Comparing the Investment Behavior of Public and Private Firms

John Asker, Joan Farre-Mensa and Alexander Ljungqvist

NYU Stern (Economics), HBS (Entrepreneurial Management) and NYU Stern (Finance)

1.	Introd	luct	ion
----	--------	------	-----

2. Data

3. Analysis

4. Implications

5. Conclusions

April 4, 2012

Kellogg M&S

Research question

- Research Question:
 - 1. "How does the investment behavior of firms vary by listing status?"
 - 2. "To what extent does this help us understand governance frictions?"
- Approach:

Data driven, largely descriptive regressions

- Why is this interesting?
 - 1. Surprisingly little is known about the behavior of privately held US firms in any systematic way Compustat is the main place to look at the firm sector (outside IO)
 - 2. Investment the most volatile part of GDP
 - 3. Recurrent debates about the incentives that public listing status creates for managers

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Context

- 6 Million firms in the US
- 0.08% are publically listed (2007)
- Of those firms with >500 employees: 85.7% are private (2007)
- Private firms generate:
 - 67.1% of private sector employment
 - 20.6% of aggregate pre-tax profits
 - 54.5% of aggregate non-residential fixed investment

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Punchline

- (When compared to comparable public firms) Private Firms:
- Investment more (10% of TA vs. 4%)
- 3 times more responsive to changes in "investment opportunities"
- This leads to interesting speculation as to why...
 - Suggestive of importance of agency ("short-termism") problems
 - Some suggestion of financing frictions faced by private firms

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Why might we expect private and public firms to differ?

- Agency:
- Public listing means management and ownership become weakly more separated
 - Heightened liquidity means owners can ditch when things get bad
 - cf in SSBF, of larger firms, 94.1% have <10 shareholders
- Three strands of literature:
- Baumol (1959) and others: Empire Building preference on part of managers
- Bertrand Mullainathan (2003): Preference for "quiet life"
 - Both assume essentially a poor monitoring technology

• Managerial Myopia: preference of manager includes both current stock price and long term value (Miller and Rock (1985), Stein (1989), Holmstrom (1999) and others)

• In the Stein version, manager diverts funds from investment to short-run cash flow generation, pumping up current earnings and "hence" share price.

- In equilibrium fully anticipated by the market, and priced in
- Extent of diversion depends on the extent to which current earnings forecast future earnings
- This last bit is the important bit.

- 1. Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Why might we expect private and public firms to differ?

(Some undergrad level economics) • Financing constraints

• Public capital markets provide opportunities for diversification and so lower firms' cost of capital

• Private firms may not be so advantaged

• They may only be able to invest in particularly good years due to constraints (?)

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Outline

Data

- Analysis
- Implications
- Remarks

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Data

- Data generally:
 - Public Firms: SEC Filings, Compustat, CRISP, etc
 - Private Firms: National Income Accounts, Census in various places, Survey of Small Business Finances, linking real activity to financial/legal structure is a challenge.
- We use:
- FY 2001-FY2007
- Compustat/CRISP
 - incorporated in US; listed on NYSE, AMEX or NASDAQ; valid stock price; Exclude NOE's (e.g. REITs), financial firms and regulated utilities
 - 3,926 firms = 19,203 firms-years

- 1. Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

- Sageworks:
 - Data from aggregator of information from accounting firms. Balance sheet and income statement data much like Compustat.
 - Large national and regional accounting firms

Data: Sageworks

- Sageworks:
 - Data from aggregator of information from accounting firms. Balance sheet and income statement data much like Compustat.
 - Large national and regional accounting firms
- Start with 95,370 firms, 250,507 firms years from FY2001-2007
- Unbalanced panel
- Exclude 10k Canadian firms, 4k firms with data quality issues (e.g. violate accounting identities etc)
- Exclude firms with less that 2 years of data
- 32,204 firms and 88,568 firms years

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions



Data: Public vs. Private

Which distribution is the private firm sample?



- 1. Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Outline

- Data
- Analysis
- Implications
- Remarks

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Analytic strategy

- Issue #1: Want to compare apples with apples
 - Basic specification is a fixed effects regression:

 $y_{it} = \alpha f(x_{it}, h_i) + \beta g_{it} + n_i + e_{it}$

- The issue is that don't want to assume that f() is linear given the huge differences in size between public and private firms
- We use a matching approach: baseline matches on size and industry
- Using matching as a way to control for stuff in a way that does not impose restrictive functional forms.
- Issue #2: Defining investment opportunities
 - Use sales growth mainly (also look at Q-measures: market-to-book measures)
- Issue #3: Measurement error
- Issue #4: Finding alternative sources of variation

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Analytic strategy

- Issue #1: Want to compare apples with apples
 - Basic specification is a fixed effects regression:

 $y_{it} = \alpha f(x_{it}, h_i) + \beta g_{it} + n_i + e_{it}$

- The issue is that don't want to assume that f() is linear given the huge differences in size between public and private firms
- We use a matching approach: baseline matches on size and industry

• Using matching as a way to control for stuff in a way that does not impose restrictive functional forms.

- Matching in a panel setting:
 - We match on industry, and then size
 - Take each public firm in the first year we see it and find the private firm in the same industry with the closest size. Then follow them for as long as we can.
 - If exits, splice in another private firm
 - Nearest-neighbor matching with a caliper set so that log assets < 2 (CHECK)

