



# PRIVATE EQUITY, LEVERAGE, AND INCENTIVES

PER STRÖMBERG

STOCKHOLM SCHOOL OF ECONOMICS & SWEDISH HOUSE OF FINANCE

Bank of Finland-CEPR conference on  
"Entrepreneurial finance, innovation, and growth"

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# OVERVIEW

1. Why are buyouts leveraged? Theory
  - Optimal capital structure: discipline and taxes
  - Result of GP incentive scheme
  
1. Why are buyouts leveraged? Empirics
  - Determinants of LBO capital structure vs public firms
  - Leverage and transaction prices
  - Leverage and LP returns
  
2. Leverage and financial distress:
  - PE vs non-PE-backed firms

Concentrated

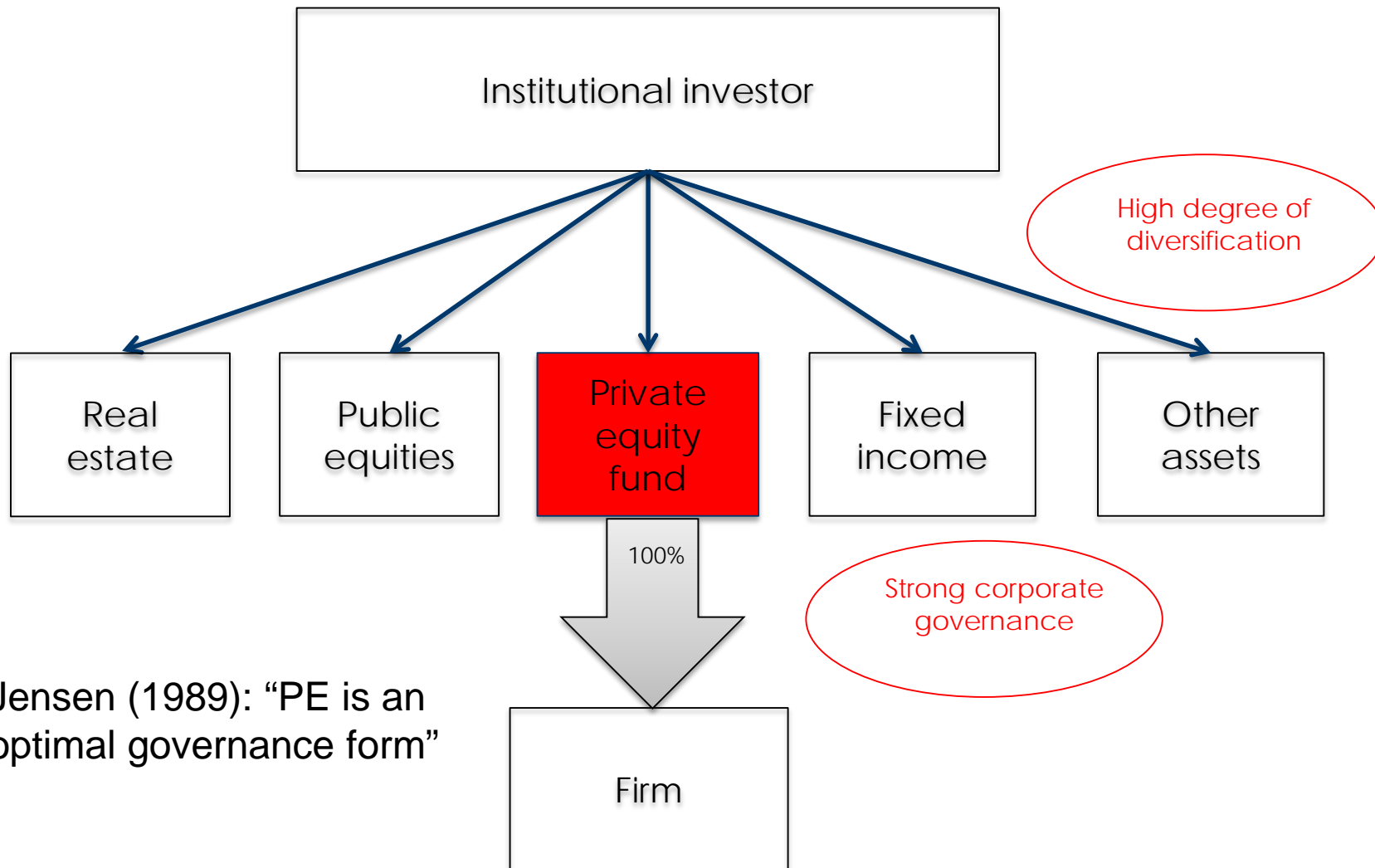
Dispersed



+ Strong governance  
- Low diversification / high cost of capital

- Weak governance  
+ High diversification / low cost of capital

Possibly exacerbated by increased institutional ownership



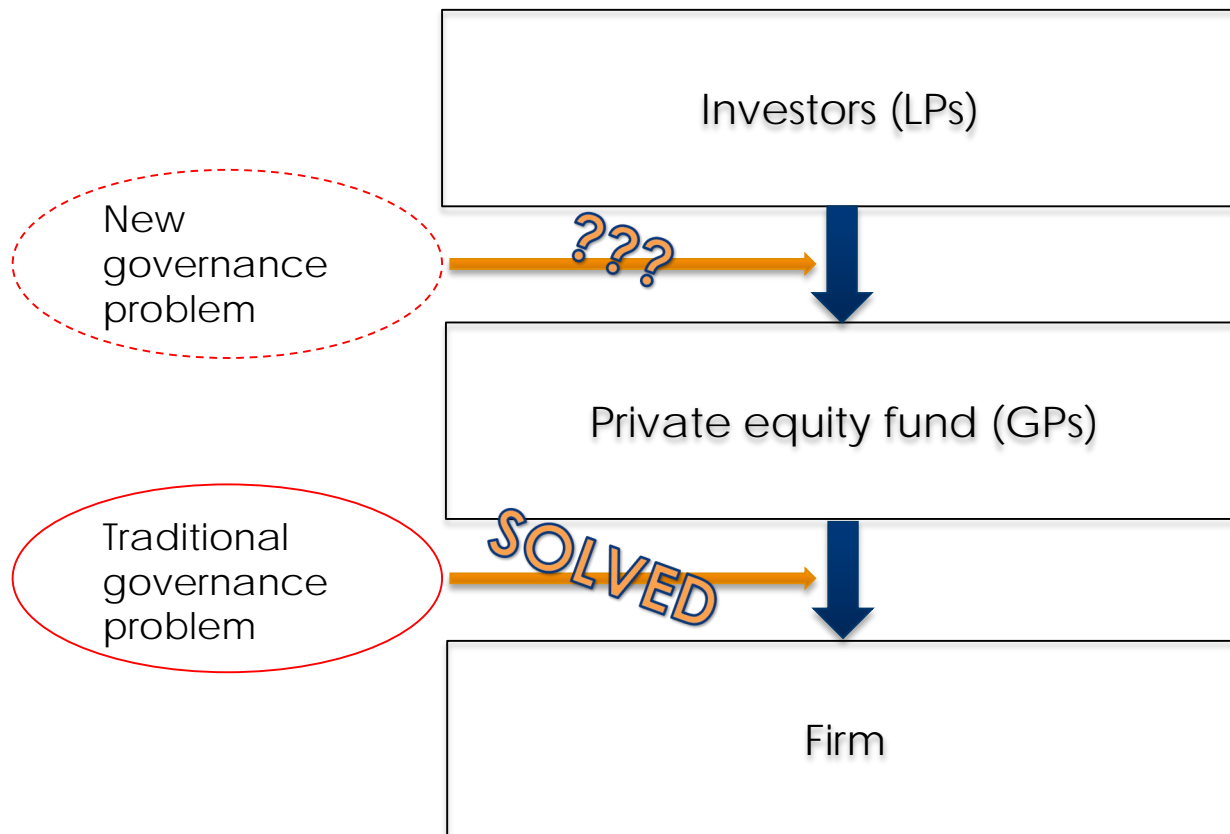


# THE PE OWNERSHIP MODEL

Jensen (Harvard Business Review 1989), "The Eclipse of the Public Corporation"

- Governance Engineering / Active owners
  - Incentive compensation, active boards, control
- Financial Engineering / Leverage
  - Debt gives discipline and tax benefits
    - Trade-off against costs of financial distress
    - Public firms seem underleveraged on average
- Operational Engineering / Corporate restructuring
  - PE firms develop unique capabilities

- Profitability goes up after buyout
  - Kaplan (1989), and others
- Productivity increases significantly after buyout
  - Davis et al (2014)
- Product quality increases after buyout
  - Bernstein et al (2014)
