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

Cyrus Aghamolla* Jash Jain† Richard T. Thakor‡

May 8, 2024

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, and reduced innovative output. The results are stronger for areas with firms that are plausibly more exposed to the effects of PE hospital buyouts, such as areas where the PE-acquired hospitals have a greater market share and areas with a greater degree of labor intensity. 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

*Rice University. E-mail: cyrus.aghamolla@rice.edu.
†University of Minnesota. E-mail: jain0125@umn.edu.
‡University of Minnesota and MIT LFE. E-mail: rthakor@umn.edu.

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.[1] 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.

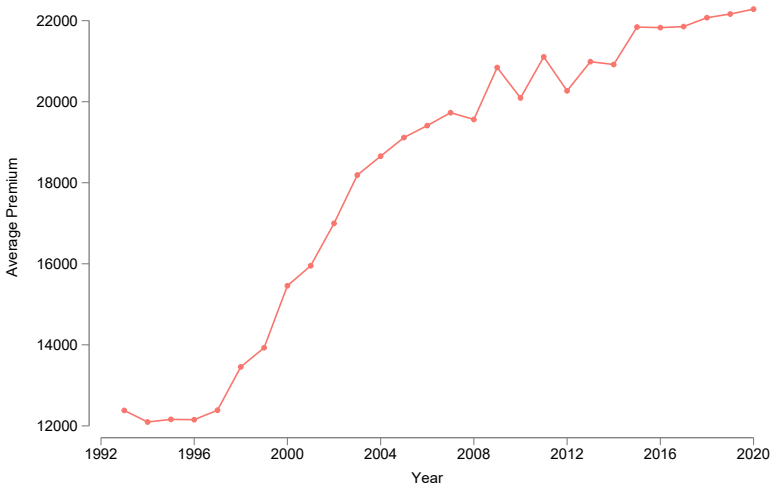
We investigate the role of rising healthcare costs on local economic outcomes, such as business bankruptcies, loans, establishment and employment growth, and innovation activity. Our empirical strategy exploits quasi-exogenous increases in healthcare costs in local economies induced by private equity (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 affects 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 difference-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

[1] 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 average healthcare insurance premiums for a family of four from 1993 to 2020. The numbers are inflation-adjusted to year 2020 dollars.



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 vol-

ume 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, and innovation output.

We provide a number of supporting analyses. First, we leverage additional establishment-level micro-data to show that there is a reduced number of new establishments formed in affected counties compared to other counties. We further show that, at the establishment level, firms in affected areas are significantly more likely to exit and experience significantly lower employment growth compared to unaffected firms. These results are consistent with our previous county-level results. Second, we run a host of heterogeneity analyses to show that the main results we document are stronger for counties that are ex ante plausibly more exposed to PE acquisitions of hospitals. In particular, we show that our results are stronger for counties where the PE-acquired hospital has a greater market share, and counties where firms are more reliant on labor and thus more exposed to changes in healthcare premiums.

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 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) and Gao et al. (2023) also example the effect of health insurance costs on firms. 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.[2] Gao et al. (2023) instrument for healthcare premiums using insurance company losses, and find that firms reduce employment (particularly low-income workers) and invest more in information technology. 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

[2]The latter result also holds for startups with 50 or fewer employees.

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 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.[3] 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.

[3]For reviews, see Kaplan and Schoar (2005), Kaplan and Strömberg (2009), and Bernstein (2022).

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 Frostmann Little and $900 million in bank lending.[4] The debt was placed on 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 healthcare, to study the impact of rising healthcare costs during times of economic distress. We

[4] As reported in the *Los Angeles Times* on June 11, 1996. See https://www.latimes.com/archives/la-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.

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)).[5] 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 hospitals.[6] 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.[7] As noted by Liu (2022), negotiated prices following private equity acquisitions increased by

[5] 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.

[6] 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).

[7] 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).

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 responses (Rosen (1986)).[8] 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

[8]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.

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 level via the following regression from 1993 to 1999:

$$\log(Avg\,Premium_{j,i,t}) = \alpha + \beta CHS\,Hospital_{j,i} \times Post_t + FEs + \varepsilon_{i,t}. \quad (1)$$

In equation (1), $\log(Avg\,Premium_{j,i,t})$ is the average employer-sponsored health insurance plan premium for firm j which is located in county i.[9] $CHS\,Hospital_{j,i}$ 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.[10] $Post_t$ 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 β 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

[9]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.

[10]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.

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.[11]

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:

$$Y_{i,t} = \alpha + \beta \, CHS \; Hospital_i \times Post_t + FEs + \varepsilon_{i,t}. \tag{2}$$

Equation (2) examines outcomes Y for treated counties i (counties that were served by a CHS hospital as of 1995, measured by $CHS \; Hospital_i$) 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 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:

$$Y_{i,t} = \alpha + \beta PE \; Buyout_{i,t} + FEs + \varepsilon_{i,t}, \tag{3}$$

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

[11] Our results are also robust to forming our control group based on propensity score matching.

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.[12] 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.[13] 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

[12] 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.

[13] 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.

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 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. 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)). For supporting analyses, we supplement our county-level data with establishment-level on firm entry, exit, and employment using the National Establishment Time-Series (NETS) database.

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).[14] 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 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 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.[15] The 7.5% increase in premiums amounts to 10.4% of net income, indicating the economically sizable magnitude of the rise in healthcare costs.[16] 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.[17] For

[14] 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.

[15] 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.

[16] 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.

[17] 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 fro the Census SUSB data and is for 1997 (this data is released

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.[18]

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).[19] 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 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

every five years).

[18]The coefficient estimate for the increase in premiums for this subsample is 5.9%.

[19]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.

equates to an additional 596 business bankruptcies per year across affected counties due to rising healthcare costs.[20]

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.[21] 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 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).[22] This implies an additional 474 small loans taken out per year across counties affected by rising healthcare costs due to PE entry.[23] 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.[24] 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.

