

# When private equity comes to town: The local economic consequences of rising healthcare costs\*

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## Abstract

We examine the effect of increased healthcare costs on local economic conditions. We use private equity (PE) buyouts of U.S. hospital systems as a shock to the healthcare costs faced by firms in affected areas. Our primary identification strategy consists of the PE acquisition of a large-scale hospital chain, with hospitals dispersed across various communities in the U.S. We supplement this strategy with broader evidence including all PE buyouts of hospitals over a longer sample period. We provide evidence that PE buyouts of hospital systems result in higher healthcare insurance premiums paid by firms, and such rises in premiums lead to higher business bankruptcies, an increase in business loan volume, slower employment and establishment growth, lower wages, and reduced innovative output. We additionally provide evidence that increases in healthcare costs result in firms being more vulnerable to the financial crisis, suggesting that the negative economic consequences of rising healthcare costs are due to weakened firm balance sheets which cause firms to be more susceptible to negative economic shocks.

*Keywords:* Healthcare finance, private equity, leveraged buyout, hospital acquisitions, business bankruptcies, insurance premiums.

*JEL classification:* G21, G31, G32, I11, I15

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# 1 Introduction

Healthcare costs in the United States have increased precipitously in the past two decades. Indeed, healthcare insurance premiums averaged \$22,463 for family coverage in 2022, representing a 182% increase in the past two decades that substantially outpaced both wage growth and inflation.<sup>1</sup> The rapid growth in average premiums is illustrated in Figure 1 below. Employer-sponsored plans in the U.S. cover approximately 159 million people, leading businesses to absorb the bulk of these increases. Healthcare costs are also non-negligible for businesses; for example, a 1% decrease in premiums is estimated to increase profits by an average of 3.37% (Lara et al. (2022)). While the steep rise in healthcare costs and spending is well known, the effects of such heightened costs on local communities is not yet well understood.

We investigate the role of rising healthcare costs on local economic outcomes, such as business bankruptcies, loans, establishment and employment growth, and wages. Our empirical strategy exploits quasi-exogenous increases in healthcare costs in local economies induced by private equity (PE) acquisitions of hospitals. In recent years, there has been an increasing trend of PE acquisitions of both individual hospitals and hospital chains. However, as documented by Liu (2022), due to increased bargaining power by PE firms with health insurance companies, PE acquisition of a hospital typically results in a significant increase in negotiated prices with insurers. Prices increase not only for the PE-acquired hospital, but for other hospitals within the locality as well. We show that higher reimbursement rates for hospital services by insurers are passed on to businesses (and their workers) in the form of higher insurance premiums. We therefore use such buyouts as a shock to healthcare costs, and we explore how this increase in costs affect local economic outcomes and the channels through which this occurs.

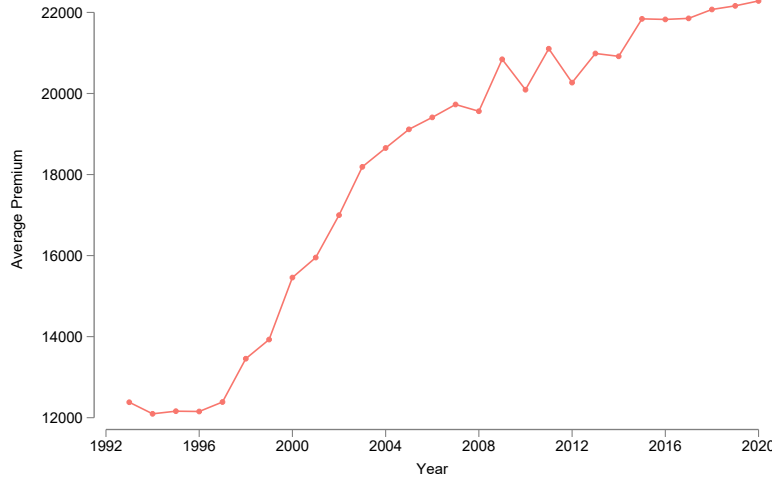
An empirical challenge with using PE buyouts as a shock is selection; PE firms may target particular hospitals because they anticipate changes in the local economy. To mitigate such concerns, in our primary empirical specification we run a differences-in-differences (DID) specification exploiting the effect of a large-scale PE acquisition of a hospital system: Community Health Systems (CHS). Since CHS owned 38 hospitals in 18 states (comprising 30 hospital referral regions) at the time of its acquisition by a PE firm in 1996, the acquisition is plausibly exogenous to any particular local economic area. Furthermore, we supplement

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<sup>1</sup>These statistics are drawn from Kaiser Family Foundation (2002) and Kaiser Family Foundation (2022). Premiums for family coverage averaged \$7,954 in 2002. Relatedly, total healthcare spending in the U.S. presently accounts for 18–20% of GDP.

**Figure 1: Rise in Premiums**

This figure depicts inflation-adjusted average healthcare insurance premiums for a family of four from 1993 to 2020.



our results with a staggered DID specification including *all* PE buyouts of hospitals over our full sample from 1993 to 2020, in which we compare economic outcomes in local areas affected by a PE hospital buyout to areas that were not affected. This long-window analysis indicates that the patterns we document in our main specification hold more generally across a broader sample of PE hospital acquisitions.

Our main results are as follows. We begin by utilizing firm-level data on employer-sponsored healthcare insurance plan premiums to document that businesses indeed face a significant increase in healthcare insurance premiums following a PE acquisition of a hospital in the local area. In our primary specification, this increase is an economically significant magnitude of 7.5% in insurance coverage expenses, amounting to 10.4% of net income for a typical firm.

We then explore a host of local economic outcomes. First, we show that business bankruptcies—Chapter 7, Chapter 11, and total bankruptcies—significantly increase at the county level following PE buyouts of hospitals. For example, following the CHS acquisition, total business bankruptcies increase by 6.5% for counties affected by the acquisition compared to unaffected counties. This is equivalent to an additional 596 business bankruptcies per year across counties affected by the large-scale hospital system acquisition. Second, consistent with the notion that firms become more strained financially due to the rising healthcare costs (thus leading to more bankruptcies), we find that total business loan volume in

affected areas significantly increases, particularly for smaller loan amounts. Finally, examining broader economic growth trends, we find that affected areas experience significantly lower employment growth, establishment growth, average wages, and innovation output.

To further validate our results and explore the channels driving them, we exploit another large-scale hospital system acquisition: the 2006 PE buyout of HCA Healthcare. At the time of the buyout, HCA operated 162 hospitals in 67 hospital referral regions. Using a DID specification with this setting, we find results consistent with our previous results. However, a unique aspect of the HCA buyout is that it occurred immediately prior to the global financial crisis of 2007–2009. This allows us to further explore the consequences of the rise in healthcare costs, and how it may lead to a depression in local economic activity. In particular, we hypothesize that rising healthcare costs lead to a weakening of firm balance sheets, thus leaving firms more vulnerable to negative economic shocks (e.g., [Kiyotaki and Moore \(1997\)](#), [Bernanke et al. \(1999\)](#)).

To test this channel, we exploit heterogeneity in counties’ exposure to the financial crisis to explore whether an increase in healthcare costs weakened firms and thus *amplified* the effect of the financial crisis. More specifically, it has been shown that areas with greater household debt-to-income (HDI) ratios experienced sharper declines in consumer expenditures and employment during the financial crisis ([Mian and Sufi \(2010\)](#), [Mian et al. \(2011\)](#), [Mian and Sufi \(2011\)](#)). We therefore use variation in household debt-to-income (HDI) ratios using a triple-differences specification to examine whether counties that were affected by the HCA buyout *and* had a greater exposure to the crisis experienced greater declines in economic outcomes relative to other counties. This is precisely what we find—HCA-affected counties with a higher pre-crisis HDI experienced greater declines in economic outcomes relative to HCA-affected counties with a lower HDI.

Finally, we consider a number of robustness checks. The results are insensitive to employing different empirical specifications, a placebo test randomly assigning treated counties, and restricting our analysis to areas with for-profit hospitals.

Our study relates to several literatures. A number of papers examine the determinants of hospital prices, including insurer-provider bargaining (e.g., [Gaynor et al. \(2015\)](#), [Ho and Lee \(2017\)](#), [Lewis and Pflum \(2017\)](#)), hospital competition and mergers (e.g., [Dranove and Satterthwaite \(2000\)](#), [Gowrisankaran et al. \(2015\)](#), [Dafny et al. \(2019\)](#)), and private equity ownership (e.g., [Liu \(2022\)](#)), among other factors. Relatedly, a recent stream of literature examines negotiated hospital prices using insurance claims data, and finds variation both within and across hospitals ([Cooper et al. \(2022\)](#)) and the relation to quality of care ([Cooper](#)

et al. (2022)). We contribute to this literature by documenting the spillover effects on businesses and local communities of increased hospital prices.

Our study is also related to the literature that examines the labor market and wage effects of increased healthcare spending and costs. Gruber (1994) finds that heightened costs following mandated maternity benefits were largely passed through to workers. In contrast, Baicker and Chandra (2006) find that a 10% increase in insurance premiums for employers is met with a 2.3% reduction in wages, indicating that businesses do not fully pass on the increase in premiums to workers. Related studies examine the wage effects following hospital mergers (Arnold and Whaley (2020), Prager and Schmitt (2021)) and employment shifts following government healthcare mandates, such as the Affordable Care Act (Kolstad and Kowalski (2016), Mulligan (2020), Almeida et al. (2022), Dillender et al. (2022)). Our study contributes to this literature as, in addition to wages and employment, we investigate a broad set of economic outcomes within local communities, including business bankruptcies, borrowing activity, establishment growth, and business patent activity following plausibly exogenous increases in health insurance premiums. In contemporaneous work, Zeller (2023) finds that PE hospital acquisitions in communities are followed by a decrease in employment shares among smaller businesses, along with lower entry and higher exit of startups or businesses with 20 or fewer employees.<sup>2</sup> Our work varies as we use a large-scale buyout of a particular hospital system (CHS) for identification in our primary specification, which helps to assuage potential selection concerns, with a second large-scale buyout (HCA) as additional evidence. Furthermore, as mentioned above, we examine a wide range of economic variables such as bankruptcies, borrowing activity, and innovation for businesses, including small and large businesses. Our second setting (HCA) around the financial crisis also allows us to provide evidence of a channel driving the effect of rising healthcare premiums.

Our paper is also related to the recent literature at the intersection of healthcare and finance (see Lo and Thakor (2022) for a review). A number of papers examine the effect of financial markets on hospitals, such as Adelino et al. (2015), Dranove et al. (2017), and Adelino et al. (2022). A more recent strand of this literature considers the interaction between healthcare providers and financial intermediaries (e.g., Aghamolla et al. (2021); Lo and Thakor (2023) provides a review), and specifically acquisitions of providers by private equity firms, focusing primarily on hospital services and patient health outcomes (e.g., Gondi and Song (2019), Gao et al. (2021), Gupta et al. (2021), Offodile et al. (2021), Cerullo et al. (2022), Zeller (2023)). Liu (2022) considers the effect of PE buyouts on hospital negotiated

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<sup>2</sup>The latter result also holds for startups with 50 or fewer employees.

prices with insurers. We add to this literature by showing how PE acquisitions of hospitals can lead to a depression of local economic activity vis à vis increasing healthcare costs. We also show that increased hospital prices pass through to local businesses in the form of higher insurance premiums.

Finally, our study contributes to the broader literature that examines the costs and benefits of private equity ownership for acquired firms.<sup>3</sup> These include the effects of leveraged buyouts and private equity ownership on target firms’ innovation activity (Lerner et al. (2011)), operational performance and outcomes (Boucly et al. (2011), Bernstein and Sheen (2016), Bernstein et al. (2019), Eaton et al. (2020), Fracassi et al. (2022), Johnston-Ross et al. (2021)), and employment (Davis et al. (2014), Davis et al. (2021)). Bernstein et al. (2017) conduct a cross-country and cross-industry analysis to explore whether greater PE activity affects industry performance. We contribute to this literature by documenting how private equity entry into a specific vital industry—hospitals—within a community can have significant spillover effects on the local economy.

## 2 Institutional setting and conceptual framework

### Private equity hospital acquisitions

Private equity has seen increasing involvement in the healthcare industry in recent years, with numerous acquisitions of both individual hospitals and hospital systems. Indeed, the value of private equity deals in the U.S. healthcare sector has witnessed a twentyfold increase between 2000 and 2018 (Offodile et al. (2021)), and private equity investments in healthcare exceeded \$151 billion in 2021 alone. Among the first of the major private equity acquisitions was of the large-scale, publicly-traded hospital system Community Health Systems (CHS) in a \$1.63 billion leveraged buyout on July 10, 1996. At the time, CHS owned 38 hospitals in 18 states (comprising 30 hospital referral regions), employing over 7,900 workers. CHS hospitals were located primarily in the southeast and southwest, with several hospitals in smaller communities of less than 75,000 residents, as well as hospitals in major metropolitan areas.

Forstmann Little & Co, the private equity firm behind the acquisition, took the publicly traded hospital system private following the acquisition. The deal was financed through \$1 billion from Forstmann Little and \$900 million in bank lending.<sup>4</sup> The debt was placed on

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<sup>3</sup>For reviews, see Kaplan and Schoar (2005), Kaplan and Strömberg (2009), and Bernstein (2022).

<sup>4</sup>As reported in the *Los Angeles Times* on June 11, 1996. See <https://www.latimes.com/archives/>

CHS’s balance sheet, resulting in total long-term liabilities of \$1.2 billion and a debt to equity ratio of 161.2% (Appelbaum (2019)). As is common in private equity deals, Frostmann Little orchestrated their (partial) exit from the acquisition four years later. In 2000, the company raised \$751 million for a 46% share in its return to public equity markets, with Frostmann Little maintaining a majority stake. Frostmann Little sold its shares completely in 2004.

As noted above, private equity companies seek a relatively quick return on their investments. This includes not just the higher valuation at the time of exit, but also through dividends (usually through asset sales of the acquired firm) as well as transaction and advisory fee payments to the private equity company. Moreover, sales of the acquired hospital’s real estate mean that the hospital must make lease payments, tantamount to another debt obligation (Gupta et al. (2021)). Private equity-acquired hospitals are thus typically in considerable debt following the acquisition.

We additionally consider a second setting of a major hospital system buyout, HCA health-care, to study the impact of rising healthcare costs during times of economic distress. We discuss this setting further in Section 5.

## Negotiated prices with insurers

In-network hospitals negotiate directly with insurance companies for reimbursement rates on services, both inpatient and outpatient, provided. Reimbursement schemes for treating privately insured patients are generally set either as a percentage of Medicare reimbursement rates or as a percentage of hospital charges (i.e., listed prices) (Cooper et al. (2019)).<sup>5</sup> Private equity acquisition of a hospital can lead to significantly higher negotiated prices and reimbursement rates with insurers for a number of reasons. First, private equity acquisitions, as in the case of CHS, are often financed through leveraged buyouts. The debt from the deal is placed on the hospital’s balance sheet. The heightened leverage thus requires greater payments to service the debt. As a result, a hospital that is unable to meet its debt obligations faces a credible threat of bankruptcy and closure—particularly by private equity investors, who have a reputation for closing distressed businesses (Liu (2022)). Importantly, a hospital closure within a market can raise the bargaining power of other hospitals within a given region, thus eventually leading to higher negotiated prices with the remaining hos-

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1a-xpm-1996-06-11-fi-13844-story.html. Additionally, after all shares were purchased and debt refinanced, Forstmann assumed or refinanced \$270 million in debt, provided \$530 million to CHS to fund internal growth and the acquisition of additional hospitals.

