

Leverage in Private Equity Real Estate

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- In ideal conditions, leverage is irrelevant
 - ▶ Creates no asset-level value
 - ▶ Part of a zero-sum game between various asset stakeholders
- In reality, leverage is far from irrelevant
 - ▶ Due to existence of market frictions
 - ▶ Leads to value creation or destruction

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- In reality, leverage is far from irrelevant
 - ▶ Due to existence of market frictions
 - ▶ Leads to value creation or destruction
- We review the scant literature on PERE leverage
 - ▶ Mixed or little evidence that leverage is employed to amplify skill or benefit investors as much as managers
 - ▶ Stylized facts and new evidence supporting the value-destroying results of leverage

Outline

- Good and Bad Leverage: Theory
- Stylized Facts
- Literature, Key Questions, and New Evidence
- Future Research Directions

Good Leverage: Theory

- Skill amplifier
 - ▶ A skilled GP better spent time sourcing positive-NPV projects rather than courting LPs
- Leverage is necessary to make sure that GPs' and LPs' interests are aligned

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- Tax shield
 - ▶ Not applicable due to the pass-through nature
- Signaling confidence in project outcomes
 - ▶ Since debt can increase risk to a fiduciary
 - ▶ The signaling hypothesis is related to quality - interpreted as GP skill

Bad Leverage: Theory

- Subpar risk-adjusted investor returns
 - ▶ Source 1: Costly financial distress
 - ★ Substantial DWL during transfer of ownership with delinquency and defaults
 - ▶ Source 2: Higher loan rates and associated covenants factored by lenders
 - ★ Restricted operational flexibility and reduced asset value

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Without any offsetting benefits, debt will cannibalize equity returns

Bad Leverage: Example 1

- Consider an office building acquisition to be financed using a mortgage
 - ▶ Expected asset return $r_A = 9\%$; expected mortgage rate with 65% LTV $r_D = 3.5\%$
 - ▶ Abstracting away from any frictions, the return to levered LP equity $r_E (= 19.2\%)$ can be derived from:

$$r_A = (1 - \text{LTV})r_E + \text{LTV} r_D, \quad (1)$$

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- The inefficiencies associated with debt financing in states of poor asset performance are borne by the equity stakeholder
 - ▶ The presence of DWL or a fire sale reduces r_A in bad states
 - ▶ Lenders will not accept r_D lower than 3.5% facing incurring poorer outcomes
 - ▶ Holding LTV constant, a decreasing r_A and weakly increasing $r_D \Rightarrow$ a lower r_E

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 - ★ Restricted operational flexibility and reduced asset value
 - ▶ Source 3: Effort is unobservable and incontractible
 - ★ In the presence of coinvestment incentives for the GP (e.g., carry), leverage can still distort alignment of interests.

Bad Leverage: Example 2

- Assuming no DWL of default or delinquency, abstracting away from any asset base fee, and a holding period of one year
 - ▶ GP's carry is 20% after investors achieve a preferred IRR of 8%
 - ▶ Assume $r_A = 9\%$ can only be achieved manager's effort without which 7%

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- leverage can dilute the incentives provided by carried interest
 - ▶ The manager expects to earn a bonus even if no effort is expended to drive fundamental asset value
 - ▶ The expected return on levered equity is $r_E = 13.5\%$ ($>8\%$) with $r_A = 7\%$

Good and Bad Leverage: Discussion

- Positive side
 - ▶ Skill amplifier and higher asset-level returns
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Good and Bad Leverage: Discussion

- Positive side
 - ▶ Skill amplifier and higher asset-level returns
 - ▶ Interpreted as a signal of skill or confidence in project outcomes
- Negative side
 - ▶ Dead-weight costs of distress borne by equityholders
 - ▶ Conflict of interests generated by standard PERE contract provisions

Stylized Facts

- Data source
 - ▶ Property-level leverage from NCREIF
 - ▶ Fund-level target leverage from StepStone and Preqin

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- Data source
 - ▶ Property-level leverage from NCREIF
 - ▶ Fund-level target leverage from StepStone and Preqin
- Median characteristics
 - ▶ Leverage use across different data sets and horizons is broadly consistent
 - ★ NCREIF CEFs: 57% of total AUM
 - ★ StepStone and Preqin: 65% of total AUM
 - ▶ Leverage and fund terms increase moving from lower-risk to higher-risk category
 - ★ Leverage doubles down on risk (in addition to risk from asset base)

Fact 1: Broadly Consistent Use of Leverage

Table: NCREIF fund leverage stats (1983-2021, secured debt, only). For each fund property, leverage is defined as mortgage balance outstanding divided by appraised market value when property data is first recorded in the NCREIF data set. Fund leverage is the average of property leverage. Only NPI properties with non-negative leverage at or below 95% are included.