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions





- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 1

		Full sampl	e	Matched sample				
			Differences			Differences in		
	Public	Private	in means or	Public	Private	means or		
	firms	firms	medians	firms	firms	medians		
mean	1,436.4	7.6	$1,428.8^{***}$	157.3	142.1	15.2		
median	263.5	1.4	262.1^{***}	41.0	35.2	5.8^{***}		
st.dev.	3,082.5	200.0		749.7	741.5			
5								
mean	0.183	0.177	0.006	0.256	0.327	-0.071***		
median	0.087	0.070	0.016^{***}	0.091	0.111	-0.020***		
st.dev.	0.674	0.652		0.925	1.075			
mean	1.747	1.398	0.349***	1.838	1.838	0.000		
median	1.579	1.235	0.344***	1.753	1.753	0.000		
st.dev.	0.840	0.613		0.740	0.740	0.000		
mean	1 817	1 473	0.344^{***}	2 1 1 9	1 964	0.155***		
median	1.017	1 385	0.393***	2.117	1 889	0.158***		
st dev	0.663	1.082	0.575	0.774	1 229	0.120		
St. de Vi	0.002	1.002		0.771	1.22)			
mean	0.065	0.075	-0.010**	-0.060	0.084	-0.144***		
median	0.005	0.075	-0.010	-0.000	0.123	-0.072^{***}		
st dev	0.286	1 069	0.010	0.031 0.437	0.125	-0.072		
51.40V.	0.200	0.152	0.070***	0.207	0.149	0.140***		
median	0.223	0.155	0.070	0.297	0.148	0.149 0.148***		
st day	0.132	0.073	0.039	0.222	0.074	0.146		
st.dev.	0.233	0.202	0 1 0 0 ***	0.200	0.193	o o c o ***		
mean	0.201	0.310	-0.109	0.155	0.217	-0.062		
median	0.145	0.156	-0.011	0.053	0.137	-0.084		
st.dev.	0.240	0.458		0.270	0.271			
	19 203	88 568		4 975	4 975			
	2,020	22,204		1,000	620			
	mean median st.dev. mean median st.dev. mean median st.dev. mean median st.dev. mean median st.dev. mean median st.dev. mean median st.dev.	Public firms mean 1,436.4 median 263.5 st.dev. 3,082.5 mean 0.183 median 0.087 st.dev. 0.674 mean 1.747 median 1.579 st.dev. 0.840 mean 1.817 median 1.778 st.dev. 0.663 mean 0.111 st.dev. 0.286 mean 0.132 st.dev. 0.235 mean 0.145 st.dev. 0.240	$\begin{tabular}{ c c c c c c } \hline Public & Private \\ firms & firms \\ \hline Public & firms \\ \hline Public & firms \\ \hline mean & 1,436.4 & 7.6 \\ median & 263.5 & 1.4 \\ st.dev. & 3,082.5 & 200.0 \\ \hline mean & 0.183 & 0.177 \\ median & 0.087 & 0.070 \\ st.dev. & 0.674 & 0.652 \\ mean & 1.747 & 1.398 \\ median & 1.579 & 1.235 \\ st.dev. & 0.840 & 0.613 \\ mean & 1.817 & 1.473 \\ median & 1.778 & 1.385 \\ st.dev. & 0.663 & 1.082 \\ \hline mean & 0.065 & 0.075 \\ median & 0.111 & 0.095 \\ st.dev. & 0.286 & 1.069 \\ mean & 0.223 & 0.153 \\ median & 0.132 & 0.073 \\ st.dev. & 0.235 & 0.202 \\ mean & 0.201 & 0.310 \\ median & 0.145 & 0.156 \\ st.dev. & 0.240 & 0.458 \\ \hline 19,203 & 88,568 \\ \hline 19,203 & 88,568 \\ \hline \end{tabular}$	Public Private firmsDifferences in means or mediansmean1,436.47.61,428.8 ***median263.51.4262.1 ***st.dev.3,082.5200.0mean0.1830.1770.006 medianmedian0.0870.0700.016 ***st.dev.0.6740.652mean1.7471.3980.349 ***median1.5791.2350.344 ***st.dev.0.8400.613mean1.8171.4730.344 ***st.dev.0.6631.082mean1.7781.3850.393 ***st.dev.0.6631.082mean0.0230.1530.070 ***median0.1110.0950.016 ***median0.1320.0730.059 ***st.dev.0.2350.202meanmean0.2010.310-0.109 ***st.dev.0.2400.45819,20388,56819,20388,56819,20388,5681069	Public Private Differences mean $1,436.4$ 7.6 $1,428.8^{***}$ 157.3 median 263.5 1.4 262.1^{***} 41.0 st.dev. $3,082.5$ 200.0 749.7 mean 0.183 0.177 0.006 0.256 median 0.087 0.070 0.016^{***} 0.091 st.dev. 0.674 0.652 0.925 mean 1.747 1.398 0.349^{***} 1.838 median 1.579 1.235 0.344^{***} 1.753 st.dev. 0.840 0.613 0.740 0.740 mean 1.817 1.473 0.344^{***} 2.119 median 1.778 1.385 0.393^{***} 2.047 st.dev. 0.266 1.069 0.437 0.437 mean 0.223 0.153 0.070^{***} 0.297 median 0.132 0.073	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 1: Matched Sample only

Introduction

Implications

Conclusions

Data

Analysis

1.

2.

3.

4.

5.

			Matched sar	nple
	****			Differences in
		Public	Private	means or
		firms	firms	medians
Firm size				
Total assets (\$m)	mean	157.3	142.1	15.2
	median	41.0	35.2	5.8***
	st.dev.	749.7	741.5	
Investment opportunitie	S			
Sales growth	mean	0.256	0.327	-0.071***
C C	median	0.091	0.111	-0.020***
	st.dev.	0.925	1.075	
Industry O	mean	1.838	1.838	0.000
, <u>,</u>	median	1.753	1.753	0.000
	st.dev.	0.740	0.740	
Predicted O	mean	2.119	1.964	0.155***
	median	2.047	1.889	0.158***
	st.dev.	0.774	1.229	
Firm characteristics				
ROA	mean	-0.060	0.084	-0.144***
	median	0.051	0.123	-0.072***
	st.dev.	0.437	0.986	
Cash holdings	mean	0.297	0.148	0.149***
e asir noranigs	median	0.222	0.074	0.148***
	st.dev.	0.266	0.195	01110
Rook leverage	mean	0.155	0.217	-0.062***
Book levelage	median	0.155	0.137	-0.002
	st dev	0.055	0.137	-0.004
	St.uev.	0.270	0.2/1	
No. of observations		4,975	4.975	
No. of firms		1,666	620	

