

# Effects of Private Equity Ownership on Healthcare Costs and Quality

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# Mentor: Atul Gupta

- Assistant Professor of Healthcare Management at the Wharton School
- Research: Applied microeconomics, healthcare, public finance, and industrial organization
- Sample papers:
  - Do Medicaid HMOs Reduce Utilization: Evidence from Florida Obstetrics
  - Impact of Performance Pay for Hospitals: The Readmission Reduction Program
  - Is American Pet Healthcare (also) Uniquely Inefficient?

# Project Overview

- Does private equity (PE) investment in healthcare benefit patients?
  - Nursing home focus

# Definitions

- What is PE?
  - Firms that conduct leveraged buyouts (LBOs).
  - Usually hold assets for a short period of time, ~5 years.<sup>1</sup>
  - High-powered profit driven.

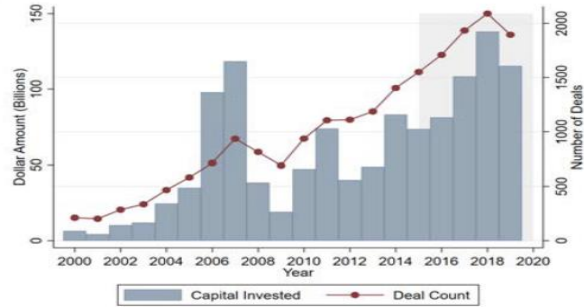
THE CARLYLE GROUP  
GLOBAL ALTERNATIVE ASSET MANAGEMENT

BlackRock

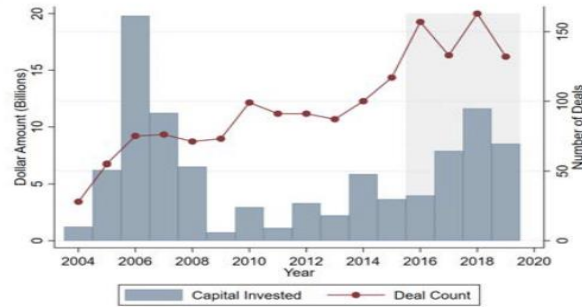
# Significance

- Over the last 20 years there has been a rise of PE investment in healthcare.
  - In 2000, <\$5B of PE funds were invested in healthcare, in 2018 over \$100B.<sup>2</sup>
- The nature of PE firms would not coincide with the social goal of healthcare.

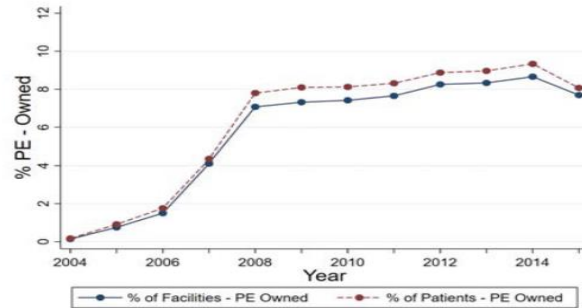
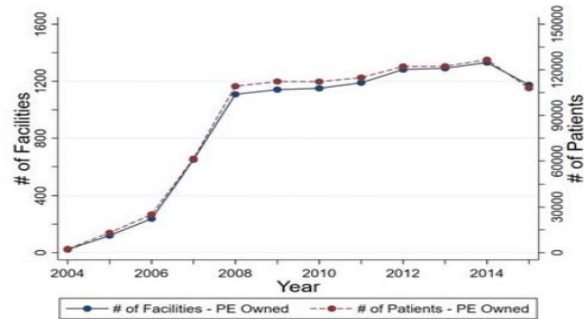
**Figure 1: Private Equity Ownership in Healthcare**



**A: PE Deals in Healthcare**



**B: PE Deals in Eldercare**



Source:  
Pitchbook

# Aims

- How do specific variables change in response to PE buyouts?
  - Five Star Rating
  - Nurse Availability
  - Mortality
  - Operating Costs

# Methods

- Utilize facility level annual data between 2000- 2017 from publicly available Centers for Medicare and Medicaid Services (CMS) sources.
  - Each year there were about 15,000 skilled nursing facilities.
  - Several variables were included in the CMS data including: patient volume, nurse availability, and components of the Five Star Ratings for nursing homes.
    - Components include: safety of care, mortality, readmission, patient experience, and timely and effective care.
- PE firm matching and nursing home deals were derived from Pitchbook.
  - Pitchbook delivers data, research, and technology for private capital markets like venture capital, private equity, and mergers and acquisitions.