[20] 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 $6.5\% \times 15.34 \times 598 = 596$.

[21] 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.

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

[23] 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 $71.55 \times 4.6\% \times 144 = 474$.

[24] 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.

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.[25] Likewise, the rising healthcare costs result in 88,441 fewer jobs created per year across affected counties.[26] We see a similar pattern with the full sample in Panel B (albeit employment growth has a negative but insignificant coefficient).[27]

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 no 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 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 (3) 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 (4)), we find a significant reduction in trademarks for treated counties under

[25] 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.

[26] Average employment in each county per year in our CHS sample is 28,448. Our calculation is therefore $28,488 \times -0.514 \times 598$ and dividing by 100, giving us $-87,441$ across treated counties.

[27] 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.

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.[28] Overall, these effects provide further evidence of a depression in economic activity due to rising healthcare costs induced by PE buyouts of hospitals.

4.4 Additional Firm-level Evidence

As additional supporting evidence for our main effects, we leverage firm-level data from the National Establishment Time-series (NETS) database, which tracks individual establishments (including private firms) across the U.S.[29] We utilize this data to examine three additional outcomes directly related to our main results.

First, we run our main specification at the county level examining entry of new businesses, i.e., the logarithm of the number of new establishments that appear in counties affected by PE acquisitions of hospitals compared to other counties. Second, we run our main specification but at the *establishment* level, examining outcomes for firms that are located in areas affected by PE buyouts of hospitals compared to other firms.[30] We examine firm exit as an outcome using a binary 0-1 variable that tracks if an establishment is no longer operating, and we also examine employment growth from year $t-1$ to year t for a given establishment.

The results are provided in Table 6. Panel A provides the results for the CHS buyout, while Panel B shows results for the full sample of all PE hospital buyouts. Column (1) in Panel A shows that treated counties gained a significantly lower (4.4%) number of new establishments following the CHS buyout compared to control counties. The sign is also negative for the full sample, albeit insignificant. Column (2) in both panels look at the propensity of a given establishment to exit, and both sets of results show that firms are significantly more likely to exit when located in treated counties compared to control counties. Finally, column (3) in both panels shows that establishments in treated counties experience significantly lower employment growth versus establishments in control counties.

Overall, the results using the establishment-level data echo our main findings.

[28] 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 $20 \times -4.9\% \times 598 = -586$.

[29] Thus, each branch of a firm—e.g. each individual location of Domino's Pizza—is considered a separate establishment in the database. Barnatchez et al. (2017) show that the NETS database covers roughly 3/4 of U.S. private sector employment.

[30] In these specifications, we include establishment and industry-by-year fixed effects.

4.5 Heterogeneity

To further validate that our results stem from the economic forces that we discussed, we run a host of heterogeneity tests.

First, we noted that the rise in healthcare premiums stem from bargaining between the PE-acquired hospital and insurers, resulting in the hospital negotiating higher reimbursement prices and thus insurers passing along higher premiums to employers. If this is indeed the case, then one would expect that acquired hospitals with a greater local market share will have greater bargaining power, thus leading to stronger effects in those areas. To explore this possibility, we run a sub-sample split based on the market share of the PE-acquired hospital system, proxied by the proportion of total beds that the PE-acquired hospital system owns in an HRR. We then run sub-sample regressions based on whether treated counties have above- or below-median market share. The results are provided in Table 7; for brevity, we show results for total bankruptcies, employment growth, and establishment growth. Overall, our effects are stronger for treated areas with above-median market share, consistent with the hypothesis mentioned above.

Second, the rise in healthcare premiums represent an additional cost for labor. However, some areas may be more dependent on industries in which labor cannot be substituted away from and thus will be more affected, while other areas may be less reliant on labor. To explore this further, we do a sample split based on labor intensity in a given county. In particular, for each county, we calculate labor intensity as the weighted average of the labor shares of all industries present in that county, weighted by the proportion of establishments in the county comprised of that industry.[31] We then run our main specification on sub-samples for counties that are above- and below-median in terms of labor intensity. The results are provided in Table 8, and show that our results are generally stronger for counties with higher labor intensity.

In the Appendix, we provide three additional heterogeneity tests. First, we show in Table A.2 that our results are stronger for counties with a lower share of high-skilled labor.[32] Second, we show in Table A.3 that our results are stronger for counties with a higher share

[31] More formally, define the weight of industry k in county c as $weight_{k,c}$ = # establishments in industry k in county c / Total # of establishments in county c. Labor intensity in county c is therefore $\sum_k LaborShare_k \times weight_{k,c}$. Labor shares are sourced from the Bureau of Labor Statistics, Office of Productivity and Technology, and represents the percentage of economic output that goes to workers as compensation.

[32] We follow Belo et al. (2017) with our definition of high-skilled labor, and calculate the proportion of total employees in an industry that can be considered high-skilled (the jobs require over 2 years of preparation). We then construct a county-level measure by weighting each industry high-skill labor measure by the proportion of establishments in the county comprised of that industry, as described above.

of firms in the service industry. Finally, in Table A.4, we show that our results are stronger for counties with a larger share of small firms (defined as establishments with less than 10 employees), which would plausibly be more affected by rising premiums.

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.[33]

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

[33]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.

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 premiums:

$$\log(Avg\,Premium_{j,i,t}) = \alpha + \beta HCA_{j,i,2004} \times Post2006_t + FEs + \varepsilon_{i,t}. \tag{4}$$

In equation (4), as before, $\log(Avg\,Premium_{j,i,t})$ 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.[34] $Post2006_t$ 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:

$$Y_{i,t} = \alpha + \beta HCA_{i,2004} \times Post2006_t + FEs + \varepsilon_{i,t}. \tag{5}$$

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 9 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).[35]

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

[34] 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.

[35] Appendix Table A.5 provides summary statistics for the HCA sample.

