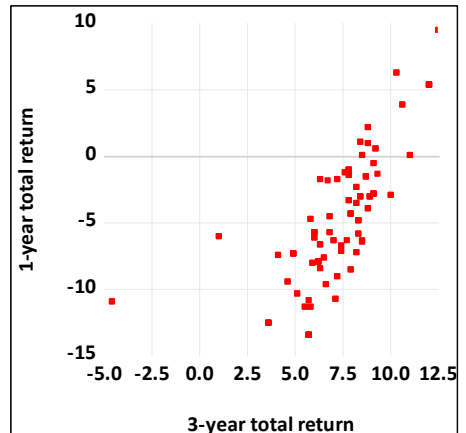


Exhibit 5. 3- and 1-year returns



$$TR_{1YR} = -23.200 + 2.506 * TR_{5YR}$$

(-14.550) (11.949)

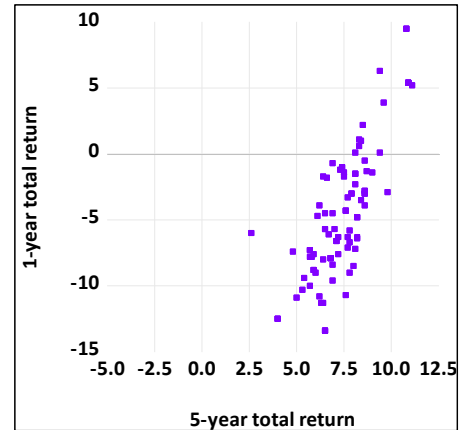
Mean dependent variable: -4.567
Adjusted R² = 0.604
Observations: 94

$$TR_{1YR} = -25.788 + 2.623 * TR_{10YR}$$

(-8.712) (7.244)

Mean dependent variable: -4.567
Adjusted R² = 0.604
Observations: 94

Exhibit 6. 5- and 1-year returns



The distribution of one-year fund returns has a wider spread—higher standard deviation—than the 10-year performance distribution. In the short term, public systems of all varieties exhibit highly varied performance.

By contrast, over ten years, much of the variation disappears. Compare exhibits 7 and 8. The 10-year distribution has a lower variance; it is tighter. The ten-year mean return is 8.1%, but the 2022 (one-year) return is -4.6%. About 14% of the public funds had a non-zero one-year return, whereas only 5% of the funds had a negative 10-year

We will show that there are systematic relationships across our sample of 94 public funds that explain underfunding and the allocation to private equity and real estate.

Exhibit 7. Distribution of 1-year returns ranges from -13.4% to 9.5%, indicating wide variance.

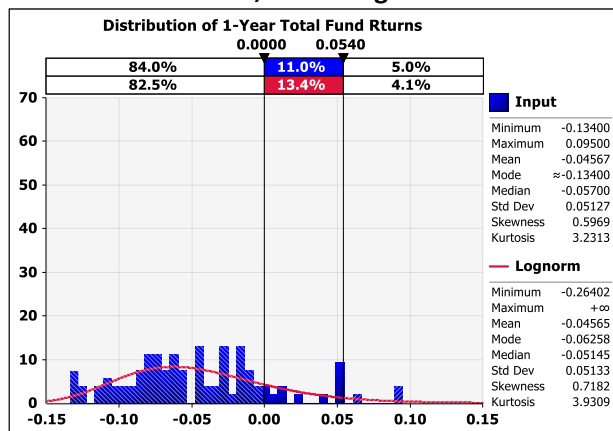
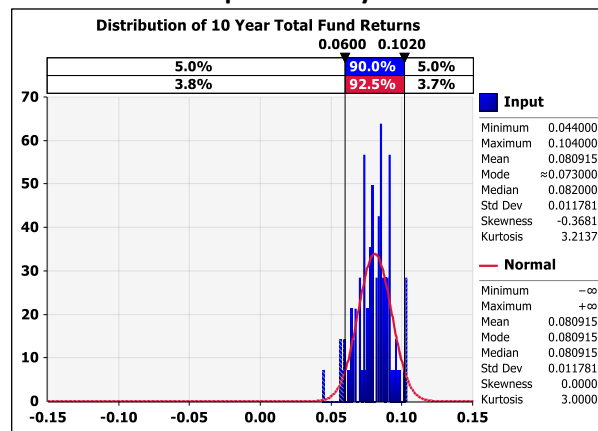


Exhibit 8. Distribution of 10-year returns exhibits less variance compared to 1-year returns.



