

# Understanding Risk and Return in Private Equity

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Private Equity for Large Institutional Investors

## My Background

- J. Rex Fuqua Distinguished Professor at Duke University's Fuqua School of Business, former head of the school's Finance area
- Director of Research for Duke's Innovation & Entrepreneurship Initiative
- Education: MBA and PhD from University of Chicago Graduate School of Business. M.Sc. in Economics from the London School of Economics.
- Research and teaching focus: entrepreneurial finance, venture capital and private equity
- Member of the National Bureau of Economic Research (Corporate Finance, Productivity and Entrepreneurship)
- Member and former Vice-Chair of World Economic Forum's Global Agenda Council on the Future of Financing
- Advisory board: Private Equity Research Consortium, Private Capital Research Institute

## Central Questions in Private Equity

- How has private equity performed as an asset class?
  - ▶ How does it compare to public equity
- How much do macro factors explain variation in performance?
  - ▶ Liquidity
  - ▶ Macro fundamentals
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  - ▶ Waterfalls and exit timing
  - ▶ Performance and carry distribution rules

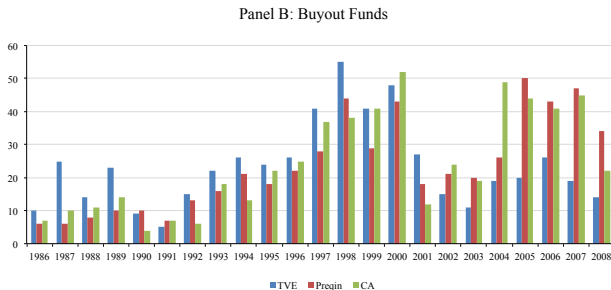
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# The Fundamental Hurdle

## Data

- Private equity is by its very nature difficult to study—it's private!
- Public-use data on PE firms is notoriously unreliable



Source: Harris, Jenkinson, Kaplan and Stücker

- To make headway, we need access to LP-level cash-flow data

## Data

Provided to us by a large anonymous institutional LP.

- Management fees, carried interest, GP ownership (capital commitments), and quarterly cash flows.
- Funds raised between 1984-2009, with cash flows to Q2 2010.
- Bona fide funds. No co-investment vehicles.

	All Funds	Venture Capital	Buyout
Number of Funds	837	295	542
Fraction of 1st Funds	0.30	0.25	0.32
Fraction of 2nd Funds	0.24	0.26	0.23
Fraction of 3rd Funds	0.16	0.15	0.16
Total Committed Capital	\$596,843	\$61,358	\$535,485
Total LP Capital	\$585,745	\$60,469	\$525,276
Total GP Capital	\$11,088	\$879	\$10,209
% of VE U.S. universe	34.4%	15.9%	55.7%
Mean Fund Size (\$M)	713.06	207.96	987.98

# Average Performance

## Key Findings

- We measure relative performance using a Public Market Equivalent (PME)
  - ▶ The ratio of the present value of distributions to the present value of capital calls
  - ▶ Discount rate is the realized public market index chosen—in our case the S&P
  - ▶ This compares the return that could be earned on the called capital, were it invested in the index, with the returns earned in PE
  - ▶ It is the  $\alpha$  on PE—the abnormal performance of the asset class—assuming that the  $\beta$  of PE is one.
- Key findings:
  - ▶ Buyout exceeds public index by about 18%
  - ▶ High dispersion in performance: the top quartile in buyout has outperformed public index by almost 50%, the bottom quartile underperforms dramatically
  - ▶ On a size-weighted basis, Venture has underperformed
  - ▶ Even the top end of the distribution in VC has underperformed
- Harris, Jenkinson and Kaplan (2014) have reported similar findings using even larger databases

## PME Illustration

Period	Index value	Net PE Cash Flows	Fund NAV
1	1105	-25000	25000
2	1237	-22000	47000
3	1274.11	0	55000
4	1598	0	69000
5	1600	45000	34000
6	1696	0	42000
7	2154	0	44000
8	2216	0	58000
9	2108	0	60000
10	2000	80000	0



