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RESEARCH BRIEF

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TRENDS IN OWNERSHIP STRUCTURES OF U.S. NURSING HOMES AND THE RELATIONSHIP WITH FACILITY TRAITS AND QUALITY OF CARE (2013-2022)

KEY POINTS

- The role of ownership has been a longstanding concern in the nursing home sector, especially around the role of for-profit companies in providing care. Investment by private equity (PE) firms and real estate investment trusts (REITs) has sparked recent scrutiny over concerns on the potential impact on nursing home quality, further fueled by the presence of complex ownership structures and challenges in ensuring ownership transparency.
- We examined PE, REIT, and chain ownership trends from 2013 through 2022. We describe investment trends over the study period and examine their relationship with nursing home staffing and survey performance.
- PE investment increased early in the study period through 2017 but has declined since then to represent around 5% of all facilities. REIT investment steadily increased over the study period, before leveling off during COVID-19 to 9% of all facilities nationwide.
- Over the study period, PE and REIT invested facilities are similar to other for-profit facilities in terms of their size, resident acuity, and payer mix. However, PE facilities appear to be lower quality on average, based on star ratings.
- In our difference-in-differences analyses examining the impact of PE and REIT investment in nursing homes, we find that PE investment results in a 12% relative decline in registered nurse (RN) hours per resident day (HPRD) compared to other for-profit facilities and a 14% relative increase (i.e., worsening) in their deficiency score index. We see a similar pattern for REIT invested facilities, with a 7% relative decline in RN HPRD and a 14% relative increase in deficiency score index.

BACKGROUND

The role of ownership in the provision of nursing home care has been a longstanding concern for researchers and policymakers. The nursing home sector has been predominantly for-profit for decades with approximately 69% of nursing homes owned by for-profit operators.[1] In addition to lower occupancy rates and higher percent Medicaid financing, for-profit facilities generally have been found to have lower staffing and worse quality of care.[2] Moreover, the role of complex ownership structures and their relationship with quality of care has become a growing policy concern. Driven by liability trends, financial pressures, and profit seeking, nursing home assets have become increasingly complex as private equity (PE) and real estate investment trust (REIT) entities have pursued investments in the sector. PE entities are defined as publicly or non-publicly traded companies that collect capital from large investors and rely heavily on debt financing to purchase an ownership share of a provider and collect capital from their investments. REIT entities are defined as publicly or non-publicly traded companies that invest in or fully own the real estate of income producing properties.[3]

Among for-profit nursing homes, recent research shows that nearly 80% are held by for-profit chains, with 5% and 12% of all nursing home facilities having PE and REIT investment, respectively.[4,5,6]

The literature is somewhat mixed on the impact of these ownership trends on quality of care. Critics of PE acquisitions note that these firms typically have little experience in the provision of care and seek short-term profits over patient health interests. Additional concerns include the potential for PE firms to prioritize short stay post-acute care patients over long-term residents, a group for whom federal reimbursements are significantly higher compared to state Medicaid reimbursements for nursing home care.[7,8] These concerns are consistent with research by Gupta et al. who found increased short-term mortality, higher anti-psychotic use, reduced patient mobility, lowered nurse hours per resident day (HPRD), and increased costs for post-acute patients following PE acquisition.[9] Another study found that Medicare costs and hospitalization of residents increased following PE acquisition, although it did not find higher anti-psychotic use.[10] Other research has found no relationship between PE acquisition and reduced quality of care for long-stay residents.[5,11] Additionally, one study found that PE ownership helped to lower the likelihood of COVID-19 outbreaks among residents and staff and to lessen shortages of critical personal protective equipment (PPE),[12] while another found that PE facilities had lower supplies of PPE.[13]

Building off the relationship between PE ownership and quality of care within nursing homes, research is beginning to investigate the impact of nursing home market characteristics (e.g., competitiveness) on trends in ownership structures and their impact on quality. Ghandi et al. found that quality of care increased when PE firms acquired facilities in competitive markets and decreased in less competitive markets, as measured by staffing and inspections.[14] One aspect of this analysis suggests that responsiveness to the 5-star rating system among PE managers was strongest in densely concentrated markets, suggesting that market concentration may be an important factor in determining the impact of ownership structures on quality of care.

Relatively less is known about the role of REIT investment in nursing homes, where complex financial relationships allow for revenue from real estate and management contracts while limiting financial losses or liability associated with operating a nursing home. One recent study found that roughly 12% of nursing homes had REIT investment and that such investment was associated with changes in nurse staffing, including a general shift away from higher to lower skilled direct care staff.[15]

Common to all work examining the impact of ownership trends on quality of care is the challenge of obtaining detailed, accurate ownership data and a broader lack of transparency surrounding the corporate structures of these companies. Not only has this factor hindered research, but it has limited oversight efforts and accountability of poor performing operators. Although provisions to improve transparency were included in the Affordable Care Act, their impact has been limited by their delayed implementation and by the increased complexity of companies that have entered the nursing home sector.16 In response to continued challenges in this area, the Centers for Medicare & Medicaid Services (CMS) finalized a rule to bolster transparency efforts, including requirements for nursing homes to disclose additional ownership information and finalizing definitions of PE and REIT, which should help provide more information in the future regarding PE and REIT ownership.[3]

The purpose of this study is to analyze recent trends in nursing home ownership and whether ownership type affects quality of care to residents. Specifically, using a range of data sources and coding efforts, we seek to understand: (1) how ownership structures have changed over the last 10 years; (2) how these changes have affected the nursing home market; and (3) how quality of care differs across various ownership structures. Unlike other research, our study examined trends in ownership over a longer duration, including before and after the COVID-19 public health emergency, and investigated the relationship between PE and REIT ownership and quality of care. Findings from this study may inform nursing home policy related to the quality of care for current and future nursing home residents and their families.