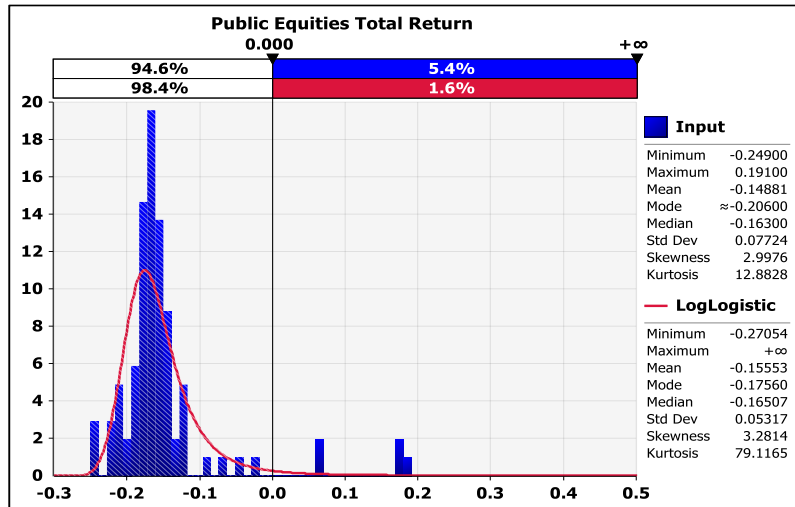
VI. Asset Class Performance

Fund managers and their investors often take undue comfort in the low measured, as opposed to true, volatility of fund returns just as they embrace the statistical smoothing of underlying property returns. Doing so amounts to a wealth-destroying cognitive error, assuming no willful attempt to deceive.

Traded public equity (stock) returns over 94 observations in 2022 are highly skewed to the right but, compared with private equity and real estate, are tightly grouped around the mean of -14.9%. Ninety-five percent of the public funds had negative returns.

Publicly traded equity returns have little or no smoothing. The REIT market is relatively efficient implying that last year's REIT returns are not a good predictor of this year's returns.¹⁵

Exhibit 9. Public equities had a highly skewed mean return of -14.9% and a standard deviation of 7.7%.



The variation of the distributions of private equity and real estate are much wider than that of public equities. We suspect that the higher variance across 94 funds reflects not just the inherent smoothing of

¹⁵ Past REIT returns are not a good predictor of future REIT returns, as shown below. The coefficient on past REIT returns is statistically indistinguishable from zero and the adjusted R² is zero"

$$REIT = 3.344 - 0.050 * REIT(-4)$$

(4.685) (-0.656)

Mean dependent variable: 3.182
Adjusted R² = -0.003
Observations: 178

Unlike REITs, past property returns predict future returns. Property returns exhibit serial correlation as indicated by the higher adjusted R² and significant coefficient, which indicates that current quarterly property returns are a function of 34.7% of property returns lagged four quarters.

$$PROPERTY = 1.369 + 0.347 * PROPERTY(-4)$$

(6.188) (4.769)

Mean dependent variable: 2.148
Adjusted R² = 0.110
Observations: 178

real estate and private equity but the manipulation by management of report fund returns as well, which is especially easy when fund management uses IRRs as a performance metric.

Contrast Exhibits 10 and 11 with Exhibit 9. Less than 10% of private equity and real estate fund returns are less than zero in 2022, 18.2% and 22.9% respectively. These are private equity and real estate fund returns, not the returns of the underlying assets.

Exhibits 11 and 12 focus on the times series of publicly traded REITs and NPI privately traded property. These are NOT distributions across public pension funds. The purpose of these exhibits is to compare and contrast the effects of smoothing on property performance. Recall that REITs essentially do not display smoothing, but property does. From 1978 to the present, 8.6% of the quarterly REIT total returns were less than zero; only 2.1% of property returns were negative. Moreover, measured property return volatility is one quarter that of REIT volatility. Property returns also have twice the negative skewness.

Exhibit 10. Private equity returns last year across 94 public funds had a mean return of 18.2% and a standard deviation of 10.8%.