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.

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:

$$\begin{aligned} Y_{i,t} = \alpha + \beta_1 HDI_{i,2006q4} \times HCA_{i,2004} \times Post2006_t + \beta_2 HCA_{i,2004} \times Post2006_t \\ + \beta_3 HDI_{i,2006q4} \times Post2006_t + FEs + \varepsilon_{i,t}, \end{aligned} \tag{6}$$

where $HDI_{i,2006q4}$ is the logarithm of county i's average household debt-to-income ratio as of the fourth quarter of 2006.[36] The coefficient of interest is β_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 10, 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.

[36] 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.

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 11 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 11 shows that employment growth declined (marginally insignificant), and establishment growth declined 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.[37] Appendix Table

[37]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.6 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.7 provides the results for the CHS specifications (equations (1) and (2)), Appendix Table A.8 provides results with controls for the full sample (equation (3)), and Appendix Table A.16 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.9, A.10, and A.17 provide these results for the different specifications.[38]

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.[39] This analysis, provided in Appendix Table A.11 for the CHS and full sample specifications and Appendix Table A.18 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.12, A.13, and

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.

[38] 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.

[39] 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.19 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.14, A.15, and A.20 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.21 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 depressed in-

novation 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.

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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.

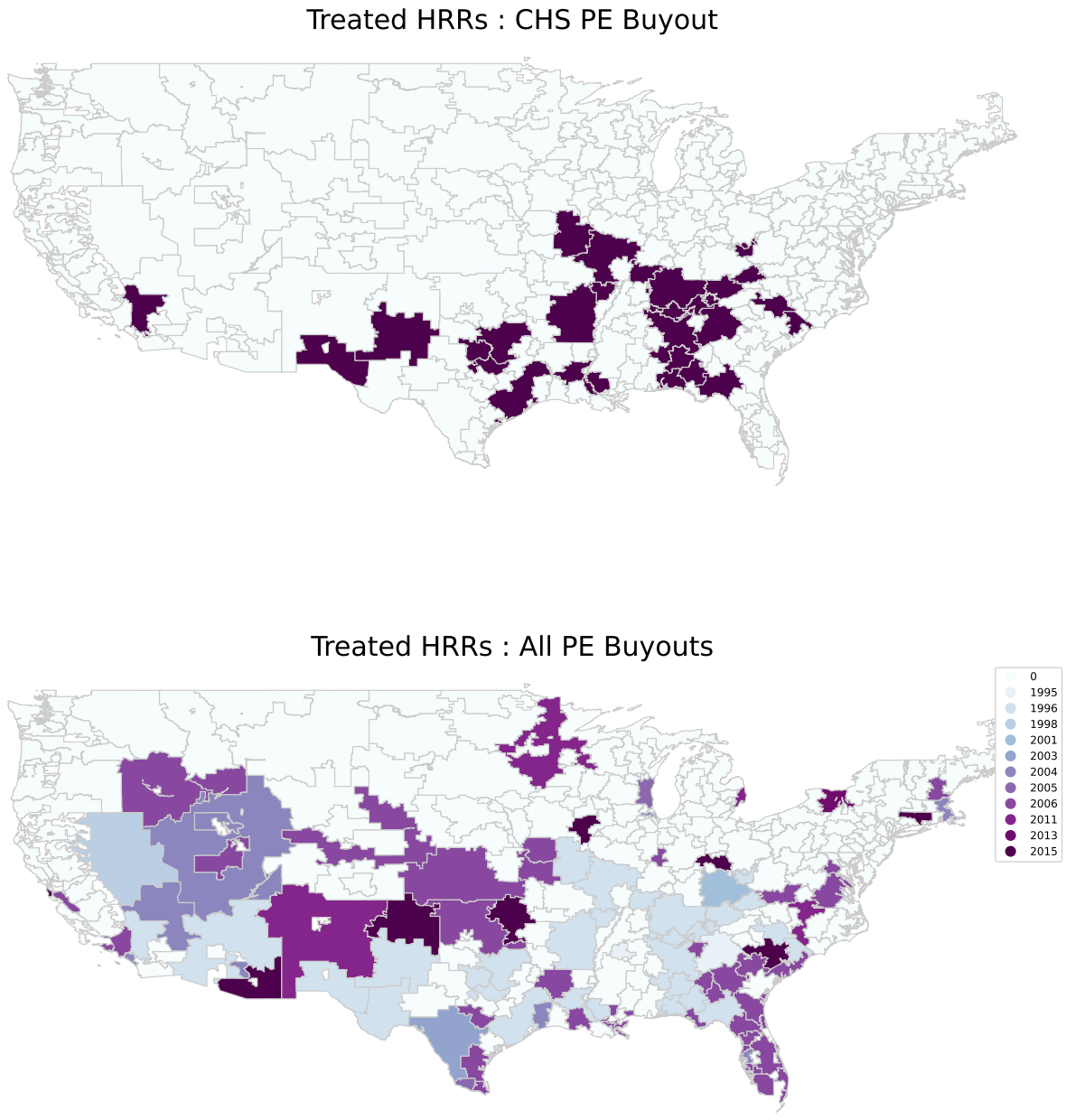
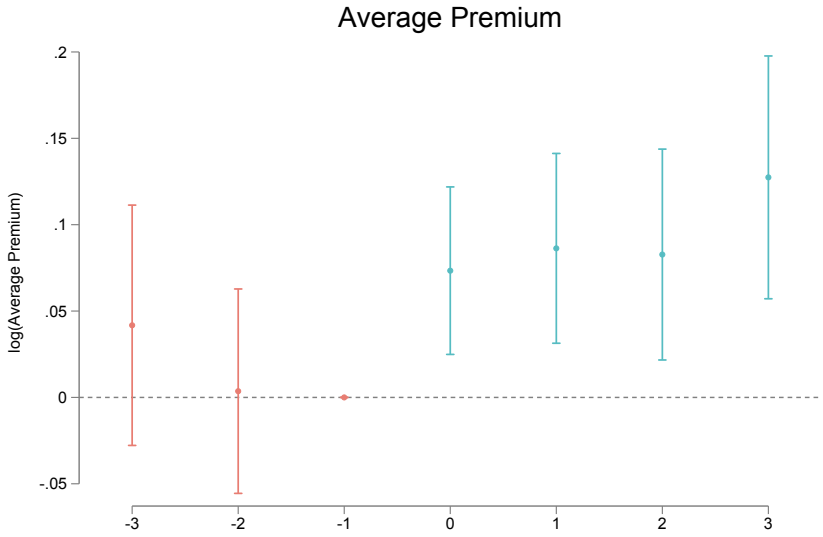


