Healthcare Provider Bankruptcies*

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Abstract: Healthcare firms are filing for Chapter 11 bankruptcy at record high levels. We show causal evidence that bankruptcies harm patients through increased worker turnover. Exploiting novel high-frequency employment data, we document a sharp post-bankruptcy increase in worker departures, with firms replacing departing workers with new hires. Using administrative data on facility-level inspections and patient-level assessments, we find that filing for bankruptcy adversely affects quality: health inspection violations increase and patient care declines. Finally, we conduct an online survey experiment and show that a bankruptcy filing leads to a dramatic increase in voluntary departures, and that the increase in inexperienced workers causes adverse patient outcomes.

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1 Introduction

Total debt in the United States healthcare sector has doubled since 2019. A rise in leveraged buyouts and declining fundamentals have prompted an uptick in healthcare bankruptcies.[1] As a result, Moodys now rates 80% of North American healthcare companies' debts as speculative grade, indicating substantial default risk.[2] In theory, a Chapter 11 bankruptcy could resolve a healthcare firm's default through reorganization with little impact on the firm's operations. However, there is virtually no empirical evidence on the effectiveness of Chapter 11 for healthcare firms. Chapter 11 is designed to maximize value for financial stakeholders, but how does a reorganization affect healthcare workers and patients?

Using rich administrative data on healthcare provider employment and patient outcomes, we provide novel causal evidence that Chapter 11 bankruptcy filings negatively affect healthcare firms and their patients. The high-frequency nature of our data helps to mitigate the confounding effects of unobserved economic and financial distress. Employing a matched difference-in-differences (DiD) event study design, we document an immediate increase in worker turnover after a bankruptcy filing. We find that the shift towards inexperienced workers coincides with a dramatic increase in health inspection violations and negative patient outcomes. Next, we survey experienced healthcare workers. Analyzing responses to our randomized survey experiment, we show that a bankruptcy filing causes an increase in voluntary departures. While a firm's pre-bankruptcy financial distress causes some workers to leave, a bankruptcy filing dramatically increases the salience of financial distress, increasing attrition. Our experiment also shows that worker turnover harms patients.

Our analysis only covers the healthcare industry. The stakes are arguably higher in healthcare bankruptcies, where patients' lives depend on the outcomes, than in any other bankruptcies. By focusing on healthcare firms, we can study critical patient health outcomes that have no analogs for customers in other industries. Additionally, the healthcare industry is economically meaningful: at $4.3 trillion dollars per year, US healthcare spending is 18.3% of US GDP and exceeds the entire GDP of most countries.[3]

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[1] See, for example, https://www.forbes.com/sites/saibala/2023/08/27/healthcare-sector-bankruptcies-are-on-the-rise/.

[2] See https://www.fiercehealthcare.com/finance/healthcare-companies-default-risk-steadily-rising-most-owned-private-equity-moodys. Moodys defines speculative grade as indicating moderate to very high default risk https://ratings.moodys.com/rating-definitions.

[3] See https://www.cms.gov/data-research/statistics-trends-and-reports/national-health-expenditure-data/historical and https://data.worldbank.org/indicator/NY.GDP.MKTP.CD.

Within the healthcare industry, we focus on skilled-nursing facilities (SNFs), which house 1.3 million patients receiving skilled medical care. SNFs are an ideal setting for at least three reasons. First, leverage and bankruptcies among SNFs have risen with a wave of private-equity leveraged buyouts.[4] Second, patient health outcomes depend on worker quality.[5] Third, we observe every SNF, their workers down to the shift-day level, and virtually every patient receiving care across the United States.[6]

We identify every Chapter 11 bankruptcy filed by a SNF from the universe of corporate bankruptcy filings and document that bankruptcies increase voluntary nurse departures, harming patients. Through a Freedom of Information Act (FOIA) request, we create a novel mapping between bankruptcies and detailed healthcare provider records collected by the Centers for Medicare and Medicaid Services (CMS). We observe worker departures and hour reductions, along with a description of the worker's role, for every worker at every SNF at a daily frequency. We also obtain patient health data through health inspections, patient claims, and patient health assessments for every patient residing at a SNF.

We use a DiD design to estimate the causal effects of a bankruptcy filing on worker and patient outcomes. Our identifying assumption is that the treatment group would have been on a parallel trend to the control group in the absence of treatment. The assumption would be invalid if negative unobservable shocks cause both bankruptcy filings and changes in patient outcomes. We address the identification concern in two ways. First, we exploit our high-frequency data to isolate changes in a tight window around each bankruptcy filing. We estimate treatment effects within weeks or months of a bankruptcy filing, rather than years. This implies that any confounding unobservable negative shocks to our treatment group would have to occur almost precisely at the bankruptcy-filing times. Second, in our main analysis, we use a stacked cohort DiD design to compare bankruptcy filers to a cohort of matched control firms of similar size, patient composition, and occupancy prior to the bankruptcy filing.[7]

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[4]See Gupta, Howell, Yannelis, and Gupta (2021); Gandhi, Song, and Upadrashta (2022) and https://skillednursingnews.com/2022/02/buying-boom-to-continue-in-skilled-nursing-as-private-equity-keeps-chasing-deals/.

[5]These two features suggest that our study of SNF bankruptcies is plausibly representative of the broader healthcare industry.

[6]Because of strict regulations, government agencies continually collect detailed, longitudinal, high-frequency data on both workers and patients at SNFs.

[7]We also show our results hold using a staggered DiD design which only includes bankruptcy filing facilities.

We first document that worker departures spike after a bankruptcy filing.[8] New workers are hired to replace exiting workers almost one for one, suggesting bankrupt firms maintain staffing levels to aid reorganization, but with a dramatic shift towards inexperienced workers. Specifically, weekly worker exits increase by 10% of the mean on average over the first year after filing. These exits are met with an 8% increase in new worker entries relative to the mean. While the staffing data do not directly distinguish between voluntary and involuntary departures, we find two pieces of empirical evidence that strongly suggest voluntary turnover. First, we obtain data on healthcare provider cost reporting and find that wages of the highest certification nursing staff increase following bankruptcy. Second, we document a shift in staffing away from wage workers and towards more costly contract staff.[9]

Turning to the administrative data on facility inspections and patient assessments, we find that increased worker turnover after a bankruptcy filing harms patients. We document that the shift towards inexperienced labor coincides with a substantial post-bankruptcy increase in quality of care violations. We then use individual patient data to evaluate the extent to which bankruptcies affect patient health outcomes.[10] While we do not find increases in either mortality or falls, we do observe evidence of substantial declines in quality of care, including the use of physical and chemical restraints on patients, patients exhibiting behavioral issues, and a decline in resident hygiene.

Finally, we design and conduct an online experiment to elicit beliefs of 247 nurses with SNF work experience. The participant responses indicate that financial distress causes voluntary worker departures and a bankruptcy filing exacerbates this effect. Our first goal is to estimate how SNF financial conditions affect voluntary worker attrition. Holding everything else fixed, a bankruptcy filing causally increases voluntary departures by 18 percentage points (47% of the control-group mean). Turning to nurse responses for their own decisions to search for other work, a bankruptcy causally increases the likelihood of job search by 30 percentage points. The second portion of our survey shows that, according to SNF nurses, newly hired replacements for departing nurses deliver lower quality care, harming patients. Holding everything else fixed, reducing nurse tenure from one year to one week increases the likelihood of negative patient outcomes by 10 percentage points (44% of the mean).

We provide the first evidence on the impact of Chapter 11 bankruptcies on healthcare

[8]Since our experiment does not rely on a parallel-trends assumption, any alternative explanation for our DiD results would have to also explain our experimental results.

[9]We additionally provide experimental evidence on voluntary attrition.

[10]We use Traditional Medicare claims data and the Minimum Data Set (MDS).

workers and patients. Our paper contributes to work studying how healthcare firms' financial decisions impact patients (Adelino, Lewellen, and Sundaram, 2015; Adelino, Lewellen, and McCartney, 2022; Aghamolla, Karaca-Mandic, Li, and Thakor, 2021; Liu, 2021; Gupta, Howell, Yannelis, and Gupta, 2021; Gandhi, Song, and Upadrashta, 2020, 2022) and the impact of a firm's financial distress on the firm's workers (Baghai, Silva, Thell, and Vig, 2021; Falato and Liang, 2016; Brown and Matsa, 2016; Gortmaker, Jeffers, and Lee, 2022; Graham, Kim, Li, and Qiu, 2023; Araujo, Ferreira, Lagaras, Moraes, Ponticelli, and Tsoutsoura, 2021; Ellias, 2022; Berk, Stanton, and Zechner, 2010) and customers (Hortaçsu, Matvos, Shin, Syverson, and Venkataraman, 2011; Matsa, 2011; Hortaçsu, Matvos, Syverson, and Venkataraman, 2013; Phillips and Sertsios, 2013; Antill and Hunter, 2021). Differing from this literature, we contribute the first experimental evidence on the causal effect of firm financial distress on voluntary employee attrition and show how a financially distressed firm's loss of employees has negative operational consequences.

This paper also contributes to work identifying determinants of healthcare provider quality and how disruptions to patients' care adversely affects health (Sabety, Jena, and Barnett, 2021; Schwab, 2023; Sabety, 2023; Agha et al., 2022; Agha, Frandsen, and Rebitzer, 2019). In particular, Olenski (2023) finds that mortality increases 16% when SNFs close. We contribute to this literature by showing that bankruptcy filings, which are intended to relieve financial distress and avoid closure, cause worker turnover and negative patient outcomes.

The remainder of the paper is organized as follows. Section 2 describes the setting. Section 3 describes the nursing home and bankruptcy data. Section 4 presents high-frequency employment responses to bankruptcy. Section 5 presents the analysis of the impact of bankruptcy on healthcare quality and patient outcomes. Section 6 contains the design and results of the randomized experiment. Section 7 concludes.

2 Empirical Setting

2.1 Nursing Home Industry

Skilled nursing facilities (SNFs), otherwise known as nursing homes, are certified by the Centers for Medicare and Medicaid Services (CMS) to provide skilled nursing services, rehabilitative therapy, and other healthcare services requiring an institutional setting. Residents at SNFs require substantial medical care. Facilities serve a wide range of patients, from

short-stay patients receiving post-acute rehabilitative therapy to long-stay patients receiving treatment for chronic conditions.

The nursing home industry is large, consisting of approximately 16,000 SNFs in the US serving 1.3 million residents. Concerns about the quality of care provided at nursing homes have been voiced by policymakers, academics, and the media alike. In addition to providing healthcare to a particularly vulnerable segment of the population, nursing homes garner much public interest due to the fact that they are largely financed by the government. Specifically, Medicare and Medicaid fund the majority of nursing home care.

Staffing. There are three key nursing staff roles at SNFs: registered nurses (RN), licensed practical nurses (LPN), and certified nursing assistants (CNA). RNs are highly skilled nursing staff who must obtain a two-to-four year degree or diploma in nursing and pass a licensing exam. LPNs are also required to have a degree or diploma in nursing and pass an exam, though these courses typically take one year to complete. CNAs need only acquire a one-to-three month training. The nationwide median hourly wages for RNs, LPNs, and CNAs are \$36.22, \$23.47, \$14.82, respectively.[11] Given their varying levels of certification, staffing quality measures typically differentiate between RN, LPN, and CNA hours. Staffing measures are key indicators of quality at nursing homes (Clarke and Donaldson, 2008; Harrington et al., 2016; Centers for Medicare & Medicaid Services, 2019; Friedrich and Hackmann, 2021), where care for rehabilitative therapy and assistance with activities of daily living are especially labor intensive.

2.2 Bankruptcy

If a firm is insolvent (unable to pay its debts), Chapter 11 bankruptcy gives the firm an opportunity to reorganize. In a reorganization, a bankrupt firm continues its operations while it negotiates with creditors. In a successful reorganization, creditors exchange existing debt claims for equity (a claim on the firm's future profits). This exchange of debt for equity makes the firm solvent, allowing it to exit bankruptcy and continue operating.[12]

Theoretically, a reorganization could have no consequences for a firm's operations. For some firms, bankruptcy is a brief and purely financial transaction in which lenders exchange

[11] Source: Bureau of Labor Statistics (2020).

[12] See Antill (2022) for more details on Chapter 11 and the plan-confirmation process.

debt for equity: the technology firm Belk completed a reorganization in 12 hours.[13] In practice, most reorganizations take 1-2 years. Additionally, not all reorganizations are successful: roughly 25% of large Chapter 11 cases conclude with a liquidation in which the firm shuts down (Antill, 2022). Even in a successful reorganization, some firms downsize; the bankruptcy code eases the process of cancelling leases and other contracts. Because some Chapter 11 bankruptcies end in liquidation, employees might be concerned after a Chapter 11 filing. Some employees might even quit, hindering a successful reorganization.

To discourage employee departures, the bankruptcy code allows bankrupt firms to pay employees for wages that they earn during a reorganization. However, bankrupt firms cannot pay employees any pre-bankruptcy wages or benefits that were unpaid at the time of filing.[14] Employees must wait with all other creditors until the end of the bankruptcy to receive payment for pre-bankruptcy obligations. This can frustrate employees, motivating many firms to request special permission to pay these pre-bankruptcy employee obligations early. For example, when the nursing-home chain Senior Care Centers filed for Chapter 11, it requested special permission to immediately pay employees their unpaid pre-bankruptcy wages. In its motion to the court, Senior Care Centers wrote:[15]

> The Employees are critical to the Debtors' business, and their value cannot be overstated. To a significant extent, the long-term prognosis of the Debtors' patients depends on the Debtors' ability to attract and retain qualified personnel. The loss of certain Employees will impede the Debtors' business and seriously harm the ability to successfully implement their bankruptcy strategy... If the Debtors cannot assure their Employees that they will promptly pay the Employee Benefits Obligations... certain Employees will likely seek employment elsewhere. The loss of Employees at this critical juncture would have a material adverse impact on the Debtors' business.

Roughly four months into the bankruptcy, creditors successfully blocked this motion, preventing the employees from receiving payment. This is precisely when Senior Care Centers,

[13] See https://www.bloomberglaw.com/external/document/X36CBBN0000000/bankruptcy-professional-perspective-1-day-prepackaged-bankruptcy.

[14] See Antill, Wang, and Jiang (2024) for a detailed discussion of the legal treatment of pre-bankruptcy employee claims.

[15] See motion 1026 in Case 18-33967, Texas Northern Bankruptcy Court: https://cases.omniagentsolutions.com/documents?clientid=2454&tagid=1031.

which is in our data sample, experienced massive employee turnover. In summary, this example highlights that: (i) employees are important to bankrupt firms; (ii) many employees quit in response to a bankruptcy; (iii) these employee departures can occur months after a bankruptcy filing, depending on how the bankruptcy unfolds; and (iv) nursing homes believe that employee departures are harmful for patients.

3 Administrative Data

3.1 Nursing Home Data

3.1.1 Payroll Based Journal

Starting in the fourth quarter of 2016, the Centers for Medicare and Medicaid Services (CMS) began requiring all SNFs in the United States to submit complete daily staffing records for all workers—including both employees and contract workers—engaged in direct resident care. To ensure accuracy, facilities are required to submit data based on payroll and other auditable data. Correspondingly, the system facilities use to submit their data is titled the Payroll-Based Journal (PBJ).

We use the PBJ data to observe the hours worked by nursing staff on each day for each facility. In total, our dataset contains 1.1 billion staffing shifts for 7.5 million different employment relationships. Facilities report the primary role of the staff member: whether the individual is a registered nurse, licensed practical nurse, or certified nursing assistant. Facilities are also required to distinguish between employees versus agency and contract staff.

We analyze a sample of PBJ data from 2016Q4 through 2020Q1. We do not extend our sample past 2020Q1 for two reasons related to the COVID-19 pandemic. First, CMS did not require facilities to submit data for 2020Q1 in order to reduce the reporting burden on an industry in crisis. Second, the COVID-19 pandemic affected nursing home staff in dramatic and unprecedented ways. Variation in staffing during the pandemic was likely predominantly attributable to pandemic-induced strains. Moreover, the federal and state governments infused the industry with many billions of dollars in aid—including $21 billion earmarked in the CARES Act (Soergel, 2020)—to prevent facilities from becoming insolvent.

Table 1 provides summary statistics of the staffing data at the facility-week level for facilities that went bankrupt during the sample period. On average, out of the three types

of nursing staff, RNs make up the smallest share of total weekly hours at 17% while CNAs supply the majority of hours at 58%.

3.1.2 Other SNF Data

In addition to comprehensive data on staffing, we obtain detailed health inspection data from CMS. Inspections are conducted unannounced by healthcare professionals who visit each SNF to assess whether it meets federal requirements. Inspections occur annually on average, and time between inspections for a given nursing home rarely exceeds fifteen months. Facilities are penalized for deficiencies that indicate non-compliance with federal standards. The inspections focus on facility practice and policy in a number of areas, including quality of care, resident rights, and physical environment. Identified deficiencies are converted to points based on their severity and scope. Levels of severity range from "no actual harm with potential for minimum harm" to "immediate jeopardy to resident harm or safety." Using the deficiency tags in the health inspection data, we also identify deficiencies that fall under the Quality of Care category as defined by CMS.[16]

Table 1 presents summary statistics of health inspection deficiencies from 2015 to 2020Q1 for facilities that went bankrupt during the staffing data sample period. The table shows that facilities are flagged for around five deficiencies per inspection, which in total amount to 43 points per inspection, on average. Deficiencies of "actual harm" or worse severity and deficiencies falling under Quality of Care as defined by CMS are both rare; the median over the sample of deficiency counts in these categories is zero.

[16] See Section 483.25 of https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/GuidanceforLawsAndRegulations/Downloads/List-of-Revised-FTags.pdf.