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10	2000	80000	0
		IRR	17%
		PME	1.69

# Average Performance

## Digging Deeper

	Equally weighted:			Size weighted:		
	All Funds (n=560)	Venture (n=192)	Buyout (n=368)	All Funds (n=560)	Venture (n=192)	Buyout (n=368)
<u>IRR</u>						
Mean	0.11	0.09	0.12	0.09	-0.07	0.12
Median	0.07	0.02	0.10	0.11	-0.03	0.13
St. Dev.	0.36	0.47	0.28	0.27	0.41	0.24
25 <sup>th</sup> %ile	-0.03	-0.08	-0.01	0.00	-0.11	0.04
75 <sup>th</sup> %ile	0.20	0.16	0.22	0.19	0.05	0.19
<u>S&amp;P PME</u>						
Mean	1.13	1.03	1.18	1.14	0.84	1.18
Median	1.01	0.82	1.09	1.05	0.75	1.12
St. Dev.	0.72	0.95	0.56	0.47	0.65	0.42
25 <sup>th</sup> %ile	0.70	0.52	0.82	0.87	0.51	0.91
75 <sup>th</sup> %ile	1.41	1.13	1.46	1.42	0.94	1.44

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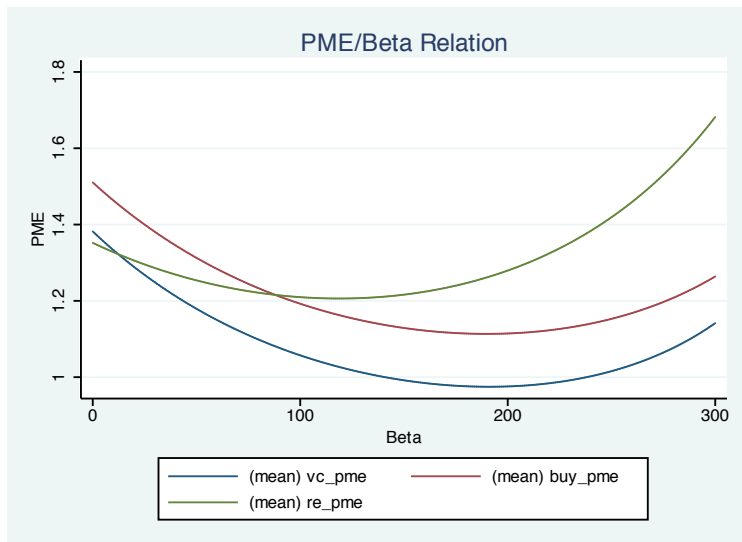
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## Possible Concerns/Explanations

- Leverage: What about the fact that the  $\beta$  of PE investments might not be 1?
  - ▶ To check this, we recalculated our PME in a way that allowed us to assume that the relevant index was a levered position in the market.
  - ▶ We also replaced the S&P 500 with indices that were more closely tailored to the nature of the underlying investments.
- Liquidity: Tying up capital for long periods of time creates broad concerns about liquidity
  - ▶ PE absorbs liquidity in market downturns and releases liquidity in market upturns, especially VC
  - ▶ But the overall sensitivity of calls/distributions to market conditions is actually not that strong

