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Welcome and overview of the conference, Molly Murphy
(OCERS)

- What is the KKCFR? Graham Elliott, Michael Melvin
- What is CAIA? John Bowman, Aaron Filbeck



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From Vision to Execution: How Investors Are Operationalizing the Total Portfolio Approach.

Presenter/Facilitator: Aaron Filbeck, CAIA, CFA, CFP®, CIPM, FDP, Managing Director, CAIA Association

Interviewee: Scott Chan, CFA, Chief Investment Officer of CalSTRS

Let the data talk: Research panel on the drivers and impacts of our alternatives investments; Rod June (LACERS), chair

The Rise of Alternatives, Emil Siriwardane (Harvard)

Rethinking Private Markets as an Asset Class, Greg Brown (U. of N. Carolina)

Pension Fund Allocations to Private Equity and Portfolio Risk and Return, Stavros Panageas (UCLA)

The Rise of Alternatives

Juliane Begenau

Stanford GSB & NBER & CEPR

Pauline Liang

Stanford GSB

Emil Siriwardane

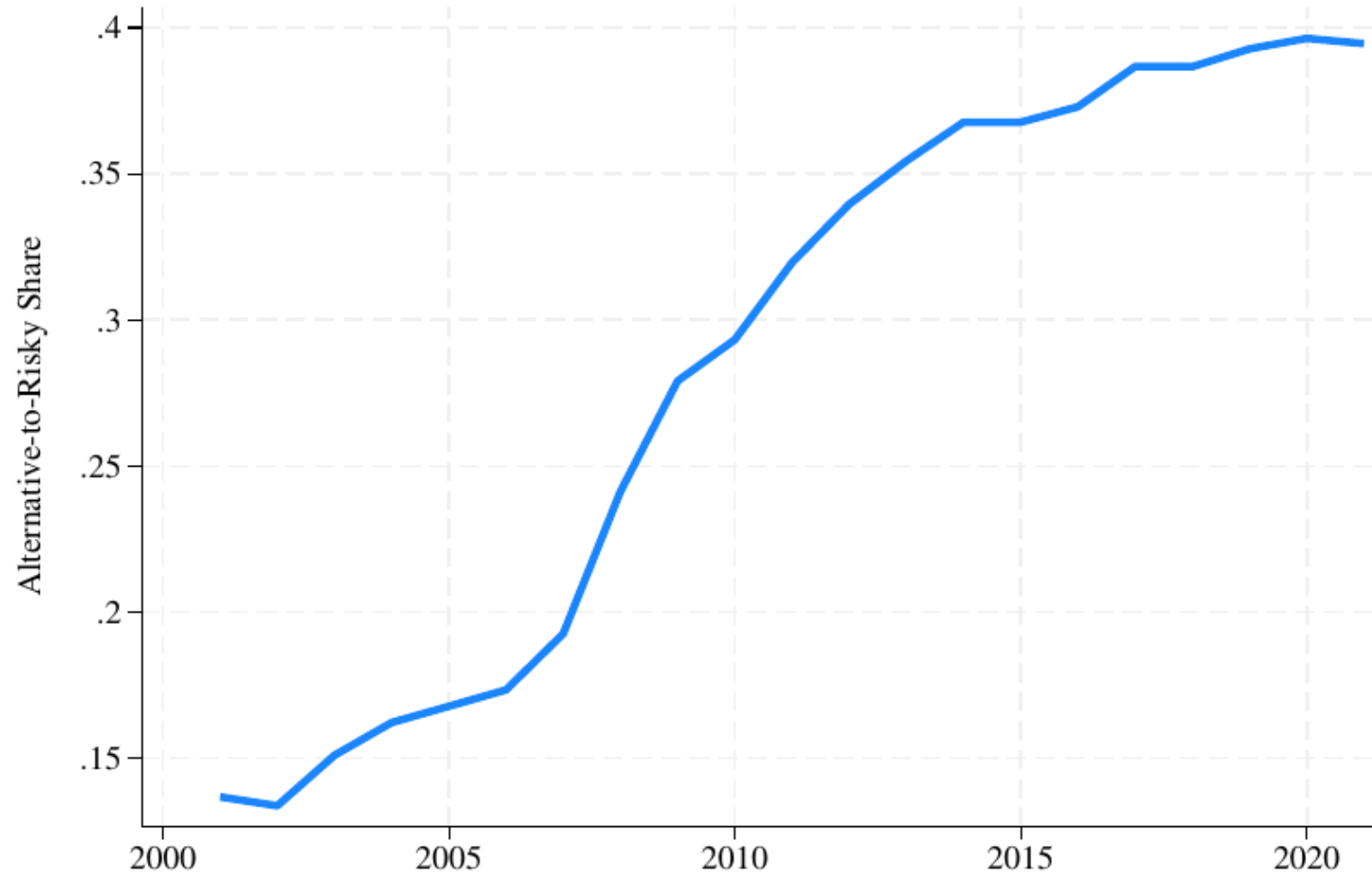
Harvard Business School & NBER

Motivating Facts

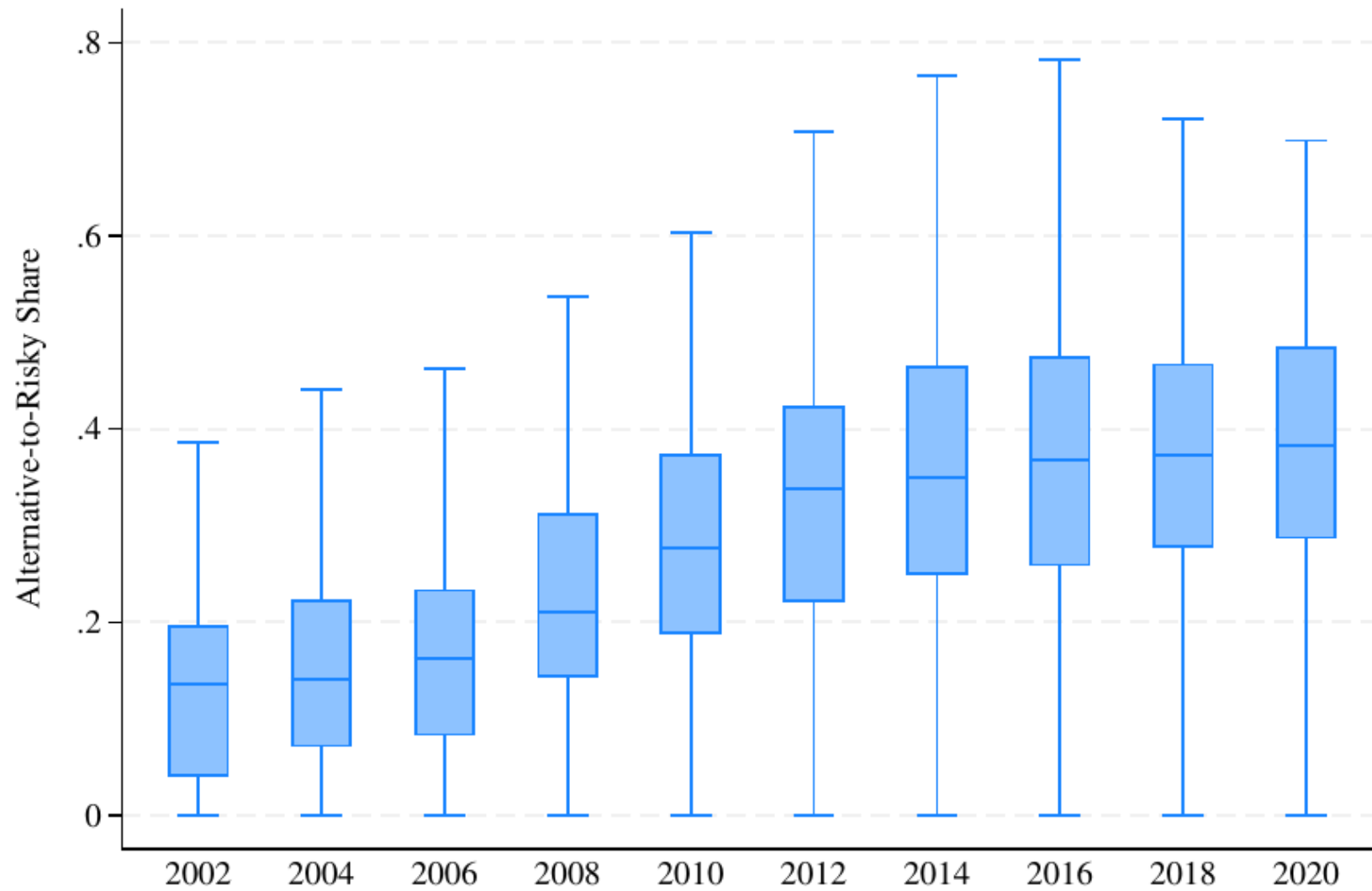
The way U.S. public pensions take risk has fundamentally changed