Figure 3: Parallel Trends: Average Premiums

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

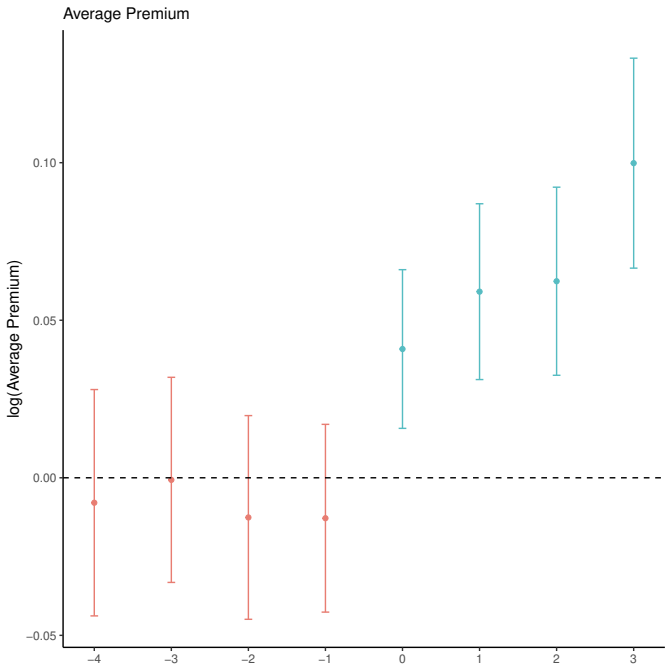
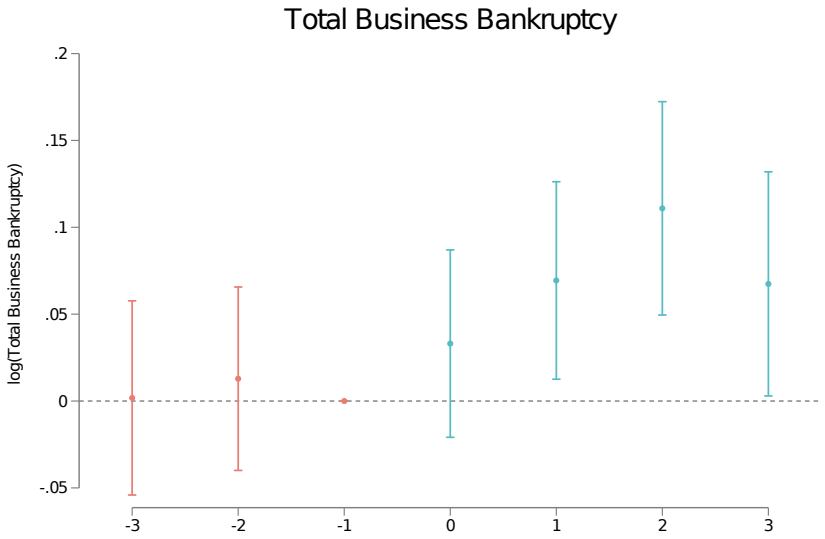