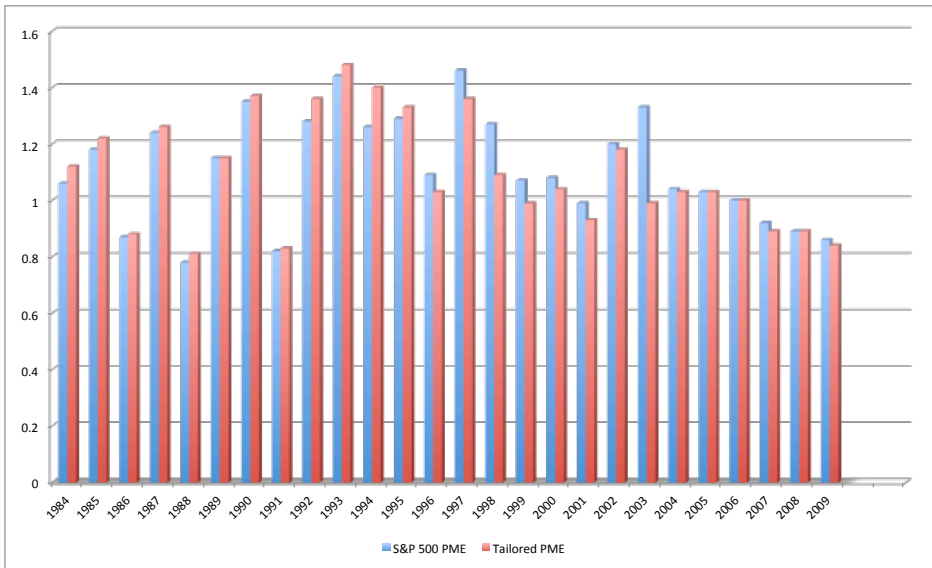
# Main Results

Varying  $\beta$  for Buyout



# Main Results

## Changing the Reference Index



## Why does PE generate abnormal returns?

Thinking about Liquidity

Vintage year diversification cuts cash flow volatility by more than half

Weighting:	Buyout Funds		Venture Capital Funds	
	Equal	Commitment	Equal	Commitment
No diversification	11.57	N/A	11.99	N/A
Diversification into fund age buckets	8.46	8.91	9.11	9.39
Full diversification	4.54	3.38	4.09	3.36



# Why does PE generate abnormal returns?

## A Different Take on Liquidity

Performance Differences based on Propensity to Call Capital in Down Markets

	Buyout Funds			Venture Capital Funds		
	IRR	TVPI	PME	IRR	TVPI	PME
High Propensity	0.14 (0.02)	1.72 (0.07)	1.27 (0.04)	0.13 (0.07)	1.58 (0.29)	1.21 (0.18)
Low Propensity	0.05 (0.02)	1.36 (0.06)	1.12 (0.03)	0.03 (0.06)	1.19 (0.17)	0.90 (0.13)
Difference	0.09*** (0.03)	0.36*** (0.10)	0.15*** (0.05)	0.09 (0.06)	0.39* (0.22)	0.31* (0.15)

## Private Equity and Macro Conditions

- PE Cash flows vary predictably with business conditions
- But only a small fraction of cash flow volatility can be explained; most is idiosyncratic
- Controlling for J-curve effects delivers most of the explanatory power
- Principal Components of six macro variables do about as well: P/D, Yield Spread, # of IPOs, # of M&A, Buyout and Venture Capital Industry Fundraising dollars

# Private Equity and Macro Conditions

	(1)	Columns (1)-(5): Buyout Funds				(6)	Columns (6)-(10): Venture Capital Funds				(10)
		(2)	(3)	(4)	(5)		(7)	(8)	(9)		
Panel A: Dependent variable is net cash flow as percentage of committed capital											
In(P/D)		1.36*** (0.46)		1.28*** (0.47)				4.24** (1.74)	4.12** (1.72)		
In(Yield Spread)				-0.62*** (0.11)					-0.81** (0.32)		
Princ. Comp. 1					0.33*** (0.11)					0.86** (0.39)	
Princ. Comp. 2					-0.44*** (0.09)					-0.72*** (0.23)	
Fund Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Time FE	No	Yes	No	No	No	No	Yes	No	No	No	
Observations	21,687	21,687	21,684	21,684	21,684	13,032	13,032	13,029	13,029	13,029	
Adjusted R <sup>2</sup>	0.072	0.079	0.072	0.074	0.075	0.038	0.075	0.043	0.045	0.046	

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# Private Equity Compensation Structure

Litvak, 2009; Robinson and Sensoy, 2013; Metrick and Yasuda, 2010

Limited Partner Agreements focus on three compensation elements:

## 1 Management fees

- ▶ Typically 1.5% to 2.5%
- ▶ Stepdowns common: either change in basis or change in fee

## 2 Carried interest percentages

- ▶ Typically bimodal distributed with mode at 20% and 25%

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## Two views on Fees and Performance

- 1: GP compensation is too high. Incentives are inadequate because of excessive fixed fees and insufficient skin in the game. Especially in booms and among large funds.
  - ▶ LPs lack sophistication and contract suboptimally (Phalippou, 2009).
  - ▶ If so, higher compensation and lower ownership should result in worse net-of-fee performance.
  
