Nursing Homes: A Healthcare, or Real Estate Industry?

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Recommendations

- **$ Invest in Assisted Living Facilities**
- **🎯 Target For-Profit Facilities**
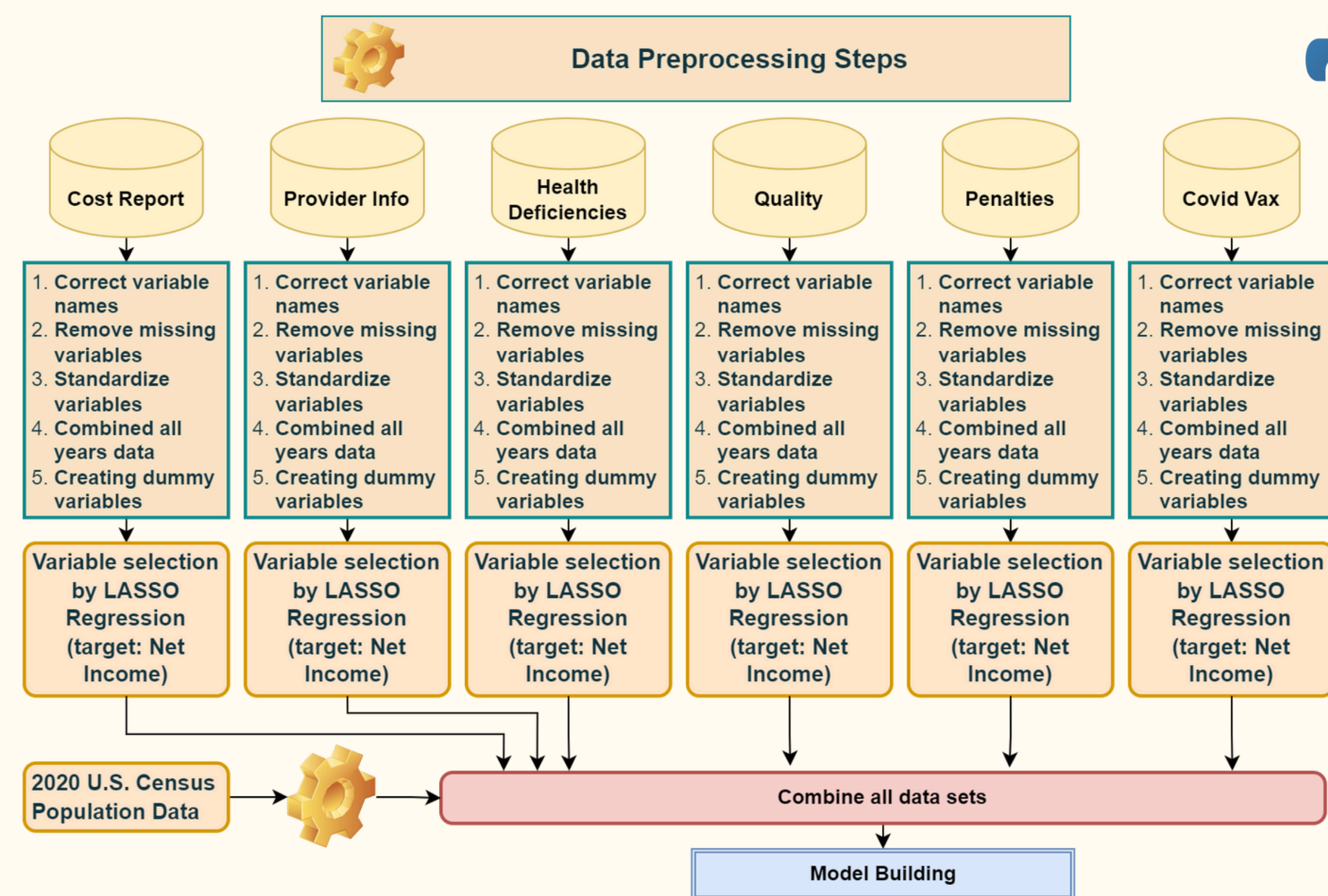- **🌟 Invest in High-Quality Facilities**

Introduction

With Baby Boomers reaching retirement age, many have begun to consider investing in the nursing home industry. Data published by the Center for Medicare and Medicaid Services (CMS) from 2015 to 2021 presents an opportunity to assess the factors impacting investment in the nursing home industry.

