28E35700 Alternative Investments

Empirical Facts on PE Fund Performance

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My Agenda

- **Aggregate Private Equity Performance**
  - Does PE outperform public markets?
  - What is the right public market benchmark?
- **Future Returns**
  - Are current valuations high?
  - What are expected returns for next few years?
- **Performance Persistence**
  - Can we pick future winner funds?
- **Contracts and Fees**
  - Does incentive structure work?
  - Are Fees too high?

Main References

1. Harris, Jenkinson and Kaplan (2014, JF): Private Equity Performance: What Do We Know?
2. Harris, Jenkinson and Kaplan (2016, JOIM): How Do Private Equity Investments Perform Compared to Public Equity?
3. Harris, Jenkinson, Kaplan and Stucke (2020, WP): Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds
4. Robinson and Sensoy (2013, RFS): Do Private Equity Fund Managers Earn Their Fees? Compensation, Ownership, and Cash Flow Performance
5. Hüther, Robinson, Sievers and Hartmann-Wendels (2019, ManSci), Paying for Performance in Private Equity: Evidence from VC Partnerships
6. Phalippou (2020, JOI): An Inconvenient Fact: Private Equity Returns & The Billionaire Factory

Big Names in Private Equity Research

Positive

Steven Kaplan
Neubauer Family Distinguished Service Professor of Entrepreneurship and Finance, University of Chicago, Booth School of Business

David Robinson
Professor of Finance and J. Rex Fuqua Distinguished Professor of International Management, Duke University, Fuqua School of Business

Robert S. Harris
PERC Director, C. Stewart Sheppard Professor of Business Administration, University of Virginia, Darden School

Tim Jenkinson
Professor of Finance, Oxford University, Said Business School

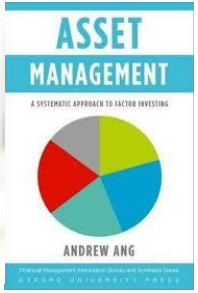
[Private Equity Research Consortium]
Access to Burgiss data
White paper on PE diversification benefits

David vs Ludo
Oxford-type debate

Negative

Ludovic Phalippou
Associate Professor of Finance, University of Oxford, Saïd Business School

"Final warning"



"Walk away from PE"

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Harris, Jenkinson and Kaplan (2014, JF)

- **New Research-Quality Data from Burgiss**
  - 1,400 U.S. buyout and venture capital funds

- **Several attractive features:**
  - Burgiss' systems provide record-keeping and performance monitoring services to LPs
  - This feature results in detailed, verified and cross-checked investment histories for nearly 1400 private equity funds derived from the holdings of over 200 institutional investors.

Main PE Fund Performance Measures

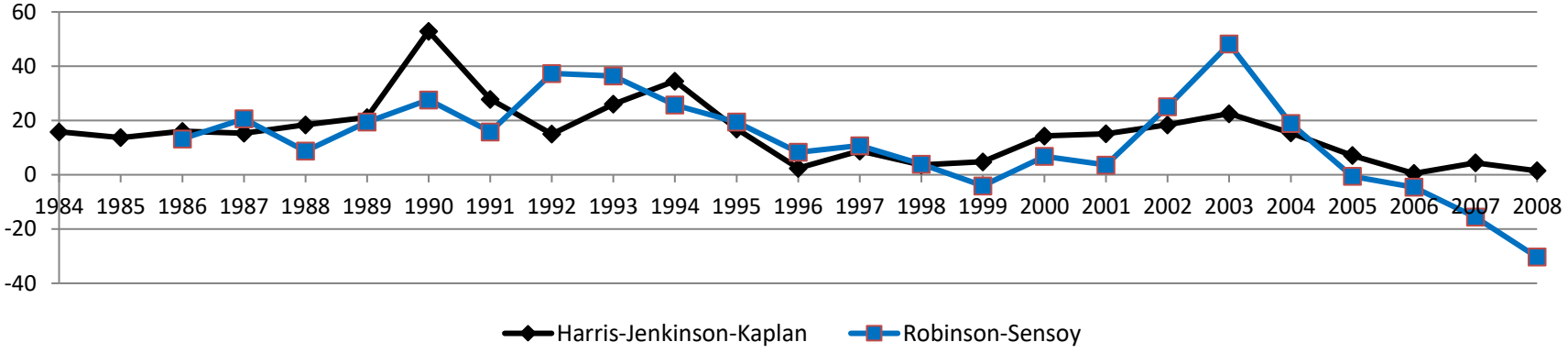
$$TVPI = \frac{\sum Dist(t)}{\sum Call(t)}$$

$$PME = \frac{\left(\sum \frac{Dist(t)}{\prod(1 + R_m(t))}\right)}{\left(\sum \frac{Call(t)}{\prod(1 + R_m(t))}\right)}$$

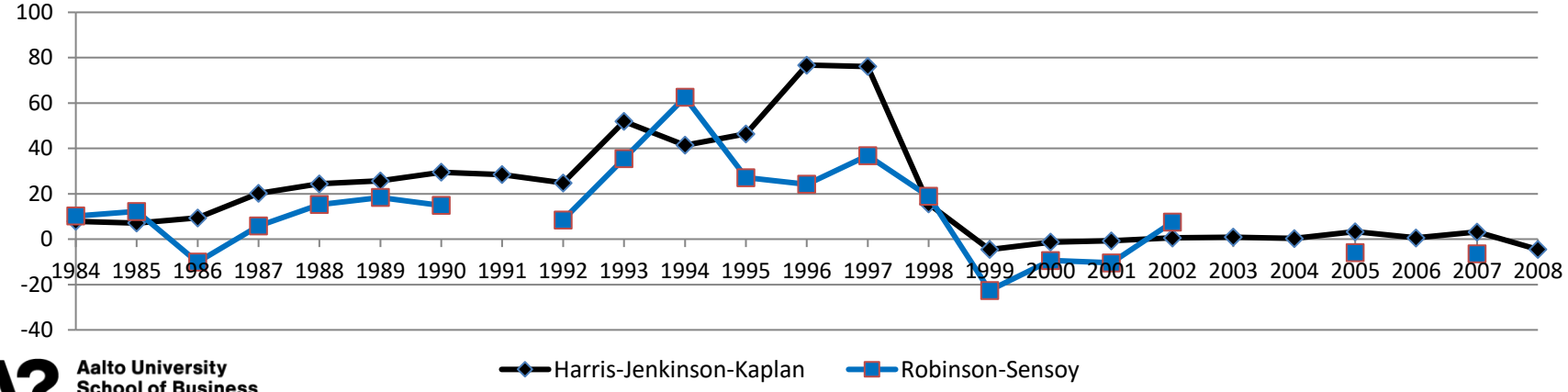
$$\frac{\left(\sum \frac{Dist(t)}{(1 + \boldsymbol{IRR})^t}\right)}{\left(\sum \frac{Call(t)}{(1 + \boldsymbol{IRR})^t}\right)} = 1$$

Ang and Sorensen (2012)