- PE-owned firms invest more efficiently in innovation
  - Lerner, Sørensen, Strömberg (2011)
- PE-owned firms better at handling financial distress
  - Hotchkiss, Smith, Strömberg (2014)
- PE-owned firms follow better business practices
  - Bloom, Van Reenen, Sadun (2010)
- Increase in growth in output and employment at the industry level
  - Bernstein, Lerner, Sørensen, Strömberg (2011)
- So, everything is perfect...?



# MANIFESTATIONS OF LP-GP GOVERNANCE PROBLEMS?

- Fee structure leads to potential overinvestment
  - Axelson, Strömberg, Weisbach (2009)
- Incentives to become “asset hoarders” to capture management fees
  - GPs who grow funds too quickly and/or have too many investments per partner, performance suffers
    - Kaplan & Schoar (2005), La Porta et al (2010)
- Profit sharing (carried interest) not adjusted for risk or market performance
  - One manifestation: use of leverage in transactions





# WHY ARE BUYOUTS LEVERAGED?

## *View 1: LBOs design an optimal capital structure for a given firm*

- “Trade-off” model of capital structure
  - Tax benefits of debt
    - Interest deductability
  - Incentive benefits of debt
    - Disciplines management
    - Allows for higher equity ownership
  - Trade off against Costs of financial distress
- LBOs are more likely to “optimize” capital structure than public companies
  - Private equity sponsors are well-informed, value maximising principals with all financing techniques available to them
    - Jensen (1986, 1989), Kaplan (1989a,b)
  - Public companies seem “underleveraged” (Graham 1996 etc)
    - Agency problems in public companies?
    - Inertia in capital structure?



