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

by

Prof. Greg Brown, Prof. Christian Lundblad, William Volckmann

UNC Institute for Private Capital

March 2025

Preliminary Results

* 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.

Motivation

INSTITUTE for PRIVATE CAPITAL

- 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

- <u>Research Objective</u>: 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

Outline of Our Study

- **Performance Measurement Methodological Survey:**
  - Unadjusted: Multiples (MOIC) & Internal Rate of Return (IRR)
  - Risk-Adjusted:
    - Simple Methods
      - Public Market Equivalent (PME) &
      - Direct Alphas (DA)
      - Innovation: Use Dimson (1979) betas from (sub-)strategy MSCI TWRR indices
    - Advanced Methods
      - Generalized PME (GPME) Estimates, Korteweg and Nagel (2016, 2024)
      - NowCasting Estimates of Brown, Gredil, and Ghysels (BGG, 2023)
- **Risk Measurement Issues**
  - Benchmark selection & risk adjustments (for PME / DA approach)
  - Model selection & risk factor estimation (for advanced methods)

Performance Metrics

INSTITUTE for PRIVATE CAPITAL

	Level-based	Return-based
Unadjusted	• Multiple on Invested Capital (MOIC)	• Internal Rate of Return (IRR) • Modified IRR (MIRR)
Risk-Adjusted	• Kaplan-Schoar PME (with Dimson βs) • Korteweg-Nagel GPME (estimated βs)	• Direct Alpha (with Dimson βs) • BGG Nowcast Alpha

- Note that KS-PMEs and KN-PMEs differ in interpretation:
  - KS-PMEs are ratios of values (like a profitability ratio) so the **reference point is 1.0**
  - KN-GPMEs are differences in values (like an NPV) so the **reference point is 0.0**

- We report pooled metrics unless otherwise stated

Data

- MSCI-Burgiss global private fund data through 2023:Q4
  - Equity: Buyout, Venture Capital, Generalist
  - Debt: Senior, Mezzanine, Distressed, Generalist
  - Real Assets: Real Estate, Infrastructure

- Benchmarks
  - Public market (commercial) indices
    - Asset type & region matched (when possible)
    - Ideally, we get close to apples-to-apples (credit and real assets are challenging though)
  - Custom benchmarks
    - For example, matched at fund-level by industry and region

MSCI-Burgiss Manager Universe

Private Capital Universe

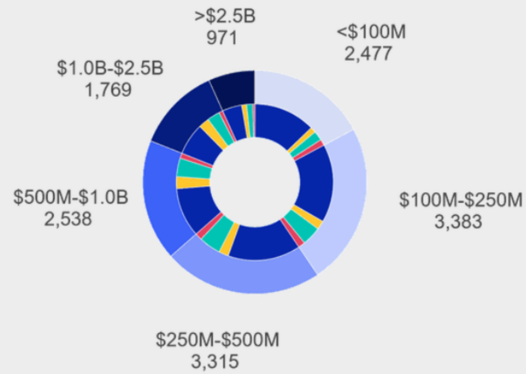
Updated through September 30, 2024

Count and Capitalization by Asset Class

Asset Class	Funds	FoFs	Total	Cap. ($M)
Private Capital	**12,964**	**1,489**	**14,453**	**$12,030,612**
Generalist	513	177	690	578,565
Equity	**8,305**	**1,053**	**9,358**	**7,335,382**
Generalist	1,026	460	1,486	1,156,669
Venture Capital*	3,969	300	4,269	1,362,176
Expansion Capital	193	4	197	133,346
Buyout	2,999	272	3,271	4,623,863
Unknown	118	17	135	59,328
Debt	**1,505**	**34**	**1,539**	**1,622,510**
Generalist	327	8	335	400,162
Senior	230	-	230	305,897
Mezzanine	398	6	404	338,442
Distressed	358	17	375	479,066
Not Elsewhere Classified	124	1	125	52,623
Unknown	68	2	70	46,320
Real Assets	**2,474**	**156**	**2,630**	**2,395,337**
Generalist	51	13	64	69,291
Real Estate*	1,613	99	1,712	1,215,531
Natural Resources*	407	26	433	241,665
Infrastructure*	394	16	410	866,931
Not Elsewhere Classified	8	-	8	1,573
Unknown	1	2	3	347
Not Elsewhere Classified	113	6	119	71,936
Unknown	54	63	117	26,881

Funds have a third tier not shown here.