Figure 4: Parallel Trends: Business Bankruptcies and Debt

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

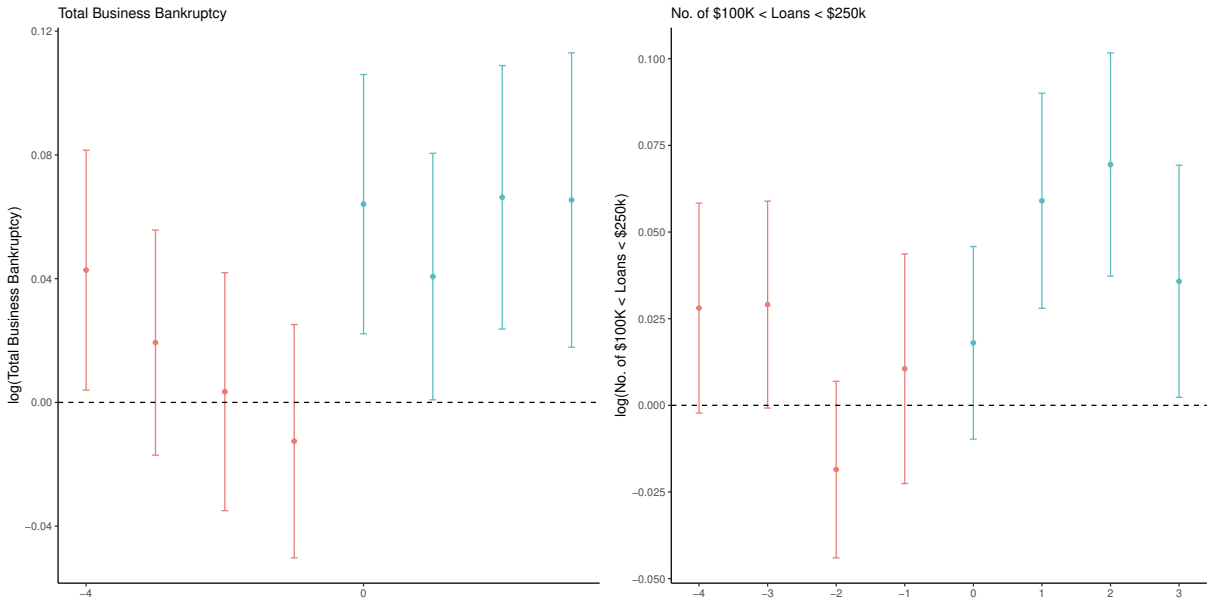
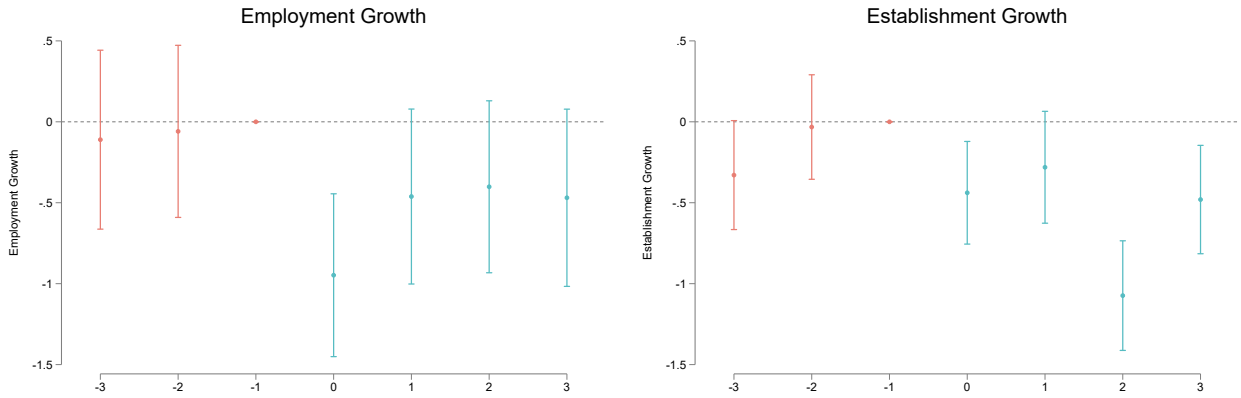


Figure 5: Parallel Trends: Employment and Establishment Growth

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

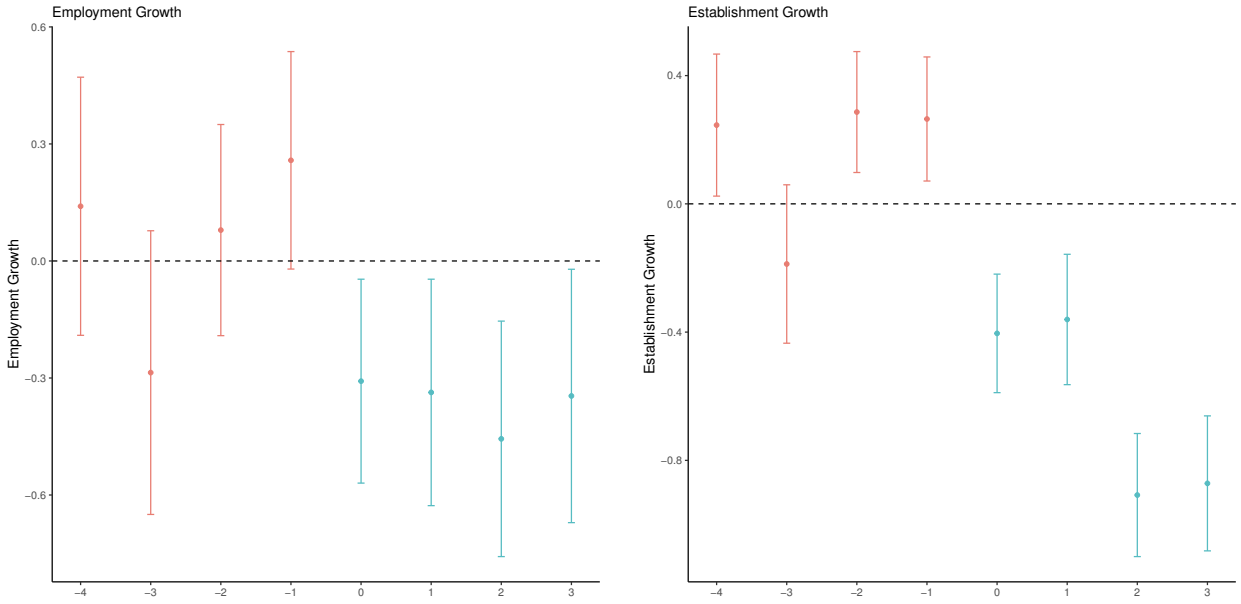


Figure 6: Parallel Trends: HCA Shock

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.