# WHY ARE BUYOUTS LEVERAGED?

*View 2: LBO funds will lever companies for other reasons than setting the optimal capital structure for the company.*

- One story: LBO funds are arbitraging mispricing in debt/equity markets.
  - “we buy stuff with cheap debt and arbitrage on the difference with equity markets” (Guy Hands, Terra Firma, FT 15 November 07)
  - Before credit crisis in summer 07, signs of overheated debt-markets
    - Low interest rates, “covenant-light” loans
    - “Yield chasing” by institutional investors
  - In 2008, volume of LBOs dropped by half



# WHY ARE BUYOUTS LEVERAGED?

- Another (not mutually exclusive) story: GP – LP agency problems make LBO funds use leverage
- Axelson, Strömberg & Weisbach (Journal of Finance, 2009): To avoid overinvestment, LBO funds are made capital constrained and have to rely on 3rd party leverage to make investments.
  - Predicts that LBO funds will use as much debt as they can get to finance a deal
  - Predicts that PE funds will overinvest in “hot” debt markets
- Compensation structure may bias GP incentives
  - 20% “carry”, independent of leverage and interest rates
  - If get compensated based on (non-risk adjusted) ROE, will maximize ROE



# OUR DATA

- Deal-level data on financial structure of 1158 deals from 168 LBO firms over 1980–2008 period
  - **Deal types:** Public-to-Private (32%), Indep. Private (14%), Divisional (28%), Secondary (25%)
  - **Countries:** 60% USA, 39% Western Europe, 1% Rest of World (25 countries in total)
  - **Industries:** 46 Fama-French (49) industries

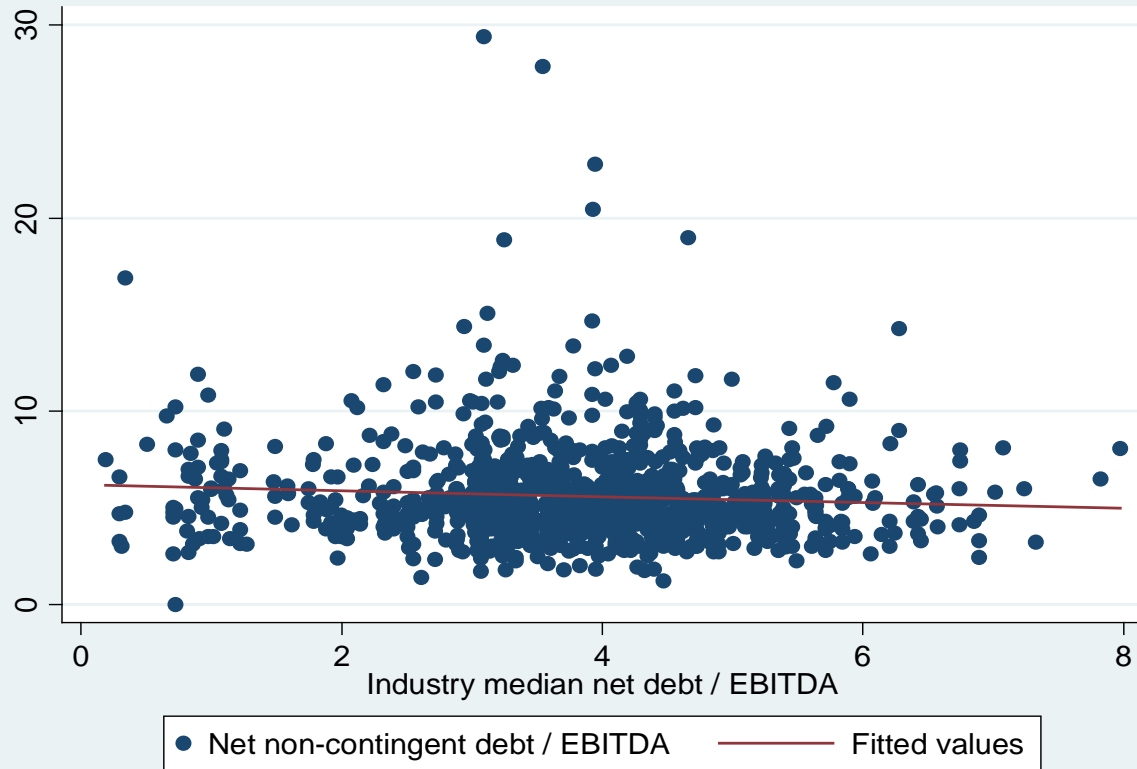
- Data sources:
  - LBO deals from Capital IQ
  - Leverage data from LPC / Dealscan
  - Some company financials for private firms from Amadeus, Edgar, Compustat, CIQ
  - Public company info from Compustat (matching sample)
- Bias towards large-cap deals
  - Mean (Med.) EV \$1600M (\$680M) in 2008 dollars  
EBITDA \$174M (\$80M)



# LBOs VS PUBLIC FIRM MATCH

- From Compustat Global
  - Match with FF 49 Industry-Year-Continent firms
  - Use industry median values
- First exercise:
  - Does the cross-section of leverage in LBOs line up with cross-section of leverage in public matches?