Alts = private equity/credit + real assets + hedge funds

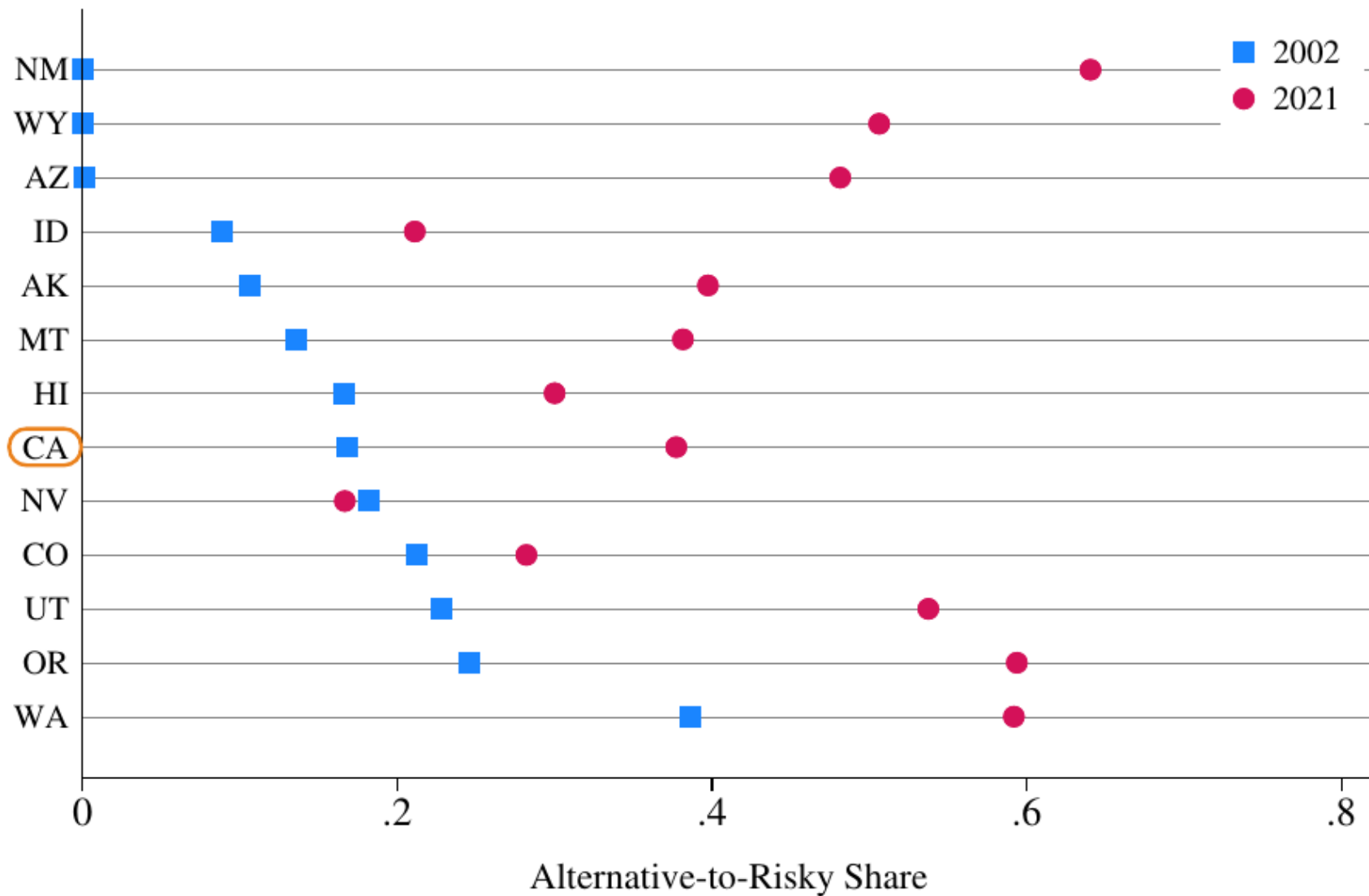
Risky share = 1 - (fixed income + cash share)



Alternative adoption in the U.S. varies widely across pensions



Even within geographies



Summary of facts

1. The aggregate alternative-to-risky share has risen sharply in the US since the 2000s
2. The adoption of alternatives also varies widely across US pensions

This paper: Why?

What drives alternative use?

Possible explanations

1. **Shift in beliefs**

The perceived risk-return profile of alternatives has improved (“alpha”)

2. **Reaching-for-yield**

Most common narrative, usually rooted in underfunding or spending constraints

3. **Agency problems within pensions (“volatility laundering”)**

Pension managers like alternatives because they aren’t marked to market

4. **Supply-side factors**

Private markets have expanded, and pensions want to hold the market

What we find

1. **Shift in beliefs** (**central driver!**)

Shaped by consultants, peers, and experience during the 1990s

2. **Reaching-for-yield** (**Weak empirical support**)

