



Private Equity Performance: What Do We Know?

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Overview

- Why another paper on PE performance?
- How is performance measured in the industry?
 - IRR, Multiple of invested capital (MIC), market-adjusted perf. (PME)
- Previous work on PE Performance.
- Who measures performance? Our data from Burgiss.
- Performance results.
- Relation of PME to IRR and MIC.
- Implied PMEs in the other commercial databases – VE, Preqin and CA.
- Persistence (new, not in paper).
- Relation of performance to aggregate fundraising and fund size.
- Implications.
- Will go through buyout results first. Will do VC if time.

Why another paper on PE Performance?

- Renewed attention to / interest in private equity, both VC and buyout.
 - Large amounts of money allocated.
 - Income inequality.
 - » Large fees and large incomes to some PE investors.
 - » Low tax rates.
 - Effects of leverage.

Why another paper on PE Performance?

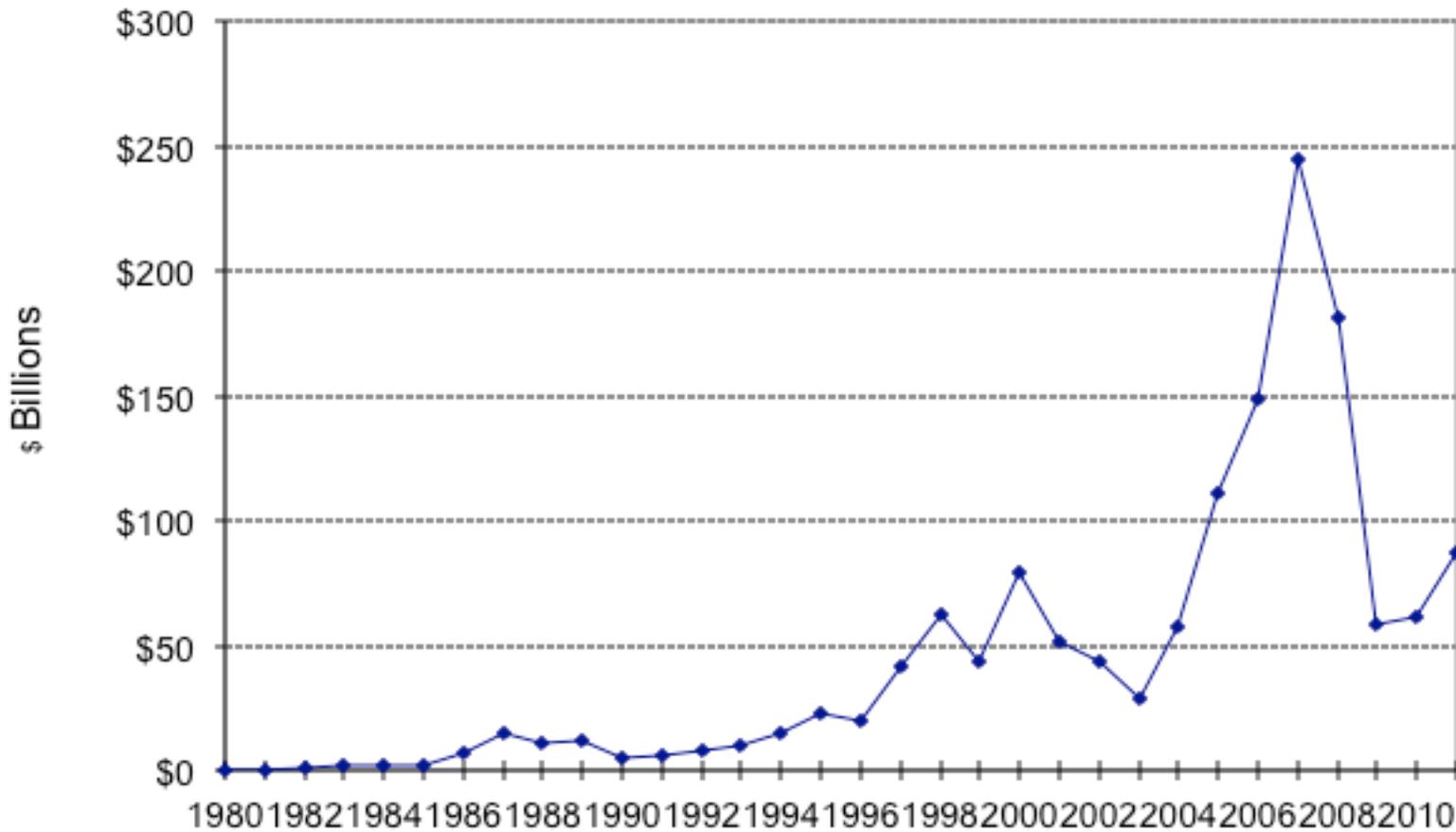
- Renewed attention to / interest in private equity, both VC and buyout.
 - Large amounts of money allocated.
 - Income inequality.
 - » Large fees and large incomes to some PE investors.
 - » Low tax rates
 - Effects of leverage.
 - Romney.
- Because we are not sure we know the answer yet.
 - Particularly for funds raised after mid-1990s.



The Private Equity Process

- Managers of PE firm are the general partners (GPs), investors are the limited partners (LPs).
 - GPs = Blackstone, KKR etc.
 - LPs = pension funds, endowments, etc.
- GPs raise first fund. Say BK I
 - LPs commit to a certain amount of investment.
 - GP draws down funds usually over first 3 to 5 years.
 - Average life of fund is usually 10 to 13 years
 - GP compensation:
 - » Annual management fee (1.5% to 2.5%).
 - » % of profits (usually 20%).
 - Effectively closed end funds with 10 to 13 year lives.
- GPs raise BK II after capital invested.

Commitments to U.S. Private Equity Partnerships 1980 - 2011 (in \$ billions)



Source: Private Equity Analyst, Steven N. Kaplan

Performance at the Portfolio Company Level

- Virtually all empirical evidence is positive re portfolio companies.
- For deals in the 1980s, Kaplan (1989), Kaplan (1991) and others find LBOs associated with:
 - Improved operating margins (absolutely and relative to industry).
 - » Up by 10% to 20%
 - Improved cash flows margins - up by 40%.
- For deals in the 1990s and early 2000s (relative to industry):
 - Higher operating margins in UK and France for deals overall.
- But since 1980s, public-to-privates may be different:
 - Modest increase in operating performance in U.S. public-to-privates (Guo, Hotchkiss et al. (2008)). (But high returns).
 - Modest increase in operating performance in UK public-to-privates (Achary et al. (2009) and Weir, Jones, Wright (2007)).

– Employment.

- » Do PE investments create jobs (PE Firms / Romney)? or
- » Destroy jobs (SEIU / Obama / Gingrich)?

- Neither and both.
- U.S. (Davis, Haltiwanger, Lerner et al (2011))
 - » Look at 70% of U.S. buyouts from 1980 to 2005.
 - » Relative to industry:
 - employment down at 3% over 2 years at existing locations.
 - employment up 2%+ at new locations.
 - net effect on employment between constant and down 1%.
 - authors conclude “the overall impact of private equity transactions on firm-level employment growth is quite modest.”
- In France, PE creates jobs (Boucly, Sraer, Thesmar (2009)).
- In UK, modest decline in employment (Ames and Wright (2007)).
- Preliminary new work by Ashwini (2013).
 - » PE portfolio companies upgrade workforce / technology.
 - » Workers who lose their jobs find new jobs.

What about performance for LPs?

- Improved operating performance does not necessarily mean that PE funds generate out-performance net of fees.
 - It depends on what the PE funds paid to acquire the companies.
 - » Premiums go to selling shareholders.
 - It depends on fees.

How is performance measured?

■ The industry focuses on two metrics

- Annualized IRR (net of fees)
- Multiple of Invested Capital (MIC) or Total Value to Paid-in-capital (TVPI).
 - » Total Value Returned / Invested Capital
 - » (Distributed Value + Residual Value) / (Capital calls + Fees)

■ Each has its drawbacks

- Net IRR
 - » Absolute (not relative) - does not control for the market.
 - » Is sensitive to sequencing of investments
 - » Does not control for leverage / beta
- Multiple of Invested Capital
 - » Absolute (not relative) - does not control for the market
 - » Does not control for leverage / beta

How is performance measured?

- More important question, how does private equity perform relative to (or as an alternative to) public equity?
- Kaplan and Schoar (2005) introduced PME.
 - = market-adjusted multiple.
 - PME = Public Market Equivalent.
 - » $\frac{\sum(\text{S\&P 500 discounted value of cash outflows})_t}{\sum(\text{S\&P 500 discounted value paid in capital})_t}$
 - » Compares fund to investment in S&P (including dividends).
 - » If $\text{PME} > 1$, then LPs did better than S&P 500.
 - Pros and cons:
 - » + Does control for the market.
 - » + Not sensitive to investment sequence.
 - » - Still does not control for beta.

Evaluating Performance

- Net IRR: Is sensitive to sequencing of investments.

	-10	-10
	-10	-10
	-10	-10
	90	90
	0	0
	0	0
	0	30
IRR	66%	71%
TVPI	3.0	4.0

Previous Results

- Kaplan and Schoar (2005) use U.S. funds in Venture Economics data:
 - VC returns exceed public markets (value-weighted)
 - Buyout returns slightly below public markets (value-weighted).
 - Use realized funds / funds with low residual values.
 - » Generally pre-1997 funds.
 - Do not focus on average performance.
 - » Not confident have complete / unbiased sample of funds.
 - Particularly buyout.
 - Focus on
 - » Persistence.
 - Strong evidence for persistence.
 - » Cross-sectional performance.

Previous Results

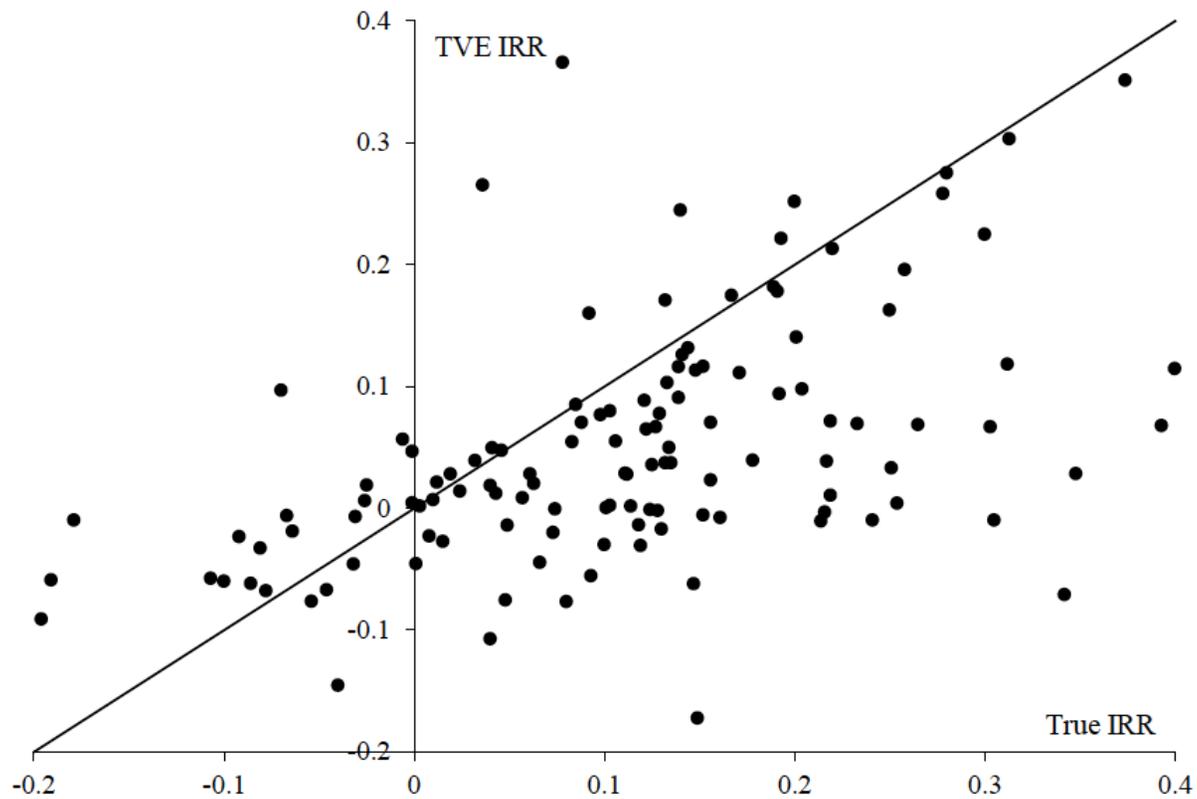
- Phalippou and Gottschalg (2009) combine U.S. and non-U.S. funds in Venture Economics data, focus on performance, make consistently negative assumptions and find:
 - VC and PE returns are poor -- below public markets (value-weighted).
 - Assume residual values are 0.
 - Assume β 's = 1, but argue β 's should be higher and abnormal performance worse.