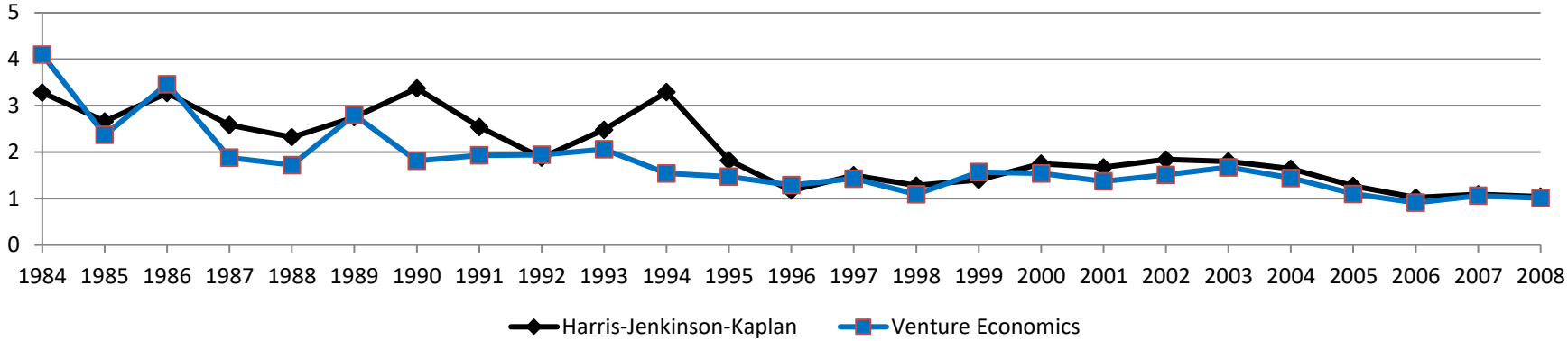
Buyout IRRs



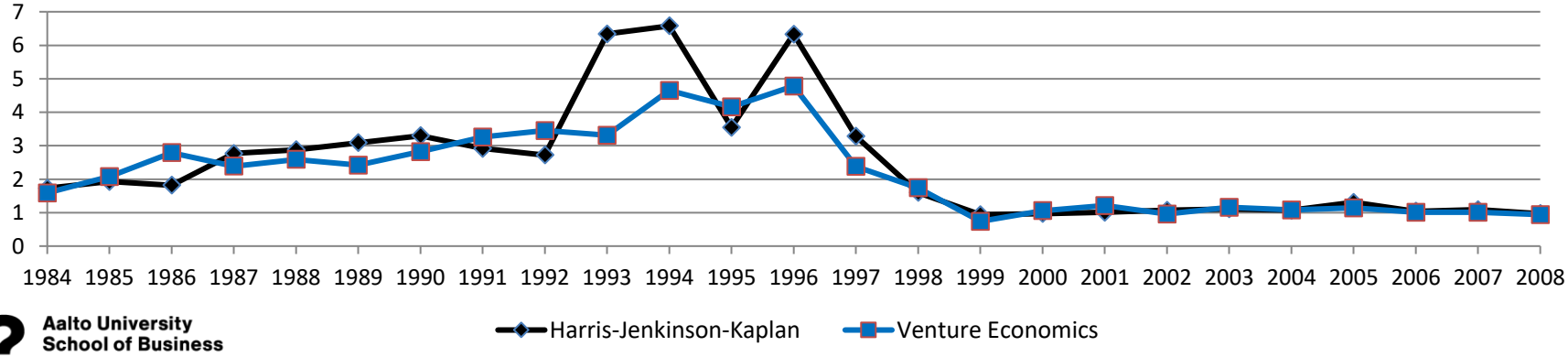
VC IRRs



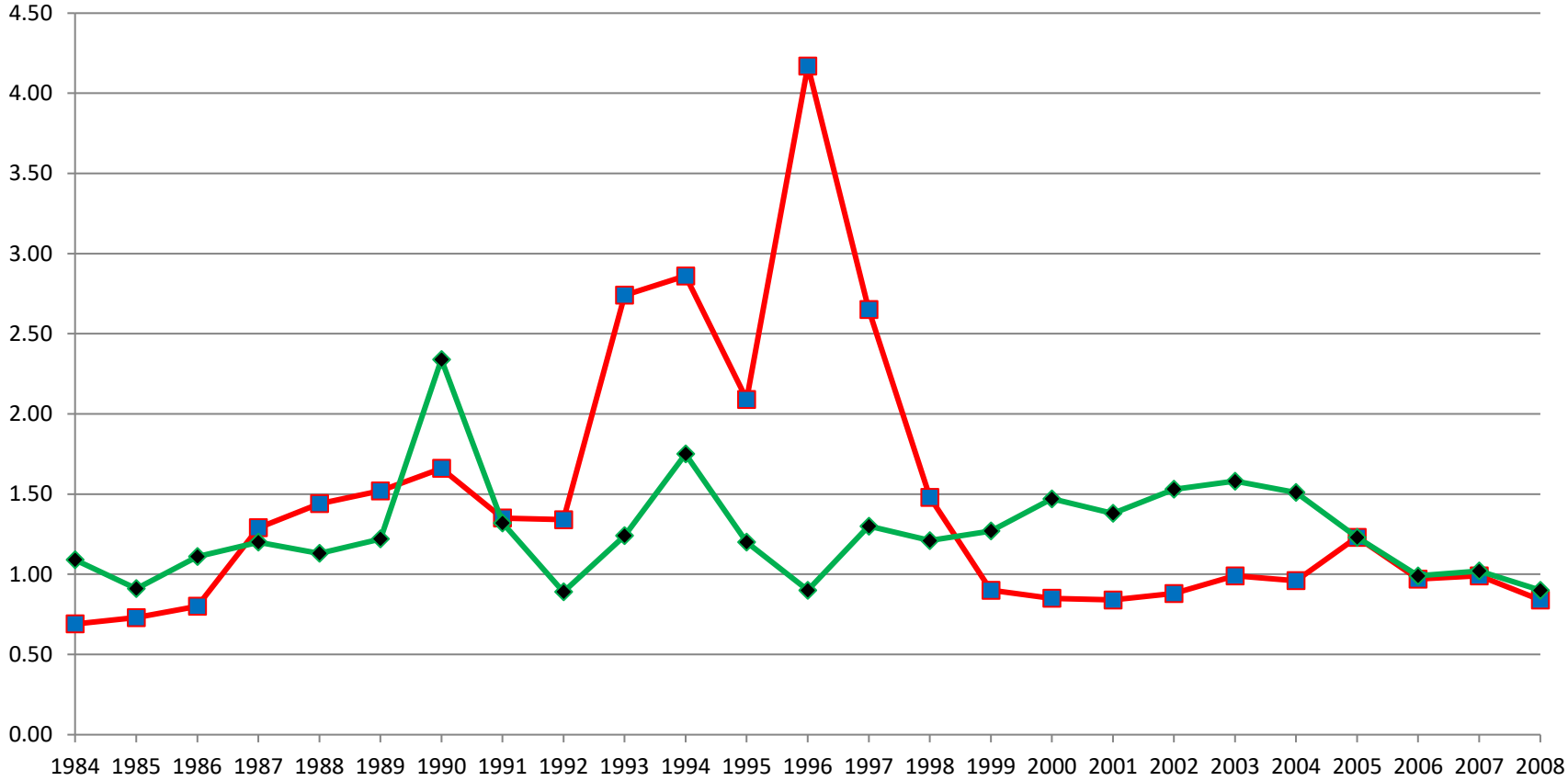
Buyout Multiples



VC Multiples



Private Equity PMEs



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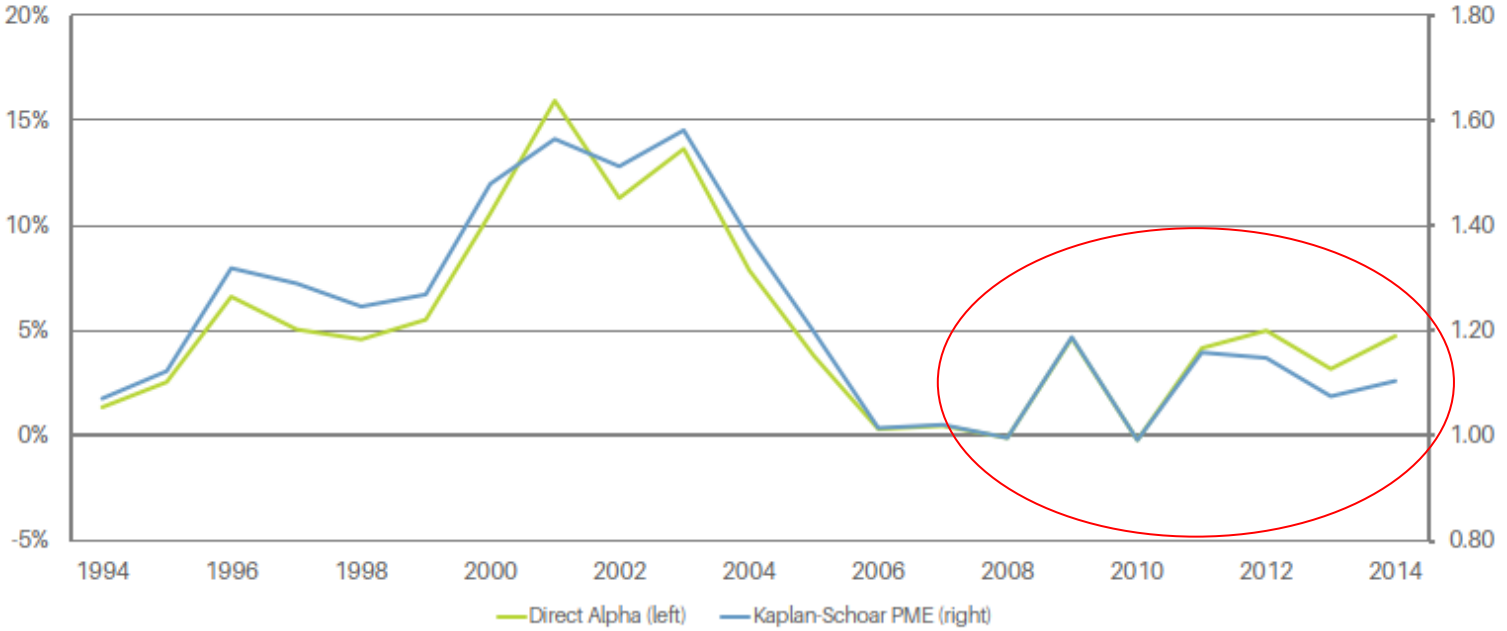
Has PE Performance Declined?