Table 1: Summary Statistics of Bankrupt Skilled Nursing Facilities

	Observations	Mean	Median	Std. Dev.
Facility Characteristics				
Bed Count	91,584	120.01	120.00	40.12
Total Weekly Occupancy	91,584	662.92	652.00	261.66
All Nursing Staff (Weekly)				
Employee Count	91,584	69.38	66.00	30.62
Staffing Hours				
Total	91,584	2,289.25	2,173.46	1,013.00
$\geq$ 60 Days Tenure	91,584	1,661.31	1,597.52	1,026.32
$<$ 60 Days Tenure	91,584	548.52	367.03	614.41
CNA				
Employee Count	91,584	40.70	39.00	18.08
Staffing Hours				
Total	91,584	1,323.53	1,263.98	600.33
$\geq$ 60 Days Tenure	91,584	954.54	914.50	604.32
$<$ 60 Days Tenure	91,584	322.29	214.43	369.59
LPN				
Employee Count	91,584	16.67	16.00	8.90
Staffing Hours				
Total	91,584	569.36	539.51	300.65
$\geq$ 60 Days Tenure	91,584	416.84	398.21	288.75
$<$ 60 Days Tenure	91,584	132.24	80.11	173.33
RN				
Employee Count	91,584	12.01	10.00	8.44
Staffing Hours				
Total	91,584	396.36	329.54	280.85
$\geq$ 60 Days Tenure	91,584	289.93	229.63	257.87
$<$ 60 Days Tenure	91,584	93.99	58.61	128.58
Health Inspections (Annual*)				
Number of Deficiencies	2,950	4.96	3.00	4.99
Total Points	2,950	43.42	20.00	87.60
Actual Harm Deficiency Count	2,950	0.28	0.00	0.94
Immediate Jeopardy Deficiency Count	2,950	0.12	0.00	0.74
Quality of Care Deficiency Count	2,950	0.58	0.00	1.12

3.2 Patient Data

In this section, we describe the three linked administrative datasets from the CMS that we use to observe virtually all patients at nearly every nursing home from 2010 through 2019.

Medicare Enrollment Files. We obtain enrollment, demographic, and chronic condition information for all Medicare beneficiaries from the Master Beneficiary Summary File (MBSF). First and foremost, the MBSF provides a record of the enrollment status of Medicare beneficiaries in each month, including whether a beneficiary is enrolled in Traditional Medicare, Medicare Advantage, or Medicaid. The data also includes a rich set of patient demographics, such as sex, age, race, and zip code of residence at the yearly level. The MBSF also tracks chronic conditions, including Alzheimer's, anemia, cancer, diabetes, asthma, stroke, rheumatoid arthritis, hip fracture, osteoporosis, depression, cataracts, glaucoma, chronic kidney disease, atrial fibrillation, chronic obstructive pulmonary disease, ischemic heart disease, acute myocardial infarction, congestive heart failure, hyperplasia, hypertension, hyperlipidemia, and hypothyroidism.

Medicare Claims. We use claims data derived from the Medicare Inpatient (IP) Claims file, Medicare Outpatient (OP) claims file, and the Medicare Provider Analysis and Review (MedPAR) files. The Medicare IP and OP files provide raw claim data, and the MedPAR file provides an aggregation of inpatient claims to the episode level. These data provide a detailed view of the procedures, diagnosis codes, and amounts for all inpatient and outpatient Medicare claims. They allow us to observe the amount, type, and cost of care that Traditional Medicare enrollees received at their nursing home. The hospital claims data also allow us to observe additional information on residents' diagnoses that may have led to their nursing home stay, as well as when residents are admitted to the emergency department or rehospitalized. Note that healthcare claims incurred by Medicare Advantage patients are not observed, so they are excluded from analyses derived from claims data.

Resident Health Assessments. Federal regulations require that nursing homes regularly submit detailed health assessments on each resident to CMS. Regardless of payer source, they must submit specific assessments for each resident at admission, discharge, or major change in status, as well quarterly and annually. Additionally, for any stay reimbursed by Medicare, the facility must file additional Medicare Prospective Payment System assessments on or

around 5, 14, 30, 60, and 90 days, as well as with any readmission or significant clinical change.

We access these assessments through the Long Term Care Minimum Data Set (MDS) version 3.0. These MDS assessments provide detail on each resident's health during the assessment period, including their physical ailments, mental and cognitive wellbeing, and chemical and physical restraints.

3.3 Bankruptcy Data

The Public Access to Court Electronic Records (PACER) service provides electronic public access to federal court records. Established in 1988, the PACER system has grown to provide virtually universal coverage of federal cases. Today, it provides "nearly all the documents filed by a judge or the parties in any case."[17] Since bankruptcy courts are federal courts, PACER contains detailed information on every bankruptcy case.

Since 2008, the Federal Judicial Center (FJC) has publicly provided a dataset covering "every case filed in the PACER system."[18] The FJC provides some variables for each case, including an indicator equal to one in all bankruptcies involving a healthcare company ("healthcare bankruptcies").[19] We use this indicator to create a dataset containing all Chapter 11 healthcare bankruptcies. Using the FJC's numeric case identifiers, we locate each bankruptcy in PACER and download comprehensive case information for each healthcare bankruptcy.[20] Notably, for each bankruptcy, we obtain the bankruptcy filing date and identifying information such as the name, address, and employer-identification number (EIN) for the bankrupt company. We merge our bankruptcy data with our CMS data using EINs, names, and addresses. Specifically, through a Freedom of Information Act request, we obtain a novel dataset containing the EIN for every healthcare provider in the NPPES database. We also obtain EINs for parent companies, allowing us to observe each subsidiary of a bankrupt parent company. In this way, we identify which healthcare facilities in the CMS data file for Chapter 11 bankruptcy. See Appendix D for details.

We also use our PACER data to group together healthcare facilities that share a parent

[17] See https://pacer.uscourts.gov/about-us.

[18] See https://free.law/idb-facts

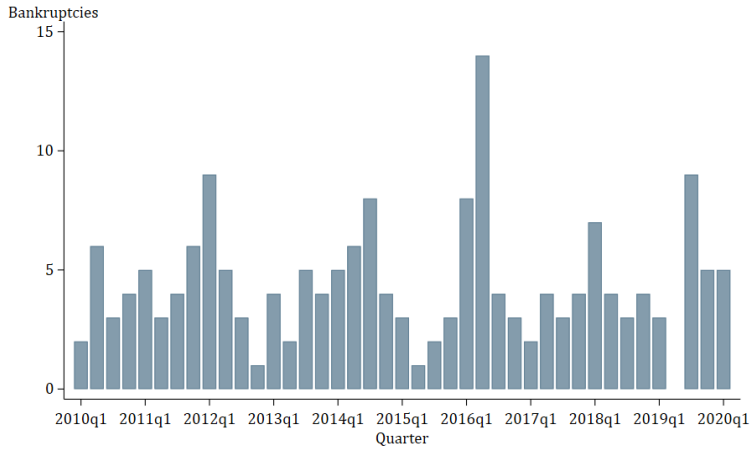
[19] Corporate Chapter 11 filing petitions include a line requiring filers to disclose if the bankruptcy involves a healthcare company.

[20] We are grateful to the 18 district courts that provided fee waivers.

company (i.e., facilities that are in the same chain). Restricting attention to SNFs covered in our PBJ sample, our final dataset contains all SNF bankruptcies filed over the period 2016Q4-2020Q1.

Figure 1 illustrates the number of nursing-home bankruptcies at the chain level during the sample period, which includes 180 chain bankrputcies, representing 727 facilities. The frequency of bankruptcies is fairly similar across the sample period.

Figure 1: Nursing Home Bankruptcies: 2010 Q1 - 2020 Q1



4 High-Frequency Employment Responses to Bankruptcy

In this section, we use a matched difference-in-differences (DiD) approach to analyze the effects of a Chapter 11 bankruptcy filing on nursing-home employment.

4.1 Empirical Strategy: Matched DiD

Creating the Matched Sample. We begin with a sample of facilities that file for Chapter 11 during our sample period (Section 3.3). We match each of these "treated" facilities to a group of observably similar "control" facilities: nursing homes that do not file for bankruptcy during our sample period. Specifically, in each year, we use all of our data (i.e., bankrupt and nonbankrupt facilities) to form ten decile bins for each of the following variables: (i) the number of certified beds; (ii) the average fraction of occupied beds (the "occupancy rate");

and (iii) the share of Medicare patients. We obtain the latter two variables at the annual level from Brown University's LTC Focus dataset.[21] We use coarse exact matching: a facility is eligible to be a control for a treated facility if it (i) shares the same decile bin as the treated facility across all three variables in the year before the treated facility files for bankruptcy and (ii) never files for bankruptcy in the sample period. Following this procedure, we identify up to five control facilities for each bankrupt facility.[22] We choose control firms without replacement—each facility can be a control for at most one treated facility. We refer to a treated facility and its matched control facilities as a "cohort."

Table 2 presents summary statistics for treated facilities and control facilities. For each cohort, we focus on the snapshot corresponding to five weeks before the bankruptcy filing.[23] Treated and control facilities are quite similar across the three variables used for matching: small differences are due to the use of decile bins in the matching procedure. Small but statistically significant differences arise when we examine variables related to staffing and worker turnover. This is unsurprising: bankrupt facilities are likely to be different from other facilities. As we discuss below, these differences do not necessarily violate our identifying assumption.

Identification. The standard identifying assumption for a DiD analysis is parallel trends: in the absence of treatment, the treated and control facilities would have experienced similar outcome-variable fluctuations (relative to potentially different baseline values). In our setting, we assume that bankrupt facilities would have experienced similar staffing changes to nonbankrupt facilities in the absence of bankruptcy filings. The assumption could be violated if unobservable economic shocks cause both bankruptcy filings and staffing changes. Our empirical design addresses this concern by exploiting the high-frequency nature of our weekly dataset to isolate the effect of a bankruptcy filing from the effect of unobserved conditions that lead to a bankruptcy. Our main specification isolates the effect of a bankruptcy in the weeks following the bankruptcy filing. Intuitively, any staffing changes observed immediately after a Chapter 11 bankruptcy filing can likely be attributed to bankruptcy. Additionally, our matched stacked cohort approach allows us to compare changes in the

[21] LTC Focus is a product of the Shaping Long-Term Care in America Project at Brown University, funded in part by the National Institute on Aging.

[22] If there are more than five eligible control facilities for a given treated facility, we randomly select five from the pool of eligible control facilities.

[23] In contrast, for our matching procedure, we use annual values from the LTCFocus dataset.

staffing of bankrupt facilities around the bankruptcy filing to contemporaneous changes in observably similar control facilities. We also show that the results are similar when using a staggered difference-in-differences approach, which includes only nursing homes that at some point file for bankruptcy.[24]

Regression Specification. To conduct our baseline matched DiD analysis, we use a facility-week panel to estimate the following equation by ordinary least squares (OLS):

$$\begin{aligned} y_{f,w,c} = & \underbrace{\delta}_{\text{Early Pre-Period}} \cdot 1\{w < T_c - 52\} \cdot B_f \\ & + \underbrace{\theta_1}_{\text{Short-Term Effect}} \cdot 1\{T_c \leq w \leq T_c + 52\} \cdot B_f \\ & + \underbrace{\theta_2}_{\text{Long-Term Effect}} \cdot 1\{w > T_c + 52\} \cdot B_f + \alpha_{w,c} + \rho_f + \epsilon_{f,w,c} \end{aligned} \tag{1}$$

In equation (1), $y_{f,w,c}$ is an outcome, such as staff hours, at facility f in match cohort c in year-week w (e.g., week two of 2017). We let B_f denote an indicator equal to one for facilities that file for bankruptcy during the sample period. For each cohort c, we let T_c denote the week in which the treated facility in the cohort files for bankruptcy. We include facility fixed effects ρ_f. Importantly, we also week-by-match cohort fixed effects $\gamma_{w,c}$. In this sense, we conduct a *stacked* matched cohort analysis, comparing a bankrupt facility in a given week to a comparison set of only its matched control facilities in the same week. This stacked matched approach avoids the issues that arise when a treated facility is compared—either directly or indirectly through sparse fixed effects—to another treated facility with a distinct treatment date (Callaway and Sant'Anna, 2020).

Equation (1) captures the dynamic effects of a bankruptcy filing. For each cohort c, we define three indicator variables for three periods: (i) the early pre-period more than one year before the treated facility files ($w < T_c - 52$); (ii) the one-year period immediately after the filing ($T_c \leq w \leq T_c + 52$); and (iii) the period more than one year after the filing

[24]Recent econometric papers caution against the two-way fixed effects (TWFE) staggered DiD estimator in the presence of heterogeneous and dynamic treatment effects (e.g., Callaway and Sant'Anna 2020, Sun and Abraham 2021). The key concern is that in the standard TWFE design, earlier treated units may be used as controls for later treated units, which can potentially lead to estimates of the opposite sign from the true ATE. For this reason, we use the matched stacked cohort approach as our main specification, which does not rely on earlier treated units as controls.

$(w > T_c + 52)$.[25] We omit the indicator for the one-year period leading up to the filing $(T_c - 52 \leq w < T_c)$, which serves as the reference period. We interact each of these three indicators with an indicator B_f that is equal to one for the treated facility in each cohort (the one that files for bankruptcy). The coefficients $\delta, \theta_1, \theta_2$ each capture a comparison between treated and control facilities in one of the three periods listed above, relative to the omitted one-year period before the bankruptcy. In this sense, θ_1 captures the short-run impact of a bankruptcy filing while θ_2 captures the long-run effect.

For some analyses, it is helpful to visualize the dynamic effects of a bankruptcy using week-level treatment effects. For these analyses, we estimate the following "dynamic" specification:

$$y_{f,w,c} = \sum_{\tau:\tau\neq -1} \beta_\tau \cdot 1\{w = T_c + \tau\} \cdot B_f + \alpha_{w,c} + \rho_f + \epsilon_{f,w,c} \tag{2}$$

For any $\tau \geq 0$, β_τ captures a comparison between treated and control facilities τ weeks after a bankruptcy filing, relative to the week prior to the filing. For $\tau < 0$, β_τ captures an analogous comparison $|\tau|$ weeks before the filing.

Typically, if one facility in a nursing-home chain files for bankruptcy, then the entire chain files for bankruptcy. We thus cluster standard errors at the nursing-home-chain level when we estimate equations (1) and (2).

4.2 Null Results on Occupancy, Total Staffing, and Skill Mix

Total Staffing. To begin, we estimate equation (2) using total staffing as the outcome variable. We define total staffing for facility f in week w as the ratio of (i) the total number of hours worked by any staff at facility f in week w to (ii) the total number of beds at facility f divided by 100. The staffing measure is thus the total number of hours worked per 100 beds. Figure 2 plots the week-level treatment effects β_τ on the y axis for each week τ around the bankruptcy on the x axis. We estimate a relatively precise null effect. We confirm this by estimating equation (1): Appendix Table B1 shows that the short-run impact θ_1 is statistically and economically insignificant. While we estimate a statistically significant negative long-run impact θ_2, the magnitude continues to be economically insignificant. Table

[25] We include cohorts in which the bankruptcy filing occurs in the first 52 weeks or last 52 weeks of our sample. In this sense, we use an "unbalanced panel." This choice allows us to maximize our sample size.

B1 shows a similar null result using an alternative staffing measure as the outcome variable: the total number of employees working at facility f in week w per 100 beds. In summary, a bankruptcy filing appears to have no effect on the *total* staffing at a nursing home.

Patient Occupancy Next, we estimate equation (2) using patient occupancy as the outcome variable. We define patient occupancy for facility f in week w as the total number of resident days. For example, if the facility has one resident that stays two days, another resident that stays three days, and no other residents, then $y_{f,w,c} = 2 + 3 = 5$. Figure 2 shows that there is no economically or statistically significant effect of a bankruptcy filing on patient occupancy. We confirm this by estimating equation (1). While Appendix Table B1 shows that the long-run impact θ_2 is statistically significant, the magnitude of the effect is trivial: a bankruptcy filing reduces patient occupancy by 6.2 / 675 $\approx$ 1% of the mean.

Skill Mix. We estimate equation (2) using the RN share as the outcome variable: the fraction of all hours worked at a given facility-week that are attributable to RNs. Figure 3 shows that a bankruptcy filing has no effect on the share of hours worked by RNs. We find similar null results when we examine LPN shares and CNA shares. In summary, a bankruptcy filing appears to have no effect on the share of employee hours worked by a given nursing role.

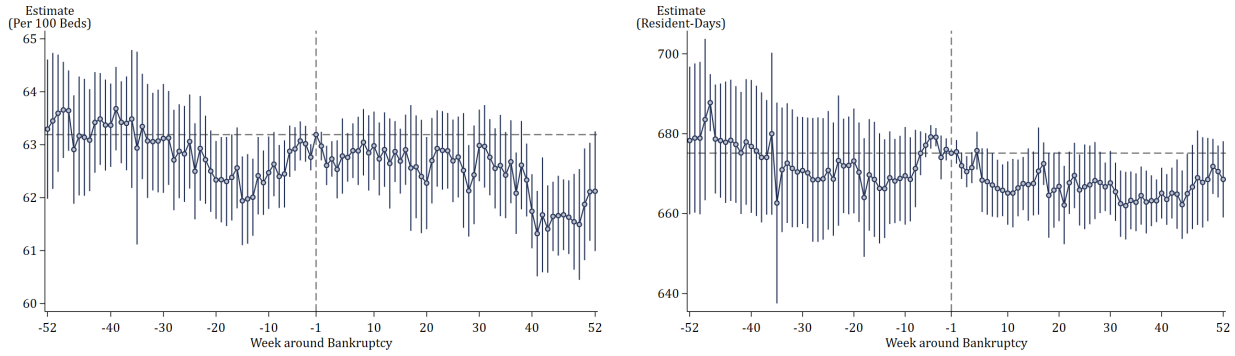
Ultimately, these null effects point to maintained overall staffing levels and nursing role composition following a Chapter 11 filing. However, simply examining total staffing levels may result in an incomplete characterization of employment responses. In particular, it does not account for changes in worker turnover and tenure, which we examine next.