- 2: GP-LP contracts are driven by market forces, reflect entry conditions.
  - ▶ Compensation, ownership will be either unrelated or positively related to net-of-fee performance, depending on how LPs add value.
  - ▶ Does not imply agency problems aren't important, just that contracts deal with them.

# Management Fees & Carry Over the Funding Cycle

What happens to compensation when money rushes in?

Dependent Variable:	PV Lifetime Fees (% of fund size)				Carried Interest (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(Industry Flows)	0.58*** (0.18)		0.71*** (0.16)		0.02 (0.05)		0.02 (0.03)	
ln(Fund Size)	-0.85*** (0.31)	-0.69** (0.29)	-1.15*** (0.15)	-1.12*** (0.16)	0.35*** (0.12)	0.32*** (0.12)	0.07 (0.06)	0.13* (0.08)
ln(Fund No.)	0.87* (0.47)	0.70* (0.41)	0.22 (0.33)	0.34 (0.33)	0.58*** (0.20)	0.63*** (0.22)	-0.16 (0.15)	-0.18 (0.16)
Sample	VC	VC	BO	BO	VC	VC	BO	BO
Vintage Year FE?	No	Yes	No	Yes	No	Yes	No	Yes
Observations	264	264	491	491	295	295	542	542
R-squared	0.08	0.17	0.18	0.22	0.17	0.20	0.01	0.08

# Compensation and Performance

## Key Takeaways

- Little support for the idea that higher compensation or lower ownership are associated with lower returns to LPs.
- Most relations insignificant, but higher carry and lower ownership buyout funds actually have higher net-of-fee performance.
- Inconsistent with the inefficiency view with one exception: Some evidence that high-carry VC funds underperform.
- Conclusions are robust to:
  - ▶ Changing the benchmark portfolio used to compute the PME
  - ▶ Lots of additional statistical controls and corrections.
- Suggests that GPs with higher fees/carry earn them in the form of higher gross returns, so net returns do not suffer.

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# Waterfalls

- Waterfalls are superficially beneficial to LPs
  - ▶ The LP gets paid first: the GP gets paid only after they have returned invested capital, fees, and a preferred return
- But the catchup provisions distort incentives
  - ▶ GP may have an incentive to exit investments just to earn all the catchup!
- Incentives are especially acute for older funds

# Liquidations Cluster Around Waterfalls

## A Gross Return Approach

Threshold:  
Total Distributions Exceed  
108% of Gross Paid In Capital

	1-yr. Window	All Quarters	Only Distributions
Before Threshold	6.83 (n=1660)	2.25 (n=26,784)	12.30 (n=922)
After Threshold	20.43 (n=1660)	5.44 (n=10,113)	29.42 (n=1,153)
t-test of Difference	10.656	19.188	8.696



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## Whole Fund vs. Deal-by-Deal Contracts

Are LPs better off with LP-friendly schemes or with GP-friendly schemes?

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- Ceteris Parabus: of course they are
  - ▶ Randomly rewrite contracts to make them more LP-friendly but don't change effort, incentives or selection and of course LPs are better off.