## Pitchbook Example:

dealid	Tot_Facility	Deal_Year	nursing_home_chain_name	PE1	PE2	PE3
101205-64T	327	2007	Genesis Healthcare	Onex		
10026-19T	321	2006	Golden Living	Fillmore Capital Partners		
40507-30T	150	2014	Kindred Healthcare	Signature HealthCARE	The Hillview Group	
10197-46T	145	2007	Hcr Manorcare	Stockwell Capital	The Carlyle Group	
00000-00T	95	2004	Mariner Healthcare	National Senior Care		
10410-94T	76	2005	Skilled Healthcare Group	Heritage Partners		
10696-24T	65	2007	Trilogy Investors	Lydian Capital Partners		
48476-89T	61	2011	Lavie Care Centers	Formation Capital	Senior Care Development	
66441-88T	41	2006	Laurel Health Care Company	Formation Capital	Longwing Real Estate Ventures	
40534-12T	35	2013	Harden Healthcare	NXT Capital	Oaktree Speciality Lending	
11635-30T	34	2008	Covenant Care	Bregal Partners	Centre Partners	
10353-61T	21	1998	Consulate Health Care	Formation Capital		
10500-85T	21	2005	Select Medical Holdings	HarbourVest Partners	Thoma Bravo	Welsh
16753-60T	20	2006	Plum Healthcare Group	GI Partners		
16800-13T	12	2010	Life Care Companies	McCarthy Capital		
48796-84T	12	2015	14 Skilled Nursing Facilities	Mission Health Communities	Windward Health Partners	
20733-22T	11	2011	United Health Services	Bain Capital	Ignition Partners	KRG Capital Pa
10786-24T	10	2005	Diakon Lutheran Social Minist	Behrman Capital		
16497-37T	9	2010	Steward Health Care System	Cerberus Capital Management		
non106	9	2005	Nine Skilled Nursing Facilities	Harborside Healthcare		
non210	9	2005	Eleven Senior Care Facilities	omega healthcare investors		
16185-34T	8	2009	Erickson Living	Redwood Capital Investments		
28146-34T	8	2007	Signature Healthcare	The Hillview Group		
11393-11T	6	2007	Gemino Healthcare Finance	BH1 Investments	Clayton Associates	D. E. Shaw & C
30151-99T	6	2013	Kindred Healthcare	Signature HealthCARE	The Hillview Group	
non212	6	2015	6 Skilled Nursing Facilities	omega healthcare investors		

## CMS Example:

snf10_2011_NMRC				
1000236	A000000	100	200	1344300
1000236	A000000	100	300	1344300
1000236	A000000	100	500	1344300
1000236	A000000	100	700	1344300
1000236	A000000	200	200	507724
1000236	A000000	200	300	507724
1000236	A000000	200	500	507724
1000236	A000000	200	700	507724
1000236	A000000	300	200	638786
1000236	A000000	300	300	638786
1000236	A000000	300	500	638786
1000236	A000000	300	700	638786
1000236	A000000	400	100	535698
1000236	A000000	400	200	3753375
1000236	A000000	400	300	4289073
1000236	A000000	400	500	4289073
1000236	A000000	400	600	-582207
1000236	A000000	400	700	3706866
1000236	A000000	500	100	68063
1000236	A000000	500	200	863661
1000236	A000000	500	300	931724
1000236	A000000	500	500	931724
1000236	A000000	500	700	931724
1000236	A000000	600	200	410761
1000236	A000000	600	300	410761
1000236	A000000	600	500	410761
1000236	A000000	600	700	410761

# Preliminary Findings

- Going to a PE-owned facility increases 90-day mortality by about 10% for short-stay Medicare patients.
- Declines in nurse availability per patient and in measures of compliance with Medicare's standards of care.
- Increase in operating costs that aid in driving PE profits.