# LBO vs. PUBLIC MATCH LEVERAGE



D/EBITDA:

Slope = -0.148,

T-statistic = -2.28,

R-squared=0.005

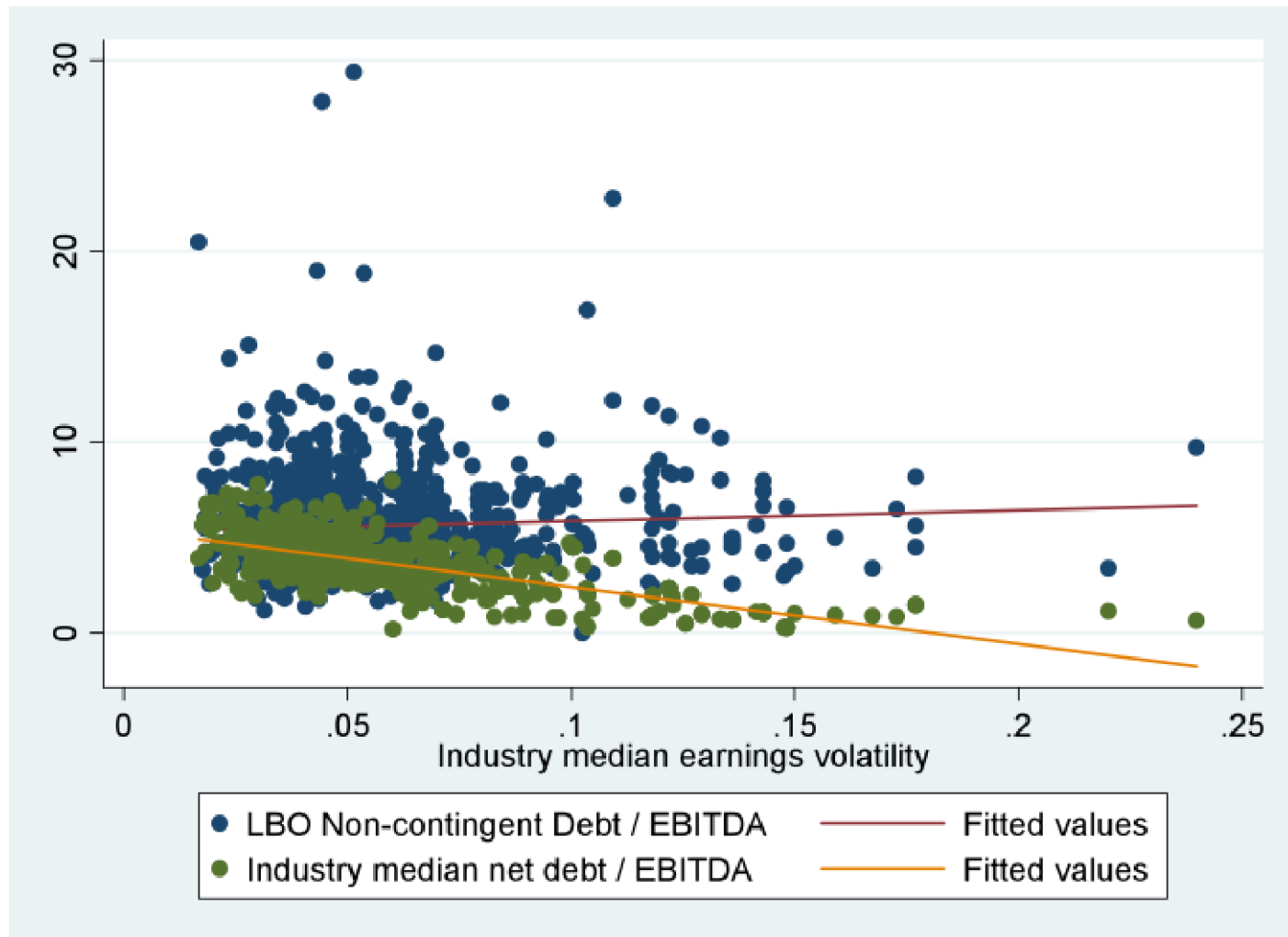
# LEVERAGE VS. M/B-RATIO



● LBO Non-contingent Debt / EBITDA	— Fitted values
● Industry median net debt / EBITDA	— Fitted values