Previous Results

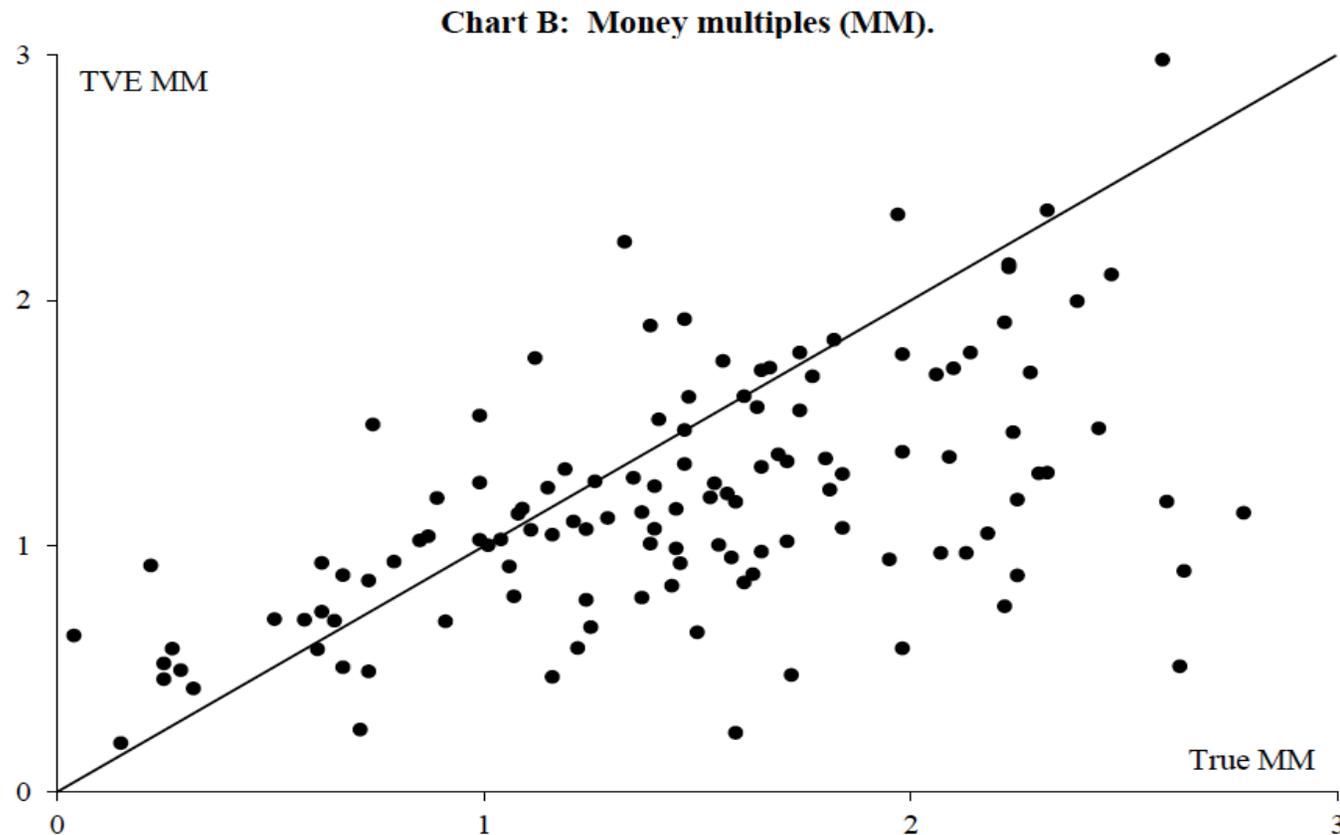
- Stucke (2011) revisits performance in Venture Economics.
 - Gets individual VE fund performance.
 - Compares to actual fund performance from large LP.
 - Should line up on 45 degree line.
 - Finds that VE consistently and substantively understates performance.
 - » Caused by rolling over performance if performance is not updated.
 - » I.e., stale returns and multiples.

VE IRR vs. Actuals from Stucke (2011)

Chart A: Internal rate of returns (IRR).



VE Multiples vs. Actuals from Stucke (2011)



Source: TVE Performance Statistics, own sample data, calculations and illustration.

Who measures performance?

- Four commercial databases:
 - Cambridge Associates (CA).
 - Preqin.
 - Thomson Venture Economics (VE).
 - Burgiss.
- We use U.S. data from all four as of March 2011.
 - We have cash flow data for funds from Burgiss.
 - We have IRRs and MICs for all four databases.

Burgiss

- Sourced exclusively from LPs.
 - Include all funds and cash flows from the LPs that provide the data.
 - » Roughly 2/3 of Burgiss' clients have allowed access.
 - LPs comprise wide array of institutions.
- Data come from “over 200 investment programs and represent over \$1 trillion in committed capital.”
 - 2/3 have PE commitments in over \$100 million. Of these,
 - » 60% are pension funds (a mix of public and corporate); and
 - » 20%+ are endowments or foundations.
 - Burgiss believes the PE funds in the sample represent >70% of funds ever raised.
- LPs use Burgiss products for their internal processes:
 - record keeping and fund investment monitoring.

Burgiss

- The data are essentially LP records.
 - Cash flow data likely to be very accurate because Burgiss systems used by LPs for record keeping and fund investment monitoring.
 - Data are up to date – given need for quarterly reporting by most LPs.
 - » No problems resulting from a lack of updating as with VE.
- Data are very strong for U.S., less extensive for Europe.
 - In this paper we focus on U.S. buyouts and venture capital.

Burgiss

- For a given LP, unlikely to be any selection bias.
 - Superior to commercial databases that rely on LPs or GPs to voluntarily provide data or rely on FOIA disclosures by LPs.
- Primary potential bias– which it shares with the other commercial databases – is how representative the LPs (and resulting GPs) are.
 - possible that LPs in the Burgiss sample have had better than average experience with private equity which is why they use Burgiss and allow Burgiss to aggregate their results.

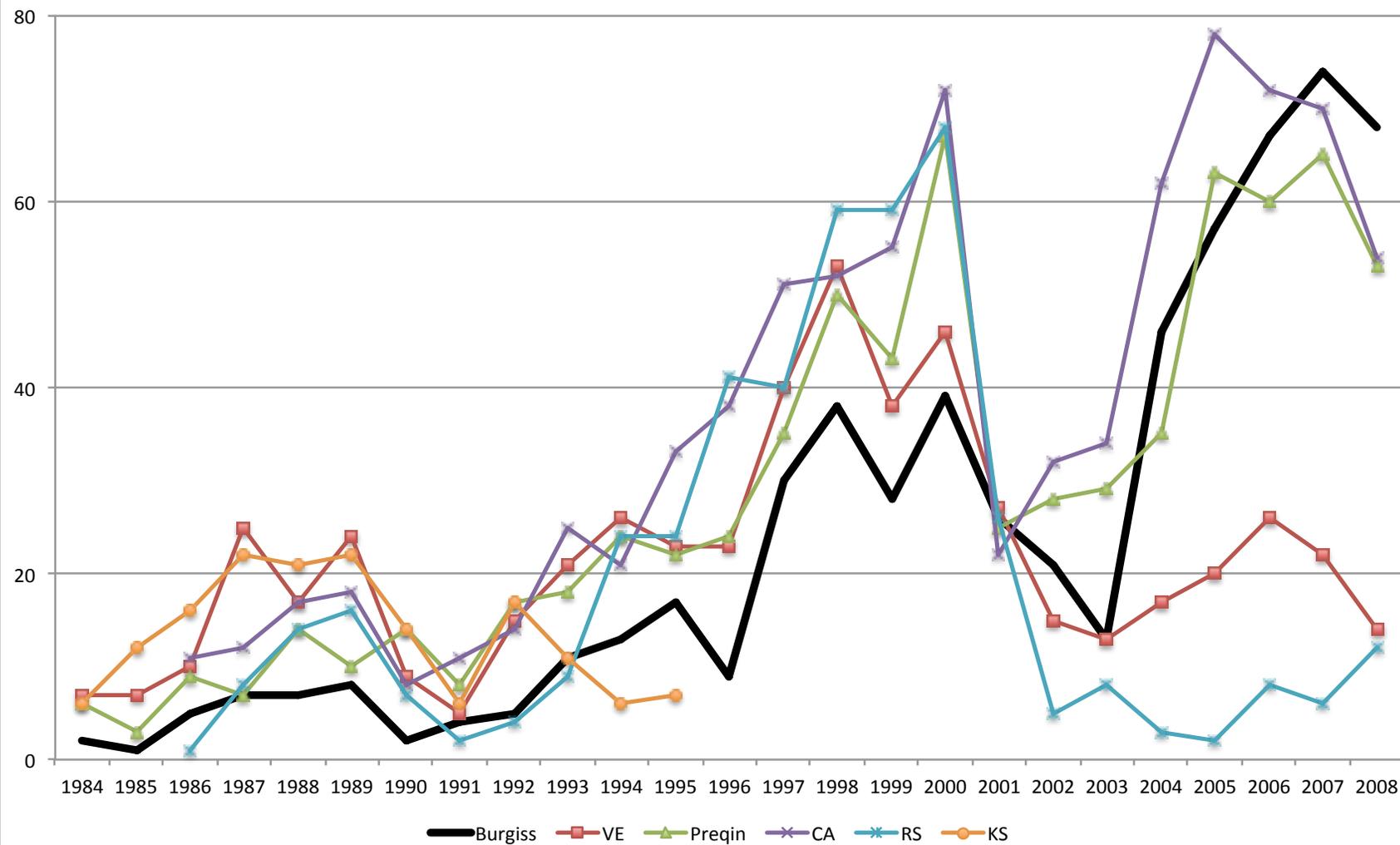
Other Databases

- Venture Economics (VE)
 - VE sources data from both LPs and GPs.
 - VE is dependent on LPs and GPs providing information.
 - Stucke (2011) suggests that VE includes stale data.
 - Unknown selection bias.
 - FLAWED.
- Cambridge Associates (CA)
 - Provides investment advice to LPs.
 - Obtains data from LPs and from GPs who have raised or are trying to raise capital.
 - May have a bias towards GPs raising new funds and, therefore, likely have performed well.

Other Databases

- Preqin
 - Preqin obtains data from public filings by pension funds, from FOIA requests to public pension funds, and also voluntarily from some GPs and LPs.
 - Has only IRRs and MICs, but not cash flows for some funds.
 - Preqin may miss some high performing funds that do not have public pension fund investors.
- Robinson and Sensoy (2011).
 - Study fund-level cash flows supplied by a single, very large LP.
 - They argue the LP invested much like an index fund, particularly for buyout funds.
- Kaplan and Schoar (2005).

Number of buyout funds with performance data



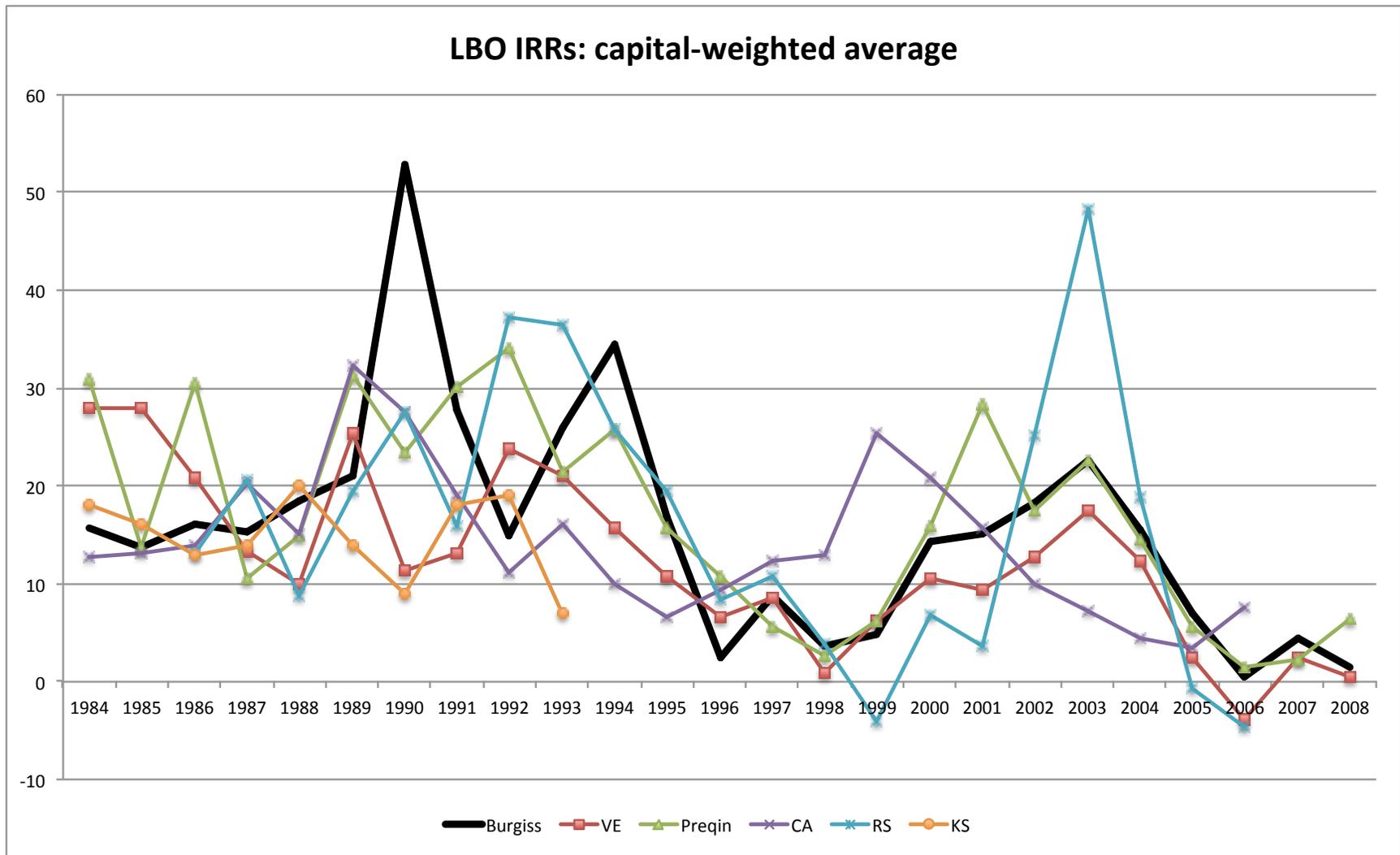
Coverage

- Burgiss coverage is very strong in the 2000s vintages.
- VE has much lower coverage in the 2000s.
- Preqin and CA have stronger coverage in the 1990s.
- Robinson-Sensoy have strong coverage in the 1990s.