Research Objectives:
1. Evaluate the **overall financial performance** of nursing homes in the United States from 2015 to 2021.
2. **Identify influential factors** affecting the financial performance of nursing homes.
3. Determine the **most significant influential factors** impacting nursing home's performance.
4. Describe **trends in performance** and these **influential factors**.
5. Analyze the impact of **COVID-19**.

Methodology

Data Preprocessing Steps

Cost Report | Provider Info | Health Deficiencies | Quality | Penalties | Covid Vax

1. Correct variable names
2. Remove missing variables
3. Standardize variables
4. Combined all years data
5. Creating dummy variables

Variable selection by LASSO Regression (target: Net Income)

2020 U.S. Census Population Data

Combine all data sets

Model Building

Assisted Living: The Real Estate Business Model for Nursing

Sources of Income
What separates success & failure?

Background: Nursing homes are typically thought of as healthcare facilities that serve the elderly.

*Net Income from Patients is the portion of net income generated from providing nursing services to patients.

Positive-Net-Income Facilities — 0.01
Negative-Net-Income Facilities — 0.49

Figure 1. Outliers in net income removed.

Figure 2. Top 30 Facilities are defined as having a best year's Net income performance within the top 30 performances by all facilities.
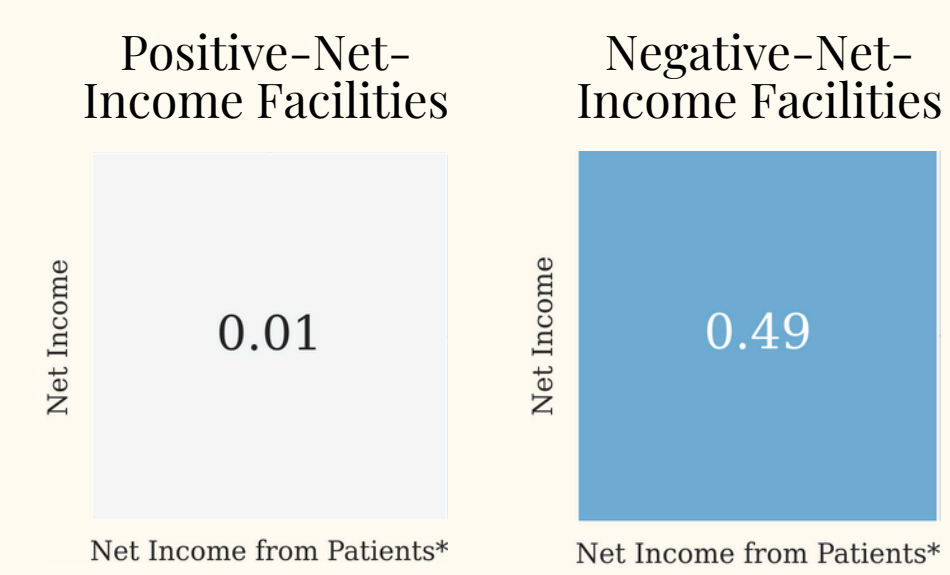
Business Model For Top 30 Facilities
- Assisted Living: 80.0%
- Rehabilitation: 20.0%

While unsuccessful facilities (**negative-net-income**) generate income primarily from service to their patients, the lack of correlation in the displayed variables for successful facilities (**positive-net-income**) suggests that they generate much of their income from other sources.