# Summary/ Responsibilities

- American Society of Health Economists Conference (ASHE)
- Ashvin Gandhi paper summarizing
- PE deals matching
- Data replication in Stata
- Merging and summarizing CMS cost reports data

# PE Matching

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	PE_Name	Tot_Beds	Num_Deals	Tot_Facility		Shell Company or PE			Links				
2	Active Day	370	2	2		Backed by Audax PE			<a href="https://www.pehub.com/audax-backed-active-day-make">https://www.pehub.com/audax-backed-active-day-make</a>				
3	ActivStyle	90	1	1		Acquired by Adapthealth Corp			<a href="https://www.cainbrothers.com/transactions/activstyle-2">https://www.cainbrothers.com/transactions/activstyle-2</a>				
4	Alpinvest Partners	56	2	3		Owned by The Carlyle Group			<a href="https://www.alpinvest.com/about-us">https://www.alpinvest.com/about-us</a>				
5	Anderson & Stowe	2094	2	32		PE			<a href="https://www.wcas.com/healthcare/companies/concentr">https://www.wcas.com/healthcare/companies/concentr</a>				
6	Ardian	132	1	1		PE			<a href="https://www.ardian.com/">https://www.ardian.com/</a>				
7	Ark Holdings	132	1	1		Owned by Omega Healthcare Invest			<a href="https://www.businesswire.com/news/home/201312030">https://www.businesswire.com/news/home/201312030</a>				
8	aviv asset management	28	1	1		VC			<a href="https://pitchbook.com/profiles/investor/39895-03#ove">https://pitchbook.com/profiles/investor/39895-03#ove</a>				
9	Bain Capital	1125	1	11		PE			<a href="https://www.baincapital.com/about-us">https://www.baincapital.com/about-us</a>				
0	Behavioral Health Group	181	1	1		Owned by The Vistria Group			<a href="https://frontenac.com/news/2018/frontenaccomplete">https://frontenac.com/news/2018/frontenaccomplete</a>				
1	Behrman Capital	132	1	1		PE			<a href="https://www.behrmancap.com/">https://www.behrmancap.com/</a>				
2	BH1 Investments	595	1	6		PE			<a href="https://pitchbook.com/profiles/investor/12732-85">https://pitchbook.com/profiles/investor/12732-85</a>				
3	birchwood healthcare	479	3	6		PE			<a href="https://birchwoodhcp.com/about-us/">https://birchwoodhcp.com/about-us/</a>				
4	Brandywine Senior Living	30	1	1		Healthcare Company			<a href="https://www.brandycare.com/about-us/">https://www.brandycare.com/about-us/</a>				
5	Bregal Partners	3983	1	34		PE			<a href="https://bregalpartners.com/home/about-us/">https://bregalpartners.com/home/about-us/</a>				
6	Brookdale Senior Living	265	2	2		Healthcare Company			<a href="https://www.brookdale.com/en/our-company.html">https://www.brookdale.com/en/our-company.html</a>				
7	bullard fresno investment	99	1	1		/							
8	Capital Z Partners	265	2	2		PE			<a href="https://pitchbook.com/profiles/investor/11138-23">https://pitchbook.com/profiles/investor/11138-23</a>				
9	CapitalSource	322	1	3		PE			<a href="https://www.bloomberg.com/profile/company/CHR-US">https://www.bloomberg.com/profile/company/CHR-US</a>				
0	Caregiver Services	141	1	1		Healthcare company			<a href="https://csicaregiver.com/">https://csicaregiver.com/</a>				
1	Carson	2094	2	32		PE			<a href="http://www.carsoncapital.com/history">http://www.carsoncapital.com/history</a>				
2	Centre Partners	3983	1	34		PE			<a href="https://www.centreparters.com/">https://www.centreparters.com/</a>				
3	Cerberus Capital Management	239	2	10		PE			<a href="https://www.cerberus.com/">https://www.cerberus.com/</a>				
4	Civitas Solutions	18	1	1		Healthcare company			<a href="https://civitas-solutions.com/">https://civitas-solutions.com/</a>				
5	Clayton Associates	670	2	7		PE			<a href="https://www.crunchbase.com/organization/clayton-asso">https://www.crunchbase.com/organization/clayton-asso</a>				
6	Continuum Healthcare	114	1	1		PE			<a href="https://www.continuumhltc.com/our-portfolio">https://www.continuumhltc.com/our-portfolio</a>				
7	Covington	628	3	3		PE			<a href="https://www.cov.com/en/practices-and-industries/pract">https://www.cov.com/en/practices-and-industries/pract</a>				
8	Cressey & Company	84	1	3		PE			<a href="https://www.cresseyco.com/about/firm/">https://www.cresseyco.com/about/firm/</a>				
9	D. E. Shaw & Co.	595	1	6		PE			<a href="https://www.deshaw.com/what-we-do">https://www.deshaw.com/what-we-do</a>				
0	DW Healthcare Partners	259	1	2		PE			<a href="https://www.dwhp.com/approach/">https://www.dwhp.com/approach/</a>				
1	EDG Partners	595	1	6		PE			<a href="https://edgpartners.com/">https://edgpartners.com/</a>				
2	Elite Health Solutions	156	1	1		Healthcare company			<a href="https://pitchbook.com/profiles/company/12261-79#ov">https://pitchbook.com/profiles/company/12261-79#ov</a>				
3	Encompass Home Health	84	1	3		Healthcare company			<a href="https://pitchbook.com/profiles/company/10707-13#ov">https://pitchbook.com/profiles/company/10707-13#ov</a>				
4	Eureka Equity Partners	156	1	1		PE			<a href="https://edgpartners.com/">https://edgpartners.com/</a>				
5	Falcon Investors	103	1	1		PE			<a href="https://www.onexfalcon.com/">https://www.onexfalcon.com/</a>				
6	FCA Venture Partners	40	1	2		PE			<a href="https://www.fcavp.com/strategy">https://www.fcavp.com/strategy</a>				
7	feiner investment corporation	315	1	1		PE			<a href="http://www.zvfeiner.com/">http://www.zvfeiner.com/</a>				
8	Ferrer Freeman & Company	20	1	2		PE			<a href="https://www.pelotonequity.com/">https://www.pelotonequity.com/</a>				
9	Fifth Street Asset Management	141	1	1		PE owned by Oaktree CM			<a href="https://www.fifthstreetcapital.com/fourstar-solutions/">https://www.fifthstreetcapital.com/fourstar-solutions/</a>				