Table 2: Balance Table

	(1) Treated Facilities	(2) Control Facilities	(3) |Diff|/SD
Match Variables			
Percent Medicare	14.52	14.25	0.02
	(9.92)	(10.93)	
Occupancy Rate	79.11	78.79	0.02
	(14.89)	(14.63)	
Certified Beds	122.22	125.06	0.05
	(39.71)	(53.43)	
Staffing Characteristics (per 100 Beds)			
Staffing Hours	1970.63	2058.81	0.14***
	(511.12)	(642.61)	
New Hires	1.46	1.34	0.05
	(1.91)	(2.53)	
Separations	1.32	1.24	0.04
	(1.54)	(1.90)	
$\geq$ 60 Days Tenure Hours	1370.80	1425.90	0.07
	(683.87)	(789.53)	
$<$ 60 Days Tenure Hours	599.83	632.91	0.05
	(544.06)	(662.54)	
$<$ 60 Days Tenure Workers	22.39	23.74	0.06
	(16.32)	(21.53)	
N	481	2,257	2,738
Health Characteristics (Not Matched On)			
Death per Beneficiary	0.04	0.04	0.13***
	(0.03)	(0.03)	
Any Assessment	68.15	64.14	0.11***
	(37.31)	(35.28)	
Any Assessment per Person	0.02	0.02	0.18***
	(0.01)	(0.01)	
Restraints Used per Assessment	0.02	0.02	0.01
	(0.10)	(0.11)	
Antipsychotic or Schizophrenic per Assessment	0.24	0.24	0.01
	(0.16)	(0.18)	
Behavioral Issue per Assessment	0.10	0.13	0.19***
	(0.11)	(0.12)	
Poor Hygiene per Assessment	3.32	3.42	0.15***
	(0.69)	(0.66)	
Falls per Assessment	0.16	0.17	0.14***
	(0.08)	(0.09)	
N	658	3,092	3,750

Note. Columns (1) and (2) present means and standard deviations of facility characteristics for treated and control facilities, where standard deviations are in parentheses. Column (3) presents the absolute value of the difference in means between treated and control facilities normalized by the control group standard deviation. Staffing values are measured 52 weeks prior to the bankruptcy filing date. Health values are measured 12 months prior to bankruptcy. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

Figure 2: Little change in total weekly hours and patient occupancy

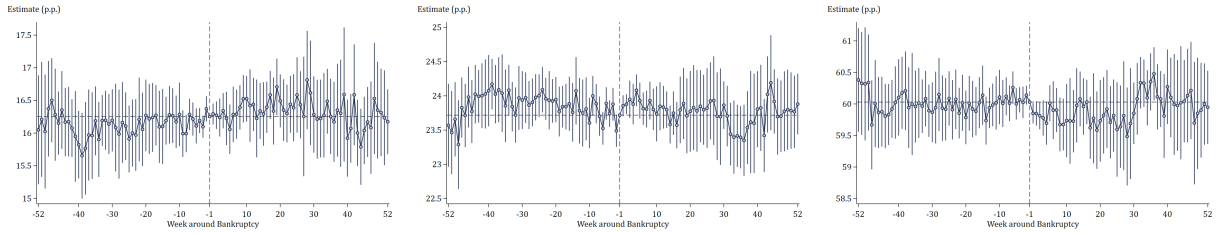


(a) Workers per 100 Beds

(b) Resident-Days

Note. This figure plots the coefficients estimated from Equation (2) and their 95% confidence intervals. The left panel shows total weekly nursing staff hours per 100 beds. The right panel shows total weekly resident-days (occupancy). Standard errors are clustered by nursing home chain.

Figure 3: No meaningful changes to hours worked by skill mix



(a) RN Share (b) LPN Share (c) CNA Share

Note. This figure examines the share of hours provided by different RNs, LPNs, and CNAs. The outcome variables are the share of total weekly hours provided by each nursing staff role. Standard errors are clustered by nursing home chain. 95% confidence intervals are shown.

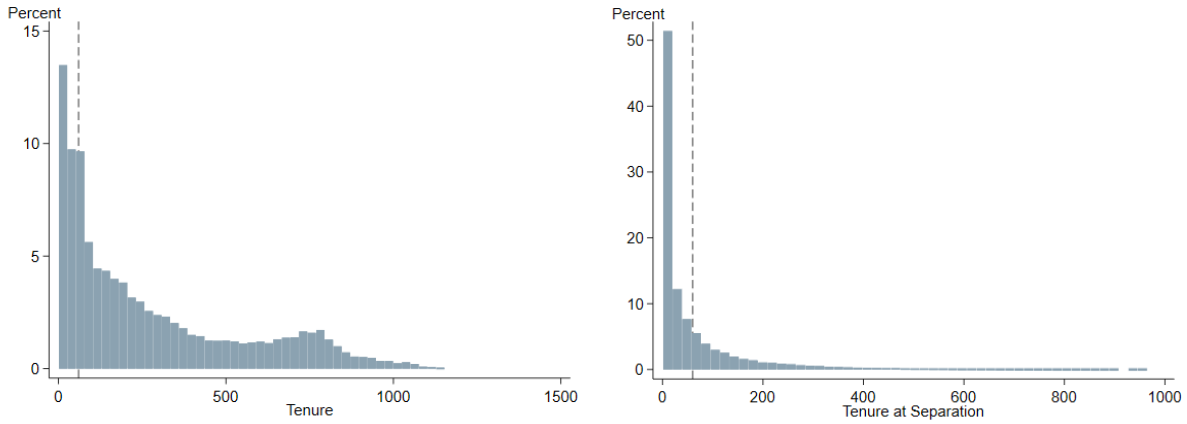
4.3 The Effect of Bankruptcy on Staffing Turnover

An important dimension of SNF quality is staff tenure. High turnover—and correspondingly having a large share of new staff—has long been considered a concerning indicator of low-quality care (Carter and Phillips, 1988; Gandhi, Yu, and Grabowski, 2021). Nursing home staff must be trained in and implement processes that are specific to each facility and its residents. Correspondingly, it's unsurprising that facilities with high staff turnover perform worse on quality measures (Castle, Engberg, and Men, 2007), and those employing a large fraction of low-tenure staff are more likely to be cited for violating infection control protocols (Loomer et al., 2021). Moreover, nursing home residents have very individualized needs and are highly dependent on staff for activities of daily living—such as eating, bathing, dressing, toileting, and moving—so we might expect that the common finding that consistent care teams yield better health outcomes (Wasson et al., 1984; Nyweide et al., 2013; Sabety, Jena, and Barnett, 2021) to apply particularly strongly in the nursing home industry. An instrumental variables analysis by Antwi and Bowblis (2018) indeed suggests a causal relation between nurse turnover and increased annual survey deficiencies.

Consistent assignment of nursing staff to residents has been increasingly emphasized as a policy goal (Roberts, Nolet, and Bowers, 2013). Turnover and tenure are such important measures of quality that the Affordable Care Act mandates that CMS collect and publicize "information on employee turnover and tenure." Starting in January 2021, CMS began publishing turnover measures on Nursing Home Compare—a tool that many consumers use to compare and choose a nursing home—and starting in July 2021, turnover will affect

facilities' five-star rating—the most salient summary quality measures on Nursing Home Compare.

Figure 4: Employee Tenure



(a) Distribution of Tenure

(b) Distribution of Tenure at Separation

Note. The distribution of tenure in 4a is computed using only workers from the last year of the sample (2019) in order to minimize the number of staff whose tenure is censored by the start of the sample.

The detailed nature of our data allows us to measure the tenure of each staff member working each week at each facility. Figure 4a presents the distribution of nursing staff tenure for staff member shifts in the last year of our sample, and Figure 4b presents the distribution of tenure for nursing home staff when they separate from a facility. In our analysis, we distinguish low-tenure staff (i.e. new staff) as those who have worked fewer than 60 days at the facility. This cutoff corresponds to approximately the 25th percentile of employee tenure, which is 59 days. Appendix B.3 demonstrates the robustness of our results to alternative definitions of low-tenure staff. In any turnover-related regression, we only include observations in which the facility reports in the 13 weeks ($\approx$ 90 days) prior. This way, we can accurately measure whether a worker has had 60 days of experience at the facility or not.

We first turn to exploring staff turnover as measured by worker exits and entries. Table 3 reports the coefficient estimates corresponding to the early pre-period, short- and long-term effects of bankruptcy for all nursing staff. Figure 5 plots the week-by-week dynamics of new hires and separations. Panel (a) examines exits per 100 beds, and Panel (b) examines new workers per 100 beds. Following bankruptcy, we estimate a 10% increase in weekly

separations in the 52 weeks following bankruptcy, relative to the mean. We find that this effect becomes smaller following the first year after bankruptcy, as the long-run effect is 5% of the mean. Consistent with our earlier finding of maintained total staffing levels, Panel (b) shows that these increases are met with comparable increases in weekly new entries. Table 3 shows that the separation effects are similar across nursing staff roles, as reported in Table 3. However, the long-run increases in new hires are concentrated among LPNs and CNAs.

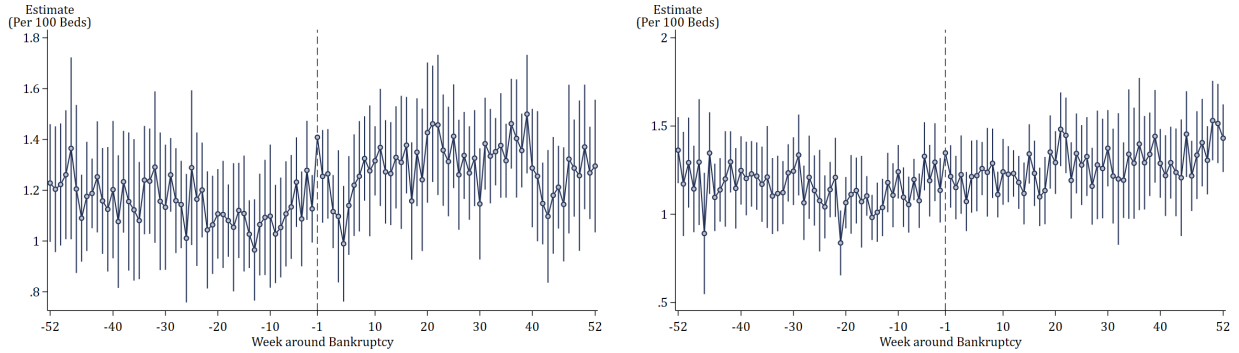
How does the documented turnover affect the amount of care provided by experienced workers? In Table 4, we explore the effects of bankruptcy on the tenure of nursing home staffing. The estimates of Panel A show both short-term and long-term losses in tenured worker care of large magnitudes. The estimates reveal a clear shift in composition toward inexperienced workers. Specifically, we document an increase in the share of low-tenure hours of 2 percentage points in the short term and 3 percentage points in the long term. These magnitudes are 11% and 17% of the mean share of low-tenure hours, respectively. Figure 6 presents the week-by-week estimates for the 52 weeks before and after filing, demonstrating a lack of observed trends prior to bankruptcy. Figures B1, B2, and B3 illustrate the high-frequency dynamics of tenure for each nursing staff role: RN, LPN, and CNA. The figures show that, as Table 3 indicates, the shift in composition towards less experienced workers occurs across nursing staff roles. Moreover, these effects appear to begin earliest for RNs, who have the highest level of certification among nursing staff roles and are viewed as key determinants of quality.

Table 3: The Effect of Bankruptcy on Nursing Staff Turnover

	All		RN		LPN		CNA	
	New Hires	Exits	New Hires	Exits	New Hires	Exits	New Hires	Exits
$0 \leq t \leq 52$	0.114**	0.135***	0.008	0.022***	0.035***	0.044***	0.074**	0.072***
	(0.046)	(0.035)	(0.008)	(0.007)	(0.008)	(0.009)	(0.033)	(0.025)
$t \geq 53$	0.148***	0.075*	-0.001	0.006	0.043***	0.027***	0.104***	0.045
	(0.057)	(0.039)	(0.012)	(0.007)	(0.009)	(0.010)	(0.038)	(0.028)
FE: Week × Match Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.37	0.42	0.27	0.28	0.30	0.31	0.34	0.38
Mean	1.35	1.41	0.19	0.21	0.26	0.28	0.88	0.91
Observations	466,938	466,938	466,938	466,938	466,938	466,938	466,938	466,938

Note. The dependent variable New Hires represents the number of new workers in a facility-week per 100 beds. The dependent variable Exits represents the number of exiting workers in a facility-week per 100 beds. The results are shown for all nursing staff, RNs, LPNs, and CNAs, respectively. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

Figure 5: Dynamic Effects of Bankruptcy on Nursing Staff Turnover



(a) Separations per 100 Beds

(b) New Workers per 100 Beds

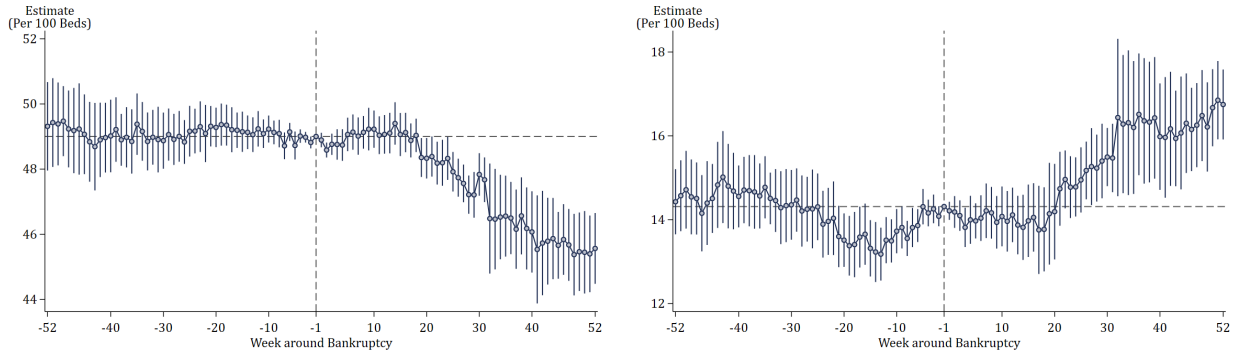
Note. This figure examines staffing turnover around bankruptcy. The left panel shows total weekly nursing staff separations per 100 beds. The right panel shows total weekly new nursing staff per 100 beds. Standard errors are clustered by nursing home chain. 95% confidence intervals are shown. See Table 3 for point estimates.

Table 4: The Effect of Bankruptcy on the Tenure of Nursing Staff

	$\geq$ 60 Days Tenure			$<$ 60 Days Tenure		
	Hours	Hour share	Employees	Hours	Hour share	Employees
$0 \leq t \leq 52$	-44.610***	-2.016***	-1.405***	28.650***	2.016***	0.917***
	(14.332)	(0.493)	(0.465)	(9.317)	(0.493)	(0.315)
$t \geq 53$	-94.698***	-3.188***	-3.119***	47.420***	3.188***	1.719***
	(13.004)	(0.706)	(0.468)	(14.712)	(0.706)	(0.597)
FE: Week $\times$ Match Group	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.86	0.53	0.87	0.57	0.53	0.63
Mean	1,691.93	81.69	49.00	362.09	18.31	14.31
Observations	466,938	466,938	466,938	466,938	466,938	466,938

Note. This table examines staffing by workers of different experience levels, measured in days. The dependent variable Hours represents weekly hours per 100 beds. The dependent variable Hour Share represents share of total weekly hours. The dependent variable Employees represents number of working employees per 100 beds. The results are shown for all nursing staff. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Tenure by hour share is illustrated in Figure 6. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

Figure 6: Dynamic Effects of Bankruptcy on Nursing Staff Tenure



(a) $\geq$ 60 Days Tenure Workers

(b) $<$ 60 Days Tenure Workers

Note. This figure examines staffing by workers of different experience levels. The left panel shows the share of weekly staffing hours provided by workers with at least 60 days of experience at the facility. The right panel shows the share of weekly staffing hours with fewer than 60 days of experience at the facility. Standard errors are clustered by nursing home chain, and 95% confidence intervals are shown. Table 4 contains the coinciding point estimates. Appendix B.1 contains the event studies for all tenure variables and for each nursing staff role.

Next, we quantify changes in staffing by employment contract. Table 5 reports the impact on wage and contract workers. The results indicate that following bankruptcy, facilities tend to shift from wage to contract workers. In particular, weekly contract worker hours rise by 13.2 in the long-term, a 32% increase relative to the mean of 41.8. The shift results in a large long-term increase in the share of total staffing hours supplied by contract labor: the coefficient estimate of 1.035 amounts to a 42% increase relative to the mean of 2.45. It is important to note that contract nursing staff can in fact be more costly to facilities than wage workers. This provides further evidence that turnover is voluntary, as facilities replace departing workers with more expensive contract labor. Indeed, Table B2 in the Appendix shows that average hourly nursing wages increase after bankruptcy. This increase is concentrated among RNs, the highest-certification nursing role. In particular, the average wage paid to RNs increases by 7% following bankruptcy.