<sup>5</sup>White and Whaley (2021) find that negotiated prices with insurers for employer-sponsored plans averaged 241% for hospital services in a sample of 25 states in 2017.

pitals.<sup>6</sup> As such, insurance companies have an interest in preventing hospital closure and are therefore willing to provide higher reimbursement rates to lower the chance of hospital bankruptcy. Likewise, insurance companies have an interest in keeping current in-network providers within their plans, as the loss of a major provider can make the plan less attractive to businesses and can frustrate their employees who would prefer not to change providers.<sup>7</sup> As noted by Liu (2022), negotiated prices following private equity acquisitions increased by an average of 32%, with most of this increase (88%) being paid by insurers.

Furthermore, neighboring (or rival) hospitals (which are not private equity-owned) can also raise their negotiated prices with insurers following private equity ownership of another hospital within the region (Liu (2022)). The loss of the rival hospital within the insurer’s network can result in more patients utilizing services at the private equity-owned hospital, which is more costly for the insurer due to the higher reimbursement rates. Consequently, the bargaining posture of neighboring hospitals increases, and the insurer is willing to provide higher rates with neighboring hospitals to keep these hospitals within their network. Hence, the entrance of private equity ownership within a region can raise reimbursement rates, and thus the overall cost of care, for several hospitals within the region. (Payments for hospital services make up the largest percentage of costs for insurers.)

While insurance companies appear to bear the financial brunt of private equity entrance into a region, insurers in turn pass these cost increases on to the local communities in the form of higher premiums—the cost of an insurance policy—for businesses and individuals. Indeed, as discussed further in the following section, we observe significant increases in insurance premiums in areas following private equity acquisitions. Local businesses can respond to these increases by absorbing the costs or by scaling back benefits, raising deductibles, raising mandatory contributions by employees, or lessening wage increases, among other re-

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<sup>6</sup>For example, as noted in recent media coverage, following private equity ownership of a prominent Philadelphia hospital, “the insurance companies had an incentive to compromise: if Hahnemann closed, the privately insured patients treated there would go to other city hospitals, where the cost of their care would rise. ‘You go into Blue Cross and you say, ‘We need some help, and it’s in your best interest to help us,’ [former Hahnemann CEO Mike] Halter explained. ‘Give us ten million dollars more per year’—versus losing fifty million per year” (*The New Yorker*, June 7, 2021).

<sup>7</sup>Media reports provide anecdotal evidence of private equity-acquired hospitals aggressively renegotiating payment rates with insurers immediately following the PE acquisition. For example, in the case of HCA Healthcare, which was acquired by private equity firms in 2006, it was reported that “[Healthcare insurance company] United had claimed that HCA-HealthOne demanded a 35 percent reimbursement rate increase over four years in Colorado. HCA-HealthOne countered that its requested increase would translate into a 1.6 percent premium increase per year for employers and individuals. [...] United had strong motivation to ink a deal to prevent the loss of customers during the open-enrollment season, said Dr. Mark Linkow, a gastroenterologist at Rose Medical Center in Denver, an HCA-HealthOne facility. ‘Other insurance carriers were having some success in getting business’ from United, said Linkow” (*The Denver Post*, November 3, 2006).



sponses (Rosen (1986)).<sup>8</sup> However, passing these costs fully to employees can be difficult, as both skilled and unskilled workers generally find benefits, along with wages, to be an important component of their compensation. Moreover, an effective cut in wages through higher employee contributions can over time lead to greater worker turnover (Dale-Olsen (2006)) or worker migration, especially of talented employees, to neighboring localities which did not experience a rise in premiums. Furthermore, as noted by Baicker and Chandra (2005), we may not observe corresponding decreases in wages as premiums rise due to the presence of heterogeneous preferences for benefits among employees, as well as minimum wage laws that restrict the firm’s ability to lower wages for lower-skilled workers. Hence, higher premiums can contribute to thinner profit margins to local businesses.

Nevertheless, if businesses are able to fully transfer the costs of higher premiums to employees through lower effective wages, then such responses are likewise detrimental to the local economy. Lower effective wages can depress spending within the community, leading to lower revenues and thus eventually lower profits for local businesses. These negative effects can further propagate and compound economic conditions; for example, local firms that are forced to close due to negative margins lead to lower overall employment and thus lower consumer spending (Bergman et al. (2020)).

## 3 Research design and data

### 3.1 Empirical methodology

#### **Main specification: PE acquisition of CHS hospital system**

Our primary identification strategy consists of the acquisition of the CHS hospital system by private equity. A key part of this strategy is the large-scale nature of the acquisition, which mitigates selection concerns of private equity targeting specific localities. More specifically, we run differences-in-differences (DID) regressions that examine outcomes following the CHS acquisition on treated areas that contained a CHS hospital compared to control areas without a CHS hospital. We first establish that healthcare costs rise as a result of the PE acquisition by examining the effect on employer-sponsored health insurance premiums at the firm-year

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<sup>8</sup>Businesses can also attempt to switch insurers. However, this can be costly as employers must hire lawyers and consultants when selecting a new plan, while also soliciting bids for insurance plans. Changing insurers can also dissatisfy employees who would prefer to continue with their current providers.

level via the following regression from 1993 to 1999:

$$\log(\text{Avg Premium}_{j,i,t}) = \alpha + \beta \text{CHS Hospital}_{j,i} \times \text{Post}_t + \text{FEs} + \varepsilon_{i,t}. \quad (1)$$

In equation (1),  $\log(\text{Avg Premium}_{j,i,t})$  is the average employer-sponsored health insurance plan premium for firm  $j$  which is located in county  $i$ .<sup>9</sup>  $\text{CHS Hospital}_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in a county  $i$  that was served by a CHS hospital as of 1995, and 0 otherwise. We define a county  $i$  as being served by a particular hospital if the county falls within the hospital referral region (HRR) of the hospital, a standard geographical unit in healthcare that tracks whether patients in an area can be referred by providers for emergencies or procedures to a particular hospital.<sup>10</sup>  $\text{Post}_t$  is an indicator variable that takes a value of 1 if year  $t$  is 1996, the year that CHS was acquired by the PE firm, or later, and 0 otherwise. The coefficient  $\beta$  thus tests whether health insurance premiums at the firm level increased following the CHS acquisition if the business was located in an area that contained a CHS hospital, relative to firms in unaffected areas. We include firm and industry-by-year fixed effects and cluster standard errors at the firm level. Our sample consists of 8,924 treated and 41,886 control businesses.<sup>11</sup>

After investigating the effect of private equity ownership of CHS on healthcare insurance premiums, we proceed to explore county-level local economic outcomes using the following regression specification:

$$Y_{i,t} = \alpha + \beta \text{CHS Hospital}_i \times \text{Post}_t + \text{FEs} + \varepsilon_{i,t}. \quad (2)$$

Equation (2) examines outcomes  $Y$  for treated counties  $i$  (counties that were served by a CHS hospital as of 1995, measured by  $\text{CHS Hospital}_i$ ) in time  $t$  compared to control counties before and after the PE acquisition of CHS. We include county and time fixed effects and cluster standard errors at the county level.

We run equations (1) and (2) from 1993 to 1999, a six-year window around the acquisition year of 1996. At the time of the PE acquisition, CHS owned 38 hospitals in 18 states (comprising 30 hospital referral regions), which provides a total of 598 treated counties for

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<sup>9</sup>For all of the outcome variables in which we take logarithms, we add one to the variable before taking logs in order to account for potential zeroes. For the discrete variables we consider, we show in supplemental tests that our main results are robust to using count regression models.

<sup>10</sup>There are 306 HRRs in the United States. HRRs typically span multiple counties; our results are robust to only considering a county as treated if the county contains a CHS hospital or is within close geographical proximity to a CHS hospital.

<sup>11</sup>Our results are also robust to forming our control group based on propensity score matching.

which  $CHS\ Hospital_i = 1$ . In order to ensure that the treatment and control groups are comparable, we choose control counties using propensity score matching, resulting in a total of 937 control counties. We provide more details on our matching procedure in the following section.

### Supporting specification: Full sample of hospital acquisitions by PE

To provide additional evidence that the effects we document with our main specification hold more generally and are not specific to the CHS acquisition, we also run specifications examining the effect of *all* PE buyouts of hospitals from 1993 to 2020:

$$Y_{i,t} = \alpha + \beta PE\ Buyout_{i,t} + FEs + \varepsilon_{i,t}, \quad (3)$$

where  $PE\ Buyout$  is an indicator variable that takes a value of one if county  $i$  is served by a PE-acquired hospital as of year  $t$ , and zero otherwise. As before, we first run equation (3) at the firm-year level (examining  $\log(Avg\ Premium_{j,i,t})$  as the dependent variable and  $PE\ Buyout_{j,i,t}$  as the independent variable), and then examine outcomes at the county-year. Over our sample, a total of 26 hospital systems are bought out by private equity, comprising 341 individual hospitals. This provides us with a total of 74,079 treated and 58,312 control firms for our firm-level regressions and 1,592 treated and 1,533 control counties for our county-level regressions.

Equation (3) is a staggered DID specification that compares outcomes for treated counties—ones that were affected by a PE buyout of a hospital—to other control counties. As has been noted in the literature, accurate estimation of treatment effects in staggered DID designs can be problematic. To account for this, we estimate the average treatment effects in equation (3) using the procedure of Callaway and Sant’Anna (2021), over a window from  $t - 4$  to  $t + 3$  around the event date ( $t = 0$ ). For robustness, we also provide estimation results for (3) using a “stacked” DID design (e.g., Cengiz et al. (2019), Deshpande and Li (2019)) with treatment-control cohorts for each event over a window from  $t - 4$  to  $t + 3$ , and find consistent results.

## 3.2 Data description and summary statistics

Our overall dataset runs from 1993 to 2020 and consists of data from a variety of different sources. For our firm-level regressions examining health insurance premiums, we obtain

information from Form 5500 reports filed with the U.S. Department of Labor.<sup>12</sup> For every insurance contract with employer-sponsored plans, firms file individual Schedule A reports (as defined in the Department of Labor’s Group Health Plan Research Files), which has information on the insurance carrier, premiums, and welfare benefit type. We only include insurance contracts that indicate the presence of health coverage, and exclude standalone dental, vision, life, and other ancillary insurance contracts. With this data on individual insurance plans offered by each firm, we then aggregate to the firm level. Specifically, in each year, we calculate *Avg Premium* as the sum of the individual health insurance plan premiums for the firm divided by the total number of insured, defined as the total number of persons that were covered by the health insurance contracts at the end of the policy or contract year.<sup>13</sup> Our overall sample includes information on 132,391 businesses from 1993 to 2020.

We use the PitchBook database to identify acquisitions of hospitals by private equity firms. We manually identify all buyouts of hospitals or hospital system chains where the purchaser is a PE firm and also obtain the locations of each of the affected hospitals. In total, we consider private equity buyouts over our sample period that comprise 362 individual hospitals across 125 hospital referral regions (HRRs). Figure 2 provides maps showing the HRRs affected by PE acquisitions of hospitals over our sample period. As the maps indicate, the affected regions are dispersed across the U.S. and are not confined to a particular geographical area.

To construct county-level economic outcome variables, we use data from Robert Dinterman’s Historical Bankruptcy Repository, the Community Reinvestment Act (CRA) Data Files, and various U.S. government sources. We construct measures of the number of business bankruptcies in a given county and year for our CHS specification from Robert Dinterman’s Historical Bankruptcy Repository, which is sourced from data hosted by the Administrative Office of the U.S. Courts. Our data include the number of Chapter 7 business bankruptcies, Chapter 11 business bankruptcies, and total business bankruptcies (which include any type of business bankruptcy filing).

We obtain the number of small business loans originated in each county, segmented by the size of the loan, from the Community Reinvestment Act (CRA) data files. The CRA data files begin in 1996 and are available until 2021 (2020 for our sample); this precludes

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<sup>12</sup>These reports are filed annually by employers maintaining welfare benefit plans covered by the Employee Retirement Income Security Act (ERISA) and excludes firms with less than 100 plan participants.

<sup>13</sup>This includes employees and their dependents who might have had coverage through the firm and is aggregated across different health insurance contracts engaged by the firm.

us from exploring loan outcomes for our CHS specification (equation (2)), but we are able to examine these outcomes for our full sample (equation (3)). We calculate establishment growth and employment growth as the yearly growth in total establishments and employment, respectively, in a county as of a given year using data from the U.S. Bureau of Labor Statistics. We calculate average salaries and wages at the county level as total wages and salaries over total returns filed from the IRS Individual Tax Statistics. Finally, to explore additional economic outcomes, we examine firm innovation activity in a local area from the U.S. Patents and Trademark Office (USPTO). Specifically, we construct data on patents filed by businesses in a given county from the USPTO’s PatentsView database, and data on trademarks registered to businesses in a given county as another measure of innovation (e.g., [Mendonça et al. \(2004\)](#)).

Table 1 provides summary statistics for the various outcome variables that we study for the CHS sample from 1993 to 1999 (Panel A) and for the full sample from 1993 to 2020 (Panel B). As previously noted, for our main empirical tests around the PE acquisition of CHS, we choose control counties using propensity score matching. More specifically, we do 2-1 matching based on average county earnings in the pre-period from 1993 to 1995 and an indicator variable for whether the county has a low urban population, resulting in 598 treated and 937 control counties. Table 2 provides a balance test for our treatment and control groups in the 1993–1995 pre-period based on this matching procedure. In particular, we provide the means for our various outcome variables for the treatment and control groups, a *t*-test of the difference in means, and the normalized difference following [Imbens and Rubin \(2015\)](#).<sup>14</sup> As the table indicates, our matching procedure results in no significant differences between treated and control counties across the vast majority of our outcome variables. The exception is wages and establishment growth; however, the absolute value of the normalized differences is less than the threshold of 0.20 suggested by [Imbens and Rubin \(2015\)](#), indicating a reasonable balance between the treatment and control groups.

## 4 Results

### 4.1 Insurance Premiums

We begin by establishing our first-stage results, whereby private equity acquisitions of hospitals lead to an increase in healthcare costs. Table 3 provides the firm-level results

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<sup>14</sup>The normalized difference provides the difference in means between the treatment and control groups, divided by the square root of the average variance of the treatment and control groups.

for employer-sponsored health insurance premiums following PE acquisitions of hospitals. Columns (1) and (2) provide the estimation results for the CHS setting in specification (2). The results show that, relative to firms in unaffected control areas, firms in areas affected by the PE acquisition of the CHS hospital system experienced a significant increase in premiums for employer-sponsored health insurance plans. These results are very similar when including firm and year fixed effects, as well as firm and industry-by-year fixed effects. In particular, premiums increased by 7.5% for treated firms after the PE buyout of CHS hospitals relative to control firms.

To provide texture to these coefficient estimates, we gather summary data from the U.S. Census on business payroll expenses and income.<sup>15</sup> The 7.5% increase in premiums amounts to 10.4% of net income, indicating the economically sizable magnitude of the rise in healthcare costs.<sup>16</sup> Likewise, as a percentage of total payroll expenses for a given business (excluding fringe), the premium is equivalent to a 4.5% increase in payroll expenses.<sup>17</sup> For firms with less than 1000 employees, we find more pronounced effects, with the increase in premiums amounting to 7.2% of payroll expenses and 15.1% of net income.<sup>18</sup>

As supporting evidence, column (3) provides the estimation results for equation (3). The results are very similar to the CHS specification—relative to unaffected firms, treated firms in areas experiencing a PE buyout of a hospital faced on average 6.6% higher healthcare insurance premiums (with similar economic magnitudes as in the CHS sample). This provides evidence that the effects we document are not unique to the CHS acquisition.

A key assumption of the DID framework is that the treatment and control groups exhibit parallel trends prior to the shock. Figure 3 provides the parallel trend graphs for these specifications. Panel A provides parallel trends for the CHS buyout, while Panel B provides parallel trends for the full sample following Callaway and Sant’Anna (2021).<sup>19</sup> For both specifications, there are no significant differences between treated and control firms and no discernible pre-trend; however, premiums for both specifications significantly jump for

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<sup>15</sup>As most businesses in the U.S., and thus in our firm-level analysis, are private, we cannot directly observe financial statement information for these firms.

