



# **Quantimentally PE**

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**A qualitative and quantitative look at why LBOs work – or why they don't –  
and what we can learn from the numbers**

***Chicago Booth School of Business  
November 2016***

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# Topics for Discussion

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- **Discuss qualitative reasons for “why LBO Private Equity works”**
- **Discuss (somewhat controversial) quantitative research suggesting that private equity performance may be replicable in public markets, at lower cost**
- **Given data-driven questions about the value of the asset class as a whole, discuss “what you have to believe” to have faith in private equity in general, or a single GP’s odds of success**



# Why LBO PE Works

Sources of Alpha		The Pitch
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	Diligence	<ul style="list-style-type: none"><li>Access to internal company data</li><li>Skilled analysts forecasting performance and multiple</li></ul>
	Ongoing Negotiations and Exit	<ul style="list-style-type: none"><li>Negotiating skill adds value (e.g., cap structure)</li><li>Create value by identifying the “right buyer” at exit (versus most companies reluctant to sell at all)</li></ul>
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	Leverage	<ul style="list-style-type: none"><li>Most companies structurally underlevered, due to managers’ lack of diversification</li><li>Diversified PE owners optimize portfolio leverage</li></ul>
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Thoughts?

# Why LBO PE Works



Sources of Alpha		The Pitch	One Man's Take
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	Diligence	<ul style="list-style-type: none"> <li>Access to internal company data</li> <li>Skilled analysts forecasting performance and multiple</li> </ul>	<ul style="list-style-type: none"> <li>Internal data is an advantage...</li> <li><u>...but very difficult to beat Mr. Market...</u></li> <li><u>...and in an auction, everyone has the data</u></li> </ul>
	Ongoing Negotiations and Exit	<ul style="list-style-type: none"> <li>Negotiating skill adds value (e.g., cap structure)</li> <li>Create value by identifying the "right buyer" at exit (versus most companies reluctant to sell at all)</li> </ul>	<ul style="list-style-type: none"> <li>Probably true</li> <li>Shades of grey with "Structural" topics below</li> <li><u>Getting paid for M&amp;A skill, not beating the market</u></li> </ul>
Structural	Operations	<ul style="list-style-type: none"> <li>Better compensation for better managers</li> <li>Equity-linked compensation aligns incentives</li> <li>Op Execs leveraged across portfolio</li> </ul>	<ul style="list-style-type: none"> <li>Great in theory – but evidence is mixed</li> <li>Harder as companies get larger</li> <li><u>Structural benefit of control– if done right</u></li> </ul>
	Leverage	<ul style="list-style-type: none"> <li>Most companies structurally underlevered, due to managers' lack of diversification</li> <li>Diversified PE owners optimize portfolio leverage</li> </ul>	<ul style="list-style-type: none"> <li><u>Material source of value</u></li> </ul>
	Long-Term Capital	<ul style="list-style-type: none"> <li>LP lock-ups (i) prevents undisciplined re-allocation; (ii) allows long-term investments; (iii) forces tolerance for volatility (levered equities)</li> <li>Stable capital allows CEO to focus on operations</li> </ul>	<ul style="list-style-type: none"> <li>Real value if can time and withstand the cycle</li> <li><u>PE track record mixed, especially large-cap,</u></li> </ul>

# Why LBO PE Works



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# Private markets are not always better than public ones

**Returns have been better in public real estate than private real estate – the opposite of equities**

Figure 1 Private vs. Public Real Estate and Private Equity Indices

Index	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	25-Year
CA US Private Equity Index	8.8%	16.2%	16.0%	12.6%	10.6%	13.5%	13.6%
S&P500	7.4%	17.3%	17.3%	7.9%	4.4%	8.9%	9.5%
<i>Outperformance</i>	<i>1.4%</i>	<i>-1.1%</i>	<i>-1.4%</i>	<i>4.7%</i>	<i>6.2%</i>	<i>4.6%</i>	<i>4.0%</i>
Index	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	25-Year
CA Real Estate Index	13.4%	13.9%	13.2%	5.6%	6.8%	7.3%	7.1%
FTSE NAREIT All Equity Index	4.1%	9.1%	14.4%	7.1%	11.3%	10.9%	11.2%
<i>Outperformance</i>	<i>9.3%</i>	<i>4.9%</i>	<i>-1.2%</i>	<i>-1.4%</i>	<i>-4.5%</i>	<i>-3.6%</i>	<i>-4.1%</i>

**And public markets are now cheaper than private markets for equities**

Figure 2 – EV/EBITDA multiples for private and public equity markets

	2010	2011	2012	2013	2014
Private Equity	8.2x	8.5x	8.4x	10.2x	10.7x
S&P500	8.8x	8.4x	8.2x	9.1x	9.9x
<i>Premium (Discount)</i>	<i>-7%</i>	<i>1%</i>	<i>3%</i>	<i>11%</i>	<i>8%</i>