Count by Fund Size Range

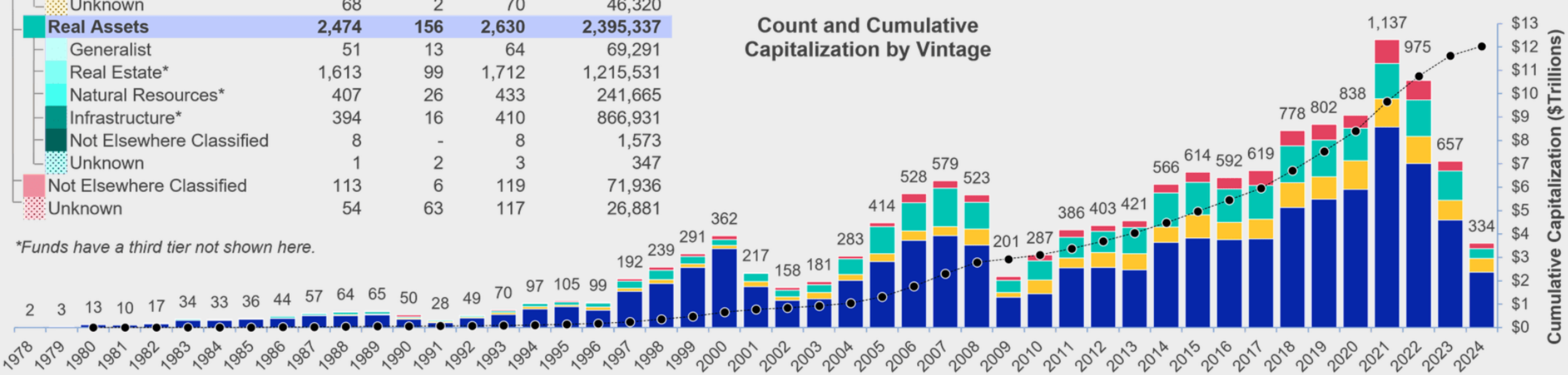


Data Update Schedule

Results Through	Update Date
Q4 2023	27-Apr-2024
Q1 2024	22-Jun-2024
Q2 2024	21-Sep-2024
Q3 2024✓	21-Dec-2024
Q4 2024	*26-Apr-2025**
Q1 2025	*21-Jun-2025**
Q2 2025	*20-Sep-2025**

*Estimated

Count and Cumulative Capitalization by Vintage



Primary Benchmarks

- These are what we use in the main analysis, but have considered others
- Will show some others for US equities (i.e., Russell 2000 and sub-indices)

Asset Type	Global	US / North America	Rest of World
Equity	MSCI-ACWI Gross TRI	CRSP Value-weighted	MSCI-EAFE
Debt	Morningstar Global Leveraged Loan Total Return	S&P UBS Leveraged Loan Index Total Return Unhedged	Morningstar European Leveraged Loan Total Return
Real Estate	The FTSE EPRA/NAREIT Global Real Estate TRI	Dow Jones U.S. Real Estate TRI	Custom composite imputed from Global and North America TRI indices
Infrastructure	MSCI World Infrastructure Gross TRI	MSCI USA Infrastructure Gross TRI	MSCI EAFE Infrastructure Gross TRI

Note: TRI denotes Total Return Index. All global and Rest of World indices are measured in (unhedged) USD, as are MSCI-Burgiss private fund returns.

What's the market beta of private equity?