Per research (**Figure 2**), successful firms are diversifying their operations to create a new business model for nursing homes.
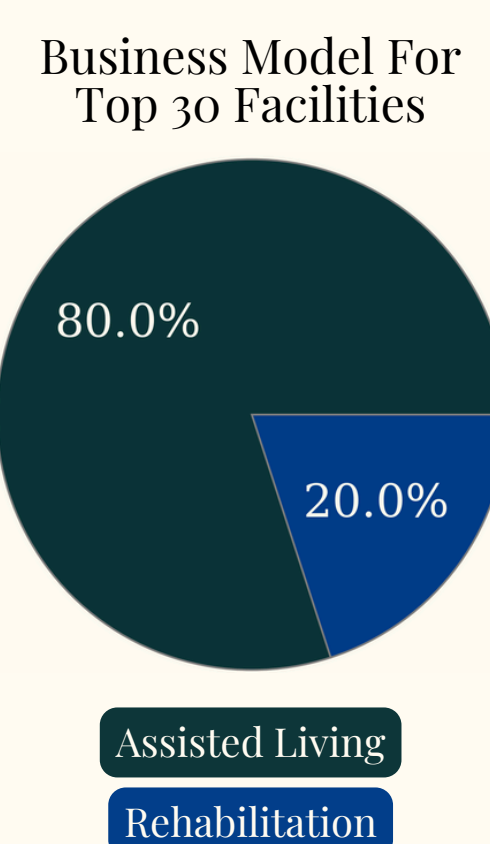
What is this new business model?

Assisted Living is a nursing business model that generates revenue primarily from renting living space rather than providing nursing services.

These facilities operate as a **real estate venture**, despite being legally categorized as nursing facilities.

Assisted living facilities are often owned by real estate firms, offering on-site care services to elderly residents.

Recommendation
A **majority** of the most successful facilities are part of an assisted living chain (**Figure 2**).

Property appreciation and greater revenue per patient make it more advisable to invest in assisted living over the traditional nursing model.
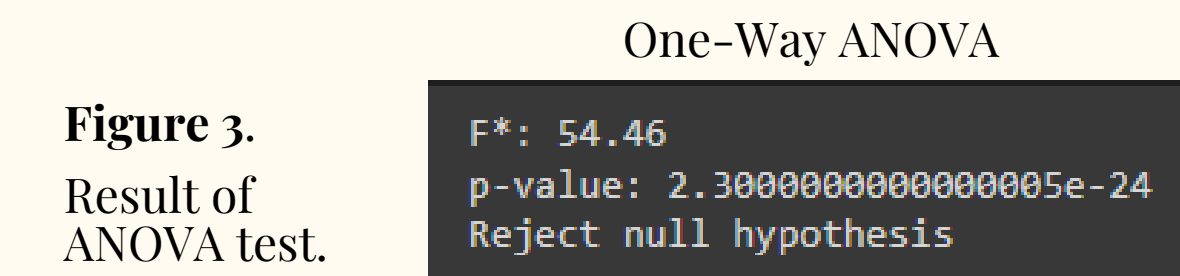
Ownership Type & Net Income

Nonprofit, For-profit, & Government-Owned Facilities
Do the various ownership types have similar net incomes?

Null Hypothesis: There is no significant difference in net income across ownership types.
Alternative Hypothesis: There is a significant difference in net income across ownership types.

One-Way ANOVA

Figure 3. Result of ANOVA test.
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F*: 54.46
p-value: 2.300000000000005e-24
Reject null hypothesis
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With a p-value approaching 0 and a significant F-statistic, the three main ownership types do not all have equal mean net incomes.

Mean Net Income (outliers removed):