Virtually no correlation with funding, spending needs, or return targets

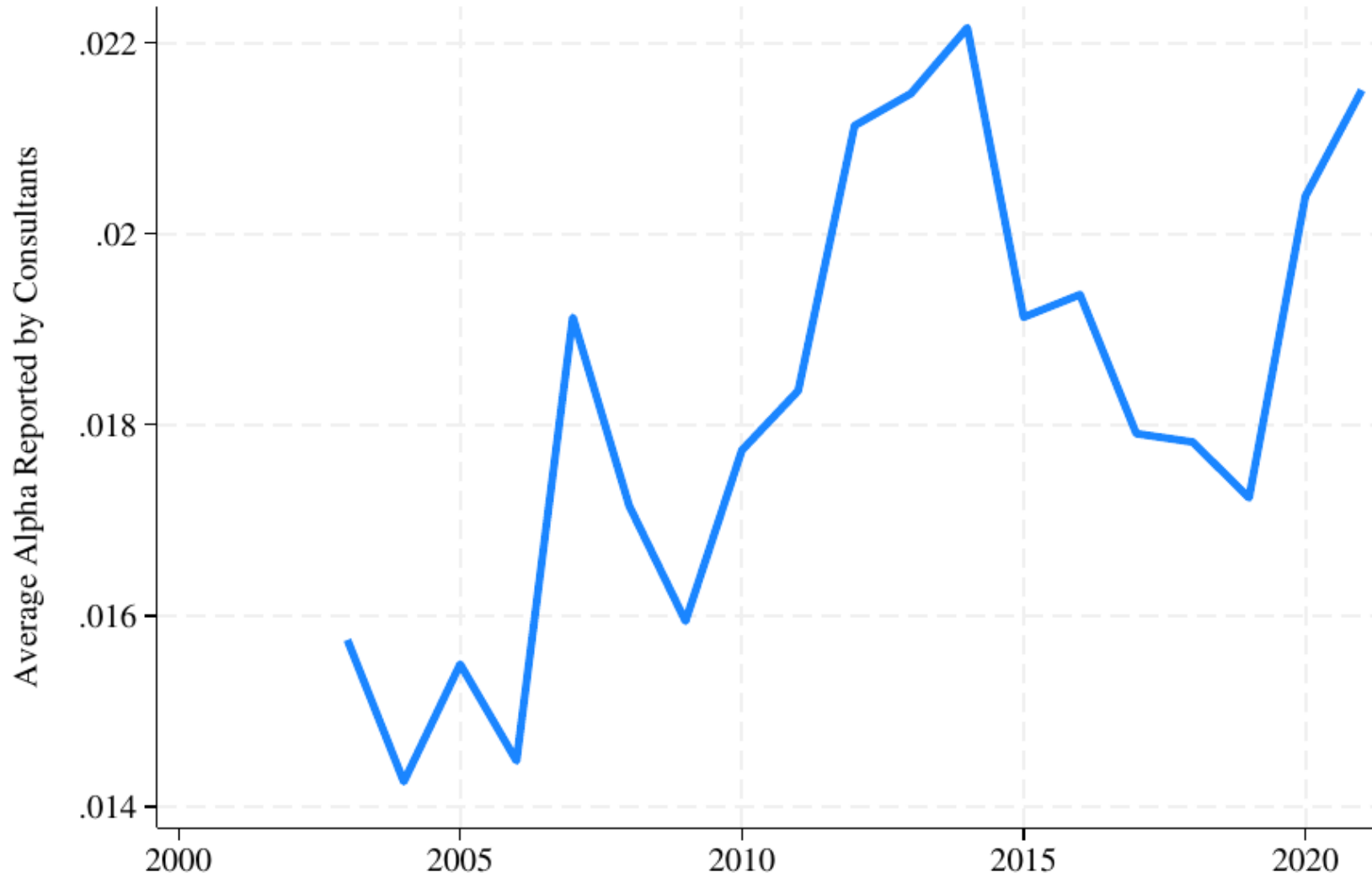
3. **Agency problems within pensions** (**Unlikely**)

May contribute to the aggregate trend, but unlikely to explain cross-pension behavior

4. **Supply-side factors** (**Maybe, but up to a limit**)

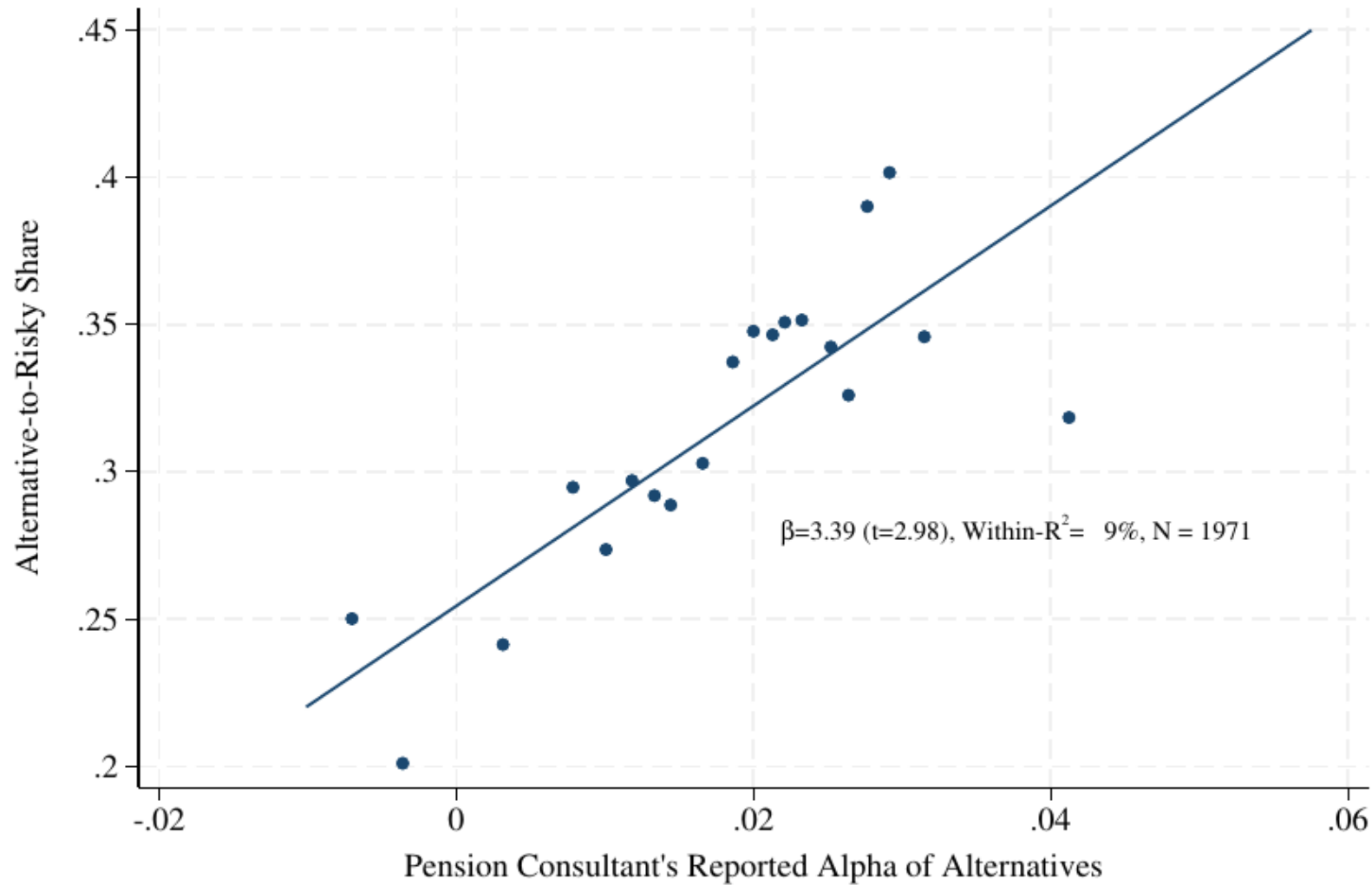
Growth of private markets cannot explain why pensions now heavily overweight alternatives