<sup>16</sup>To calculate average profit or net income, we multiply total revenue by net profit margin and divide by the number of firms. This gives us a value of \$212,318 average profit. The median total premium payment by firms to insurers in our sample is \$420,486; an increase of 7.5% is therefore \$22,075, which is 10.4% of average profit. Revenue and the number of firms are for 1997 (as they are released every five years) and taken from the Census Statistics of U.S. Businesses (SUSB) dataset.

<sup>17</sup>Average payroll expense is calculated by dividing total payroll expenses by the number of firms, resulting in a value of \$492,294. Payroll expense is taken from the Census SUSB data and is for 1997 (this data is released every five years).

<sup>18</sup>The coefficient estimate for the increase in premiums for this subsample is 5.9%.

<sup>19</sup>The parallel trends we present are for the full sample considering hospital system buyouts. The parallel trends including individual hospitals look similar and are available upon request.

treated firms compared to control immediately after the PE acquisition of hospitals (CHS in Panel A and any hospital in Panel B).

Overall, the results provide validation for our use of PE buyouts of hospitals in a given local economic area as a positive shock to healthcare costs.

## 4.2 Business Bankruptcies and Loan Volumes

To explore the direct consequences of this increase in healthcare costs and whether they lead to depressed economic outcomes in an area, we begin by examining business bankruptcies. Table 4 examines the number of Chapter 7 (liquidation), Chapter 11 (reorganization), and total business bankruptcy filings in a given county and year. Panel A provides the results for the CHS buyout employed in specification (2). The results indicate an important negative spillover effect of heightened healthcare costs—communities which experienced a rise in healthcare costs through PE entry saw a significant rise in business bankruptcies following the acquisitions. In other words, the increase in healthcare costs for local firms within an area led to higher bankruptcies within that area. In particular, treated counties affected by the CHS buyout experienced 4.6% greater Chapter 7 and 4.8% greater Chapter 11 business bankruptcies relative to control counties. When examining combined business bankruptcies, treated counties experienced 6.5% greater bankruptcies relative to control counties. This equates to an additional 596 business bankruptcies per year across affected counties due to rising healthcare costs.<sup>20</sup>

Panel B examines effects for the full sample of PE buyouts via estimating specification (3). We see that the results are consistent with those in Panel A—treated counties experienced significantly higher business bankruptcies than control counties. Moreover, due to the longer sample period and thus greater data availability, our full sample specification also allows us to dive deeper and explore what may be leading to this increase in bankruptcies. In order to do so, we examine business loan volumes as outcome variables.<sup>21</sup> Column (4) of Panel B examines the number of new business loans originated within a given county for loan amounts between \$100K and \$250K, and column (5) examines the number of larger business loans (amounts greater than \$250K) originated.

We find that the volume of business loans originated in treated areas *increases* relative to

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<sup>20</sup>As noted in Table 1, the mean number of business bankruptcies per year in CHS counties is 15.34. In the CHS sample, we have 598 treated counties. The total number of additional business bankruptcies due to PE entry across affected counties in a given year is therefore given as  $6.5\% \times 15.34 \times 598 = 596$ .

<sup>21</sup>As previously noted, our data on business loans from the CRA data files starts in 1996, and thus we cannot examine this as an outcome for our CHS specification. However, we are able to use this data for our HCA specification in Section 5.

untreated areas. In particular, the effect is strongest, with an increase of 4.6%, for loans of smaller amounts—between \$100K and \$250K—which are likely for smaller businesses that are more cash constrained (we find positive but marginally insignificant effects for larger loans).<sup>22</sup> This implies an additional 474 small loans taken out per year across counties affected by rising healthcare costs due to PE entry.<sup>23</sup> Furthermore, this increase in loans is consistent with firms in a local area requiring additional external financing following the rise in healthcare costs. The combination of higher costs and the resulting increase in leverage leaves businesses more susceptible to negative economic shocks, thus leading to an increase in bankruptcies.<sup>24</sup> In Section 5, we provide further evidence of this channel.

Figure 4 provides the parallel trends for total bankruptcies for both the CHS specification (Panel A) and the full sample (Panel B), and for loans for the full sample. There are no significant differences between treatment and control counties prior to PE buyouts of hospitals, but then an increase in bankruptcy and loans in the periods after. This provides justification that the parallel trends assumption holds for these outcomes.

### 4.3 Effect on Economic Growth

We now proceed to examine whether rising healthcare costs, and their subsequent effect on business bankruptcies and leverage, lead to real effects in terms of economic growth in local economies. More specifically, in Table 5 we examine employment and business establishment growth at the county-level. Focusing first on the CHS specification in Panel A, both employment and establishment growth significantly decline in treated areas following the PE acquisition of CHS hospitals. The coefficients imply 5,363 *fewer* establishments launched per year aggregated across affected counties, relative to unaffected counties which did not experience PE entry into their healthcare systems.<sup>25</sup> Likewise, the rising healthcare costs result in 88,441 fewer jobs created per year across affected counties.<sup>26</sup> We see a similar pattern with the full sample in Panel B (albeit employment growth has a negative but

<sup>22</sup>In untabulated tests, we also find that very small loans of less than \$100K increase for treated counties.

<sup>23</sup>The average number of loans between \$100K and \$250K in our full sample is 71.55. The average number of affected counties in our full sample is 144 counties per year. The average increase in loans across counties in a given year is therefore  $71.55 \times 4.6\% \times 144 = 474$ .

<sup>24</sup>This is in line with the effect documented by Bergman et al. (2020), where positive cash inflows in a strained economic environment lead to a decrease in loan delinquencies.

<sup>25</sup>As noted in Panel A of Table 1, we have an average of 2,002 establishments per county in the CHS sample, with a decline in the growth rate of  $-0.448$  as noted in column (2), and 598 treated counties. We therefore calculate  $2002 \times -0.448 \times 598$  and then divide this number by 100 to scale for the percentage embedded in the variable construction, giving us  $-5,363$  across treated counties.

<sup>26</sup>Average employment in each county per year in our CHS sample is 28,448. Our calculation is therefore  $28,448 \times -0.514 \times 598$  and dividing by 100, giving us  $-87,441$  across treated counties.



insignificant coefficient).<sup>27</sup>

Figure 5 provides the parallel trends for these outcomes. In Panel A, treated and control counties are insignificantly different from one another prior to the PE buyout of CHS and exhibit no pre-trends, while employment and establishment growth for treated counties significantly drop relative to control counties following the CHS buyout. In Panel B for the full sample, while noisier, the treated and control counties do not exhibit any apparent trend prior to PE buyouts of hospitals; however, following the buyouts, there is a clear and significant drop for treated counties relative to control counties.

As additional evidence of the impact of the rise in premiums on economic outcomes, we also explore a number of other variables. First, we examine average wages in a county. As Panel A indicates, wages significantly drop for the treated counties following the CHS buyout. Thus, in addition to lower employment and establishment growth, workers on average are earning less following the rise in healthcare costs, which may lower consumption and further weaken businesses reliant on that consumption, as previously argued. We also find a negative effect on wages for our full sample results in Panel B, although the effect is insignificant.

We additionally explore innovation activity, as this outcome is also closely linked to economic growth (e.g., [Grossman and Helpman \(1993\)](#)). We examine the number of patents filed by businesses (column (4) in Panels A and B), and find a significant reduction in patents for treated compared to control counties after the PE buyout of CHS (we also find an insignificant reduction for the full-sample analysis). Another measure of innovation that has been posited in the literature is trademarks registered to firms ([Mendonça et al. \(2004\)](#)). Using this measure (column (5)), we find a significant reduction in trademarks for treated counties under both specifications. In the CHS sample, these estimates amount to 296 fewer patents and 586 fewer trademarks filed per year across affected counties relative to unaffected counties.<sup>28</sup> Overall, these effects provide further evidence of a depression in economic activity due to rising healthcare costs induced by PE buyouts of hospitals.

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<sup>27</sup>In Table A.1, we examine the number of business establishments following PE hospital buyouts. We find a decrease in the number of firms with more than 100 employees and a slight increase in the number of firms with less than 100 employees. This is consistent with a composition change, whereby firms in affected areas are not expanding and may be downsizing.

<sup>28</sup>Average patents per county in the CHS sample 15. We therefore calculate  $15 \times -3.3\% \times 598 = -296$  across treated counties. Similarly, average trademark filings per county is 20; this gives us  $20 \times -4.9\% \times 598 = -586$ .

## 5 Resilience following negative economic shocks

In this section, we further shed light on the channels through which our effects operate. To do so, we utilize an additional setting featuring a large-scale hospital system buyout by private equity investors.

### 5.1 Framework and empirical approach

As previously noted, one conceptual channel through which we may see the decline in economic outcomes is due to a “financial accelerator” mechanism, as posited theoretically by Gertler and Gilchrist (1994), Bernanke and Gertler (1995), Kiyotaki and Moore (1997), and Bernanke et al. (1999), among others. The idea is that, in the presence of financial frictions, weakened firm balance sheets can cause negative shocks to propagate and amplify, thus further weakening firms and causing a contraction in economic activity. In our current setting, this mechanism would manifest due to the increase in healthcare costs weakening firm balance sheets in the local economy and causing them to take on more debt, which then amplifies any negative shocks these firms experience, in turn causing an increase in bankruptcies and dampened firm and employment growth.<sup>29</sup>

To provide evidence of this channel, we exploit another large-scale hospital acquisition by private equity: the buyout of the HCA Healthcare hospital system by a group of private equity investors in July 2006, relying largely on debt to finance the acquisition. Examining the HCA Healthcare buyout carries similar advantages to our previous CHS specification, in that it is large-scale—HCA operated 162 hospitals in 67 hospital referral regions at the time of the buyout—and thus can be viewed as plausibly exogenous to any particular local economy. Relatedly, like CHS, HCA Healthcare was a publicly-traded hospital system at the time of the leveraged buyout and was taken private by the PE investors. The shock therefore serves as another laboratory in which we can validate our previous results. We consider specifications along the same lines as our main specifications for the HCA healthcare buyout. At the firm level, we run the following regression to explore the effect on average

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<sup>29</sup>For example, an affected firm that must pay higher premiums can have a higher cost of labor and lower net income. As such, this firm must rely more on external funds, such as debt (rather than retained earnings), to finance its operations. Consequently, a negative macroeconomic shock that reduces revenues and net income can lead to covenant violations (which increase the cost of credit) or missed payments to creditors, pushing the business into financial distress. As a result, the presence of heightened healthcare costs through insurance premiums can accelerate and amplify poor outcomes for firms following negative economic shocks.

premiums:

$$\log(\text{Avg Premium}_{j,i,t}) = \alpha + \beta HCA_{j,i,2004} \times \text{Post2006}_t + FEs + \varepsilon_{i,t}. \quad (4)$$

In equation (4), as before,  $\log(\text{Avg Premium}_{j,i,t})$  is the average employer-sponsored health insurance plan premium for firm  $j$  which is located in county  $i$ .  $HCA_{j,i,2004}$  is an indicator variable that takes a value of one if firm  $j$  is located in a county  $i$  in an HRR where HCA operated a hospital as of 2004, and zero otherwise.<sup>30</sup>  $\text{Post2006}_t$  is an indicator variable that takes a value of 1 if year  $t$  is 2006, the date of the PE acquisition of HCA, or later, and 0 otherwise. We estimate equation (4) from 2002 to 2009. Our sample consists of a total of 18,305 treated and 40,363 control firms.

For our county-level outcomes, we first run the following regression:

$$Y_{i,t} = \alpha + \beta HCA_{i,2004} \times \text{Post2006}_t + FEs + \varepsilon_{i,t}. \quad (5)$$

In equation (5),  $HCA_{i,2004}$  is an indicator variable that takes a value of one if county  $i$  is in an HRR where HCA operated a hospital as of 2004, and zero otherwise. Equation (5) is estimated from 2002 to 2009 for our annual outcomes. As in the previous analysis, to ensure that the treatment and control groups are comparable, we choose control counties (and thus control firms located in those counties) using propensity score matching, resulting in a total of 848 treated and 1,130 control counties. Table 6 provides a balance test for our matched sample; there are no significant differences between treated and control counties across all outcomes except for employment and establishment growth. However, as before, the absolute value of the normalized differences is less than the threshold of 0.20 suggested by Imbens and Rubin (2015).<sup>31</sup>

An additional feature of the HCA buyout, which allows us to further shed light on our previous results, is that it occurred immediately prior to the global financial crisis of 2007–2009. The fact that the PE-induced increase in healthcare costs occurred just prior to the large negative shock of the crisis affords a test of the financial frictions-based channel described above. In particular, if the financial frictions channel is at play, then areas that experienced increases in healthcare costs which weakened firms should be *more* affected by the financial crisis. Put differently, we should find an amplified effect in areas hit hardest by the crisis that also previously experienced a PE acquisition of hospitals.

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<sup>30</sup>This allows us to consider HCA hospitals in 2006 that were also part of HCA in 2004, and precludes any hospital that was dropped or acquired just before or during the year of the buyout.

<sup>31</sup>Appendix Table A.2 provides summary statistics for the HCA sample.

To test this channel, we exploit heterogeneity in counties’ exposure to the financial crisis. Previous work has shown that areas with greater household debt-to-income (HDI) ratios suffered sharper declines in consumer expenditures and employment during the financial crisis (Mian and Sufi (2010, 2011), Mian et al. (2011)). We use variation in household debt-to-income (HDI) ratios using a triple-differences specification to examine whether counties which had greater exposure to the crisis *and* were affected by the HCA buyout experienced greater declines in economic outcomes relative to other counties:

$$Y_{i,t} = \alpha + \beta_1 HDI_{i,2006q4} \times HCA_{i,2004} \times Post2006_t + \beta_2 HCA_{i,2004} \times Post2006_t + \beta_3 HDI_{i,2006q4} \times Post2006_t + FEs + \varepsilon_{i,t}, \quad (6)$$

where  $HDI_{i,2006q4}$  is the logarithm of county  $i$ ’s average household debt-to-income ratio as of the fourth quarter of 2006.<sup>32</sup> The coefficient of interest is  $\beta_1$ , which estimates whether HCA-affected counties that were more exposed to the crisis were affected relatively more after the HCA buyout.

Under this research design, specification (5) examines the direct effect of rising healthcare costs following private equity entry on local economic outcomes, while specification (6) estimates the possible amplification effects of the financial crisis on rising healthcare costs in counties more affected by the crisis. If the amplification effect is present, we predict that counties which were more susceptible to the deleterious consequences of the financial crisis will exhibit more severe consequences of the increase in healthcare costs following PE entry.

## 5.2 Results: HCA buyout

We begin with the estimation results for equations (4) and (5) as a validation of our main results. These are provided in Table 7, while Figure 6 provides parallel trends graphs for the main effects. We find similar results regarding our first stage, whereby we observe a 4.2% increase in insurance premiums for businesses in regions with PE entry. Moreover, we observe similar effects with regard to an increase in business bankruptcies and small business loan originations, and a decrease in employment and establishment growth in affected areas.<sup>33</sup>

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<sup>32</sup>We obtain county-level household debt-to-income ratios from the FRNY Enhanced Financial Accounts. We show that our results are also robust to using an indicator variable for a high (top quartile) HDI rather than a continuous variable.

<sup>33</sup>In contrast to our results using the CHS buyout, we find a small but significant increase in wages in affected areas. The reason for this can be due to the fact that the high number of bankruptcies in affected areas is removing lower-skilled labor from the workforce, resulting in a higher concentration of higher-wage jobs, which means an increase in the average wages of the employed population.

These findings using the second natural experiment of the HCA buyout provide further supporting evidence of the robustness of the phenomena we have documented in Section 4.