AQR Yes! vs Kenan Institute No!

Exhibit 2: Direct Alphas and PMEs of U.S. Buyout Funds against the S&P 500 by Vintage Year



Source: Burgiss Private iQ, as of September 30, 2018.

PMEs for European Buyout Funds

Vintage year	European Funds						
	US$, S&P 500 benchmark				Euros, MSCI Europe benchmark		
	Funds	Average	Median	Weighted average	Average	Median	Weighted average
1994	7	1.19	1.12	1.70	1.38	1.31	1.98
1995	2	0.69	0.69	0.61	0.71	0.71	0.63
1996	5	1.25	1.21	1.28	1.16	1.19	1.29
1997	8	2.05	1.71	1.69	1.84	1.48	1.55
1998	12	1.90	1.80	1.89	1.59	1.48	1.59
1999	9	1.40	1.57	1.74	1.13	1.35	1.38
2000	19	1.83	1.61	1.81	1.45	1.31	1.46
2001	13	1.75	1.65	1.67	1.40	1.41	1.37
2002	11	1.72	1.55	1.70	1.46	1.34	1.39
2003	13	1.44	1.48	1.60	1.32	1.36	1.46
2004	17	1.09	0.98	1.26	1.12	1.07	1.29
2005	27	1.10	1.02	1.17	1.22	1.23	1.30
2006	42	0.91	0.78	0.90	1.08	0.92	1.11
2007	43	0.81	0.85	0.87	0.96	1.03	1.05
2008	33	0.86	0.88	0.93	0.99	1.01	1.07
2009	14	0.85	0.82	0.88	0.97	0.91	1.00
2010	7	0.76	0.71	0.77	0.83	0.76	0.83
Average*	282	1.27	1.20	1.32	1.21	1.17	1.28
Average 2000-10	*239*	*1.19*	*1.12*	*1.23*	*1.16*	*1.12*	*1.21*
Average 1994-99	*43*	*1.41*	*1.35*	*1.48*	*1.30*	*1.25*	*1.40*

Harris, Jenkinson and Kaplan (2016, JOIM)

PMEs for European VC Funds

Vintage years	*European Funds*						
		US$, S&P 500 benchmark			EUROs, MSCI Europe benchmark		
	Funds	Average	Median	Weighted average	Average	Median	Weighted average
Average 1994-2010*	87	0.95	0.94	1.05	0.96	0.94	1.07
Average 2000-10	*69*	*0.80*	*0.77*	*0.88*	*0.83*	*0.81*	*0.92*
Average 1994-99	*18*	*1.29*	*1.29*	*1.43*	*1.24*	*1.21*	*1.38*

Harris, Jenkinson and Kaplan (2016, JOIM)

- Burgiss data provides a sample of **282 European buyout funds**.
- Unfortunately, they do not have enough **European venture funds** for detailed analysis across vintages. Only **87 European venture funds**

Is S&P 500 Right Benchmark for PE?

Table IV
Private Equity PMEs Using Alternative Public Market Indices

Panel A: Buyout Funds

			Russell indices			Fama French				Multiple of S&P 500	
Vintage years	S&P 500	Nasdaq	3000	2000	2000 value	8th	6th	4th	2nd	1.5X	2X
1984	0.87	0.97	0.90	1.15	1.07	0.93	0.96	1.15	1.39	0.59	0.44
1985	0.91	0.98	0.94	1.18	1.09	0.98	0.99	1.20	1.45	0.6	0.42
1986	1.00	1.02	1.02	1.18	1.10	1.05	1.05	1.21	1.36	0.75	0.61
1987	1.25	1.2	1.27	1.43	1.32	1.31	1.30	1.49	1.59	0.95	0.75
1988	0.98	0.9	0.99	1.05	0.99	1.00	0.97	1.09	1.14	0.74	0.58
1989	1.26	1.15	1.27	1.34	1.23	1.29	1.26	1.36	1.36	0.95	0.76
1990	1.57	1.48	1.57	1.58	1.43	1.49	1.51	1.56	1.47	1.23	1.03
1991	1.23	1.15	1.25	1.40	1.31	1.35	1.32	1.39	1.35	0.95	0.77
1992	0.79	0.78	0.82	0.97	0.92	0.92	0.98	0.98	0.88	0.58	0.44
1993	1.35	1.33	1.38	1.62	1.56	1.53	1.60	1.59	1.45	1.03	0.81
1994	1.48	1.45	1.52	1.78	1.70	1.59	1.76	1.72	1.51	1.13	0.9
1995	1.34	1.3	1.35	1.5	1.43	1.33	1.54	1.48	1.25	1.13	0.99
1996	1.13	1.26	1.12	1.02	0.83	0.92	1.05	1.00	0.80	1.06	1.07
1997	1.23	1.3	1.19	1.01	0.88	0.94	1.03	0.99	0.83	1.21	1.28
1998	1.35	1.56	1.3	1.01	0.81	0.98	1.02	0.99	0.85	1.39	1.51
1999	1.19	1.36	1.15	0.92	0.74	0.91	0.88	0.89	0.84	1.2	1.28
2000	1.42	1.48	1.38	1.18	1.05	1.17	1.08	1.12	1.16	1.38	1.43
2001	1.31	1.27	1.28	1.15	1.12	1.12	1.04	1.09	1.16	1.23	1.24
2002	1.42	1.34	1.39	1.28	1.29	1.22	1.12	1.21	1.32	1.34	1.35
2003	1.75	1.66	1.72	1.63	1.66	1.54	1.39	1.54	1.71	1.75	1.87
2004	1.40	1.3	1.38	1.32	1.36	1.24	1.12	1.25	1.35	1.42	1.54
2005	1.20	1.1	1.19	1.12	1.17	1.07	0.97	1.07	1.14	1.26	1.39
2006	1.03	0.94	1.02	0.96	0.99	0.95	0.87	0.94	0.99	1.1	1.19
2007	1.03	0.95	1.02	0.94	0.97	0.95	0.90	0.94	0.96	1.07	1.13
2008	0.91	0.86	0.91	0.85	0.87	0.89	0.88	0.91	0.90	0.94	0.91
Average	1.22	1.20	1.21	1.22	1.16	1.15	1.14	1.21	1.21	1.08	1.03
Average 2000s	*1.27*	1.21	1.25	1.16	1.16	*1.13*	*1.04*	*1.12*	*1.19*	1.28	1.34
Average 1990s	*1.27*	1.30	1.27	1.28	1.16	*1.20*	*1.27*	*1.26*	*1.12*	1.09	1.01
Average 1980s	*1.07*	1.04	1.07	1.22	1.13	*1.09*	*1.09*	*1.25*	*1.38*	0.76	0.59
Sample average	1.20	1.17	1.18	1.11	1.07	1.07	1.04	1.09	1.09	1.18	1.21
Sample median	1.11	1.05	1.09	1.02	0.99	1.00	0.96	1.01	1.01	1.11	1.13