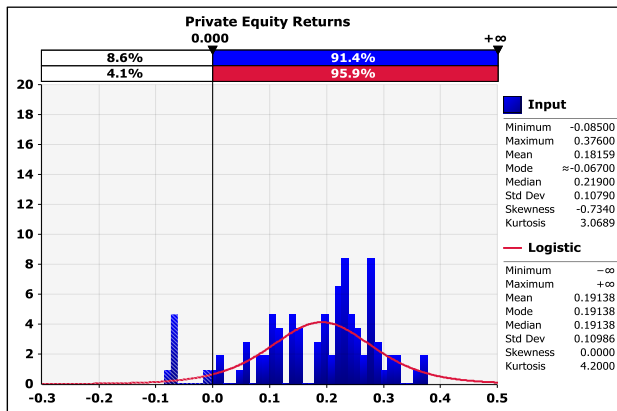


Exhibit 11. Real estate returns across 94 funds had a mean return of 22.9% and a standard deviation of 9.5%.

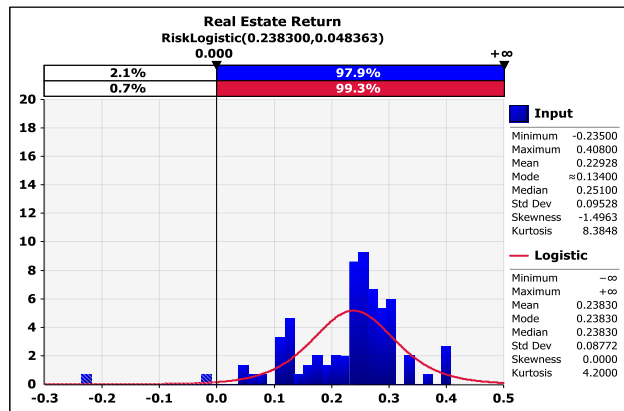


Exhibit 12. All equity quarterly REIT returns

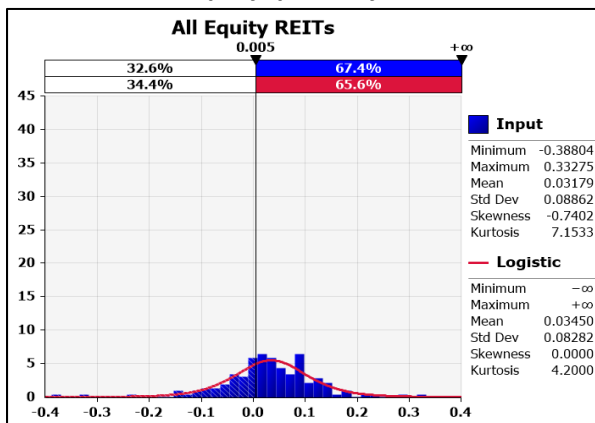
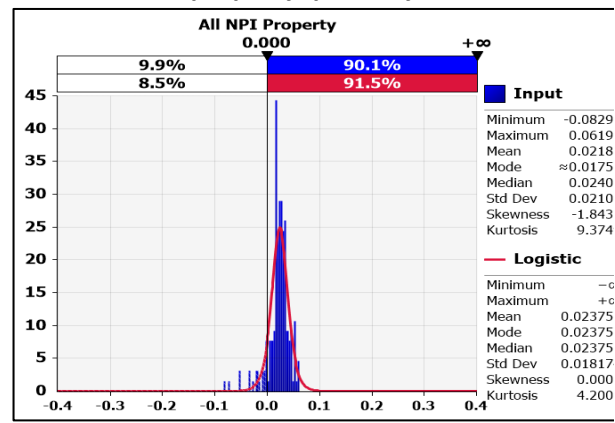


Exhibit 13. All property quarterly NPI returns



VII. State pension funding ratios in 2022

Due to severe underfunding, public funds have tilted their portfolios toward riskier and more opaque alternative assets that include hedge funds, real estate, and private equity.

Exhibit 14. The surplus of the sample of 94 pension funds in 2022 is negative.