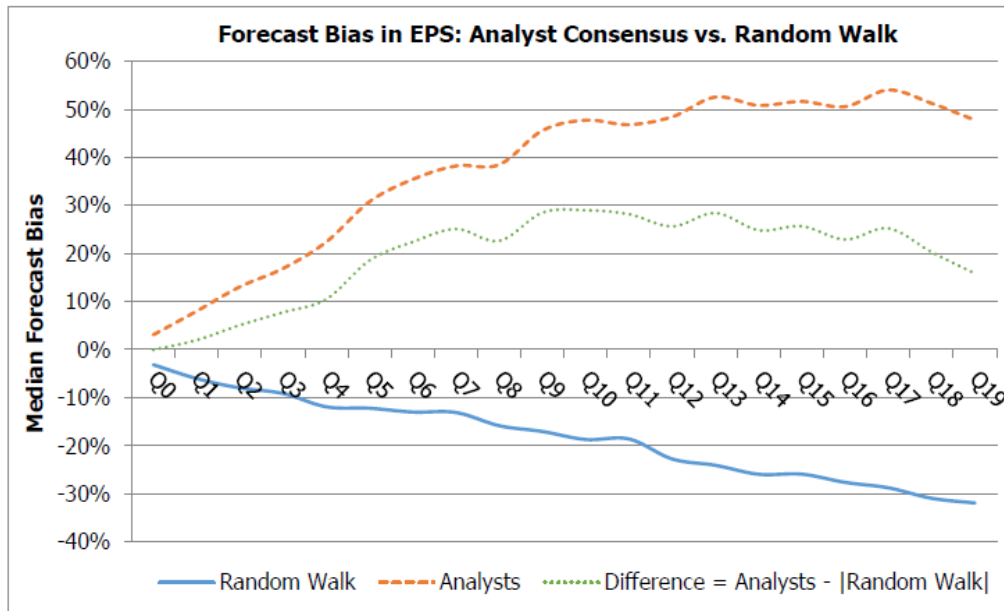
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# Predicting EBITDA 2-5 years out is impossible



Source: Evans et al (2012)

- Investment analysts are too optimistic
- Investment analysts are worse than random walk at predicting growth outside of a one year forecast horizon
- Large scale studies by Tetlock and others suggest that forecasting almost anything one year out is nearly impossible

***This study has been replicated at several large buyout shops and the results are the same: past one year, growth predictions have worse predictive accuracy than random walk***



# Mean reversion analysis in forecasting multiples

	2001	2002	2003	2004	2005
<b>Top Decile</b>	38.1x	19.0x	20.6x	16.0x	13.9x
2	21.1x	13.7x	15.3x	13.0x	12.9x
3	15.3x	11.4x	12.9x	12.0x	12.3x
4	12.7x	10.9x	11.6x	11.3x	12.1x
<b>Mean</b>	11.0x	10.2x	11.2x	10.5x	10.7x
6	9.6x	8.7x	9.4x	9.6x	9.9x
7	8.4x	7.6x	8.4x	8.4x	8.7x
8	7.4x	6.9x	7.7x	7.9x	8.1x
9	6.2x	6.3x	7.3x	7.3x	8.0x
<b>Bottom Decile</b>	4.3x	4.6x	5.3x	5.7x	6.3x

- EBITDA multiples are strongly mean reverting
- Correlation of a company's EBITDA multiple at year 1 to year 0 is 55%, from year 2 to year 0 is 40%, from year 3 to year 0 is 14%, and it declines to 11% by year 4.
- Shiller's work on excess volatility suggests that multiples vary 5-15x more than they should. This is not a rational predictable time series!

***Exit multiples wag the dog in most LBO models, and current comp sets are not good predictors of future multiples. Predicting multiples 3-5 years out is even more difficult than predicting EBITDA!***



# Investing in “quality” is a non-falsifiable hypothesis

**Counterargument: Okay, what if we agree that PE analysts can’t predict EBITDA and can’t predict multiples, but what if they select businesses that outperform by applying the insights from competitive strategy and business quality?**

## Morningstar Evidence

- For over a decade, Morningstar has rated every stock in their coverage universe by size and type of “competitive moat”
- Chief quantitative strategist said the metric provided no alpha in large scale quant regressions and was not a useful variable for quant investing

## BCG Strategy Evidence

- Subjects (n = 1015) asked to choose between investments that would either double or decline 50%
- Of subjects exposed to the BCG matrix, 64% selected the unprofitable investment.
- Of subjects who used the BCG matrix in their analysis, 87% selected the less profitable investment.