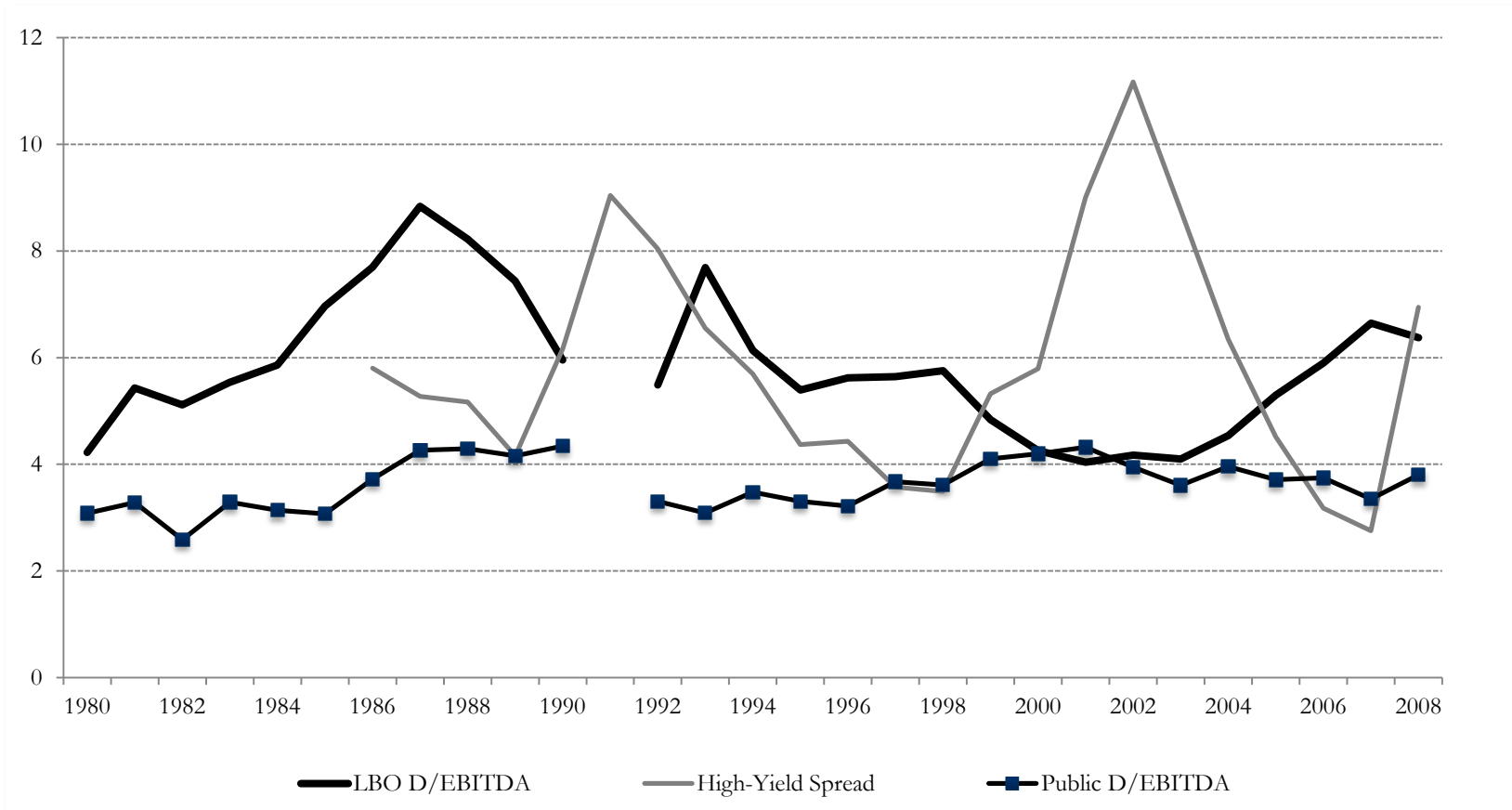
# LEVERAGE VS. VOLATILITY OF PROFITS



# VERY ROBUST (ABSENCE OF A) RELATIONSHIP

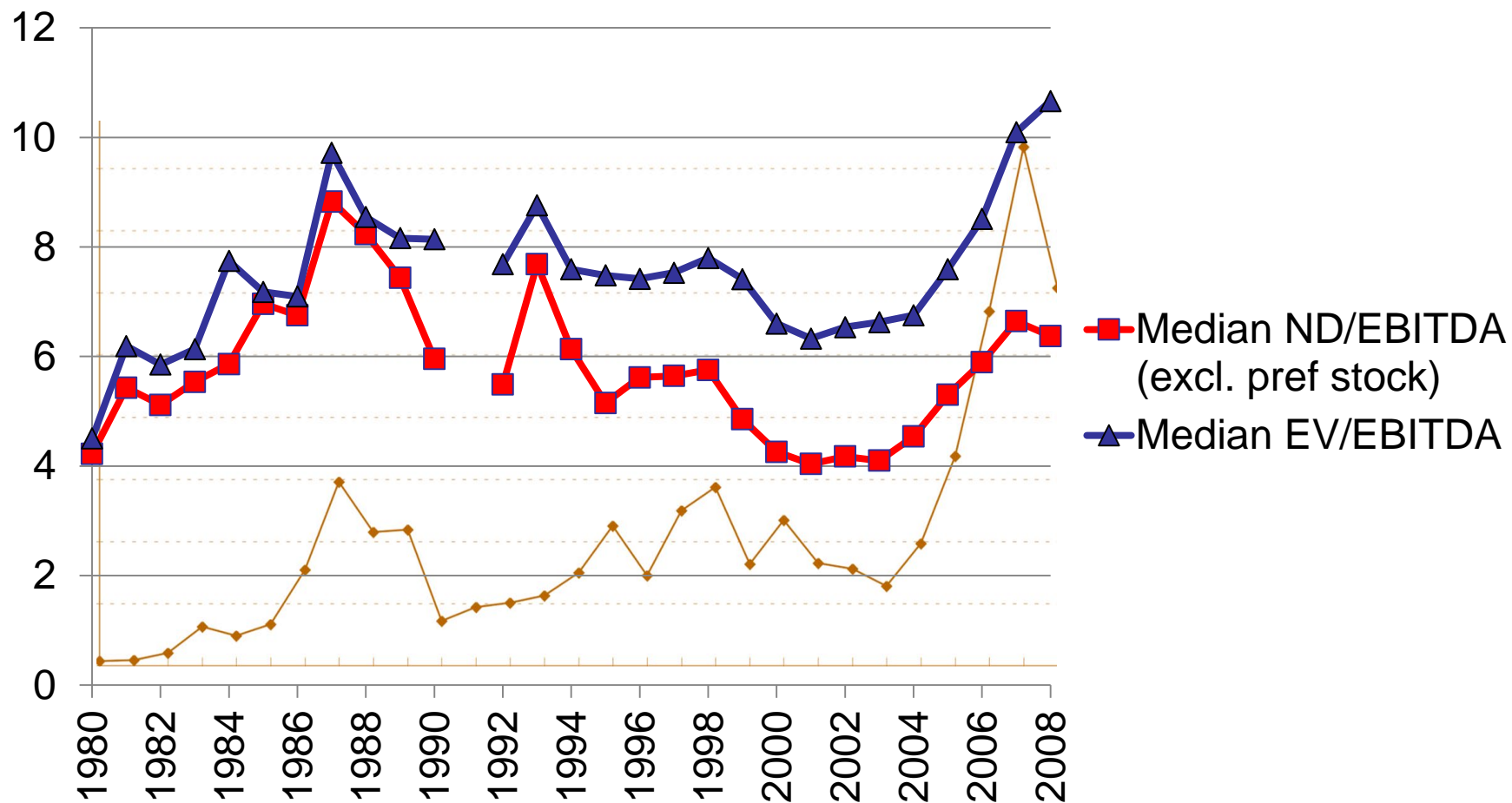
- Look at expected LBO leveraged using expected repayment schedules → still no relationship
- Look at pre-LBO leverage for public-to-private transactions → still no relationship
  - But pre-LBO leverage lines up well with matched public leverage
- Regression with fixed effects:
  - LBO leverage explained by time-series factors, public company leverage explained largely by industry factors