Table 2

					Public firm	ıs		Private firms				Public - private firms		
R		Invest ment												
0		mea-		Std.		No. of	No. of		Std.		No. of	No. of	Diff. in	Diff. in
W	Sample	sure	Mean	dev.	Median	obs.	firms	Mean	dev.	Median	obs.	firms	means	medians
1	Full sample	Gross	0.045	0.154	0.023	19,203	3,926	0.076	0.261	0.017	88,568	32,204	-0.031***	0.005***
		Net	0.022	0.123	0.002	19,203	3,926	0.033	0.205	0.000	88,568	32,204	-0.011****	0.002^{***}
	Samples matched on:													
2	NAICS4, size	Gross	0.040	0.191	0.017	4,975	1,666	0.097	0.304	0.016	4,975	620	-0.056***	0.001
		Net	0.022	0.150	0.000	4,975	1,666	0.094	0.302	0.009	4,975	620	-0.072***	-0.009***
3	NAICS5, size	Gross	0.042	0.197	0.017	4,320	1,483	0.099	0.298	0.016	4,320	566	-0.057***	0.001
4	NAICS6, size	Gross	0.070	0.258	0.017	1,462	558	0.118	0.301	0.028	1,462	223	-0.048***	-0.011***
5	NAICS4, size, sales growth	Gross	0.047	0.170	0.021	7,273	2,578	0.086	0.244	0.022	7,273	1,635	-0.039***	-0.001
6	NAICS4, size, sales growth, ROA, cash, and debt	Gross	0.049	0.171	0.022	7,413	2,618	0.079	0.270	0.015	7,413	1,809	-0.030***	0.007***
7	NAICS4, size, RE/TA	Gross	0.047	0.153	0.023	16,999	3,702	0.108	0.322	0.019	16,999	1,817	-0.062***	0.004***
8	NAICS4, size, age	Gross	0.024	0.161	0.014	1,987	736	0.094	0.256	0.029	1,987	251	-0.059***	-0.013***
	NAICS4, size, restricted to													
9	C Corps	Gross	0.039	0.196	0.016	4,077	1,472	0.082	0.275	0.016	4,077	441	-0.043***	0.000
10	accrual basis accounting	Gross	0.040	0.191	0.017	4,914	1,644	0.091	0.280	0.016	4,914	611	-0.050***	0.001

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 2: Full Sample

		Invest		1	Public firm	IS			I	Private firm	18		Public - pr	ivate firms
R o		ment mea-		Std.		No. of	No. of		Std.		No. of	No. of	Diff. in	Diff. in
	Full sample	Gross	0.045	0.154	0.023	19,203	3,926	0.076	0.261	0.017	88,568	32,204	-0.031***	0.005***
		Net	0.022	0.123	0.002	19,203	3,926	0.033	0.205	0.000	88,568	32,204	-0.011***	0.002***
-	Samples maxiled on.													
2	NAICS4, size	Gross Net	0.040 0.022	0.191 0.150	0.017	4,975 4,975	1,666 1,666	0.097 0.094	0.304 0.302	0.016 0.009	4,975 4,975	620 620	-0.056*** -0.072***	0.001 -0.009***
3	NAICS5, size	Gross	0.042	0.197	0.017	4,320	1,483	0.099	0.298	0.016	4,320	566	-0.057***	0.001
4	NAICS6, size	Gross	0.070	0.258	0.017	1,462	558	0.118	0.301	0.028	1,462	223	-0.048***	-0.011***
5	NAICS4, size, sales growth	Gross	0.047	0.170	0.021	7,273	2,578	0.086	0.244	0.022	7,273	1,635	-0.039***	-0.001
6	NAICS4, size, sales growth, ROA, cash, and debt	Gross	0.049	0.171	0.022	7,413	2,618	0.079	0.270	0.015	7,413	1,809	-0.030***	0.007***
7	NAICS4, size, RE/TA	Gross	0.047	0.153	0.023	16,999	3,702	0.108	0.322	0.019	16,999	1,817	-0.062***	0.004***
8	NAICS4, size, age	Gross	0.024	0.161	0.014	1,987	736	0.094	0.256	0.029	1,987	251	-0.059***	-0.013***
9	NAICS4, size, restricted to C Corps	Gross	0.039	0.196	0.016	4,077	1,472	0.082	0.275	0.016	4,077	441	-0.043***	0.000
10	accrual basis accounting	Gross	0.040	0.191	0.017	4 914	1.644	0.091	0.280	0.016	4.914	611	-0.050***	0.001

		Ι	Public firm	IS			
Invest ment		G (1					
mea-	Mean	Std. dev	Median	No. of obs	No. of firms		
Suit	witcuit	<u>uev.</u>	wiedlah			-	
Gross	0.045	0.154	0.023	19,203	3,926		
Net	0.022	0.123	0.002	19,203	3,926		
			Private f	firms		Public -	- private firms
	N	Std.		No. c	of No. of	Diff. ii	n Diff. in
	Mean	dev.	Media	in obs.	. firms	means	s medians

1.	Introduction	_	Mean	dev.	Median	obs.	firms	means	medians
2.	Data		0.076	0.261	0.017	88.568	32.204	-0.031***	0.005^{***}
•								***	***
3.	Analysis		0.033	0.205	0.000	88,568	32,204	-0.011	0.002
	-								

4. Implications

5. Conclusions

Table 2: Differences in mean investment levels

Introduction

Implications

Conclusions

Data

Analysis

1.

2.

3.

4.

5.

			Public - pr	ivate firms
R o w	Sample	Invest ment mea- sure	Diff. in means	Diff. in medians
1	Full sample	Gross	-0.031***	0.005***
	in the first	Net	-0.011***	0.002***
	Samples matched on:			
2	NAICS4, size	Gross	-0.056***	0.001
		Net	-0.072***	-0.009***
3	NAICS5, size	Gross	-0.057***	0.001
4	NAICS6, size	Gross	-0.048***	-0.011***
5	NAICS4, size, sales growth	Gross	-0.039***	-0.001
6	NAICS4, size, sales growth, ROA, cash, and debt	Gross	-0.030***	0.007^{***}
7	NAICS4, size, RE/TA	Gross	-0.062***	0.004***
8	NAICS4, size, age	Gross	-0.059***	-0.013***
	NAICS4, size, restricted to			
9	C Corps	Gross	-0.043***	0.000
10	accrual basis accounting	Gross	-0.050***	0.001