DATA AND METHODS

Data Sources. To describe the trends in ownership structures of United States nursing homes and the effect of this ownership on quality of care, we used data from multiple sources over the 2013-2022 time period as listed below and detailed in **Appendix A**:

- Online Survey, Certification and Reporting (OSCAR)/Certification and Survey Provider Enhanced Reports (CASPER) data.
- Provider Enrollment, Chain, and Ownership System (PECOS).
- S&P Capital IQ and Irving Levin Associates Health Care M&A transaction data.
- Medicare Cost Reports (MCRs).
- Care Compare and Five Star Quality Rating System.
- LTCFocus.

Chain Identification. In the OSCAR/CASPER data, nursing homes' reported chain ownership appears in a field titled "Name of Multi-Facility Organization." Building on prior efforts, we coded chain identifiers based on this text field. This coding consisted of approximate string (or "fuzzy") matching with statistical software and line-by-line inspection of the text field to group nursing homes into specific chains, along with a rigorous assessment of potential inconsistencies, typographical errors, and abbreviations in names across years and nursing homes. Where possible, inconsistencies were resolved through Internet searches of publicly available information (for example, tracing the history of specific corporations) available on company websites and government reports and in media coverage of nursing home transactions.

To examine traits that could be associated with transactions, we also categorized chains by size and examined other facility traits of interest. Focusing on nursing homes with two or more commonly-owned facilities, we categorized chains each year into small (those owning 2-5 nursing homes), medium (6-29 nursing homes), and large (30 or more nursing homes) chains, as we have done in prior work.[16,17] Similarly, we included other relevant traits such as ownership (for-profit or non-profit), payer mix (among Medicaid, Medicare, and private payers), bed size, occupancy rate, and hospital ownership (i.e., whether the nursing home is owned by a hospital).

COVID-19 Chain Backfilling. The COVID-19 pandemic presented challenges to identifying changes in chain ownership. As the pandemic was met with a steep decline in re-certification surveys in 2020, fewer CASPER observations were available to identify any ownership changes. When CASPER observations were unavailable between 2020 and 2022, we used the chain information from 2019 unless a change of ownership record in PECOS could be identified. For example, if a facility had neither ownership changes in PECOS between 2020 and 2022 nor any CASPER observations, we assumed the chain owner in 2019 remained the same for the remainder of the study period. If a facility had an ownership change in PECOS between 2020 and 2022 and no CASPER observation for the corresponding year, we identified the chain name in PECOS as the facility's new chain. We used PECOS to identify chain ownership changes for 564 nursing homes over the 2020-2022 period.

PE/REIT Identification. As with the chain coding, we used previously developed methods to identify PE and REIT investment in nursing homes. We primarily used three databases in this work: CMS PECOS data, S&P Capital IQ, and Irving Levin Associates Health Care M&A databases, supplemented by web-based searches and other publicly available information. These databases reported transactions, including PE and REIT investment dates and the name of the nursing home operator.

From PECOS, we used facility information including the CMS Certification Number (CCN), facility name and address, owner name, and the date on which ownership began and divestment date (if applicable). We

considered the date ownership began as the investment date. From the Irving Levin data, we obtained transaction data including the name of the associated nursing home, the city and state of the facility; the name and business description of the PE or REIT; and the investment date of the deal. From S&P Capital IQ, we obtained transaction data including the name and description of the associated facility, the name and business description of the PE or REIT, and the investment or divestment dates of the deal.

Investment by PE firms were identified in two ways. First, we confirmed PE investment in the S&P and Irving Levin databases by manually reviewing each acquirers' company profile using CB Insights, Bloomberg Businessweek, Pitchbook, and web-based searches to see whether they were a PE firm or PE-backed platform nursing home. Second, we used keyword searches in the Care Compare database for nursing homes to identify PE firms and PE-backed platform nursing homes that were not in the S&P and Irving Levin databases. Identified acquisitions were then manually matched to CMS data using nursing home name, address, and location to obtain the CCN.

For REIT invested nursing homes, we searched PECOS data for known REITs and using targeted keyword searches for "REIT," "real estate," "trust," "land," "investment," "properties", etc., and manually reviewing nursing home owners with those keywords in their names. In addition, known REIT firms or subsidiaries were matched to the ownership field with PECOS data.

Data Linkages. To obtain facility-level resident characteristics, we used CCNs and relevant data fields and merged information from Brown University's LTCFocus and several CMS databases: PECOS, Care Compare and the Five Star Quality Reporting System, and MCRs.

Analytic Approach. Our analyses contained four steps. We first analyzed nursing home investment trends by PE, REIT, and joint PE/REIT ownership type. Next, we compared descriptive characteristics of for-profit nursing homes by PE or REIT investment and chain ownership. We focused on for-profit nursing homes because we hypothesized that they were more similar to PE and REIT invested facilities. For each of these categories of investment structure, we described resident acuity (by acuity index from LTCFocus data), quality ratings (from Care Compare and the Five Start Quality Rating System, and including overall CMS Five Star quality ratings and specific ratings for health inspections, staffing and quality measures), health deficiencies score index (from Care Compare, and derived from CASPER/OSCAR), payer type, and facility size (by number of residents).

We then produced difference-in-differences estimates with nursing home and year fixed effects, comparing changes among PE or REIT acquired facilities to non-acquired for-profit facilities in health deficiencies scores and in staffing levels, both of which have been used in prior studies to characterize nursing home quality of care.[1] The health deficiencies score index is a scope and severity adjusted score based on the most recent re-certification and complaint deficiencies and is calculated relative to other facilities in the state over the same time period. The measure reflects survey performance relative to other local facilities. Staffing measures were derived from MCR and include registered nurse (RN), licensed practical nurse (LPN), certified nursing assistant (CNA), and total direct care staffing HPRD. We used MCR staffing data, as they offer consistent measures over the entire study period (e.g., Payroll Based Journal [PBJ] staffing data are available only from 2017 forward). Staffing levels have been used as a proxy for quality of care in a range of prior analyses and reflect a key input used by facilities and ownership.