The average consultant's reported alpha of alternatives has risen



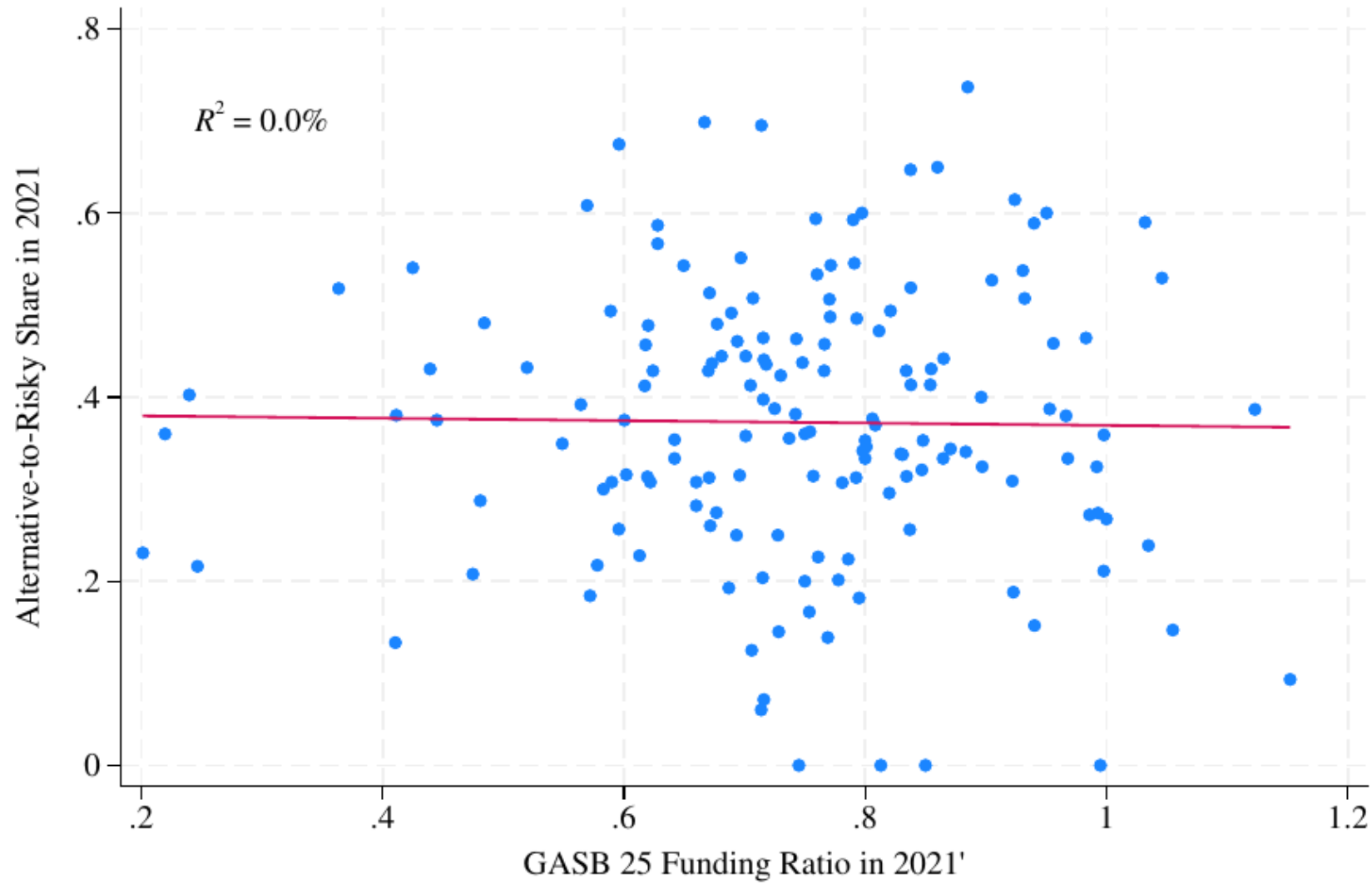
Mostly driven by an increase in expected returns

And consultant beliefs transmit to pension clients

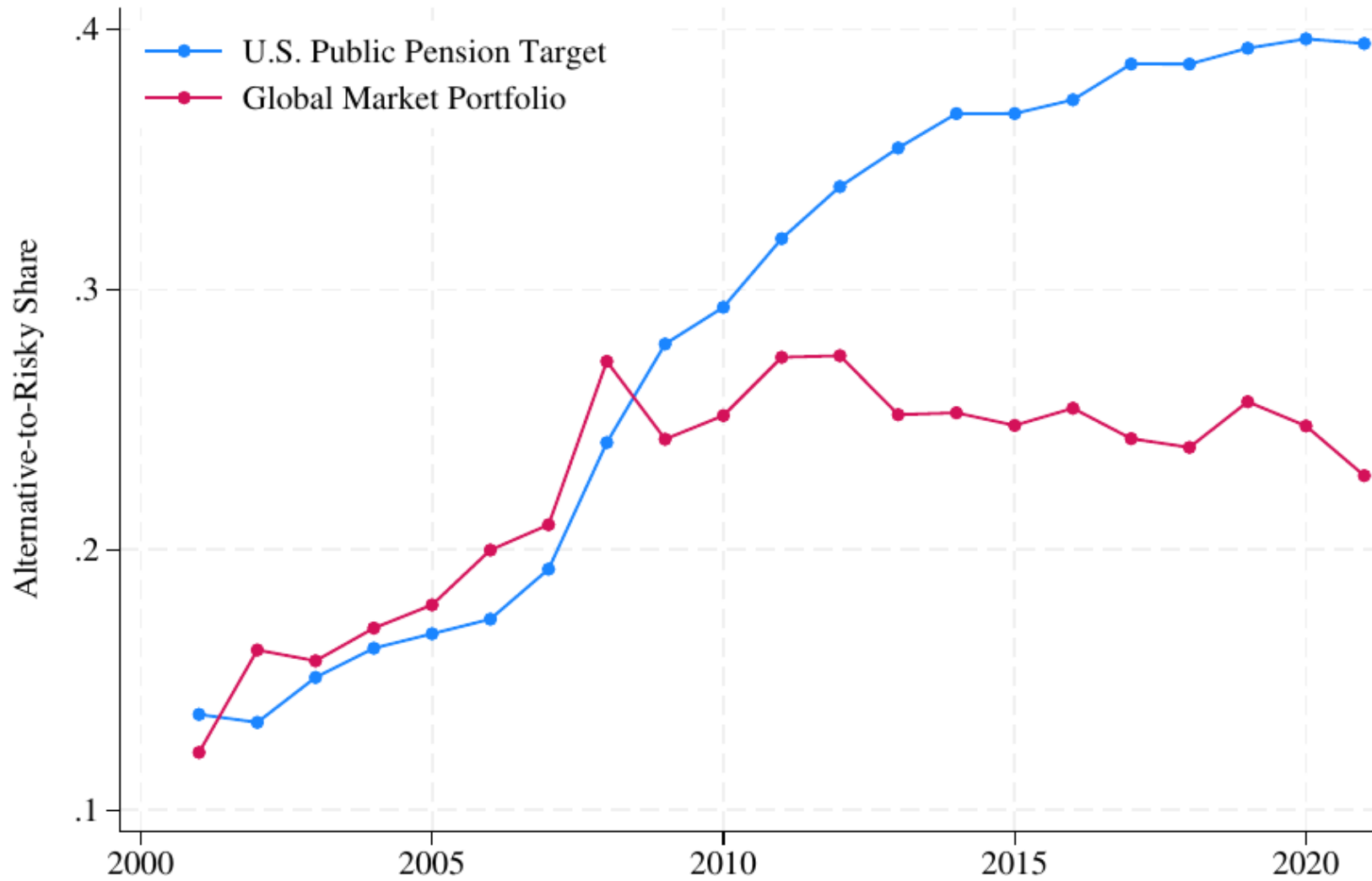


IV design based on consultant location suggests effect is mostly causal

Alternative use disconnected from funding status



Supply Side Factors?



Implications and Open Questions

- Are beliefs about the alpha of alternatives rational?
 - Especially important question given fees (~5-7% per year with carry)
- Difficult to precisely estimate alpha, given lack of market pricing:
 - Cashflow methods help, so long as no need to sell (endowments!)
 - Also hard b/c managers often act on their incentives to hide risk (Barth et al., 2025)
- To the extent that there has been alpha, should we expect it to persist?
 - Size usually the enemy of alpha... will pensions turn out to be late to the party?
- Whether beliefs are rational also depends heavily on manager selection, given known performance dispersion across alternative managers

Final Thoughts

- Alternatives have become central to public pension portfolios
- Shift driven largely by beliefs about their future outperformance
 - Reaching-for-yield explanations hard to detect in the data
 - Agency problems within pensions and supply side stories also not enough
- Key question for retirees is whether beliefs are rational
- Especially important given push to expand into 401(k) plans

References

Barth, D., P. Monin, E. Siriwardane, and A. Sunderam (2025, June). Hidden risk.

Working paper.