Nonprofit.............................$(65,682)
For-Profit.............................$101,004
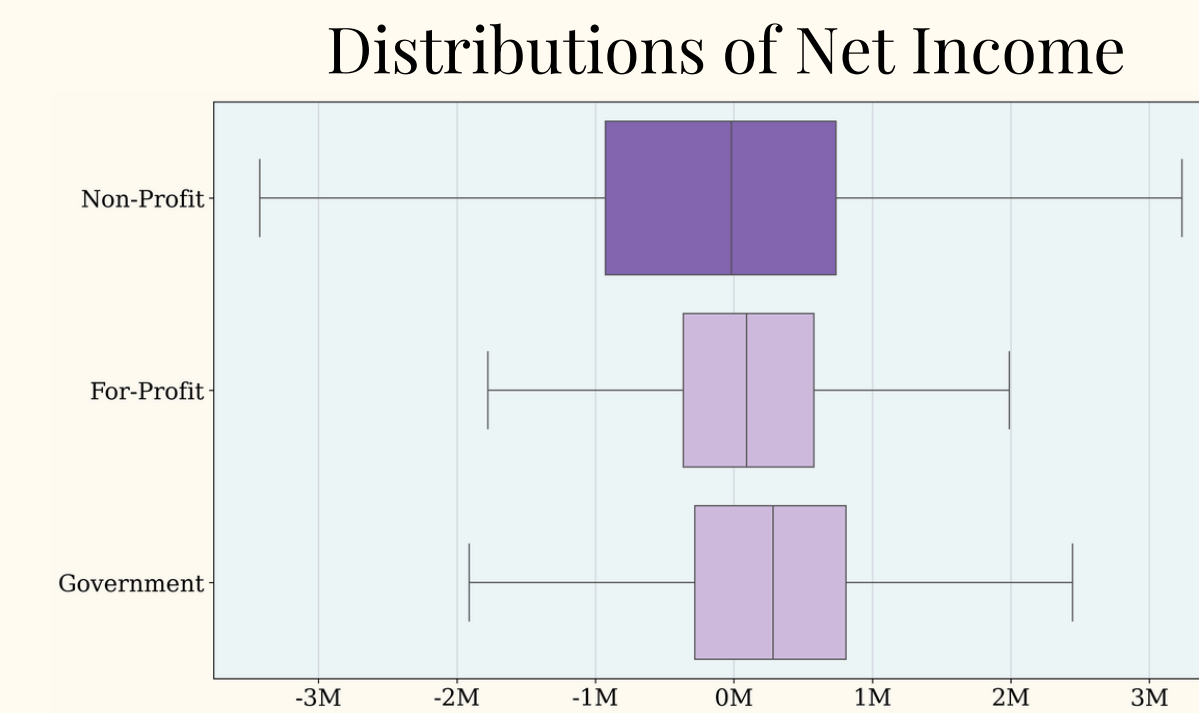Government........................$217,464

Distributions of Net Income

Figure 4. Differing variances between ownership types are not an issue because ANOVA was conducted using populations rather than samples, since population data was available.

Recommendation
Government facilities exhibit better performance, but are not accessible for investment. In contrast, for-profit facilities outperform nonprofit organizations and are available for investment. Therefore, investment in for-profit facilities should be prioritized over non-profits.

Influential Factors & Trends

Lasso (L1) Regularization: Identifying Influential Factors

- Variables such as **Major Moveable Equipment**, **Number of Federally-Certified Beds**, and **Reported Licensed Nurse Staffing Hours per Resident per Day** have a negative association with net income and appear to be a byproduct of industry domination by assisted living facilities (**Figures 1, 2**) since positive association would be expected for traditional nursing facilities. **Net Income from Patients** appears to only have strong predictive power because of the abundance of unsuccessful facilities (**Figure 1**).

Top 5 Variables with Highest Absolute-Value Coefficients after Z-Score Standardization

Predictive Power	Cost Reports	ProviderInfo	Quality Reports
Highest	Equity	Average # of Residents per Day	% of long-stay residents whose ability to move independently worsened
	Net Income from Patients	# of Federally-Certified Beds	% of long-stay residents experiencing one or more falls with major injury
	Major Moveable Equipment	Health Inspection Rating (1-5)	% of long-stay residents with a urinary tract infection
	Inpatient PPS Amount	Reported Licensed Nurse Staffing Hours per Resident per Day	% of long-stay residents who lose too much weight
Lowest	Total Salaries	Overall Quality (QM) Rating	% of long-stay residents who received an antianxiety or hypnotic medication

Positive Association with Net Income / Negative Association with Net Income

Figure 5. Top 5 Lasso regression coefficient rankings (target: Net Income).

- The positive association between net income and **Overall Quality Rating** indicates that the cost of providing higher quality service tend to be offset by gains in net income. As indicated by the Quality Reports section of **Figure 5**, some quality issues may be less desirable than others (negative association relative to other issues), making it more cost effective to address negatively-associated issues first.

Although present data limitations do not allow for analysis establishing a direct causal relationship, variables with the most predictive power are good candidates for establishing factors influential on the financial performance of nursing facilities.

Recommendation
Investing in high-quality-rating facilities will produce better long-term financial outcomes, both for facilities and investors. Costs of improving quality of service tend to be offset by increases in net income (**Figure 5**).

Recommendation
The negative correlation between **Reported Licensed Nurse Staffing Hours per Resident per Day** and **Net Income** suggests that low-labor business models (assisted living) may produce better financial performance. Invest in assisted living!