## Verdad Evidence

- PE firms confused about quality
- Higher purchase prices for higher margins, but missing the GP/Assets importance

EBITDA Multiple	GP Margin	GP/ Assets
Q1 (5.2x)	29%	24%
Q2 (7.5x)	29%	26%
Q3 (9.8x)	35%	28%
Q4 (14.3x)	42%	22%

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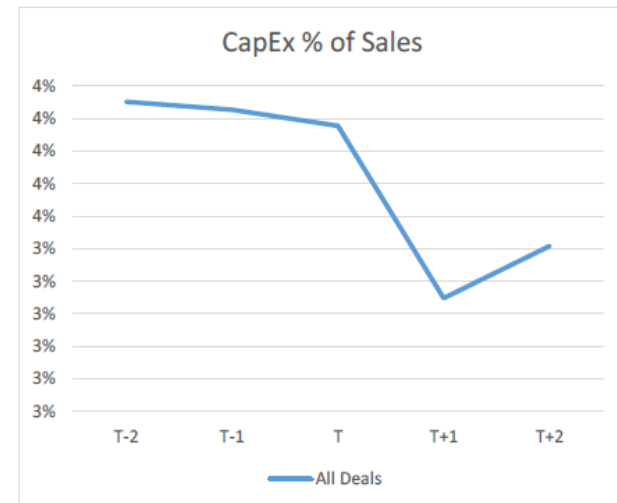
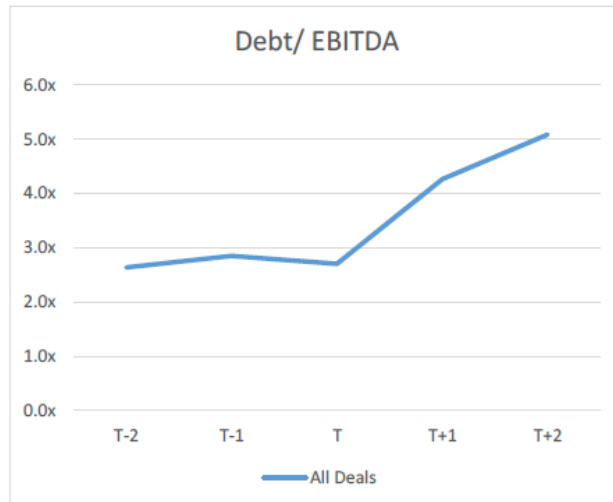
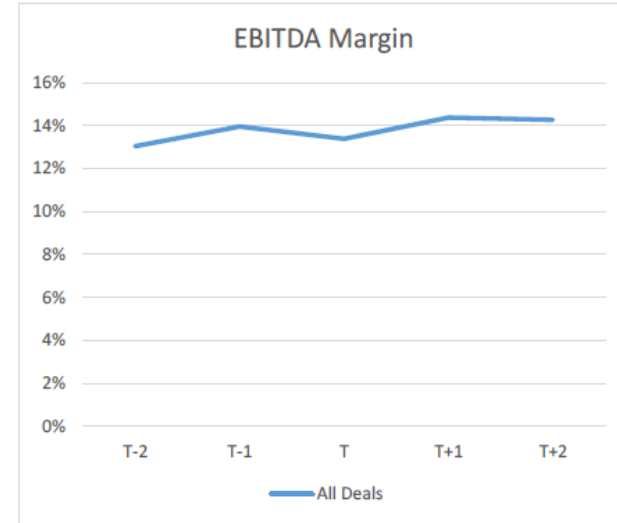
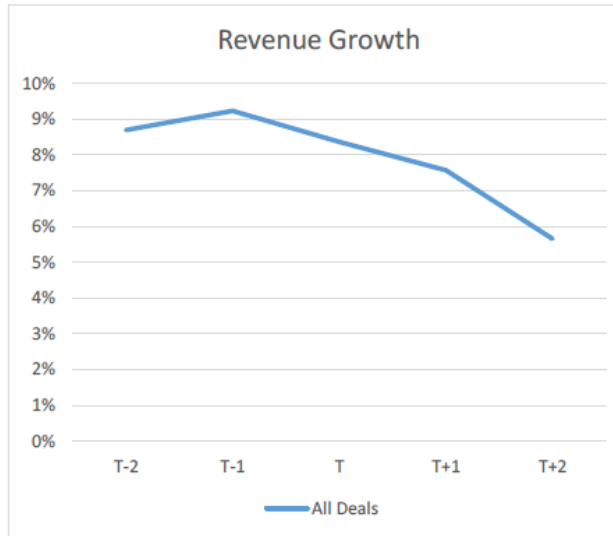


# No systematic evidence for operational value add

What happens  
when PE firms  
buy  
companies?

What changes  
operationally?