We considered facilities acquired within 2014-2019 as our treatment group and observed outcomes during the pre-acquisition and post-acquisition periods. Outcomes among for-profit nursing homes not acquired by a PE or REIT during 2013-2020 were used as the counterfactual for if PE or REIT investment had never occurred. Additionally, facilities were compared within hospital referral regions (HRRs) that had PE and REIT investment, thus our sample excluded non-PE or REIT facilities within HRRs without PE or REIT investment. Using the approach by Baker et al.,[18] we excluded time-varying covariates from our primary analysis. Subsequently, to

investigate whether resident and facility characteristics changed after PE/REIT investment, which could bias estimated effects of investments on outcomes, we applied difference-in-differences to analyze changes in variables such as acuity, resident count, payer categories, racial composition, and occupancy rates vis-à-vis nursing home investment.

Finally, to examine selection effects, we produced difference-in-differences estimates comparing acuity, number of residents, payer type, race, and occupancy levels by nursing home investment.

We include three appendices in the report. First, we include detailed data source descriptions (**Appendix A**). Next, we include trends in PE and REIT investment by chain status and facility size (by number of residents) from 2013 through 2022 (**Appendix B**). Finally, we display trends in PE and REIT transactions from 2013 through 2022 (**Appendix C**).

Limitations. There are two main potential limitations with our analytic approach: (1) the (mis)identification of facilities within chains, PE firms, and REITs; and (2) using only survey and staffing data to characterize quality of care. Because our coding strategy generally relied on text fields and shared organizational names, it is possible that standalone nursing homes may be incorrectly identified as a part of a chain/PE/REIT; that chain/PE/REIT facilities are not coded as such; and that facilities are coded into the wrong organization. Although we have refined our coding schema over time and feel that it adequately captures major trends in the nursing home sector, it is still plausible that our coding will have inaccuracies. The addition of PECOS data and their included numerical identifiers also help improve accuracy. For PE investment in particular, we also assumed a 4-year investment window if disassociation or sale dates were missing, a limitation that affects around one-quarter of PE transactions in the 2013-2020 period. We also did not have a true, multidimensional measure of quality of care available over time. Although the overall star rating was an intriguing possibility (and we included this measure in descriptive analyses), it is based on 3 years of survey data and, thus, slow to change (e.g., after an ownership change). For our differences-in-differences analyses, we instead used the health deficiencies score index that captures the severity of the most recent survey and complaint deficiencies relative to other facilities in the state and staffing measures for overall, RN, and nurse aide staffing, each of which has its own imitations. Most important, neither measure is a true measure of quality.

FINDINGS

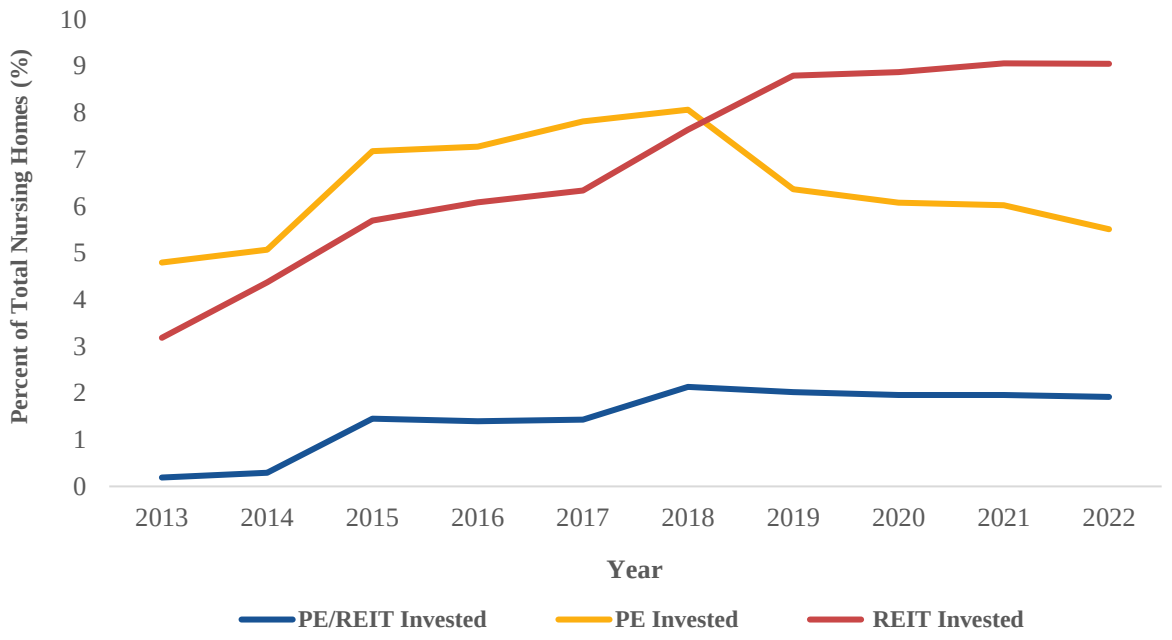
Section I: PE and REIT Ownership Trends

Exhibit 1 displays trends in PE, REIT, and PE/REIT joint investment from 2013 through 2022. The figure demonstrates the percentage of facilities with each type of investment relative to the total number of nursing home facilities in the United States. The investment categories are not mutually exclusive.

Highlights:

- REIT investment rose substantially over the study period.
- In 2014, there was a large increase in PE investment in nursing homes. We find a significant drop in PE investment in 2018, although this reflects, in part, our assumption of a 4-year PE investment period in the absence of a disassociation date (detailed in our methodology). From 2018 through the end of our study period, PE investment continues a slight decline.
- In 2022, our findings indicate roughly 9% of nursing homes were REIT invested, 5% PE invested, and 2% PE/REIT invested.