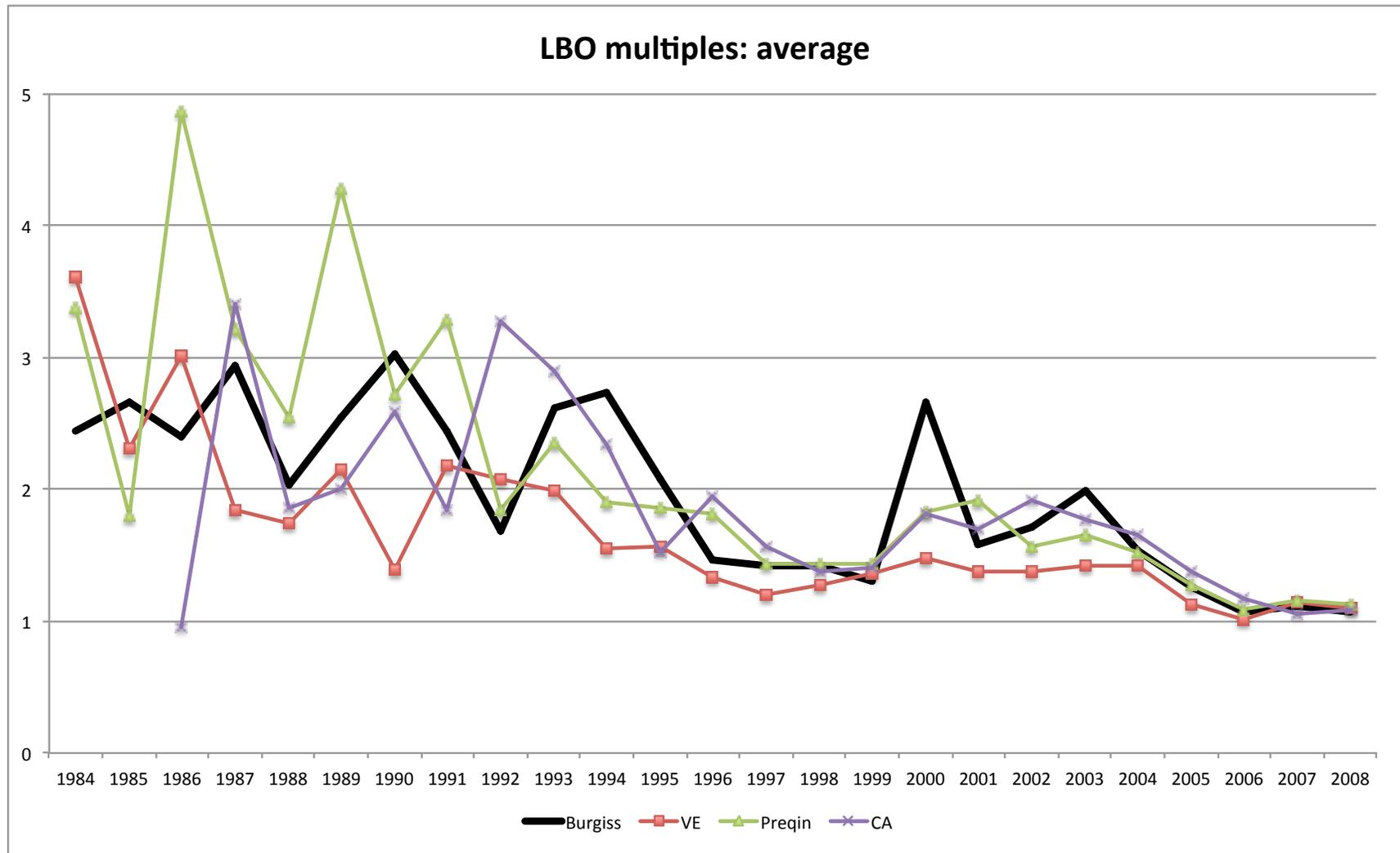
What has performance been on average?

- Look at vintage year IRRs and MICs.
- In the Burgiss data,
 - Vintage years before 2001 are largely realized.
 - » Unrealized investments are 10% or less of invested capital.
 - 2000 to 2003 vintages, unrealized investments are:
 - » 38%, 42%, 55% and 71% of invested capital
 - For later vintages:
 - » Unrealized investments exceed 80% of invested capital.
- Since end of 2009, FAS 157 / Topic 820 requires PE firms to value assets at fair value every quarter.
 - Used to ok to leave investments at cost.
 - Has practical effect of making estimated unrealized values closer to true value.

What has performance been on average?



What has performance been on average?



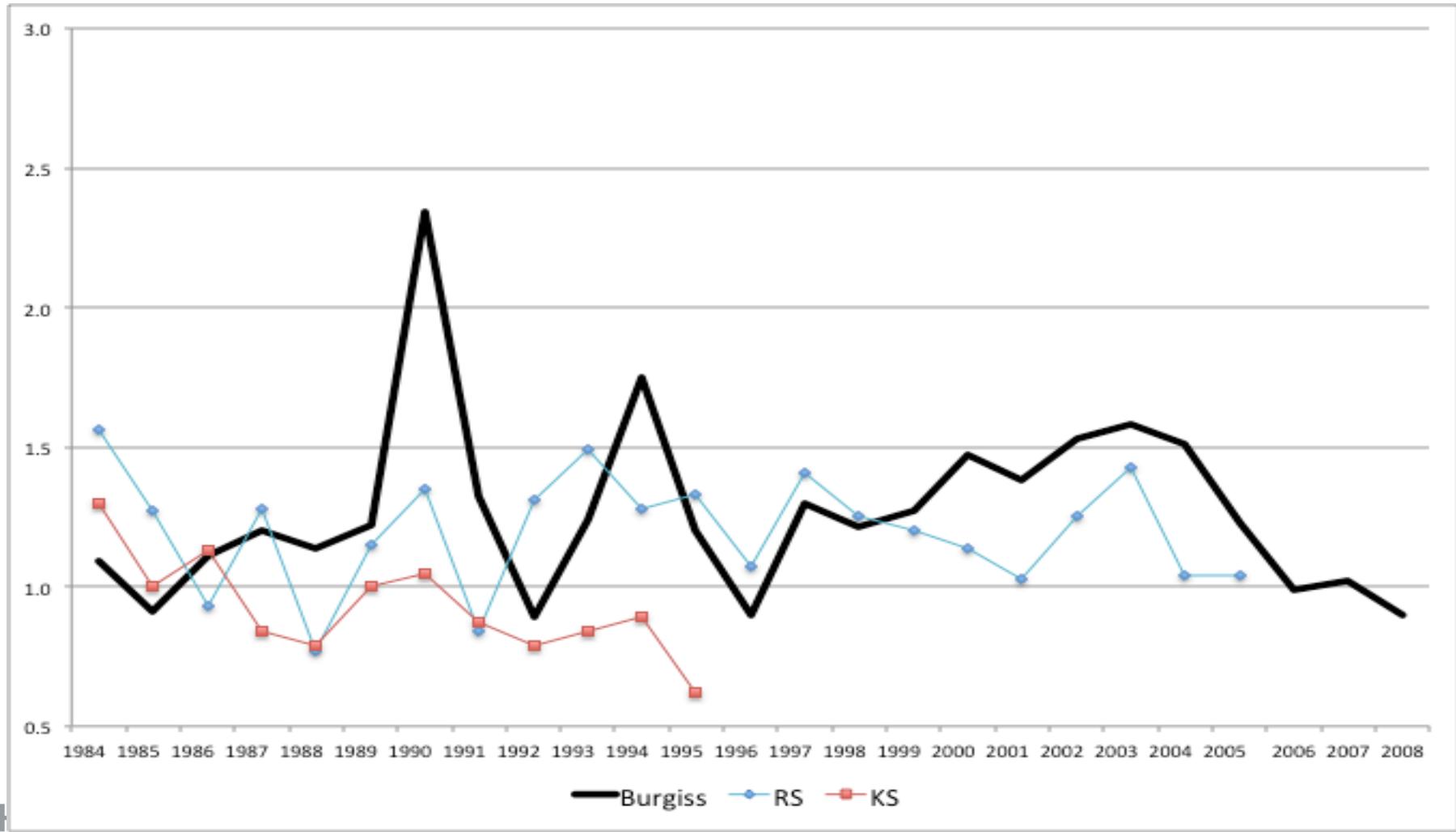
What has performance been on average?

- Vintage year IRRs vary a lot.
- Vintage year Multiples of Invested Capital vary less.
 - Generally between 1.0 and 2.0 since mid-1990s.
- VE generally lower than the other 3 databases.
 - Consistent with Stucke (2011).
 - Explains why so many funds are top quartile.
 - » They compare themselves to VE.
 - Implication for LPs: Do not use VE any longer.

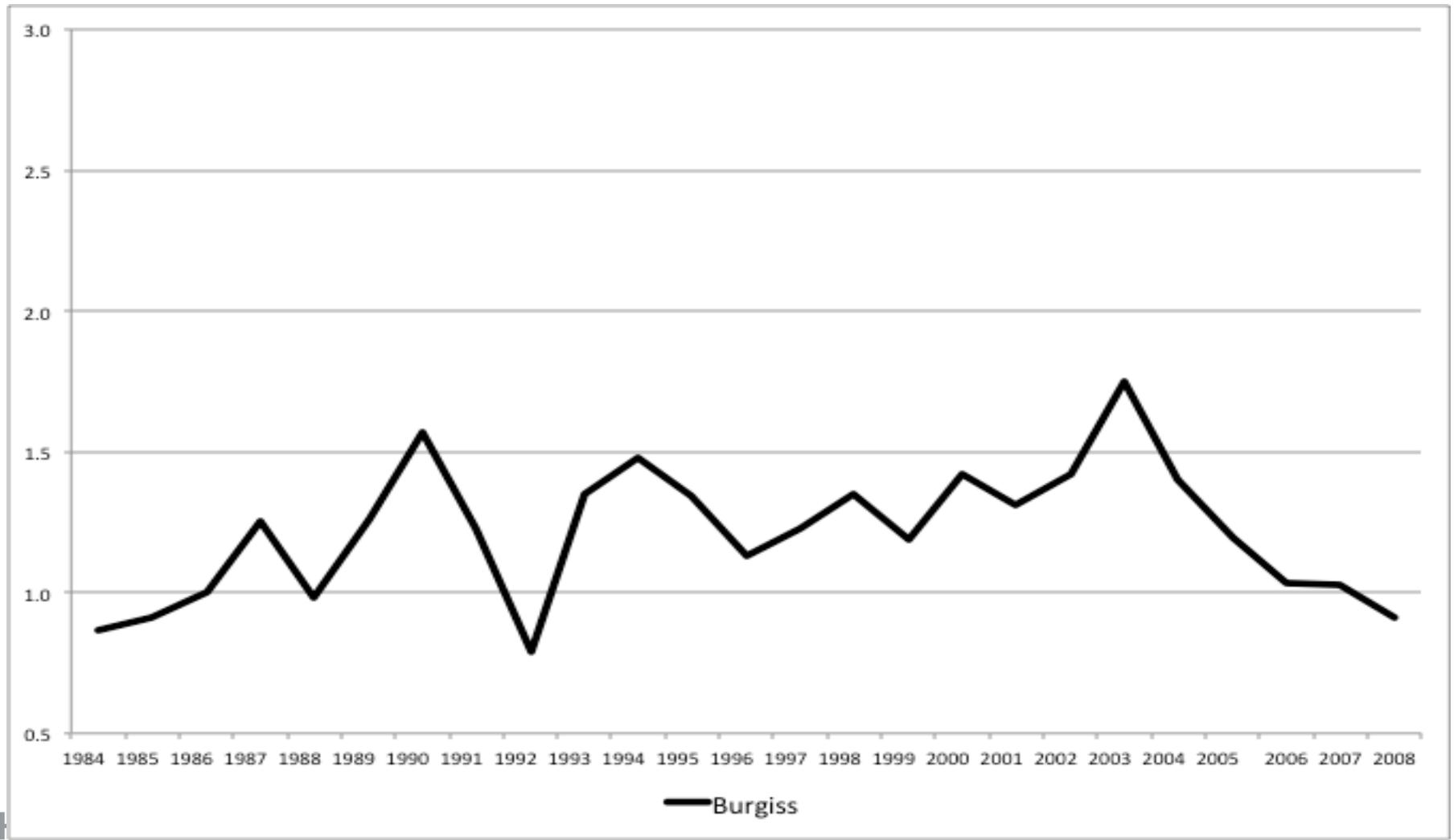
Do Buyout Funds Outperform Public Markets?

- Cannot say whether Buyout PE outperforms public markets in previous slides.
- Need to compare individual fund cash flows to public markets.
 - Among commercial databases, only Burgiss does this correctly (by calculating PME).
- We use Burgiss individual fund cash flow data to calculate performance.
- Also report results from
 - Kaplan and Schoar (2005); and
 - Robinson and Sensoy (2011).

What has performance been on average? Vintage Year PME (capital weighted average)



What has performance been on average? Vintage Year PME (average)



Do Buyout Funds Outperform Public Markets?