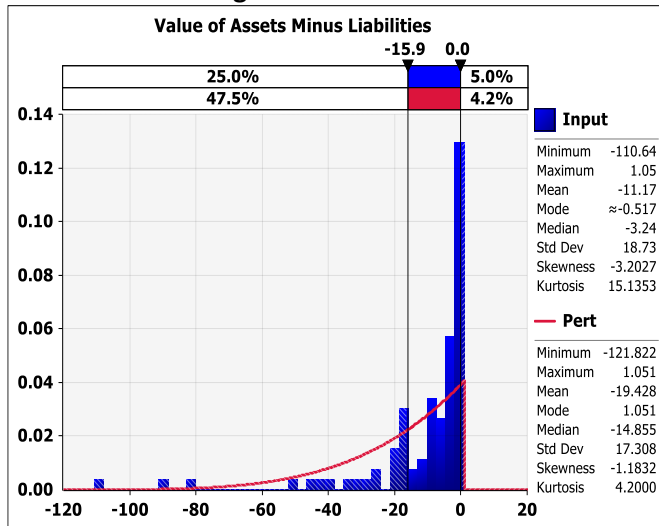
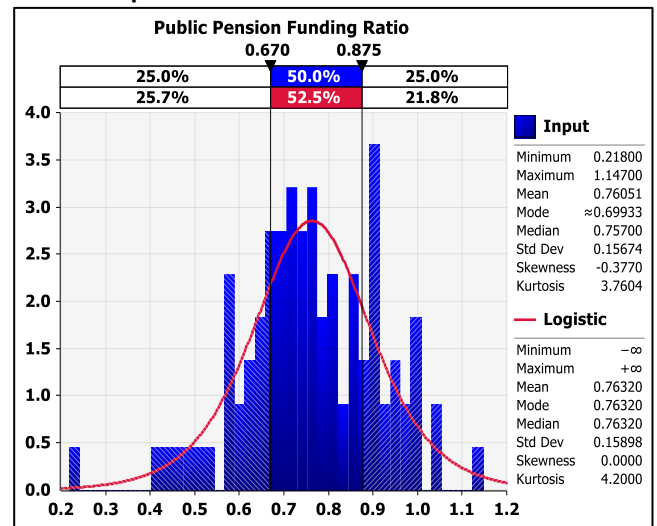


Exhibit 15. The distribution of the funding ratios across 94 pension funds.



Larger pension funds tend to have slightly higher funding ratios. The following regression shows that there is a positive relationship between the funding ratio and fund size, holding other factors constant.

$$FUNDING.RATIO = 54.573 + 40.874 * ASSETS - 5.784 * STATE + 2.968 * RED$$

(4.962) (1.682) (-1.518) (0.927)

$$+ 3.021 * TR10YR - 23.482 * TEACH * STATE + 16.070 * TEACH$$

(2.273) (-2.396) (1.777)

Mean of dependent variable: 6.051
Adjusted R2 = 0.129
Observations: 94

The funding ratio model above explains 13% of the variation in FUNDING.RATIO, which leaves a lot of variation in the dependent variable unexplained. However, readers should focus on the coefficient associated with each independent, or right-hand, variable. The RED states variable is insignificant; due to its low t-statistic (in parentheses), we cannot statistically distinguish its coefficient, 2.968, from zero. Republican states are not better or worse at managing the pension surplus. The STATE coefficient is negative and, while only significant at the 13% level, indicates that the funding ratio for state pension funds is almost 5.8% lower than other public pension funds. If the state pension fund is also a teachers' retirement system, the funding ratio is 23.5% lower. However, if the teachers' retirement system is a municipal fund and not a state-managed system, the funding ratio is 16.1% higher.

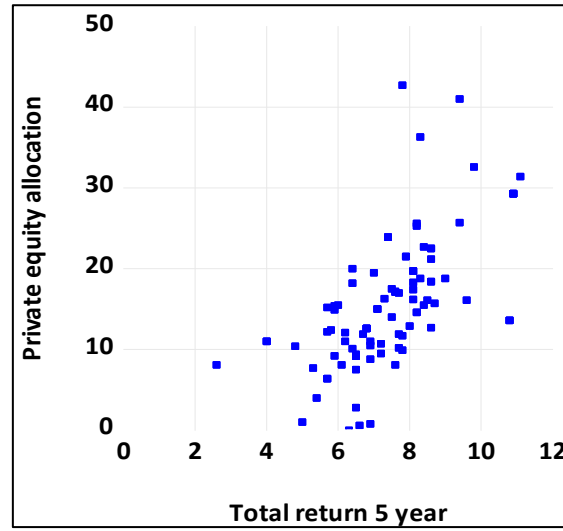
VIII. Asset Allocation.