Verdad Study  
of N=390 deals  
& >\$700B in  
EV, data from  
companies that  
issued publicly  
traded debt



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	Long-Term Capital	<ul style="list-style-type: none"> <li>LP lock-ups (i) prevents undisciplined re-allocation; (ii) allows long-term investments; (iii) forces tolerance for volatility (levered equities)</li> <li>Stable capital allows CEO to focus on operations</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>



# Leverage explains the rest

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- In our paper, “Leveraged Small Value Equities,” we found that selecting the small value stocks with leverage levels (Net Debt/EV) equivalent to private equity produced returns comparable to the gross returns of PE
- In essence, we explain PE outperformance through 5 factors:
  - **Size:** smaller companies have higher expected returns
  - **Value:** cheaper companies have higher expected returns
  - **Leverage levels:** more leveraged companies have higher expected returns
  - **Debt paydown:** companies paying down debt do better than ones issuing debt
  - **Asset turnover:** growth in revenue/assets helps sort the good from the bad
- Of these, the most important is the combination of high leverage with debt paydown. We used machine learning techniques to prove that the best predictor of debt paydown is historic debt paydown
- The essence of our approach is to capture the magic of private equity by using quantitative methods to test simple logical propositions and then develop an investment strategy that combines fundamental logic with empirical proof



# Size + value partially explain PE outperformance

## Phalippou (2012): “Performance of buyout funds revisited?”

- 95% of the 5,316 buyout transactions in Capital IQ have an enterprise value below \$1.08 billion
- Largest stock in Fama-French’s small-cap index had a market capitalization of ~\$1 billion (in 2011)
- **Therefore, over 95% of LBO transactions would fall within the Fama-French small-cap index**
- LBO targets tend to be “value” firms more than “growth” companies
- Therefore, a small-value index should be the most appropriate public benchmark for PE

### Buyout Fund Performance versus Mutual Funds

Benchmark (Ticker)	Vanguard S&P 500 (VFINX)	DFA U.S. Micro-Cap (DFSCX)	DFA U.S. Small-Value (DFSVX)
Mean PME	1.20	1.04	1.00
Median PME	1.14	0.99	0.96
Std-error	0.02	0.02	0.02
<b>t-stat</b>	<b>8.85</b>	<b>1.83</b>	<b>0.23</b>





# We then added leverage to test its importance

**Universe Selection:** Annual independent sorts on size, value and leverage for all stocks in the NYSE, AMEX and NASDAQ from 1965 to 2013. Portfolios are formed on March 31 of each year, using accounting fundamentals from the prior calendar year.

## Size: Market Cap

Q4 (Largest)
3rd Quartile
2nd Quartile
Q1 (Smallest)

## Value: EBITDA/EV

Q4 (Cheapest)
3rd Quartile
2nd Quartile
Q1 (Expensive)

## Leverage: LT Debt/EV

Q4 (High Leverage)
3rd Quartile
2nd Quartile
Q1 (Low Leverage)

## Universe of Leveraged Small Value Stocks

### Leveraged Small Value Universe: 1965-2013

	EBITDA/ EV	LT Debt/ EV	Gross Profit/ Assets	LT Debt/ Assets
Mean	22.7%	38.8%	33.2%	25.8%
Standard Deviation	14.6%	18.7%	24.5%	17.0%
10th Percentile	14.1%	16.7%	5.6%	5.4%
25th Percentile	16.5%	23.7%	16.2%	14.8%
Median	20.0%	35.7%	28.9%	23.7%
75th Percentile	25.6%	50.9%	43.7%	34.0%
90th Percentile	33.5%	65.6%	61.9%	46.7%
Number of Stocks	15,607	15,607	15,607	15,607

### Market Cap Distribution of Small Stocks in 2013

*\$ in mil*

Variable	Obs	Mean	Median	Std. Dev.
Market Cap	2,574	\$715.38	\$500.66	\$611.07



# We then found the factors that most mattered

**Factor Selection:** We regressed the *Next 1 Year Return* of universe stocks on the factors in our model using a time fixed-effects regression

- Five variables were statistically significant at the 10% level

# Variable	Coefficient	t-statistic
1 Debt Paydown	0.0362	2.84
2 $\ln(\text{LT Debt}/\text{EV})$	0.1891	2.21
3 Asset Turnover	0.0265	2.20
4 $\ln(\text{Market Cap})$	-0.0152	-1.91
5 $\ln(\text{EBITDA}/\text{EV})$	0.1166	1.90
6 $\ln(\text{Share Turnover})$	-0.0146	-1.48
7 PY Return Below Median	0.0162	1.46
8 $\ln(\text{EBITDA}/\text{EV}) \times \ln(\text{LT Debt}/\text{EV})$	0.0677	1.37
9 Gross Profit/Assets	0.0310	1.18
10 LT Debt/Assets	-0.0505	-0.84
11 Share Repurchases	0.0007	0.05

$R^2$	19.6%
Number of obs	14,511

# Machine learning confirmed our “deleveraging” theory

- Randomly split all NYSE/AMEX/NASDAQ data from 1965 - 2012 into a training sample (60% of observations), validation sample (20%), and a test sample (20%)