Risk-adjusted Performance of Private Funds: What do we know?

by

Prof. Greg Brown, Prof. Christian Lundblad, William Volckmann
UNC Chapel Hill & Institute for Private Capital

The authors gratefully acknowledge generous support provided by the Kroner Center for Financial Research at UC-San Diego, the Institute for Private Capital, the Private Equity Research Consortium, and MSCI.

IPC Operates Initiatives in Three Primary Subject Areas



**Private Equity
Research Consortium**

- Academic researchers and industry professionals dedicated to advancing research on private equity, private credit, and VC
- Completed: 70+ projects by 90+ Faculty, 50+ Univ., 20+ Ph.D. Students

Real Assets

- Collect and curate data on real assets include real estate, infrastructure, and natural resources.
- Launched new initiative last October

**Active Management with
Alternative Assets**

- Research projects aimed at better understanding portfolio management and construction with alternative assets
- Creating a comprehensive database of institutional-quality hedge funds for research

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Prof. Tim Jenkinson Oxford University Saïd Business School	Keith Crouch Executive Director, MSCI	Prof. Yael Hochberg Rice University Jones School of Business
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- Private fund performance analysis and attribution is difficult for all the reasons we know:
 - Lack of market return time series
 - Uncertainty about proper benchmarks and risk loadings
 - Lack of long/accurate data series for some assets
- Research Objective: Provide historical context for risk-adjusted performance using high-quality comprehensive data & methods
 - **Goal 1**: Generate comprehensive & current dataset for analysis (easy part)
 - **Goal 2**: Help move toward a common agreement of how to evaluate funds and portfolios of illiquid assets
 - Challenges & trade-offs of different methods
 - Evaluation and recommendations for benchmarks

- **Comparison of Performance Metrics:**
 - Unadjusted:
 - Multiples (MOIC)
 - Internal Rate of Return (IRR)
 - Risk-Adjusted:
 - Simple Methods
 - Public Market Equivalent (PME) – Kaplan & Schoar (KS, 2005)
 - Direct Alphas (DA) – Gredil, Griffiths, and Stucke (2023)
 - Advanced Methods
 - Generalized PME (GPME) & Alphas, Korteweg and Nagel (KN, 2024)
 - NowCasted Alphas & Betas -- Brown, Gredil, and Ghysels (BGG, 2023)
 - *NEW* Driessen, Lin, and Phalippou (2012)
 - *NEW* Ang, Chen, Goetzmann, and Phalippou (2018)

- **Equity Funds**
 - US buyout has $\beta \sim 1$ and generates reliable excess returns (regardless of benchmark/model)
 - US VC has $\beta \gg 1$ and \sim zero excess returns (regardless of benchmark/model)
 - Rest-of-world (ROW) has reliable excess returns using a ROW benchmark
- **Debt Funds**
 - We estimate substantial variation in β s of debt funds across sub-strategies
 - Benchmarks are more important than for equity funds (broad indices are uncorrelated)
 - Fairly consistent positive excess returns across strategies
- **Real Estate Funds** – Roughly zero excess returns
- **Infrastructure Funds** – Reliably positive excess returns
- **Risk Models**
 - Advanced models like the GPME, NowCasting, DLP, & ACGP models can be hard to estimate
 - KS-PME and Direct Alpha using asset-specific betas provide estimates highly correlated with the advanced models
- **Benchmarks**
 - Custom benchmarks (matched by sector-geography at fund-level) do not provide much additional explanatory power beyond the total stock market index (which we found surprising)
 - Need better benchmarks for private credit, real estate, & infrastructure

- **MSCI-Burgiss global private fund data through 2023:Q4**
 - Equity: Buyout, Venture Capital, Generalist
 - Debt: Senior, Mezzanine, Distressed, Generalist
 - Real Assets: Real Estate, Infrastructure
 - LP experience, net of fees for 7,816 private equity, credit, and real asset funds from vintage years from 1988 through 2019 with 6.8 trillion USD in committed capital
- **Benchmarks**
 - Commercial public-market indices
 - Ideally, we get close to public equivalent of private fund mandate
 - Credit and real assets are challenging though
 - Custom benchmarks - matched at fund-level by industry & region (when possible)

What's the market beta of private equity?

- **We utilize 5 independent methods of estimating the level of market risk (β)**
 1. Dimson (1979) market-model regression with 5 lagged quarterly returns (to capture NAV smoothing effects)
 - 2-5. GPME, NowCasting, DLP and ACGP as described in original papers
- Estimated β s for North American funds with the total market index as the benchmark

	Buyout Funds	VC Funds
Dimson Method	0.93	1.73
GPME (Korteweg & Nagel)	0.92	2.33
Nowcasting (BGG)	1.00	1.45
Driessen, Lin, and Phalippou	0.70	1.83
Ang et al.	0.84	1.07

What's the risk-adjusted performance of private equity?

- **We utilize (essentially) the same independent methods of estimating risk-adjusted performance**
 - PME and Direct Alpha using the estimated β s from Dimson (instead of assuming $\beta=1.0$)
 - Alphas from other models
- Estimated performance for NA funds with the total market index as the benchmark:

	Buyout Funds	VC Funds
PME - 1 (reference point is 0.0)	0.18	0.01
GPME Alpha (ref. point is 0.0)	0.20	-0.17
Direct Alpha (ref. point is 0%)	4.4%	0.2%
Nowcast Alpha (ref. point is 0%)	6.3%	-1.4%
Driessen, Lin, and Phalippou	6.5%	-3.6%
Ang et al.	4.4%	1.2%

What's the market beta and risk-adjusted performance of Rest-of-World private equity?



Betas	Buyout Funds	VC Funds
Dimson Method	0.91	0.76
GPME (Korteweg & Nagel)	--	--
Nowcasting (BGG)	1.02	1.41
Driessen, Lin, and Phalippou	0.86	--
Ang et al.	1.06	1.06

Performance Metrics	Buyout Funds	VC Funds
PME -1 (reference point is 0.0)	0.31	0.74
GPME Alpha (ref. point is 0.0)	--	--
Direct Alpha (ref. point is 0%)	7.6%	8.0%
Nowcast Alpha (ref. point is 0%)	7.7%	5.2%
Driessen, Lin, and Phalippou	7.2%	--
Ang et al.	5.4%	4.7%

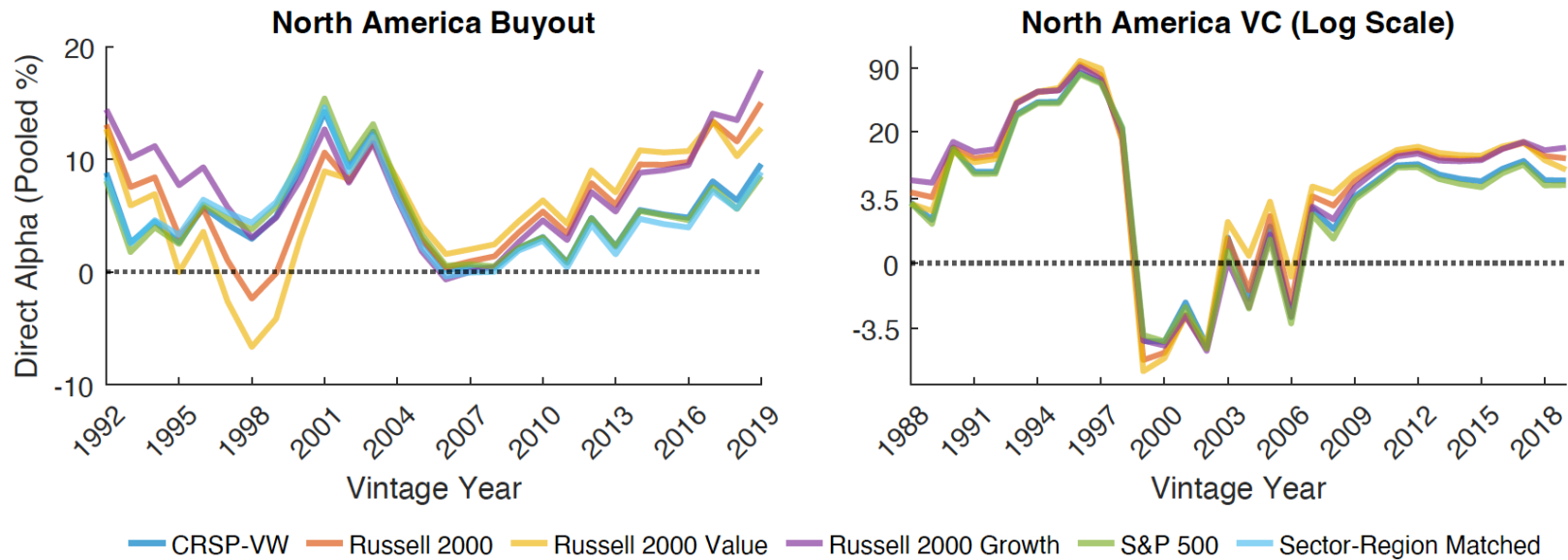
How do performance measures correlate?