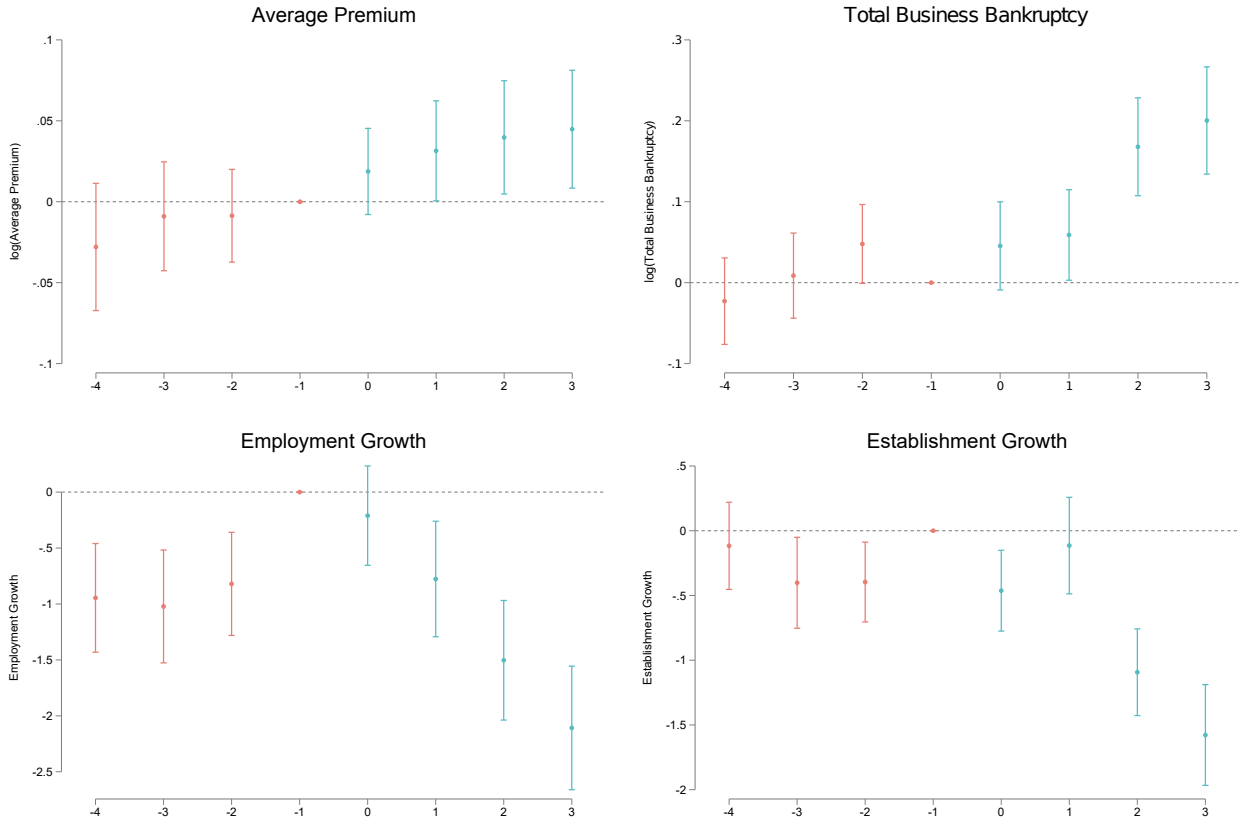


Table 1: Summary Statistics

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. 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. 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
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
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.

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

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***	0.075***	
	(0.026)	(0.026)	
$PE\,Buyout_{j,i,t}$			0.066***
			(0.021)
Firm FEs	Y	Y	Y
Year FEs	Y	-	-
Industry × 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 bankuptcies 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**	0.048***	0.065***
	(0.022)	(0.018)	(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:	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$
	(1)	(2)	(3)	(4)	(5)
$PE\,Buyout_{i,t}$	0.077***	0.020	0.059**	0.046***	0.013
	(0.021)	(0.015)	(0.022)	(0.016)	(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, and employment growth 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. $Emp\,Growth$ 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. $\log(Patents)$ 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:	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)
$CHS\,Hospital_i \times Post_t$	−0.514***	−0.448***	−0.033*	−0.049**
	(0.194)	(0.119))	(0.019)	(0.019)
County FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
N	10,388	10,388	10,745	10,654
Adj. R^2	0.185	0.265	0.921	0.912

Panel B: Full Sample

Dep. Variable:	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)
$PE\,Buyout_{i,t}$	−0.362**	−0.636***	−0.006	−0.028*
	(0.149)	(0.101)	(0.011)	(0.015)
County FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
N	84,077	84,077	87,500	86,604

Table 6: Establishment-level Results: Entry, Exit, and Employment Growth

This table provides regression results using establishment-level data examining entry, exit, and employment growth 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 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. $CHS\,Hospital_i$ 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. $Entry$ is the growth in total employment for county i in from year $t-1$ to year t. $New\,Estabs$ is the number of new establishments in county i in year t. $Exit$ is an establishment-level variable that takes a value of 1 if establishment j exited in year t, and 0 otherwise. $Emp\,Growth$ is the growth in employment at the establishment-level in from year $t-1$ to year t. Regressions are run at the county-year or establishment-year level, as indicated. Standard errors are clustered at the county level in column (1) in both panels, at the establishment level in columns (2)-(3) in Panel A, and at the establishment-cohort level in Panel B. 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:	$log(New\,Estabs)$	$Exit$	$Emp\,Growth$
	(1)	(2)	(3)
$CHS\,Hospital_i \times Post_t$	−0.044*	0.014***	−0.400***
	(0.025)	(0.000)	(0.031)
Regression Level	County	Establishment	Establishment
County FEs	Y	-	-
Year FEs	Y	-	-
Establishment FEs	-	Y	Y
Industry × Year FEs	-	Y	Y
N	10,664	31,183,165	25,668,184
Adj. R^2	0.913	0.163	-0.038

Panel B: Full Sample

Dep. Variable:	$log(New\,Estabs)$	$Exit$	$Emp\,Growth$
	(1)	(2)	(3)
$PE\,Buyout_{i,t}$	−0.001	0.001***	−0.037***
	(0.010)	(0.000)	(0.006)
Regression Level	County	Establishment	Establishment
Year FEs	Y	-	-
Establishment FEs	-	Y	Y
Industry × Year FEs	-	Y	Y
N	175,391	936,298,397	785,649,959
Adj. R^2	0.951	0.494	0.247

Table 7: Heterogeneity: Market Share of PE-acquired Hospital

This table provides heterogeneity results based on the market share of PE-acquired hospitals. 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). Sample splits are based on whether treated counties are above- or below-median in terms of the market share of the PE-acquired hospital. $PE\,Buyout_{i,t}$ 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. $Total$ is the total number of business bankuptcies 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. 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