### 5.3 Results: HCA buyout and amplification of the crisis

Table 8 provides estimation results for equation (6). Across the various outcomes, we find evidence that greater exposure to the financial crisis amplifies the effect of the increase in healthcare costs. In particular, examining columns (1)–(3) of Panel A, we see that, among counties that were more exposed to the financial crisis, the counties that were also affected by the HCA buyout (and thus experienced an increase in healthcare costs) exhibit more business bankruptcies. Columns (4) and (5) indicate that the number of loans for these affected counties also declined (although not significantly), which is consistent with the sharp contraction in credit as the crisis unfolded.

Panel B of Table 8 shows that employment growth declined (marginally insignificant), establishment growth declined, and wages declined (although insignificantly) for affected counties. Overall, these results are consistent with rising healthcare costs weakening business balance sheets and making firms more susceptible to the effects of negative economic shocks. Accordingly, the results indicate that rising healthcare costs can have stronger effects in counties or regions experiencing higher levels of economic distress.

## 6 Robustness and additional tests

In this section, we provide a number of robustness and additional tests. All of the results in this section are included in the Appendix.

### Alternative specifications

Our results are robust to a number of alternative specifications. First, our full sample specification (equation (3)) estimates dynamic treatment effects using the procedure of Callaway and Sant’Anna (2021). However, an alternative specification involves using a “stacked” DID design (e.g., Cengiz et al. (2019), Deshpande and Li (2019)), for which control counties are first matched to each county that is treated at a particular time (a “cohort”). The effects for the treated counties are then compared to the match control counties over a window from  $t - 4$  to  $t + 3$  around the PE buyout date of  $t = 0$  for the treated county.<sup>34</sup> Appendix Table

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<sup>34</sup>More specifically, control counties are chosen among the set of counties that are either never-treated or are treated more than three years from the event date. For the premium regressions, we include firm-cohort

A.3 provides these results, which are very similar to our main results.

Second, in our specifications, we do not include county-level control variables, as many such variables may themselves be affected by the shock. Furthermore, we use propensity-score matching to closely align our treated and control counties along with county fixed effects, which control for time-invariant differences between counties. Nonetheless, we verify that our results hold when including county-level controls for county population and income per capita. Appendix Table A.4 provides the results for the CHS specifications (equations (1) and (2)), Appendix Table A.5 provides results with controls for the full sample (equation (3)), and Appendix Table A.13 provides results for the supporting HCA specifications (equations (4) and (5)). The results are very similar to those of our main specifications. Along similar lines, our results also hold when controlling for time-varying geographic trends; Appendix Tables A.6, A.7, and A.14 provide these results for the different specifications.<sup>35</sup>

Finally, some of our outcome variables—i.e., the number of bankruptcies, loans, and amount of innovation—are discrete count variables. As has been documented by the econometrics literature (e.g., Cameron and Trivedi (1986, 2013)), using linear regression models may introduce bias in estimates involving count variables. To address this potential concern, for robustness, we re-estimate our results for the appropriate count variables using Poisson regressions.<sup>36</sup> This analysis, provided in Appendix Table A.8 for the CHS and full sample specifications and Appendix Table A.15 for the HCA specifications, is similar to that of our earlier findings.

## Sample selection

To show that our results are not driven by potential sample selection concerns, we run two additional robustness tests. First, we run a placebo test in which we randomly assign counties as “treated” counties, and the control counties are then selected among the remaining counties using the matching procedure described earlier. Appendix Tables A.9, A.10, and

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and industry-year fixed effects, and cluster at the firm-cohort level. For the county-level regressions, we include county-cohort and time fixed effects and cluster at the county-cohort level.

<sup>35</sup>We note that since our treatment is at the HRR level—and HRRs may extend across state lines with some states having only have a small number of HRRs—we do not have enough variation to be able to include state-by-year fixed effects. As a result, in these tables we instead include Census-region-by-year fixed effects.

<sup>36</sup>It has been noted that the validity of Poisson models hinge upon specific restrictions on the underlying distribution of the variables which may not hold if there is significant dispersion (see, e.g., Greene (2008)). Given significantly higher dispersion for our CHS sample for certain outcomes, we winsorize outcomes at the 1% level for that sample. We obtain similar results using a negative binomial model as an alternative specification.

A.16 provide this placebo test for the CHS specification, the full sample specification, and the HCA specification, respectively. Across all of the specifications and outcomes, we find insignificant results, providing evidence that our results are specific to our treatment effects and not due to spurious correlations in our sample.

Second, we show that our results continue to hold when we restrict our sample to counties with at least one for-profit hospital. While non-profit and for-profit hospitals generally have very similar financial motivations and behavior (Duggan (2000)), non-profit hospitals may be less aggressive in reimbursement rate negotiations following PE acquisitions of rival hospitals. Appendix Tables A.11, A.12, and A.17 provide these results, which are in line with our main specifications.

## HCA specifications

In our specification exploring the channel of amplification in the financial crisis (equation (6)), we run a triple-differences specification using a continuous variable for HDI to proxy for exposure to the crisis:  $HDI_{i,2006q4}$ . To show that this is mainly driven by areas with high HDI, we show that our estimation results for equation (6) hold if we instead use an indicator variable that takes a value of one if  $HDI_{i,2006q4}$  is in the top quartile, and zero otherwise. Appendix Table A.18 provides these results, which closely match our original specification.

## 7 Concluding remarks

This paper explores the economic consequences of increases in healthcare costs. We use the private equity acquisition of a large hospital chain—Community Health Systems—as a quasi-natural experiment that increased premiums for employer-sponsored healthcare insurance plans in the areas affected hospitals operated in. The large-scale nature of the acquisition helps mitigate selection concerns that the acquisition was targeted towards a particular economic area. To provide supplemental evidence establishing the external validity of our setting, we also examine all PE acquisitions of hospitals over our sample period.

Utilizing detailed firm-level data, we first establish that the acquisition of hospitals by PE investors leads to an increase in healthcare insurance premiums faced by firms operating in an area served by the affected hospital. We then provide evidence that, following these acquisitions and the resultant increase in premiums, affected areas experience increases in business bankruptcies and greater business loan volume. Exploring additional economic outcomes, we find lower employment and establishment growth in these areas, as well as

lower average wages and depressed innovation output. To establish the channels behind our results, we exploit another large-scale PE acquisition—HCA Healthcare—that occurred immediately prior to the financial crisis. We find evidence in line with our previous effects using this setting, but additionally find that the effects we document are larger for areas that were harder-hit by the financial crisis. These results are consistent with a channel of increasing healthcare costs causing firms to be weaker financially, and thus more vulnerable to negative economic shocks.

Our study sheds light on how healthcare costs, which have been rapidly rising over the past two decades, can impact local businesses and economic growth within local communities. Overall, our results point to negative consequences to local areas following rises in healthcare premiums, as well as negative spillovers that are associated with the recent trend of hospital acquisitions by private equity firms. The study also helps us to understand the broader consequences of private equity entry into the healthcare system, which has been a recent and growing concern in public policy discussions.



## References

- ADELINO, M., K. LEWELLEN, AND W. B. MCCARTNEY (2022): “Hospital financial health and clinical choices: evidence from the financial crisis,” *Management Science*, 68, 2098–2119.
- ADELINO, M., K. LEWELLEN, AND A. SUNDARAM (2015): “Investment decisions of non-profit firms: Evidence from hospitals,” *The Journal of Finance*, 70, 1583–1628.
- AGHAMOLLA, C., P. KARACA-MANDIC, X. LI, AND R. T. THAKOR (2021): “Merchants of death: The effect of credit supply shocks on hospital outcomes,” Tech. rep., National Bureau of Economic Research.
- ALMEIDA, H., R. HUANG, P. LIU, AND Y. XUAN (2022): “How does health insurance affect firm employment and performance? Evidence from Obamacare,” *Working paper*.
- APPELBAUM, E. (2019): “How Private Equity Makes You Sicker,” *The American Prospect*, October 7, 2019.
- ARNOLD, D. AND C. WHALEY (2020): “Who pays for health care costs? The effects of health care prices on wages,” *Working paper*.
- BAICKER, K. AND A. CHANDRA (2005): “The consequences of the growth of health insurance premiums,” *American Economic Review*, 95, 214–218.
- (2006): “The labor market effects of rising health insurance premiums,” *Journal of Labor Economics*, 24, 609–634.
- BERGMAN, N. K., R. IYER, AND R. T. THAKOR (2020): “The effect of cash injections: Evidence from the 1980s farm debt crisis,” *The Review of Financial Studies*, 33, 5092–5130.
- BERNANKE, B. S. AND M. GERTLER (1995): “Inside the black box: the credit channel of monetary policy transmission,” *Journal of Economic perspectives*, 9, 27–48.
- BERNANKE, B. S., M. GERTLER, AND S. GILCHRIST (1999): “The financial accelerator in a quantitative business cycle framework,” *Handbook of macroeconomics*, 1, 1341–1393.
- BERNSTEIN, S. (2022): “The effects of public and private equity markets on firm behavior,” *Annual Review of Financial Economics*, 14, 295–318.
- BERNSTEIN, S., J. LERNER, AND F. MEZZANOTTI (2019): “Private equity and financial fragility during the crisis,” *The Review of Financial Studies*, 32, 1309–1373.
- BERNSTEIN, S., J. LERNER, M. SORENSEN, AND P. STRÖMBERG (2017): “Private equity and industry performance,” *Management Science*, 63, 1198–1213.
- BERNSTEIN, S. AND A. SHEEN (2016): “The operational consequences of private equity buyouts: Evidence from the restaurant industry,” *The Review of Financial Studies*, 29, 2387–2418.
- BOUCLY, Q., D. SRAER, AND D. THESMAR (2011): “Growth LBOs,” *Journal of Financial*

- Economics*, 102, 432–453.
- CALLAWAY, B. AND P. H. SANT’ANNA (2021): “Difference-in-differences with multiple time periods,” *Journal of Econometrics*, 225, 200–230.
- CAMERON, A. C. AND P. K. TRIVEDI (1986): “Econometric models based on count data. Comparisons and applications of some estimators and tests,” *Journal of applied econometrics*, 1, 29–53.
- (2013): *Regression analysis of count data*, vol. 53, Cambridge university press.
- CENGIZ, D., A. DUBE, A. LINDNER, AND B. ZIPPERER (2019): “The effect of minimum wages on low-wage jobs,” *The Quarterly Journal of Economics*, 134, 1405–1454.
- CERULLO, M., K. YANG, K. E. J. MADDOX, R. C. MCDEVITT, J. W. ROBERTS, AND A. C. OFFODILE (2022): “Association between hospital private equity acquisition and outcomes of acute medical conditions among Medicare beneficiaries,” *JAMA Network Open*, 5, e229581–e229581.
- COOPER, Z., S. V. CRAIG, M. GAYNOR, AND J. VAN REENEN (2019): “The price ain’t right? Hospital prices and health spending on the privately insured,” *The Quarterly Journal of Economics*, 134, 51–107.
- COOPER, Z., J. J. DOYLE JR, J. A. GRAVES, AND J. GRUBER (2022): “Do Higher-Priced Hospitals Deliver Higher-Quality Care?” Tech. rep., National Bureau of Economic Research.
- DAFNY, L., K. HO, AND R. S. LEE (2019): “The price effects of cross-market mergers: theory and evidence from the hospital industry,” *The RAND Journal of Economics*, 50, 286–325.
- DALE-OLSEN, H. (2006): “Wages, fringe benefits and worker turnover,” *Labour economics*, 13, 87–105.
- DAVIS, S. J., J. HALTIWANGER, K. HANDLEY, R. JARMIN, J. LERNER, AND J. MIRANDA (2014): “Private equity, jobs, and productivity,” *American Economic Review*, 104, 3956–3990.
- DAVIS, S. J., J. HALTIWANGER, K. HANDLEY, B. LIPSIOUS, J. LERNER, AND J. MIRANDA (2021): “The economic effects of private equity buyouts,” *Available at SSRN 3465723*.
- DESHPANDE, M. AND Y. LI (2019): “Who is screened out? Application costs and the targeting of disability programs,” *American Economic Journal: Economic Policy*, 11, 213–248.
- DILLENDER, M., C. J. HEINRICH, AND S. HOUSEMAN (2022): “Effects of the Affordable Care Act on Part-Time Employment Early Evidence,” *Journal of Human Resources*, 57, 1394–1423.
- DRANOVE, D., C. GARTHWAITE, AND C. ODY (2017): “How do nonprofits respond to

- negative wealth shocks? The impact of the 2008 stock market collapse on hospitals,” *The RAND Journal of Economics*, 48, 485–525.
- DRANOVE, D. AND M. A. SATTERTHWAITE (2000): “The industrial organization of health care markets,” *Handbook of health economics*, 1, 1093–1139.
- DUGGAN, M. G. (2000): “Hospital ownership and public medical spending,” *The Quarterly Journal of Economics*, 115, 1343–1373.
- EATON, C., S. T. HOWELL, AND C. YANNELIS (2020): “When investor incentives and consumer interests diverge: Private equity in higher education,” *The Review of Financial Studies*, 33, 4024–4060.
- FRACASSI, C., A. PREVITERO, AND A. SHEEN (2022): “Barbarians at the store? Private equity, products, and consumers,” *The Journal of Finance*, 77, 1439–1488.
- GAO, J., M. SEVILIR, AND Y. S. KIM (2021): “Private Equity in the Hospital Industry,” *Available at SSRN 3924517*.
- GAYNOR, M., K. HO, AND R. J. TOWN (2015): “The industrial organization of health-care markets,” *Journal of Economic Literature*, 53, 235–84.
- GERTLER, M. AND S. GILCHRIST (1994): “Monetary policy, business cycles, and the behavior of small manufacturing firms,” *The Quarterly Journal of Economics*, 109, 309–340.
- GONDI, S. AND Z. SONG (2019): “Potential implications of private equity investments in health care delivery,” *J of the American Medical Association*, 321, 1047–1048.
- GOWRISANKARAN, G., A. NEVO, AND R. TOWN (2015): “Mergers when prices are negotiated: Evidence from the hospital industry,” *American Economic Review*, 105, 172–203.
- GREENE, W. (2008): “Functional forms for the negative binomial model for count data,” *Economics Letters*, 99, 585–590.
- GROSSMAN, G. M. AND E. HELPMAN (1993): *Innovation and growth in the global economy*, MIT press.
- GRUBER, J. (1994): “The incidence of mandated maternity benefits,” *The American economic review*, 622–641.
- GUPTA, A., S. T. HOWELL, C. YANNELIS, AND A. GUPTA (2021): “Does private equity investment in healthcare benefit patients? evidence from nursing homes,” Tech. rep., National Bureau of Economic Research.
- HO, K. AND R. S. LEE (2017): “Insurer competition in health care markets,” *Econometrica*, 85, 379–417.
- IMBENS, G. W. AND D. B. RUBIN (2015): *Causal inference in statistics, social, and biomedical sciences*, Cambridge University Press.
- JOHNSTON-ROSS, E., S. MA, AND M. PURI (2021): “Private equity and financial stability: evidence from failed bank resolution in the crisis,” Tech. rep., National Bureau of Economic

Research.