Panel B: Venture Capital Funds

			Russell indices			Fama French				Multiple of S&P 500	
Vintage years	S&P 500	Nasdaq	3000	2000	2000 growth	8th	6th	4th	2nd	1.5X	2X
1984	0.70	0.80	0.73	0.92	1.01	0.75	0.78	0.91	1.11	0.48	0.35
1985	0.71	0.76	0.73	0.91	0.98	0.75	0.77	0.93	1.10	0.49	0.36
1986	0.75	0.73	0.76	0.86	0.95	0.76	0.75	0.89	1.00	0.54	0.41
1987	1.18	1.10	1.18	1.32	1.42	1.20	1.18	1.36	1.48	0.85	0.66
1988	1.18	1.07	1.18	1.26	1.34	1.20	1.16	1.29	1.32	0.87	0.66
1989	1.34	1.18	1.35	1.45	1.57	1.40	1.36	1.48	1.47	0.98	0.74
1990	1.50	1.32	1.50	1.55	1.68	1.52	1.48	1.58	1.54	1.14	0.89
1991	1.37	1.23	1.40	1.64	1.75	1.55	1.61	1.66	1.53	0.98	0.74
1992	1.27	1.24	1.32	1.56	1.68	1.50	1.55	1.57	1.46	0.92	0.68
1993	2.79	2.38	2.92	3.88	3.90	3.55	3.92	3.86	3.42	1.91	1.35
1994	2.40	2.10	2.50	3.23	3.35	2.86	3.33	3.24	2.75	1.70	1.24
1995	2.16	1.89	2.21	2.59	2.67	2.33	2.67	2.58	2.25	1.71	1.40
1996	3.79	3.01	3.85	4.46	4.34	3.92	4.62	4.47	3.82	3.13	2.69
1997	2.43	2.05	2.42	2.45	2.42	2.21	2.53	2.47	2.12	2.26	2.15
1998	1.43	1.52	1.38	1.15	1.37	1.08	1.18	1.14	0.97	1.47	1.58
1999	0.76	0.89	0.73	0.57	0.72	0.56	0.54	0.55	0.52	0.81	0.92
2000	0.79	0.83	0.77	0.64	0.73	0.63	0.56	0.61	0.64	0.80	0.87
2001	0.80	0.76	0.78	0.69	0.72	0.68	0.60	0.66	0.72	0.80	0.84
2002	0.82	0.76	0.80	0.73	0.73	0.71	0.63	0.70	0.78	0.81	0.84
2003	0.88	0.82	0.87	0.82	0.80	0.80	0.71	0.80	0.88	0.91	0.98
2004	0.90	0.82	0.89	0.83	0.80	0.81	0.73	0.81	0.87	0.95	1.01
2005	1.27	1.16	1.26	1.18	1.13	1.15	1.03	1.14	1.22	1.36	1.48
2006	0.93	0.85	0.92	0.85	0.82	0.85	0.79	0.85	0.87	0.98	1.02
2007	0.97	0.89	0.95	0.88	0.86	0.91	0.86	0.91	0.92	1.02	1.04
2008	0.84	0.78	0.83	0.77	0.75	0.79	0.78	0.80	0.79	0.84	0.81
Average	1.36	1.24	1.37	1.49	1.54	1.38	1.44	1.49	1.42	1.15	1.03
Average 2000s	*0.91*	0.85	0.90	0.82	0.82	*0.81*	*0.74*	*0.81*	*0.85*	0.94	0.99
Average 1990s	*1.99*	1.76	2.02	2.31	2.39	*2.11*	*2.34*	*2.31*	*2.04*	1.60	1.36
Average 1980s	*0.98*	0.94	0.99	1.12	1.21	*1.01*	*1.00*	*1.14*	*1.25*	0.70	0.53
Sample average	1.20	1.12	1.19	1.21	1.25	1.14	1.17	1.21	1.17	1.10	1.07
Sample median	0.88	0.86	0.87	0.83	0.85	0.81	0.76	0.83	0.84	0.87	0.85

Is S&P 500 Right Benchmark?

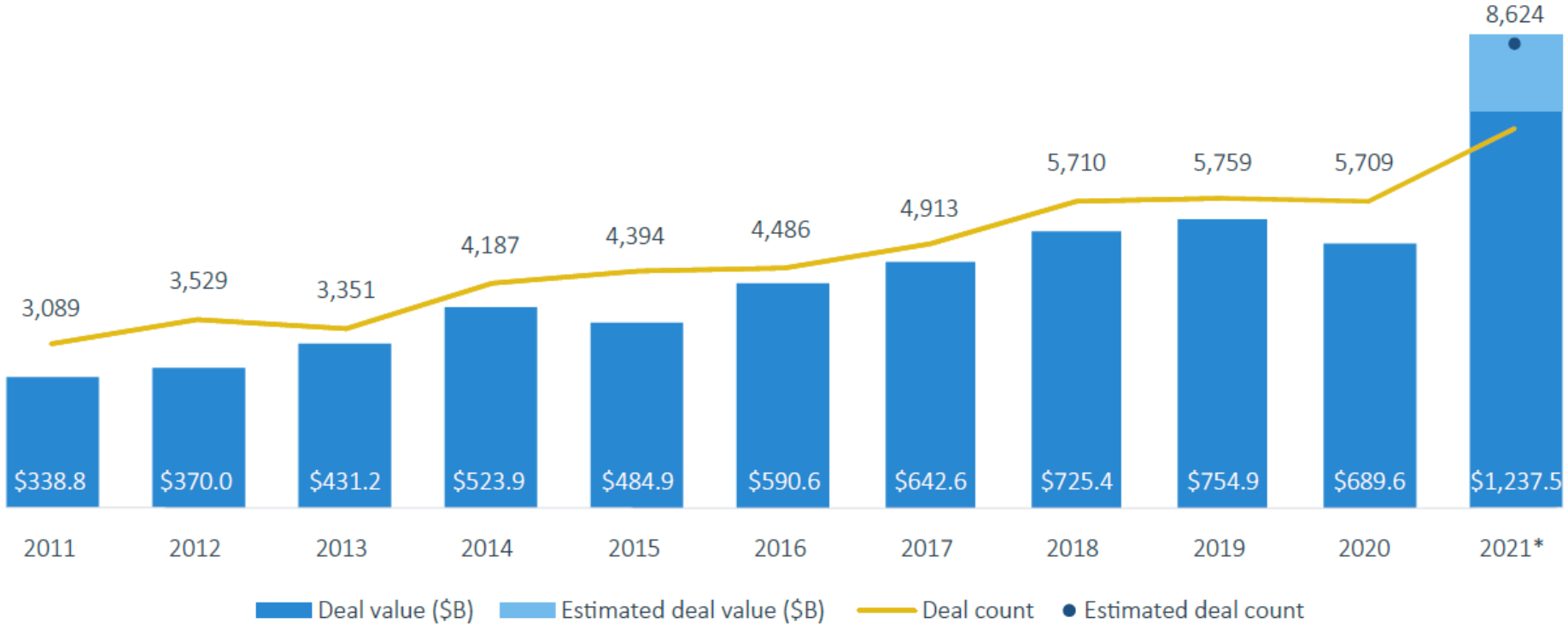
- **Buyouts use more leverage are smaller than the typical company in the S&P 500**
- **Buyouts are more like value investments than growth investments.**
- **VC more like small (high-tech) growth companies**

→ **S&P 500 or MSCI World are not probably best benchmarks**

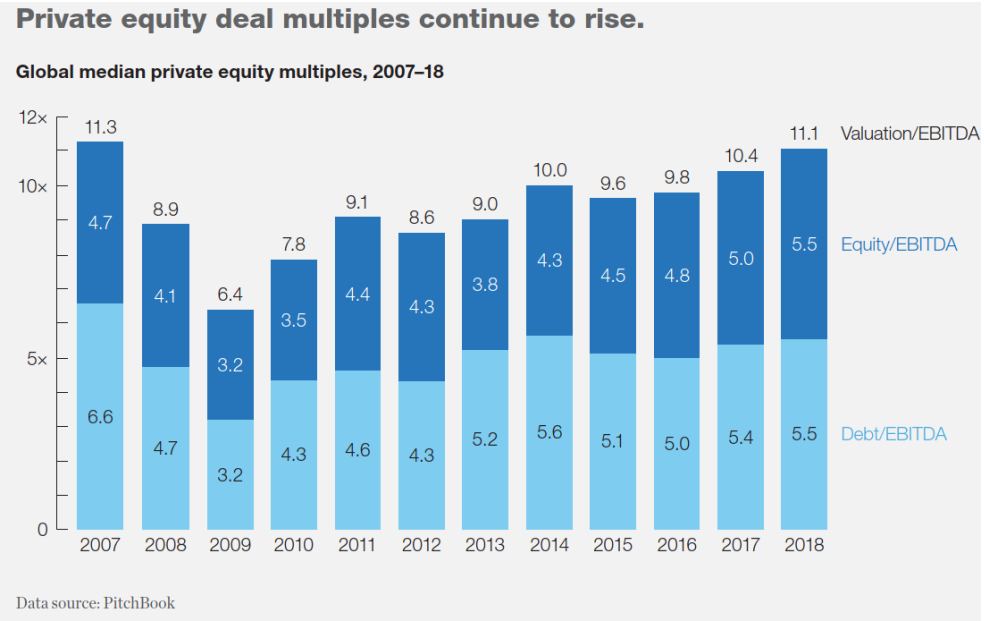
- **Possible to replicate private equity by**
  - Value Investing, Homemade Leverage, and Hold-to-Maturity Accounting
  - Leveraged Small Value Equities