Altogether, our findings indicate that facilities maintain total weekly nurse staff hours but experience heightened worker turnover in response to filing for Chapter 11. This leads to a substantial increase in the share of inexperienced workers. The findings that (1) exiting workers are quickly replaced by new hires, (2) facilities shift to more costly contract labor, and (3) RN wages increase provide strong evidence that the effects are worker-driven. More-

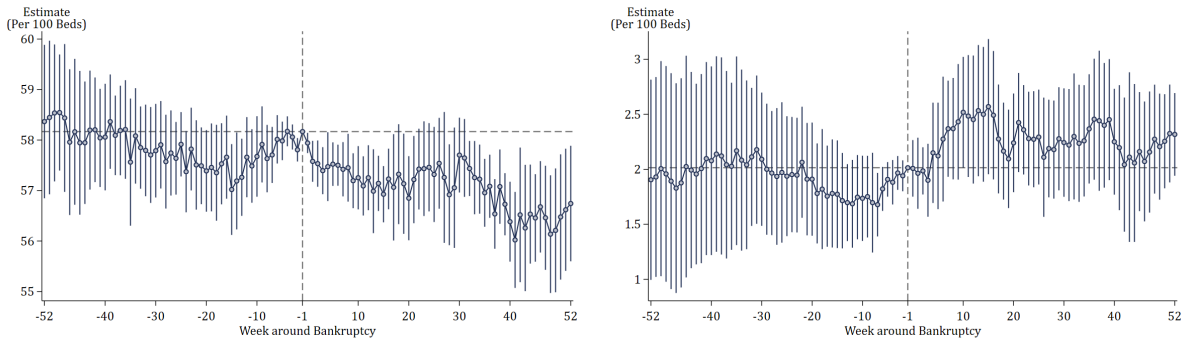
Table 5: Staffing Responses to Bankruptcy by Employment Contract

	Wage Workers			Contract Workers		
	Hours	Hour Share	Employees	Hours	Hour Share	Employees
$0 \leq t \leq 52$	-24.165**	-0.824***	-0.755**	8.305**	0.782***	0.341*
	(11.601)	(0.260)	(0.340)	(3.890)	(0.195)	(0.178)
$t \geq 53$	-52.769***	-1.009*	-1.596***	13.201**	1.035***	0.490***
	(11.624)	(0.541)	(0.374)	(5.573)	(0.354)	(0.175)
FE: Week × Match Group	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.86	0.58	0.88	0.66	0.56	0.66
Mean	1,901.78	92.40	58.17	41.80	2.45	2.01
Observations	516,034	516,034	516,034	516,034	516,034	516,034

Note. This Table examines staffing by workers of different employment contracts. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively. See Figure 7 for event studies.

over, the persistent effects on turnover and tenure suggest an "unraveling" of experienced employees.

Figure 7: Staffing Responses to Bankruptcy by Employment Contract



(a) Wage Workers

(b) Contract Workers

Note. This figure examines staffing by workers of different employment contracts. The left panel shows total weekly hours (per 100 beds) supplied by wage nursing staff. The right panel shows total weekly hours (per 100 beds) supplied by contract nursing staff. Standard errors are clustered by chain, and 95% confidence intervals are shown. See Table 5 for point estimates.

5 Quality of Care and Patient Health

The previous section analyzed nursing staff responses to filing for Chapter 11 bankruptcy, documenting increased worker turnover and shifts towards inexperienced labor. As the continuity of care and composition of nursing staff may directly affect the quality of care delivered to patients, we now explore the implications of bankruptcy for patient health and safety. We first study detailed health inspection data at the facility level. We then turn to restricted-use Medicare claims and nursing home assessment data, which allow us to study changes in outcomes at the patient level.

5.1 Health Inspections

We obtain detailed nursing home inspection data from CMS in order to study how patient health and safety are affected by Chapter 11 bankruptcy. Inspections are conducted by healthcare professionals who visit facilities unannounced in order to check whether the facility is compliant with federal requirements. Onsite inspections strive to provide a comprehensive assessment of the nursing home, reviewing practice and policy in areas such as quality of care, resident rights, and physical environment. For the purpose of systematically rating nursing homes based on these inspections, identified deficiencies are also assigned points

based on their scope and severity.

In Table 6, we explore the quantity of deficiencies on a given inspection date and the total point value of these deficiencies. We then turn to the quantity of deficiencies that fall under the CMS severity level of "actual harm" or "immediate jeopardy to resident health or safety." Next, we use the specified deficiency tags in the inspection data to observe the number of deficiencies that fall under the Quality of Care category. The category is defined by CMS and includes things like pain management, dialysis, bedrails, catheters, and treatment to prevent/heal pressure ulcers.[26] Since inspections occur at irregular intervals with sometimes more than 12 months elapsing between inspections, we conduct this analysis at the facility-inspection level, regressing these four measures on *Bankrupt*, an indicator for whether the given inspection date is after the Chapter 11 filing. We study how violations change prior to and following the bankruptcy filing, specifically, we include the three inspections before bankruptcy and the three inspections after bankruptcy.

Each observation is a facility-inspection. The specification is

$$y_{f,s} = \delta \times \text{Bankrupt}_{f,s} + \gamma_q + \rho_f + \epsilon_{f,s} \tag{3}$$

where ρ_f are facility fixed effects and γ_q are inspection quarter fixed effects. Standard errors are two-way clustered by nursing home chain and quarter.

Table 6 presents the results. We find that health inspection deficiencies and point values increase substantially following bankruptcy. In particular, bankrupt facilities incur more deficiencies that may present actual harm or immediate jeopardy to patients, as well as deficiencies that indicate low quality of care as defined by CMS. Total deficiencies increase by 19% relative to the mean and deficiencies associated with quality of care increase by 47% relative to the mean following bankruptcy.

[26] See https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/GuidanceforLawsAndRegulations/Downloads/List-of-Revised-FTags.pdf.

Table 6: Implications of Provider Bankruptcy for Patient Health and Safety

	Deficiencies	Points	Harm	Jeopardy	Low Quality Care
Bankrupt	0.937***	12.356*	0.079	0.080	0.272***
	(0.329)	(6.435)	(0.067)	(0.049)	(0.057)
FE: Facility	Yes	Yes	Yes	Yes	Yes
FE: Quarter	Yes	Yes	Yes	Yes	Yes
Observations	2,950	2,950	2,950	2,950	2,950
R^2	0.25	0.22	0.22	0.22	0.34
Mean	4.96	43.42	0.28	0.12	0.58
Std. Dev	4.99	87.60	0.94	0.74	1.12

Note. The dependent variables are total number of deficiencies, total number of points incurred (where more points indicates higher severity), number of actual harm (or worse) severity deficiencies, number of immediate jeopardy severity deficiencies, and number of deficiencies that fall under the quality of care category. Standard errors are provided in parentheses and are clustered by chain and quarter of inspection. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

5.2 Health Outcomes

We leverage patient-level Medicare claims and resident assessment data from the Long Term Care Minimum Data Set (MDS) 3.0 to assess whether bankruptcy observably affects patients' health outcomes. These data detail a variety of patient health outcomes—such as resident hygiene, behavioral issues, and use of physical and chemical restraints.

To parallel our previous analyses, we aggregate outcomes across patients at a facility during each month and employ the following matched difference-in-differences specification:

$$y_{f,t,c} = \sum_{\tau} \beta^{\tau} \times \mathbf{1}(t = B_f + \tau) + \rho_f + \alpha_{t,c} + \epsilon_{f,t,c} \tag{4}$$

where $y_{f,t,c}$ is an outcome for facility f in month-year t of relative time for match cohort c. Some outcomes, such as the facility's census or number of admissions or discharges, are a total over all patients. For other outcomes, such as use of antipsychotics, this is an average. We include facility fixed effects ρ_f and cohort- relative month fixed effects $\alpha_{t,c}$. The coefficients $\{\beta^{\tau}\}_{\tau}$ provide the event-study coefficients of interest. We plot these for the 12 months before and after bankruptcy.[27] In addition, we include the pooled treatment effects and standard

[27]Note that we index the month of bankruptcy as month zero and therefore the estimates go from $\tau = -12$ to $\tau = 11$.

errors in the Appendix. As with previous analyses, standard errors are clustered at the chain level since bankruptcies typically occur at the chain level.

Figure 8 illustrates that patient care degrades along a number of important dimensions in response to a SNF filing for Chapter 11 bankruptcy. Facilities report employing both physical and chemical restraints on patients more frequently.[28] The use of restraints is highly suggestive that the facility's staff is struggling to productively interact with and care for patients. This is further evidenced by a rise in residents exhibiting behavioral problems.[29] These challenges plausibly stem from new staff lacking familiarity and know-how on how to interact productively with residents.

It is important to emphasize that the use of physical or chemical restraints is a cause for concern. A primary objective in long-term care is to respect residents' autonomy, as well as to encourage them to actively participate in activities of daily living. Therefore, the use of restraints clearly indicates poor quality care. For example, CMS penalizes use of either physical or chemical restraints in their quality rating system for nursing homes.

In addition to the use of restraints, we also observe some indication that other areas of care decline. For example, we observe a marked increase in residents having poor hygiene. High scores on this measure indicate either that residents have little independence in the activity or that it was not done at all. While such degradations may seem minor, they may still be important to well-being of patients, particularly those for whom the facility provides long-term residential care.

It is worth noting that for three of the four aforementioned outcomes, the worsening of care occurs on a timeline that parallels the staff turnover we observe in the previous sections. While not conclusive, this suggests that the instability in post-bankruptcy staffing may underlie the worsening care.

Notably, while we do observe multiple dimensions of worsening care, we do not observe any evidence that bankruptcy results in greater mortality or falls, which are common adverse outcomes for nursing home patients. This suggests limits to the adverse consequences of bankruptcy in that care does not degrade badly enough or in a way that would result in

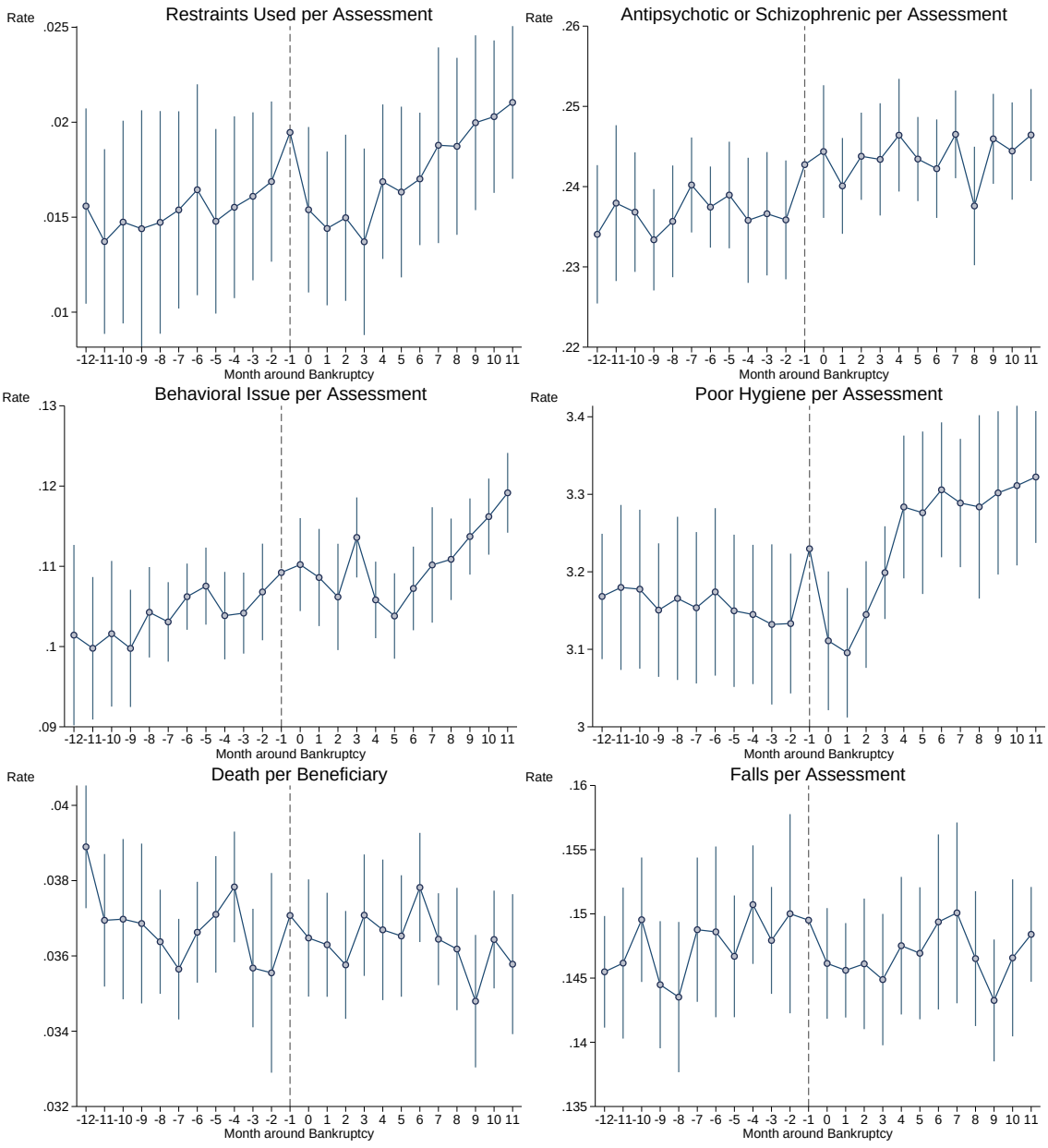
[28] Note that the term "chemical restraint" is a euphemism for inappropriate use of drugs such as antipsychotics to sedate patients. We include all antipsychotic use and schizophrenia diagnoses as indicators of chemical restraint because nursing homes have been shown to frequently improperly diagnose schizophrenia to justify the use of antipsychotics (Thomas, Gebeloff, and Silver-Greenberg, 2021).

[29] Behavioral problems include threatening, screaming, cursing at others, hitting, kicking, pushing, scratching, grabbing, or abusing others sexually.

major adverse outcomes, such as mortality.

As an additional analysis in Figure C3 and Table C2, we consider how the composition of facilities' residents may have changed due to filing for bankruptcy. While we do not see a statistically significant reduction in census in the year following bankruptcy, we do see a nearly 1 percentage point reduction in Traditional Medicare patients. Facilities also experience slightly fewer admissions and discharges, suggesting their post-bankruptcy patient stays at the facility are slightly longer.

Figure 8: Effects of Bankruptcy on Patient Health
at the SNF Level



Note. This figure examines health outcomes over relative month t among patient assessments recorded in the MDS. Regressions include match-id by relative time and skilled nursing facility fixed effects. The values have been shifted up by the mean of the dependent variable to provide scale. Standard errors are clustered by skilled nursing facility chain, and 95% confidence intervals are shown. See Table C1 for point estimates.

6 Experimental Evidence on Mechanisms

We have shown that a nursing-home bankruptcy filing causes nurse turnover (Section 4) and a decline in patient health (Section 5). These results raise several questions: do nurses quit in reaction to a bankruptcy filing, or are they fired as part of the firm's bankruptcy strategy? Is nurse turnover the mechanism driving the decline in patient health, or do bankruptcy filings coincide with some other shift in strategy that harms patients?

To answer these questions, we conduct an online survey experiment. We survey 247 nurses, all of whom have experience working in nursing homes. The survey has two parts. First, each participant reads descriptions of hypothetical patient-care scenarios (e.g., a nurse gives a patient medicine). Participants estimate each hypothetical patient's risk of a negative outcome. We randomly vary the tenure of the nurse in each hypothetical scenario, holding every other detail fixed. According to our randomized design, participants believe that a reduction in nurse tenure causally increases negativse-outcome risk by 44%. In this sense, according to nursing-home workers, nurse turnover causes a decline in patient health. Second, each participant reads a description of a hypothetical nursing facility. Each participant estimates the rate of voluntary departures at the facility. We randomly vary the bankruptcy status of the facility, holding all other details fixed. Our randomized design shows that a bankruptcy causally increases voluntary nurse departures by 47%.

Together, the survey experiment results reveal that: (i) nurses are likely to quit in response to a bankruptcy filing, and (ii) the nurse turnover caused by a bankruptcy filing is likely to harm patients. An important caveat is that our nurse participants evaluate hypothetical scenarios in an unincentivized manner. Nonetheless, we show that our preferred interpretation of our main results is consistent with the collective experience of 247 nursing-home workers. In the following sections, we briefly summarize the experiment and its implications. In Appendix A, we provide a detailed description of the survey experiment.

6.1 Nurses Voluntarily Quit in Response to a Bankruptcy Filing

At the start of our survey, each nurse participant describes their prior work experience. We confirm that each nurse has experience working at a nursing home. Using standard attention tests, we also confirm that each nurse is carefully reading the survey questions.

In the second part of our survey, each nurse reads a description of a job at a hypothetical

nursing home. Each participant's hypothetical job description is designed to match their own prior work experience: the wage, nursing role, and location match the participant's description of their most recent job. We ask each participant to imagine they currently have this hypothetical job and to estimate: (i) how likely they would be to search for a job at another facility, and (ii) what fraction of nurses at this hypothetical facility would voluntarily quit in the next year.

We randomly assign each nurse participant to one of three groups. In the control group, the hypothetical facility in the description can afford to pay its expenses. In the "Distressed" group, the facility has a 25% chance of filing for Chapter 11 bankruptcy in the next year. In the "Bankrupt" group, participants read the following: "While [the facility] is currently open, it recently filed for Chapter 11 bankruptcy and is currently in bankruptcy proceedings."

We compare participant responses across randomly assigned groups, controlling for observable participant characteristics with OLS regressions. Relative to control-group participants, participants in the Bankrupt group: (i) are 28.8 percentage points more likely to search for a new job (75% of the control-group mean), and (ii) estimate a rate of voluntary attrition that is 18 percentage points higher (47% of the control-group mean). These treatment effects are economically and statistically significant ($p < 0.01$). We similarly find significant treatment effects associated with the Distressed treatment, though these are smaller in magnitude. We provide further details and results in Appendix A.