- KAISER FAMILY FOUNDATION (2002): “Employer Health Benefits 2002 Annual Survey,” Tech. rep.
- (2022): “Employer Health Benefits 2022 Annual Survey,” Tech. rep.
- KAPLAN, S. N. AND A. SCHOAR (2005): “Private equity performance: Returns, persistence, and capital flows,” *The journal of finance*, 60, 1791–1823.
- KAPLAN, S. N. AND P. STRÖMBERG (2009): “Leveraged buyouts and private equity,” *Journal of economic perspectives*, 23, 121–146.
- KIYOTAKI, N. AND J. MOORE (1997): “Credit cycles,” *Journal of political economy*, 105, 211–248.
- KOLSTAD, J. T. AND A. E. KOWALSKI (2016): “Mandate-based health reform and the labor market: Evidence from the Massachusetts reform,” *Journal of health economics*, 47, 81–106.
- LARA, A. B., C. NGUYEN, M. SHORT, AND V. HO (2022): “Estimating the Potential Profit Gains from Lowering Employee Health Care Costs for America’s Largest Companies,” Tech. rep.
- LERNER, J., M. SORENSEN, AND P. STRÖMBERG (2011): “Private equity and long-run investment: The case of innovation,” *The Journal of Finance*, 66, 445–477.
- LEWIS, M. S. AND K. E. PFLUM (2017): “Hospital systems and bargaining power: Evidence from out-of-market acquisitions,” *The RAND Journal of Economics*, 48, 579–610.
- LIU, T. (2022): “Bargaining with private equity: implications for hospital prices and patient welfare,” *Available at SSRN 3896410*.
- LO, A. W. AND R. T. THAKOR (2022): “Financing biomedical innovation,” *Annual Review of Financial Economics*, 14, 231–270.
- (2023): “Financial intermediation and the funding of biomedical innovation: A review,” *Journal of Financial Intermediation*, 101028.
- MENDONÇA, S., T. S. PEREIRA, AND M. M. GODINHO (2004): “Trademarks as an indicator of innovation and industrial change,” *Research policy*, 33, 1385–1404.
- MIAN, A. AND A. SUFI (2010): “Household leverage and the recession of 2007 to 2009. IMF Economic Review, 58 (1), 74-117,” .
- (2011): “Finance and macroeconomics: The role of household leverage,” *NBER Reporter Online*, 11–13.
- MIAN, A., A. SUFI, ET AL. (2011): “Consumers and the Economy, Part II: Household Debt and the Weak US Recovery,” *FRBSF Economic Letter*, 2.
- MULLIGAN, C. B. (2020): “The employer penalty, voluntary compliance, and the size distribution of firms: Evidence from a survey of small businesses,” *Tax Policy and the*

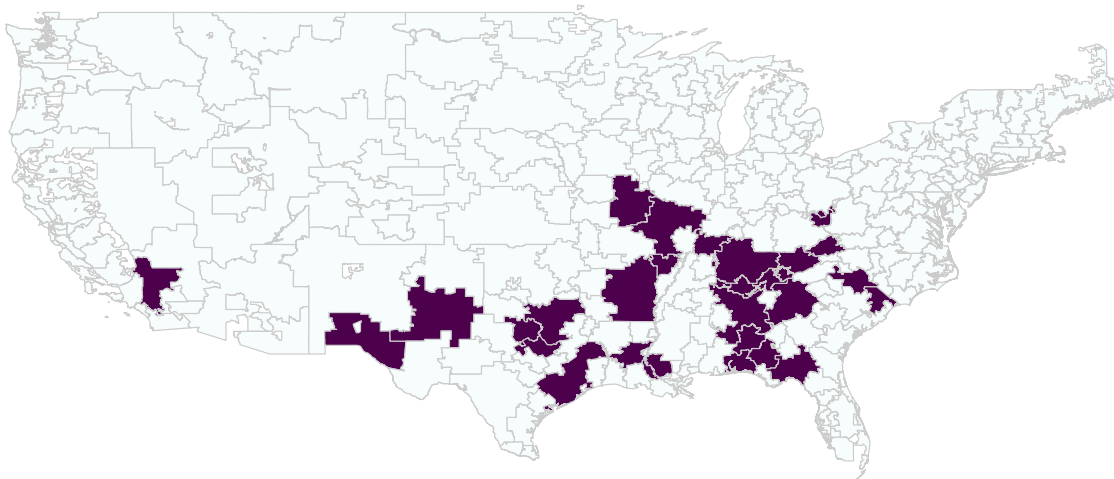
*Economy*, 34, 139–171.

- OFFODILE, A. C., M. CERULLO, M. BINDAL, J. A. RAUH-HAIN, AND V. HO (2021): “Private equity investments in health care: an overview of hospital and health system leveraged buyouts, 2003–17,” *Health Affairs*, 40, 719–726.
- POMORSKI, C. (2021): “Death of a Hospital,” *The New Yorker*, June 7, 2021.
- PRAGER, E. AND M. SCHMITT (2021): “Employer consolidation and wages: Evidence from hospitals,” *American Economic Review*, 111, 397–427.
- ROSEN, S. (1986): “The theory of equalizing differences,” *Handbook of labor economics*, 1, 641–692.
- WHITE, C. AND C. M. WHALEY (2021): “Prices paid to hospitals by private health plans are high relative to Medicare and vary widely: findings from an employer-led transparency initiative,” *Rand Health Quarterly*, 9.
- ZELLER, S. (2023): “Effect of Increasing Healthcare Costs on Small Firms: Evidence from Private Equity Acquisitions of Hospitals,” *Working paper*.

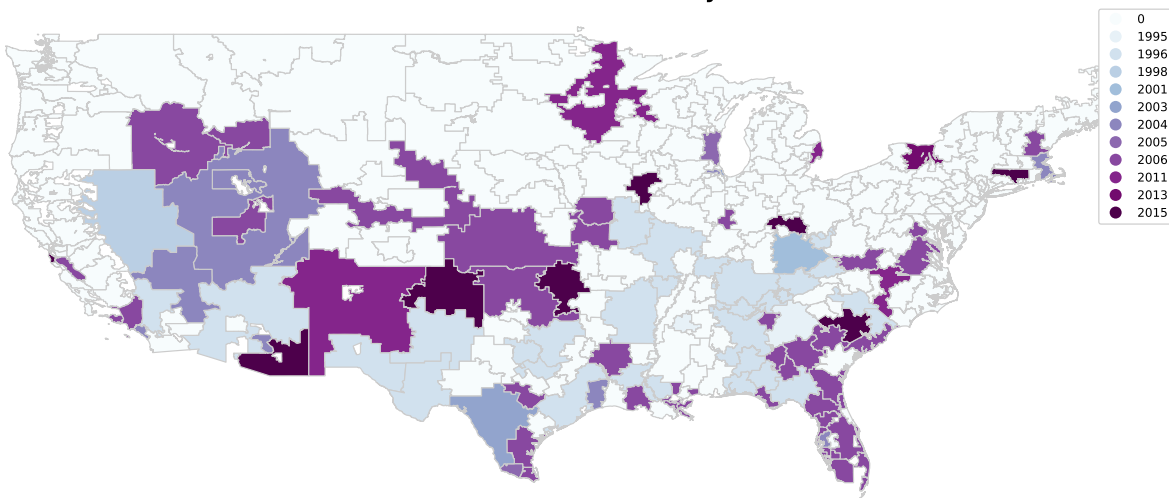
## Figure 2: Map of PE Buyouts of Hospitals

This figure provides a map of hospital referral regions (HRRs) affected by PE buyouts of hospitals across the US over our sample. Each shape represents an HRR, and the different shadings indicate the year in which a hospital in the HRR was acquired by a PE firm. The top map shows CHS hospitals, and the bottom map shows hospital system buyouts over the full sample.

Treated HRRs : CHS PE Buyout



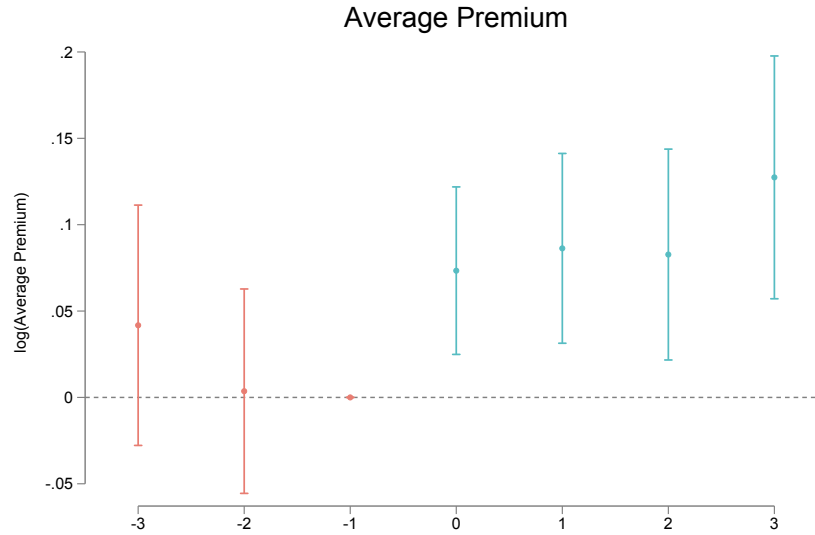
Treated HRRs : All PE Buyouts



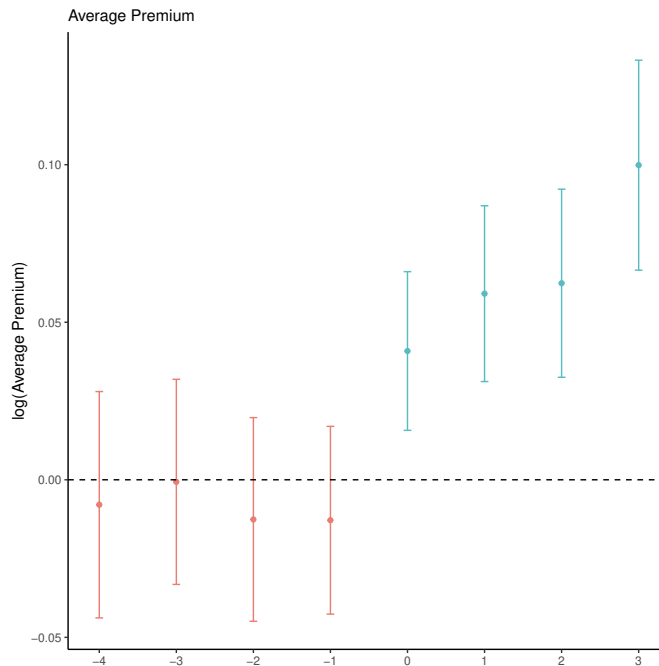
**Figure 3: Parallel Trends: Average Premiums**

This figure provides parallel trends for average premiums at the firm-year level for firms in areas affected by private equity (PE) buyouts of hospital systems. Panel A provides results for the CHS specification. Panel B provides full sample results from 1993 to 2020. Treatment effects are estimated using dynamic treatment effects following [Callaway and Sant'Anna \(2021\)](#) in Panel B, as indicated. *Avg Premium* is the average premium that a firm paid for employer-sponsored health insurance plans in a given year.

***Panel A: CHS Buyout***



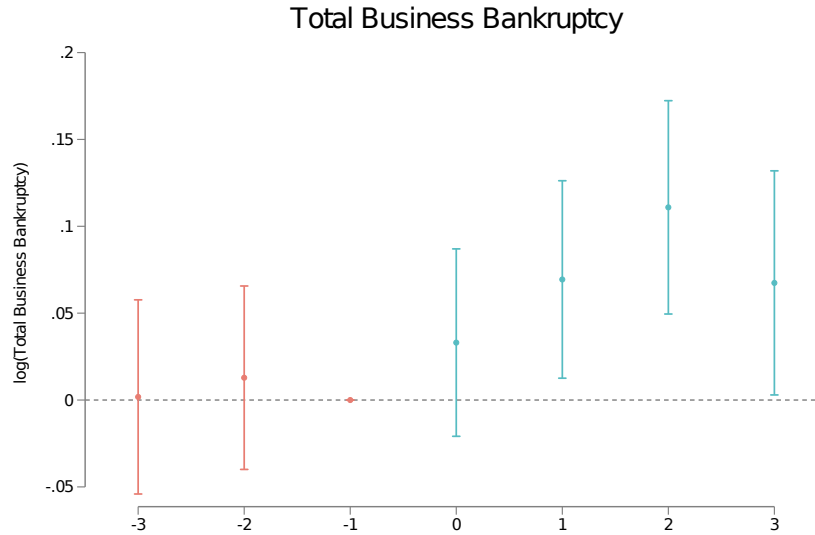
***Panel B: Full Sample***



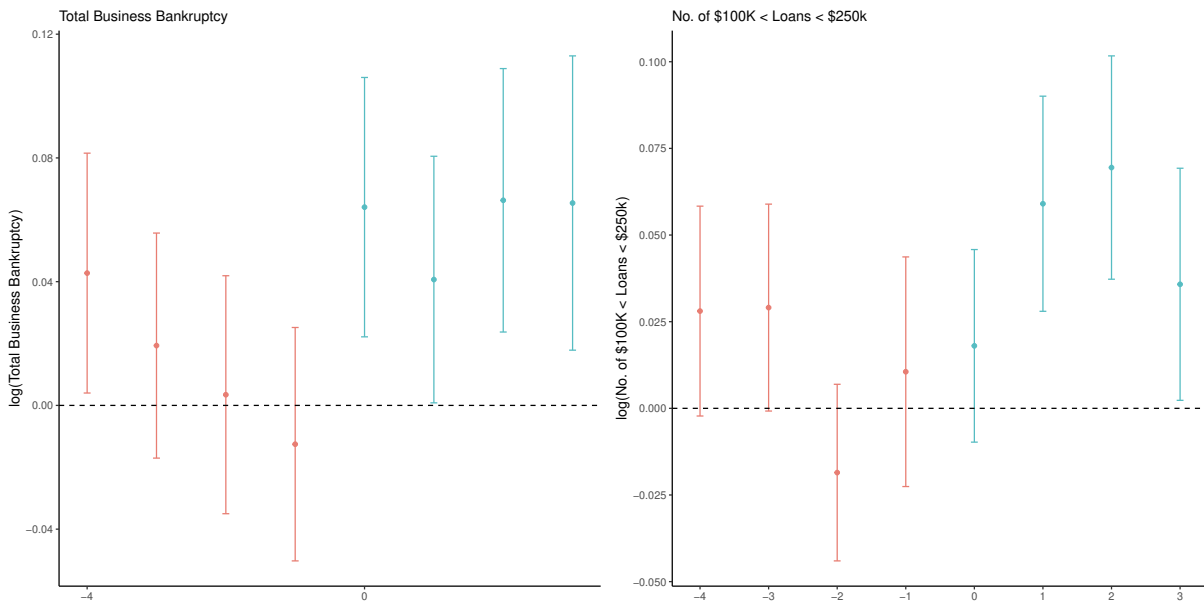
### Figure 4: Parallel Trends: Business Bankruptcies and Debt

This figure provides parallel trends for county-level business bankruptcies and Debt for counties in areas affected by private equity (PE) buyouts of hospital systems. Panel A provides results for total business bankruptcies for the CHS specification. Panel B provides full sample results for total business bankruptcies and county-level business loan volumes from 1993 to 2020. Dynamic treatment effects are estimated in Panel B following Callaway and Sant’Anna (2021).