- **We utilize 3 independent methods of estimating the level of market risk (β)**
  1. **Dimson (1979)** market-model regression with lagged returns to account for smoothing
  2. From GPME model of Korteweg and Nagel (2016, 2024)
  3. From Brown, Gredil, and Ghysels (henceforth, BGG, 2023)

- Estimated βs for U.S. 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

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

INSTITUTE for PRIVATE CAPITAL

- **We utilize (essentially) the same 3 independent methods of estimating risk-adjusted performance**
  1. PME and Direct Alpha using the estimated βs from Dimson (instead of assuming β=1.0)
  2. Alpha from GPME model of Korteweg and Nagel (2016, 2024)
  3. Nowcast Alpha from Brown, Gredil, and Ghysels (BGG, 2023)

- Estimated performance for U.S. funds with the total market index as the benchmark

	Buyout Funds	VC Funds
PME (reference point is 1.0)	1.18	1.01
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%

What's the market beta and risk-adjusted performance of **ex-US** private equity?

INSTITUTE for PRIVATE CAPITAL

Betas	Buyout Funds	VC Funds
Dimson Method	0.91	0.76
GPME (Korteweg & Nagel)	--	--
Nowcasting (BGG)	1.02	1.41

Performance Metrics	Buyout Funds	VC Funds
PME (reference point is 1.0)	1.31	1.74
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%

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:

	MOIC	IRR	MIRR	PME	GPME	Direct Alphas
IRR	0.57					
MIRR	0.57	0.67				
PME	0.89	0.74	0.66			
GPME-Alpha	0.76	0.73	0.64	0.95		
Direct Alpha	0.54	0.98	0.67	0.76	0.77	
NowCast Alpha	0.52	0.82	0.80	0.71	0.75	0.85

How do “top quartiles” correlate?

INSTITUTE for PRIVATE CAPITAL

- **Do complicated performance metrics tell you something different?**
- Percent of funds jointly identified as “top quartile” with-in vintage years for US equity funds for various combinations of performance metrics:

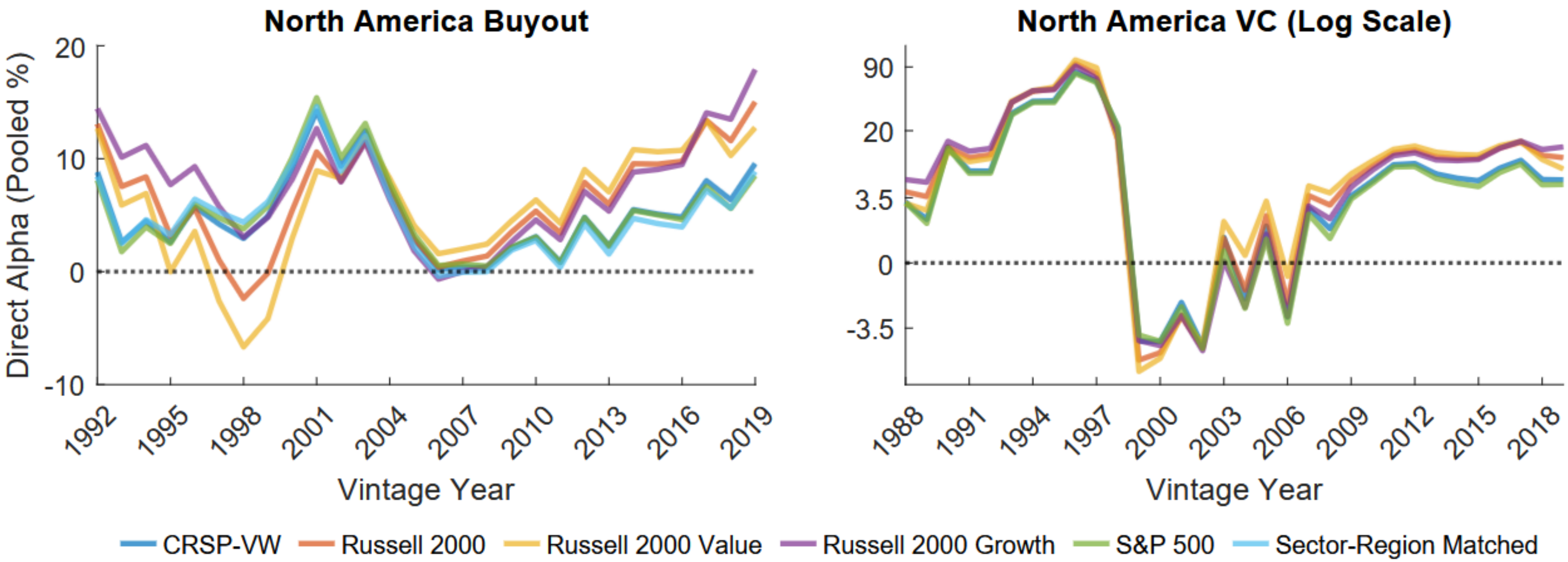
	MOIC	IRR	MIRR	PME	GPME	Direct Alphas
IRR	0.74					
MIRR	0.83	0.88				
PME	0.83	0.84	0.88			
GPME-Alpha	0.77	0.84	0.83	0.93		
Direct Alpha	0.74	0.91	0.85	0.89	0.90	
NowCast Alpha	0.64	0.79	0.73	0.76	0.79	0.82