6.2 Nurse Turnover Harms Patients and Reduces Efficiency

At the start of the survey, each participant reports the nursing role corresponding to their work experience: LPN, CNA, or RN. The participant then reads hypothetical patient-care scenarios involving tasks corresponding to that role. We worked with a nurse to design realistic task descriptions for each nursing role.

After reading each hypothetical scenario, each participant reports: (i) the likelihood that the hypothetical nurse makes a mistake, leading to a bad outcome for the hypothetical patient (e.g., administering an incorrect medication dose); and (ii) the amount of time that the hypothetical nurse would need to complete the task.

We randomly assign each survey participant to one of two groups. In the control group, the hypothetical nurse performing the task in each hypothetical scenario has one year of tenure (i.e., the nurse has worked at the hypothetical facility for one year). In the treatment

group, the hypothetical nurse has one week of tenure. All other details in the hypothetical scenarios are identical across groups.

Once again, we compare participant responses across randomly assigned groups. Relative to the control-group participants, participants in the treatment group (one week of tenure) report: (i) a 9.7 percentage point increase in the rate of nurse mistakes (44% of the control-group mean), and (ii) a 6 minute higher completion time (14% of the control-group mean). Both effects are statistically significant ($p < 0.01$).[30]

6.3 Discussion

Together, the results from the randomized experiment allow for a back-of-the-envelope calculation to estimate the effect of bankruptcy on patient outcomes through the loss of experienced nursing workers. We find that bankruptcy increases voluntary attrition by 47% of the control-group mean, while turnover increases the reported rate of bad patient outcomes (nurse mistakes) by roughly 44%. Therefore, a crude back-of-the-envelope calculation shows that bankruptcy is likely to increase adverse patient outcomes by $44\% \times 47\% = 21\%$ through the loss of experienced employees. Analogously, a bankruptcy reduces nurse efficiency (timely task completion) by $14\% \times 47\% = 7\%$ through a loss of facility-specific human capital.

These results are based on nurses evaluating hypothetical scenarios in an unincentivized manner. Nonetheless, these nurses are likely to report answers consistent with their experience because (i) they have no incentive to lie and (ii) our across-participant design mitigates experimenter-demand concerns since participants are unaware of the treatment.[31]

7 Conclusion

This paper leverages administrative and survey data from the healthcare sector to study the implication of healthcare provider bankruptcies in the US nursing home industry. We find that filing for bankruptcy results in substantial turnover in nursing home staff, which our survey of nursing home staff suggests harms quality of care.

[30] We cluster standard errors by participant to adjust for the fact that each participant evaluates multiple scenarios.

[31] I.e., treatment-group participants do not know how their descriptions differ from those viewed by control-group participants.

Using administrative data we affirm the survey results, finding that quality of care declines after bankruptcy, with facilities performing worse on health inspections and showing signs of poor care as measured by residents' health assessments. These results suggest that bankruptcies are not costless. However, when considering how to mitigate these costs, a key provision is likely patient ability to substitute to nearby facilities to compensate for the lower quality of care delivered by bankrupt facilities.

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A Survey Experiment Appendix

This appendix provides further details regarding our online survey experiment. In Section A.1, we describe the experiment design. In Section A.2, we provide details regarding our statistical analysis of the experiment data and the corresponding results. In Section A.3, we present additional survey results elucidating the mechanism by which a bankruptcy causes nurse turnover.

A.1 Experiment Design

We use a platform called Lucid to survey a participant sample consisting exclusively of nurses. We first screen applicants using attention tests. These are questions with answers that are obvious if and only if the participant reads carefully. We exclude participants that fail these attention tests. Next, we ask screening questions to ensure that the participant: (i) has worked in the healthcare industry; (ii) has worked as either a LPN, CNA, or RN; and (iii) has worked at a nursing home (skilled nursing facility). We record the highest paid nursing role that the participant has held (i.e., if a participant has worked as both a RN and a LPN, we record RN). We refer to this as the participant's prior nursing role.

A.1.1 Part 1: Hypothetical Patient-Care Scenarios

In the first part of the experiment, participants read descriptions of hypothetical patient-care scenarios. Each scenario involves a specific set of tasks that a nurse must complete for a specific hypothetical patient. Consider the following example:

> Sally Conner is a 75 year old diabetic who recently suffered a stroke at home. She has left-sided weakness in her arm and leg, and currently spends most of her time in bed.
>
> Imagine that Mrs. Conner has been moved into a skilled nursing facility for recovery and needs her daily vital signs assessed: blood pressure, heart rate, vision, temperature, glucose levels, and weight.

After reading the description, the participant estimates how long they personally would take to complete the tasks. This helps the participant estimate a concrete completion time. We

next ask the participant to estimate completion times for the same tasks for two hypothetical nurses. One nurse, "Nurse Smith," has two years of tenure at the SNF. The other nurse, "Nurse Williams" has a shorter tenure at the SNF. Each participant reports estimated completion times for both nurses.

In theory, participants might infer that they are supposed to care about the length of tenure at a SNF. Importantly, our main specification does not compare a given participant's responses for one nurse to the same participant's responses for the other nurse. Instead, we randomize the length of tenure for "Nurse Williams" *across* participants and compare completion-time reports across participants. Specifically, half of participants see that Nurse Williams has one year of tenure at the SNF. The other half are told that Nurse Williams has one week of tenure at the SNF. Once a participant is randomized into a Nurse-Williams-tenure level, they see the same Nurse-Williams description in all scenarios they evaluate. Comparing responses for Nurse Williams across participants, we can thus exogenously vary a nurse's length of tenure without leading participants to think this variation is important.

In other words, even if a participant thinks they are supposed to report a longer completion time for the shorter-tenure nurse, they cannot possibly believe they are supposed to report a longer completion time than other participants who were randomly assigned a longer-tenure nurse. We use reported completion times for the longer-tenured nurse, Nurse Smith, only to control for idiosyncratic beliefs about completion times. Comparing average reported completion times for Nurse Williams across the two randomized groups, we estimate the effect of employee tenure on task-completion efficiency.

We use a similar approach to evaluate the impact of employee tenure on task-completion quality. For each scenario, each participant evaluates the likelihood that an adverse outcome would occur if they were to complete the tasks. To make this concrete, we give examples of adverse outcomes that could occur. For example, for the above scenario, we write the following:

> In completing the above tasks, potential mistakes or bad outcomes include: (i) incorrect or incomplete documentation of vital signs; (ii) not following proper hand hygiene, such as not washing or sanitizing hands and not using new, sterile gloves.

Just as for completion times, each participant then reports the likelihood of an adverse

outcome if the task were completed by a hypothetical nurse.[32] Participants provide answers for the same nurses and see the same randomized length of tenure for the less experienced nurse. Comparing responses across participants, we estimate the effect of employee tenure on the likelihood of an adverse patient outcome.

Each survey participant reads three descriptions of hypothetical scenarios, answering the above questions for each scenario. We use each participant's prior nursing role (e.g., RN or LPN) to select which tasks they see. For example, participants with LPN experience see scenarios describing tasks that would be performed by a LPN.

A.1.2 Part 2: Bankruptcy and Hypothetical Nurse Departures

In the second part of the experiment, participants read about a hypothetical nursing job at a hypothetical facility and estimate the rate of voluntary attrition at the facility.

To begin, participants provide details about their most recent nursing-home job: the position, wage, and the state in which the facility was located. We also ask the participant to estimate what fraction of employees voluntarily leave that employer each year. The response to this question is used to control for the participant's idiosyncratic beliefs about voluntary worker attrition.

Next, for each participant, we construct a hypothetical job with the same position, wage, and location (state) as the participant's prior job.[33] Each participant then reads a description of the employer in the hypothetical job. Importantly, participants are randomly assigned to see different descriptions of the financial health of the employer. One third of participants see a "Control" description in which the employer is solvent:

> Facility A's revenue is large enough to pay for both its operating expenses (e.g., wages) and other financial obligations (e.g., annual debt payments).

One third of participants see a "Distressed" description in which the employer has a 25% chance of filing for Chapter 11 bankruptcy in the next year. Within this Distressed group, half of participants see a description of a "Profitable Distressed" employer:

[32] We ask participants to report how likely they believe it is that an adverse outcome will occur, on a scale from 0 (no chance of occurring) to 100 (certain to occur), if the task is performed by him or herself, Nurse Smith, or Nurse Williams.

[33] This controls for a participant's required job characteristics.

> Facility A's revenue is large enough to pay for its operating expenses (e.g., wages), but is not enough to also fully pay its other financial obligations (e.g., annual debt payments). Facility A has a 25% chance of filing for Chapter 11 bankruptcy in the next year.

The other half of the Distressed group sees the following description of a "Baseline Distressed" employer:

> Facility A has a 25% chance of filing for Chapter 11 bankruptcy in the next year.

In our baseline specification, we pool the "Baseline Distressed" and "Profitable Distressed" participants together. We let the indicator Distressed_i indicate whether a participant is in either of these two groups.

The final third of participants see a "Bankrupt" description in which the employer is currently open but has recently filed for bankruptcy. Within the Bankrupt group, half of participants see a description of a "Bankrupt Profitable" employer:

> Facility A's revenue is large enough to pay for its operating expenses (e.g., wages), but is not enough to also fully pay its other financial obligations (e.g., annual debt payments). While Facility A is currently open, it recently filed for Chapter 11 bankruptcy and is currently in bankruptcy proceedings.

The other half of participants in the Bankrupt group see a description of a "Baseline Bankrupt" employer:

> While Facility A is currently open, it recently filed for Chapter 11 bankruptcy and is currently in bankruptcy proceedings.

In our baseline specification, we pool the "Baseline Bankrupt" and "Profitable Bankrupt" participants together. We let the indicator Bankrupt_i indicate whether a participant is in either of these two groups.

After each participant reads the hypothetical job description, we ask them to imagine they are currently working in this position for this hypothetical employer. We then measure two key dependent variables. First, each participant reports the likelihood they would search for

another job rather than continue working in this position. Second, each participant estimates the fraction of employees they believe will voluntarily leave the employer this year. As above, we compare responses across participants in different randomly assigned groups to estimate causal effects without biasing participants toward particular responses.

A.1.3 Sample Selection

We exclude individuals that fail attention checks. Additionally, we exclude individuals that have never worked in the healthcare industry at a skilled nursing facility as an RN, LPN, or CNA. We also exclude participants who do any of the following: (i) report a probability above 100, (ii) report a time to complete a task above four hours, (iii) report a historical wage greater than $100 per hour, or (iv) give answers that are self-contradictory in the following manner: For each participant, we average their reported time for Nurse Williams to complete tasks across the three scenarios/patients. We do the same for Nurse Smith. At the end of the first part of the survey, we ask participants whether, on average, they think Nurse Smith is slower than Nurse Williams, faster than Nurse Williams, or the same speed. If the answer to this question is not "same speed" and is inconsistent with the participant's reported times, we drop the participant. For example, we drop a participant if their average reported completion time for Nurse Williams is 45 minutes, their average reported time for Nurse Smith is 20 minutes, yet they say on average Nurse Williams is faster than Nurse Smith.

We apply the analogous filter for the reported likelihood of an adverse patient outcome or mistake. For example, we drop a participant if their average reported likelihood of a mistake is 50% for Nurse Williams and 25% for Nurse Smith, yet they say that Nurse Smith makes more mistakes.

A.2 Statistical Analysis of our Experiment

A.2.1 Turnover Harms the Quality and Efficiency of Patient Care

To begin, we analyze the importance of employee turnover using the first part of the experiment (Section A.1.1). We let $j = 1, 2, 3$ index the hypothetical patient scenarios considered by each participant i. We let $k \in \{RN, CNA, LPN\}$ index the job that participant

i previously held at a SNF.[34]

Recall that in each scenario j, each participant i considers the performance of two hypothetical nurses. The longer-tenured "Nurse Smith" has been at the hypothetical SNF for two years. The shorter-tenured "Nurse Williams" has been at the SNF for less time: we randomize her tenure to be either one year or one week. Once a participant is randomized into seeing one of these two tenure levels, that participant sees the same tenure level in all questions.

To measure the importance of employee turnover, we compare participant evaluations of the one-week-of-tenure nurse to those of the one-year-of-tenure nurse. This is thus a comparison across participants. Since tenure levels are randomized, we evaluate the causal effect of replacing a nurse who has worked at a facility for one year with a nurse who has worked there for one week. Specifically, we estimate the following regression by OLS:

$$\text{Task Completion Time}_{ijk} = \alpha_j + \alpha_k + \delta \text{Turnover}_i + \gamma \text{Perceived Task Difficulty}_{ij} + \epsilon_{ijk}. \quad (5)$$

In this equation, an observation is a participant i with prior job k evaluating a particular scenario j. We include fixed effects α_j and α_k for the hypothetical scenario j and the participant i's prior job k. Task Completion Time is the reported completion time for the shorter-tenured nurse. Turnover is an indicator for participant i being randomly selected to consider a nurse with one week, rather than one year, of tenure. Finally, Perceived Task Difficulty is the reported completion time for the longer-tenured nurse; As discussed in Section A.1.1, we only use participant responses for the longer-tenured nurse to control for idiosyncratic participant beliefs about task difficulty. We cluster standard errors at the participant level.

Finally, we estimate a similar regression to study the effects of turnover on the quality of patient care. Recall that each participant evaluates the likelihood of a mistake or bad outcome in each scenario. We use these responses to estimate the following regression by OLS:

$$\text{Rate of Mistakes}_{ijk} = \alpha_j + \alpha_k + \delta \text{Turnover}_i + \gamma \text{Perceived Task Risk}_{ij} + \epsilon_{ijk}. \quad (6)$$

[34] If a participant reports that they have worked in more than one of these roles, we use the one with the highest required level of training.

In this equation, Rate of Mistakes is the reported likelihood of a mistake or bad outcome for the shorter-tenured nurse. Perceived Task Risk is the reported likelihood of a mistake or bad outcome for the longer-tenured nurse. Turnover is once again an indicator for participant i being randomly assigned to evaluate a shorter-tenure nurse with only one week of experience at the hypothetical SNF.

Panel A of Table A1 presents our OLS estimates of equations (5) and (6). According to the nursing staff we survey, turnover reduces the efficiency and quality of patient care. Comparing participants who evaluate a nurse with one week of SNF tenure to those who evaluate a nurse with one year of SNF tenure, the nurse with one week of tenure takes 6.2 minutes longer to complete tasks on average. This represents an increase equal to 14% of the control-group average completion time. Likewise, the nurse with one week of tenure has a higher likelihood of mistakes or bad outcomes - the rate increases by 9.7 percentage points on average, 44% of the control-group mean.

A.2.2 Bankruptcy Increases Turnover Through Voluntary Employee Departures

Next, we evaluate how a firm's bankruptcy or financial distress affects the willingness of employees to work for that firm. As described in Section A.1.2, each participant i considers a hypothetical job. Participants are randomly assigned to view different descriptions of the employer. Each participant then reports the likelihood that they would search for another job if they currently had this hypothetical job. Participants also estimate the fraction of employees that would voluntarily leave this employer this year. Using these participant responses, we estimate the following regressions:

$$\text{Voluntary Departure}_{ik} = \alpha_k + \beta \text{Distressed}_i + \delta \text{Bankrupt}_i + \text{Turnover Belief}_i + \epsilon_{ik} \quad (7)$$

$$\text{Departure-Rate Guess}_{ik} = \alpha_k + \beta \text{Distressed}_i + \delta \text{Bankrupt}_i + \text{Turnover Belief}_i + \epsilon_{ik}. \quad (8)$$

In this equation, an observation is a participant i with prior job k. Voluntary Departure is the likelihood that participant i would search for another job if they held this hypothetical position. Departure-Rate Guess is participant i's estimate of the percentage of workers that will voluntarily leave this hypothetical employer this year. Distressed is an indicator equal to one if participant i is randomly assigned to evaluate a hypothetical job for a financially

distressed employer - one with a 25% chance of filing for bankruptcy in the next year. Bankrupt is an equivalent indicator for being randomly assigned to consider a bankrupt employer. We omit the indicator for the control group. Finally, Turnover Belief is participant i's estimate of the percentage of workers that voluntarily left participant i's prior employer each year. We use robust standard errors.

Panel B of Table A1 presents OLS estimates of equations (7) and (8). Panel B demonstrates that both bankruptcy and financial distress dramatically decrease willingness to work at a facility and likely increase voluntary worker separations. Specifically, bankruptcy increases the participant's own likelihood of searching for another job by 28.8 percentage points (75% of the control-group mean), while financial distress increases the likelihood by 25.3 percentage points (66% of the control-group mean). Bankruptcy and distress also increase participants' perceived rates of voluntary attrition by 18 (47% of the control-group mean) and 7.5 (20% of the control-group mean) percentage points, respectively.