PE Fund Type	Num Funds	mean	sd	p5	p25	p50	p75	p95
CEF	309	54%	16%	21%	47%	57%	64%	73%
ODCE	46	31%	20%	7%	15%	24%	50%	66%
Non-ODCE OEF	83	39%	19%	6%	26%	43%	55%	64%
Separate Account	537	44%	18%	10%	32%	46%	57%	72%
Total	975	46%	18%	9%	34%	49%	61%	72%

- Median leverage across different data sets and horizons is broadly consistent
 - ▶ NCREIF CEFs: 57% of total AUM
 - ▶ StepStone and Preqin CEFs: 65% of total AUM
- Median leverage of OEFs
 - ▶ NCREIF (37%; ODCE and non-ODCE combined) \approx StepStone (40%)

Fact 2: Leverage and Fund Terms Increasing in Risk Categories

Table: StepStone Fund Terms (2014-2021). The table summarizes US PERE fund terms, as collected and reported by StepStone. Effective cost is the difference between gross and net (LP) target returns. 'Mgt fee' is the average of fees incurred during and after the fund's investment (capital deployment) period.

sector	Stat	Gross target return	Effective cost	Target leverage	Carry	Preferred retn	GP commitment	Mgt fee
Core/Core+ (OEFs)	Num funds	48	44	58	47	32	24	25
	mean	10.0%	1.5%	41.5%	9.5%	7.2%	7.3%	1.1%
	median	10.0%	1.0%	40.0%	10.0%	7.0%	2.0%	1.0%
	sd	1.7%	0.5%	12.0%	7.0%	0.8%	13.6%	0.2%
Core/Core+ (CEFs)	Num funds	16	14	28	25	22	16	21
	mean	11.2%	1.8%	50.5%	14.3%	7.6%	2.1%	1.1%
	median	11.0%	2.0%	50.0%	15.0%	7.3%	1.0%	1.1%
	sd	1.6%	0.9%	13.3%	5.3%	0.8%	2.2%	0.3%
Value-Add (CEFs)	Num funds	121	103	197	186	185	155	159
	mean	15.8%	3.0%	62.9%	19.7%	8.2%	3.7%	1.4%
	median	15.0%	3.0%	65.0%	20.0%	8.0%	2.0%	1.5%
	sd	1.8%	0.8%	8.6%	2.3%	0.9%	4.6%	0.2%
Opportunistic (CEFs)	Num funds	66	47	100	98	98	80	79
	mean	18.9%	3.9%	65.0%	20.2%	8.4%	3.2%	1.5%
	median	19.0%	4.0%	65.0%	20.0%	8.0%	2.5%	1.5%
	sd	2.1%	1.0%	8.8%	2.1%	0.8%	2.4%	0.2%

Fact 3: Cross-Sectional Relationship between Leverage and Fund Terms

Table: Target Leverage and Fund Terms. The tables reports on a series of regressions of target leverage (in percentage points) against various PERE fund terms using StepStone U.S. CEF data.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High-risk fund	9.505*** (2.461)	6.930* (3.125)	6.553* (2.618)			5.022 (3.174)	5.431* (2.681)
Opportunistic fund	2.828* (1.404)	1.341 (1.546)	2.427 (1.385)			1.283 (1.525)	1.315 (1.515)
Carry (%)		0.171 (0.432)		0.418 (0.369)		0.0709 (0.428)	
LP Tgt Retn (%)		0.634* (0.307)		0.633* (0.284)	0.775** (0.261)	0.496 (0.308)	0.523 (0.296)
Pref Retn (%)		0.0349 (0.725)		0.294 (0.718)		0.201 (0.718)	
Fee (%)			8.202** (2.795)	8.398** (2.791)	9.157*** (2.697)	7.294* (2.864)	7.270* (2.830)
Constant	52.73*** (2.334)	43.22*** (7.951)	43.88*** (3.788)	31.07*** (7.503)	38.69*** (4.368)	37.10*** (8.205)	39.41*** (4.538)
Observations	209	209	209	209	209	209	209
Adjusted R^2	0.089	0.099	0.122	0.118	0.119	0.123	0.131

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fact 3: Cross-Sectional Relationship between Leverage and Fund Terms