## Whole Fund vs. Deal-by-Deal Contracts

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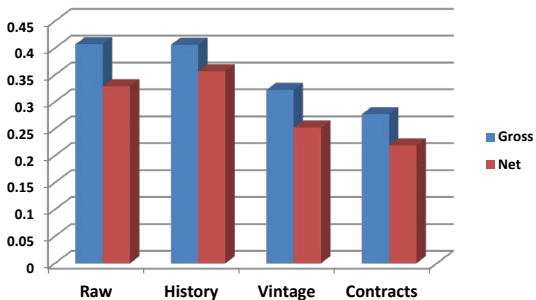
- Ceteris Parabus: of course they are
  - ▶ Randomly rewrite contracts to make them more LP-friendly but don't change effort, incentives or selection and of course LPs are better off.
- But what if Ceteris isn't Parabus?
  - ▶ Differences in bargaining power may reflect differences in underlying skill
  - ▶ GP-friendly contracts may induce GPs to make different choices
    - ★ Sharper market-timing incentives
    - ★ Changing risk preferences conditional on "money in the pocket"
    - ★ Grandstanding to signal GP type

## The Data

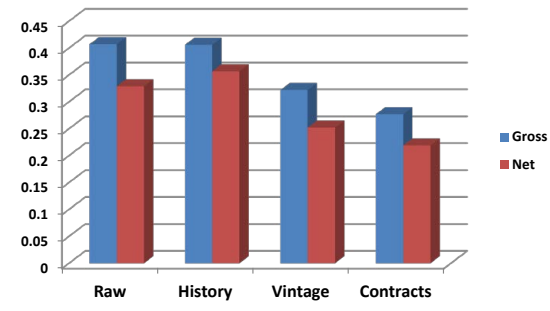
- LPAs and cash flows from 85 invested VC funds from 1992-2005
  - ▶ 60 deal-by-deal
  - ▶ 25 whole fund
  - ▶ About 1/2 the sample has 2/20, about half are more expensive
- LPAs and no cash flows from an additional 102 funds that passed the penultimate round of due diligence

	Our sample: CF data with LPAs	Mean Thompson One	p(Diff)
First closing	12/2000	9/2000	0.006
Size (m USD)	556.004	85.404	0.000
Early stage focus	56%	45%	(0.042)
Company Age VCC (in years)	10.29	9.01	0.106
# of past funds	2.81	1.71	0.001
Work experience	11.55	-	-

## The Findings in a Nutshell



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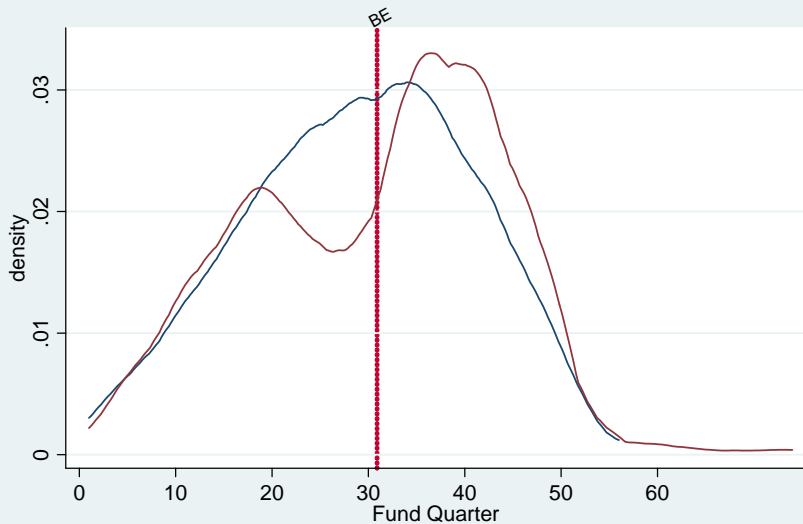


- Additional statistical work suggests that most of this occurs because contracts affect incentives, not just because better GPs get sweeter contracts
- Indeed, we see differences in exit timing consistent with incentives induced by the contract