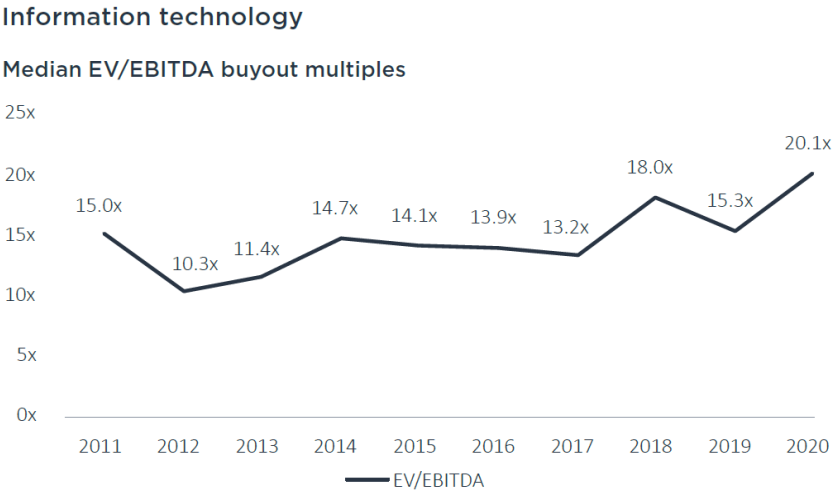
Predicting Future PE Aggregate Returns

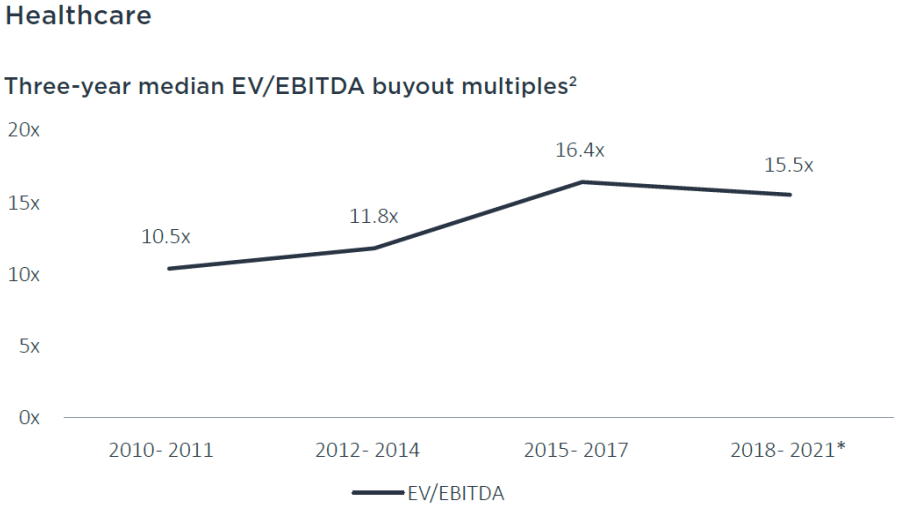
PE Deal Activity



Valuations are high







VC Valuations

Veteran investors have been nervous on and off for several years about the risk of a potential bubble forming in the venture capital markets. That anxiety has been especially pronounced among VCs who saw their portfolio companies obliterated in the dot-com crash of March 2000.

Today those same industry veterans are increasingly vocal about the heightened risk of the market going through yet another sharp correction, drawing comparisons between 2000 and a hawkish Fed and the new wave of hyper-driven valuation increases.

For a time, many VCs worried about meager exits after building up massive gains on paper. That angst turned out to be unwarranted when liquidity finally took off in the past couple of years, with US VC exit values hitting $774 billion in 2021—most of it through public offerings, PitchBook data shows.

Whole story on [Pitchbook]

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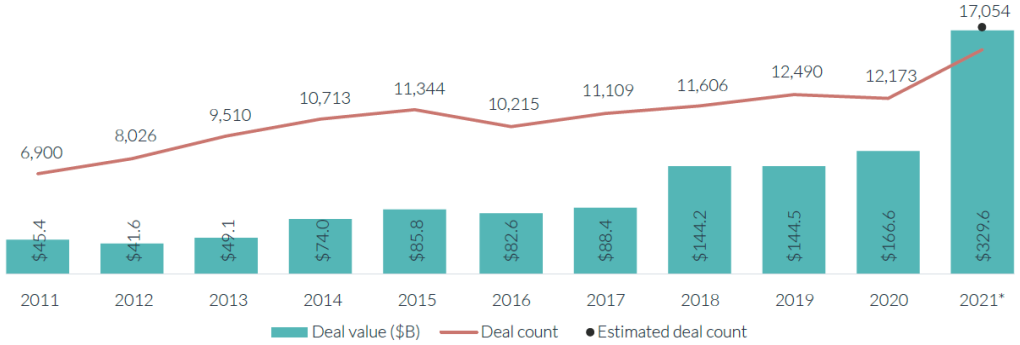
VC investment nearly doubles YoY

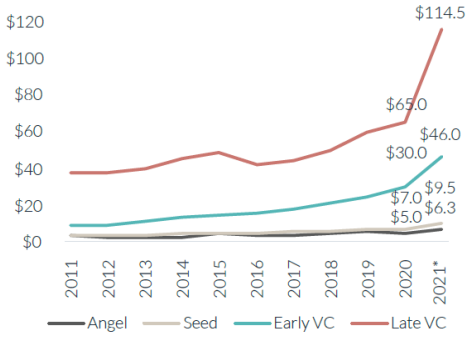
US VC deal activity



PitchBook-NVCA Venture Monitor
*As of December 31, 2021

Valuations continue relentless climb across all stages

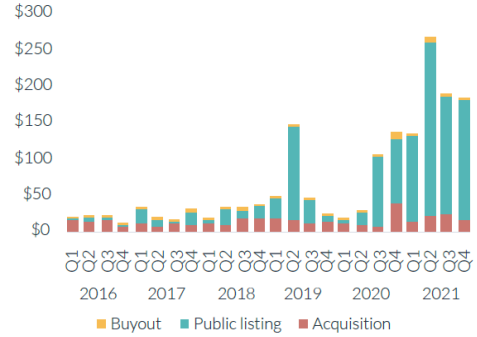
US VC median pre-money valuations ($M) by stage



PitchBook-NVCA Venture Monitor
*As of December 31, 2021

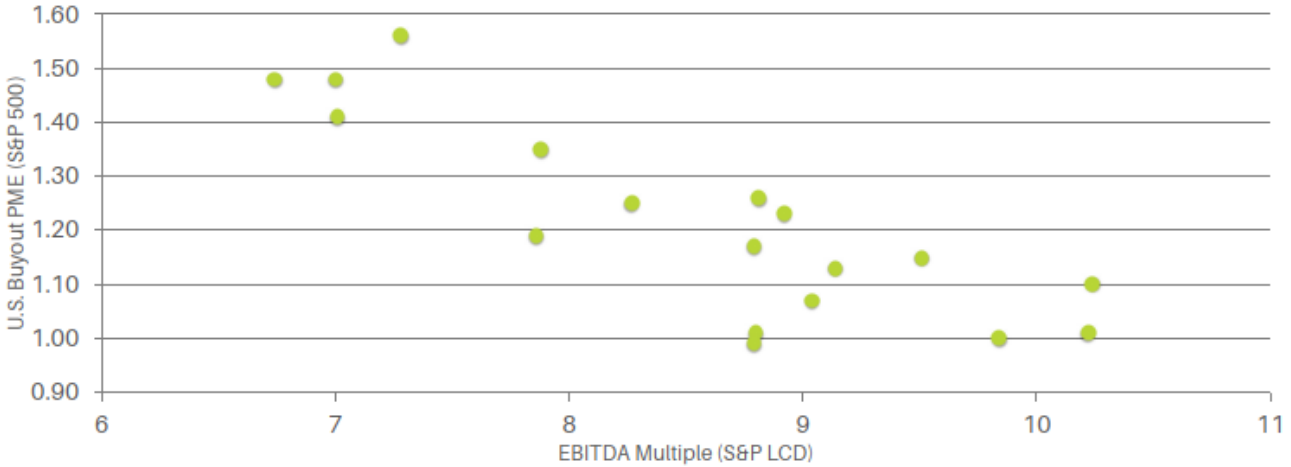
Public listing activity sustains dominant streak within VC exit market

Quarterly US VC exit value ($B) by type



PitchBook-NVCA Venture Monitor
*As of December 31, 2021

PMEs Versus EBITDA: 1997-2014
The coefficient is – 0.13



Source: Burgiss Private IQ, as of September 30, 2018. S&P LCD.

Valuations are highest for most recent years

→ Low future returns?

Capital Committed PE to Total Value of Public Stock

Predict Lower Future PE Returns?

VC vs Buyout

Table VII

The Relationship Between Aggregate Flows into Private Equity and Performance

This table reports regressions where the dependent variable is fund performance – as measured by IRR, investment multiple, or PME – and the explanatory variable is an estimate of capital flows into PE. We measure capital flows by summing the capital commitments as estimated by Private Equity Analyst in the current and previous vintage years, and then take the ratio of this sum to the aggregate U.S. stock market value at the start of the current vintage year. This provides a measure of the amount of capital available to fund PE deals. The performance measures are weighted averages, where the weights are the proportion of capital committed in each vintage year to the total capital committed over the vintages included in the regression. Only funds with a North American Focus are included. Given the small sample sizes in early vintages, only vintage years from 1993 onwards are included. Separate regressions are estimated for buyout funds and VC funds. Standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Buyout Funds			VC Funds		
Dependent variable:	PME	IRR	Multiple	PME	IRR	Multiple
Capital Commitments to Total Stock Market Value	-21.67**	-2.38	-31.85**	-297.55**	-77.55**	-635.51**
	[7.91]	[2.92]	[14.89]	[135.65]	[32.51]	[259.98]
Constant	1.45***	0.17***	2.02***	2.57***	0.47***	4.61***
	[0.09]	[0.03]	[0.17]	[0.48]	[0.12]	[0.92]
N	18	18	18	18	18	18
R-squared	0.32	0.04	0.22	0.23	0.26	0.27

Fund Size and Performance: Harris, Jenkinson and Kaplan (2014)

Table VI
The Relationship Between Private Equity Fund Size and Performance

This table examines whether fund size affects performance. In Panel A, funds are classified into size quartiles by decade. The cut off points for each quartile, by decade, are reported. The performance – as measured by PME – is then analyzed for these size quartiles. Buyout funds and venture capital funds are considered separately. Panel B reports regressions where the dependent variable is PME, and the explanatory variables are fund size quartiles (calculated as above) and, for some regressions, vintage year dummies. Standard errors are reported in brackets. ***, ** and * denote significance at the 1%, 5% and 10% respectively.