		-												
					Public firm	IS				Private firm	IS	_	Public - pr	ivate firms
R		ment												
o w	Sample	mea- sure	Mean	Std. dev.	Median	No. of obs.	No. of firms	Mean	Std. dev.	Median	No. of obs.	No. of firms	Diff. in means	Diff. in medians
1	Full sample	Gross	0.045	0.154	0.023	19,203	3,926	0.076	0.261	0.017	88,568	32,204	-0.031***	0.005***
		Net	0.022	0.123	0.002	19,203	3,926	0.033	0.205	0.000	88,568	32,204	-0.011***	0.002***
	Samples matched on:													
2	NAICS4, size	Gross	0.040	0.191	0.017	4,975	1,666	0.097	0.304	0.016	4,975	620	-0.056	0.001
		rvet	0.022	0.150	0.000	4,975	1,000	0.094	0.302	0.009	4,975	620	+0.072	-0.009
3	NAICS5, size	Gross	0.042	0.197	0.017	4,320	1,483	0.099	0.298	0.016	4,320	566	-0.057	0.001
4	NAICS6, size	Gross	<mark>0</mark> .070	0.258	0.017	1,462	558	0.118	0.301	0.028	1,462	223	-0.048***	-0.011***
5	NAICS4, size, sales growth	Gross	0.047	0.170	0.021	7,273	2,578	0.086	0.244	0.022	7,273	1,635	-0.039***	-0.001
6	NAICS4, size, sales growth, ROA, cash, and debt	Gross	<mark>0</mark> .049	0.171	0.022	7,413	2,618	0.079	0.270	0.015	7,413	1,809	-0.030***	0.007***
7	NAICS4, size, RE/TA	Gross	<mark>0</mark> .047	0.153	0.023	16,999	3,702	0.108	0.322	0.019	16,999	1,817	-0.062***	0.004***
8	NAICS4, size, age	Gross	0.024	0.161	0.014	1,987	736	0.094	0.256	0.029	1,987	251	-0.059***	-0.013***
9	NAICS4, size, restricted to C Corps	Gross	0.039	0.196	0.016	4,077	1,472	0.082	0.275	0.016	4,077	441	-0.043***	0.000
10	accrual basis accounting	Gross	0.040	0.191	0.017	4,914	1,644	0.091	0.280	0.016	4,914	611	-0.050***	0.001

T 0				Public - pr	ivate firms
Table 2:	_		Invest		
Differences in	R		ment	T : 22 :	5:00 :
moon	0	a 1	mea-	Diff. in	Diff. in
IIIeaII	W	Sample	sure	means	medians
investment	1	Full sample	Gross	-0.031***	0.005***
			Net	-0.011****	0.002***
		Samples matched on:			
	2	NAICS4, size	Gross	-0.056***	0.001
			Net	-0.072^{***}	-0.009***
			1100	0.072	0.009
	3	NAICS5, size	Gross	-0.057***	0.001
	4	NAICS6, size	Gross	-0.048***	-0.011***
	5	NAICS4, size, sales growth	Gross	-0.039***	-0.001
	6	NAICS4, size, sales growth, ROA, cash, and debt	Gross	-0.030***	0.007***
	7	NAICS4, size, RE/TA	Gross	-0.062***	0.004^{***}
1. Introduction	8	NAICS4, size, age	Gross	-0.059***	-0.013***
2. Data		NAICS4 size restricted to			
3. Analysis	9	C Corps	Gross	-0.043***	0.000
 Generations Conclusions 	10	accrual basis accounting	Gross	-0.050***	0.001

Table 3: Sensitivity of investment to "investment opportunities"

		De	pendent variable:	Gross investm	ient / lagged to	tal assets
			Sales growth			
Matched on size and industry (NAICS4) (1)	Matched public firms only (2)	All public firms (3)	Matched on size and industry (NAICS5) (4)	Matched on size and industry (NAICS6) (5)	Matched on size, sales growth & industry (NAICS4) (6)	Matched on size, sales growth, ROA, cash, debt & industry (NAICS4) (7)
0.136***	0.038***	0.038***	0.135***	0.186***	0.098***	0.081***
-0.097 ^{***} 0.015	0.009	0.005	-0.099*** 0.018	-0.143** 0.057	-0.061*** 0.021	-0.048** 0.023
0.173 ^{***} 0.014	0.038^{*} 0.023	0.055^{**} 0.027	0.171^{***} 0.018	0.232 ^{***} 0.065	0.124 ^{***} 0.025	0.102 ^{***} 0.021
-0.135 ^{***} 0.027			-0.146 ^{***} 0.029	-0.254 ^{***} 0.077	-0.076^{**} 0.036	-0.041 0.034
29.6 % 32.1 ^{***} 9,950 2,286	5.5 % 5.6 ^{***} 4,975 1,666	4.3 % 10.5 ^{***} 19,203 3,926	26.5 % 19.9*** 8,640 2,049	17.4 % 2.9*** 2,924 781	18.1 % 7.8 ^{***} 14,546 4,213	11.7 % 8.6 ^{***} 14,826 4,427
	Matched on size and industry (NAICS4) (1) 0.136 ^{***} 0.013 -0.097 ^{***} 0.015 0.173 ^{***} 0.014 -0.135 ^{***} 0.027 29.6 % 32.1 ^{***} 9,950 2,286	Matched on size and industry (1) Matched public firms only (2) 0.136^{***} 0.038^{***} 0.013 0.009 -0.097^{***} 0.038^{***} 0.015 0.038^{***} 0.0173^{***} 0.038^{*} 0.014 0.023 -0.135^{***} 0.027 29.6% 5.5% 32.1^{***} 5.6^{***} 9.950 4.975 2.286 1.666	DeMatched on size and industryMatched public(NAICS4)firms only firms(1)(2)(3) 0.136^{***} 0.038^{***} 0.038^{***} 0.038^{***} 0.013 0.009 0.009 0.005 -0.097^{***} 0.038^{*} 0.015 0.0173^{***} 0.014 0.023 0.014 0.023 0.027 0.027 29.6 % 5.5% 4.3% 32.1^{***} 5.6^{***} 9.950 4.975 19.203 2.286 $1,666$ 3.926	Dependent variable:Sales growthMatched on size and industryMatched size and industry(NAICS4)firms onlyfirms firms(NAICS4)firms onlyfirms firms(1)(2)(3)(4) 0.136^{***} 0.038^{***} 0.038^{***} 0.013 0.009 0.005 0.016 -0.097^{***} -0.099^{***} -0.099^{***} 0.015 0.027 0.018 0.173^{***} 0.038^{*} 0.055^{**} 0.171^{***} 0.038^{**} 0.027 0.014 0.023 0.027 0.027 0.029 29.6% 5.5% 4.3% 0.027 29.6% 5.5% 4.3% 0.023 29.6% 5.5% 4.3% 0.023 29.6% 5.5% 4.3% 0.023 29.6% 5.5% 0.171^{***} 9.950 4.975 19.203 3.640 2.286 $1,666$ 3.926 2.049	Dependent variable: Gross investmSales growthMatched on size and industryMatched on size and industryMatched on size and industry(NAICS4)firms only firms onlyfirms firms(NAICS5)(NAICS6) (NAICS6) (1) (1) (2) (3) (4) (5) 0.136^{***} 0.038^{***} 0.038^{***} 0.135^{***} 0.186^{***} 0.013 0.009 0.005 0.016 0.055 -0.097^{***} -0.099^{***} -0.143^{**} 0.015 0.018 0.057^{***} 0.171^{***} 0.038^{*} 0.055^{***} 0.171^{***} 0.038^{***} 0.018 0.027 0.018 0.065 -0.146^{****} -0.254^{****} 0.027 0.029 0.077 29.6% 5.5% 4.3% 26.5% 17.4% 0.029 0.077 0.029 0.077 29.6% 5.5% 19.203 8.640 2.924 2.286 1.666 3.926 2.049 781	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 3: Sensitivity of investment to "investment opportunities"	Sample	Matched on size and industry (NAICS4) (1)	Matched public firms only (2)	All public firms (3)
	Investment opportunities	0.136***	0.038***	0.038***
	Investment opp. x public	0.013 -0.097 ^{***}	0.009	0.005
	ROA	0.015 0.173 ^{***}	0.038^{*}	0.055**
	ROA x public	0.014 -0.135***	0.023	0.027
	-2	0.027	/	
	R^2 (within)	29.6 %	5.5%	4.3%
	F-test: all coeff. = 0	32.1	5.6	10.5
	No. observations	9,950	4,975	19,203
1. Introduction	No. firms	2,286	1,666	3,926
2. Data				

- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 3: Sensitivity of investment to "investment opportunities"	Sample	Matched on size and industry (NAICS4) (1)	Matched on size and industry (NAICS5) (4)	Matched on size, sales growth & industry (NAICS4) (6)	Matched on size, sales growth, ROA, cash, debt & industry (NAICS4) (7)
	Investment opportunities	0.136***	0.135***	0.098***	0.081***
	investment opportunities	0.130	0.135	0.020	0.031
	Investment opp. x public	-0.097***	-0.099***	-0.061***	-0.048**
		0.015	0.018	0.021	0.023
	ROA	0.173^{***}	0.171^{***}	0.124***	0.102^{***}
		0.014	0.018	0.025	0.021
	ROA x public	-0.135***	-0.146***	-0.076***	-0.041
		0.027	0.029	0.036	0.034
	R^2 (within)	29.6 %	26.5 %	18.1 %	11.7 %
	<i>F</i> -test: all coeff. $= 0$	32.1***	19.9***	7.8^{***}	8.6***
1 Introduction	No. observations	9,950	8,640	14,546	14,826
	No. firms	2,286	2,049	4,213	4,427
2. Data			,		
3. Analysis					
4. Implications					

5. Conclusions

Table 4: Robustness to alternate matching

		Relative	size < 2		······································				
	Baseline (1)	w/o splicing in new firm (2)	w/o replace- ment (3)	multiple- neighbor matches (N=5) (4)	Relative size < 1.5 (5)	Relative size < 1.33 (6)	Relative size < 1.2 (7)	Propensity score match w/ .05 caliper (8)	Full samples of public and private firms (9)
Investment opportunities	0.136****	0.136***	0.146***	0.125***	0.136***	0.138***	0.133***	0.116****	0.054***
Investment opp. x public	0.013 -0.097**** 0.015	0.013 -0.102*** 0.016	0.032 -0.105*** 0.035	0.014 -0.086*** 0.016	0.013 -0.101*** 0.016	0.013 -0.107*** 0.016	0.014 -0.102*** 0.017	0.016 -0.081**** 0.017	0.004 -0.016** 0.006
ROA	0.173**** 0.014	0.177 ^{***} 0.013	0.146 ^{***} 0.031	0.163 ^{***} 0.017	0.178 ^{***} 0.014	0.179 ^{***} 0.013	0.176 ^{***} 0.013	0.145 ^{***} 0.018	0.034 ^{***} 0.005
ROA x public	-0.135**** 0.027	-0.152*** 0.030	-0.133 ^{***} 0.047	-0.123 ^{***} 0.029	-0.141 ^{***} 0.029	-0.151 ^{***} 0.029	-0.152*** 0.033	-0.109 ^{***} 0.029	0.021 0.027
R^2 (within) <i>R</i> -test: all coeff. = 0 <i>N</i> . observations No. firms	29.6 % 32.1*** 9,950 2,286	32.8 % 42.2*** 8,188 2,118	16.6 % 11.6 ^{***} 4,084 1,554	23.0 % 15.0*** 17,736 3,224	27.7 % 28.8 ^{***} 7,772 1,956	28.3 % 28.8*** 6,526 1,780	25.0 % 25.7*** 5,260 1,557	8.7 % 18.7*** 12,852 2,988	3.3 % 43.9*** 107,771 36,130
							Full of	sample public	es
							and	privat	e
					Baseli	ne	f	ĩrms	
					(1)			(9)	
Investme	ent opp	ortuniti	ies		0.136)	0.0	54***	
					0.013	***	0.0	04	
Investme	ent opp.	x pub	lic		-0.097	7	-0.0	016	
					0.015	***	0.0	06	
ROA					0.173	3	0.0	034	
DOA					0.014	***	0.0	05	
ROA x p	oublic				-0.133)	0.0	021	
					0.027		0.0	27	
R^2 (with	in)				29.6	%	3.	3 %	
	-	- 0			32.1*	**	43.	9^{***}	
F-test: a	ll coeff.	=0							
<i>F</i> -test: a No. obse	ll coeff. ervation	s = 0			9,950		107,	771	

Matched on size and industry (NAICS4)

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 4: Robustness to alternate matching

Introduction

Data

Analysis

Implications

Conclusions

1.