- Controlling for the fund's self-reported risk category, target leverage is only related to management fees
 - ▶ A fee increases of 0.8% (i.e., moving from the 5th to 95th fee percentiles) is associated with 6% of higher target leverage
 - ▶ Carry covary with preferred and target returns
 - ▶ GP contribution is insignificantly related to leverage
- Expl. 1: larger asset base that comes with greater leverage requires more managerial overhead
- Expl. 2: skilled GPs with market power may command a higher management fee, and increasing leverage can amplify the value they create net of the higher fee

Fact 4: Muted Time Series of Variation of Median Fund terms

Table: Prequin U.S. Fund terms by Year. Target returns are calculated as the midpoint of the range for each fund for gross and net (LP) fund returns. Data is only reported for variables with at least nine observations.

Year	Effective cost (%)	LP target returns (%)	Target leverage (%)	Carry (%)	Fee (%)
2003		15			
2004		15.5			
2005		15			
2006		16			
2007		15	65		1.5
2008	3	15	65		
2009	3.5	16			
2010	3	15	61		
2011	3	15	62.5		1.5
2012	3.5	15	65	20	1.5
2013	3	15	65	20	1.5
2014	3.75	15	65	20	1.5
2015	3.5	14	64	20	1.5
2016	3	14	65		1.5
2017	3	14.75	65	20	1.5
2018	3	14	65	20	1.5
2019	3	14	60	20	1.5
2020	2.9	13.5	62.5	20	1.5
2021	3.5	13.5			
2022	3	15			1.5

Fact 4: Muted Time Series of Variation of Median Fund terms

- Median leverage levels from funds with inception vintage years associated with times of distress (2010, 2011, and 2020) are only marginally lower
 - ▶ Everything else being equal, one might expect leverage to vary inversely with the distress costs embedded in mortgage rates
- Investor expectations of PERE return have hardly budged between 2003 and 2022
 - ▶ LP target return declined by only 1%
 - ▶ mortgage rates (6.1 → 3.6%) and cap rates (8 → 4.2%) declined – dramatic decline in cost of capital
 - ▶ As the cost of capital declines, LPs should expect higher return - investors would expect the same target returns under (roughly) identical fund terms only if the value created by GPs increases

Fact 5: Use of Subscription Facilities Linked Negatively to Performance

Table: Preqin Survey (1998-2021) on subscription facilities

	No use or intention to use	Use or intend to use
1998	4	4
1999	5	2
2000	4	2
2001	3	3
2002	4	2
2003	3	6
2004	6	5
2005	9	9
2006	8	11
2007	11	10
2008	7	6
2009	7	5
2010	10	5
2011	21	13
2012	31	19
2013	23	24
2014	27	18
2015	26	40
2016	32	21
2017	24	56
2018	37	42
2019	49	60
2020	38	51
2021	20	29
2022	16	21

Hypotheses and Key Questions

- Theories in conflict with empirics
 - ▶ Theories: Leverage should be positively related to GP skill and negatively related to costs of distress and contractual terms that lead to conflict of interest
 - ▶ Empirics: The relationships above do not hold true
 - ★ Endogenous interaction between skill, agency problems, distress costs and leverage

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 - ▶ Empirics: The relationships above do not hold true
 - ★ Endogenous interaction between skill, agency problems, distress costs and leverage
- Following predictions should hold true in equilibrium:
 - ▶ H1: PERE leverage should be positively associated with measures of skill
 - ★ To balance leverage costs to LPs from potential distress and carried interest value erosion (without tax shield benefits), GPs should offer offsetting benefits from skilled management
 - ▶ H2: While PERE leverage may not be positively associated with risk-adjusted net performance, it should not be negatively associated with it
 - ★ At the very least, the use of leverage should not hurt LPs (in risk-adjusted terms).

PERE Leverage Linked Negatively to Risk-Adjusted Performance

Categories	Region	Period	Data	Selected Literature
Fund Leverage	-	-	-	Anson and Hudson-Wilson (2003)
	U.S.	1999-2010	Investment Property Databank (indices)	Fairchild et al. (2011)
	Global	2003-2009	Investment Property Databank, NCREIF-Townsend, Property Funds Research (indices)	Baum et al. (2011)
	Global	2001-2011	Property Funds Research (performance metrics)	Alcock et al. (2013)
	U.S.	1979-2009	NCREIF (property-level metrics)	Shilling and Wurtzbaach (2012)
	U.S.	2008-2017	PREA (indices)	MacKinnon (2018)
	U.S.	2000-2017	Burgiss, NCREIF (indices)	Bollinger and Pagliari (2019)
	U.S.	1988-2019	NCREIF (property-level metrics)	Cypher et al. (2020)
	U.S.	1997-2014	NCREIF (property-level metrics)	Gang et al. (2020)
Fund Terms	U.S.	1988-2014	Cambridge Associates (performance metrics)	Arnold et al. (2017)
	Global	2005-2015	Dutch PGGM (performance metrics)	van der Spek (2017)