	Above-median Market Share			Below-median Market Share		
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)
$CHS\,Hospital_i \times Post_t$	0.111***	−0.563**	−0.473***	0.029	−0.428*	−0.420***
	(0.029)	(0.259)	(0.153)	(0.028)	(0.222)	(0.136)
County FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
N	8,743	8,393	8,393	8,932	8,736	8,736
Adj. R^2	0.838	0.156	0.233	0.857	0.188	0.281

Panel B: Full Sample

	Above-median Market Share					Below-median Market Share				
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{i,t}$	0.061*	−0.471**	−0.851***	0.065***	0.024	0.003	−0.204	−0.697***	0.037	0.004
	(0.033)	(0.232)	(0.155)	(0.022)	(0.022)	(0.036)	(0.203)	(0.141)	(0.026)	(0.025)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	48,200	56,576	56,576	48,306	48,306	43,753	57,534	57,534	43,896	43,896

Table 8: Heterogeneity: Labor Intensity

This table provides heterogeneity results based on the average labor intensity of industries in an area, defined as the labor share of each industry in the area weighted by the share of establishments in the area comprised of that industry. 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). Sample splits are based on whether a county is above- or below-median in terms of labor intensity. $PE\,Buyout_{i,t}$ 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. $Total$ is the total number of business bankuptcies 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. 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

	Above-median Labor Intensity			Below-median Labor Intensity		
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)
$CHS\,Hospital_i \times Post_t$	0.095***	−0.849***	−0.625***	0.043	−0.184	−0.278*
	(0.034)	(0.292)	(0.176)	(0.032)	(0.245)	(0.151)
County FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
N	5,082	5,082	5,082	5,173	5,173	5,173
Adj. R^2	0.806	0.164	0.238	0.866	0.230	0.307

Panel B: Full Sample

	Above-median Labor Intensity					Below-median Labor Intensity				
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{i,t}$	0.057*	−0.611***	−0.879***	0.025	−0.006	0.043	−0.180	−0.399***	0.102***	0.041*
	(0.031)	(0.255)	(0.135)	(0.023)	(0.023)	(0.034)	(0.182)	(0.127)	(0.020)	(0.022)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	29,722	41,132	41,132	29,800	29,800	28,543	41,160	41,160	28,546	28,546

Table 9: 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.

	(1)	(2)	(3)	(4)
Variable	Control group	Treatment group	Difference	Normalized Diff.
100< Loan Num <250	83.768	86.089	2.321	0.009
	(227.204)	(284.350)	(11.832)	
Loan Num >250	79.899	83.644	3.746	0.013
	(261.962)	(329.420)	(13.695)	
Business Ch7 Bankruptcy	6.795	8.74 3	1.948	0.063
	(20.244)	(38.541)	(1.420)	
Business Ch11 Bankruptcy	2.062	2.660	0.598	0.053
	(9.595)	(12.834)	(0.493)	
Total Business Bankruptcy	10.460	13.565	3.105	0.069
	(30.798)	(55.742)	(2.084)	
Employment Growth	0.333	1.064	0.730***	0.133
	(4.912)	(5.989)	(0.143)	
Establishment Growth	0.736	1.996	1.260***	0.190
	(5.907)	(7.340)	(0.163)	

Table 10: 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. $Post\,2006_t$ is an indicator variable that takes a value of 1 if t is year 2006 or later, and 0 otherwise. $Emp\,Growth$ 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. Loan variables represent the logarithm of the number of small business loans of a given size in county i 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. 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:	$\log(Avg\,Prem)$	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HCA_{j,i,2004} \times Post\,2006_t$	0.042***							
	(0.015)							
$HCA_{i,2004} \times Post\,2006_t$		0.134***	0.036**	0.110***	0.034*	0.015	−0.453***	−0.583***
		(0.024)	(0.015)	(0.025)	(0.020)	(0.018)	(0.168)	(0.120)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry × Year FEs	Y	-	-	-	-	-	-	-
N	230,088	15,808	15,808	15,808	15,806	15,806	15,152	15,152
Adj. R^2	0.551	0.807	0.769	0.820	0.943	0.952	0.243	0.241

Table 11: 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. $Post\,2006_t$ 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. $Ch\,7$ 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. 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:	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$	$EmpGrowth$	$EstabGrowth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$HDI_{i,2006q4} \times HCA_{i,2004} \times Post\,2006_t$	0.114**	0.005	0.125**	0.007	0.014	−0.894*	−1.166***
	(0.057)	(0.036)	(0.059)	(0.050)	(0.045)	(0.508)	(0.345)
$HCA_{i,2004} \times Post\,2006_t$	0.005	0.029	−0.032	0.027	−0.001	0.602	0.765**
	(0.063)	(0.039)	(0.066)	(0.061)	(0.055)	(0.586)	(0.388)
$HDI_{i,2006q4} \times Post\,2006_t$	0.142***	0.093***	0.166***	0.018	0.049	−1.460***	−0.990***
	(0.039)	(0.026)	(0.038)	(0.036)	(0.031)	(0.362)	(0.233)
County FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
N	15,792	15,792	15,792	15,790	15,790	15,136	15,136
Adj. R^2	0.808	0.769	0.821	0.943	0.952	0.234	0.230

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. 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.