# ACCESSABILITY OF DEBT *ONLY* SYSTEMATIC DETERMINANT OF LEVERAGE IN PE TRANSACTIONS



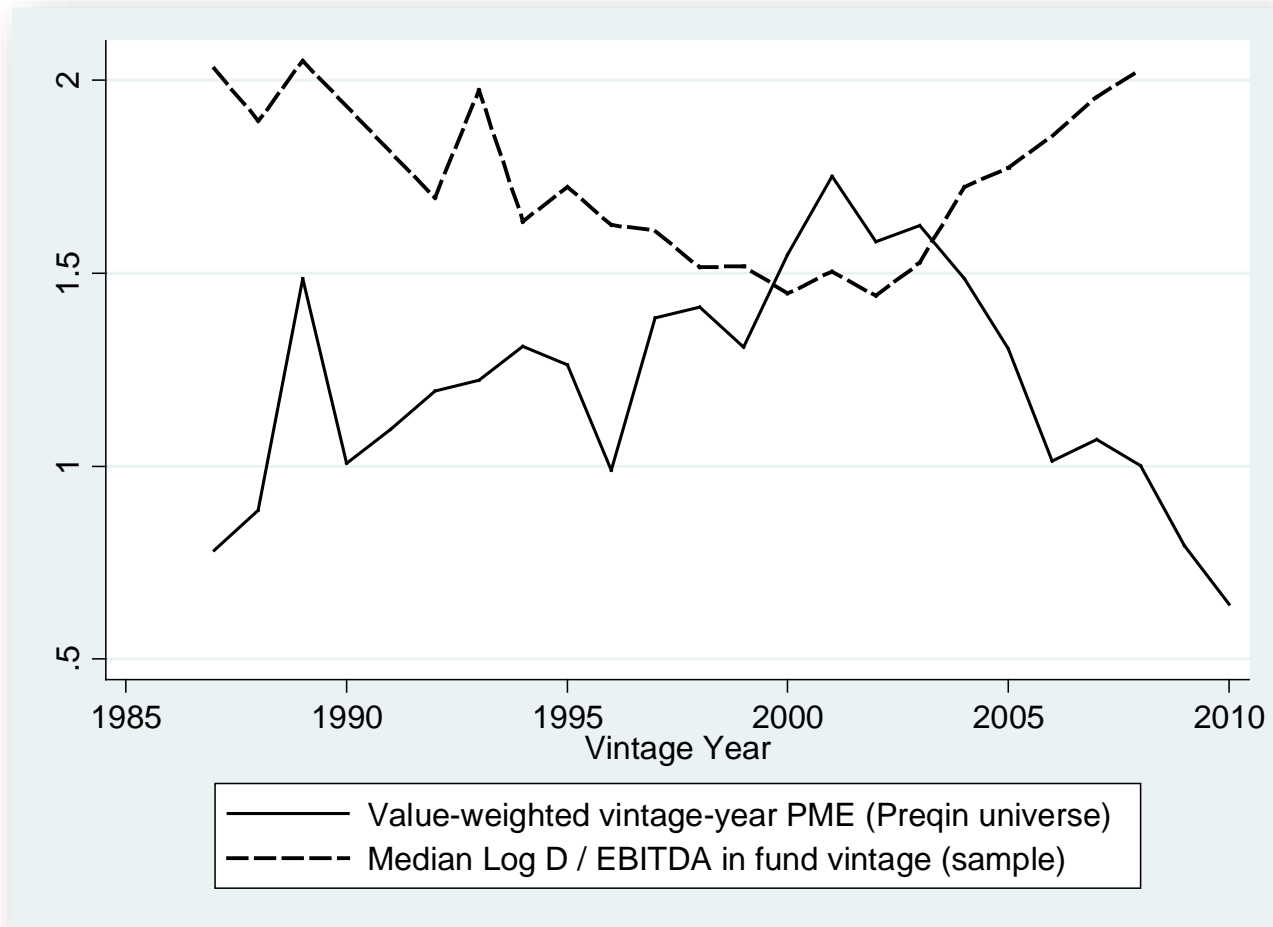
• Source: Axelson, Jenkinson, Strömberg & Weisbach (2013)

# LEVERAGE RELATED TO LBO PRICING



Source: Axelson, Jenkinson, Strömberg, & Weisbach (2011)

# HIGHER LEVERAGE → LOWER FUND RETURNS



Although costs of financial distress at the firm level seem relatively modest,  
(Hotchkiss, Smith, Strömberg, 2012)

# HIGHER LEVERAGE → LOWER FUND RETURNS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Fund PME						
Deal Log D / EBITDA		-0.237*** (-2.70)	-0.333** (-2.46)	-0.166** (-2.26)			-0.123* (-1.89)
Deal Log D / EBITDA, predicted					-0.741*** (-2.75)	-0.846*** (-2.98)	
Deal Log D / EBITDA, residual					-0.166** (-2.26)	-0.163* (-1.71)	
Deal Log EV/EBITDA			0.058 (0.61)				
High-yield bond spread over LIBOR				0.035** (2.17)			
Capital Commitments / Stock Market Value	-0.611*** (-9.53)	-0.531*** (-8.03)	-0.529*** (-7.25)	-0.411*** (-3.85)	-0.411*** (-3.85)	-0.409*** (-4.07)	-0.237* (-1.80)
Log fund size, 2008 USD	0.005 (0.10)	0.013 (0.23)	0.026 (0.48)	0.002 (0.04)	0.002 (0.04)	0.007 (0.16)	0.011 (0.20)
Log fund sequence number	0.010 (0.12)	0.021 (0.28)	0.016 (0.22)	0.019 (0.28)	0.019 (0.28)	0.019 0.314	0.013 0.194
First-time fund	0.340* (1.92)	0.337* (1.90)	0.325* (1.77)	0.358** (2.06)	0.358** (2.06)	0.380* (1.90)	0.380** (2.45)
PME in previous fund	0.266*** (2.97)	0.268*** (3.07)	0.274*** (3.25)	0.279*** (3.22)	0.279*** (3.22)	0.276*** (3.31)	0.276*** (3.08)
Constant	1.262*** (3.77)	1.534*** (4.90)	1.461*** (4.57)	1.236*** (4.15)	2.376*** (4.45)	2.392*** (4.85)	1.366** (2.20)
Industry, region, and LBO type fixed effects	No	No	No	No	No	Yes	No
Deal year fixed effects	No	No	No	No	No	No	Yes
Number of LBO deals	505	502	443	502	502	502	502
Number of funds	156	156	143	156	156	156	156
Number of vintage years	17	17	17	17	17	17	17
Adjusted R <sup>2</sup>	0.203	0.238	0.262	0.263	0.263	0.294	0.293

# CONCLUSIONS SO FAR

- LBO leverage driven by accessibility of debt, rather than optimal capital structure trade-off for portfolio company
- LBO leverage drives up transaction prices, and lowers LP returns
- Inconsistent with:
  - Optimal capital structure story
  - Beneficial market timing story
- Consistent with:
  - Agency / compensation model + competition across PE-funds