- PMEs consistently greater than 1.0.
 - Average fund PME is 1.20.
 - Weighted average fund PME is 1.16.
 - Median fund PME is 1.11.
 - Top quartile is 1.42.
 - Average vintage year PME is 1.22.
 - Average cap weighted average vintage year is 1.27.
- Similar results in RS.

What does this mean in terms of excess IRR?

- Calculate an annualized excess return measure using the Long-Nickels methodology in Kocis et al. (2009).
- Average fund has return 6.6% greater than if it invested in the S&P 500.
 - Median is 3.4%.
- Capital weighted average excess return is 3.7%, median is 3.0%.
- We could not calculate an S&P 500 equivalent for 22 funds.
 - These funds have an average PME of 2.0.
 - If these funds have an excess return of 10% (top quartile) and include them, the averages increase by 0.10% and the medians increase by 0.40%.
- Conclude that average fund IRR exceeds S&P 500 by 4% to 5%.

What about other indices?

- PMEs using Nasdaq.
 - Average vintage year PME is 1.20.
 - Average fund PME is 1.17.
 - Top quartile is 1.41.
- PMEs using Russell 2000.
 - Average vintage year PME is 1.22.
 - Average fund PME is 1.11.
 - Top quartile is 1.29.
- PMEs using Russell 2000 Value.
 - Average vintage year PME is 1.16.
 - Average fund PME is 1.07.
 - Top quartile is 1.26.

What about other indices?

- PMEs using Fama-French Size Decile 6. (Firm mkt. value of \$2B).
 - Average vintage year PME is 1.14.
 - Average fund PME is 1.04.
 - Top quartile is 1.18.
- PMEs using Fama-French Size Decile 4. (Firm mkt. value of \$1B).
 - Average vintage year PME is 1.21.
 - Average fund PME is 1.09.
 - Top quartile is 1.24.
- PMEs using Fama-French Size Decile 2. (Firm mkt. value of \$0.5B).
 - Average vintage year PME is 1.21.
 - Average fund PME is 1.09.
 - Top quartile is 1.26.

What about beta / leverage?

- Some argue that Buyout underperforms leveraged investment in S&P 500.
 - I.e., beta of buyout funds is greater than 1.
- Jegadeesh et al. (2010) estimate betas for publicly-traded private equity vehicles.
 - One factor model betas generally less than one.
 - Four factor model:
 - » Market β 's ≤ 1 .
 - » HML ≈ 0.3 to 0.35 .
 - » SMB ≈ 0.5 to 0.60 .

What about beta / leverage?

- Also, can look at PME's assuming 1.5 X and 2.0 X the performance of the S&P 500. Equivalent to betas of 1.5 and 2.0.
- Sample PME's using beta of

	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>
– Average	1.20	1.18	1.20
– Median	1.12	1.11	1.13.
- If buyout funds had betas much larger than 1, would expect 1997 to 1999 vintages to have PME's (assuming beta of 1) lower than 1 because stock market declined after 2000.
 - We do not find that.
- PME's are most stable assuming betas of 1.0.

Relation of PME to IRRs and MICs

- What about CA and Preqin (and VE)?
 - They do not calculate PMEs.
 - They do calculate vintage year IRRs and Multiples.
- We look at the Burgiss data and see if we can predict PMEs using IRRs and Multiples.
 - For a given vintage year, IRRs and Multiples explain over 93% of the variation in PMEs in most years.
 - In other words, IRRs and Multiples very good predictors of PME if you know the right conversion factor.
 - Aside:
 - » Multiples explain more of variation in PMEs than IRRs.
 - Focus on Multiples.

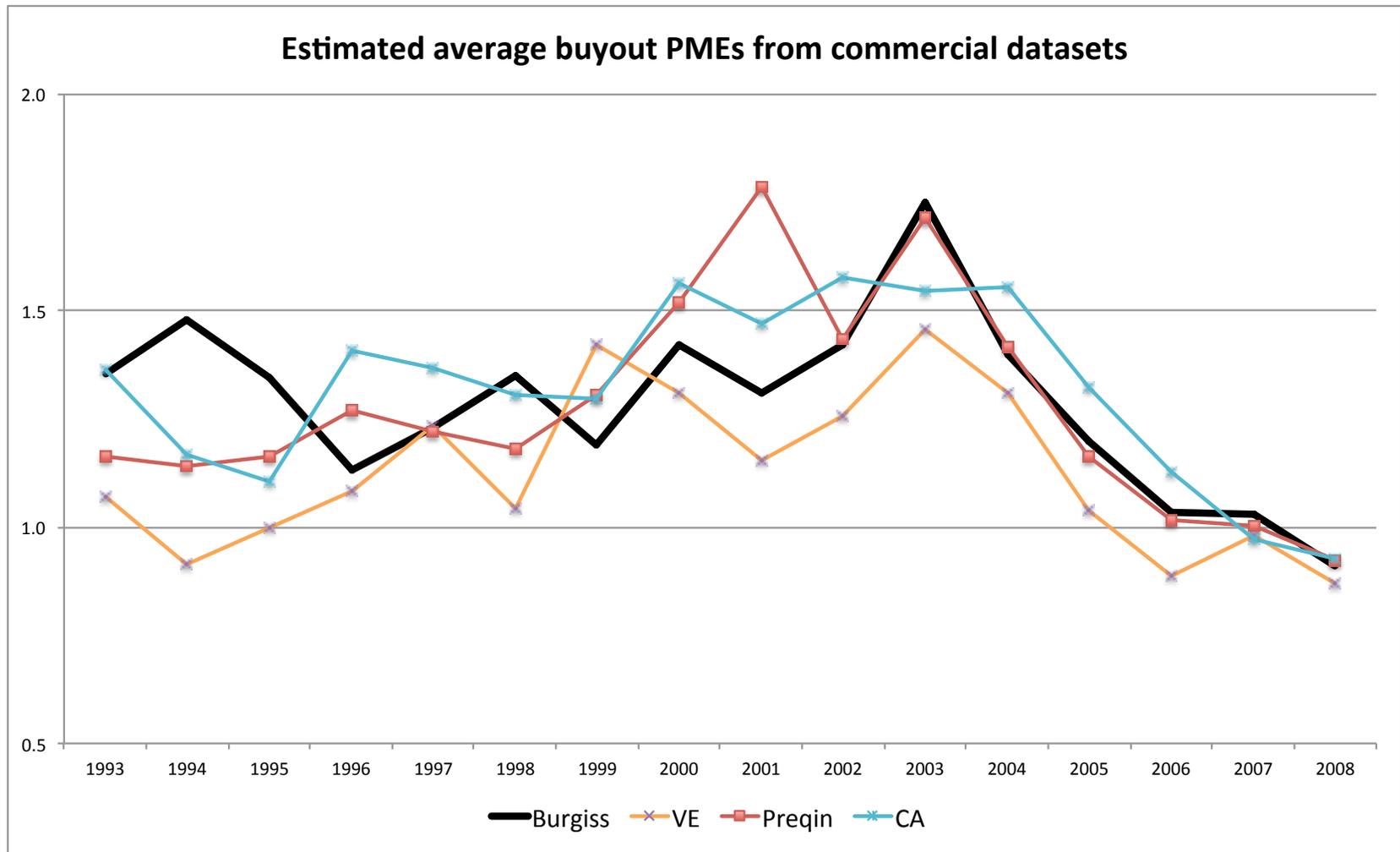
Relation of PME to IRRs and MICs

Vintage	Buyout Funds			N	R ²
	IRR	Multiple	Constant		
1993	1.08** [0.22]	0.32*** [0.04]	0.18 [0.05]	11	0.99
1994	0.80** [0.30]	0.37*** [0.05]	0.22 [0.06]	13	0.99
1995	1.04** [0.45]	0.37*** [0.08]	0.34 [0.08]	17	0.99
1996	3.04 [2.84]	0.38 [0.38]	0.39 [0.18]	9	0.89
1997	-0.53 [0.33]	0.95*** [0.09]	-0.08 [0.10]	30	0.98
1998	0.08 [0.50]	0.91*** [0.10]	0.05 [0.12]	38	0.95
1999	0.25 [0.34]	0.81*** [0.07]	0.13 [0.08]	28	0.99
2000	-1.11** [0.45]	1.03*** [0.09]	-0.16 [0.10]	39	0.96
2001	0.56 [0.42]	0.70*** [0.11]	0.14 [0.11]	26	0.98
2002	0.28 [0.34]	0.76*** [0.08]	0.07 [0.09]	21	0.98
2003	0.13 [0.64]	0.94*** [0.09]	-0.14 [0.11]	13	0.97
2004	-0.52* [0.27]	1.04*** [0.07]	-0.12 [0.07]	46	0.98
2005	0.04 [0.29]	1.00*** [0.08]	-0.06 [0.08]	57	0.96
2006	-0.25 [0.14]	1.00*** [0.14]	-0.03 [0.14]	67	0.93
2007	-0.34*** [0.12]	1.12*** [0.06]	-0.20 [0.07]	74	0.94
2008	-0.01 [0.10]	0.72*** [0.08]	0.14 [0.08]	68	0.87

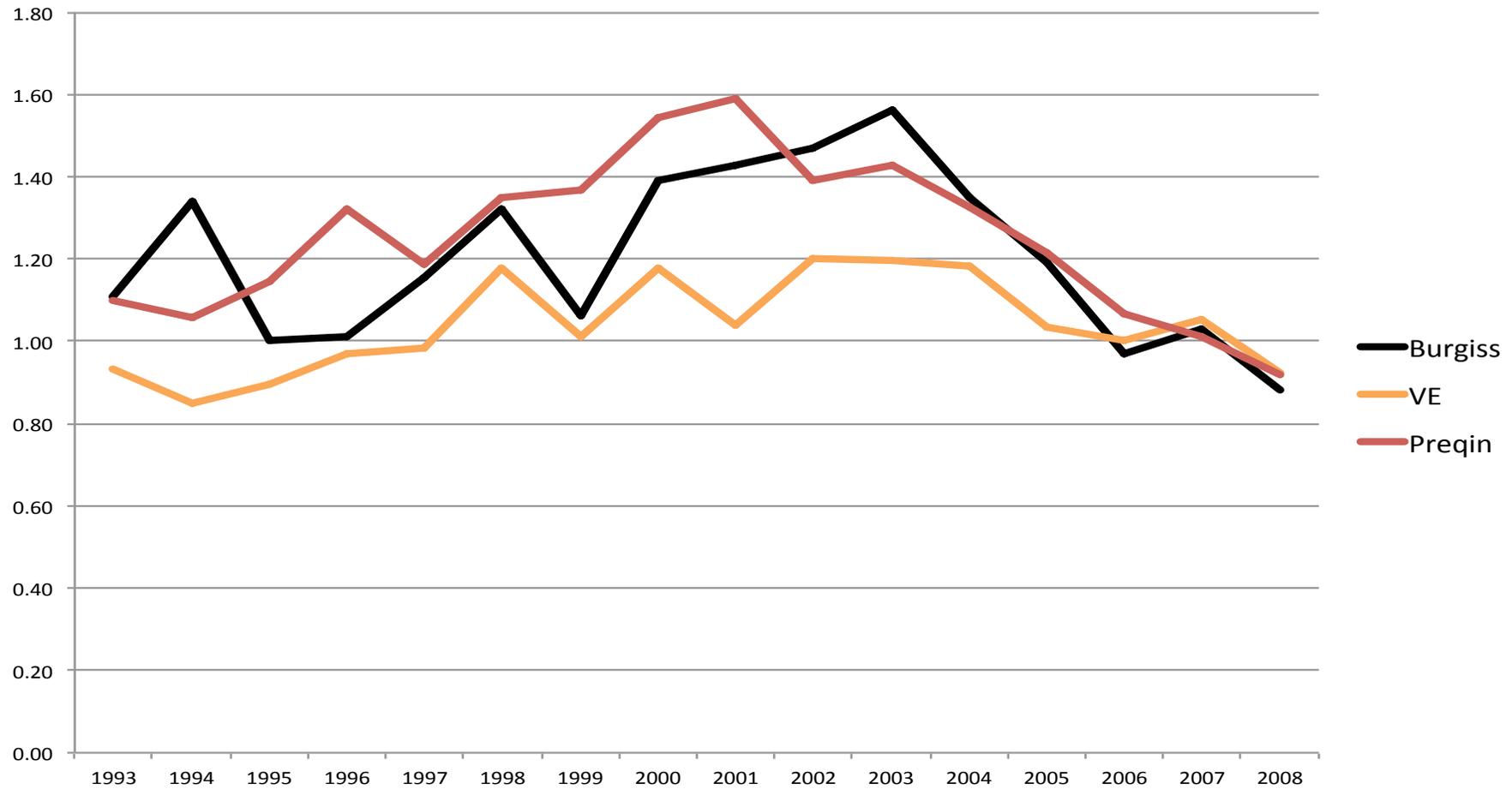
Do Buyout Funds Outperform Public Markets?

- Can use relationships between PME, IRRs and Multiples from annual regressions using the Burgiss data to estimate the PMEs in CA, Preqin and VE.

US LBO Vintage Year PME (estimated for VE, Preqin & CA)



Estimated Median Buyout PME From Commercial Datasets



- All vintages for all commercial datasets average PME's well above 1.0.
 - All vintages before 2007 in Burgiss, CA, and Preqin have $PME > 1.0$
 - Most vintages above 1.0 even for VE despite its downward bias.
 - In fact, median funds in most vintages have PME above 1.0.
 - Outperformance has increased as of December 2011.
- What does this mean?
 - PE has outperformed S&P net of fees by a wide margin.
 - » Results in Burgiss, CA, Preqin and RS remarkably similar despite very different sample selection criteria.
 - » Seems unlikely that all of these can be upward biased.
 - PE has outperformed S&P gross of fees by a very wide margin.
- In subsequent paper, Higson and Stucke (2012) corroborate this for a dataset from Cambridge Associates.