Literature on PERE Leverage

- Leverage, performance, and risk categories
 - ▶ A major difference between core and either value-add or opportunistic funds is leverage
Shilling and Wurtzebach (2012) and MacKinnon (2018)
 - ▶ A negative association between leverage and risk-adjusted fund performance
Fairchild et al. (2011), Baum et al. (2012), Alcock et al. (2013)
 - ▶ Core assets strongly outperform Non-Core assets across multiple dimensions and sub-periods.
Gang, Peng, and Thibodeau (2020), Cypher, Pinkowitz, and Rutledge (2020)

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Gang, Peng, and Thibodeau (2020), Cypher, Pinkowitz, and Rutledge (2020)
- **Using unlevered returns to proxy for skill, no evidence in support of H1 and some evidence decidedly against it!**

(H1: PERE leverage should be positively associated with measures of skill)

Literature on PERE Leverage - Cont.

- PERE leverage negatively associated with risk-adjusted net performance
 - ▶ Bolinger and Pagliari (2019) and Pagliari (2020): net-of-fees and on a leverage adjusted basis, value-added funds substantially underperform core funds from 1995-2012 - reject H2
(H2: PERE leverage should not be negatively associated with risk-adjusted net performance)

Literature on PERE Leverage - Cont.

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(H2: PERE leverage should not be negatively associated with risk-adjusted net performance)
- Leverage and fund terms
 - ▶ van der Spek (2017): fund leverage increases with management fees, with the relationship stronger during adverse market conditions - GPs bear both market power and skill?
- GP-LP conflict
 - ▶ Arnold, Ling, and Naranjo (2017): how management fees and GP discretion over the timing of calling capital can dilute LP value (echos the potential conflict of interests created through long-term use of subscription facilities)

Robust Underperformance of PERE High-Risk Funds

Categories	Region	Period	Data	Selected Literature
Underperformance	U.S.	1994-2012	NCREIF TBI (Indices)	Ling and Naranjo (2015)
	Global	1980-2013	Burgiss (cash flows)	Fisher and Hartzell (2016)
	Europe	1998-2009	Burgiss (cash flows)	Kiehelä and Falkenbach (2015)
	U.S.	2000-2017	Burgiss, Cambridge Associates, NCREIF (indices)	Bollinger and Pagliari (2019)
	U.S.	2001-2019	Preqin (performance metrics)	Riddiough (2022)
	U.S.	1995-2012	NCREIF-Townsend (performance metrics)	Pagliari (2020)
	U.S.	2000-2017	Preqin (cash flows)	Gupta and Van Nieuwerburgh (2021)
	U.S.	2001-2019	Cambridge Associates (performance metrics)	Arnold et al. (2021)
Risk Factors	Europe	2001-2007	INREV (performance metrics)	Fuerst and Matysiak (2013)
	Europe	2001-2014	INREV (performance metrics)	Delfim and Hoesli (2016)
	U.S.	2000-2017	Cambridge Associates (performance metrics)	Arnold, Ling, and Naranjo (2019)
	U.S.	2001-2019	Cambridge Associates (performance metrics)	Arnold et al. (2021)
	U.S.	1994-2012	Townsend Group (cash flows)	Farrelly and Stevenson (2019)

Literature on PERE Underperformance

- The underperformance of high-risk PERE funds, when benchmarked against low risk-PERE and non-PERE alternatives, is found to be robust across benchmarks (both public and private), regions, time horizons, and data sources
 - ▶ US PERE funds or private real estate underperforms public benchmarks such as REITs
Ling and Naranjo (2015), Fisher and Hartzell (2016), Riddiough (2022), Gupta and Van Nieuwerburgh (2021), and Arnold, Ling, and Naranjo (2021)
 - ▶ Kiehelä and Falkenbach (2015): negative IRR and underperforming PME multiple for European PERE funds
 - ▶ Other consistent asset-level evidence - Core vs. Non-Core (Bollinger and Pagliari, 2019; Pagliari, 2020)

New Evidence: Testing H1

- Low leverage funds deliver a quarterly property-level (unlevered) return of 2.29%, which is significantly 50 basis points higher than high leverage funds