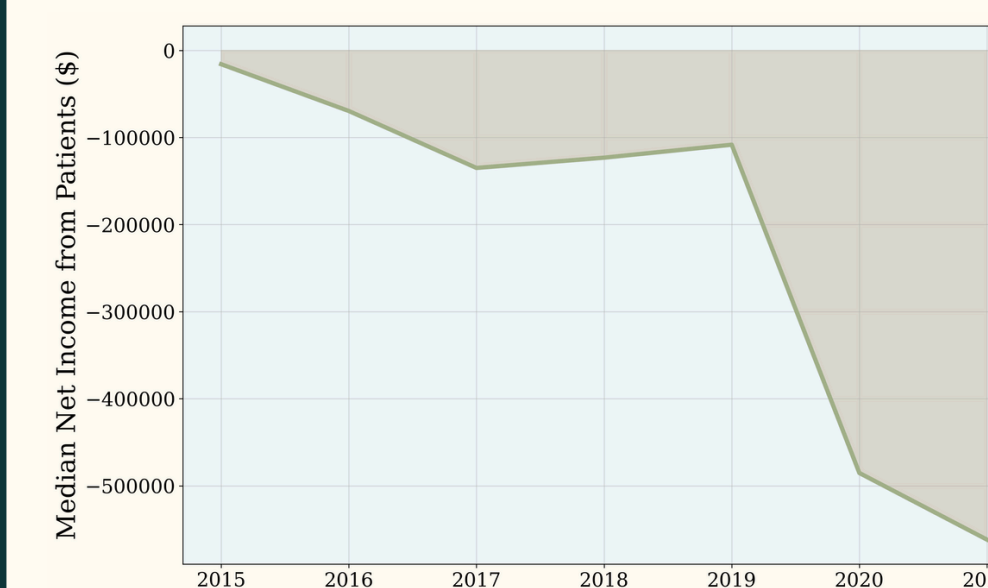Median Net Income from Patients over Time

Figure 6. Net Income from Patients represents the portion of Net Income generated from providing nursing services to patients. Negative values indicate losses on services, working to reduce overall net income.

Before COVID-19, median **Net Income from Patients**, a financially-influential factor, was already negative.

Since COVID-19, the market has shifted into an even more favorable environment for the assisted living model, making it wise to invest in such facilities.