Persistence in Performance:

- Are there good GPs?
- Do the good GPs repeat?
- Preliminary evidence from Harris, Jenkinson, Kaplan and Stucke (2013).
 - Burgiss data as of December 2011.

Persistence in Performance:

- Top quartile performance is strong. Top 2 quartiles have PME's > 1.

Panel A : Buyout Funds					
A.1 Total Sample	Average IRR	Average MOIC	Average PME	N	
Current Fund Quartile PME					
1	26.0%	2.30	1.81	165	
2	13.9%	1.58	1.31	155	
3	8.0%	1.31	1.08	159	
4	-2.7%	0.93	0.78	141	
A.2 Pre-2001 Funds					
Current Fund Quartile PME					
1	30.7%	2.91	2.00	69	
2	14.8%	1.80	1.34	65	
3	7.4%	1.38	1.00	68	
4	-2.6%	0.94	0.68	58	
A.3 Post-2000 Funds					
Current Fund Quartile PME					
1	22.6%	1.86	1.68	96	
2	13.3%	1.43	1.29	90	
3	8.4%	1.26	1.13	91	
4	-2.7%	0.93	0.85	83	

Persistence in Performance: Are there good GPs? Historically yes but.

- Can you predict top quartile? Somewhat:

	Current fund				Total funds	Average current fund		
	Top quartile 1	2	3	Bottom quartile 4		IRR	MOIC	PME
Previous Fund	1	34%	26%	25%	15%	13.1%	1.60	1.36
		34	26	25	15	100		
	2	24%	23%	31%	21%	9.5%	1.44	1.25
		22	21	28	19	90		
3	24%	28%	34%	14%	12.4%	1.52	1.26	
	18	21	26	11	76			
4	12%	24%	29%	34%	8.2%	1.33	1.11	
	7	14	17	20	58			
					324			
Not available, not first time	28%	27%	22%	23%	13.4%	1.68	1.28	
	49	46	37	40	172			
First time	28%	22%	21%	29%	11.8%	1.56	1.24	
	35	27	26	36	124			
					620			

Persistence in Performance: Are there good GPs? Historically yes but.

- But, it is stronger in earlier period.

- Stay away from bottom quartile.

A.2 Pre-2001 Funds

Current Fund Quartile

Previous Fund Quartile PME	1	2	3	4		IRR	MIC	PME
1	42.5% 17	25.0% 10	22.5% 9	10.0% 4	100.0% 40	15.3% 40	1.91 40	1.50 40
2	27.6% 8	31.0% 9	27.6% 8	13.8% 4	100.0% 29	8.4% 29	1.58 29	1.26 29
3	21.2% 7	27.3% 9	33.3% 11	18.2% 6	100.0% 33	15.7% 33	1.79 33	1.33 33
4	13.0% 3	26.1% 6	26.1% 6	34.8% 8	100.0% 23	8.9% 23	1.48 23	1.13 23

A.3 Post-2000 Funds

Previous Fund Quartile PME

1	28.3% 17	26.7% 16	26.7% 16	18.3% 11	100.0% 60	11.6% 60	1.39 60	1.27 60
2	23.0% 14	19.7% 12	32.8% 20	24.6% 15	100.0% 61	10.0% 61	1.37 61	1.24 61
3	25.6% 11	27.9% 12	34.9% 15	11.6% 5	100.0% 43	9.8% 43	1.32 43	1.21 43
4	11.4% 4	22.9% 8	31.4% 11	34.3% 12	100.0% 35	7.8% 35	1.22 35	1.10 35
It not First Time	30.9% 29	27.7% 26	19.1% 18	22.3% 21	100.0% 94	11.9% 94	1.44 94	1.31 94
First Time	31.3% 21	23.9% 16	16.4% 11	28.4% 19	100.0% 67	11.8% 67	1.44 67	1.28 67

Persistence in Performance:

- Are there good GPs? Do the good GPs repeat?
 - Persistence in sample overall.
 - Appears to have declined post-2000.
 - » All previous quartiles outperform S&P 500.
 - » Bottom quartile performs worst.
 - Avoid bottom quartile funds.

Past Performance, Fundraising, Future Performance

- Kaplan and Schoar (2005), Kaplan and Stromberg (2009) and Robinson and Sensoy (2011) find a negative relation between capital committed to PE and future vintage year IRR and MICs.
 - Robinson and Sensoy do not find a negative relation for PMEs.
- We use the Burgiss vintage year returns and the PEA capital commitments to estimate these relations.
 - Capital committed is measured in the vintage year and the previous vintage year and is deflated by the market value of the U.S. stock market (from CRSP).

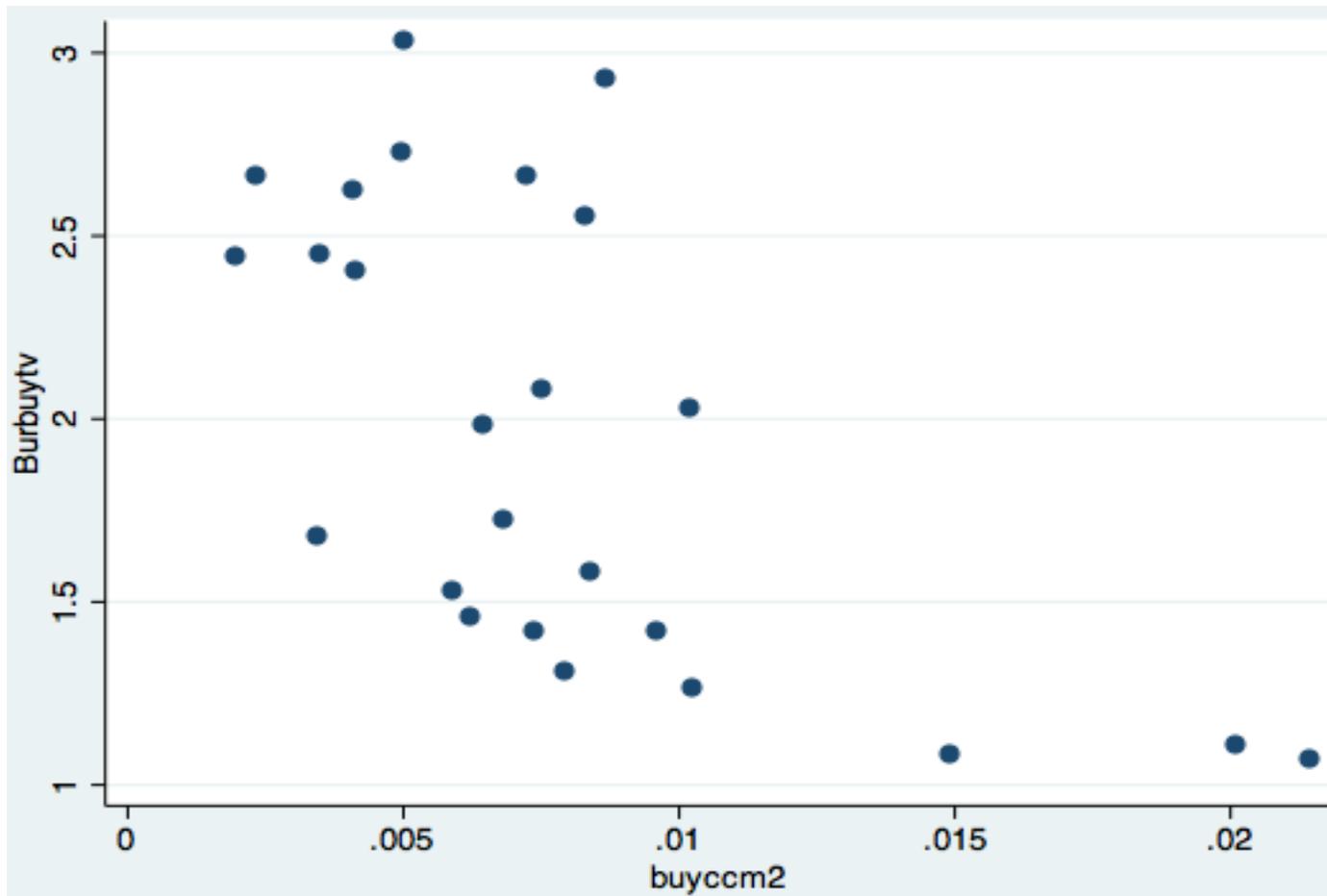
Go back to the historical record

Panel A: All Vintages from 1984-2008			
Dependent variable:	Buyout Funds		
	IRR	Multiple	PME
Capital Commitments to Total Stock Market Value	-12.49*** [4.27]	-101.9*** [25.6]	-18.8 [13.2]
Constant	0.26 [0.04]	2.83 [0.23]	1.42 [0.12]
N	25	25	25
R-squared	0.27	0.41	0.08

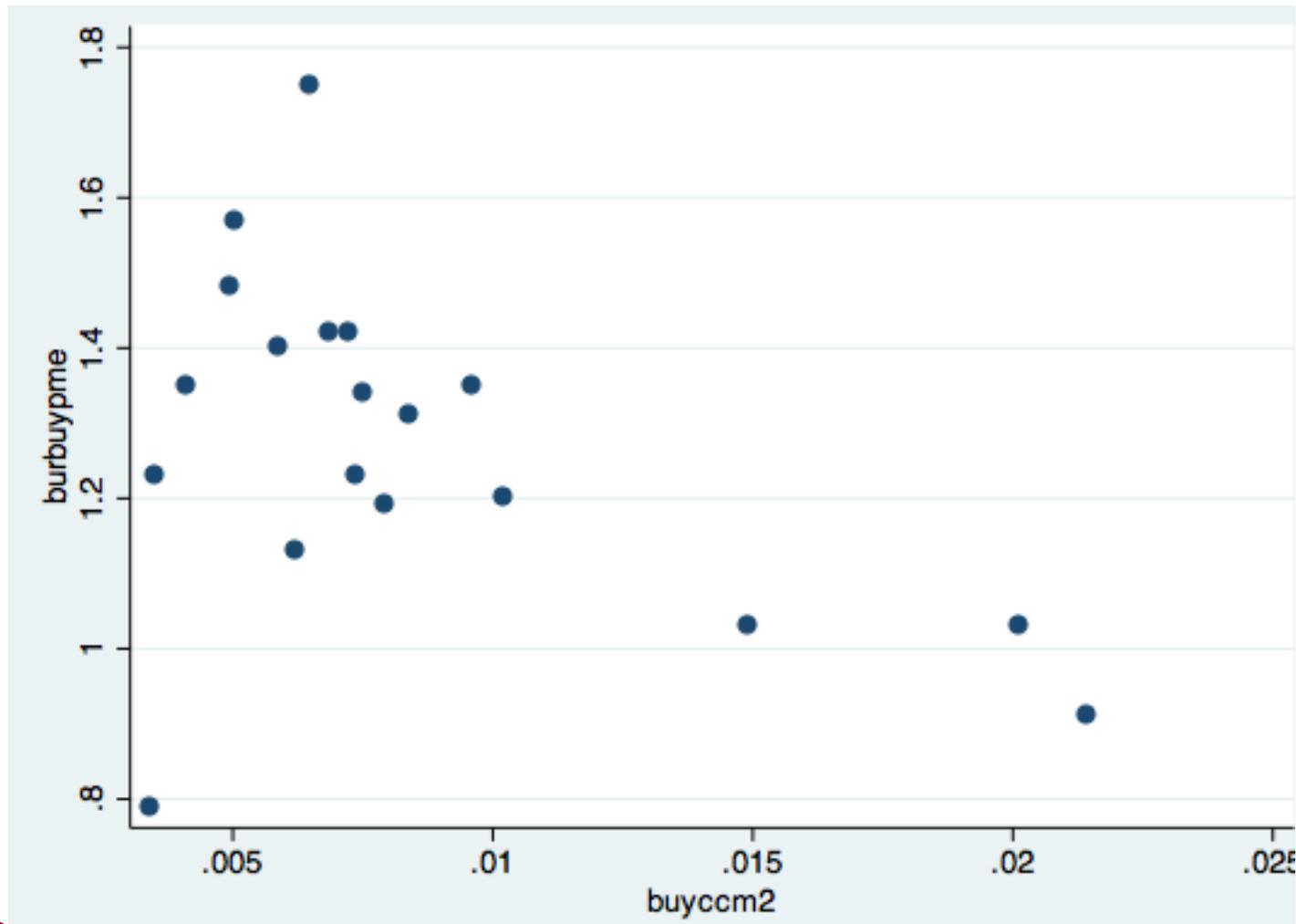
Panel B: Vintages from 1993 to 2008			
Dependent variable:	Buyout Funds		
	IRR	Multiple	PME
Capital Commitments to Total Stock Market Value	-12.23*** [3.97]	-71.9*** [23.9]	-31.7*** [9.9]
Constant	0.24 [0.04]	2.30 [0.25]	1.58 [0.10]
N	16	16	16
R-squared	0.40	0.39	0.42

- IRRs, Multiples and PMEs related to funds raised.