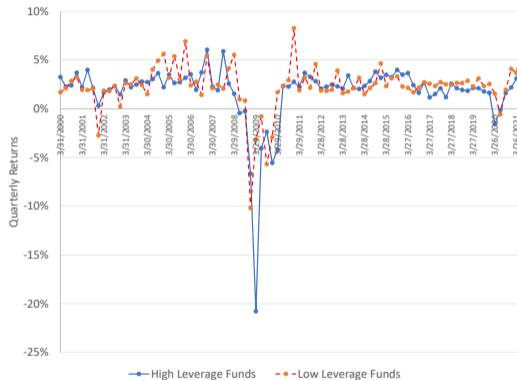


Figure: Time series of property-level returns since 2000 for NCREIF CEFs with top and bottom quartile leverage. Calculated by value-weighted appraisal-based returns for all NPI-qualifying properties owned by funds in respective leverage quartile.

New Evidence: Testing H2

- An investor might be better off by directly investing in levered real estate assets than putting money in high-risk PERE funds (similar to Bollinger and Pagliari (2019))
 - ▶ NPI index is levered to a continuous range of leverage (e.g., 65%) using prevailing average mortgage rates to proxy for the debt yield

Leverage (%)	NPIE with no mgmt fee	NPIE with 1% mgmt fee
50	0.973	1.043
51	0.968	1.039
52	0.965	1.035
53	0.962	1.028
54	0.956	1.026
55	0.945	1.022
56	0.941	1.016
57	0.933	1.01
58	0.927	1.009
59	0.918	1.003
60	0.912	0.996
61	0.911	0.987
62	0.901	0.98
63	0.895	0.977
64	0.89	0.969
65	0.879	0.965
66	0.873	0.964
67	0.865	0.952
68	0.86	0.942
69	0.846	0.937
70	0.841	0.932

Table: PME ratios calculate for Preqin value-added and opportunistic PERE funds and using LP distributions (net of fees)

Conclusion on the Use of Leverage and Skill

- Little evidence of skill being amplified through leverage
 - ▶ Even exists some evidence that skill is negatively linked to leverage. This points towards use of leverage that, on average, is value destroying for LPs - a rejection of H1
- Underperformance relative to the benchmark due to inefficient use of leverage
 - ▶ Consistent with the literature that funds employing significant leverage underperform for LPs - a rejection of H2

Need for Additional Work, Data, and Benchmarking

- Need to more definitely establish the value-destroying conclusion?
- Detailed data on PERE leverage use is largely unavailable
 - ▶ Real (rather than simulated) leverage would be helpful in more definitively establishing existing conclusions

Future Research Directions

- Need for a “volatility veil” or short-run risk insensitivity
 - ▶ Institutional investors flock to alternative investments in order to avoid the daily price volatility endemic to public markets (e.g., adverse affecting fiduciaries in large institutions through bonuses or contract renewals)
 - ▶ Pension funds are willing to forego 3-4% of public market performance by opting for the volatility veil afforded by PERE alternatives

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- Lack of adequate performance benchmarking
 - ▶ From “spread over index” approach to liquid asset benchmarking (e.g., direct alpha, PME)
 - ▶ No control for leverage to evaluate asset-level performance

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 - ▶ From “spread over index” approach to liquid asset benchmarking (e.g., direct alpha, PME)
 - ▶ No control for leverage to evaluate asset-level performance
- Sluggish Adjustment of Strategies and Expectations
 - ▶ Possible reasons for REITs outperforming PERE
 - ▶ GPs have not fully adjusted their strategies and LPs have not fully adjusted their expectations
 - ▶ Need to adjust to reflect a more competitive current investment landscape

Conclusion

- We review the scant academic literature on the use of leverage in institutional private equity real estate (PERE) investments and summarizes a number of stylized facts.
 - ▶ Existing literature fails to support the hypothesis that GPs using higher leverage are more skilled (e.g., deliver better unlevered performance).
 - ▶ Both existing work and our new evidence suggest that leverage, as used by high-risk PERE funds, does not adequately compensate limited partners for the risk that it adds.

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 - ▶ Existing literature fails to support the hypothesis that GPs using higher leverage are more skilled (e.g., deliver better unlevered performance).
 - ▶ Both existing work and our new evidence suggest that leverage, as used by high-risk PERE funds, does not adequately compensate limited partners for the risk that it adds.
- Our additional work finds that the unlevered asset-level returns of PERE funds decrease with (simulated) leverage, supporting the view that leverage is value destroying
 - ▶ Not included in the final paper

Thank you for listening!

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