#### Panel A: CHS Buyout



#### Panel B: Full Sample

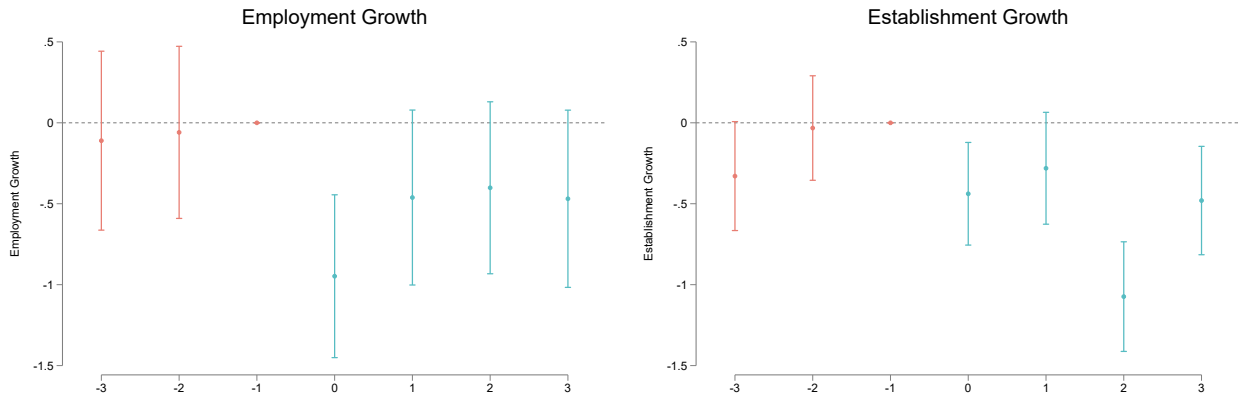




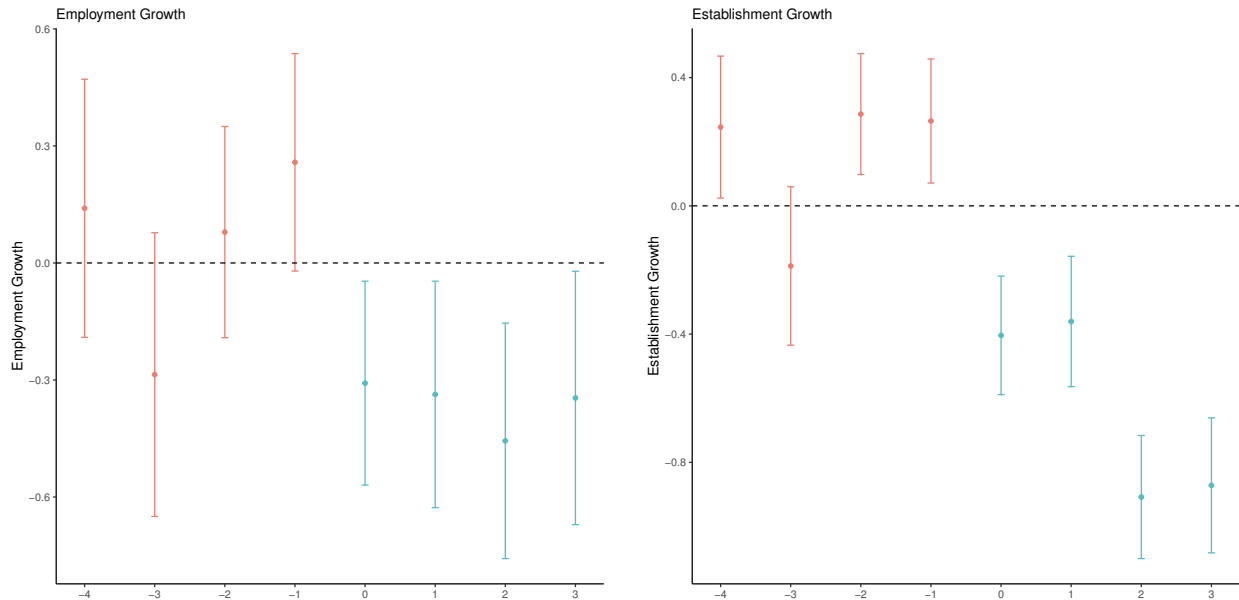
## Figure 5: Parallel Trends: Employment and Establishment Growth

This figure provides parallel trends for employment and establishment growth for counties in areas affected by private equity (PE) buyouts of hospital systems. Panel A provides results for total business bankruptcies for the CHS specification. Panel B provides full sample results for total business bankruptcies and county-level business loan volumes from 1993 to 2020. Dynamic treatment effects are estimated in Panel B following Callaway and Sant'Anna (2021).

### *Panel A: CHS Buyout*

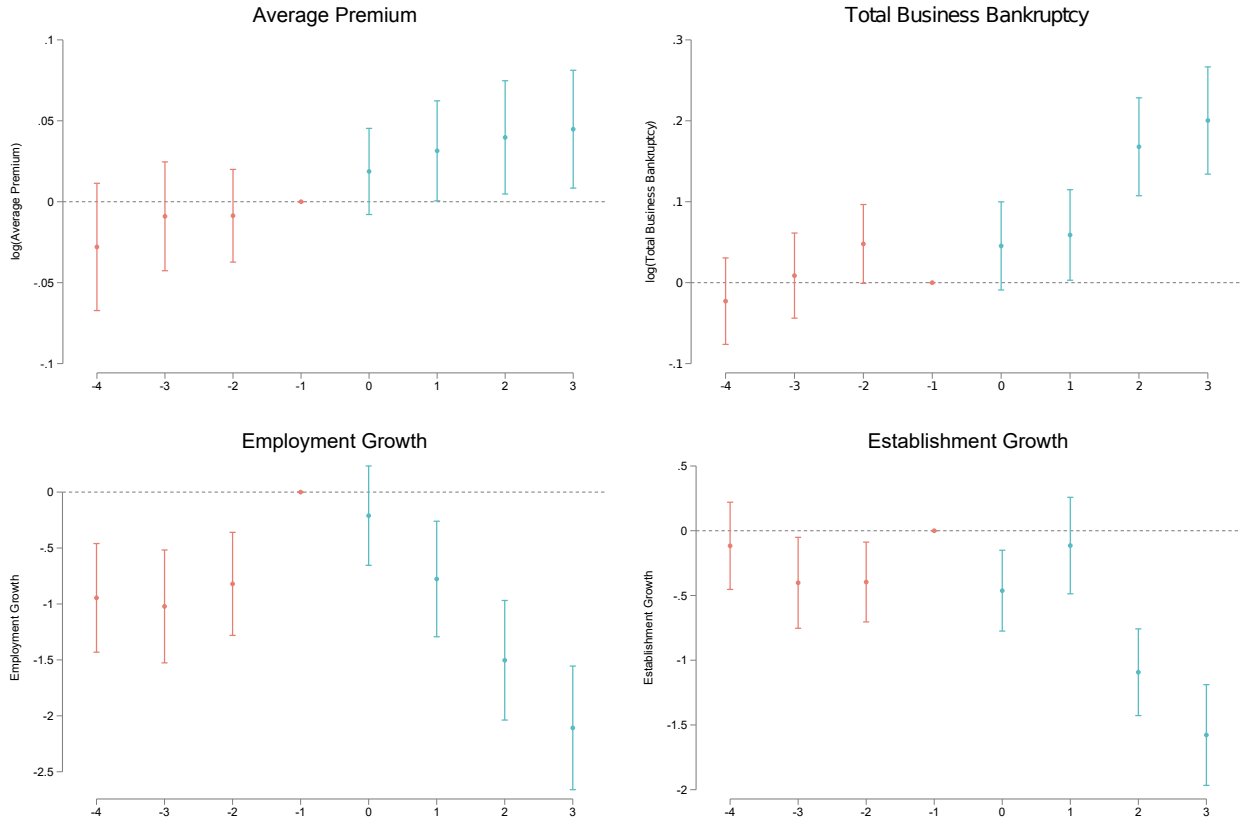


### *Panel B: Full Sample*



### Figure 6: Parallel Trends: HCA Shock

This figure provides parallel trends examining outcomes following the HCA buyout by private equity (PE). Treatment effects are for HCA-affected firms/counties compared to control firms/counties.



**Table 1: Summary Statistics**

This table provides summary statistics for the variables used in this study. Panel A provides summary statistics for the CHS sample from 1993–1999, and Panel B provides summary statistics for the full sample from 1993–2020. Average Premium is the total premiums for any health insurance contract at the firm-year level scaled by the number of insured, calculated using Schedule A of Form 5500 as defined in the Department of Labor’s Group Health Plan Research Files. Total Insured is the total number of persons at the firm-year level that were covered by health insurance contracts at the end of the policy or contract year. Total Participants is the total number of employees at the firm-year level who are covered by a firm’s welfare benefit plan. Average Wages and Salaries (thousands of dollars) is defined as total wages and salaries scaled by total tax returns filed at the county-year level from the IRS Individual Tax Statistics. Business Ch7 Bankruptcy is the number of businesses filing for Chapter 7 bankruptcy, while Business Ch11 Bankruptcy is the number of businesses filing for Chapter 11 bankruptcy, both at the county-year level. Total Business Bankruptcy is the number of businesses filing for any type of bankruptcy, at the county-year level. Establishment Growth is the annual growth in total establishments in a county. Employment Growth is the annual growth in total employment in a county. Average wages and salaries is total wages and salaries for the county divided by the total number of returns filed. Patents is the number of patents filed in the county by businesses, and Trademarks is the number of trademarks registered in the county.

***Panel A: CHS Sample***

	N	Mean	SD	p10	p25	Median	p75	p90
Average Premium	70,269	2,195.55	1,978.72	110.18	645.31	1,769.36	3,175.93	4,628.61
Total Insured	70,269	805.44	2,507.10	50.00	117.00	222.00	503.00	1,354.00
Total Participants	70,269	915.96	2,377.95	74.00	134.00	242.00	588.00	1,803.00
Business Ch7 Bankruptcy	10,745	8.91	55.15	0.00	0.00	2.00	6.00	15.00
Business Ch11 Bankruptcy	10,745	2.98	21.73	0.00	0.00	0.00	1.00	4.00
Total Business Bankruptcy	10,745	15.34	85.94	0.00	1.00	3.00	9.00	25.00
Employment Growth	10,388	2.45	4.75	−3.00	0.00	2.40	4.90	7.80
Establishment Growth	10,388	1.97	3.22	−1.80	0.00	1.80	3.80	6.10
Average Wages and Salaries	10,745	23.66	6.43	16.91	19.45	22.65	26.48	31.41
Patents	10,745	15.16	99.69	0.00	0.00	0.00	2.00	12.00
Trademarks	10,654	19.80	132.24	0.00	0.00	1.00	5.00	22.00
Population	10,745	81,280.50	306,970.97	6,016.00	11,724.00	23,576.00	57,383.00	146,970.00
Establishment Count	10,388	2,002.28	8,853.87	121.00	227.00	497.00	1,195.00	3,257.00

***Panel B: Full Sample***

	N	Mean	SD	p10	p25	Median	p75	p90
Average Premium	879,334	4,865.75	4,029.28	435.13	1,852.25	4,174.90	6,671.18	9,972.28
Total Insured	879,334	644.03	1,473.11	85.00	137.00	243.00	497.00	1203.00
Total Participants	879,334	942.63	2,576.81	114.00	151.00	250.00	551.00	1,660.00
Business Ch7 Bankruptcy	77,784	7.08	32.63	0.00	0.00	1.00	4.00	14.00
Business Ch11 Bankruptcy	77,784	2.62	15.36	0.00	0.00	0.00	1.00	4.00
Total Business Bankruptcy	77,784	10.95	47.55	0.00	0.00	2.00	6.00	21.00
\$100K < No. of Loans < \$250K	77,972	71.55	247.35	1.00	3.00	12.00	48.00	165.00
No. of Loans > \$250K	77,972	67.48	244.23	0.00	2.00	9.00	38.00	148.00
Employment Growth	84,077	0.76	4.71	−4.70	−1.40	0.80	3.10	5.90
Establishment Growth	84,077	0.92	3.22	−2.80	−0.90	0.70	2.70	4.80
Average Wages and Salaries	87,327	30.98	9.78	20.44	24.59	29.70	35.42	42.31
Patents	87,500	34.59	334.39	0.00	0.00	0.00	3.00	20.00
Trademarks	86,604	39.50	253.35	0.00	0.00	2.00	9.00	47.00
Population	85,732	95,930.68	30,9911.30	5,160.00	11,020.50	25,266.00	64,708.50	192,749.00
Establishment Count	84,077	2,539.58	10,207.73	118.00	235.00	553.00	1,458.00	4,657.00

**Table 2: Balance Test, CHS Treatment**

This table provides differences between the control group and treatment group for the CHS specification sample in the pre-period from 1993–1995. The treatment group consists of counties that contain a CHS hospital as of 1995, while the control group consists of propensity-score-matched counties that do not contain a CHS hospital as of 1995. Control counties are matched based on average county earnings and an indicator variable for whether the county has a low urban population, yielding 598 treated and 937 control counties. Means of each variable for the treatment and control groups (columns (1) and (2)), a t-test of the differences (column (3)), and the normalized difference (column (4)) following [Imbens and Rubin \(2015\)](#) are provided.

Variable	(1) Control group	(2) Treatment group	(3) Difference	(4) Normalized Diff.
Average Wages and Salaries	22.046 (5.879)	21.551 (4.985)	−0.495* (0.277)	−0.090
Business Ch7 Bankruptcy	7.803 (19.209)	11.991 (96.056)	4.188 (3.954)	0.060
Business Ch11 Bankruptcy	3.102 (11.457)	4.546 (43.070)	1.444 (1.772)	0.045
Total Business Bankruptcy	13.869 (35.422)	21.052 (149.636)	7.184 (6.203)	0.066
Employment Growth	3.510 (5.521)	3.519 (5.660)	0.009 (0.207)	0.001
Establishment Growth	1.923 (3.741)	2.452 (3.150)	0.529*** (0.131)	0.152
Patents	14.087 (72.968)	14.904 (117.240)	0.817 (5.319)	0.008
Trademarks	15.102 (59.025)	19.127 (158.567)	4.026 (6.724)	0.033

**Table 3: PE Buyouts and Insurance Premiums**

This table provides regression results examining average premiums at the firm-year level for firms in areas affected by private equity (PE) buyouts of hospital systems. Columns (1) and (2) provide results for the CHS specification. Column (3) provides full sample results from 1993 to 2020 for all hospital system buyouts. Treatment effects are estimated using dynamic treatment effects following Callaway and Sant’Anna (2021).  $PE\ Buyout_{j,i,t}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $CHS\ Hospital_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that contained a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $Avg\ Premium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ . Standard errors are clustered at the firm level, and firm and industry-by-year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dependent Variable: $\log(Avg\ Premium)$			
	(1)	(2)	(3)
$CHS\ Hospital_{j,i} \times Post_t$	0.072*** (0.026)	0.075*** (0.026)	
$PE\ Buyout_{j,i,t}$			0.066*** (0.021)
Firm FEs	Y	Y	Y
Year FEs	Y	-	-
Industry $\times$ Year FEs	N	Y	Y
$N$	155,928	146,551	919,471
Adj. $R^2$	0.510	0.515	-

**Table 4: Business Bankruptcies and Loans**

This table provides regression results examining county-level business bankruptcies for counties in areas affected by private equity (PE) buyouts of hospital systems. Panel A provides results for the CHS specification from 1993 to 1999. Panel B provides full sample results from 1993 to 2020 for all hospital system buyouts. Dynamic treatment effects are estimated in Panel B following [Callaway and Sant’Anna \(2021\)](#).  $PE\ Buyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $CHS\ Hospital_i$  is an indicator variable that takes a value of 1 if county  $i$  served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $Ch\ 7$  is the number of Chapter 7 business bankruptcies,  $Ch\ 11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the county-year level. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

**Panel A: CHS Buyout**

Dep. Variable:	$\log(Ch\ 7)$	$\log(Ch\ 11)$	$\log(Total)$
	(1)	(2)	(3)
$CHS\ Hospital_i \times Post_t$	0.046** (0.022)	0.048*** (0.018)	0.065*** (0.023)
County FEs	Y	Y	Y
Year FEs	Y	Y	Y
$N$	10,745	10,745	10,745
Adj. $R^2$	0.829	0.789	0.848

**Panel B: Full Sample**

Dep. Variable:	$\log(Ch\ 7)$	$\log(Ch\ 11)$	$\log(Total)$	$\log(Loans\ 100-250K)$	$\log(Loans\ >250K)$
	(1)	(2)	(3)	(4)	(5)
$PE\ Buyout_{i,t}$	0.077*** (0.021)	0.020 (0.015)	0.059** (0.022)	0.046*** (0.016)	0.013 (0.015)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
$N$	61,700	61,700	61,700	61,857	61,857

**Table 5: Economic Activity**

This table provides regression results examining county-level establishment growth, employment growth, and average wages counties in areas affected by private equity (PE) buyouts of hospital systems. Panel A provides results for the CHS specification from 1993 to 1999. Panel B provides full sample results from 1993 to 2020 for all hospital system buyouts. Dynamic treatment effects are estimated in Panel B following [Callaway and Sant’Anna \(2021\)](#).  $PE\ Buyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $CHS\ Hospital_i$  is an indicator variable that takes a value of 1 if county  $i$  served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg\ Wage$  is the average wage in the county.  $\log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $\log(Trademarks)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the county-year level. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

**Panel A: CHS Buyout**

Dep. Variable:	<i>EmpGrowth</i>	<i>EstabGrowth</i>	$\log(Avg\ Wages)$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)
$CHS\ Hospital_i \times Post_t$	-0.514*** (0.194)	-0.448*** (0.119)	-0.008*** (0.002)	-0.033* (0.019)	-0.049** (0.019)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
$N$	10,388	10,388	10,745	10,745	10,654
Adj. $R^2$	0.185	0.265	0.988	0.921	0.912

**Panel B: Full Sample**

Dep. Variable:	<i>EmpGrowth</i>	<i>EstabGrowth</i>	$\log(Avg\ Wages)$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)
$PE\ Buyout_{i,t}$	-0.362** (0.149)	-0.636*** (0.101)	-0.000 (0.001)	-0.006 (0.011)	-0.028* (0.015)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
$N$	84,077	84,077	87,327	87,500	86,604

**Table 6: Balance Test, HCA Treatment**

This table provides differences between the control group and treatment counties for the HCA specification sample over the pre-period from 2002–2005. The treatment group consists of counties that contained a HCA hospital as of 2004 (dropping hospitals that were sold off in 2005 and 2006), while the control group consists of propensity-score-matched counties that do not contain a HCA hospital as of 2004. The match is based on average county earnings and an indicator variable for whether the county has a low urban population, yielding 848 treated and 1,130 control counties. Means of each variable for the treatment and control groups (columns (1) and (2)), a t-test of the differences (column (3)), and the normalized difference (column (4)) following [Imbens and Rubin \(2015\)](#) are provided.