Vintage Year Multiples vs. Capital Committed



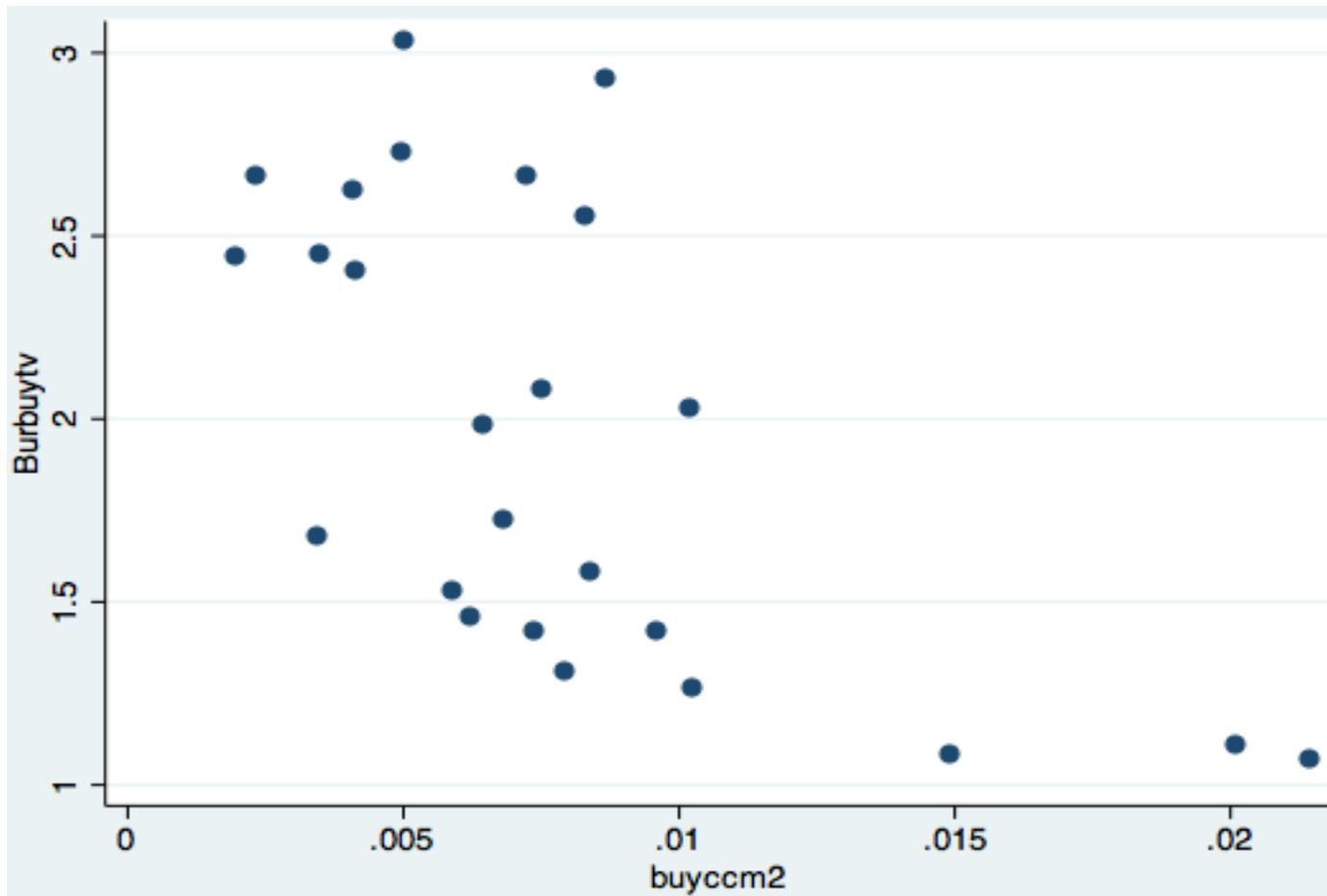
Vintage Year PME vs. Capital Committed



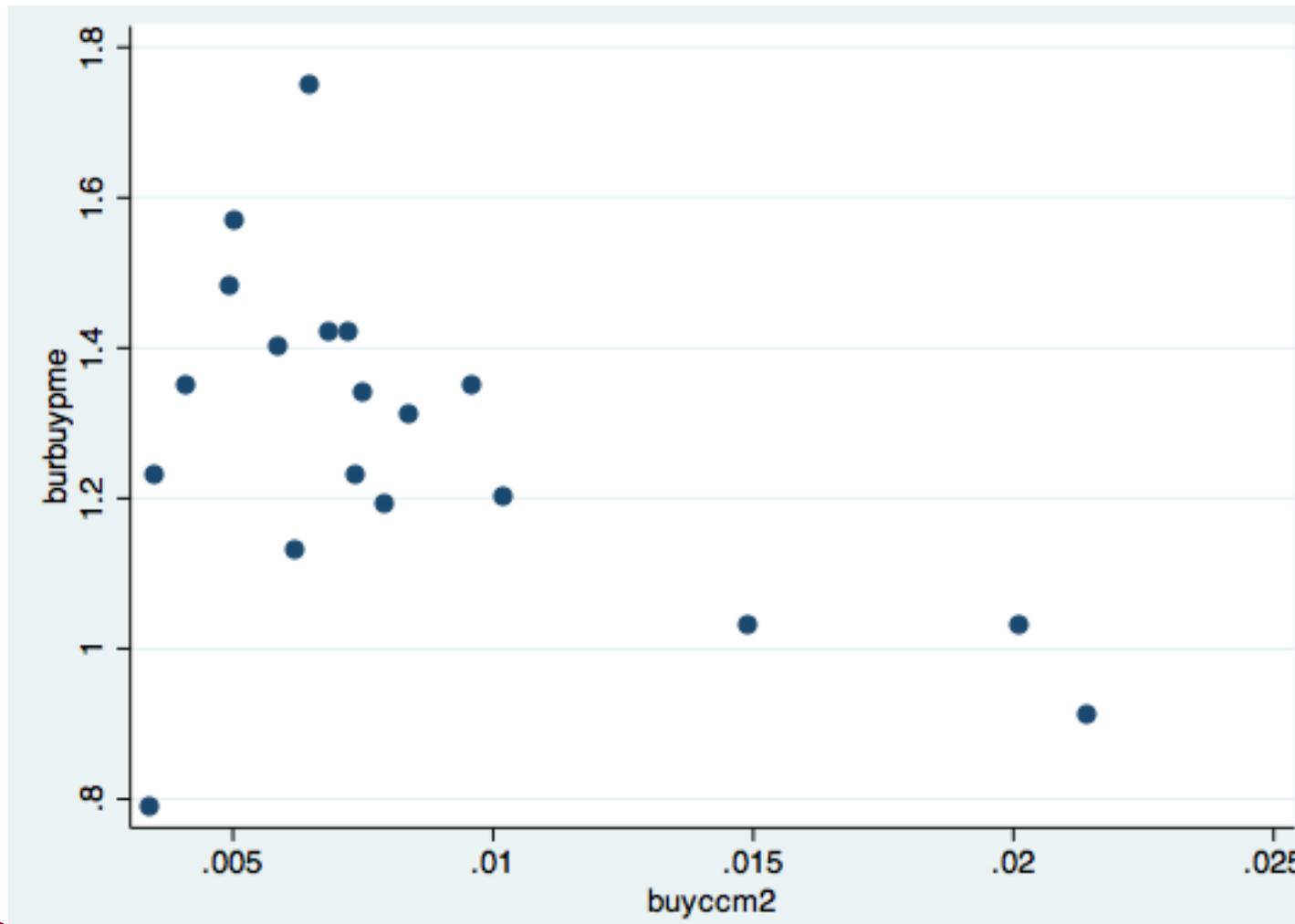
Go back to the historical record

- PE market is cyclical. IRRs, Multiples and PMEs related to funds raised.
 - IRR in Vintage Year =
 - » 24% - 12 x PE inflows in current and prior year as % of stock mkt.
 - Multiple in Vintage Year =
 - » 2.30 - 72 x PE inflows in current and prior year as % of stock mkt.
 - PME in Vintage Year =
 - » 1.58 - 32 x PE inflows in current and prior year as % of stock mkt.
 - On average PE inflows = 0.4% of stock market. (2 years 0.8%).
 - Not exactly an efficient markets conclusion.

Vintage Year Multiples vs. Capital Committed



Vintage Year PME vs. Capital Committed

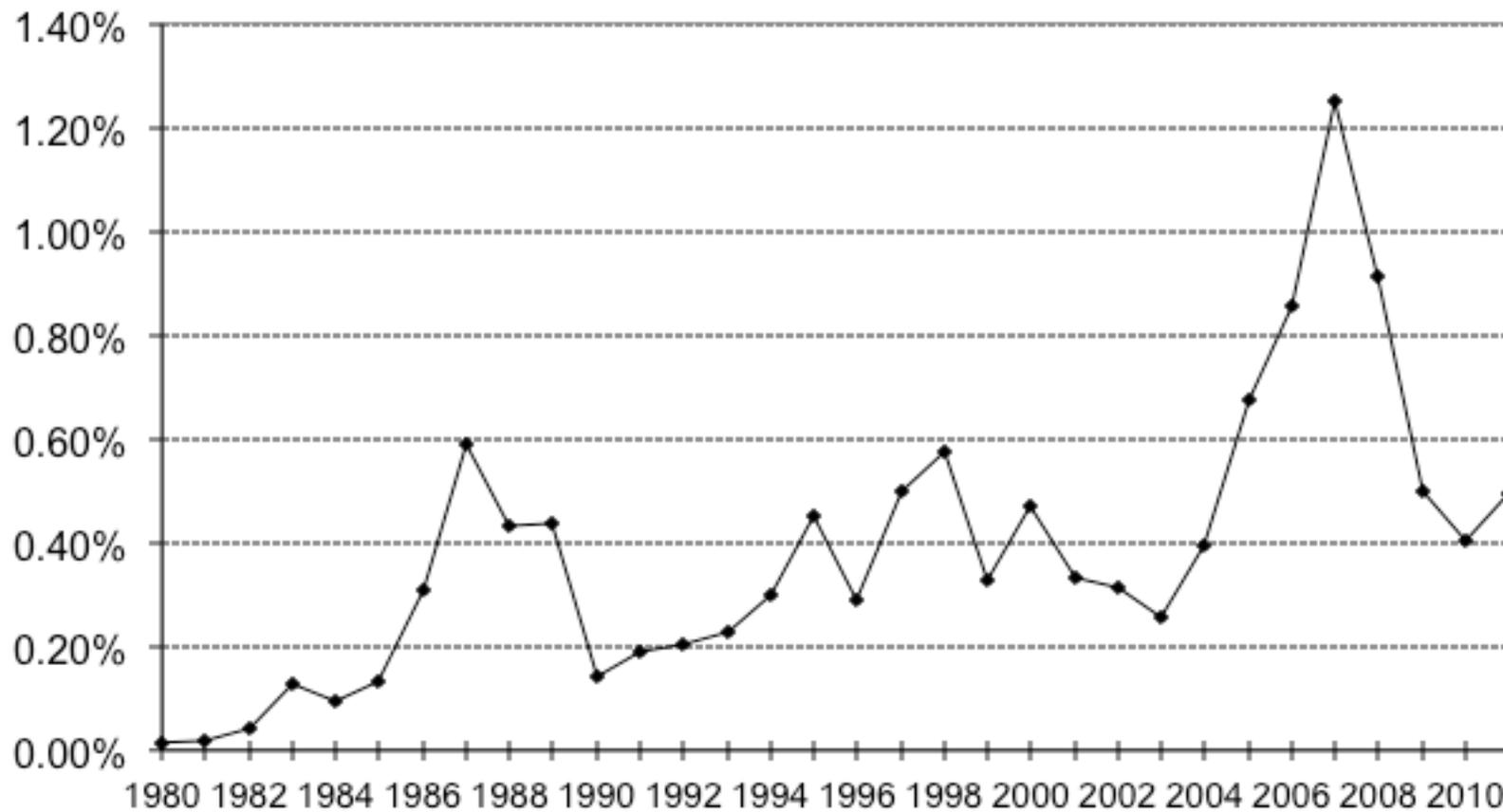




Go back to the historical record

- Where are we in the cycle?

Commitments to Private Equity Partnerships in U.S. as Fraction of Stock Market Capitalization 1980 - 2011



Source: Private Equity Analyst, Steven N. Kaplan

- Record (two year) fundraising levels in 2006, 2007 and 2008.
 - 1.5%, 2.0%, and 2.1% of the stock market.

- Record fundraising levels in 2006, 2007 and 2008.
 - 0.86%, 1.25%, and 0.91% of the stock market.

- If historical relationships are repeated, 2006, 2007, and 2008 vintages will have low IRRs.
 - » $24\% - 12 \times 1.5\% = 6\%$
 - » $24\% - 12 \times 2.1\% = -1\%$
 - » $24\% - 12 \times 2.2\% = -3\%$

- Looks like that could happen?

What about 2009 to 2011 Vintages?

- Commitments declined in 2009 to 2011. Came in at
 - 0.50%, 0.40% and 0.50%.
- This is roughly equal to the historical average.
 - Predict average performance?
 - » which has been pretty good over time.
 - Caveat is overhang from 2008 funds is greater than usual.

Summary / Implications

- Buyout fund evidence is positive at portfolio company level.
- Buyout funds have outperformed public markets in the 1980s, 1990s, and 2000s.
 - Supported by performance in Burgiss, Prequin, CA and Robinson and Sensoy (2011).
 - Each dollar invested in average fund returned > 20% more than a dollar invested in the S&P 500.
 - Works out to outperformance of > 3% per year.
 - VE, despite likely downward bias, also implies that the average buyout fund has outperformed public markets.
 - Conclusions insensitive to benchmark indices and systematic risk.
 - » Lower, but positive using small cap / value indices.
 - For more recent vintage funds, eventual performance will depend on the ultimate realization of remaining investments.