Assessing Overall Market Performance
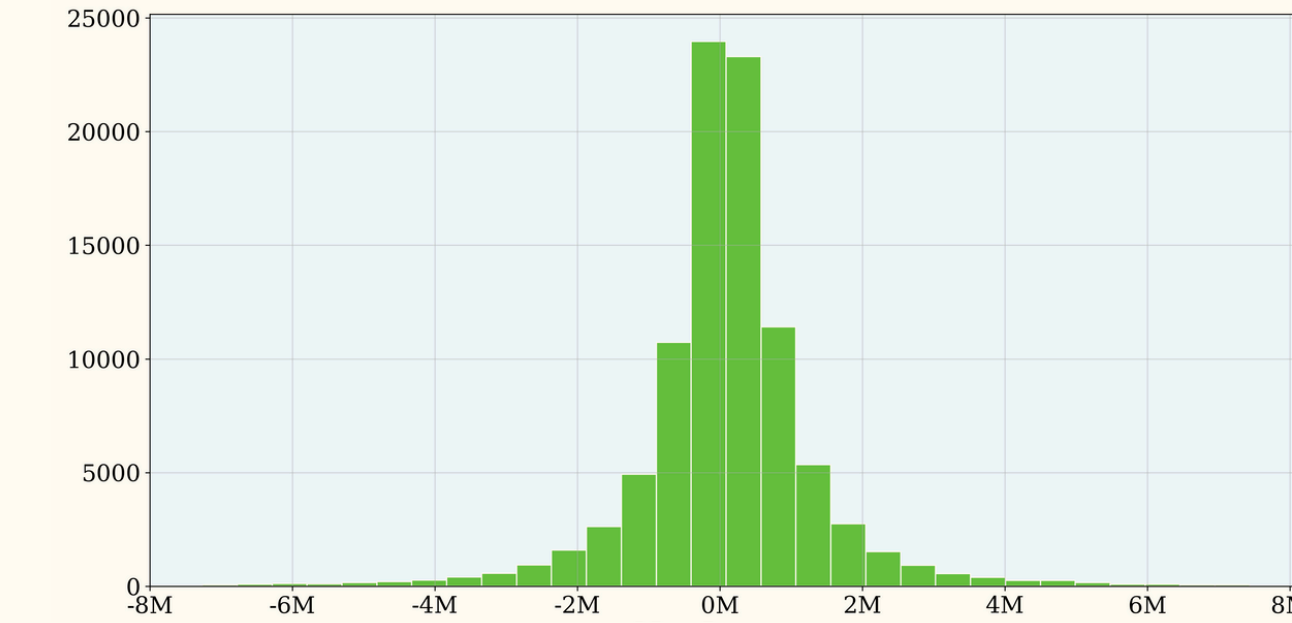

Distribution of Annual Net Income

Figure 7. Net income distribution of nursing facilities from Years 2015 to 2021.

With a normal distribution centered near $0 for annual net income, about 50% of all nursing facilities are failing to make a profit.

Further investigation of facilities showing exceptionally-high net income showed that 80% of these facilities operate according to the **assisted living** model and do not rely heavily on nursing as a source of income (**Figure 2**).

Many Nursing Facilities are Struggling

Median annual net income saw a notable increase during the COVID-19 pandemic. The surge in demand for healthcare professionals led the country to utilize its healthcare resources by directing COVID-19 patients to receive care in nursing homes.

With the COVID-19 pandemic receding, the median annual net income for nursing facilities is starting to decline.
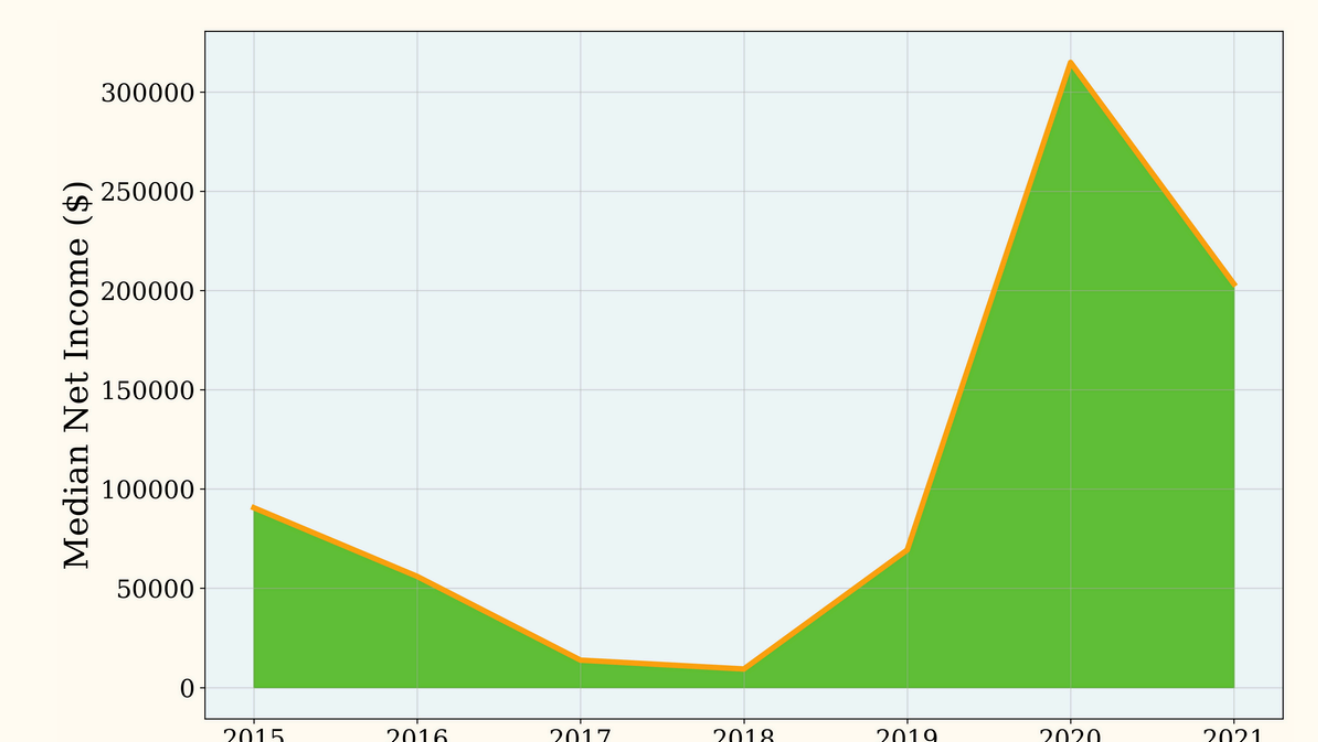

Median Annual Net Income over Time

Figure 8. Median Annual Net Income from Years 2015-2021.