Exhibit 1: PE, REIT, and PE/REIT Invested Facilities by Year, 2013-2022



*Data sourced from CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Categories are not mutually exclusive, meaning that PE/REIT facilities (where there is joint PE and REIT investment) are also counted in the PE and REIT categories.

Section II: Demographic and Quality Information

Exhibit 2 displays nursing home demographics, payer mix, acuity index, and quality rating information by different for-profit (PE invested, REIT invested, PE and REIT invested, chain, and non-chain) and non-profit ownership types. All nursing home metrics for PE and REIT facilities include observations from both the pre-investment and post-investment periods. Metrics are averaged across the 2013-2020 timeframe. For-profit nursing home chain membership is characterized as any for-profit facility that was ever affiliated with a chain and without PE or REIT investment from 2013 through 2020. For-profit non-chain nursing homes are facilities that were not a part of a chain and without PE or REIT investment from 2013 through 2020. Non-profit nursing home membership is characterized as any non-profit facility without PE or REIT investment from 2013 through 2020.

Highlights:

- Nursing homes with PE and REIT investment were comparable to other for-profit chain and non-chain facilities in facility-level traits of interest with some exceptions.
- REIT invested facilities were somewhat smaller (by number of residents) and more reliant on Medicare financing, compared to other ownership types.
- PE invested nursing homes had a higher health deficiencies score index and lower overall, inspection, and staffing ratings, compared to other ownership types.
- Nursing homes with PE investment had a slightly lower resident acuity index compared to other ownership types.
- Non-profit nursing homes tend to be smaller, with a lesser reliance on Medicaid financing, and with higher quality metrics overall.

Exhibit 2: Nursing Home Payer Mix, Acuity, and Quality Ratings by Ownership Type, 2013-2020						
	PE Invested Nursing Homes	REIT Invested Nursing Homes	PE and REIT Invested Nursing Homes	For-Profit Chain Nursing Homes	For-Profit Non-Chain Nursing Homes	Non-Profit Nursing Homes
Count	894	1,001	407	6,807	3,221	3,490
Avg. # of Residents	91.54	84.40	93.97	82.46	87.67	75.62
Medicaid %	62.37%	58.19%	57.63%	61.61%	58.89%	45.44%
Medicare %	15.28%	17.73%	19.27%	14.20%	13.38%	16.83%
Acuity Index	12.22	12.28	12.40	12.21	12.17	11.98
Deficiency Index	1.22	1.03	1.16	1.11	1.02	0.75
Overall Rating	2.91	3.19	3.07	3.04	3.26	3.84
Inspection Rating	2.49	2.73	2.60	2.67	2.84	3.24
MDS Quality Rating	3.70	3.77	3.72	3.61	3.67	3.81
Staffing Rating	2.91	3.10	3.06	2.96	3.13	3.87
*Data sourced from LTCFocus, CMS Care Compare, and CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Non-profit includes chain and non-chain facilities.						

Section III: Relationship of PE and REIT Investment with Quality of Care

Exhibits 3.1 and **3.2** display direct care staffing and health deficiencies score index metrics before and after PE and REIT investment. Acquisitions that took place between 2014 and 2019 are included allowing at least 1 year of data pre-acquisition and post-acquisition. The comparison group consists of nursing homes that were for-profit and never had PE or REIT investment during the study period.

Highlights:

- Prior to investment, PE and REIT invested facilities were similar to other for-profit facilities on the outcomes of interest, with the exception of both PE and REIT facilities having higher unadjusted RN staffing levels. Differences remained in RN staffing following PE or REIT investment, but they were diminished.
- In fact, both PE and REIT facilities saw significant declines in adjusted RN staffing relative to other for-profit facilities following these transactions (relative declines from pre-acquisition values of 12% and 7% in RN staffing at PE and REIT facilities, respectively).
- Adjusted CNA, LPN, and total nurse staffing HPRD were unchanged following PE and REIT investment.
- Although there were no significant differences in unadjusted survey performance prior to PE and REIT investment, adjusted health deficiency scores significantly increased (worsened) among facilities with PE and REIT investment compared to non-invested for-profit nursing homes. For PE invested nursing homes, we observed a relative increase of 14% in the health deficiencies score index. For REIT invested nursing homes, this figure equaled 14%.

Exhibit 3.1: Difference-in-Differences Estimates of Changes in Outcomes Between PE Invested and Other For-Profit Facilities, 2013-2022

Outcome	Pre-acquisition, 2013				Post-acquisition, 2020			
	PE	For-Profit	Difference (95% CI)	P-Value	PE	For-Profit	Difference (95% CI)	P-Value
Health Deficiencies (Score) (n=36,869)	0.99	1.05	-0.06 (-0.22, 0.10)	0.45	1.25	1.10	0.15 (0.00, 0.30)	0.05
RN Hours/Resident Day (n=38,276)	0.76	0.51	0.24 (0.17, 0.32)	0.00	0.61	0.50	0.12 (0.04, 0.19)	0.00
LPN Hours/Resident Day (n=38,150)	0.83	0.90	-0.07 (-0.15, 0.02)	0.12	0.82	0.87	-0.06 (-0.15, 0.03)	0.21
CNA Hours/Resident Day (n=38,289)	2.29	2.42	-0.13 (-1.07, 0.81)	0.78	2.06	2.14	-0.08 (-1.06, 0.90)	0.87
Total Hours/Resident Day (n=38,451)	3.84	3.81	0.03 (-0.93, 0.99)	0.95	3.49	3.49	0.00 (-1.01, 0.99)	0.99

Outcome	Unadjusted		Adjusted		
	Unadjusted Difference from Pre- and Post-acquisition (95% CI)	P-Value	Difference-in-Difference* (95% CI)	Relative Change, %	P-Value
Health Deficiencies (Score) (n=36,869)	0.21 (-0.01, 0.43)	0.06	0.14 (0.01 to 0.26)	14.20%	0.03
RN Hours/Resident Day (n=38,276)	-0.13 (-0.23, -0.03)	0.01	-0.09 (-0.12 to -0.06)	-11.85%	0.00
LPN Hours/Resident Day (n=38,150)	0.01 (-0.11, 0.13)	0.86	-0.03 (-0.07 to 0.01)	-3.62%	0.11
CNA Hours/Resident Day (n=38,289)	0.05 (-1.31, 1.41)	0.94	-0.06 (-0.26 to 0.13)	-2.62%	0.53
Total Hours/Resident Day (n=38,451)	-0.03 (-1.42, 1.35)	0.96	-0.14 (-0.35 to 0.07)	-3.64%	0.20

*Data sourced from LTCFocus, CMS Care Compare, CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Sample sizes differ slightly based on missingness in variables of interest.