# Stata

```
* Save S and G to dta
forvalues yr=2000/2017 {
*foreach yr in 2002 {
    local subdirs : dir "$dir/data/raw" dirs "*`yr'"
    foreach s of local subdirs {
        local subdir `s'
    }
    foreach x in ALPHA NMRC {
        local files : dir "$dir/data/raw/`subdir'" files "*`x'.CSV"
        foreach f of local files {
            local file `f'
        }
        local files: dir "$dir/data/raw/`subdir'" files "*`x'.csv"
        foreach f of local files {
            local file `f'
        }
        di "`file'"
        import delimited "$dir/data/raw/`subdir'/`file'", clear stringc(_all)
        ren (v1 v2 v3 v4 v5) (cost_report_num worksheet line_num col_num en
        tab worksheet
        // Note for pre-2011, "bad debt" shows up in worksheet A. For consi
        keep if substr(worksheet, 1, 1)=="G" | inlist(worksheet, "S000000",

    if "`x'" == "ALPHA" {
        * Turn into columns
        encode col_num, gen(col_num2)
        drop col_num
    }
```

# Variable Selection

snf_total_salaries_2011_2020					
id	wksht	line	col	val	year
1000236	A000000	3000	700	8151779	2011
1000242	A000000	3000	700	6972539	2011
1000321	A000000	3000	700	2369690	2011
1000482	A000000	3000	700	6037581	2011
1000483	A000000	3000	700	2935387	2011
1001452	A000000	3000	700	3453585	2011
1001453	A000000	3000	700	17316802	2011
1001454	A000000	3000	700	9228081	2011
1001455	A000000	3000	700	22100724	2011
1001456	A000000	3000	700	3339201	2011
1001457	A000000	3000	700	3559138	2011
1001458	A000000	3000	700	5608723	2011
1001459	A000000	3000	700	3842440	2011
1001460	A000000	3000	700	2850987	2011
1001461	A000000	3000	700	3140370	2011
1001462	A000000	3000	700	4998357	2011
1001463	A000000	3000	700	2943922	2011
1002409	A000000	3000	700	961466	2011
1004262	A000000	3000	700	160071	2011
1004265	A000000	3000	700	1180224	2011
1004266	A000000	3000	700	1530977	2011
1004268	A000000	3000	700	3200167	2011
1004269	A000000	3000	700	3001163	2011
1004270	A000000	3000	700	3196912	2011

# Lessons Learned

- How much of research is data cleaning.
- How much data is publicly available.

# Acknowledgements

- Atul Gupta
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- SUMR Scholars
- Family



# References

1. Lykken, A. (2020, January 24). *PE firms aren't keeping portfolio companies as long as they used to*. Pitchbook.  
<https://pitchbook.com/news/articles/pe-firms-arent-keeping-portfolio-companies-as-long-as-they-used-to>
2. Appelbaum, E., & Batt, R. (2020). Private equity buyouts in healthcare: Who wins, who loses?. *Institute for New Economic Thinking Working Paper Series*, (118).