Summary / Implications

- Buyout funds have outperformed public markets in the 1980s, 1990s, and 2000s.
 - Acknowledge that different datasets may not constitute complete samples of buyout funds.
 - Confirmation of outperformance result must await the emergence of a complete buyout fund dataset.
 - Nevertheless, for conclusion of outperformance to turn out to be incorrect, all the various datasets would have to have a substantial positive selection bias.
 - » We believe that is unlikely.
 - Nailing down the sources of this large outperformance would seem a fruitful subject for future research.
 - » Gompers, Kaplan and Mukharlyamov (2013).

Summary / Implications

- Within a given vintage year, PME's are reliably related to IRRs and MICs.
 - In vintage year regressions, IRR and MICs explain at least 93% of the variation of PME's in most vintage years.
 - Researchers and practitioners can use our models to estimate PME's without having underlying fund cash flows as long they have access to IRRs and investment multiples.

- Persistence.
 - Persistence in sample overall.
 - Appears to have declined post-2000.
 - » All previous quartiles outperform S&P 500.
 - » Bottom quartile performs worst.
 - Avoid bottom quartile funds.

Summary / Implications

- Vintage year performance for buyout and VC funds, both absolute and relative to public markets, decreases with aggregate capital committed to the relevant asset class.
 - Suggests that a contrarian investment strategy would have been successful in the past in these asset classes.

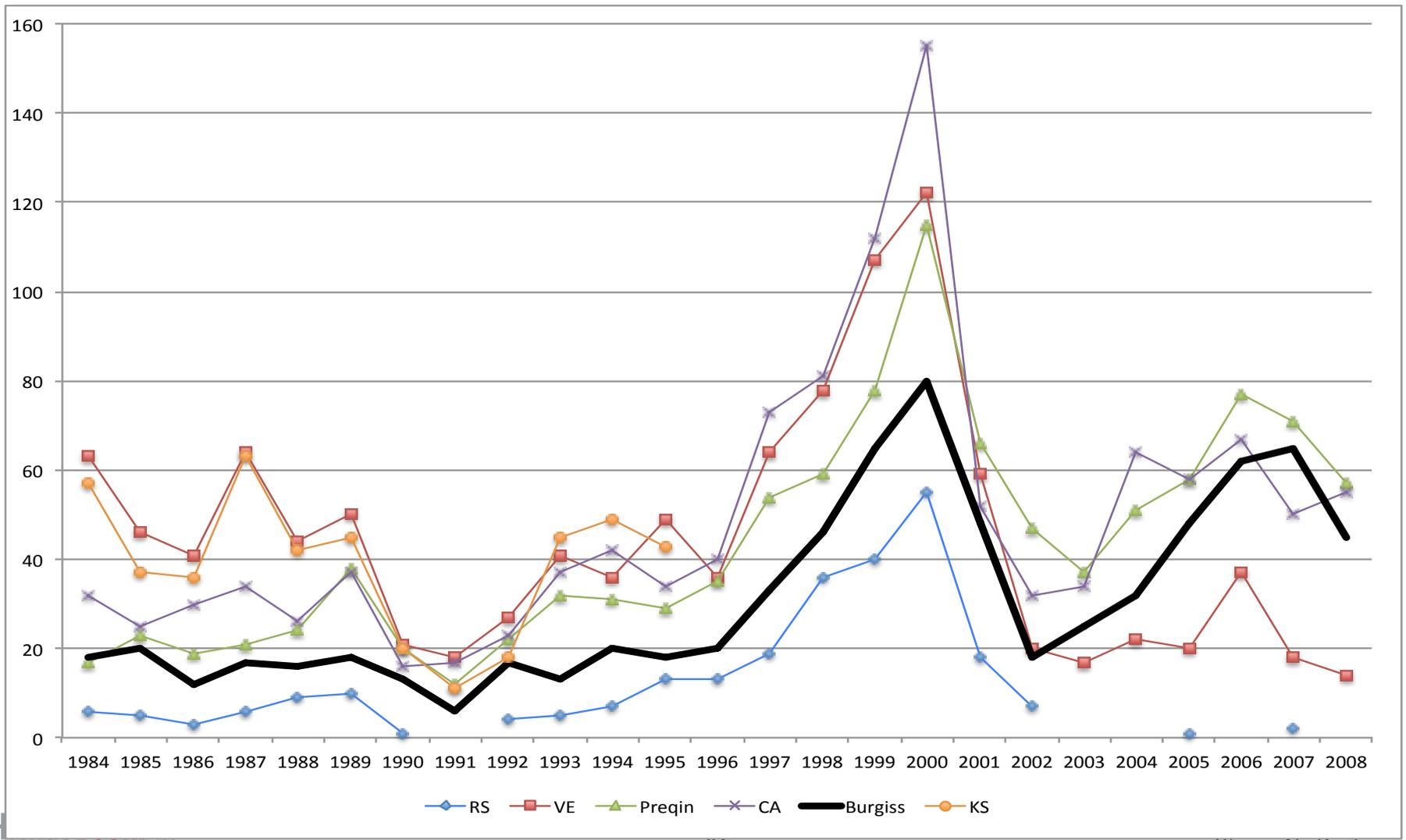
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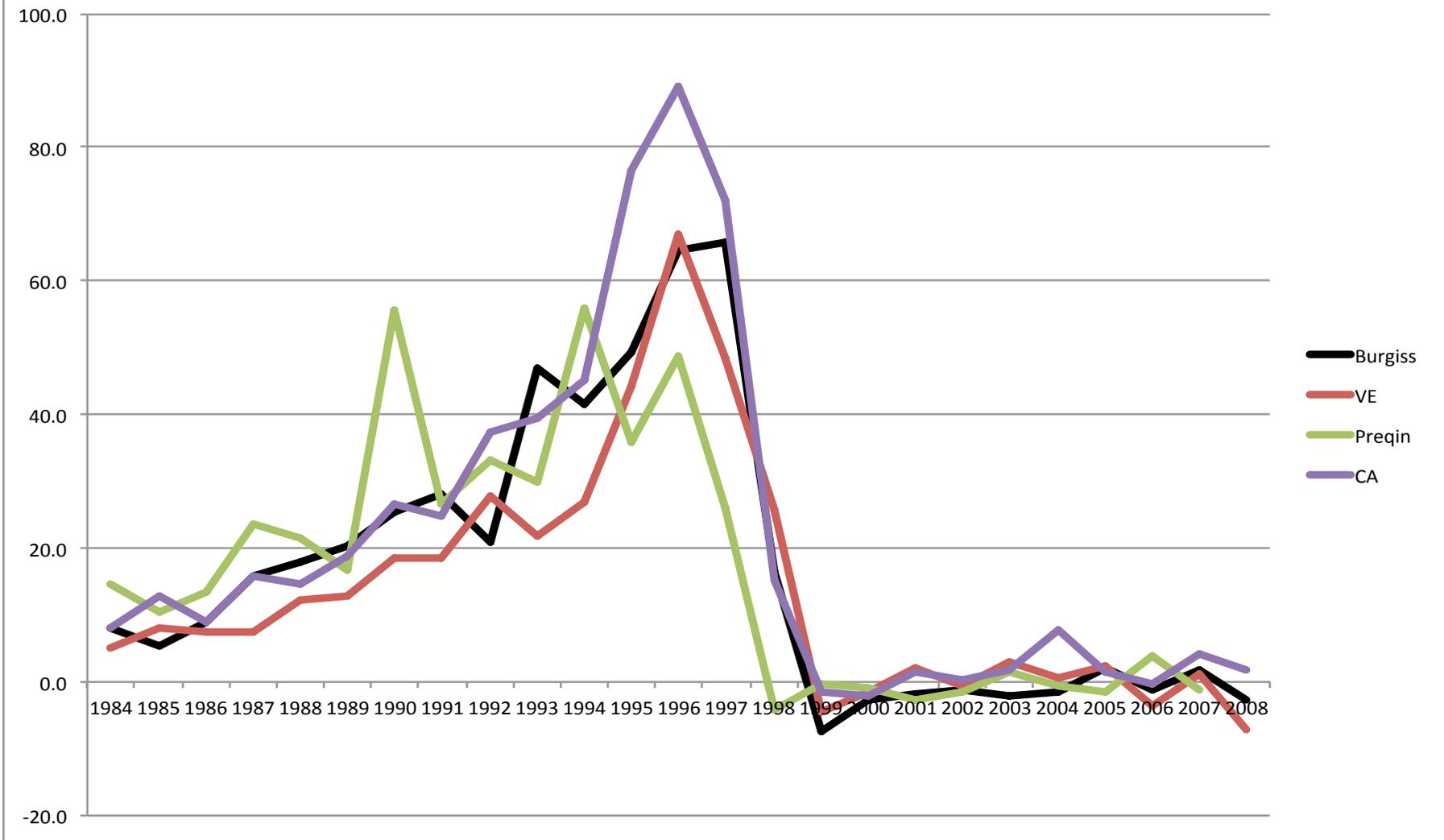