2.

3.

4. 5.

			Matel	ned on size and	l industry (NA	ICS4)			
		Relative	size < 2						
		w/o splicing in	w/o replace-	multiple- neighbor matches	Relative	Relative	Relative	Propensity score match w/	Full samples of public and private
	Baseline (1)	new firm (2)	(3)	(N=5) (4)	size < 1.5	size < 1.33	size < 1.2	.05 caliper	firms (9)
Investment opportunities	0.136***	0.136***	0.146***	0.125***	0.136***	0.138***	0.133***	0.116***	0.054***
Investment opp. x public	-0.097***	-0.102*** 0.016	-0.105*** 0.035	-0.086*** 0.016	-0.101***	-0.107***	-0.102*** 0.017	-0.081**** 0.017	-0.016** 0.006
ROA	0.173***	0.177***	0.146^{***}	0.163***	0.178^{***}	0.179***	0.176****	0.145****	0.034***
ROA x public	-0.135*** 0.027	-0.152*** 0.030	-0.133*** 0.047	-0.123**** 0.029	-0.141 ^{***} 0.029	-0.151*** 0.029	-0.152*** 0.033	-0.109**** 0.029	0.021 0.027
R^2 (within) F-test: all coeff. = 0 No. observations No. firms	29.6 % 32.1*** 9,950 2,286	32.8 % 42.2*** 8,188 2,118	16.6 % 11.6 ^{****} 4,084 1,554	23.0 % 15.0*** 17,736 3,224	27.7 % 28.8 ^{***} 7,772 1,956	28.3 % 28.8*** 6,526 1,780	25.0 % 25.7 ^{***} 5,260 1,557	8.7 % 18.7 ^{***} 12,852 2,988	3.3 % 43.9*** 107,771 36,130

		Relative	size < 2	
	Baseline (1)	w/o splicing in new firm (2)	w/o replace- ment (3)	multiple- neighbor matches (N=5) (4)
T / / / //	0.12(***	0.126***	0.140***	0.105**
Investment opportunities	0.136 0.013	0.136 0.013	0.146 <i>0.032</i>	0.125 0.014
Investment opp. x public	-0.097***	-0.102***	-0.105***	-0.086**
	0.015	0.010	0.035	0.010
				Propensity score
	Relative	Relative	Relative	match w/
	size < 1.5	size < 1.33	size < 1.2	.05 caliper
	(5)	(6)	(7)	(8)
	0.136***	0.138***	0.133***	0.116***
	0.013	0.013	0.014	0.016
	-0.101***	-0.107***	-0.102***	-0.081***

0.016

0.016

0.017

0.017

Table 5: Confounding factors

Introduction

Implications

Conclusions

Data

Analysis

1.

2.

3.

4.

5.

				Dependent	variable: Invest
	Lifecycle	e effects		Intangibles	
	Matched				
	on size,	Matched			R&D,
	industry	on size,			advertising,
	and	industry,			change in
	RE/TA	and age	R&D	Advertising	goodwill
	(1)	(2)	(3)	(4)	(5)
Investment opportunities	0.113***	0.111***	0.137***	0.159***	0.164^{***}
	0.028	0.022	0.013	0.014	0.015
x public	-0.075***	-0.087***	-0.094***	-0.117***	-0.084***
	0.029	0.022	0.016	0.017	0.019
ROA	0.018	0.033***	0.175^{***}	0.203^{***}	0.209^{***}
	0.043	0.011	0.014	0.015	0.016
x public	0.026	0.012	-0.297***	-0.164***	-0.408***
	0.053	0.021	0.040	0.029	0.051
Cash holdings					
Book leverage					
Size (<i>ln</i> (total assets))					
R^2 (within)	6.5 %	4.2 %	27.0 %	33.6 %	26.4 %
<i>F</i> -test: all coeff. $= 0$	8.5***	11.4^{***}	32.0***	32.1***	34.2***
No. observations	33,998	3,974	9,950	9,950	9,950
No. firms	5,519	987	2,286	2,286	2,286

Table 5: Confounding factors

	Only C Corps (6)	Only accrual- basis accounting (7)	Net rather than gross investment (8)	Exclude multi- nationals (9)	Additional controls (10)
Investment opportunities	0.121*** 0.013	0.131 ^{***} 0.021	0.210 ^{***} 0.016	0.158^{***} 0.021	0.092^{***}
x public	-0.085 ^{***} 0.017	-0.092 ^{***} 0.022	-0.175 ^{***} 0.017	-0.128 ^{***} 0.023	-0.058 ^{***} 0.022
ROA	0.159^{***} 0.015	0.166^{***} 0.025	-0.006 0.019	0.198^{***} 0.024	0.174^{***} 0.012
x public	-0.114 ^{***} 0.032	-0.128^{***} 0.034	0.007 0.028	-0.162 ^{***} 0.034	-0.118 ^{***} 0.030
Cash holdings					$0.116^{*}_{-0.065}$
Book leverage					-0.157 ^{**} 0.062
Size (<i>ln</i> (total assets))					-0.055 ^{***} 0.017
R^2 (within)	34.0 %	19.3 %	50.0 %	22.5 %	32.4 %
<i>F</i> -test: all coeff. $= 0$	15.1***	11.0***	27.4^{***}	14.9***	80.2***
No. observations	8,154	9,828	9,950	6,608	9,931
No. firms	1,913	2,255	2,286	1,681	2,282

nt / lagged total assets

1. Introduction

2. Data

3. Analysis

4. Implications

5. Conclusions

Analytic strategy

- Issue #2: Defining investment opportunities
 - Use sales growth mainly (also look at Q-measures: market-to-book measures)
- Issue #3: Measurement error
 - May worry that we measure investment opportunities with error. We do too.
 - Do some measurement error corrections
 - More usefully look at an alternative measure arising from tax changes