Exhibit 3.2: Difference-in-Differences Estimates of Change in Outcomes Between REIT Investment and Non-Invested For-Profit Facilities, 2013-2022

Outcome	Pre-acquisition, 2013				Post-acquisition, 2020			
	REIT	For-Profit	Difference (95% CI)	P-Value	REIT	For-Profit	Difference (95% CI)	P-Value
Health Deficiencies (Score) (n=48,179)	1.04	1.06	-0.03 (-0.16, 0.10)	0.67	1.21	1.11	0.10 (-0.03, 0.23)	0.12
RN Hours/Resident Day (n=49,847)	0.60	0.48	0.12 (0.07, 0.17)	0.00	0.58	0.48	0.10 (0.05, 0.15)	0.00
LPN Hours/Resident Day (n=49,697)	0.86	0.89	-0.03 (-0.10, 0.03)	0.32	0.86	0.85	-0.00 (-0.07, 0.06)	0.88
CNA Hours/Resident Day (n=49,819)	2.35	2.43	-0.08 (-0.74, 0.58)	0.81	2.14	2.15	-0.00 (-0.69, 0.67)	0.98
Total Hours/Resident Day (n=50,033)	3.80	3.78	0.02 (-0.65, 0.69)	0.95	3.57	3.47	0.10 (-0.60, 0.80)	0.78

Exhibit 3.2: (*continued*)					
Outcome	Unadjusted		Adjusted		
	Unadjusted Difference from Pre- and Post-acquisition (95% CI)	P-Value	Difference-in-Difference* (95% CI)	Relative Change, %	P-Value
Health Deficiencies (Score) (n=48,179)	0.13 (-0.05, 0.31)	0.17	0.15 (0.05, 0.26)	14.48%	0.01
RN Hours/Resident Day (n=49,847)	-0.03 (-0.10, 0.04)	0.45	-0.04 (-0.07, -0.01)	-6.67%	0.00
LPN Hours/Resident Day (n=49,697)	0.03 (-0.06, 0.12)	0.56	-0.00 (-0.04, 0.04)	0.00%	0.94
CNA Hours/Resident Day (n=49,819)	0.07 (-0.87, 1.02)	0.88	-0.08 (-0.22, 0.06)	-3.40%	0.29
Total Hours/Resident Day (n=50,033)	0.08 (-0.89, 1.05)	0.87	-0.11 (-0.28, 0.05)	-2.89%	0.19
*Data sourced from LTCFocus, CMS Care Compare, CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Sample sizes differ slightly based on missingness in variables of interest.					

Section IV: Relationship Between PE and REIT Investment and Facility Traits of Interest

Exhibits 4.1 and **4.2** display demographic, payer mix, and acuity index before and after PE and REIT investment. Investment that took place between 2014 and 2019 is compared allowing at least 1 year of data pre-acquisition and post-acquisition periods. The comparison group consists of nursing homes that were for-profit and never had PE or REIT investment during the study period.

Highlights:

- Resident acuity did not change following PE or REIT investment.
- PE investment was associated with a significant increase in percent of Medicaid financing and a decrease in Medicare financing.
- REIT investment was associated with a significant increase in percent of Medicaid financing and a decrease in Medicare financing.

Exhibit 4.1: Difference-in-Differences Estimates of Changes in Facility Traits Between PE Investment and Non-Invested For-Profit Facilities, 2013-2022								
Outcome	Pre-acquisition, 2013				Post-acquisition, 2020			
	PE	For-Profit	Difference (95% CI)	P-Value	PE	For-Profit	Difference (95% CI)	P-Value
Acuity Index (n=37,014)	12.29	12.20	0.08 (-0.06, 0.22)	0.24	12.31	12.34	-0.03 (-0.22, 0.15)	0.74
Occupancy (n=37,005)	85.40	82.70	2.70 (1.23, 4.17)	0.00	81.50	79.29	2.21 (0.24, 4.17)	0.03
% Medicare (n=37,014)	19.41	14.87	4.55 (3.32, 5.77)	0.00	12.03	12.08	-0.05 (-1.67, 1.58)	0.96
% Medicaid (n=37,014)	59.76	64.38	-4.61 (-6.72, -2.50)	0.00	66.72	64.15	2.57 (-0.24, 5.38)	0.07
% White (n=37,715)	84.28	80.14	4.14 (1.77, 6.52)	0.00	80.29	75.71	4.58 (2.12, 7.04)	0.00

Exhibit 4.1: (*continued*)					
Outcome	Unadjusted		Adjusted		
	Unadjusted Difference from Pre- and Post-acquisition (95% CI)	P-Value	Difference-in-Difference* (95% CI)	Relative Change, %	P-Value
Acuity Index (n=37,014)	-0.11 (-0.34, 0.12)	0.33	-0.01 (-0.09, 0.06)	-0.08%	0.69
Occupancy (n=37,005)	-0.49 (-2.95, 1.96)	0.69	-0.62 (-1.42, 0.19)	-0.73%	0.13
% Medicare (n=37,014)	-4.59 (-6.62, -2.56)	0.00	-1.84 (-2.45, -1.23)	-9.48%	0.00
% Medicaid (n=37,014)	7.18 (3.67, 10.69)	0.00	3.80 (2.98, 4.62)	6.36%	0.00
% White (n=37,715)	0.44 (-2.98, 3.86)	0.80	0.86 (0.21, 1.51)	1.02%	0.01
*Data sourced from LTCFocus, CMS Care Compare, CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Sample sizes differ slightly based on missingness in variables of interest.					