## DOES “EXCESS” LEVERAGE LEAD TO DEADWEIGHT COSTS ON FIRMS ?

- Yes: excessive leverage leads to higher defaults and larger costs of financial distress
- No: PE funds are better at handling high debt levels. Hence, defaults and costs of financial distress are not higher
  - Lower PE fund returns, as a result of high leverage and transaction prices, is mainly a redistribution of value between sellers and buyers, not a sign of distress costs



# WHY WOULD PE-OWNED COMPANIES HAVE EASIER TIME DEALING WITH HIGH DEBT LEVELS?

- Locked in fund-capital makes equity infusions easier
  - ”Conglomerate effect” increases debt capacity of firms
- PE funds build expertise in managing highly leveraged and distressed companies
  - E.g. Distressed investment funds
- Desire to maintain reputational capital with lenders (and others) increases willingness to invest and ”save” company

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Follows an unbalanced panel of 2,156 leveraged loan, non-investment grade borrowers over period 1997-2010.

- 46% are PE-backed at some point.
- 26% default at some point.

Benefit: both PE- and non-PE-backed firms voluntarily choose to lever up

Tracks which firms default and how these firms resolve financial distress.

1. Are PE firms more likely to default?
2. What is the role of PE firms in resolving distress?



# PE PORTF. CO DEFAULTS BY TRANSACTION YEAR

<u>Year of PE entry</u>	<u># of PE entries</u>	<u># that default within 7 yrs of entry</u>	<u>% defaults</u>
1996 or earlier*	171	27	15.8%
1997	76	24	31.6%
1998	105	25	23.8%
1999	100	22	22.0%
2000	76	10	13.2%
2001	57	7	12.3%
2002	66	11	16.7%
2003	107	18	16.8%
2004	124	27	21.8%
2005	111	17	15.3%
2006	133	26	19.5%
2007	114	15	13.2%
2008	35	3	8.6%
2009	24	0	0.0%
Total	1,299	232	17.9%

# HSS (2014) RESULTS:

- PE-backed companies have no difference in default probabilities conditional on leverage (but leverage, on average, higher) compared to other companies
- Conditional on default PE-backed firms have significantly lower costs of financial distress
  - More likely to restructure out of court
  - More likely to reorganize in bankruptcy
  - Defaulted co more likely to survive as going concern
  - (No difference in recovery rate)

## In- vs. out-of-court restructuring

	Ch. 11 (non prepack)	Pre-pack	Out -of -Court
PE-backed (N = 238)	48%	24%	28%
Non PE-backed (N = 375)	64%	16%	20%

## Number of months to complete restructuring

	Mean	Median
PE-Backed (N = 237)	10.1	7.7
Non PE-backed (N = 345)	16.2	11.9

## Restructuring outcome

		Reorganized	Sale to non- strategic buyer	Acquired by strategic buyer	Liquidated	Ongoing
Whole sample	N	430	36	76	79	2
	% of defaults	69%	6%	12%	13%	0%
PE-backed	N	184	14	29	22	0
	% of defaults	74%	6%	12%	9%	0%
Non-PE-backed	N	246	22	47	57	2
	% of defaults	66%	6%	13%	15%	1%

# WHAT IS THE MECHANISM?

		<i>Not controlled by PE at default</i>	<i>PE control at default</i>	<i>Sign diff</i>
<u>Company received capital infusion pre-default?</u>	% receiving	18%	29%	***

## Effects of receiving capital

### Infusion:

### *Capital infusion before default?*

	<i>No</i>	<i>Yes</i>	
Default results in Ch 11	80%	66%	***
Company remains independent	74%	77%	
Old equity remains in control in Ch. 11	7%	17%	***
Months in default	14.4	11.2	**
Total recovery to creditors	53%	52%	

Better PE-backed default outcomes related to:

- PE-funds having “dry powder
- Sponsors also running distress (“Special situations”) funds



# HHS (2014) RESULTS (CONT.)

- Beneficial default outcomes related to:
  - Fund dry powder and ability to infuse new capital in portfolio company
  - Distress expertise for sponsor
- Does not seem to be driven PE funds selecting firms with lower costs of financial distress
  - Control for multitude of observable characteristics (profitability, size, debt structure, etc.) in regressions
  - Match PE- and non-PE backed on characteristics
  - Compare with defaults where PE has exited → most beneficial effects rely on PE fund still being owner at time of default

# IMPLICATIONS - SUMMARY

- On the one hand:
  - PE-ownership increases efficiency, productivity etc.
  - PE-backed firms resolve default more efficiently
- On the other: PE-funds lever firms up, which increases default
  - Even though default less costly for PE-backed, it is still costly
- Weight against benefits of PE on firm performance
  - Combining evidence seems to suggest net positive effect
- Excessive PE-leverage in booms hurts investors more than portfolio companies
- **Outstanding puzzle: Why is PE compensation not adjusted for market risk and leverage?**
  - Or: could the PE compensation contract be designed better?