Future Debt Paydown	0	1	% of $Y = 1$
Training Sample	95,069	56,765	37%
Validation Sample	31,843	18,696	37%
Test Sample	31,742	18,851	37%

- Train algorithms with debt pay down over the next year (1 or 0) as the Y variable

e.g. **Logit model:** 
$$p(Y = 1|X) = \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_N X_N}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_N X_N}}$$

	Estimate	Std. Error	z value	Pr(> z )	
(Intercept)	-1.08E+00	1.42E-02	-75.45	< 2e-16	***
Prior Debt Paydown	7.88E-01	1.28E-02	61.71	< 2e-16	***
LT Debt/EV	1.59E+00	2.78E-02	57.03	< 2e-16	***
Asset Turnover	-4.43E-02	1.27E-02	-3.50	0.000473	***
Market Cap	-1.13E-06	5.84E-07	-1.93	0.053529	.
EBITDA/EV	8.95E-02	2.21E-02	4.06	4.97E-05	***
Gross Profit/Assets	1.52E-01	1.91E-02	8.00	1.25E-15	***
Prior 1 Year Return	9.73E-03	3.66E-03	2.66	0.007783	**

Signif. codes: 0 '\*\*\*' | 0.001 '\*\*' | 0.01 '\*' | 0.05 '.'

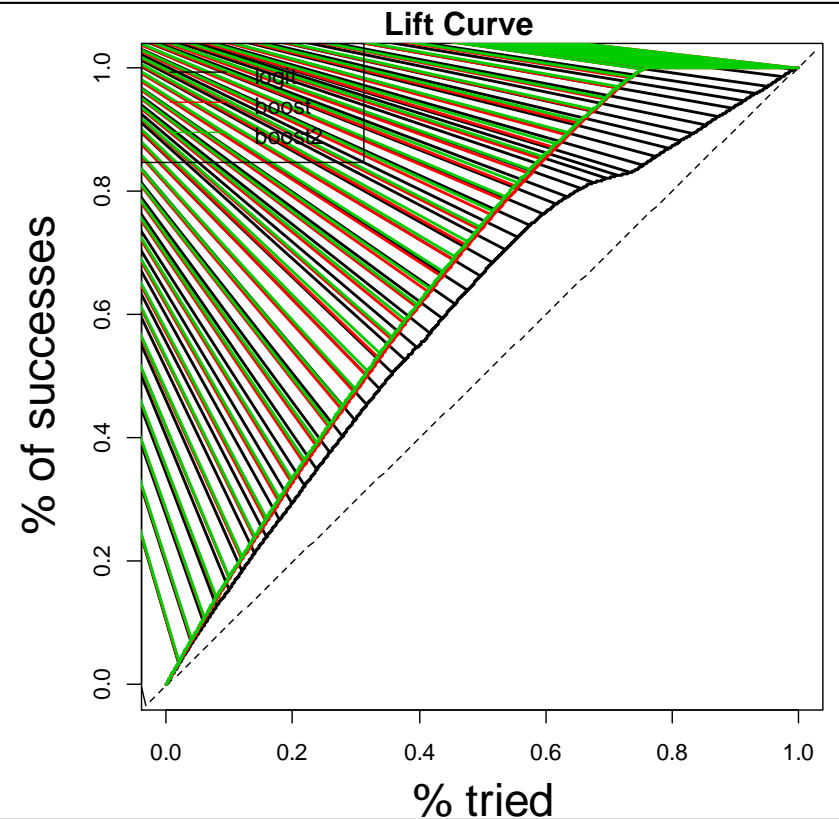
# Our models predict effective capital allocation

- Apply algorithms (logit and boost) to the validation set to get out of sample predictions ( $\hat{p}$ )
- Classify all  $\hat{p} > 0.37$  as “1”
- Compare the accuracy of our predictions to the actual values of Y in the validation sample:

**Matrix of Predictions and Outcomes  
(Boosting Model)**

	Actual	
	0	1
Predicted 0	15,492	1,483
Predicted 1	16,093	17,315

- 32,807 correct predictions out of 50,383 obs
- **65%** accuracy in predicting debt paydown
- This is better than a coin flip



- Predictive accuracy will likely improve with additional machine learning techniques



# We achieved returns $\geq$ PE's avg. gross returns...

---

## Value-Weighted Portfolio Returns

The ranking system appears to be robust in terms of identifying winners and losers in the universe of leveraged small-value stocks

- Based on weighted scores of fundamentals, our algorithm assigns better ranks to stocks that have higher expected returns
- Worse ranks are assigned to the least attractive stocks that have lower expected returns