- **Do complicated performance metrics tell you something different?**
- Correlation of performance ranks with-in vintage years for US equity funds:

	PME	GPME	Direct Alphas
GPME-Alpha	0.95		
Direct Alpha	0.76	0.77	
NowCast Alpha	0.71	0.75	0.85

What's are the effects of benchmark choice?

- We can do calculations using different benchmarks for U.S. equity funds and see how much it matters
- We do this analysis by vintage year and plot direct alphas



Debt Funds – Benchmark Choice

- We can calculate β s for private credit using the Dimson method
- 3 different public benchmarks:
 - Bloomberg-Barclay Aggregate
 - High-yield bond index
 - Leveraged-loan index
- Very different estimates!
 - Across benchmarks
 - Across sub-strategies

		All Geographies			
		All	Senior	Mezz	Distressed
Aggregate	Beta	0.25	0.47	0.06	0.51
	SE	0.23	0.25	0.15	0.33
	Adj. R ²	0.00	0.13	-0.03	0.03
	Quarters	144	65	144	133
High Yield	Beta	0.81	0.49	0.46	1.11
	SE	0.10	0.09	0.09	0.12
	Adj. R ²	0.62	0.70	0.25	0.67
	Quarters	144	65	144	133
Lev. Loan	Beta	1.28	0.77	0.78	1.57
	SE	0.13	0.08	0.15	0.14
	Adj. R ²	0.72	0.72	0.45	0.70
	Quarters	88	65	88	88

Risk-adjusted performance of Private Debt

Performance Metrics	All	Senior	Mezz	Distressed
PME (reference point is 1.0)	1.06	1.11	1.15	1.02
GPME Alpha (ref. point is 0.0)	0.37	--	0.32	0.40
Direct Alpha (ref. point is 0%)	1.9%	4.0%	4.3%	0.6%
Nowcast Alpha (ref. point is 0%)	5.0%	5.0%	5.0%	0.7%

What's the market beta and risk-adjusted performance of real asset funds?

Betas	Real Estate	Infrastructure
Dimson Method	0.80	0.65
GPME Method	0.74	--
Nowcasting Method	0.70	0.69

Performance Metrics	Real Estate	Infrastructure
PME (reference point is 1.0)	1.03	1.20
GPME Alpha (ref. point is 0.0)	0.05	--
Direct Alpha (ref. point is 0%)	0.7%	4.3%
Nowcast Alpha (ref. point is 0%)	3.0%	3.3%

Key Take-aways:

- Real Estate PE as a whole has performed on par with public real estate
- Infrastructure has performed well on a risk-adjusted basis
- Betas are low (always less than 1.0) regardless of method

- **Equity Funds** – Buyouts have performed well on a **risk-adjusted basis** whereas U.S. VC has not
- **Debt Funds** – **Good risk-adjusted performance** across sub-strategies. Betas vary substantially across sub-strategy
- **Real Asset Funds** – **Real Estate PE has consistently weak performance**, even on a risk-adjusted basis; **infrastructure has outperformed public benchmarks**
- **A bit more work to do** on advanced models but...
 - Simpler models like KS-PME and Direct Alpha with proper benchmarks and risk-adjustments feel like the robust and preferred solution in most applications
 - Need better benchmarks outside of private equity



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Sarah Franks (sarah_franks@kenan-flagler.unc.edu)

PRIVATE EQUITY FOR PENSION PLANS?
EVALUATING PRIVATE EQUITY PERFORMANCE FROM AN
INVESTOR'S PERSPECTIVE

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¹University of Southern California

²University of California, Los Angeles

February 3, 2026

OVERVIEW

- **Key Question:** Can investors benefit from including PE in their portfolios?
- We propose a new approach to evaluating the performance of PE investments.
- This approach is theoretically founded and takes an investor-focused perspective.
- Allows us to disentangle whether a realized PE return corresponds to a genuine expansion of the investor's investment opportunity set ("alpha"), or is just the result of risk taking ("beta")
- The measure is purely cash-flow based (no NAV).

MAIN RESULTS

- In our sample (1995-2018) there is no evidence that further increasing allocation to PE would have genuinely improved investment performance of pension plans (with the possible exception of buyout funds).
- Public pension plans experience above average performance in PE: The PE funds that public pension plans actually committed funds to resulted in a higher “alpha” compared to the average PE fund in that same vintage.
 - ▶ Conditioning on access to better performing PE fund managers, we find no evidence of superior fund picking across pension plans.
- Underfunded pension plans, and plans with comparatively more state officials on their boards take more risk, but earn lower risk-adjusted returns in their PE investments.

Note: For clear distinction, we use *plans* for pension plans and *funds* for PE funds

OUTLINE

- Institutional setting and theory
- Investor Portfolio Equivalent (IPE)
- Generalized Investor Portfolio Equivalent (GIPE)
- Pension plan heterogeneity and PE performance

BACKGROUND: WHY A NEW PERFORMANCE METRIC?

- **IRR & TVPI:** Easy to compute, but no risk-adjustment.

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- **IRR & TVPI**: Easy to compute, but no risk-adjustment.
- **PME** (Public Market Equivalent): Discounts CF at the public market rate of return. Valid if:
 1. The CAPM holds (all investors hold the same portfolio of risky assets, so that the market portfolio is mean-variance efficient)
 2. Investors have “log utility”.
 - ▶ Would imply that the equity premium (6%) is equal to the variance of the market, which is much lower (about 2.5-4%).

BACKGROUND: WHY A NEW PERFORMANCE METRIC?

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 1. The CAPM holds (all investors hold the same portfolio of risky assets, so that the market portfolio is mean-variance efficient)
 2. Investors have “log utility”.
 - ▶ Would imply that the equity premium (6%) is equal to the variance of the market, which is much lower (about 2.5-4%).
- **GPME** Levers the return on the market before discounting
 1. Is not as restrictive as the log utility assumption.
 2. However, it still implicitly assumes that all investors hold the same portfolio
 - ▶ all investors should feel the same when adding a given PE investment to their portfolio.

THEORY

- Two alternative objectives
- Investors (LPs) maximize either expected compounded returns

$$E \log(W_T) = E \log(R_1 R_2 R_3 \dots R_T) = E \sum_{i=1}^T \log R_i$$

- A more generalized objective

$$V_0 = E_0 \left[\frac{W_T^{1-\gamma}}{1-\gamma} \right]$$

- ▶ allows more flexible modeling of investor attitudes towards risk.
- ▶ The higher is γ , the more an investor dislikes bad outcomes compared to how much she likes good outcomes.
- ▶ The first objective is a special case of the second objective when $\gamma = 1$.