What’s are the effects of benchmark choice?

INSTITUTE for PRIVATE CAPITAL

- **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 βs for private credit using the Dimson method
- 3 different public benchmarks:
  - Bloomberg-Barclay Aggregate
  - High-yield bond index
  - Leveraged-loan index
- Very different estimates!

		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

Debt Funds (2) - Global

INSTITUTE for PRIVATE CAPITAL

Metric	World	North America	Rest of World
MOIC	1.32	1.34	1.24
IRR	8.3%	9.5%	6.7%
MIRR (10%)	9.8%	10.0%	9.5%
KS-PME (Dimson βs)	1.06	1.09	1.12
Direct Alpha (Dimson βs)	1.9%	2.8%	3.8%
KN-Alpha	0.23	0.22	0.15
BGG-Alpha	4.8%	5.1%	3.7%
Number of Funds	892	692	157
Vintage Start Date	2002	1992	2002
Dimson βs	1.28	1.28	0.89

Key Take-aways:

- Private Debt performance has been good on both a nominal and risk-adjusted basis.
- Reasonable that βs for North America are a bit greater than 1 and excess returns are ~3%.
- This is in contrast to the recent paper by Erel, Flanagan, and Weisbach, "Risk-Adjusting the Returns to Private Debt Funds"
  - Though we do not have a lot of equity exposure in the leveraged-loan benchmark

Debt Funds (3) – Global by Type

Metric	All	Generalist	Senior	Mezz	Distressed
MOIC	1.32	1.26	1.25	1.31	1.39
IRR	8.3%	6.9%	8.5%	8.3%	9.1%
MIRR (10%)	9.8%	9.5%	9.8%	9.7%	9.9%
KS-PME (Dimson βs)	1.06	1.01	1.11	1.15	1.02
Direct Alpha (Dimson βs)	1.9%	0.2%	4.0%	4.3%	0.6%
KN-Alpha	0.23	0.19	--	0.28	0.24
BGG-Alpha	5.0%	6.2%	5.0%	5.0%	0.7%
Number of Funds	892	198	129	249	227
Vintage Start Date	2002	2004	2002	2002	2002
Dimson βs	1.28	1.44	0.77	0.78	1.57

Key Take-aways:

- Senior and Mezz funds have better risk adjusted performance than generalist and distressed funds. But this is driven by beta estimates.
- KN-Alpha estimates are reasonable but βs (not tabled) are too low!
- BGG estimates based on ICE-BofA US High yield bond index
- <u>We are not convinced there is an acceptable risk model for private credit yet.</u>

Real Asset Funds (1)