	<b>Top 25</b>	<b>Top 50</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>
<b>Value-Weighted</b>	<b>Portfolios</b>	<b>Portfolios</b>	<b>Portfolios</b>	<b>Portfolios</b>	<b>Portfolios</b>	<b>Portfolios</b>
Average Annual Return	25.1%	23.0%	22.0%	16.7%	15.7%	11.6%
Standard Deviation	39.4%	40.0%	41.9%	34.2%	29.5%	27.1%
Sharpe Ratio	0.51	0.45	0.40	0.34	0.36	0.24
Annualized Return	19.7%	17.9%	16.9%	12.5%	12.5%	8.6%

# ... With significant risk-adjusted performance

## Summary

- Our factor analysis uses the 3 Fama-French factors, momentum and the traded Pástor-Stambaugh liquidity factor
- Portfolios do not have a statistically significant beta to the liquidity risk factor (despite being formed with a tilt towards stocks with low share turnover)
- All three value-weighted portfolio series have positive risk-adjusted returns that are statistically significant at the 5% level

Regression:	(21)	(22)	(23)
<b>Dependent Variable:</b>	<b>Portfolio Excess Return Above 30-Day T-Bill (<math>R_P - R_F</math>)</b>		
	<b>Top 25 Portfolios</b>	<b>Top 50 Portfolios</b>	<b>Q1 Portfolios</b>
<b>Factors (<math>\beta</math>)</b>			
MKT ( $R_M - R_F$ )	1.46 (7.95)	1.46 (9.27)	1.41 (8.29)
SMB	1.09 (3.94)	1.13 (4.72)	1.09 (4.24)
HML	0.55 (2.25)	0.66 (3.17)	0.77 (3.42)
MOM	-0.77 (-3.10)	-0.91 (-4.26)	-1.11 (-4.78)
LIQ	-0.26 (-0.98)	-0.10 (-0.45)	-0.34 (-1.34)
<b>Intercept (<math>\alpha</math>)</b>	<b>13.06%</b> <b>(2.77)</b>	<b>10.92%</b> <b>(2.69)</b>	<b>12.33%</b> <b>(2.81)</b>
$R^2$	78.88%	84.57%	83.36%
Number of obs	46	46	46



# Benchmarking the Leveraged Small Value Strategy

Regression:	(13a)	(13b)	(14)	(15)	(16)	(17)
Dependent Variable:	Portfolio Excess Return Above 30-Day T-Bill ( $R_p - R_f$ )					
Benchmark ( $R_B - R_f$ ):	F-F Small Value	F-F Small Value	CRSP Small Value	S&P 500	Russell 2000	CA Private Equity*
Time Horizon:	1965 - 2013	2002 - 2013	2002 - 2013	1965 - 2013	1995 - 2013	1987 - 2013
Top 25 Portfolios ( $\beta$ )	1.33 (12.08)	1.53 (8.93)	1.83 (9.05)	1.56 (6.71)	1.90 (4.04)	1.27 (1.95)
Intercept	0.97% (0.29)	21.41% (2.99)	20.34% (2.86)	10.15% (2.30)	18.55% (1.82)	12.37% (1.07)
<b>R<sup>2</sup></b>	<b>75.63%</b>	<b>88.85%</b>	<b>89.12%</b>	<b>48.95%</b>	<b>48.99%</b>	<b>13.15%</b>
Number of obs	49	12	12	49	19	27
Top 50 Portfolios ( $\beta$ )	1.39 (14.10)	1.65 (9.41)	1.96 (9.30)	1.57 (6.71)	1.82 (3.55)	1.11 (1.65)
Intercept	-1.88% (-0.64)	10.45% (1.43)	9.37% (1.26)	8.02% (1.80)	14.98% (1.35)	10.79% (0.90)
<b>R<sup>2</sup></b>	<b>80.87%</b>	<b>89.85%</b>	<b>89.64%</b>	<b>48.90%</b>	<b>42.62%</b>	<b>9.82%</b>
Number of obs	49	12	12	49	19	27
Q1 Portfolios ( $\beta$ )	1.41 (12.35)	1.74 (7.75)	2.07 (7.56)	1.53 (5.93)	1.79 (3.03)	0.84 (1.15)
Intercept	-3.14% (-0.93)	5.76% (0.62)	4.69% (0.49)	7.26% (1.48)	9.52% (0.74)	11.53% (0.89)
<b>R<sup>2</sup></b>	<b>76.44%</b>	<b>85.72%</b>	<b>85.09%</b>	<b>42.83%</b>	<b>35.01%</b>	<b>5.06%</b>
Number of obs	49	12	12	49	19	27

\* Cambridge Associate's PE benchmark is net of fees, which makes it less comparable to the other benchmarks