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 6:		Within-			
		groups		First-differe	ence GMM
Measurement		(1)	(2)	(3)	(4)
error and	Panel A. Public firms				
investment	lagged gross investment				0.001 0.058
dynamics	investment opportunities	0.038^{***} 0.009	0.026^{***}	0.026 ^{**} 0.012	0.027 ^{**} 0.012
	lagged inv. opportunities			-0.002 0.006	
	ROA	0.038 0.023	0.016 0.036	0.012 0.040	0.007 0.043
	Hansen over-identification test (p)	n.a.	0.401	0.535	0.232
	Hansen difference test of system instruments (p) Arellano-Bond test: AB(2) (p)	n.a.	n.a. 0.425	n.a. 0.609	n.a. 0.613
	$\operatorname{Arenano-Done test.}\operatorname{Are}(2)(p)$	11.a.	0.425	0.007	0.015
	Panel B. Private firms				
	lagged gross investment				-0.126
	investment opportunities	0.134***	0.136***	0.136*	0.088**
	lagged inv. opportunities	0.012	0.012	0.072 -0.019 0.035	0.035
	ROA	0.172 ^{***} 0.013	0.170^{***} 0.014	0.884^{***} 0.307	0.253 ^{***} 0.058
1. Introduction	Hansen over-identification test (p)	n.a.	0.142	0.495	0.153
	Hansen difference test of system instruments (p)	n.a.	n.a.	n.a.	n.a.
Z. Data	Arellano-Bond test: $AR(2)(p)$	n.a.	0.109	0.288	0.644

(5)

0.001

0.012 -0.002 0.006

0.009

0.041

0.235

0.626

-0.169

0.139

0.043 0.034 0.039

0.106**

0.243***

0.063

0.232

0.499

n.a.

n.a.

0.059 0.026^{**}

Analysis 3.

- Implications 4.
- 5. Conclusions

Analytic strategy

- Issue #2: Defining investment opportunities
 - Use sales growth mainly (also look at Q-measures: market-to-book measures)
- Issue #3: Measurement error
 - May worry that we measure investment opportunities with error. We do too.
 - Do some measurement error corrections
 - More usefully look at an alternative measure arising from tax changes
 - Have 33 tax changes in 18 states
 - 127 public and 148 private firms affected by tax increase
 - 138 public and 106 private firms affected by a tax decrease
 - Affected if a C-Corp headquartered in a state with a corporate tax change

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 7: Tax Changes: Diffin-Diff approach

Introduction

Implications

Conclusions

Data

Analysis

1.

2.

3.

4.

5.

		Matched sample (No observations = 9.950 : no firms = 2.286)				Private non-C Corps	
	(1)	(100.00301741	(3)	(4)	(5)	(6)	
Tax change (cut = 1, increase = -1)	0.074***		0.088***	0.077***	0.074***	0.004	
x public	-0.022 -0.058 ^{**} 0.025		-0.073*** 0.024	0.023	-0.058** 0.025	0.005	
x public single-state firm	0.025		0.024	-0.080^{***} 0.026	0.025		
x public multi-state firm				-0.062^{***}			
Tax cut		0.092^{***}		01020			
x public		-0.072^{*}					
Tax increase		-0.056* 0.030					
x public		0.045					
Tax change (<i>t</i> -1)		0.052	0.039^{*}				
x public			-0.040^{*}				
Tax change (<i>t</i> +1)			-0.002				
x public			-0.001				
Change in tax payments <i>t</i> -1 to <i>t</i>			0.025		0.034		
x public					0.011		
Sales growth	0.136^{***}	0.136^{***}	0.136^{***}	0.136^{***}	0.136***	0.053^{***}	
x public	-0.097 ^{***}	-0.097*** 0.010	-0.097*** 0.010	-0.097 ^{***}	-0.097*** 0.010	01002	
ROA	0.174***	0.174^{***}	0.174^{***}	0.174^{***}	0.174^{***}	0.037^{***}	
x public	-0.135*** 0.024	-0.135*** 0.024	-0.135*** 0.024	-0.135*** 0.024	-0.135*** 0.024	01000	
R^2 (within)	29.8 %	29.8 %	29.8 %	29.8 %	29.8 %	3.5 %	
<i>F</i> -test: all coefficients $= 0$?	199.2^{***}	170.2^{***}	167.3***	181.4^{***}	168.6^{***}	33.5***	
<i>F</i> -test: coeff.(tax change, public) = 0 ?	1.6	1.0	1.8	0.8	1.6	n.a.	
<i>F</i> -test: tax cut = $-$ tax increase?	n.a.	0.4	n.a.	n.a.	n.a.	n.a.	
<i>F</i> -test: single-state = multi-state?	n.a.	n.a.	n.a.	1.1	n.a.	n.a.	

Dependent variable: Gross investment / lagged total assets

Table 7: Tax Changes: Diffin-Diff approach

			Private non-C Corps
	(1)	(4)	(6)
Tax change (cut = 1, increase = -1)	0.074^{***}	0.077^{***}	0.004
	0.022	0.023	0.005
x public	-0.058**		
	0.025		
x public single-state firm		-0.080***	
		0.026	
x public multi-state firm		-0.062***	
		0.026	
Sales growth	0.136***	0.136***	0.053***
	0.005	0.005	0.005
x public	-0.097***	-0.097^{***}	
	0.010	0.010	***
ROA	0.174***	0.174^{***}	0.037***
	0.004	0.004	0.006
x public	-0.135	-0.135	
	0.024	0.024	
R^2 (within)	29.8 %	29.8 %	3.5 %
<i>F</i> -test: all coefficients $= 0$?	199.2***	181.4^{***}	1 33.5***
<i>F</i> -test: coeff.(tax change, public) = 0?	1.6	0.8	n.a.
<i>F</i> -test: tax cut = $-$ tax increase?	n.a.	n.a.	n.a.
<i>F</i> -test: single-state = multi-state?	n.a.	1.1	n.a.