What determines the allocation of funds, specifically private equity and real estate?

Exhibit 16. The real estate allocation increases if the 10-year return increases.



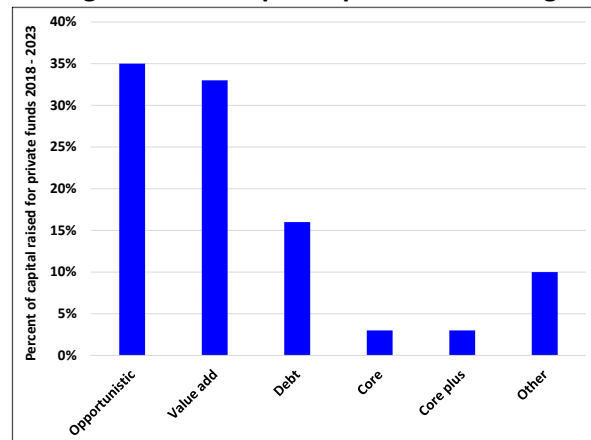
Exhibit 17. Private equity allocation increases with higher 5-year total fund returns.



Public pension funds have shifted their focus from stocks and bonds to less liquid assets that include opportunistic and value-add strategies, which comprise 68% of capital raised between 2018 and 2023. Public pension funds, in contrast to their corporate counterparts, have increased their allocation to alternative assets from about 3% in 2000 to over 9% in 2022.

The spread between the public pension and corporate pension funds has increased along a near linear path from less than 1% to over 5%, as shown in Exhibits 19 and 20.

Exhibit 18. Opportunistic and value-add strategies dominate public pension fund targets.



The regressions on page 16 indicate variables that are strongly associated with private equity and real estate allocations. The most important observation is that state pension retirement systems have allocated more to private equity than other public pension funds. This behavior is consistent with public pension funds assuming greater, hidden risks. The higher is the five-year total fund return, the greater is the allocation to private equity and real estate funds. If publicly traded equity returns are strong, then private equity allocations are lower. Larger pension funds have slightly lower private equity allocations; such is not the case with real estate funds. Most of the variables that drive private equity allocations do not influence allocations to real estate funds in the same way. A reason could be that institutional investors have been

investing in real estate assets through joint ventures, separate accounts and funds longer than they have invested in private equity funds. They may fail to confuse funds other investment modalities.

Exhibit 19. Since 2008, public pension funds, compared with corporate funds, have increased their allocation to alternatives.

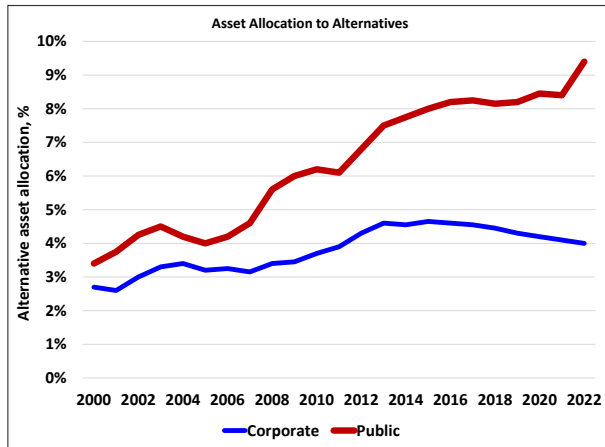
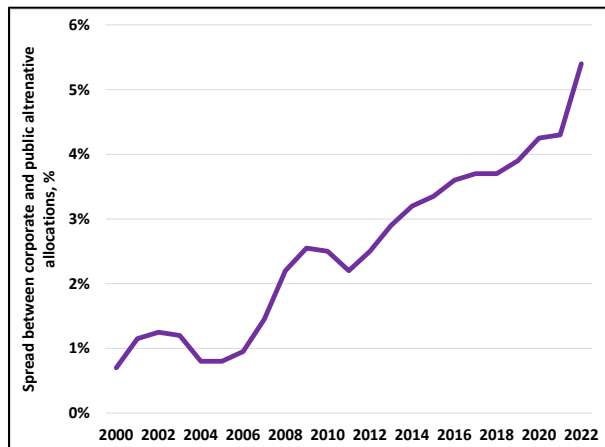


Exhibit 20. The spread between the public pension fund and corporate allocations to alternatives have rapidly increased since 2000.