- **Potential implications**





# But don't the best firms outperform?

## Results are volatile but strong...



- \$4 billion / 1997
- 9% net IRR

- \$4 billion / 2000
- 38% net IRR



- \$2 billion / 1999
- 25% net IRR

- \$4 billion / 2003
- 11% net IRR



- \$3 billion / 2000
- 24% net IRR

- \$5 billion / 2003
- 16% net IRR



- \$3 billion / 2001
- 30% IRR

- \$4 billion / 2004
- 12% IRR

***These guys have earned their reputation.....***



# But don't the best firms outperform?

## Results are volatile but strong...

## ...still volatile, at least...



- \$4 billion / 1997
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- \$4 billion / 2000
- 38% net IRR

- \$10 billion / 2005
- 10% net IRR

- \$15 billion / 2007
- 26% net IRR



- \$2 billion / 1999
- 25% net IRR

- \$4 billion / 2003
- 11% net IRR

- \$10 billion / 2006
- 18% net IRR

- \$8 billion / 2012
- 52% net IRR



- \$3 billion / 2000
- 24% net IRR

- \$5 billion / 2003
- 16% net IRR

- \$15 billion / 2006
- 3% net IRR

- \$19 billion / 2007
- 12% net IRR



- \$3 billion / 2001
- 30% IRR

- \$4 billion / 2004
- 12% IRR

- \$10 billion / 2006
- 8% net IRR

- \$11 billion / 2007
- 7% net IRR

***If “Past performance is not indicative of future success”, what is?***



# But don't the best firms outperform?

## Results are volatile but strong...

Fund A	Fund B
--------	--------

- |                      |                      |
|----------------------|----------------------|
| ▪ \$4 billion / 1997 | ▪ \$4 billion / 2000 |
| ▪ 9% net IRR         | ▪ 38% net IRR        |

## ...still volatile, at least...

Fund C	Fund D
--------	--------

- |                       |                       |
|-----------------------|-----------------------|
| ▪ \$10 billion / 2005 | ▪ \$15 billion / 2007 |
| ▪ 10% net IRR         | ▪ 26% net IRR         |



SILVERLAKE



BainCapital

*What can we learn from the data?*

*How much shall we credit variations in (i) skill; (ii) luck; or (iii) changes in firm methods / culture over time?*

*How much can we attribute to the nature of a small-n portfolio of highly levered equity assets?*

- \$8 billion / 2012
- 52% net IRR

- \$19 billion / 2007
- 12% net IRR

- |                      |                      |                       |                       |
|----------------------|----------------------|-----------------------|-----------------------|
| ▪ \$3 billion / 2001 | ▪ \$4 billion / 2004 | ▪ \$10 billion / 2006 | ▪ \$11 billion / 2007 |
| ▪ 30% IRR            | ▪ 12% IRR            | ▪ 8% net IRR          | ▪ 7% net IRR          |

***If “Past performance is not indicative of future success”, what is?***

# Still, there is hope....

---



- If LPs can mimic net returns from the average PE GP with a public strategy, how can we identify GPs with potential to outperform?
- **Outperformance comes where (i) effective markets don't exist; or (ii) GPs "get paid for" something other than beating Mr. Market**
  - Statistics around the "average firm" do not necessarily deny the existence of firms that consistently generate alpha
  - Where markets don't exist, you don't have to beat them!



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	Market Avoidance	Irreplicable Alpha
▪ <u>Smaller equity checks</u> are good, if more volatile	▪ Less effective / comprehensive research and sell-side activity	▪ Lower-quality management pre-close ▪ "Jetski versus Titanic" dynamics
▪ <u>Structurally-advantaged sourcing is good</u>	▪ Exclusive and proprietary processes are rare, but avoid market dynamics	▪ Correlated with ability of control investors to add operational value (e.g., leads to carve-outs, restructuring)
▪ <u>Businesses at a point of inflection are good</u>	▪ n/a	▪ Often need new management ▪ Investors require control to implement
▪ <u>Betting you can beat the market is bad</u>	▪ n/a	▪ n/a
▪ <u>Honest operations- and M&amp;A-led theses are good</u>	▪ n/a	▪ Definition of getting paid for something only available to control investors
▪ <u>Smaller equity checks</u> are good, if more volatile	▪ Less efficient markets due to less effective/comprehensive research and sell-side activity	▪ Operational value-add more credible due to lower-quality management, and "jetski versus Titanic" dynamics



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- Nothing can guarantee success, but brutal honesty about "what we're getting paid for" provides a fighting chance
  - "The 60<sup>th</sup> percentile becomes the 90<sup>th</sup>" - high-volatility strategies produce high-volatility outcomes, but everybody reverts

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▪ <u>Businesses at a point of inflection</u> are good	▪ n/a	
▪ <u>Betting you can beat the market</u> is bad	▪ n/a	▪ n/a
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Other thoughts?