Exhibit 4.2: Difference-in-Differences Estimates of Changes in Facility Traits Between REIT Investment and Non-Invested For-Profit Facilities, 2013-2022								
Outcome	Pre-acquisition, 2013				Post-acquisition, 2020			
	REIT	For-Profit	Difference (95% CI)	P-Value	REIT	For-Profit	Difference (95% CI)	P-Value
Acuity Index (n=48,214)	12.28	12.12	0.16 (0.05, 0.28)	0.01	12.31	12.22	0.09 (-0.06, 0.24)	0.25
Occupancy (n=48,204)	82.50	81.59	0.91 (-0.32, 2.14)	0.15	80.28	78.38	1.91 (0.29, 3.52)	0.02
% Medicare (n=48,214)	22.63	15.12	7.51 (6.48, 8.55)	0.00	14.83	11.98	2.85 (1.49, 4.21)	0.00
% Medicaid (n=48,214)	55.57	63.88	-8.32 (-10.04, -6.59)	0.00	62.21	63.97	-1.76 (-4.02, 0.50)	0.13
% White (n=49,269)	82.03	80.59	1.44 (-0.44, 3.32)	0.13	77.05	76.42	0.62 (-1.29, 2.54)	0.52

Outcome	Unadjusted		Adjusted		
	Unadjusted Difference from Pre- and Post-acquisition (95% CI)	P-Value	Difference-in-Difference* (95% CI)	Relative Change, %	P-Value
Acuity Index (n=48,214)	-0.07 (-0.26, 0.11)	0.44	0.01 (-0.07, 0.09)	0.08%	0.78
Occupancy (n=48,204)	1.00 (-1.03, 3.03)	0.34	0.33 (-0.47, 1.14)	0.40%	0.42
% Medicare (n=48,214)	-4.66 (-6.37, -2.95)	0.00	-1.60 (-2.25, -0.95)	-7.07%	0.00
% Medicaid (n=48,214)	6.56 (3.72, 9.41)	0.00	2.81 (2.01, 3.61)	5.06%	0.00
% White (n=49,269)	-0.81 (-3.50, 1.87)	0.55	-0.23 (-0.75, 0.29)	-0.28%	0.38
*Data sourced from LTCFocus, CMS Care Compare, CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data. Sample sizes differ slightly based on missingness in variables of interest.					

CONCLUSION

Using a range of public use and proprietary databases, we investigated PE and REIT investment trends within the nursing home sector and their impact on quality of care. Over the 2013-2022 study period, PE investment in nursing homes peaked in 2015 and gradually decreased in subsequent years. REIT investment grew significantly over the study period, before leveling off with the start of the COVID-19 pandemic. Investment from both PE firms and REITs predominantly occurred among chain-affiliated nursing homes, with investment especially focused in large and medium sized chains. In 2022, PE and REIT invested facilities were 5% and 9% of United States nursing homes, respectively.

We found that nursing homes acquired by PE and REIT investment are similar to other for-profit facilities in many respects, including resident acuity. Facilities with PE and REIT investment had a higher percentage of residents relying on Medicare and higher RN staffing HPRD; however, both differences diminished following investment. Over the study period, PE invested facilities were lower in several of the 5-Star quality ratings relative to other for-profit facilities.

Using a difference-in-differences approach, we found that nursing homes with PE and REIT investment had significantly reduced RN staffing (12% and 7% declines, respectively) and performed relatively worse on their health deficiency score indices (14% worse for both), relative to other for-profit facilities. These findings are generally consistent with the prior literature and raise concerns that PE and REIT investment could lead to lower quality nursing home care. In particular, if PE and REIT invested facilities reduce skilled (RN) staffing levels in their facilities, research has shown that this can have a detrimental effect on a range of resident outcomes. Using the same analytic approach to examine facility traits of interest, we found that nursing homes with PE and REIT investment had significantly lower proportions of residents relying on Medicare (9% and 7%, respectively) and significantly higher proportions of residents relying on Medicaid (6% and 5%, respectively) following acquisition. These findings run somewhat counter to expectations; however, the decline in more profitable Medicare financing should be considered in the context of PE and REIT invested facilities having significantly higher levels of Medicare financing upon acquisition.

Our study results point to a changing ownership landscape within the nursing home sector over the last decade. The findings contribute to a growing set of studies that assess the influence of these changes on nursing home quality of care, with our findings raising concerns about the impact of PE and REIT investment on nursing home staffing and survey performance. Going forward, it is imperative that publicly available data allow researchers and policymakers to monitor and assess the impact of the ongoing evolution of the nursing home sector and the impact of ownership on quality. We utilized multiple databases, relied on intensive coding efforts, and used data that had important limitations. In the future, similar analyses would ideally not be as labor intensive.

Importantly, CMS has made tremendous strides in making more detailed nursing home ownership data available, including information about direct and indirect facility owners, changes of ownership (including mergers and acquisitions), and common ownership across affiliated entities. Nonetheless, our study indirectly identified several gaps in these data, including reliable identification of operating chains (as opposed to just common ownership) and instances of PE and REIT investment, the latter of which was the subject of a now finalized rule. Addressing these limitations should remain a priority for CMS, especially as they seek to improve ownership transparency and accountability as one of the many strategies aimed at improving overall nursing home quality of care.