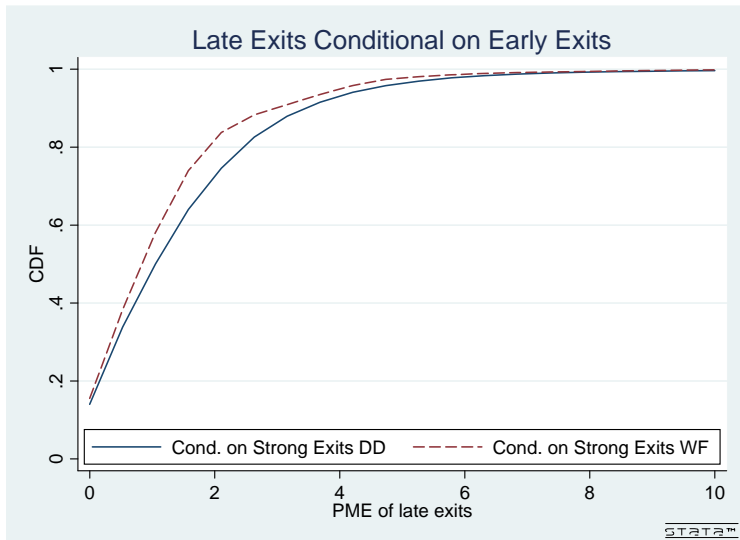


## A Closer Look

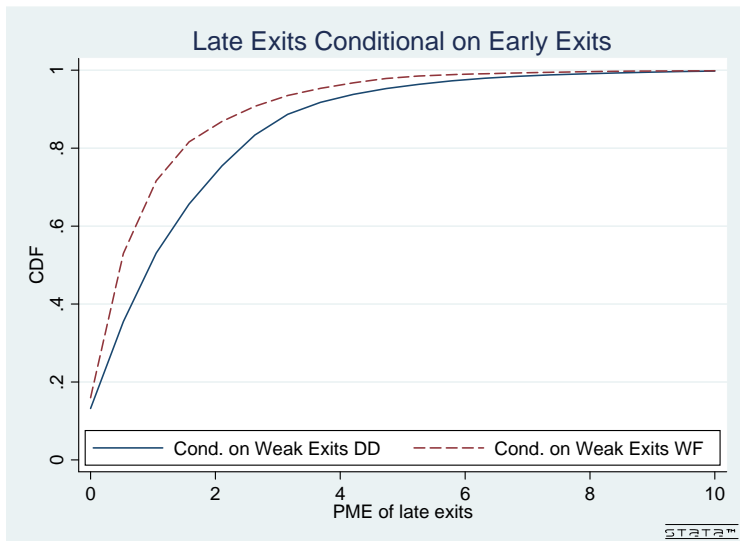
## Deal-by-deal &amp; Whole-fund Exit Time



# Investment Hangover



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## To Conclude

- The best available data indicates that Private Equity has outperformed public equities by around 2-3% per year over the last 20 years.
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- Determinants of Fee/Carry
  - ▶ Carried interest goes up for VCs during boom times
  - ▶ Carry goes up with fund size and experience
  - ▶ Not so for Buyout
  - ▶ Holding fund size constant, fees go up during booms
  - ▶ But fund size doesn't stay constant during booms, it grows a lot

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  - ▶ Contrast this with public intermediated equity investment
- Nevertheless: waterfalls, distribution rules, and fee and carry provisions introduce measurable distortions in behavior

## For Further Reading

- Robinson, David T and Berk Sensoy, "Cyclicality, Performance Measurement and Cash Flow Liquidity in Private Equity," forthcoming, *Journal of Financial Economics*
  - ▶ Contains performance statistics as well as an analysis of liquidity and macro factors.
- Harris, Robert, Tim Jenkinson and Steven N. Kaplan, "Private Equity Performance: What Do We Know?" *Journal of Finance*, 2014.
  - ▶ Additional evidence in favor of a PME around 1.8 using an even larger data set.
- Robinson, David T and Berk Sensoy, "Do Private Equity Fund Managers Earn their Fees? Compensation, Ownership, and Cash Flow Performance," *Review of Financial Studies*, 26(11): 2760-2797 (November, 2013).
  - ▶ Shows that net-of-fee returns are uncorrelated with fees, and that waterfalls, fee basis changes, etc., affect behavior.
- Hartmann-Wendells, Thomas, Niklas Hüther, David T. Robinson, and Sönke Sievers, "Paying for Performance in Private Equity: Evidence from Limited Partner Agreements," working paper, Duke University.
  - ▶ Shows that carry provisions are correlated with performance and appear to induce distortions in exit behavior.