INVESTOR PORTFOLIO EQUIVALENT (IPE)

- IPE_{ij} is defined between PE fund $-i$ and pension plan $-j$ (with $\gamma = 1$) as

$$IPE_{ij} = \sum_{k=0}^K \frac{C_{ik}}{R_{jk}}$$

- If $IPE_{ij} > 0$, the investor can raise the log growth rate of investments by investing more capital into the PE fund.
- For easier interpretation, one can convert the IPE_{ij} measure into an “alpha” by computing the value of α that sets the IPE to zero in the equation

$$0 = \sum_{k=0}^K e^{-\alpha t_k} \frac{C_{ik}}{R_{jk}}$$

IPE ALL STRATEGIES

- An observation is a PE fund - pension plan pair (ignoring commitments)
- Grey areas are the 10th and 90th percentiles IPE across observations in a vintage year (not standard errors)

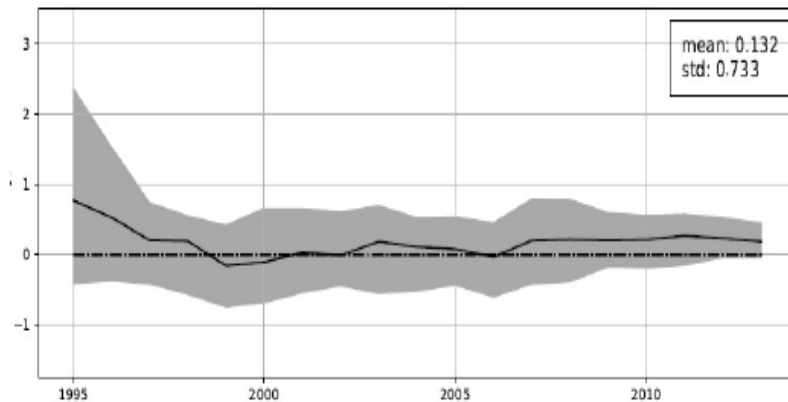


FIGURE: IPE For All Funds

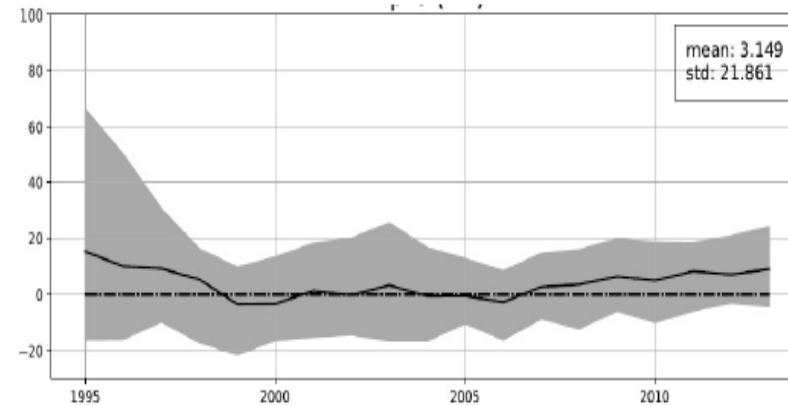


FIGURE: α -IPE For All Funds

GENERALIZED INVESTOR PORTFOLIO EQUIVALENT (GIPE)

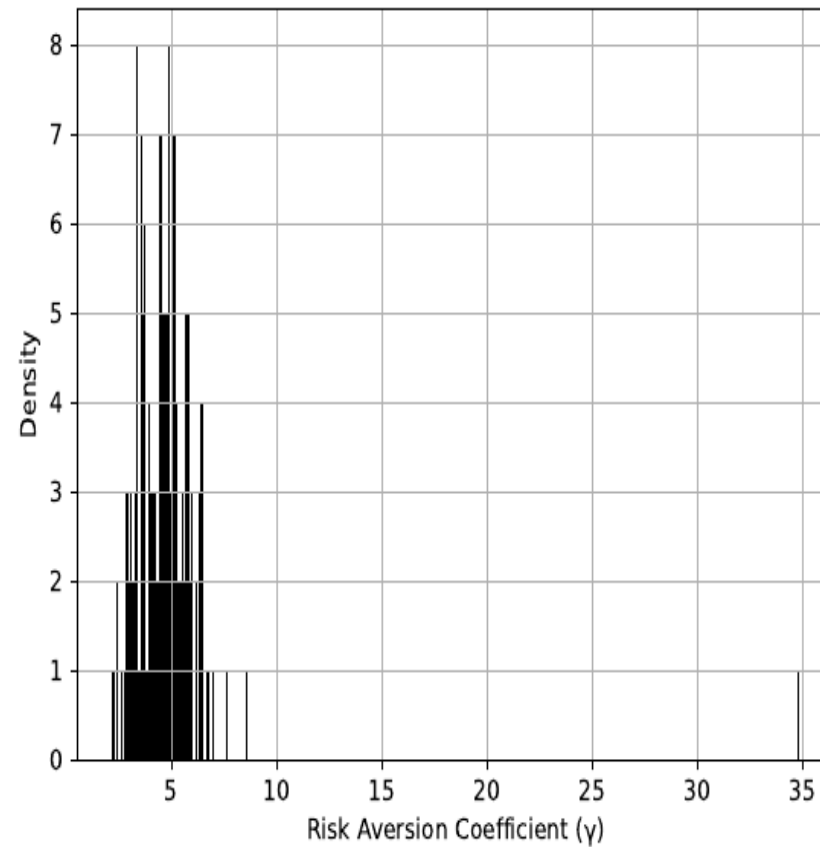
- The GIPE is given by

$$\text{GIPE}_{ij} = \sum_{k=0}^K e^{-r(t_k - t_0)} \frac{C_{ik}}{\tilde{R}_{jk}^{\gamma}}$$