Table A1: Results from Online Randomized Experiment on Nursing Staff

Panel A: Effect of Turnover on Task Efficiency and Quality of Care

	Completion Time	Completion Time	Mistake Rate	Mistake Rate
New Hire	6.211***	6.209***	9.666***	9.668***
	(1.516)	(1.517)	(2.099)	(2.102)
Task Difficulty	1.177***	1.180***		
	(0.047)	(0.047)		
Task Risk			0.818***	0.816***
			(0.038)	(0.038)
FE: Job	Yes	Yes	Yes	Yes
FE: Scenario	No	Yes	No	Yes
R^2	0.86	0.86	0.52	0.52
Clusters	247	247	247	247
Control Mean	43.03	43.03	22.13	22.13
Observations	741	741	741	741

Panel B: Effect of Bankruptcy on Job Search and Attrition

	Probability You Job Search	Probability You Job Search	Probability Others Voluntarily Separate	Probability Others Voluntarily Separate
Bankrupt Pool	28.810***	29.741***	17.972***	19.203***
	(5.140)	(4.841)	(3.618)	(2.959)
Distressed Pool	25.295***	27.666***	7.481**	10.615***
	(5.125)	(4.972)	(3.604)	(3.008)
Baseline Turnover		0.431***		0.569***
Belief		(0.091)		(0.058)
FE: Job	Yes	Yes	Yes	Yes
R^2	0.15	0.23	0.13	0.41
Control Mean	38.48	38.48	37.97	37.97
Observations	244	244	244	244

Note. **Panel A:** Each participant is asked three questions about the care provided by Nurse Williams and Nurse Smith to different patients. The tenure of Nurse Williams is randomized over {One Week, One Year} with equal probability across participants. The dependent variable Completion Time denotes participant belief of the number of minutes Nurse Williams takes to complete the task. The dependent variable Mistake Rate denotes participant belief of the probability of a bad outcome or mistake if Nurse Williams undertakes the task. Standard errors in parentheses are clustered at the participant level. **Panel B:** Participants are randomized into Control, Bankrupt, and Distressed with probabilities 1/3, 1/3, and 1/3, respectively. The dependent variables are the participant's reported likelihood of searching for another job and the perceived voluntary worker attrition rate from the facility. Robust standard errors in parentheses. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

A.3 Mechanisms

After participants answer questions regarding their willingness to work at Facility A, we collect survey evidence from those in the treatment groups (Bankrupt or Distressed) about the specific concerns that affect their decisions. We ask participants to rate four specific concerns on a scale from 1 (not at all concerned) to 7 (very concerned). Table A2 displays the average ratings reported for the four concerns. Every concern has an average rating above 4, the neutral rating. The strongest concern that participants have is that the facility's financial problems would cause it to close down, forcing them to find another job. The second strongest concern is that the facility would reduce wages.

We also ask participants to share in their own words any concerns that may have influenced their willingness to stay. Appendix A.3.1 contains the free responses in their raw form. Consistent with the numerical ratings, many participants report concerns about job security, the facility closing down, and wages. However, the free responses also bring some additional insights. Some participants express direct concerns with working for a facility that was potentially poorly managed (either financially or operationally):

> *"For a nursing facility to file for bankruptcy or have any type of financial troubles is an immediate red flag. It could mean poor leadership or weak business management. I would have no interest in working for any company like that."*

Other participants indicate that the financial condition of the facility wasn't a direct consideration, but that their primary concern was the facility being short-staffed. Many participants specifically report concerns about the consequences of other workers leaving (e.g., on team dynamics), and particularly that departures of existing workers mean that those who remain would be left to train new hires and become overworked. For example:

> *"I'd be afraid the experienced workers would find other jobs and we would be training mostly brand new employees."*

Within the Distressed group, participants have relatively mixed responses. Some further emphasize concerns related to wages and shutting down. Some state that as long as the facility provided adequate pay, the firm's financial distress would not cause them to search. Similarly, some express that a 25% chance of bankruptcy was not high enough to leave, and that they would not search for a new job until problems started occurring.

Table A2: Concerns Influencing Willingness to Work at Facility

	Bankrupt		Distressed		All Treated	
	mean	sd	mean	sd	mean	sd
SNF will close down	5.56	1.58	5.47	1.63	5.52	1.60
Sign of poor-quality SNF	4.80	1.50	4.88	1.54	4.84	1.51
SNF will reduce my wage	5.15	1.50	5.35	1.58	5.25	1.54
Will be unpleasant	5.06	1.44	4.87	1.70	4.97	1.57

Note. Participants in the treated groups rank four potential concerns about working at a bankrupt or distressed facility on the following scale from 7 to 1: strongly agree, agree, somewhat agree, neither agree nor disagree, somewhat disagree, disagree, and strongly agree. The full text of the four concerns are: (i) I am concerned that Facility A's financial problems will cause it to close down, forcing me to find another job. (ii) I am concerned that Facility A's financial problems are a sign of a poor-quality SNF. (iii) I am concerned that Facility A's financial problems will cause it to reduce my wage. (iv) I am concerned that Facility A's financial problems will make working there unpleasant.

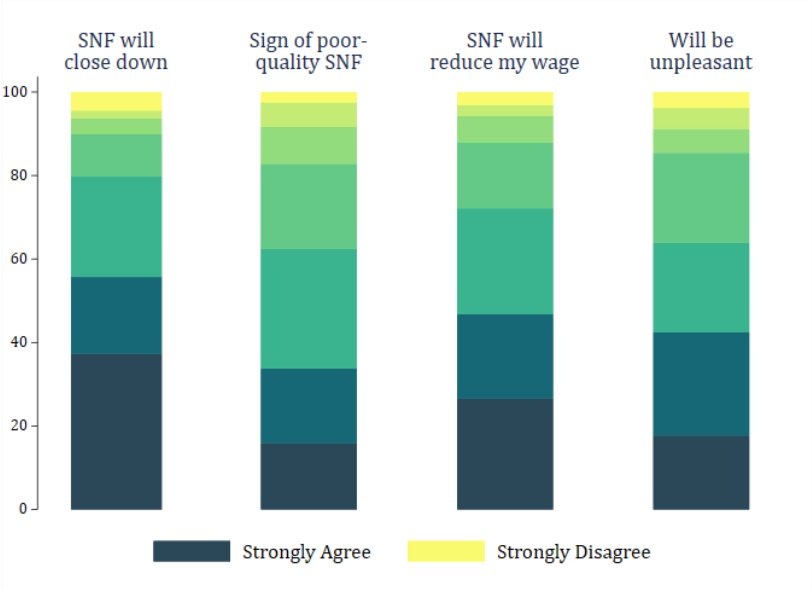


Figure A1: Concerns Influencing Willingness to Work at Facility

Note. Participants in the treated groups rank four potential concerns about working at a bankrupt or distressed facility on the following scale from 7 to 1: strongly agree, agree, somewhat agree, neither agree nor disagree, somewhat disagree, disagree, and strongly agree. The full text of the four concerns are: (i) I am concerned that Facility A's financial problems will cause it to close down, forcing me to find another job. (ii) I am concerned that Facility A's financial problems are a sign of a poor-quality SNF. (iii) I am concerned that Facility A's financial problems will cause it to reduce my wage. (iv) I am concerned that Facility A's financial problems will make working there unpleasant.

A.3.1 Concerns Influencing Willingness to Work: Participant Free-Text Responses

All responses have been kept in their original form, including spelling or grammatical errors. Responses are presented in descending order by length.

Bankrupt Group

- Any job I work is based on financial needs and passion. I have a passion for caring for others and certainly would feel sympathetic to the faculty and patients, however in the end, I have a family to care for and bills that have to be paid. A good raise would certainly extend my stay, and possibly less than $5 raise would be considered, but ultimately, it would be a see and tell situation. Even with a raise, I would likely be looking around elsewhere for a backup plan.
- Just because they have financial problems does not mean that it was a bad facility. It does not mean that the workers are not dependable and good workers. It does not mean that the residents are bad. Some companies just go through financial hardships and they work their way out of it. I would give a chance to see if that would happen before I would leave if I enjoyed my job my coworkers and enjoyed working with the residents
- Facility A clearly has serious challenges with management - either someone is making bad financial decisions, overhead is too high or patient selection is ineffective. Since they've already filed for bankruptcy, the writing is on the wall with this facility and I wouldn't stick around to find out how quickly the doors will close.
- If I chose to stay it would be hard because during bankruptcy so many things could happen and leave you with no job and a roof over your head. If I would stay they would have to offer me a significant amount of money and the residents would have to be so very special that I didn't want to go
- With this type of news, filing for chapter 11, it's highly unlikely I would remain. I don't see much influence for me to stay. I may show up one day and the doors are locked. I can't have that happen so to be proactive and initiate another job, is in my best interest.
- finding a position elsewhere if facility A closes, would want to locate a position just in case. would like to know if there are any potential buyers for the facility and who they are, past facilities and their success in business, ratings, etc.
- For a nursing facility to file for bankruptcy or have any type of financial troubles is an immediate red flag. It could mean poor leadership or weak business management. I would have no interest in working for any company like that
- with increased costs of operating any healthcare facility now, I do not see financials as the biggest factor in people leaving. I think worker shortage and lack of teamwork as a bigger factor for people leaving the work place.
- It depends on the amount of time I've put in for work at the facility and how close I am with the residents. It's hard to leave a facility once you've been there for so long
- I would not leave a facility just because it filed for bankruptcy. I evaluate the facility on the quality of care and the teamwork ability of the employees.
- They have been good to me so I would be reluctant to look for a nother job because you form a relationship with your coworkers and become like family
- If Facility A goes bankrupt, I'm for sure without a job, and even though the hourly wage is good, I'd rather not have to worry about losing my job.

- North Carolina's minimum wage is awful as it is but being a CNA and the pay is even not worth being one. Been ready to leave this job long ago
- If unable to manage finances how are they able to properly manage everything else that is required for a facility to be ran safely.
- If finances are in trouble supplies may be inadequate. Staffing is likely to be the legal minimum leaving an impossible workload.
- The possibility of it closing down due to it's financial problems and then I would have to search for a job anyway
- im afraid they will cut the amount of workers they use to save money and they will be overworked and short staffed
- I would work at Facility A if the pay is good and that it would help me pay anything like rent or something else.
- I'd be afraid the experienced workers would find other jobs and we would be training mostly brand new employees.
- My concern would be that there would not be enough supplies to maintain adequate care needed for the residents.
- Cause the money is there to pay the wages and alit of facilities have problems but there not always on going
- The residents that live there are a joy to work with as well as my coworkers and the hourly pay is decent.
- Read all the responses above. This is not a surprise in the healthcare field. Let alone in ALF's or SNF's
- They may not tell people they are losing their jobs until the last minute to prevent them from quitting.
- Not receiving paycheck on time. Not receiving enough hours. Not receiving any health benefits.
- If they can't afford or manage the money to run a skilled place how will I know I can get paid
- Loyalty to staff, management and clients. I can always (later) find another job in nursing.
- The patients or residents are not getting the proper care they need due to short staffing
- I would be fearful of losing my employment there. I need health benefits for my children.
- I enjoy my job, co-workers, and residents I would stick by them as long as I could
- To try and make the situation better, but if they bankrupt I would not stay
- Would want to see if someone would buy the Facility and turn things around
- That the residents living there will always need help with daily living.
- I love my job my clients and workers I've been with them for 8 years
- Being unsure of the potential outcome once bankruptcy is completed.
- That the facility is filing bankruptcy and possibly closing down.
- The residents in the facility still need to be taken care of
- The residents and the relationships I get to build there.
- Just the overall treatment of workers and also the wages
- for the care of the residents that you become bonded to

- The patients that you grow close to and need good care
- I would willingly stay if I was promised an incentive.
- Job security, financial security, and quality of care.
- I hope I can contribute to making it a better place
- It may be that there is poor leadership at the top?
- The supplies and staff needed to provide good care
- The residents still need people to care for them.
- It is having financal issues and could shut down.
- I feel that they will cut my hours and pay rate.
- i have no concerns at this time for facility A
- None because they are having financial issues
- Closeness to home, relationships to coworkers
- Concern for the residents care and wellbeing
- Loyalty. And tonprovide good patient care
- Instability and fear of financial worries
- concerned they would cut down on staff
- I love the people and co workers there
- Not finding someone who truly cares
- The residents still need help
- Better pay better faciliry
- Starting over at a new job
- To stay for the residents
- The residents and staff.
- Getting a pay check
- Fear of losing job
- That there closing
- Chance of closing
- I love the work
- The atability
- Wage per hour
- Nothing much
- I don't know
- Higher wage
- No concerns
- Nothing

- Finance
- The pay
- Wages
- N/a
- B

Distressed Group

- Jobs for nurses are a dime a dozen. I will not stay at a facility that is financially unstable - unless they are paying me so much that I couldn't possibly leave. Even then, my attitude would suck and I'd view it as a short-term position until the facility failed.
- I have concerns that it may have to close down leaving me without a job. I am also concerned that it will cause stress in our working environment which isn't fair to the residents if we cannot do our jobs properly.
- For me to work at a nursing home first and foremost the patients have to be well cared for they must always be number one priority. Next the past must be decent and comparable to other facilities in the area.
- If I was assured the facility would be able to keep the doors open, and that wages and benefits are still being paid. I would also worry about shortcuts being taken with patient care and medical supplies.
- The location and distance between work and home. Flexibility and benefits. Opportunities for advancement. Positive staff/resident and work environment and good working relationships
- As long as they don't start making shortcuts to patient care I'm good. When staff cuts, lack of supplies, crappy food trays, etc start happening I am gone no matter what the pay!
- I would want to make certain My wages would not decrease and conditions are good to work in. I also make definitely sure that we would have enough help for the residents
- My main concern is the facility may not be fully forthcoming and things may be worse than suspected. It is possible I shoe up to work one day and the door is locked.
- If it's going under chances are management is going to treat the employees bad and residents will feel that and they'll become hostile especially memory care
- Patients still need care no matter if the facility declares bankruptcy or not. If to many workers leave, the patients don't receive the care that is needed.
- The bankruptcy issue therefore that would affect my pay eventually and then closing down so then I will that will leave me with not having a job
- Because it's only a 25 percent chance of filling for bankruptcy. So there's still a very good chance of 75 percent that it won't happen.
- My concerns would be having to drive a distance for another job as well as the bond that I have with the residents at the facility.
- I don't understand. Why would concerns influence me to work at this facility. Wouldn't concerns cause me to leave?
- Relationship with residents and staff. May be convenient to my home. Knowing the systems in that facility.
- The pay rate and the fact that it's only a 25

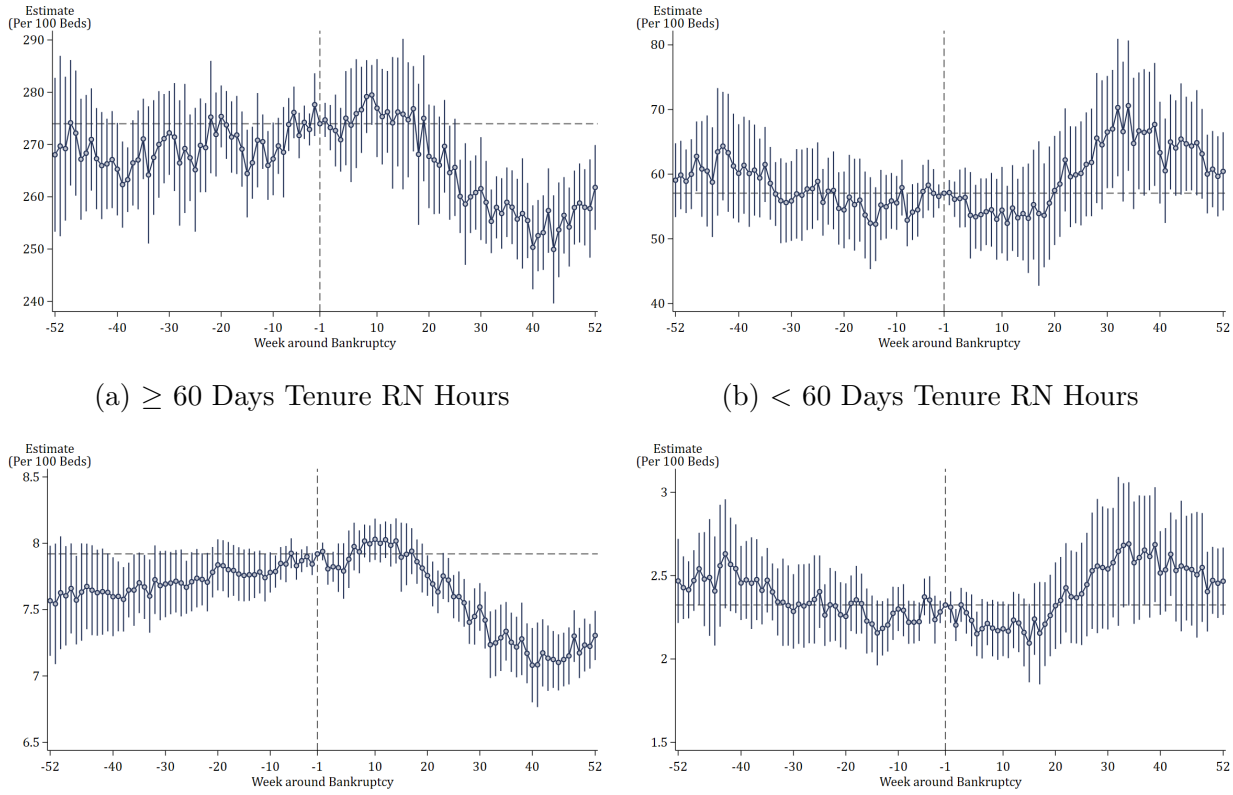
- There's only a 25
- Being afraid of a pay cut in order for them to obtain their own bills or a potential shutdown
- Job security and the possible reduced level of care as a result of poor financial management.
- I don't like to change jobs frequently... Prefer to establish trust with patients in a SNF.
- The people I work with, the nurse patient ratio, the type of duties I need to perforn
- Once my hourly wage was raised I didn't have any concerns with staying at facility A.
- reduced wages, unpleasant working environment, decrease in quality of care provided
- It might b a decent place to work but it wouldnt pay as much as other better places
- How well it works for the client and how well they at and train the new employees
- I would be concerned that they may be closed down if they can't pay their bills.
- Residents not receiving proper care and employees being overworked and underpaid
- I would work there until problems start occurring then I would find another job
- The money in working in that facility. Having the help they truly need for it.
- I'm afraid they try to cut down expenses and doing that make my work harder
- The residents still need help regardless if they are closing soon or not
- I don't want to suddenly be without a job or with a very diminishes wage
- Feeling of helping people. Making a positive impact on people lives
- Low pay & possible bankruptcy percentage increase in upcoming years.
- It pays good and the fact I just love taking care of residents
- Not much they don't seem like the greatest company to work for
- The money bit of they are in financial trouble I'm leaving
- I care about the patients on my unit and my coworkers.
- I want to stick out out but not otf they can't pay me
- Loyalty and waiting to see what the outcome would be
- If they pay more I would definitely work with them
- Not sure I would stay, depends on circumstances
- I lovw the job and the people i work with
- Their financial situation is a red flag
- The fact they are in financial trouble.
- Worried about the system shutting down.
- They have patients who need cared for
- Not enough staff, not enough supplies
- The facility going into bankruptcy
- Good facility and work environment
- financial status and job stability