Ratios	Successful (n=52709)			Unsuccessful (n=41321)			Mean (t-test)	P-value
	Mean	STD	Median	Mean	STD	Median		
Net Profit Margin	0.08	0.19	0.05	-0.11	0.92	-0.05	40.35	0.00
ROA	0.21	2.74	0.13	-0.54	106.84	-0.10	1.43	0.15
Current Ratio	3.11	36.71	1.63	1.69	27.49	0.96	6.78	0.00

Figure 9. Ratios are calculated after removing outlier values for input variables. "Successful" and "Unsuccessful" refer to positive- and negative-net-income facilities, respectively. (STD: standard deviation).

T-tests were conducted to identify if there were significant differences in performance metrics between successful and unsuccessful facilities. Significant differences were found in both **Net Profit Margin** (Net Income/Revenue) and **Current Ratio** (Current Assets/Current Liabilities), where successful facilities scored higher on both metrics.
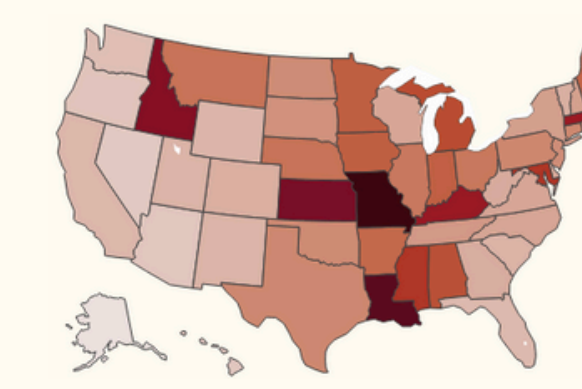
Recommendation
We recommend evaluating **Net Profit Margin** and **Current Ratio** as essential indicators for informing investment decisions in nursing homes.
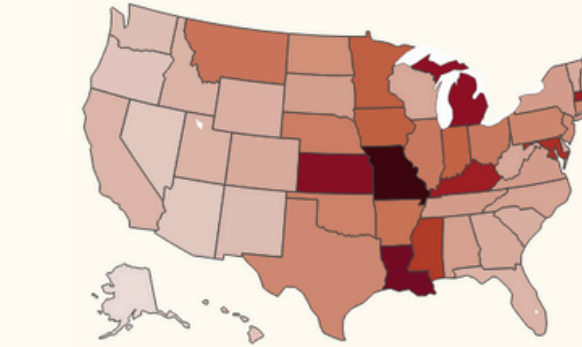
COVID-19 & Supply of Beds