- **Backup**





# Benchmarking Private Equity

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## Phalippou (2012): “*Performance of buyout funds revisited?*”

- Uses Preqin data to analyze the cashflows and NAVs of 392 U.S. buyout funds
- Applies a Public Market Equivalent (PME) methodology to evaluate performance

$$PME = \frac{\text{Present value of cash distributions (plus last reported NAV)}}{\text{Present value of cash invested}}$$

*Discount rate is based on the return of the benchmark (e.g. S&P 500)*

- On average, private equity outperforms Vanguard's S&P 500 index (mean PME of 1.20)
  - The equates to an annualized outperformance of ~5.7% per year
  - Similar to the results of other studies that compare PE to the S&P 500: Robinson and Sensoy (2011), Harris, Jenkinson and Kaplan (2012), and Higson and Stucke (2012)
- But are large stocks in the S&P 500 comparable to PE investments?
  - 95% of the 5,316 buyout transactions in Capital IQ have an enterprise value below \$1.08 billion
  - Largest stock in Fama-French's small-cap index had a market capitalization of ~\$1 billion (in 2011)
  - **Therefore, over 95% of LBO transactions would fall within the Fama-French small-cap index**



# Ranking Universe Stocks into Portfolios

**Annual Portfolios:** Based on the results of the previous regression, we developed a ranking system for creating annual portfolios of leveraged small value stocks

- Portfolios included: (i) Top 25 ranked stocks, (ii) Top 50 stocks, (iii) Q1 to Q4 portfolios

## Comparison of portfolio returns against the market (equal-weighted)

- In the table below, we regressed the Next 1 Year Return against a binary variable that indicates a universe stock's portfolio assignment

$$\text{Next 1 Year Return} = \alpha + \beta * \text{Portfolio} + \varepsilon$$

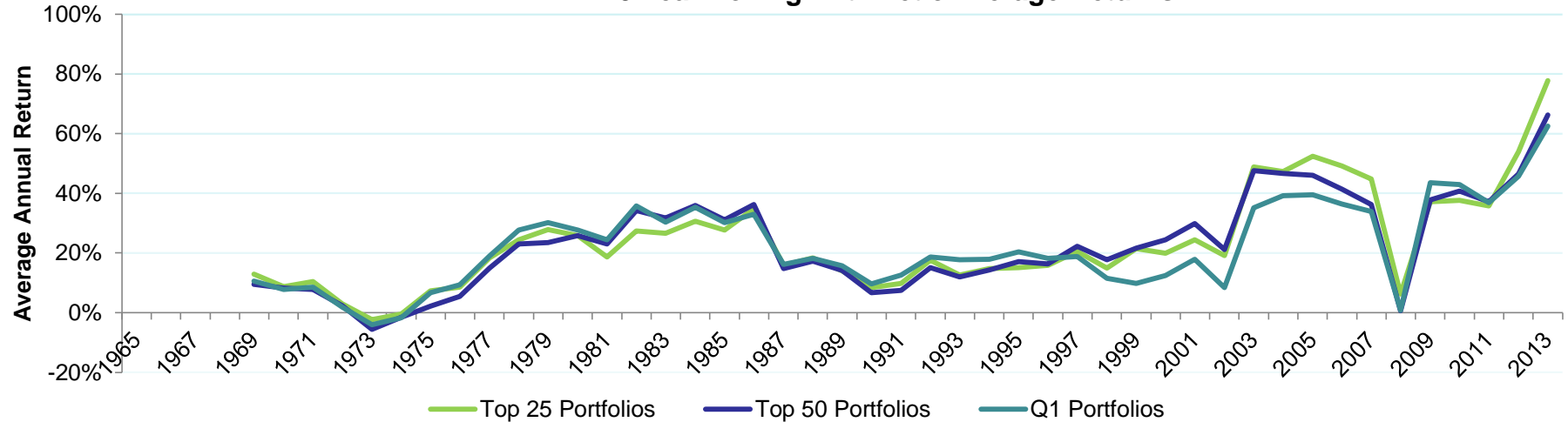
- The regressions capture all NYSE/AMEX/NASDAQ stocks in our database

Regression:	(7)	(8)	(9)	(10)	(11)	(12)
Scope of Analysis:	<i>All Stocks</i>					
Dependent Variable:	Next 1 Year Return					
Binary Indep. Variable:	Top 25 Portfolios	Top 50 Portfolios	Q1 Portfolios	Q2 Portfolios	Q3 Portfolios	Q4 Portfolios
Coefficient	0.1172 (4.65)	0.0916 (4.90)	0.0906 (5.65)	-0.0010 (-0.07)	-0.0006 (-0.05)	-0.0357 (-3.59)
Intercept	0.1555 (42.77)	0.1552 (42.49)	0.1547 (42.17)	0.1561 (42.54)	0.1561 (42.52)	0.1567 (42.64)
R <sup>2</sup>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of obs	232,694	232,694	232,694	232,694	232,694	232,694



# Importance of a Long Term Perspective

## 5 Year Rolling Arithmetic Average Returns



## 10 Year Rolling Arithmetic Average Returns