Variable	(1) Control group	(2) Treatment group	(3) Difference	(4) Normalized Diff.
Average Wages and Salaries	29.681 (7.927)	30.001 (7.999)	0.320 (0.359)	0.040
100< Loan Num <250	83.768 (227.204)	86.089 (284.350)	2.321 (11.832)	0.009
Loan Num >250	79.899 (261.962)	83.644 (329.420)	3.746 (13.695)	0.013
Business Ch7 Bankruptcy	6.795 (20.244)	8.743 (38.541)	1.948 (1.420)	0.063
Business Ch11 Bankruptcy	2.062 (9.595)	2.660 (12.834)	0.598 (0.493)	0.053
Total Business Bankruptcy	10.460 (30.798)	13.565 (55.742)	3.105 (2.084)	0.069
Employment Growth	0.333 (4.912)	1.064 (5.989)	0.730*** (0.143)	0.133
Establishment Growth	0.736 (5.907)	1.996 (7.340)	1.260*** (0.163)	0.190



**Table 7: Additional Shock: HCA Buyout**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE).  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that contained an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(Avg Prem)$	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100-250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(Avg Wages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$HCA_{j,i,2004} \times Post2006_t$	0.042*** (0.015)								
$HCA_{i,2004} \times Post2006_t$		0.134*** (0.024)	0.036** (0.015)	0.110*** (0.025)	0.034* (0.020)	0.015 (0.018)	-0.453*** (0.168)	-0.583*** (0.120)	0.007*** (0.003)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
$N$	230,088	15,808	15,808	15,808	15,806	15,806	15,152	15,152	15,805
Adj. $R^2$	0.551	0.807	0.769	0.820	0.943	0.952	0.243	0.241	0.971

**Table 8: Amplification: HCA Buyout and the Financial Crisis**

This table provides triple-differences regression results examining outcomes following the HCA buyout by private equity (PE), and heterogeneity of the impact during the financial crisis.  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  that was served by an HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $HDI_{i,2006q4}$  is the logarithm of county  $i$ 's average household debt-to-income ratio in 2006q4.  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ . Regressions are run at the county-year level. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100–250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(AvgWages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HDI_{i,2006q4} \times HCA_{i,2004} \times Post2006_t$	0.114** (0.057)	0.005 (0.036)	0.125** (0.059)	0.007 (0.050)	0.014 (0.045)	-0.894* (0.508)	-1.166*** (0.345)	-0.005 (0.007)
$HCA_{i,2004} \times Post2006_t$	0.005 (0.063)	0.029 (0.039)	-0.032 (0.066)	0.027 (0.061)	-0.001 (0.055)	0.602 (0.586)	0.765** (0.388)	0.013 (0.008)
$HDI_{i,2006q4} \times Post2006_t$	0.142*** (0.039)	0.093*** (0.026)	0.166*** (0.038)	0.018 (0.036)	0.049 (0.031)	-1.460*** (0.362)	-0.990*** (0.233)	-0.023*** (0.005)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y
$N$	15,792	15,792	15,792	15,790	15,790	15,136	15,136	15,789
Adj. $R^2$	0.808	0.769	0.821	0.943	0.952	0.234	0.230	0.971

## Appendix: Additional tables

**Table A.1: Additional Outcomes: Number of Establishments by Size**

This table provides regression results examining the county-level number of establishments by size for counties in areas affected by private equity (PE) buyouts of hospital systems. CHS specification run from from 1993 to 1999, and full sample results run from 1993 to 2020 with dynamic treatment effects estimated following [Callaway and Sant’Anna \(2021\)](#).  $PE\ Buyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $CHS\ Hospital_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $\log(Estabs, > 100\ Emp)$  is the logarithm of the number of establishments in county  $i$  in year  $t$  which have more than 100 employees, and  $\log(Estabs, < 100\ Emp)$  is the is the logarithm of the number of establishments with less than 100 employees.  $Avg\ Wage$  is the average wage in the county. Regressions are run at the county-year level. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	CHS Specification		Full Sample	
	log( $\overline{Estabs},$ >100 $\overline{Emp}$ )	log( $\overline{Estabs},$ <100 $\overline{Emp}$ )	log( $\overline{Estabs},$ >100 $\overline{Emp}$ )	log( $\overline{Estabs},$ <100 $\overline{Emp}$ )
	(1)	(2)	(3)	(4)
$CHS\ Hospital_i \times Post_t$	-0.033*** (0.011)	0.011* (0.006)		
$PE\ Buyout_{i,t}$			-0.004 (0.007)	0.006 (0.005)
County FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
$N$	10,745	10,745	88,052	88,052
Adj. $R^2$	0.986	0.994	-	-

**Table A.2: Summary Statistics: HCA Sample**

This table provides summary statistics for the HCA sample from 2002 to 2009. Average Premium is the total premiums for any health insurance contract at the firm-year level scaled by the number of contracts, calculated using Schedule A of Form 5500 as defined in the Department of Labor's Group Health Plan Research Files. Total Insured is the total number of persons at the firm-year level that were covered by health insurance contracts at the end of the policy or contract year. Total Participants is the total number of employees at the firm-year level who are covered by a firm's welfare benefit plan. Average Wages and Salaries (thousands of dollars) is defined as Total Wages and Salaries scaled by total tax returns filed at the county-year level from the IRS Individual Tax Statistics. Business Ch7 Bankruptcy is the number of businesses filing for Chapter 7 bankruptcy, while Business Ch11 Bankruptcy is the number of businesses filing for Chapter 11 bankruptcy, both at the county-year level. Total Business Bankruptcy is the number of businesses filing for any type of bankruptcy, at the county-year level. Establishment Growth is the annual growth in total establishments in a county. Employment Growth is the annual growth in total employment in a county. Average wages and salaries is total wages and salaries for the county divided by the total number of returns filed.

	N	Mean	SD	p10	p25	Median	p75	p90
Average Premium	156,601	4,738.40	3,779.93	492.29	2,120.10	4,056.71	6,489.76	9,367.93
Total Insured	156,601	708.01	1,643.20	94.00	141.00	253.00	530.00	1,345.00
Total Participants	156,601	1,074.45	2,928.04	120.00	161.00	275.00	625.00	1,952.00
Business Ch7 Bankruptcy	15,808	8.33	38.36	0.00	0.00	1.00	4.00	16.00
Business Ch11 Bankruptcy	15,808	2.39	12.20	0.00	0.00	0.00	1.00	4.00
Total Business Bankruptcy	15,808	12.32	52.68	0.00	0.00	2.00	6.00	23.00
\$100K < No. of Loans < \$250K	15,806	79.14	252.82	1.00	3.00	12.00	52.00	192.00
No. of Loans > \$250K	15,806	78.40	287.69	0.00	2.00	9.00	40.00	176.00
Employment Growth	15,152	-0.06	5.09	-6.20	-2.80	0.10	2.60	5.60
Establishment Growth	15,152	0.85	3.52	-3.30	-1.30	0.70	2.70	5.20
Average Wages and Salaries	15,805	31.02	8.50	22.47	25.60	29.41	34.48	41.08
Population	15,824	101,621.93	359,838.20	4,871.00	10,166.00	22,969.00	59,615.50	199,622.00
Establishment Count	15,152	2,706.02	11,663.42	109.00	214.00	493.00	1,339.00	4,935.00

**Table A.3: Robustness: Full Sample, Stacked Cohort Specification**

This table provides regression results examining outcomes following all buyouts of hospitals by private equity (PE) over the full sample from from 1993 to 2020 using a stacked cohort DID specification.  $PE\ Buyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $Avg\ Premium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch\ 7$  is the number of Chapter 7 business bankruptcies,  $Ch\ 11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $Emp\ Growth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $Estab\ Growth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg\ Wage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $\log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $\log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the firm-cohort (column (1)) or county-cohort level (other columns) levels, and fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log ( <i>Avg Prem</i> )	log( <i>Ch 7</i> )	log( <i>Ch 11</i> )	log( <i>Total</i> )	log ( <i>Loans</i> 100– 250 <i>K</i> )	log ( <i>Loans</i> >250 <i>K</i> )	<i>Emp Growth</i>	<i>Estab Growth</i>	log ( <i>Avg Wages</i> )	log( <i>Patents</i> )	log( <i>TM</i> )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$PE\ Buyout_{j,i,t}$	0.022** (0.011)										
$PE\ Buyout_{i,t}$		0.065*** (0.016)	0.033*** (0.011)	0.055*** (0.016)	0.054*** (0.014)	0.016 (0.013)	-0.125 (0.098)	-0.328*** (0.066)	0.001 (0.001)	0.001 (0.009)	-0.022** (0.010)
Unit of Analysis	Firm-year	County- year	County- year	County- year	County-year	County-year	County- year	County- year	County- year	County- year	County- year
County-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-cohort FEs	Y	-	-	-	-	-	-	-	-	-	-
Industry × Year FEs	Y	-	-	-	-	-	-	-	-	-	-
$N$	1,433,989	153,690	153,690	153,690	153,711	153,711	170,516	170,516	175,136	175,576	173,869
Adj. $R^2$	0.577	0.801	0.677	0.837	0.945	0.950	0.204	0.211	0.986	0.937	0.927

**Table A.4: Robustness: CHS Specification with County-level Controls**

This table provides regression results examining outcomes following the CHS buyout by private equity (PE). Regressions run from 1993 to 1999.  $CHSHospital_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $CHSHospital_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $AvgPremium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year level for premiums and at the county-year level for other outcomes. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. County-level controls include county population and income per-capita. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log(Avg Prem)	log(Ch7)	log(Ch11)	log(Total)	EmpGrowth	EstabGrowth	log(Avg Wages)	log(Patents)	log(Trademarks)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CHSHospital_{j,i} \times Post_t$	0.074*** (0.027)								
$CHSHospital_i \times Post_t$		0.045** (0.022)	0.047*** (0.018)	0.064*** (0.023)	-0.426** (0.197)	-0.432*** (0.118)	-0.010*** (0.002)	-0.040** (0.019)	-0.056*** (0.019)
County Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
$N$	143,921	10,745	10,745	10,745	10,388	10,388	10,745	10,745	10,654
Adj. $R^2$	0.515	0.829	0.789	0.848	0.192	0.266	0.989	0.921	0.912

**Table A.5: Robustness: Full Sample, Stacked Cohort Specification with Controls**

This table provides regression results examining outcomes following all buyouts of hospitals by private equity (PE) over the full sample from 1993 to 2020 using a stacked cohort DID specification with county-level controls.  $PEBuyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $AvgPremium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $\log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $\log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the firm-cohort (column (1)) or county-cohort level (other columns) levels, and fixed effects are included, as indicated. County-level controls include county population and income per-capita. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log ( <i>Avg Prem</i> )	log( <i>Ch7</i> )	log( <i>Ch11</i> )	log( <i>Total</i> )	log ( <i>Loans</i> 100– 250 <i>K</i> )	log ( <i>Loans</i> >250 <i>K</i> )	<i>Emp</i> <i>Growth</i>	<i>Estab</i> <i>Growth</i>	log ( <i>Avg Wages</i> )	log( <i>Patents</i> )	log( <i>TM</i> )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$PEBuyout_{j,i,t}$	0.0222** (0.011)										
$PEBuyout_{i,t}$		0.068*** (0.016)	0.036*** (0.012)	0.060*** (0.016)	0.042*** (0.014)	0.003 (0.013)	-0.091 (0.097)	-0.329*** (0.066)	-0.001 (0.001)	-0.004 (0.009)	-0.033*** (0.009)
Unit of Analysis	Firm-year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year
County Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-cohort FEs	Y	-	-	-	-	-	-	-	-	-	-
Industry × Year FEs	Y	-	-	-	-	-	-	-	-	-	-
$N$	1,400,549	150,547	150,547	150,547	150,655	150,655	167,755	167,755	171,665	171,821	170,114
Adj. $R^2$	0.577	0.803	0.679	0.838	0.945	0.950	0.213	0.215	0.988	0.937	0.927

**Table A.6: Robustness: CHS Specification with Time-varying Region Fixed Effects**

This table provides regression results examining outcomes following the CHS buyout by private equity (PE), including time-varying region fixed effects. Regressions run from 1993 to 1999.  $CHSHospital_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $CHSHospital_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $AvgPremium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year level for premiums and at the county-year level for other outcomes. Standard errors are clustered at the county level, and county and Census region-by-time fixed effects are included, as indicated. \*\*\*, \*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CHSHospital_{j,i} \times Post_t$	0.076*** (0.029)								
$CHSHospital_i \times Post_t$		0.052** (0.024)	0.008 (0.019)	0.055** (0.026)	-0.309 (0.232)	-0.584*** (0.132)	-0.005** (0.002)	-0.019 (0.021)	-0.031 (0.020)
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Region $\times$ Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
N	146,149	10,745	10,745	10,745	10,388	10,388	10,745	10,745	10,654
Adj. $R^2$	0.515	0.830	0.792	0.848	0.187	0.283	0.988	0.921	0.912



**Table A.7: Robustness: Full Sample, Stacked Cohort Specification with Time-varying Region Fixed Effects**

This table provides regression results examining outcomes following all buyouts of hospitals by private equity (PE) over the full sample from from 1993 to 2020 using a stacked cohort DID specification with time-varying region fixed effects.  $PE\text{Buyout}_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $Avg\text{Premium}_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg\text{Wage}$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $\log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $\log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the firm-cohort (column (1)) or county-cohort level (other columns) levels, and fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log ( <i>AvgPrem</i> )	log( <i>Ch7</i> )	log( <i>Ch11</i> )	log( <i>Total</i> )	log ( <i>Loans</i> 100- 250K)	log ( <i>Loans</i> >250K)	<i>Emp</i> <i>Growth</i>	<i>Estab</i> <i>Growth</i>	log ( <i>AvgWages</i> )	log( <i>Patents</i> )	log( <i>TM</i> )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$PE\text{Buyout}_{j,i,t}$	0.012 (0.011)										
$PE\text{Buyout}_{i,t}$		0.059*** (0.015)	0.030*** (0.011)	0.051*** (0.016)	0.043*** (0.014)	0.004 (0.013)	-0.061 (0.099)	-0.327*** (0.068)	0.002 (0.001)	0.000 (0.009)	-0.022** (0.010)
Unit of Analysis	Firm-year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year
County-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region-Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-cohort FEs	Y	-	-	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-	-	-
$N$	1,425,290	153,690	153,690	153,690	153,711	153,711	170,516	170,516	175,136	175,576	173,869
Adj. $R^2$	0.577	0.804	0.680	0.838	0.946	0.950	0.210	0.238	0.987	0.937	0.927