- 1. Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Analytic strategy

- Issue #4: Finding alternative sources of variation
 - Within firm variation would be nice.
 - We look at a specific class of IPO's
 - These are firms that go public for some purpose other than raising capital.
 - Typically, these are viewed as firms where the owners want to cash-out
 - 90 firms do this between 1990 and 2007
 - These come with on average 4.4 years on pre-IPO data

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 8: Within Firm: Pre and Post IPO

Own differd in tment &&D) 1) 74*** 25	ence westment (with R&D) (2) 0.111****	Diff-in-diff w contr investment (no R&D) (3)	vith matched rols investment (with R&D) (4)
in tment &&D) 1) 74*** 25	vestment (with R&D) (2) 0.111****	investment (no R&D) (3)	investment (with R&D) (4)
1) 74 ^{***} 25	(2) 0.111 ^{***}	(3)	(4)
74 ^{***} 25	0.111***	0.012*	
	0.031	0.013	0.027^{***}
	0.001	0.066**	0.092***
58* -	0.080*	0.003	0.006
53	0.041	0.020 0.139 ^{***}	0.027 0.140 ^{***}
63	0.074	-0.093	0.027 -0.052
59	0.057	0.067 -0.019	0.080 0.019
5 <i>3</i> 01 -	0.062 0.004	0.038 -0.004	0.046 -0.006
10	0.012	0.009	0.012
% 2	1.1 % 7.3 ^{***}	13.9 % 16.6***	14.3 % 14.8 ^{***}
63 90	963 90	4,501 419	4,501 419
	25 58 [*] - 32 53 63 59 53 01 - 10 % 22 63 90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

5. Conclusions

Analysis

Data

Introduction

Implications

1.

2.

3.

4.

- Comparable private firms, on average, appear to invest more and be more sensitive to changes in investment opportunities, than public firms.
- Why?
- Agency...
- Financing restrictions...
- Let's focus for the moment on agency.

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

• Lots of different types of legal structures to hold a private firm in:

Agency

- Sole Proprietorship
- LLC
- LLP
- Partnership
- S-Corp
- C-Corp
- Public firms are all C-Corps

• Threshold question is, whether private firms are different according to legal structure...

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Table 9: Private firms by legal entity

Introduction

Data

Analysis

Implications

Conclusions

1.

2.

3.

4.

5.

		vs. an other
	All private	private
	firms	firms
	(1)	(2)
Investment encerturities	0.057***	0.054***
investment opportunities	0.037	0.034
x sole proprietorship	0.007	0.004
x sole proprietorship	-0.017	-0.020
v II C	-0.003	0.045
X LLC	-0.003	
v nartnershin	-0.013	
x particisinp	-0.015	
vIIP	-0.035	
X ELI	0.024	
x S Corp	-0.003	
x b corp	0.009	
x (sole prop.+LLC+partnership+LLP)	0.007	
POA	0.034***	0.033***
KOA	0.005	0.055
x sale proprietorship	0.005	0.003
x sole proprietorship		0.023
x (sole prop.+LLC+partnership+LLP)		0.020
R^2 (within)	32%	32%
F test: all coeff $= 0$	20 1 ^{***}	30.2***
F-test. all coefficients = 0 F test; inv. on interaction coefficients = 0	0.54	59.2
r-test. my. opp. interaction coefficients = 0	0.34	11.d.
INO. ODSERVATIONS	88,368	88,308
NO TIPMS	32.204	32,204

• Lots of different types of legal structures to hold a private firm in:

Agency

- Sole Proprietorship
- LLC
- LLP
- Partnership
- S-Corp
- C-Corp
- Public firms are all C-Corps

• Threshold question is, whether private firms are different according to legal structure...

• Appears that the answer is no

- 1. Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Agency

- Look at the Stein model...
- What matters for public listing to affect the managers' behavior is that earnings today have some predictive power for earnings tomorrow.

• Managerial Myopia: preference of manager includes both current stock price and long term value (Miller and Rock (1985), Stein (1989), Holmstrom (1999) and others)

- In the Stein version, manager diverts funds from investment to short-run cash flow generation, pumping up current earnings and "hence" share price.
- In equilibrium fully anticipated by the market, and priced in
- Results in under-investment
- Extent of diversion depends on the extent to which current earnings forecast future earnings
- This last bit is the important bit.
- (note Bebchuk and Stole (1994) show that if productivity of investment, rather than level, is unobserved then can get over-investment)

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Agency

Row	Industry definition	Sales growth	Sales growth x public	Sales growth x ERC	Sales growth x ERC x public
1	Fama-French 30 industries	0.099 ^{***} 0.031	-0.033 0.036	0.208 0.154	-0.373 ^{**} 0.174
2	Fama-French 48 industries	0.106 ^{***} 0.028	-0.048 0.032	0.189 0.157	-0.298 [*] 0.166

ERC	ERC x public	ROA	ROA x public	R^2 (within)	F-test: all coef. = 0
0.017 0.058	-0.010 0.057	0.168 ^{***} 0.019	-0.139 ^{***} 0.028	30.6%	13.1***
0.082 0.053	-0.064 0.056	0.167 ^{***} 0.019	-0.135 ^{***} 0.028	30.6%	14.1***

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

A note of caution

- Some evidence that the differences we see may have something to do with managerial incentives generated by the stock market.
- Other things are likely important...
- Financing constraints
 - Public capital markets provide opportunities for diversification and so lower firms' cost of capital
 - Private firms may not be so advantaged
 - They may only be able to invest in particularly good years due to constraints (?)
- Important caveat
 - 'Sub-optimal' (more properly, second best) outcomes on one dimension does not imply global sub-optimality

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Conclusion

- Evidence that public and private firms behave in quite different ways, even when otherwise observably similar.
- All else equal: Private firms
 - Higher investment
 - More response to changes in opportunities
- This is coupled with some evidence that is consistent with channels often used to generate stories in which managers behavior is distorted by stock-market participation.
- This is not a claim that public listing is inefficient in some total welfare sense.

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Investment of Public and	
Private Firms	

Conclusion • FIN

- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions

Auxiliary Stuff

- **1.** Introduction
- 2. Data
- 3. Analysis
- 4. Implications
- 5. Conclusions