- The need of care for the patients
- 25
- I would stay for the residents.
- They seemed very promising.
- It's a lot going on their.
- No other options available
- The care of the residents
- Their financial problems
- The care of the patients
- Care of the patients
- Everyone needs help
- It was close by
- Needed income
- pay my bills
- Nothing
- Unsure
- Shift
- N/a

B Staffing Analysis Appendix

B.1 Tenure Figures for each Nursing Staff Role

Figure B1: Dynamic Effects of Bankruptcy on Registered Nurse (RN) Staffing Tenure



(a) $\geq$ 60 Days Tenure RN Hours

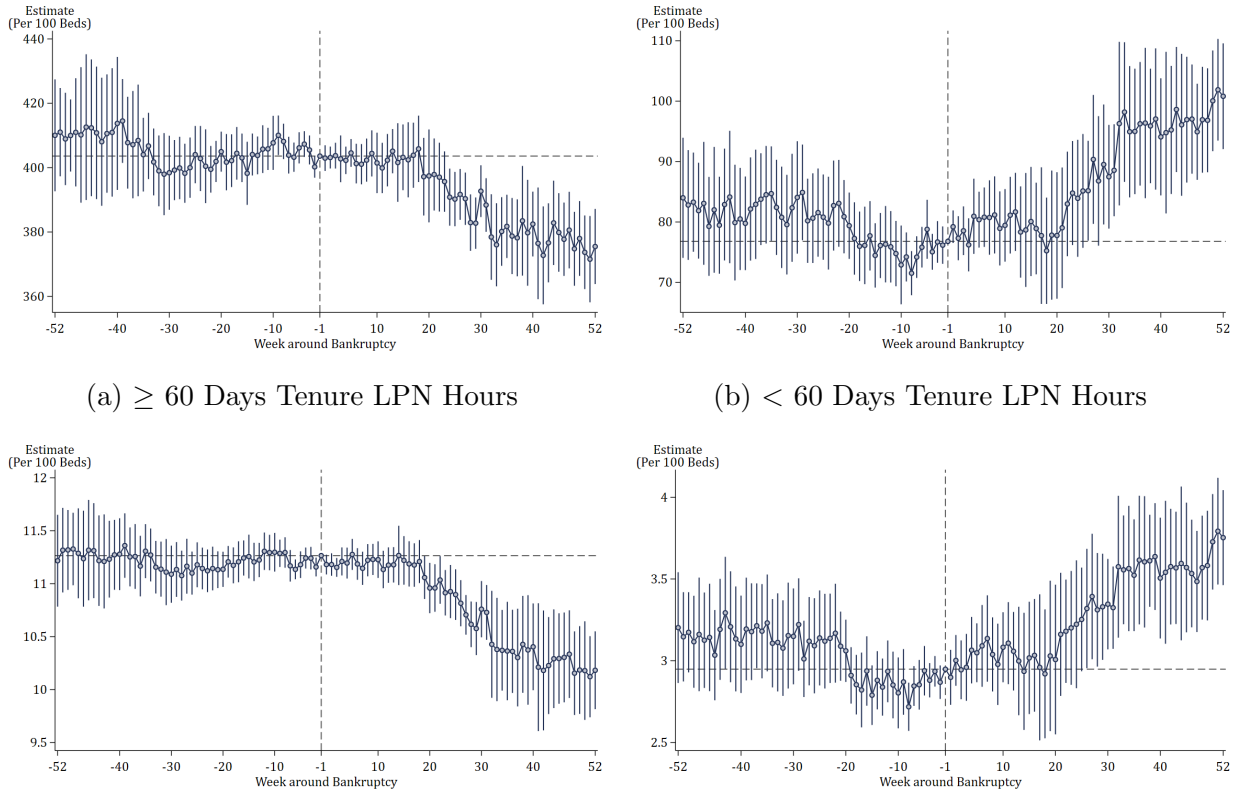
(b) $<$ 60 Days Tenure RN Hours

(c) $\geq$ 60 Days Tenure RNs

(d) $<$ 60 Days Tenure RNs

Note. This figure examines staffing by workers of different experience levels. The left panel shows total weekly (per 100 beds) RNs with at least 60 days of experience at the facility. The right panel shows total weekly (per 100 beds) RNs with fewer than 60 days of experience at the facility. Standard errors are two-way clustered by week and chain-year pairs, and 95% confidence intervals are shown.

Figure B2: Dynamic Effects of Bankruptcy on Licensed Practical Nurse (LPN) Staffing Tenure



(a) $\geq$ 60 Days Tenure LPN Hours

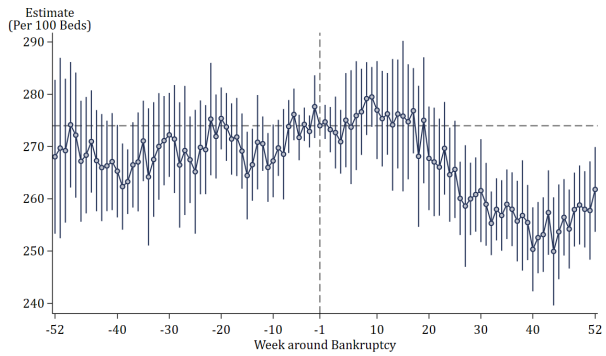
(b) $<$ 60 Days Tenure LPN Hours

(c) $\geq$ 60 Days Tenure LPNs

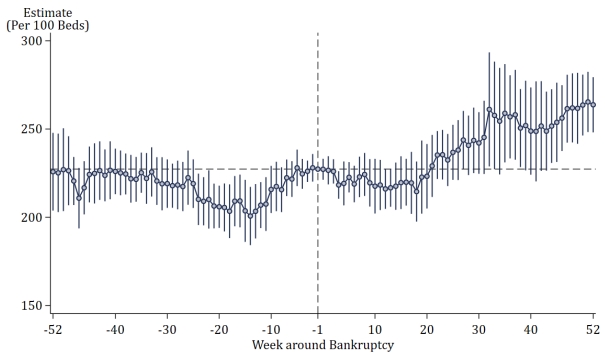
(d) $<$ 60 Days Tenure LPNs

Note. This figure examines staffing by workers of different experience levels. The left panel shows total weekly (per 100 beds) LPNs with at least 60 days of experience at the facility. The right panel shows total weekly (per 100 beds) LPNs with fewer than 60 days of experience at the facility. Standard errors are two-way clustered by week and chain-year pairs, and 95% confidence intervals are shown.

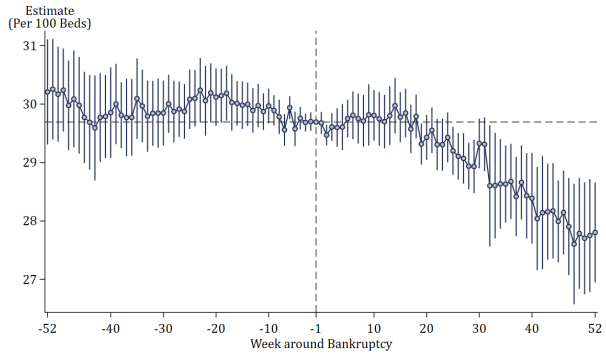
Figure B3: Dynamic Effects of Bankruptcy on Certified Nursing Assistant (CNA) Staffing Tenure



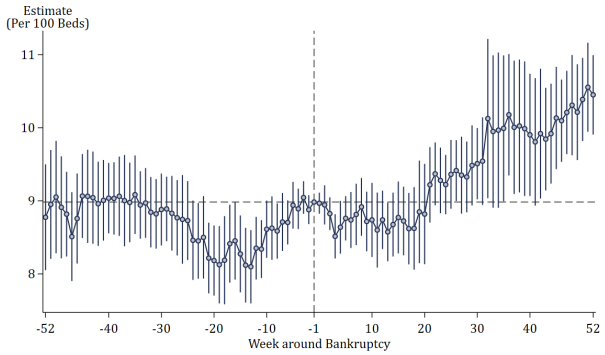
(a) $\geq$ 60 Days Tenure CNA Hours



(b) $<$ 60 Days Tenure CNA Hours



(c) $\geq$ 60 Days Tenure CNAs



(d) $<$ 60 Days Tenure CNAs

Note. This figure examines staffing by workers of different experience levels. The left panel shows total weekly (per 100 beds) CNAs with at least 60 days of experience at the facility. The right panel shows total weekly (per 100 beds) CNAs with fewer than 60 days of experience at the facility. Standard errors are two-way clustered by week and chain-year pairs, and 95% confidence intervals are shown.

B.2 Staffing Levels and Wages

Table B1: The Effect of Bankruptcy on Staffing Levels and Skill Mix

	Hours	Employees	Resident-Days	RN Hour Share	LPN Hour Share	CNA Hour Share
$0 \leq t \leq 52$	-14.408	-0.421	-6.096	0.199	-0.091	-0.108
	(11.298)	(0.390)	(5.047)	(0.237)	(0.151)	(0.222)
$t \geq 53$	-42.516***	-1.278***	-6.154**	-0.238	0.270	-0.032
	(14.503)	(0.413)	(3.091)	(0.492)	(0.289)	(0.272)
FE: Week × Match Group	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.89	0.89	0.97	0.74	0.80	0.68
Mean	2,052.44	63.19	675.23	16.25	23.72	60.03
Observations	516,034	516,034	503,092	516,034	516,034	516,034

Note. The dependent variables from left to right are: total weekly hours per 100 beds, total number of employees working at the facility in a given week per 100 beds, total weekly patient occupancy (resident-days), and the share of weekly hours provided by RNs, LPNs, and CNAs, respectively. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

Table B2: The Effect of Bankruptcy on Nursing Staff Wages

	All Nurses	RN	LPN	CNA
Bankrupt	0.756**	2.807**	-0.044	-0.003
	(0.305)	(1.352)	(0.626)	(0.253)
FE: Year	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes
Observations	4,217	4,217	4,217	4,217
R^2	0.81	0.67	0.77	0.81
Mean	21.45	36.64	27.97	15.56
Std. Dev	4.47	7.40	5.56	3.54

	All Nurses	RN	LPN	CNA
Bankrupt	0.031**	0.069*	-0.004	-0.007
	(0.015)	(0.035)	(0.021)	(0.017)
FE: Year	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes
Observations	4,217	4,217	4,217	4,217
R^2	0.82	0.70	0.77	0.82
Mean	3.05	3.58	3.31	2.72
Std. Dev	0.20	0.19	0.19	0.21

Note. The dependent variables in Panel A are average hourly wages by nursing staff type. The dependent variables in Panel B are the natural log of average hourly wages by nursing staff type. Each observation is an annual filing in the Healthcare Cost Report Information System (HCRIS). Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

B.3 Alternative Definitions of Low Tenure

This section demonstrates the robustness of our tenure result to alternative tenure definitions. The main text presents results in which low-tenure staff are defined as those that have worked fewer than 60 days at the facility, as this is approximately the 25th percentile of employee tenure of 59 days. Table B3 shows the results hold with alternative tenure cutoffs of 30 days and 90 days.

Table B3: Robustness: The Effect of Bankruptcy on the Tenure of Nursing Staff

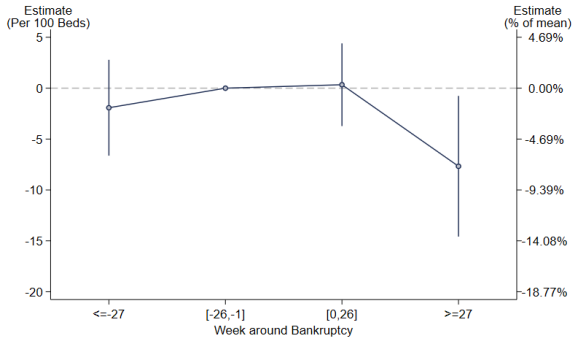
	$\geq$ 30 Days Tenure			$<$ 30 Days Tenure		
	Hours	Hour share	Employees	Hours	Hour share	Employees
$0 \leq t \leq 52$	-32.025***	-1.258***	-1.061***	15.228***	1.258***	0.572**
	(12.313)	(0.266)	(0.390)	(5.543)	(0.266)	(0.224)
$t \geq 53$	-69.870***	-1.789***	-2.313***	23.861***	1.789***	0.928***
	(10.555)	(0.401)	(0.314)	(8.505)	(0.401)	(0.349)
FE: Week $\times$ Match Group	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.89	0.42	0.90	0.50	0.42	0.56
Mean	1,864.30	90.15	55.02	191.59	9.85	8.33
Observations	466,938	466,938	466,938	466,938	466,938	466,938

	$\geq$ 90 Days Tenure			$<$ 90 Days Tenure		
	Hours	Hour share	Employees	Hours	Hour share	Employees
$0 \leq t \leq 52$	-76.232***	-3.444***	-2.275***	57.592***	3.444***	1.686***
	(19.344)	(0.851)	(0.620)	(13.734)	(0.851)	(0.441)
$t \geq 53$	-140.739***	-5.508***	-4.503***	90.852***	5.508***	3.017***
	(21.209)	(1.332)	(0.774)	(26.195)	(1.332)	(0.945)
FE: Week $\times$ Match Group	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.84	0.70	0.85	0.69	0.70	0.71
Mean	1,504.28	72.53	43.00	549.90	27.47	20.30
Observations	466,938	466,938	466,938	466,938	466,938	466,938

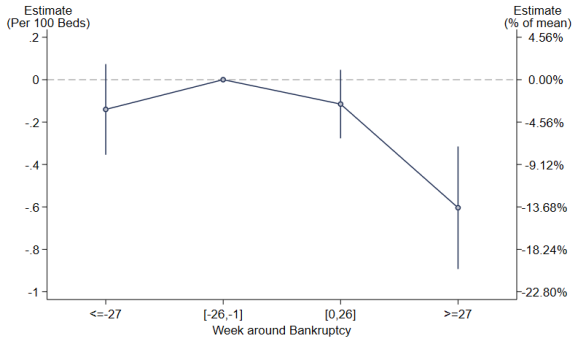
Note. This table examines staffing by workers of different experience levels, measured in days. The dependent variable Hours represents weekly hours per 100 beds. The dependent variable Hour Share represents share of total weekly hours. The dependent variable Employees represents number of working employees per 100 beds. The results are shown for all nursing staff. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

B.4 Occupational and Physical Therapists

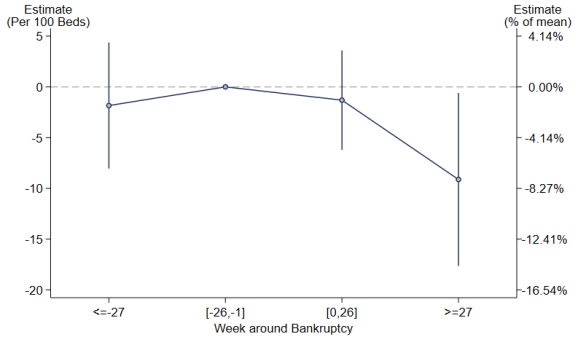
Figure B4: Dynamic Effects of Bankruptcy on Occupational Therapist (OT) and Physical Therapist (PT) Staffing



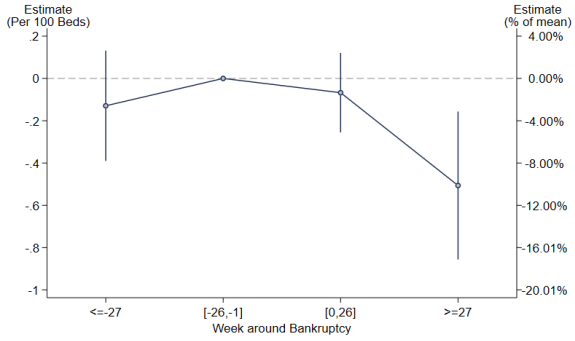
(a) Hours per 100 Beds, OT



(b) Workers per 100 Beds, OT



(c) Hours per 100 Beds, PT



(d) Workers per 100 Beds, PT

Table B4: The Effect of Bankruptcy on the Tenure of Occupational Therapists

Occupational Therapists

	≥ 60 Days Tenure			< 60 Days Tenure		
	Hours	Hour share	Employees	Hours	Hour share	Employees
$0 \leq t \leq 26$	-0.763	-1.255	0.040	1.718	1.255	-0.132
	(2.366)	(2.417)	(0.071)	(1.993)	(2.417)	(0.087)
$t \geq 27$	-7.097**	-2.683	-0.242**	1.904	2.683	-0.276**
	(3.547)	(3.747)	(0.122)	(3.237)	(3.747)	(0.134)
FE: Week	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
Week Clusters	169	169	169	169	169	169
Chain × Year	182	168	182	182	168	182
R^2	0.73	0.24	0.69	0.20	0.24	0.28
Mean	81.54	74.45	2.78	24.99	25.55	1.60
Observations	84,670	78,282	84,670	84,670	78,282	84,670

Physical Therapists

	≥ 60 Days Tenure			< 60 Days Tenure		
	Hours	Hour share	Employees	Hours	Hour share	Employees
$0 \leq t \leq 26$	-2.307	-1.765	0.006	1.995	1.765	-0.037
	(2.432)	(1.949)	(0.079)	(1.903)	(1.949)	(0.083)
$t \geq 27$	-10.514**	-4.111	-0.378**	4.641	4.111	-0.017
	(4.481)	(3.658)	(0.156)	(3.827)	(3.658)	(0.161)
FE: Week	Yes	Yes	Yes	Yes	Yes	Yes
FE: Facility	Yes	Yes	Yes	Yes	Yes	Yes
Week Clusters	169	169	169	169	169	169
Chain × Year	182	169	182	182	169	182
R^2	0.72	0.24	0.69	0.22	0.24	0.34
Mean	92.38	74.33	3.17	28.52	25.67	1.83
Observations	84,670	78,345	84,670	84,670	78,345	84,670

Note. This table examines staffing by workers of different experience levels, measured in days. The dependent variable Hours represents weekly hours per 100 beds. The dependent variable Hour Share represents share of total weekly hours. The dependent variable Employees represents number of working employees per 100 beds. Each observation is a facility-week. Standard errors are provided in parentheses and are clustered by nursing home chain. Significance at the 10%, 5%, and 1% level are indicated using *, **, and ***, respectively.