$$\begin{aligned}
 PR. ALLOCATION = & -0.153 + 0.060 * FUNDING. RATIO - 0.231 * TR. PUBEQ \\
 & (-3.006) \quad (1.043) \quad (-2.080) \\
 & +0.158 * TR. FIXED + 3.124 * TR5YR + 0.037 * STATE \\
 & (0.957) \quad (6.918) \quad (1.877) \\
 & -0.014 * RED - 0.013 * TEACH - 0.0002 * ASSETS \\
 & (-0.787) \quad (-0.898) \quad (-1.551)
 \end{aligned}$$

Mean of dependent variable: 15.612
Adjusted R2 = 0.400
Observations: 94

$$\begin{aligned}
 RE. ALLOCATION = & 0.032 + 0.054 * FUNDING. RATIO + 0.022 * TR. PUBEQ \\
 & (1.075) \quad (1.837) \quad (0.316) \\
 & +0.022 * TR. FIXED + 0.515 * TR5YR + 0.009 * STATE \\
 & (0.219) \quad (1.880) \quad (0.864) \\
 & -0.002 * RED + 0.009 * TEACH \\
 & (-0.291) \quad (-0.959)
 \end{aligned}$$

Mean of dependent variable: 0.114
Adjusted R² = 0.056
Observations: 94

One of the best predictors of fund private equity and real estate asset allocation levels is the spread between ten-year and one-year returns, as shown by the following regressions:

$$PR. ALLOCATION = 0.245 - 1.002 * (TR10YR - TR1YR) - 0.254 * TR. PUBEQ$$

(10.406) (-5.965) (10.406) (-2.577)

Mean of dependent variable: 0.156

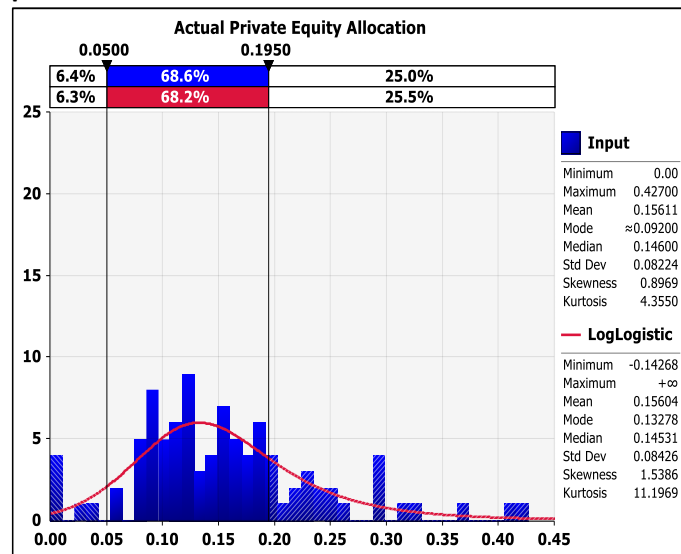
Adjusted R² = 0.273

Observations: 94

In 2022, the one-year return was -4.6% and the ten-year return was 8.1%. Hence, the spread was 12.7%. The more positive the spread—a declining return environment—the lower is the allocation to private equity funds. This result may suggest that during volatile times even the pension fund investors recognize the risks of value-add and opportunistic funds. The ten-year return may be an anchor affecting expectations.

The distribution of private equity allocations is skewed to the right, indicating that there are many outliers (25%) with allocations over 19.5%. The average allocation is 16%

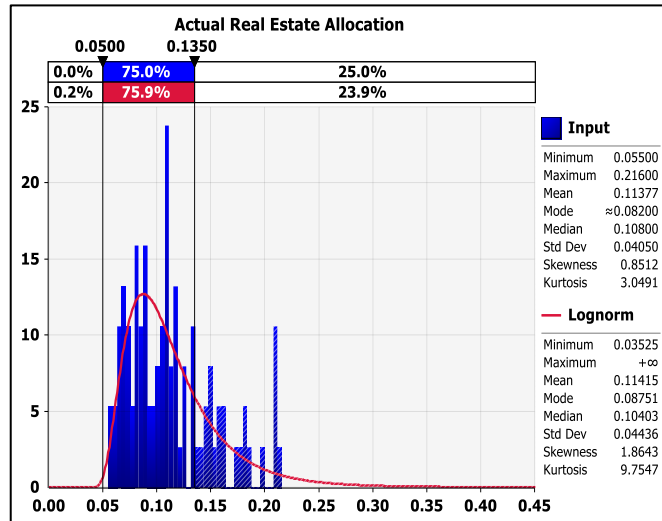
Exhibit 21. Private equity allocation across public pension funds.