	All Geographies		North America		Rest of World	
Metric	**Real Estate**	**Infra**	**Real Estate**	**Infra**	**Real Estate**	**Infra**
MOIC	1.29	1.41	1.37	1.39	1.12	1.46
IRR	6.7%	8.3%	8.3%	8.0%	2.7%	8.0%
MIRR (10%)	9.6%	9.7%	9.8%	9.7%	8.8%	9.4%
KS-PME (Dimson βs)	1.03	1.20	1.03	1.14	0.81	1.29
Direct Alpha (Dimson βs)	0.7%	4.3%	0.8%	3.2%	-4.3%	5.4%
KN-Alpha	0.51	--	-0.01	--	--	0.22
BGG-Alpha	3.1%	3.3%	3.7%	1.4%	2.0%	4.3%
Number of Funds	1,167	231	822	112	304	82
Vintage Start Date	1990	2000	1992	2000	1998	2004
Dimson βs	0.80	0.65	0.73	0.6	0.83	0.53

Key Take-aways:

- Real Estate PE has performed poorly both in NA and Rest of World
- Infrastructure has performed well on a risk-adjusted basis, especially outside NA
- Betas are low (always less than 1.0) regardless of method
  - GPME model struggles and ROW infrastructure beta (not tabled) seems too low.

Summary & Conclusions

- **Equity Funds** – Buyouts have performed well on a **risk-adjusted basis** whereas VC has not.
  - True for North America and Rest of World ex-US and sub-periods
- **Debt Funds** – **Good risk-adjusted performance** across regions and sub-strategies. Betas vary substantially across sub-strategy (believable?)
- **Real Asset Funds** – **Real Estate PE has consistently weak performance** on a risk-adjusted basis; **infrastructure has outperformed**
  - True for North America and Rest of World (ex-NA) and sub-strategies
- **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.

INSTITUTE for PRIVATE CAPITAL

uncipc.org

For additional information please contact:
Prof. Greg Brown (gregwbrown@unc.edu)
Sarah Franks (sarah_franks@kenan-flagler.unc.edu)

Public Market Equivalent (PME)

INSTITUTE for PRIVATE CAPITAL

- Like simple multiples, the PME measures the ratio of cash inflows to cash outflows, however the cash flows are future values calculated using realized rates of return for a public market benchmark.
  - A PME>1 (<1) means the investment returned more (less) than the public benchmark.

$$PME = \frac{\sum_{t=0}^{T} CF_t^{inflow}(1 + R_t^M)}{\sum_{t=0}^{T} CF_t^{outflow}(1 + R_t^M)}$$

where R_t^M is the total return on the public market benchmark between *t* and *T*.

Pros	Cons
• Allows for explicit comparison to a public market benchmark • Provides a precise estimate of the total outperformance, e.g., a PME=1.25 means the investment provided a total return that was 25% higher than the public market benchmark	• Need to pick an appropriate public market benchmark • Does not adjust for investment time horizon, e.g., a PME of 1.25 for a 5-year investment is much better than for a 10-year investment

There are different flavors of PME but the method in Kaplan-Schoar (2005) is generally considered the best and used most in research.

Direct Alpha (DA)

- Direct Alpha measures the excess return over the benchmark return by calculating the IRR of the future value of all cash flows obtained (as with PME) using returns on a public market benchmark (R_t^M)
  - A DA>0% (<0%) means the investment returned more (less) than the public benchmark.

$$0 = \sum_{t=0}^{T} \frac{CF_t(1 + R_t^M)}{(1 + DA)^t}$$

Pros	Cons
• Allows for explicit comparison to a public market benchmark • Provides a precise estimate of the total outperformance on an annualized basis, e.g., a DA=3% means the investment on average returned 3% more than the public benchmark.	• Need to pick an appropriate public market benchmark

For more details see, Gredil, Griffiths, and Stucke, 2014, Benchmarking Private Equity: The Direct Alpha Method https://ssrn.com/abstract=2403521