**Table A.8: Robustness: Poisson Regressions**

This table provides regression results examining outcomes following the CHS buyout by private equity (PE), using a Poisson model. Panel A provides regressions for the CHS buyout from 1993 to 1999, while Panel B provides regressions for the full sample (using the stacked cohort specification) from 1993 to 2020.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $CHSHospital_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $PEBuyout_{i,t}$  is an indicator variable that takes a value of 1 if county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $Patents$  is the number of patents filed in county  $i$  in year  $t$ .  $TM$  is the number of trademarks registered in county  $i$  in year  $t$ . All variables are winsorized at the 1% level in Panel A to account for overdispersion due to extreme outliers. Regressions are run at county-year level, as indicated. Standard errors are clustered at the county level, and county and time fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

**Panel A: CHS Buyout**

	<i>Ch7</i>	<i>Ch11</i>	<i>Total</i>	<i>Patents</i>	<i>TM</i>
	(1)	(2)	(3)	(4)	(5)
$CHSHospital_i \times Post_t$	-0.006 (0.041)	0.158*** (0.046)	0.039 (0.035)	-0.019 (0.047)	-0.084** (0.038)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
<i>N</i>	10,416	8,596	10,682	6,783	8,848

**Panel B: Full Sample**

	<i>Ch7</i>	<i>Ch11</i>	<i>Total</i>	<i>Loans</i> 100–250K	<i>Loans</i> >250K	<i>Patents</i>	<i>TM</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$PEBuyout_{i,t}$	0.166*** (0.055)	0.155*** (0.057)	0.155*** (0.051)	0.039** (0.016)	0.028** (0.012)	0.007 (0.028)	0.022 (0.019)
County FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
<i>N</i>	144,326	115,079	149,843	150,964	149,426	121,471	154,139

**Table A.9: Robustness: CHS Placebo, Random Treatment Assignment**

This table provides placebo regression results examining outcomes following the CHS buyout by private equity (PE), randomly assigning counties as treated. Regressions are run from 1993 to 1999.  $CHSHospital'_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $CHSHospital'_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $AvgPremium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $log(Trademarks)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CHSHospital'_{j,i} \times Post_t$	0.019 (0.024)								
$CHSHospital'_i \times Post_t$		0.001 (0.022)	0.004 (0.018)	0.017 (0.023)	0.030 (0.187)	-0.041 (0.124)	-0.001 (0.002)	0.020 (0.009)	0.016 (0.019)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
$N$	146,551	10,388	10,388	10,388	10,010	10,010	10,372	10,388	10,241
Adj. $R^2$	0.516	0.846	0.811	0.862	0.149	0.226	0.985	0.934	0.919

**Table A.10: Robustness: Full Sample, Random Treatment Assignment**

This table provides regression results examining outcomes following all buyouts of hospitals by private equity (PE) over the full sample from 1993 to 2020, randomly assigning counties as treated. Regressions are run from 1993 to 2020 with dynamic treatment effects are estimated following Callaway and Sant'Anna (2021).  $PE\text{Buyout}'_{i,t}$  is an indicator variable that takes a value of 1 if placebo county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $Avg\text{Premium}_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log ( <i>Avg Prem</i> )	log( <i>Ch7</i> )	log( <i>Ch11</i> )	log( <i>Total</i> )	log ( <i>Loans</i> 100– 250 <i>K</i> )	log ( <i>Loans</i> >250 <i>K</i> )	<i>Emp Growth</i>	<i>Estab Growth</i>	log ( <i>Avg Wages</i> )	log( <i>Patents</i> )	log( <i>TM</i> )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$PE\text{Buyout}'_{j,i,t}$	-0.006 (0.013)										
$PE\text{Buyout}'_{i,t}$		0.012 (0.014)	-0.000 (0.013)	0.013 (0.015)	0.004 (0.013)	0.004 (0.012)	-0.020 (0.129)	-0.132 (0.091)	0.001 (0.001)	0.012 (0.010)	-0.009 (0.014)
Unit of Analysis	Firm-year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-	-	-
Industry × Year FEs	Y	-	-	-	-	-	-	-	-	-	-
<i>N</i>	919,471	73,472	73,472	73,472	73,663	73,663	84,077	84,077	87,327	87,500	86,604

**Table A.11: Robustness: CHS Specification, Counties with For-profit Hospitals**

This table provides regression results examining outcomes following the CHS buyout by private equity (PE), restricting the sample to HRRs with at least one for-profit hospital. Regressions run from 1993 to 2020.  $CHSHospital_{j,i}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by a CHS system hospital as of 1995, and zero otherwise.  $Post_t$  is an indicator variable that takes a value of 1 if  $t$  is year 1996 or later, and 0 otherwise.  $CHSHospital_i$  is an indicator variable that takes a value of 1 if county  $i$  was served by a CHS system hospital as of 1995, and zero otherwise.  $AvgPremium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $log(Trademarks)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year level for premiums and at the county-year level for other outcomes. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log(Avg Prem)	log(Ch7)	log(Ch11)	log(Total)	EmpGrowth	EstabGrowth	log(AvgWages)	log(Patents)	log(Trademarks)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$CHSHospital_{j,i} \times Post_t$	0.086*** (0.028)								
$CHSHospital_i \times Post_t$		0.038* (0.021)	0.036** (0.017)	0.036 (0.022)	-0.574*** (0.194)	-0.330*** (0.121)	-0.008*** (0.002)	-0.037** (0.017)	-0.051*** (0.019)
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
N	89,850	13,486	13,486	13,486	12,838	12,838	13,430	13,486	13,346
Adj. $R^2$	0.565	0.840	0.816	0.857	0.178	0.251	0.988	0.934	0.920

**Table A.12: Robustness: Full Sample, Counties with For-profit Hospitals**

This table provides regression results examining outcomes following all buyouts of hospitals by private equity (PE) over the full sample from 1993 to 2020, restricting the sample to HRRs with at least one for-profit hospital. Regressions are run from 1993 to 2020 with dynamic treatment effects are estimated following Callaway and Sant'Anna (2021).  $PE\ Buyout_{i,t}$  is an indicator variable that takes a value of 1 if placebo county  $i$  that experienced a PE buyout of a hospital or hospital system as of year  $t$ , and zero otherwise.  $Avg\ Premium_{j,t}$  is the average premium that firm  $j$  paid for employer-sponsored health insurance plans in year  $t$ , and zero otherwise.  $Ch\ 7$  is the number of Chapter 7 business bankruptcies,  $Ch\ 11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ .  $Emp\ Growth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $Estab\ Growth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg\ Wage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size or for firms of a given revenue in county  $i$  in year  $t$ .  $\log(Patents)$  is the logarithm of the number of patents filed in county  $i$  in year  $t$ .  $\log(TM)$  is the logarithm of the number of trademarks registered in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log ( <i>AvgPrem</i> )	log( <i>Ch7</i> )	log( <i>Ch11</i> )	log( <i>Total</i> )	log( <i>Loans</i> 100-250K)	log( <i>Loans</i> >250K)	<i>Emp</i> <i>Growth</i>	<i>Estab</i> <i>Growth</i>	log ( <i>AvgWages</i> )	log( <i>Patents</i> )	log( <i>TM</i> )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<i>PE Buyout<sub>i,t</sub></i>	0.057*** (0.017)										
<i>PE Buyout<sub>i,t</sub></i>		0.106*** (0.024)	0.022 (0.019)	0.094*** (0.027)	0.089*** (0.020)	0.065*** (0.022)	-0.406*** (0.155)	-0.617*** (0.106)	0.001 (0.001)	-0.0003 (0.015)	-0.003 (0.017)
Unit of Analysis	Firm-year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year	County- year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-	-	-
<i>N</i>	555,711	37,561	37,561	37,561	37,581	37,581	53,815	53,815	56,242	56,367	55,764

**Table A.13: Robustness: HCA Specification with County-level Controls**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE), including county-level control variables.  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that contained an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg Wage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. County-level controls include county population and income per-capita. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(Avg Prem)$	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100-250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(Avg Wages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$HCA_{j,i,2004} \times Post2006_t$	0.038** (0.018)								
$HCA_{i,2004} \times Post2006_t$		0.101*** (0.025)	0.024 (0.015)	0.078*** (0.025)	0.028 (0.020)	0.000 (0.018)	-0.106 (0.163)	-0.330*** (0.116)	0.005** (0.002)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-
N	145,579	15,808	15,808	15,808	15,806	15,806	15,152	15,152	15,805
Adj. $R^2$	0.545	0.811	0.770	0.822	0.943	0.952	0.257	0.237	0.975

**Table A.14: Robustness: HCA Specification with Time-varying Region Fixed Effects**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE), including time-varying region fixed effects.  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that contained an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg Wage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $Ch11$  is the number of Chapter 11 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county, year, and region-by-time fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(Avg Prem)$	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100-250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(Avg Wages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$HCA_{j,i,2004} \times Post2006_t$	0.005 (0.018)								
$HCA_{i,2004} \times Post2006_t$		0.096*** (0.025)	0.025 (0.016)	0.077*** (0.026)	0.038* (0.021)	0.014 (0.020)	-0.206 (0.181)	-0.730*** (0.133)	0.008*** (0.003)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Region $\times$ Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
$N$	229,210	15,808	15,808	15,808	15,806	15,806	15,152	15,152	15,805
Adj. $R^2$	0.551	0.810	0.769	0.822	0.944	0.952	0.238	0.247	0.972



**Table A.15: Robustness: Poisson Regressions, HCA Buyout**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE), using a Poisson model.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post\ 2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $Ch\ 7$  is the number of Chapter 7 business bankruptcies,  $Ch\ 11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

	<i>Ch 7</i>	<i>Ch 11</i>	<i>Total</i>	<i>Loans</i> 100–250K	<i>Loans</i> >250K
	(1)	(2)	(3)	(4)	(5)
$HCA_{i,2004} \times Post\ 2006_t$	0.240*** (0.076)	0.173** (0.077)	0.216*** (0.071)	0.078** (0.031)	0.053*** (0.016)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
<i>N</i>	14,976	11,416	15,480	15,638	15,478

**Table A.16: Robustness: HCA Placebo, Random Treatment Assignment**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE), randomly assigning counties as treated.  $HCA'_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in placebo county  $i$  that contained an HCA system hospital as of 2004, and zero otherwise.  $HCA'_{i,2004}$  is an indicator variable that takes a value of 1 if placebo county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $Avg Wage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $Ch11$  is the number of Chapter 11 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(Avg Prem)$	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100–250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(Avg Wages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$HCA'_{j,i,2004} \times Post2006_t$	-0.005 (0.015)								
$HCA'_{i,2004} \times Post2006_t$		0.004 (0.025)	-0.010 (0.014)	-0.016 (0.025)	-0.013 (0.019)	-0.004 (0.017)	0.218 (0.154)	-0.129 (0.111)	0.005** (0.002)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-
N	230,088	16,584	16,584	16,584	16,584	16,584	15,968	15,968	16,581
Adj. $R^2$	0.551	0.799	0.759	0.815	0.948	0.955	0.235	0.186	0.970

**Table A.17: Robustness: HCA Specification, Counties with For-profit Hospitals**

This table provides regression results examining outcomes following the HCA buyout by private equity (PE), restricting the sample to HRRs with at least one for-profit hospital.  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that contained an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  was served by a HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ .  $AvgWage$  is the average wage in the county. Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $Ch11$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Regressions are run at the firm-year or county-year level, as indicated. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	$\log(AvgPrem)$	$\log(Ch7)$	$\log(Ch11)$	$\log(Total)$	$\log(Loans$ 100-250K)	$\log(Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	$\log(AvgWages)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$HCA_{j,i,2004} \times Post2006_t$	0.028* (0.017)								
$HCA_{i,2004} \times Post2006_t$		0.125*** (0.023)	0.031** (0.014)	0.116*** (0.024)	0.061*** (0.018)	0.047*** (0.017)	-0.282* (0.159)	-0.520*** (0.115)	0.009*** (0.002)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-
Industry $\times$ Year FEs	Y	-	-	-	-	-	-	-	-
$N$	167,463	18,506	18,506	18,506	18,472	18,472	17,660	17,660	18,483
Adj. $R^2$	0.554	0.798	0.754	0.810	0.944	0.952	0.239	0.211	0.970

**Table A.18: HCA Buyout and the Financial Crisis, High HDI**

This table provides triple-differences regression results examining outcomes following the HCA buyout by private equity (PE), and heterogeneity of the impact during the financial crisis.  $HCA_{j,i,2004}$  is an indicator variable that takes a value of 1 if firm  $j$  is located in county  $i$  that was served by an HCA system hospital as of 2004, and zero otherwise.  $HCA_{i,2004}$  is an indicator variable that takes a value of 1 if county  $i$  that was served by an HCA system hospital as of 2004, and zero otherwise.  $Post2006_t$  is an indicator variable that takes a value of 1 if  $t$  is year 2006 or later, and 0 otherwise.  $HDIHigh_{i,2006q4}$  takes a value of 1 if county  $i$ 's average household debt-to-income ratio in 2006q4 was in the top quartile, and 0 otherwise.  $Ch7$  is the number of Chapter 7 business bankruptcies,  $Ch11$  is the number of Chapter 11 business bankruptcies, and  $Total$  is the total number of business bankruptcies in county  $i$  in year  $t$ . Loan variables represent the logarithm of the number of small business loans of a given size in county  $i$  in year  $t$ .  $EmpGrowth$  is the growth in total employment for county  $i$  in from year  $t - 1$  to year  $t$ .  $EstabGrowth$  is the growth in the number of businesses in county  $i$  in from year  $t - 1$  to year  $t$ . Regressions are run at the county-year level. Standard errors are clustered at the county level, and county and year fixed effects are included, as indicated. \*\*\* indicates significance at the 1% level, \*\* significance at the 5% level, and \* significance at the 10% level.

Dep. Variable:	log( $Ch7$ )	log( $Ch11$ )	log( $Total$ )	log( $Loans$ 100–250K)	log( $Loans$ >250K)	$EmpGrowth$	$EstabGrowth$	log( $AvgWages$ )
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HDIHigh_{i,2006q4} \times HCA_{i,2004} \times Post2006_t$	0.149*** (0.054)	0.009 (0.033)	0.156*** (0.055)	-0.008 (0.042)	0.013 (0.037)	-1.161*** (0.372)	-1.055*** (0.277)	-0.014*** (0.005)
$HCA_{i,2004} \times Post2006_t$	0.091*** (0.028)	0.032* (0.017)	0.064** (0.029)	0.035 (0.024)	0.010 (0.022)	-0.086 (0.192)	-0.245* (0.130)	0.011*** (0.003)
$HDIHigh_{i,2006q4} \times Post2006_t$	0.083*** (0.037)	0.071*** (0.021)	0.085*** (0.036)	0.048* (0.027)	0.057*** (0.025)	-0.826*** (0.229)	-0.688*** (0.157)	-0.004 (0.003)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	-	-	Y
N	15792	15792	15792	15790	15790	15136	15136	15789
Adj. $R^2$	0.808	0.769	0.820	0.943	0.952	0.232	0.228	0.971