APPENDIX A: DATA SOURCES

Online Survey, Certification and Reporting (OSCAR)/Certification and Survey Provider Enhanced Reports (CASPER) data. OSCAR/CASPER contain survey and certification data for all Medicaid-certified and Medicare-certified facilities in the United States. These data were used to characterize the nursing homes that are part of a chain and the chains to which they belong. The latter is based on a free-text field, and prior work has standardized and cleaned this variable to code facilities with common ownership. Collected and maintained by CMS, OSCAR/CASPER data also include information about whether homes are in compliance with federal regulatory requirements. Following an initial survey, states are required to survey each facility no less often than every 15 months, with the average time being 12 months. Deficiencies are entered into OSCAR/CASPER by survey agencies when facilities are found to be out of compliance with federal regulatory standards. These data have limitations that should be noted, including a lack explicit auditing procedures of facility-reported information, potential variation in survey practices across states and over time, and possible under-reporting of serious quality problems.

Provider Enrollment, Chain, and Ownership System (PECOS). All Medicare providers must be registered with the PECOS online system and submit current enrollment information. This system provides data on the type of Medicare provider, parent organization and ownership information, and whether the provider is a member of a chain. Although the PECOS system was launched in the early 2000s, early analyses of the data identified substantial limitations. Beginning in 2011, payment of Medicare claims was more closely tied to health care providers' registration in PECOS, and these requirements likely led to subsequent improvements in data quality. PECOS data, which include numeric -- as opposed to text -- identifiers for ownership, will be used to supplement chain information provided in the OSCAR/CASPER data, described above. We obtained PECOS data for skilled nursing facilities (SNFs) in November 2022. Although these data include observations back in time, the file structure is not longitudinal in nature and instead captures ownership transactions when they occur. The project will focus on 2010 forward.

S&P Capital IQ and Irving Levin Associates Health Care M&A transaction data. S&P Capital IQ and Irving Levin Associates are both privately maintained, proprietary databases that can be used to track and identify SNF transactions over time. Using the S&P Capital IQ database, we obtained investment histories for facilities, allowing us to capture investments, divestitures, as well as re-investments. Using Irving Levin Associates investment data, we acquired the name and description of the invested nursing home, city and state of the invested facilities, name and business description of the investor, a description of the investment, and the announcement date of the investment. Both the Irving Levin Associates Health Care M&A and S&P Capital IQ data were filtered for nursing home investments.

Medicare Cost Reports (MCRs). All Medicare-certified SNFs submit cost reports on a yearly basis to CMS, and these data are publicly available. MCRs include SNF (nursing home) name, geographic location, staffing inputs, and number of residents, in addition to more detailed financial information. As described below, we created staffing measures using the MCR data, including RN HPRD, LPN HPRD, and CNA HPRD. Following previously used methods, HPRD is defined as the total number of hours associated with the staff type divided by the corresponding resident census. Although CMS's PBJ staffing data have some advantages over MCR staffing data, PBJ data are available only from 2017 forward. Thus, to capture staffing over our entire timeframe, we will use the MCR staffing variables.

Care Compare and Five Star Quality Rating System. CMS has maintained and made publicly available a range of data for United States nursing homes since 1998. These data include structural information, inspection data (including certification and complaint survey deficiencies, typically derived from OSCAR/CASPER), staffing information, Minimum Data Set (MDS) facility-level quality measures, and (from 2008 forward) star ratings.

We primarily used the annual Provider Information files, which include quarterly summary information about nursing home characteristics and performance.

LTCFocus. LTCFocus is a product of the Shaping Long-Term Care in American project funded by the National Institute on Aging and maintained by Brown University. LTCFocus includes facility-level data from 2011 through 2020. We used these data to characterize the distribution of race/ethnicity at facilities and for resident case-mix and acuity at the facility level.

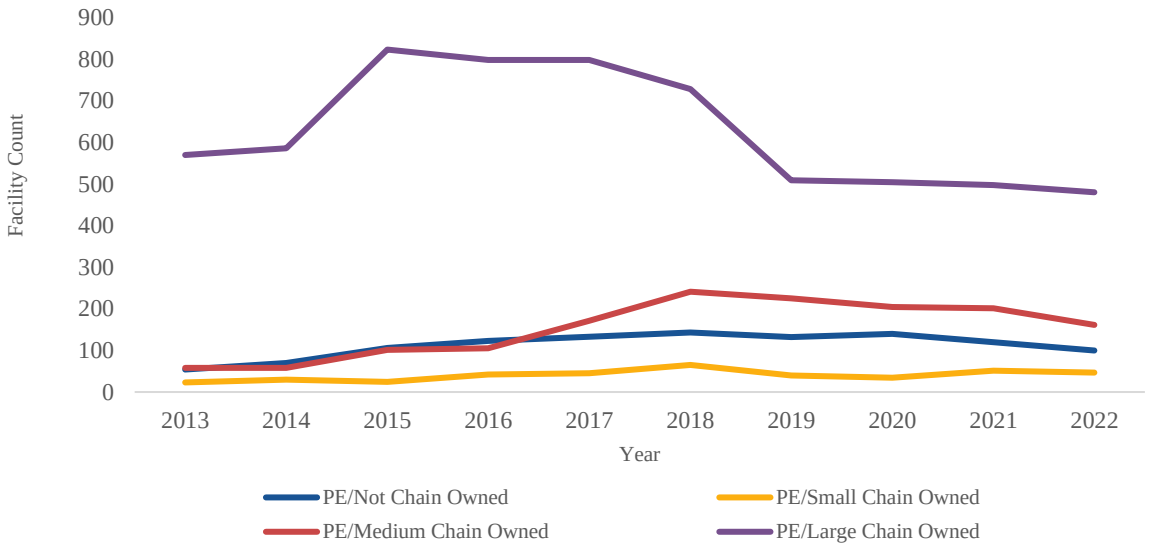
APPENDIX B: PE AND REIT OWNERSHIP TRENDS

Exhibits B.1 and **B.2** display trends in nursing home ownership by chain size and PE or REIT ownership respectively. All facilities included in the small (2-5 facilities), medium (6-29), and large (30+) chain categories are a part of a chain. Facilities characterized as not chain owned were not affiliated with a chain during the year of interest.