Panel A: Average Performance by Fund Size Quartile

	Buyout Funds				Venture Capital Funds			
	Bottom quartile	Median	Top Quartile	Mean	Bottom quartile	Median	Top quartile	Mean
Size Cutoffs ($ Millions)								
1980s	85	215	425	390	34	55	90	77
1990s	200	485	998	782	81	137	250	191
2000s	284	700	1530	1420	137	278	475	358
PME								
Small Funds	0.80	1.02	1.37	1.16	0.57	0.78	1.08	1.03
2nd Quartile Funds	0.90	1.16	1.49	1.23	0.61	0.90	1.24	1.25
3rd Quartile Funds	0.93	1.14	1.40	1.21	0.69	0.96	1.30	1.34
Large Funds	0.91	1.14	1.43	1.19	0.70	0.90	1.14	1.18

Panel B: Regressions of PME on Fund Size Quartiles

Dependent variable: PME	Buyout Funds		Venture Capital Funds	
2nd size quartile	0.065	0.039	0.219	0.138
	[0.059]	[0.057]	[0.149]	[0.140]
3rd size quartile	0.042	0.059	0.314**	0.318**
	[0.059]	[0.057]	[0.150]	[0.141]
4th (highest) size quartiile	0.027	0.031	0.149	0.349**
	[0.059]	[0.057]	[0.150]	[0.145]
Vintage year dummies	No	Yes	No	Yes
Funds	598	598	775	775
R-squared	0.00	0.15	0.01	0.21

Harris, Jenkinson, Kaplan and Stucke (2020):
Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds

Strong Top Quartile Performance

Panel A: Buyout Funds

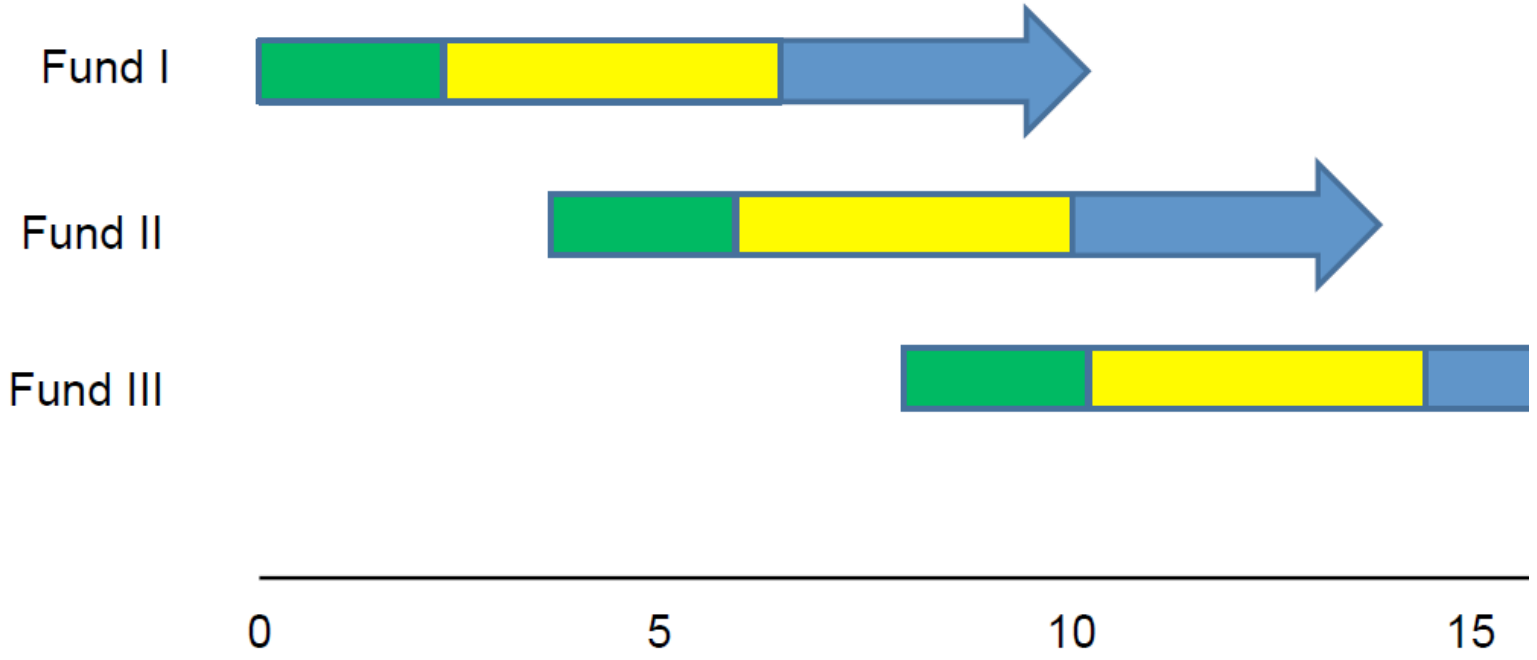
	Average IRR	Average MOIC	Average PME	N
Whole sample				
TOP ↑ Quartile 1	30.6%	2.74	1.81	214
Quartile 2	17.5%	1.98	1.30	225
Quartile 3	10.5%	1.52	1.03	235
Quartile 4	-1.4%	1.00	0.68	219
Pre-2001 Funds				
TOP ↑ Quartile 1	32.1%	3.08	2.05	66
Quartile 2	17.2%	2.22	1.40	73
Quartile 3	8.1%	1.48	1.01	79
Quartile 4	-5.1%	0.87	0.61	69
Post-2000 Funds				
TOP ↑ Quartile 1	29.9%	2.58	1.70	148
Quartile 2	17.7%	1.87	1.24	152
Quartile 3	11.7%	1.54	1.04	156
Quartile 4	0.3%	1.06	0.71	150

Panel B: VC funds

	Average IRR	Average MOIC	Average PME	N
Whole sample				
TOP ↑ Quartile 1	45.3%	4.53	2.60	318
Quartile 2	17.2%	2.00	1.17	341
Quartile 3	5.8%	1.31	0.76	344
Quartile 4	-8.2%	0.70	0.41	326
Pre-2001 Funds				
TOP ↑ Quartile 1	63.0%	5.34	3.19	146
Quartile 2	21.5%	2.16	1.25	162
Quartile 3	5.6%	1.32	0.75	166
Quartile 4	-9.0%	0.69	0.38	150
Post-2000 Funds				
TOP ↑ Quartile 1	30.0%	3.84	2.11	172
Quartile 2	13.3%	1.85	1.09	179
Quartile 3	6.0%	1.30	0.78	178
Quartile 4	-7.4%	0.72	0.43	176

Is there performance persistence?

- **If Fund I provides superior performance, does Fund II outperform as well?**



Can you pick top quartile buyout funds?

Panel A: Buyout Funds

Previous Fund Quartile at Fund End	Current Fund Quartile 1	2	3	4	N	Average Current Fund IRR	Average Current Fund MOIC	Average Current Fund PME
Post-2000 Funds								
1	33.3%	23.4%	27.9%	15.3%		17.8	1.93	1.27
	37	26	31	17	111			
2	18.4%	28.2%	30.1%	23.3%		15.7	1.78	1.18
	19	29	31	24	103			
3	15.7%	33.7%	31.5%	19.1%		15.5	1.71	1.15
	14	30	28	17	89			
4	17.5%	21.1%	21.1%	40.4%		11.3	1.54	1.02
	10	12	12	23	57			

Can you pick top quartile VC funds?