Beds per 1,000 Individuals Age 65+ (Pre- & Post-COVID-19)
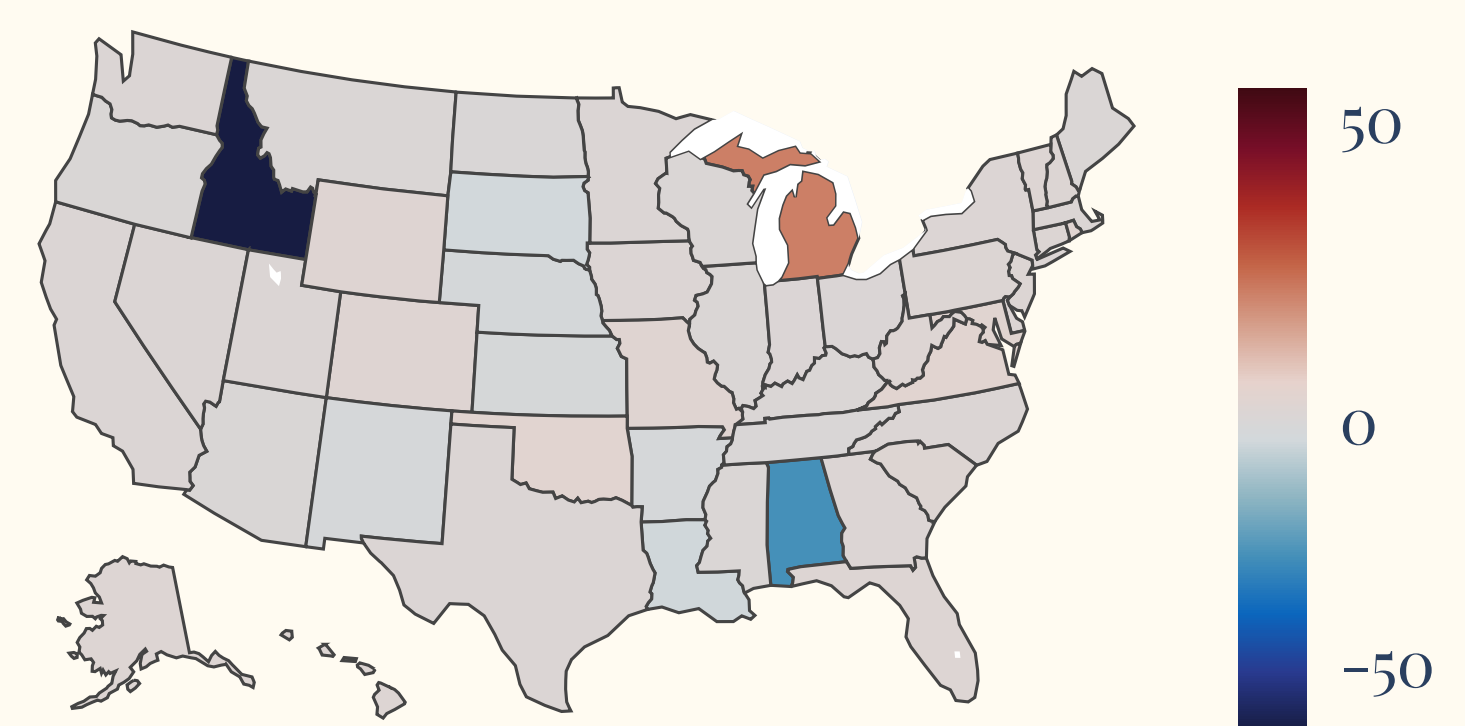

2019 (Pre-COVID)

2021 (Post-COVID)

Change in Beds/Capita (2019-2021)

Figures 10, 11, 12. Change is measured from Years 2019 to 2021 (based on 2020 U.S. Census population data).

The impact of COVID-19 on the nationwide distribution of beds per capita was generally negligible, except for three states: **Idaho**, **Alabama**, and **Michigan**.

Idaho witnessed a notable decline from approximately 90 beds per capita to around 20 per capita. Despite the absence of reports indicating the widespread closure of nursing facilities in **Idaho** during the pandemic, an investigation was initiated to ascertain the reason behind the significant disparity in CMS data.

The investigation suggests that **Idaho** and **Alabama** have faced challenges maintaining regular nursing facility inspections (Brigham, 2023). A plausible hypothesis is that nursing facilities may only report their bed capacities following inspections, or that such data is collected exclusively by inspectors. Consequently, the marked decrease in beds per capita in **Idaho** and **Alabama** might be attributed to deficiencies in data collection processes.

Limitations & Future Analysis

Limitations

- Some nursing homes reported assets and liabilities as negative. The former implies money owed to the facility, and the latter implies money owed by the facility. Absolute values of assets and liabilities were considered in this analysis.

- In this study, nursing homes deemed to be outliers were removed. A separate analysis may be conducted using the extreme ends of net income.

Recommended Future Analysis

- Given that assisted living facilities tend to perform the best (**Figures 1, 2, 5**), an analysis strictly assessing the data for assisted living facilities is prompted.

- We hypothesized that the moderate increase in Michigan's beds per capita (**Figure 12**) is a possible outcome of recent migration by Baby Boomers into Michigan for retirement. Future research may validate this hypothesis.

References & Additional Analysis