VC

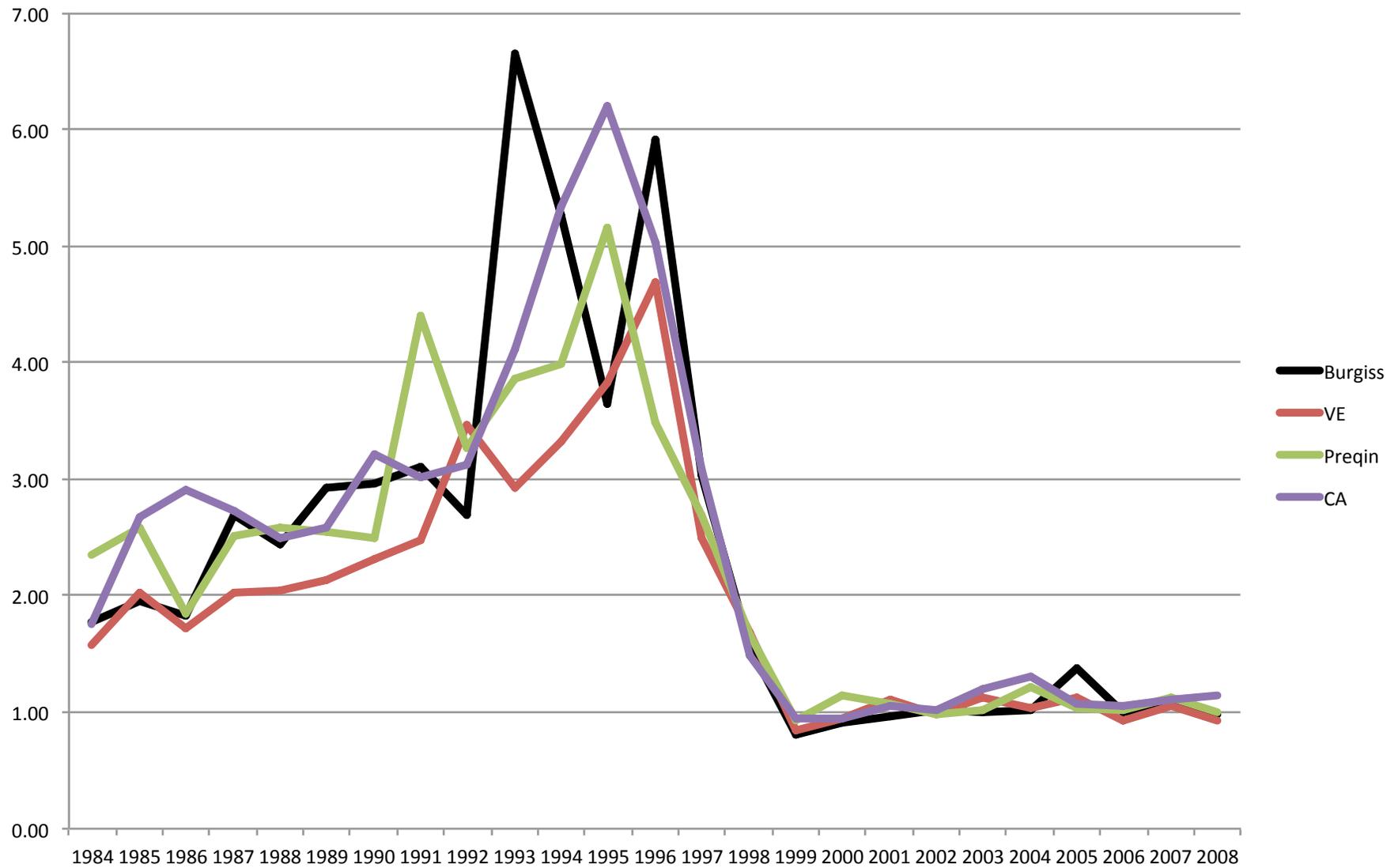
Number of VC Funds



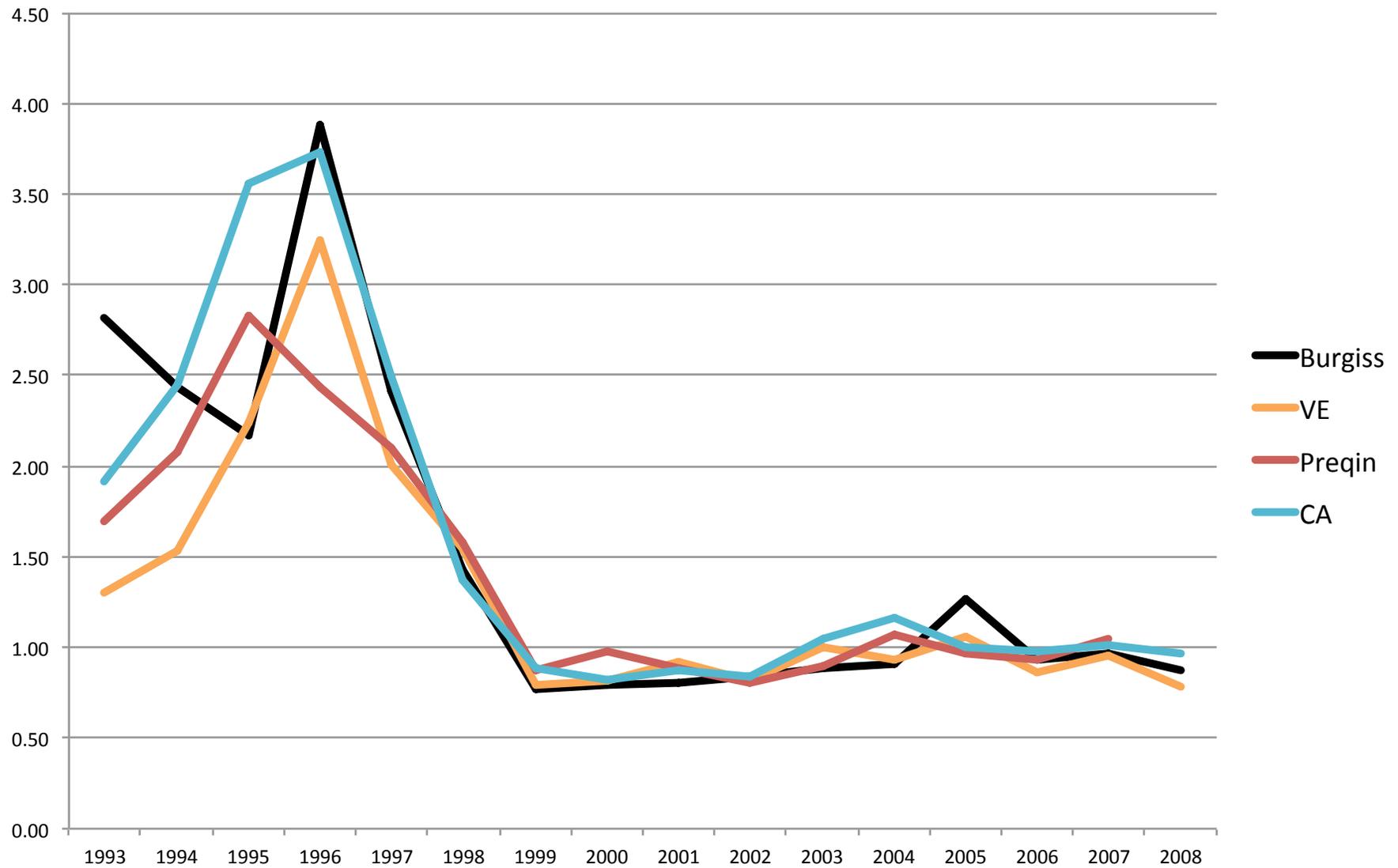
VC IRRs - Average



VC Multiples - Average



Estimated Average VC PME From Commercial Datasets



Do VC Funds Outperform Public Markets?

Panel B: Venture Capital Funds

Vintage	Weighted Average				Unweighted Average			
	Actual PME Burgiss	Actual PME Robinson- Sensoy	Implied PME Venture Economics	Implied PME Preqin	Actual PME Burgiss	Implied PME Venture Economics	Implied PME Preqin	Implied PME Cambridge Associates
1993	2.74	1.19	1.51	1.76	2.82	1.30	1.70	1.91
1994	2.86	1.87	2.18	3.14	2.44	1.53	2.08	2.45
1995	2.09	1.22	2.47	3.52	2.17	2.24	2.82	3.56
1996	4.17	1.27	3.21	1.75	3.89	3.25	2.44	3.73
1997	2.65	1.80	1.92	2.28	2.41	2.01	2.09	2.50
1998	1.48	1.54	1.61	1.64	1.43	1.55	1.58	1.37
1999	0.90	0.61	0.69	0.81	0.77	0.79	0.87	0.88
2000	0.85	0.71	0.92	0.90	0.80	0.82	0.98	0.82
2001	0.84	0.67	1.00	0.99	0.81	0.92	0.89	0.87
2002	0.88	0.85	0.80	0.91	0.84	0.81	0.80	0.84
2003	0.99		1.03	0.95	0.89	1.00	0.90	1.05
2004	0.96		0.97	1.06	0.91	0.94	1.07	1.16
2005	1.23	0.80	1.07	1.03	1.27	1.05	0.96	1.01
2006	0.97		0.93	0.97	0.93	0.86	0.94	0.98
2007	0.99		0.93	0.96	0.97	0.96	1.04	1.01
2008	0.84		0.85	0.89	0.87	0.78		0.97
<i>Average 2000s</i>	<i>0.95</i>		<i>0.94</i>	<i>0.96</i>	<i>0.92</i>	<i>0.90</i>	<i>0.95</i>	<i>0.97</i>
<i>Average 1993-99</i>	<i>2.41</i>	<i>1.36</i>	<i>1.94</i>	<i>2.13</i>	<i>2.28</i>	<i>1.81</i>	<i>1.94</i>	<i>2.34</i>

Overall return evidence

- IRRs, Multiples and PMEs vary substantially across vintage years.
 - PMEs well above 1.0 through 1998.
 - PMEs below 1.0 in the 2000s, particularly 1999 to 2002.
- Recent vintages are holding their own relative to the overall stock market.
- IRRs, Multiples and PMEs vary substantially within vantage year.
 - Even more so than PE.

Persistence in Performance:

- Top quartile performance is strong. Top 2 quartiles have PME's > 1.

Panel B : Venture Capital Funds					
B.1 Total Sample	Average IRR	Average MOIC	Average PME		
Current Fund					
Quartile PME					
1	42.3%	3.88	2.56	222	
2	12.4%	1.66	1.16	210	
3	2.7%	1.16	0.82	218	
4	-10.0%	0.69	0.49	206	
A.2 Pre-2001 Funds					
Current Fund					
Quartile PME					
1	59.8%	5.38	3.22	126	
2	17.1%	2.00	1.23	122	
3	5.1%	1.30	0.80	127	
4	-9.1%	0.67	0.39	117	
A.3 Post-2000 Funds					
Current Fund					
Quartile PME					
1	19.3%	1.91	1.70	96	
2	5.9%	1.19	1.05	88	
3	-0.7%	0.96	0.85	91	
4	-11.1%	0.70	0.61	89	

Persistence in Performance: Are there good GPs? Historically yes!

- There is persistence in overall sample, stronger than in PE:

	Current fund				Total funds	Average current fund			
	Top quartile 1	2	3	Bottom quartile 4		IRR	MOIC	PME	
Previous Fund	1	49% 71	21% 30	20% 29	11% 16	146	32.4%	3.22	2.17
	2	27% 38	32% 45	23% 32	17% 24	139	12.6%	1.77	1.30
	3	20% 25	30% 37	28% 35	22% 27	124	8.8%	1.66	1.13
	4	13% 12	19% 18	30% 28	38% 35	93	-0.2%	1.00	0.80
						502			
Not available, not first time	22% 48	21% 49	27% 65	30% 65	227	6.6%	1.49	0.93	
First time	24% 28	22% 31	24% 29	30% 39	127	11.7%	1.97	1.32	
						856			

Persistence in Performance: Are there good GPs? Historically yes!

- And strong in both periods, for both bottom and top performers.

B.2 Pre-2001 Funds		Current Fund Quartile				IRR	MIC	PME
Previous Fund Quartile PME	1	2	3	4				
1	49.4%	20.5%	16.9%	13.3%	100.0%	49.5%	4.58	2.85
	41	17	14	11	83	83	83	83
2	28.0%	32.0%	26.7%	13.3%	100.0%	18.8%	2.13	1.38
	21	24	20	10	75	75	75	75
3	27.0%	30.2%	22.2%	20.6%	100.0%	16.6%	2.24	1.34
	17	19	14	13	63	63	63	63
4	3.9%	23.5%	27.5%	45.1%	100.0%	-0.6%	0.97	0.69
	2	12	14	23	51	51	51	51
B.3 Post-2000 Funds								
Previous Fund Quartile PME	1	2	3	4				
1	47.6%	20.6%	23.8%	7.9%	100.0%	9.8%	1.42	1.28
	30	13	15	5	63	63	63	63
2	26.6%	32.8%	18.8%	21.9%	100.0%	5.3%	1.35	1.21
	17	21	12	14	64	64	64	64
3	13.1%	29.5%	34.4%	23.0%	100.0%	0.9%	1.07	0.92
	8	18	21	14	61	61	61	61
4	23.8%	14.3%	33.3%	28.6%	100.0%	0.4%	1.03	0.92
	10	6	14	12	42	42	42	42
at not First Time	25.9%	19.8%	22.2%	32.1%	100.0%	1.8%	1.07	0.93
	20	17	17	27	81	81	81	81
First Time	22.6%	20.8%	24.5%	32.1%	100.0%	2.7%	1.25	1.11
	11	13	12	17	53	53	53	53

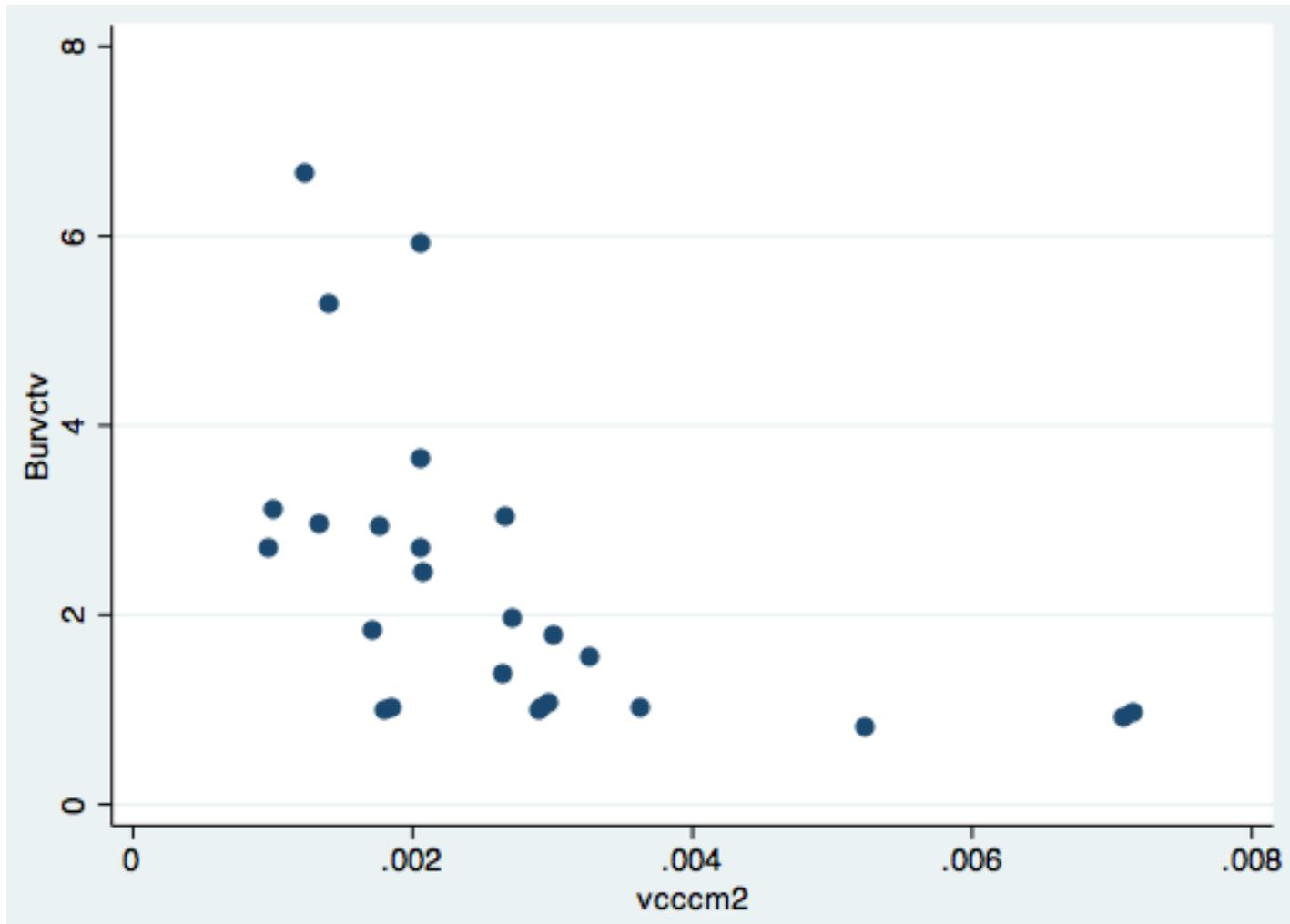
Persistence in Performance:

- Are there good GPs? Do the good GPs repeat?
 - Strong persistence in sample overall.
 - Strong persistence in both sub-periods.
 - » Top two quartiles beat S&P 500.
 - » Avoid bottom two quartiles.

Future Performance and Fundraising:

VC Funds		
IRR	Multiple	PME
-65.2**	-542.3***	-191.7*
[27.0]	[191.4]	[100.8]
0.37	3.93	1.97
[0.08]	[0.60]	[0.32]
25	25	25
0.20	0.26	0.14
om 1993 to 2008		
VC Funds		
IRR	Multiple	PME
-75.0*	-625.8**	-278.9**
[37.9]	[268.8]	[128.6]
0.43	4.39	2.48
[0.14]	[0.98]	[0.47]
16	16	16
0.22	0.28	0.25

Vintage Year Multiples vs. Capital Committed



Vintage Year PME vs. Capital Committed