Highlights:

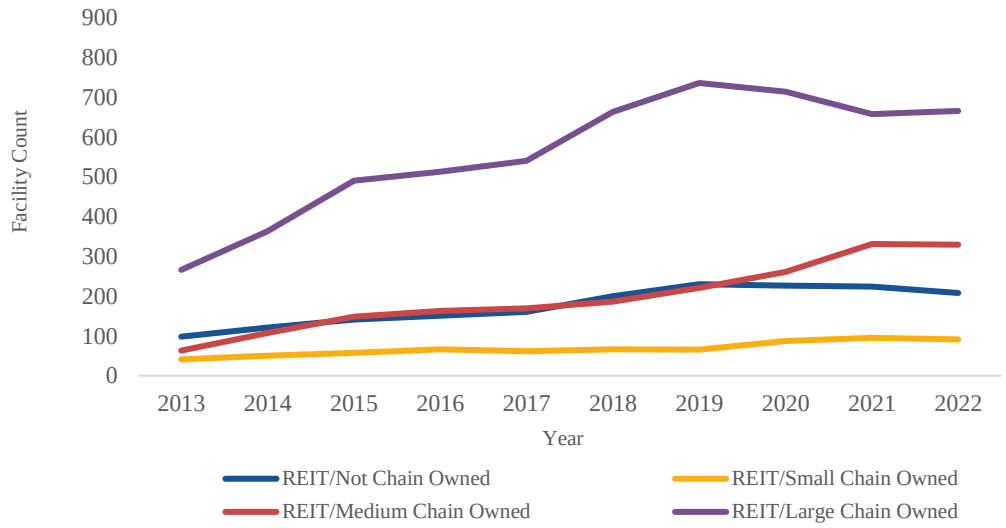
- REIT/Large Chain owned investment rose substantially over the study period.
- In 2014, there was a large increase in PE acquisitions of nursing homes. As noted in our methodology, in the absence of disassociation dates, we assumed that PE firms remained invested in nursing homes for an average of 4 years. Reflecting this assumption, we find a significant drop in total PE ownership among large chains in 2018.
- Over the last 10 years there has been a significant increase in PE and REIT investment in facilities that are part of medium sized chains.

Exhibit B.1: PE Ownership by Chain Size, 2013-2022



*Data sourced from CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data.

Exhibit B.2: REIT Ownership by Chain Size, 2013-2022



*Data sourced from CASPER, S&P Capital IQ, and Irving Levin Associates Health Care M&A Transaction Data.

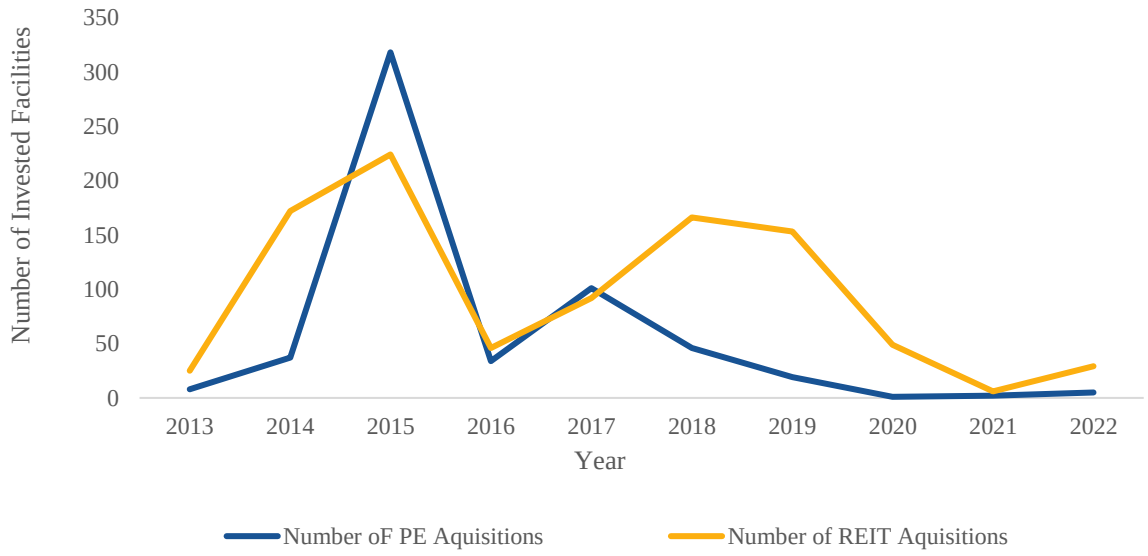
APPENDIX C: TRENDS IN PE AND REIT INVESTMENT

Exhibit C.1 displays the number of PE and REIT nursing home facility investments between 2013 and 2022.

Highlights:

- There was a large spike in PE and REIT acquisitions between 2013 and 2015.
- PE acquisitions have steadily declined since 2017.
- PE and REIT acquisitions decreased substantially during the COVID-19 pandemic (2020-2022).

Exhibit C.1: PE and REIT Nursing Home Acquisitions by Year, 2013-2022



*Data sourced from S&P Capital IQ and Irving Levin Associates Health Care M&A Transaction Data.

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ABOUT THE AUTHORS
David Stevenson, Hannah Peterson, Robert Skinner, and Estrella Ndrianasy work in the Department of Health Policy at Vanderbilt School of Medicine and the Tennessee Valley Healthcare System (Stevenson).

Robert Tyler Braun, Mark Unruh, and Rahul Fernandez work in the Department of Population Health Sciences, Weill Cornell Medical College.

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Iara Oliveira, works in the Office of Behavioral Health, Disability, and Aging Policy in the Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services.

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