The average real estate allocation is 11%. This distribution is highly skewed. Only 25% of funds have a real estate allocation over 13.5%. By contrast, 25% of funds had an allocation exceeding 19.5%.

The real estate allocation across 94 funds is less skewed than private equity, which implies that the allocation to private equity varies substantially from 5.5% to 21.6%.

Exhibit 22. Real estate allocation across public pension funds.



IX. Conclusion

Investors have responded to the allure of greater total, not risk-adjusted, returns by increasing their allocations to funds that focus on value-add and opportunistic investing. So, what is the problem?

They fail to understand that leverage does not increase alpha. Most benchmarks are inappropriate and reported returns underestimate true risk. Why should their fund managers receive generous incremental compensation based on leverage while institutional investors face greater downside risk?

Low funding ratios—liabilities in excess of assets—are an important reason why pension funds are investing in value add and opportunistic funds. I am not critical of value-add and opportunistic strategies per se, just managed funds that pursue those strategies to the detriment of investors and that fail to deliver alpha.

I am concerned that fund risk is opaque and improperly reported. Private equity and real estate funds have produced negative alpha. Investors would have been better served had they leveraged simple core funds.

Institutional investors should band together and insist on better risk metrics and better disclosures through better published manager research or more transparent offering documents. If pension funds want to assume greater risk in light of low funding ratios, then so be it. However, their actions should be evidence-based, effective and transparent. Moreover, most fund offerings today should not be the investment vehicle of choice, especially if pension funds are most concerned about risk-adjusted returns net of fees.

Investors need independent advice so that they can invest with eyes wide open. Such is not the case today.

I. Appendix

The following descriptive statistics table compares and contrasts the variables associated with 94 public pension fund observations for 2022. We characterize the data base as including 39% politically red states, 73% public pension funds, 25% municipal pension funds, 14% police and fire, 30% public teachers' retirement systems and 2% university funds.

The average funding ratio is 76%; the minimum to maximum spread is 22% to 115%. Yes, some funds are over-funded—assets exceed liabilities—but they are few.

Even though the 2022 total public equity return is a negative 15%, private equity and real estate returns are 18% and 23%. Academic studies report that private investments are highly illiquid. Due to serial correlation, private asset returns are sluggish during a downturn and upturn. The lags can be substantial, thus masking true returns.

Exhibit 23. Descriptive 2022 statistics for variables used in regressions.

	RED	STATE	CITY	POLFIRE	TEACH	UNIV	Assets	Funding Ratio	Private equity allocation	Real estate allocation	Public equity allocation	Fixed income allocation	Total return equity	Total return private equity	Total return real estate
Mean	0.391	0.728	0.250	0.141	0.304	0.022	\$ 36.909	75.9%	15.8%	11.4%	39.2%	20.6%	-14.8%	18.1%	22.8%
Median	0.000	1.000	0.000	0.000	0.000	0.000	\$ 16.553	75.4%	14.8%	10.8%	39.6%	20.0%	-16.3%	21.9%	25.1%
Maximum	1.000	1.000	1.000	1.000	1.000	1.000	\$477.000	114.7%	42.7%	21.6%	55.7%	37.0%	19.1%	37.6%	40.8%
Minimum	0.000	0.000	0.000	0.000	0.000	0.000	\$ 0.173	21.8%	0.6%	5.5%	15.6%	2.2%	-24.9%	-8.5%	-23.5%
Std. Dev.	0.491	0.447	0.435	0.350	0.463	0.147	\$ 65.682	15.8%	8.1%	4.1%	9.8%	7.3%	7.8%	10.8%	9.6%
Skewness	0.445	-1.026	1.155	2.059	0.850	6.559	4.252	-0.351	0.941	0.845	-0.344	-0.148	2.929	-0.710	-1.441
Kurtosis	1.198	2.053	2.333	5.241	1.723	44.022	25.249	3.598	4.243	2.975	2.337	2.753	12.156	2.966	7.921