Panel B: Venture Capital Funds

		Current Fund Quartile 1	2	3	4	N	Average Current Fund IRR	Average Current Fund MOIC	Average Current Fund PME
Post-2000 Funds									
Previous Fund Quartile at Fund End	1	44.6%	26.9%	18.5%	10.0%		18.0	2.77	1.57
		58	35	24	13	130			
	2	18.6%	29.7%	29.7%	22.0%		13.7	1.78	1.02
		22	35	35	26	118			
	3	15.8%	37.6%	27.7%	18.8%		9.4	1.66	0.99
		16	38	28	19	101			
	4	5.8%	21.7%	27.5%	44.9%		1.6	1.20	0.69
		4	15	19	31	69			

Persistence at Time of Fundraising

Persistence at Time of Fundraising for Buyout Funds

Panel A: Buyout Funds

		Current Fund Quartile 1	2	3	4	N	Average Current Fund IRR	Average Current Fund MOIC	Average Current Fund PME
Post-2000 Funds									
Previous Fund Quartile at Fundraise	1	23.9%	23.9%	27.4%	24.8%		16.0	1.79	1.19
		27	27	31	28	113			
	2	22.7%	28.1%	28.9%	20.3%		15.4	1.77	1.19
		29	36	37	26	128			
	3	16.5%	28.2%	31.8%	23.5%		15.0	1.72	1.12
		14	24	27	20	85			
	4	27.3%	30.3%	21.2%	21.2%		15.9	1.85	1.20
		9	10	7	7	33			

No more spreads for buyout funds

Persistence at Time of Fundraising for VC Funds

Panel B: Venture Capital Funds

		Current Fund Quartile					Average Current Fund IRR	Average Current Fund MOIC	Average Current Fund PME
		1	2	3	4	N			
Post-2000 Funds									
Previous Fund Quartile at Fundraise	1	30.1%	23.7%	26.9%	19.2%		14.7	2.14	1.20
		47	37	42	30	156			
	2	21.8%	37.6%	21.8%	18.8%		12.2	2.04	1.15
		29	50	29	25	133			
	3	20.7%	24.1%	28.7%	26.4%		9.4	1.76	1.07
		18	21	25	23	87			
	4	14.3%	35.7%	23.8%	26.2%		6.6	1.49	0.91
		6	15	10	11	42			

Wide spreads for VC funds

Fund Persistence Regressions

Panel A: Whole sample

	Buyout Funds				VC Funds			
(Log) Previous Fund PME	0.043	0.004			0.329***	0.339***		
	[0.075]	[0.072]			[0.079]	[0.08]		
(Log) 2nd Previous Fund PME			-0.004	-0.048			0.202***	0.217***
			[0.069]	[0.071]			[0.058]	[0.060]
Fund size increases > 50%		0.022		-0.082		-0.048		-0.092
		[0.046]		[0.073]		[0.071]		[0.105]
Fund size increases > 100%		0.061		0.123*		-0.078		-0.045
		[0.049]		[0.064]		[0.084]		[0.110]
Secondary fund style		-0.164**		-0.244**		0.221		0.108
		[0.082]		[0.105]		[0.149]		[0.316]
Vintage Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	483	483	274	274	726	726	462	462
R2	0.04	0.05	0.15	0.19	0.26	0.26	0.29	0.29

What can we learn from persistence results?

- **Previous research was based on the *ex*-post results**
  - Fund I performance is not available when the investments in Fund II must be made
  - Difficult to exploit performance persistence in practice
- **After we consider frictions**
  - No past-performance based persistence for Buyout funds
  - Past-performance based persistence for Venture Capital funds

- **Hot current research topic:**
  - What predicts fund performance?
  - Jockey or Horse? (Steve Kaplan's paper)

Fund Manager Incentives and Gaming Behavior

- **Since the evidence shows that “top quartile” funds outperform, all PE managers wants to be “top quartile” funds**
  - According to the consulting firm PERACS, 77% firms claim to be in the top 25%

- **How they do it?**
  - Smart choice of performance measure
  - Smart choice of vintage year
  - Smart choice of peer group and other benchmarks

Two Views on Fees and Performance

1. **GP compensation is too high**
   - 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**
   - Compensation, ownership will be either unrelated or positively related to net-of-fee performance
   - Does not imply agency problems aren't important, just that contracts deal with them

Evidence on Lifetime Fees

- **The median fund is 2/20/1:**
  - 2% management fee off a basis of committed capital
  - 20% carried interest
  - 1% GP ownership

- **Which contributes more to GP compensation, fees or carry?**
  - Lifetime Management Fees: about $10-13 out of every $100 under commitment
  - Carry: about $5.41 out of every $100 under commitment

Robinson and Sensoy (2014, RFS)

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***		0.71***		0.02		0.02	
	(0.18)		(0.16)		(0.05)		(0.03)	
ln(Fund Size)	-0.85***	-0.69**	-1.15***	-1.12***	0.35***	0.32***	0.07	0.13*
	(0.31)	(0.29)	(0.15)	(0.16)	(0.12)	(0.12)	(0.06)	(0.08)
ln(Fund No.)	0.87*	0.70*	0.22	0.34	0.58***	0.63***	-0.16	-0.18
	(0.47)	(0.41)	(0.33)	(0.33)	(0.20)	(0.22)	(0.15)	(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

VC = Venture Capital Funds
BO = Buyout Funds

Robinson and Sensoy (2014, RFS)

Table 4
Compensation, ownership, and cash flow performance

Dependent variable:	PME		Tailored PME		Levered PME	
	(1)	(2)	(3)	(4)	(5)	(6)
PV lifetime fees	−0.01	0.02	−0.01	0.01	−0.01	0.02
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Carried interest (%)	0.04**	−0.01	0.04***	−0.04	0.03**	−0.04*
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
GP ownership high	0.10	−0.22	0.10*	−0.21	0.10*	−0.22
	(0.06)	(0.14)	(0.06)	(0.14)	(0.06)	(0.14)
GP ownership low	0.20***	−0.15	0.22**	−0.04	0.20***	−0.10
	(0.07)	(0.16)	(0.09)	(0.20)	(0.07)	(0.20)
ln(Fund size)	−0.02	−0.02	−0.01	−0.00	−0.03	−0.03
	(0.02)	(0.07)	(0.02)	(0.07)	(0.02)	(0.08)
ln(Fund no.)	0.02	0.01	0.03	0.03	0.02	0.00
	(0.05)	(0.11)	(0.06)	(0.12)	(0.05)	(0.12)
Sample	BO	VC	BO	VC	BO	VC
Vintage year FE?	yes	yes	yes	yes	yes	yes
Observations	542	295	542	295	542	295
R^2	0.08	0.13	0.06	0.10	0.10	0.14

VC = Venture Capital Funds
BO = Buyout Funds

Robinson and Sensoy (2014, RFS)

Efficient Contracting?

- **The patterns of compensation and ownership terms are potentially consistent with optimal, efficient contracting.**
  - For example, higher fixed compensation in booms could reflect higher expected productivity of GP skills during periods of high investment activity.
- **But they could be consistent with the inefficiency view as well.**
  - It could that less sophisticated LPs “show up late to the party" and get taken to the cleaners with unfavorable LPAs that reward underperforming GPs with high fees.

- **Proof is in the performance pudding.**
  - **Inefficiency view**: Higher pay or lower ownership leads to lower net-of-fee performance.
  - **Efficiency view**: Better firms charge more but ‘earn their keep,’ and competitive entry drives away any relationship between fees and performance.

Robinson and Sensoy (2014, RFS)

Limited Partner Agreements

- **Deal-by-deal, or "American," carry provisions are considered more GP-friendly (Portfolio Manager (GP)-Friendly):**
  - They allow the GPs to earn carried interest on each deal as it is exited.
  - May make GP to work hard in order to make a good exit

- **In contrast, whole-fund, or "European," carry provisions are more LP-friendly (Investor-Friendly).**
  - They require that the LP receive a return on their investment before GPs receive any carried interest.

Hüther, Robinson, Sievers and Hartmann-Wendels (2019, ManSci)