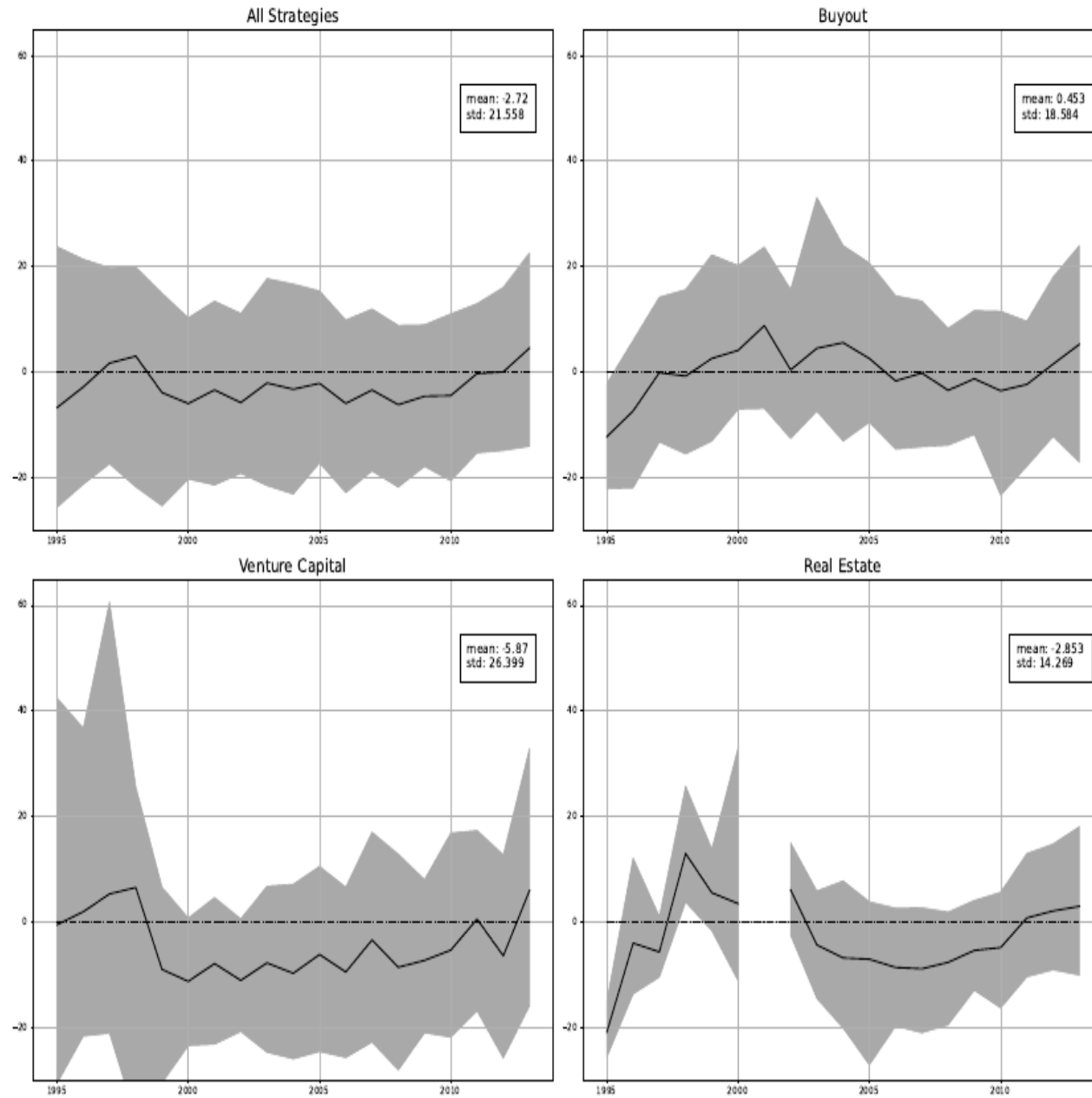
- The parameter γ is estimated by revealed preference:
 - ▶ the investor should be indifferent between investing a marginal dollar in either stocks or bonds.
- Implication: any investment that is just a (dynamically levered) version of the market portfolio has a GIPE equal to zero.
- If PE is just a levered version of investing in public stocks, then its GIPE will be zero by construction.

THE DISTRIBUTION OF γ

$$\frac{1}{n_T - n_0 + 1} \sum_{t=n_0}^{n_T} (R_{j,t})^{-\gamma} \cdot \left(R_t^m - (1 + r_{t-1}^f) \right) = 0$$



α -GIPE



GIPE OF THE CASHFLOW C AND \hat{C}

- $GIPE > 0 \implies$ PE is attractive to add to the portfolio.
- $GIPE > 0 \not\Rightarrow$ PE is uniquely superior.
 - ▶ E.g: Value investments could have a positive GIPE.
- We construct PE-mimicking portfolios that invest in a long-only traded index and match the PE fund's timing of capital calls and distributions.

GIPE-TYPE METRICS

	All funds		Buyout		VC		Real Estate	
	Mean	s.e.	Mean	s.e.	Mean	s.e.	Mean	s.e.
GIPE	-0.029	0.032	0.109	0.035***	-0.131	0.064**	-0.102	0.075
GPME	-0.122	0.133	0.164	0.205	-0.288	0.109***	-0.367	0.147**
GIPE(mkt-repl.)	-0.043	0.021**	-0.040	0.023*	-0.050	0.021**	-0.037	0.022*
GIPE(value-repl.)	0.069	0.055	0.069	0.051	0.111	0.079	-0.016	0.024
GIPE(growth-repl.)	-0.235	0.041***	-0.213	0.040***	-0.259	0.039***	-0.231	0.052***
α (GIPE)	-2.720	1.210**	0.453	1.192	-5.870	1.535***	-2.853	1.796
N	170,355		68,649		67,696		34,010	

PENSION PLAN COMMITMENT AND PERFORMANCE

	All funds		Buyout		VC		Real Estate	
	Mean	s.e.	Mean	s.e.	Mean	s.e.	Mean	s.e.
<i>Panel A: Plan-Fund Pairs - Committed Funds.</i>								
IPE	0.167	0.032***	0.244	0.028***	0.079	0.104	0.072	0.057
PME(KN)	0.087	0.031***	0.181	0.046***	-0.008	0.091	-0.047	0.059
GIPE	0.040	0.028	0.175	0.048***	-0.116	0.080	-0.123	0.077
GPME	-0.007	0.175	0.239	0.243	-0.214	0.145	-0.424	0.188**
IRR	12.396	1.486***	14.082	1.329***	9.438	3.354***	12.034	2.569***
α (GIPE)	0.887	0.758	3.584	0.944***	-2.431	1.759	-1.991	1.564
N	6,229		3,356		1,778		1,095	
<i>Panel B: Plan-Fund Pairs - Non-committed Funds.</i>								
IPE	0.130	0.036***	0.224	0.024***	0.057	0.083	0.090	0.054*
PME (KN)	0.035	0.028	0.153	0.036***	-0.048	0.067	-0.034	0.053
GIPE	-0.031	0.033	0.106	0.035***	-0.132	0.064**	-0.101	0.075
GPME	-0.126	0.131	0.160	0.203	-0.290	0.108***	-0.365	0.146**
IRR	10.636	1.432***	13.107	1.227***	7.215	2.354***	12.587	2.014***
α (GIPE)	-2.857	1.237**	0.292	1.224	-5.963	1.541***	-2.882	1.812
N	164,126		65,293		65,918		32,915	

SEC PAY-TO-PLAY VIOLATORS

	Non-SEC Violators			SEC Violators		
	(1) IRR	(2) $\alpha(GIPE)$	(3) IRR- $\alpha(GIPE)$	(4) IRR	(5) $\alpha(GIPE)$	(6) IRR- $\alpha(GIPE)$
Home State=1	-2.313 (1.476)	-1.121 (1.399)	-1.191 (0.829)	-1.650 (0.957)	-1.591* (0.901)	-0.059 (0.632)
State Appointed	-11.675 (10.838)	-4.555 (14.491)	-7.120 (14.397)	5.374 (10.511)	-6.175 (6.562)	11.549 (9.542)
State ex-officio	-13.022** (4.608)	13.093 (16.216)	-26.115 (16.061)	-1.255 (4.005)	-13.607*** (2.835)	12.352*** (3.521)
Member Elected	-4.440 (3.640)	32.236 (24.370)	-36.675 (23.343)	-4.609* (2.607)	-3.807 (3.499)	-0.802 (4.094)
Public Appointed	-1.415 (3.187)	29.209 (21.965)	-30.624 (21.906)	1.046 (2.391)	-10.166** (4.311)	11.212*** (2.759)
Board Size	-0.101 (0.144)	0.446 (0.274)	-0.547** (0.252)	0.277* (0.133)	0.274 (0.199)	0.003 (0.160)
Other Trustees	5.406 (7.713)	29.201 (17.845)	-23.795 (16.299)	-1.408 (4.928)	0.539 (9.691)	-1.947 (8.714)
<i>N</i>	2,388	2,388	2,388	2,350	2,350	2,350
adj. <i>R</i> ²	0.088	0.099	0.352	0.128	0.109	0.359
Controls	Y	Y	Y	Y	Y	Y
Vintage FE	Y	Y	Y	Y	Y	Y
Plan State FE	Y	Y	Y	Y	Y	Y

CONCLUSION

- A new performance metric.
- Investor-specific. Helps diagnose **over- / under- allocation** to private equity funds.
- Helps disentangle **risk** from **outperformance**.
- There is some evidence that pension plans tend to get matched with above average private equity funds.
 - ▶ This is probably due to **superior access**, not selectivity skills on the part of the pension plans
- The sort of characteristics that one would expect to correlate with risk taking (underfunding, etc.) tend to correlate with our measure of *IRR-alpha*.