B.5 Correlation between Firm-Specific and Industry Tenure

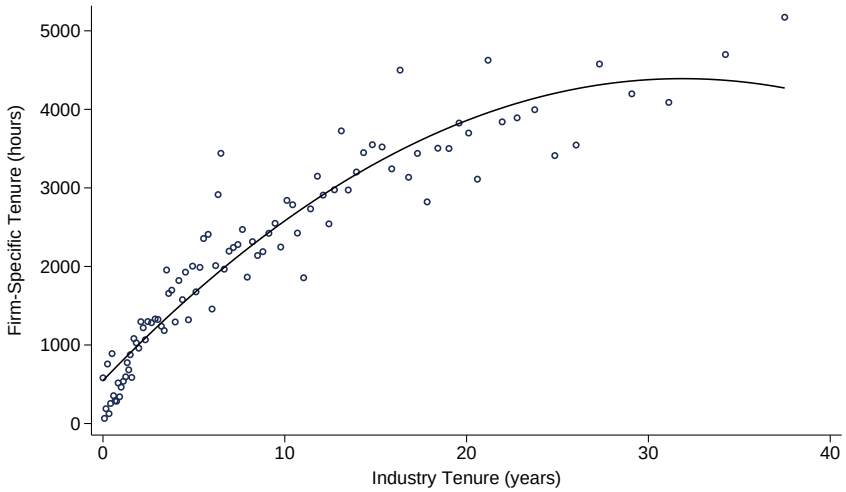


Figure B5: Firm-Specific and Industry Tenure for CNAs in Illinois (from Gandhi, Olenski, Ruffini, and Shen (2023)

Note. This figure demonstrates the relationship between firm-specific tenure in PBJ and self-certified lifetime experience of CNAs. The data are from 2022. The CNA experience data were collected for an Medicaid reimbursement reform in Illinois intended to incentivize facilities to employ experienced CNAs.

C Facility Closures and Changes in Ownership

This paper studies the effects of bankruptcy on employees and patients. In doing so we focus on Chapter 11 reorganizations, during which debtors continue to operate while bankruptcy proceedings take place. However, it is possible for firms to shut down as a result of the restructuring even after filing for Chapter 11.

While one way to detect closures might be to observe conversions to Chaper 7 liquidation, this method might underestimate closures since liquidations can also occur in Chapter 11. Instead, we detect closures by observing attrition from the operations data. Since not all facilities were required to submit staffing data in 2020Q1 due to COVID-19, we count attrition up to 2019. We find that a small percentage of facilities close during the sample period. Specifically, 6% of facilities (34 total) have Payroll Based Journal (PBJ) staffing data that end sometime before the last week of 2019.

Most commonly, providers continue operating after filing for Chapter 11 bankruptcy. However, we do observe a small increase in ownership changes after bankruptcy. We investigate this by obtaining the ownership files from CMS, which track the owners of each facility over time. Figure C1 provides the empirical distribution of ownership changes during the sample period. The majority of facilities do not change ownership at all, and close to 30% of facilities undergo a complete (100%) change in ownership.

We formally investigate ownership changes around bankruptcy through a difference-in-differences analysis of monthly percent ownership changes at the facility level. The dynamic event study of Figure C2 shows a delayed increase in ownership changes, with a noticeable five percentage point average effect at eight months post-filing. This delay seems reasonable given that bankruptcy proceedings take time.

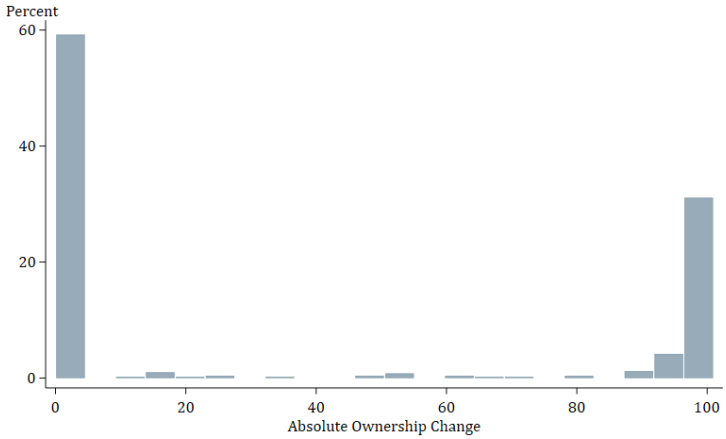


Figure C1: Empirical Ownership Change Distribution

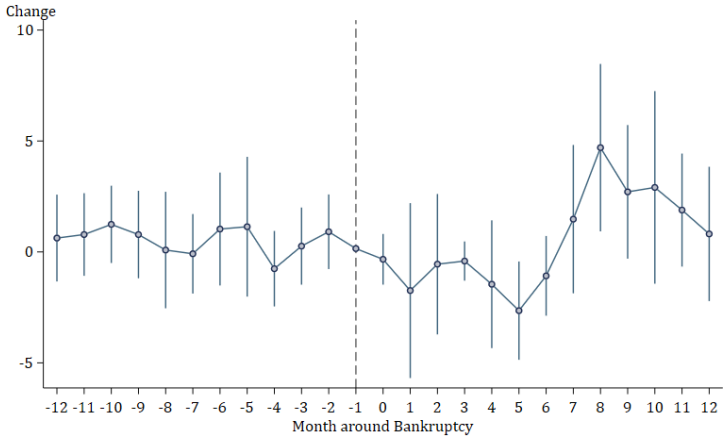


Figure C2: Dynamic Estimates of Ownership Change around Bankruptcy

D Data Appendix

D.1 Matching Bankruptcies to SNFs

We begin with the universe of corporate Chapter 11 bankruptcy filings over the period from January 1, 2010 to March 31, 2020. We exclude the period before 2010 due to data limitations. We exclude the period after March 2020 to avoid COVID-driven bankruptcies. We focus on Chapter 11 bankruptcies because Chapter 7 cases lead to 100% employee attrition by definition. We collect 66,121 corporate Chapter 11 bankruptcies over this period from Bankruptcydata.com.

We exclude a small fraction of bankruptcies in which the EIN is missing or a unique case identifier is not provided. This leaves us with 59,266 bankruptcies. We focus on the first filing date for any EIN to avoid studying refilings, in which employees may already be primed by the earlier bankruptcy. This excludes 4,000 bankruptcies, leaving us with 55,266 bankruptcies.

We then merge these bankruptcies to NPIs using a map provided by CMS. The map from CMS has the EIN for every type-2 provider (e.g., business) with an NPI. In some instances, the map also has the EIN of the parent company of the provider. Finally, the map sometimes contains historical EINs or parent EINs for NPIs that have changed their EIN or parent EIN over time. We focus attention on NPIs associated with SNFs. To do this, we first merge our CMS-provided map with a list of all NPIs associated with SNFs in the Minimum Data Set (MDS).

We match bankruptcies to SNF NPIs by EIN in steps. Specifically, we order EINs in the CMS-provided map as follows: 1. current EIN; 2. current parent EIN; 3. historical EINs, going from most recent to least recent; 4. historical parent EINs, going from most recent to least recent. We match NPIs to bankruptcies using the first EIN in this ranking, the current EIN. For NPIs that do not match any bankruptcy by this step, we match those NPIs to bankruptcies by the second EIN in the ranking (parent EIN). We repeat this process moving down the above ordering. In each step, we match the following number of NPIs: 1. 535 NPIs match by current EIN; 19 NPIs match by current parent EIN; 48 NPIs match by historical EIN; 1 NPI matches by historical parent EIN. We thus match 603 NPIs by EIN.

Our list of SNF-associated NPIs also includes all provider IDs, the identifier from the POS and PBJ datasets, associated with each NPI. In instances where multiple provider-ids

are associated with an NPI, we manually check that the addresses and names match in the NPPES and POS databases. We exclude a small handful of incorrect NPI - provider ID associations in which the names and addresses do not match, likely due to a typo when the healthcare provider inputted the provider ID. This process identifies 568 provider IDs associated with the 603 NPIs that we match to bankruptcies.[35]

Next, we group together jointly administered bankruptcy cases. For jointly administered cases, Bankruptcydata.com has a variable indicating the name of the lead case. We call two bankruptcies jointly administered if they have the same value for the lead case. Likewise, the Federal Judicial Center (FJC) database has a coded variable identifying the lead case for any jointly administered case. We supplement the Bankruptcydata.com lead-case classification with the FJC lead-case classification. In instances where there is a conflict, we resolve the conflict by checking PACER. Specifically, when we are unsure what the lead case is for a particular bankruptcy, we go to the PACER page for that bankruptcy and check either the list of associated cases or motions for joint administration or the filing petition to find the full set of cases that are jointly administered in that case. Within a collection of jointly administered cases, we rely on the same method to determine which is the lead case. Finally, we manually inspect the final set of bankruptcies to ensure that Bankruptcydata.com and FJC do not miss any instances in which two cases are jointly administered. This involves checking cases filed in the same court with similar filing dates or similar names, then going to PACER and verifying the set of jointly administered cases by the same method described above. Within a set of jointly administered cases, we define the filing date as the earliest filing date of any of the jointly administered cases. In most instances, all jointly administered cases share the same filing date.

We then verify that each NPI is associated with at most one collection of jointly administered bankruptcies. This process reveals that one chain, Bloomfield Nursing Operations, sold off all of its facilities to Preferred Care (a chain that later filed for bankruptcy) prior to Bloomfield's bankruptcy. We thus drop the Bloomfield Nursing bankruptcy. Likewise, we confirm that each facility was not involved in an earlier bankruptcy under a different lead case. This leads to a slightly lower number of NPIs.

Next, we go through large bankruptcies to ensure we did not miss anything. In some cases, a large bankrupt firm will have many subsidiaries, each of which file their own bankruptcy

[35]Sometimes a provider ID will have two NPIs associated with it in the NPPES. We verify that these two NPIs have the same name and address. Likewise, sometimes an NPI will have two provider IDs associated with it. We verify that these two provider IDs have the same name and address.

with their own EIN. In such cases, our EIN merge will correctly assign the subsidiaries' facilities to the large bankrupt firm. However, in other cases, a large bankrupt firm will operate many facilities itself. In these instances, if the parent EIN field is missing for the individual facilities, we could miss some facilities. To check for this, we manually inspect all of the 55,266 bankruptcies in Bankruptcydata.com that (i) list healthcare as their industry and (ii) have at least 100 million in liabilities. Using company descriptions from Bankruptcydata.com, first-day declarations, disclosure statements, and reorganization plans, we determine which of these companies operate SNFs. For the companies that operate SNFs, we use a combination of these same bankruptcy documents and SEC filings to locate the names and addresses of their facilities. For example, for HCR Manorcare, we use the master lease agreement to identify names and addresses of 245 facilities it operates. We then manually find these facilities in POS to obtain their provider IDs. We likewise use the following documents to identify facilities, which we then match to provider IDs in POS: a disclosure statement from CC Care listing facility names and addresses; a motion for joint administration from Preferred Case listing facility names; a disclosure statement from Orianna listing facility names; a disclosure statement from Senior Care Centers listing facility names.

Finally, we fuzzy merge our sample of bankruptcies by names and addresses to POS and manually inspect highly similar strings to ensure that names and addresses are identical (up to abbreviations). This adds a small number of matches. We assign these to jointly-administered-case clusters by inspecting bankruptcy documents as described above.

In the end, we identify 187 clusters of jointly-administered cases, covering 869 provider IDs and 598 NPIs. The lower number of NPIs is likely due to the fact that in our manual process of matching large bankruptcies, we only link to provider IDs to save time.

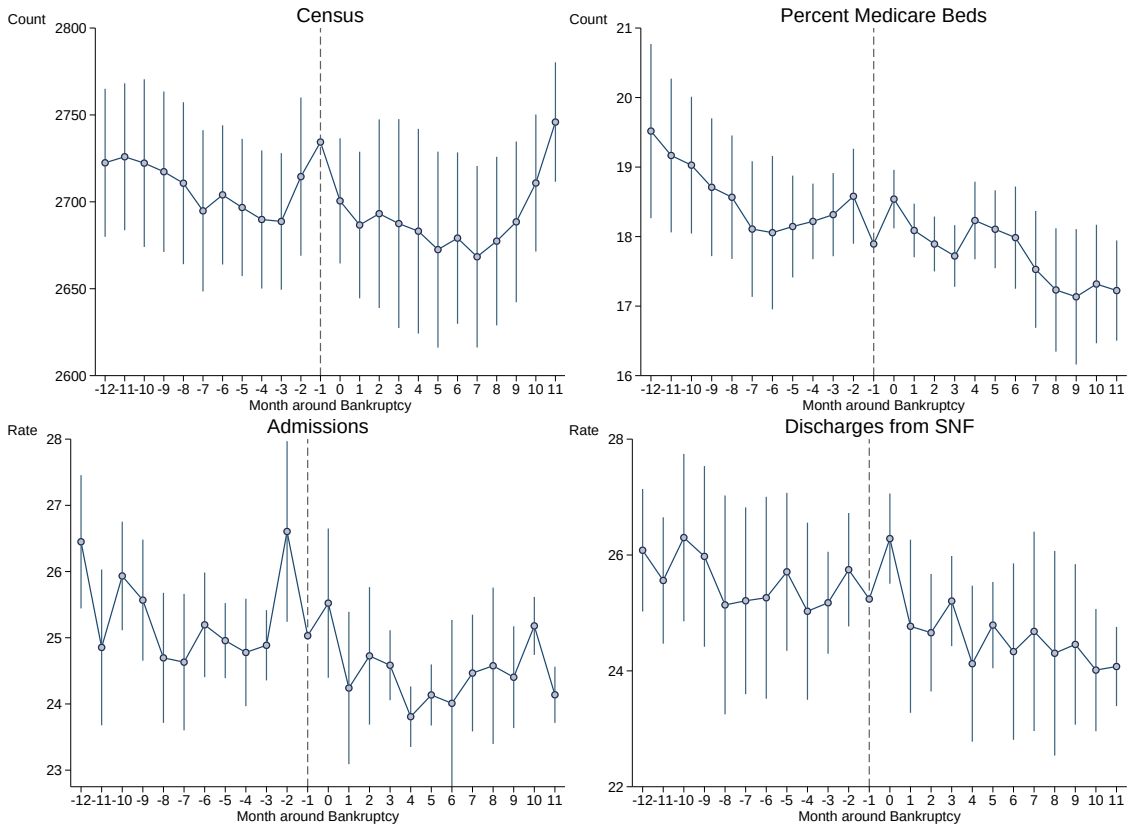
E Additional Health Outcome Results

Table C1: Bankruptcy and Patient Outcomes

		Relative Month
Type	Mean	$0 \leq t \leq 11$
Restraints Used per Assessment	0.020	0.0026 (0.0029) 13.1%
Antipsychotic or Schizophrenic per Assessment	0.24	0.0072** (0.0024) 3.0%
Behavioral Issue per Assessment	0.11	0.0075** (0.0026) 6.9%
Poor Hygiene per Assessment	3.3	0.089 (0.074) 2.7%
Death per Beneficiary	0.036	-0.00070 (0.00043) -1.9%
Falls per Assessment	0.16	-0.00042 (0.0016) -0.26%

Note. Estimates pool the coefficients from $0 \leq t \leq 11$ and are relative to $-12 \leq t \leq -1$. Regressions include match-id by relative time and skilled nursing facility fixed effects, and are clustered at the chain level. Two stars indicates significance at the 5% level and one star indicates significance at the 10% level.

Figure C3: Bankruptcy and Facility Census



Note. This figure examines health outcomes over month t among individuals who were enrolled in Traditional Medicare. Regressions include fixed effects for calendar month and the skilled nursing facility. The values have been shifted up by the mean of the dependent variable to provide scale. Standard errors are two-way clustered by month and chain-year pairs, and 95% confidence intervals are shown. MDS stands for the minimum data set and indicates that outcomes were derived from the MDS, not the Medicare claims data. Table C2 contains point estimates.

Table C2: Bankruptcy and Facility Census

		Month
Type	Mean	$0 \leq t \leq 11$
Census	2842.6	-13.8
		(32.4)
		-0.49%
Percent Medicare Beds	18.1	-0.92*
		(0.53)
		-5.1%
Admissions	24.9	-0.73**
		(0.33)
		-3.0%
Discharges from SNF	24.9	-0.97**
		(0.40)
		-3.9%

Note. Regression estimates correspond to Figure C3. Estimates pool the coefficients from $0 \leq t \leq 11$ and are relative to $-12 \leq t \leq -1$. Regressions include match-id by relative time and skilled nursing facility fixed effects, and are clustered at the chain level.