Positive relation between incentives and PMEs

Higher Incentives

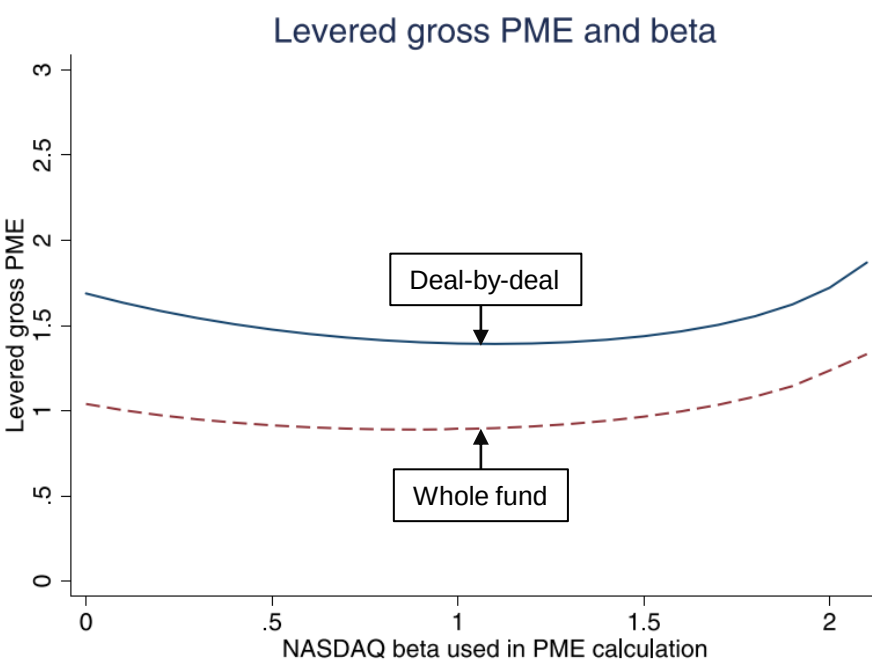
Higher PMEs

Panel C: Finer contractual details

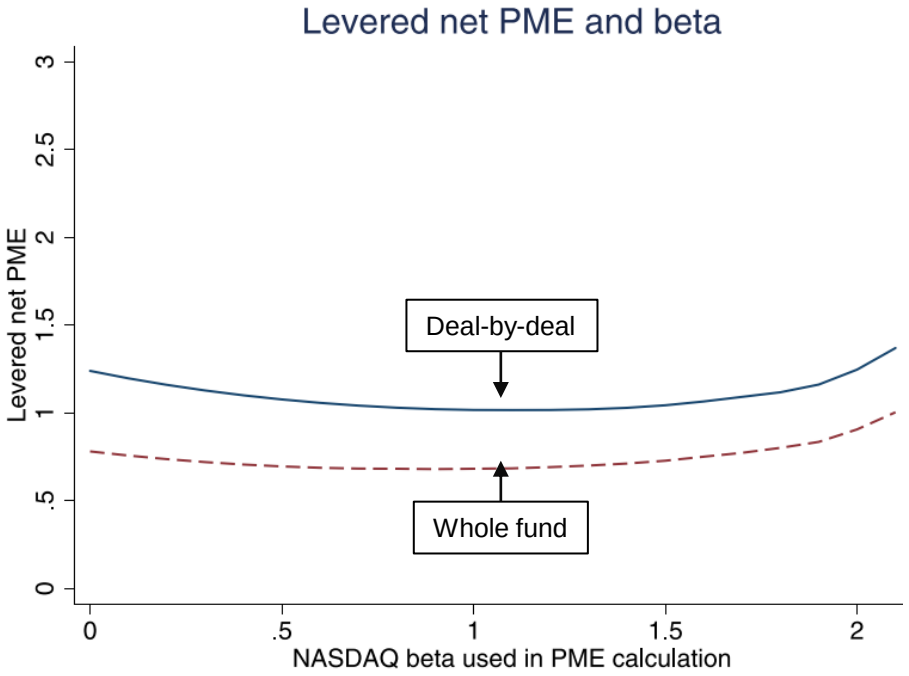
	Gross PME	*p*-value *t*-test	Net PME	*p*-value *t*-test
Strict deal-by-deal (GP-friendly: 1)	1.483		1.062	
Otherwise (GP-friendly: 2–4)	1.110	0.025	0.836	0.050
Deal-by-deal realized loss (GP-friendly: 2)	1.299		0.969	
Otherwise (GP-friendly: 3, 4)	0.891	0.016	0.682	0.019
Basic fund-as-a-whole (GP-friendly: 3)	0.966		0.714	
Otherwise (GP-friendly: 1, 2)	1.394	0.032	1.017	0.026
Full fund back (GP-friendly: 4)	0.698		0.600	
Otherwise (GP-friendly: 1–3)	1.296	0.041	0.947	0.086

Hüther, Robinson, Sievers and Hartmann-Wendels (2019, ManSci)

Figure 2. Levered PME-β Sensitivity Conditional on Deal-by-Deal and Whole-Fund



Levered gross-of-fee PME-β sensitivity

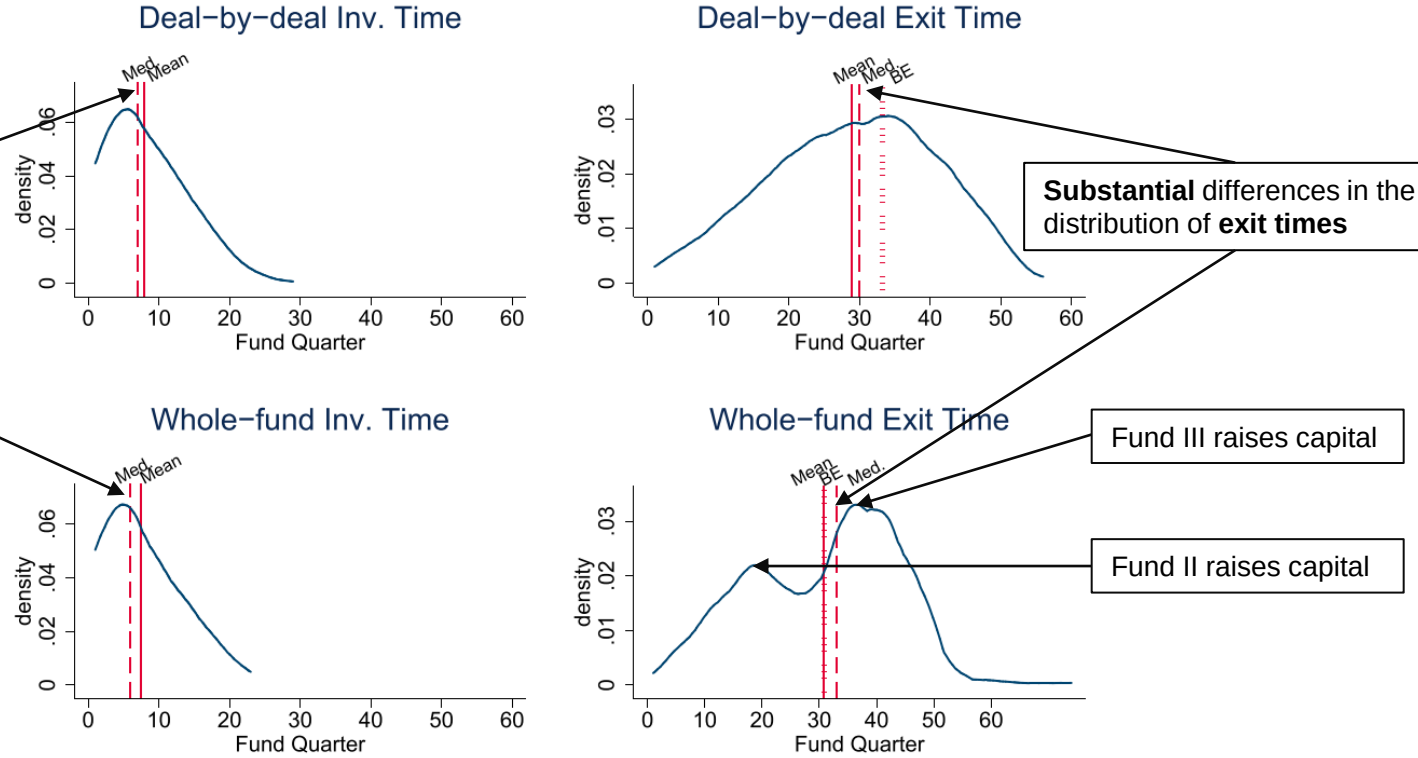


Levered net-of-fee PME-β sensitivity

Hüther, Robinson, Sievers and Hartmann-Wendels (2019, ManSci)

Differences in incentives is exit behavior

Figure 4. Portfolio Companies Investment and Exit Times by Fund Quarter



Notes. The left column of this graph depicts the distribution of investment times, denoted "Inv. Time," for the two types of contracts, i.e., deal-by-deal and whole-fund contracts, as a function of fund age. This is generated by pooling all initial investments by fund age for each contract type and then plotting the distribution of investments. The right column depicts the distribution of exit times by contract type. In addition, the plots contain the mean, median (Med.) and break-even (BE) point time marked by the different red lines.

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What we learned from Limited Partners Agreements?

- **LP-friendly contracts offered lower returns than GP-friendly contracts.**
  - Deal-by-deal are acting under an incentive to maximize the value of each exit → Focus on better performance
  - Whole-fund contracts operate under an increased incentive to grandstand, posting early returns to investors in order to send a signal of the fund's underlying quality → Focus on gathering assets

- **On average, GP-friendly LPAs are good for LPs because better quality GPs can produce better returns, and some of this added surplus flows back to LPs.**

Ludo Phalippou (2020)

- **Private and Public returns are the same since 2006:**
  - Large Pension Funds (some Endowment funds)
  - Big Four PE Firms
- **The estimated Carry collected by PE funds is $230 - $370 billion**
  - Most of which goes to a relatively small number of individuals
  - The number of PE multibillionaires rose from 3 in 2005 to 22 in 2020

- **Ludo: Very costly model for society → Must be changed**

- **His paper has gained a lot of visibility around the world**