	CHS Specification		Full Sample	
Dep. Variable:	$\log(Estabs,$ $>100\ Emp)$	$\log(Estabs,$ $<100\ Emp)$	$\log(Estabs,$ $>100\ Emp)$	$\log(Estabs,$ $<100\ Emp)$
	(1)	(2)	(3)	(4)
$CHS\,Hospital_i \times Post_t$	−0.033***	0.011*		
	(0.011)	(0.006)		
$PE\,Buyout_{i,t}$			−0.004	0.006
			(0.007)	(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: Heterogeneity: High-skilled Labor Share

This table provides heterogeneity results based on the average share of high-skilled labor in an area, which is defined as the proportion of employees in each industry that have jobs requiring high levels of preparation, weighted by the proportion of establishments in the area comprised of that industry. 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). Sample splits are based on whether a county is above- or below-median in terms of high-skilled labor share. $PE\,Buyout_{i,t}$ 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. $Total$ is the total number of business bankuptcies 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. 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

	Above-median High-skilled Labor Share			Below-median High-skilled Labor Share		
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)
$CHS\,Hospital_i \times Post_t$	0.047	−0.103	−0.240	0.090***	−0.938***	−0.680***
	(0.032)	(0.243)	(0.153)	(0.032)	(0.293)	(0.175)
County FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
N	5,166	5,166	5,166	5,089	5,089	5,089
Adj. R^2	0.865	0.224	0.306	0.810	0.168	0.237

Panel B: Full Sample

	Above-median High-skilled Labor Share					Below-median High-skilled Labor Share				
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Loans$ $100\text{–}250K)$	$\log(Loans$ $>250K)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{i,t}$	0.029	−0.265	−0.407***	0.093***	0.042**	0.064**	−0.538**	−0.880***	0.027	−0.011
	(0.036)	(0.180)	(0.126)	(0.024)	(0.021)	(0.032)	(0.216)	(0.144)	(0.022)	(0.021)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	28,518	41,132	41,132	28,521	28,521	29,747	41,160	41,160	29,825	29,825

Table A.3: Heterogeneity: Services Industry Share

This table provides heterogeneity results based on the share of the services industry in an area, defined as the percentage of establishments in an area comprised of the services industry. 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). Sample splits are based on whether a county is above- or below-median in terms of employment share in the services industry. $PE\,Buyout_{i,t}$ 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. $Total$ is the total number of business bankuptcies 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. 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

	Above-median Services Share			Below-median Services Share		
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)
$CHS\,Hospital_i \times Post_t$	0.098***	−0.886***	−0.755***	0.030	−0.092	−0.187
	(0.033)	(0.265)	(0.164)	(0.033)	(0.273)	(0.165)
County FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
N	5,019	5,019	5,019	5,313	5,313	5,313
Adj. R^2	0.890	0.156	0.228	0.731	0.214	0.304

Panel B: Full Sample

	Above-median Services Share					Below-median Services Share				
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{i,t}$	0.076**	−0.317	−0.857***	0.043**	0.021	0.032	−0.319	−0.396***	0.077***	0.016
	(0.031)	(0.216)	(0.147)	(0.020)	(0.020)	(0.031)	(0.199)	(0.131)	(0.023)	(0.022)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	30,636	41,440	41,440	30,696	30,696	28,050	41,468	41,468	28,075	28,075

Table A.4: Heterogeneity: Share of Small Firms

This table provides heterogeneity results based on the share of small firms in an area, defined as the proportion of establishments in an area consisting of less than 9 employees. 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). Sample splits are based on whether a county is above- or below-median in terms of proportion of firms that are small firms operating in an area. $PE\,Buyout_{i,t}$ 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. $Total$ is the total number of business bankuptcies 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. 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

	Above-median Share of Small Firms			Below-median Share of Small Firms		
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)
$CHS\,Hospital_i \times Post_t$	0.096***	−0.437	−0.750***	0.049	−0.541**	−0.154
	(0.034)	(0.324)	(0.193)	(0.031)	(0.224)	(0.142)
County FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
N	5,383	5,243	5,243	5,362	5,145	5,145
Adj. R^2	0.703	0.143	0.238	0.877	0.264	0.308

Panel B: Full Sample

	Above-median Small Firm Share					Below-median Small Firm Share				
Dep. Variable:	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)	$log(Total)$	$Emp\,Growth$	$Estab\,Growth$	log($Loans$ 100–250K)	log($Loans$ >250K)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{i,t}$	0.064**	−0.270	−0.741***	0.026	−0.005	0.036	−0.470***	−0.556***	0.064***	0.029
	(0.030)	(0.248)	(0.161)	(0.023)	(0.023)	(0.030)	(0.159)	(0.106)	(0.022)	(0.020)
County FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	31,542	42,472	42,472	31,695	31,695	29,971	41,552	41,552	30,000	30,000

Table A.5: 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. 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.

	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
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.6: 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 bankuptcies 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. 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.

iptsizeDep. Variable:	log ($Avg\,Prem$)	log($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$	log($Patents$)	log(TM)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{j,i,t}$	0.022**									
	(0.011)									
$PE\,Buyout_{i,t}$		0.065***	0.033***	0.055***	0.054***	0.016	−0.125	−0.328***	0.001	−0.022**
		(0.016)	(0.011)	(0.016)	(0.014)	(0.013)	(0.098)	(0.066)	(0.009)	(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-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	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	175,576	173,869
Adj. R^2	0.577	0.801	0.677	0.837	0.945	0.950	0.204	0.211	0.937	0.927

Table A.7: 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 from 1993 to 1999. $CHS\,Hospital_{j,i}$ 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. $CHS\,Hospital_i$ 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. $Avg\,Premium_{j,t}$ 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 bankuptcies 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. 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:	$\log(Avg\,Prem)$	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CHS\,Hospital_{j,i} \times Post_t$	0.074***							
	(0.027)							
$CHS\,Hospital_i \times Post_t$		0.045**	0.047***	0.064***	−0.426**	−0.432***	−0.040**	−0.056***
		(0.022)	(0.018)	(0.023)	(0.197)	(0.118)	(0.019)	(0.019)
County Controls	Y	Y	Y	Y	Y	Y	Y	Y
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-
N	143,921	10,745	10,745	10,745	10,388	10,388	10,745	10,654
Adj. R^2	0.515	0.829	0.789	0.848	0.192	0.266	0.921	0.912

Table A.8: 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 from 1993 to 2020 using a stacked cohort DID specification with county-level controls. $PE\,Buyout_{i,t}$ 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. 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 ($Avg\,Prem$)	log($Ch\,7$)	log($Ch\,11$)	log($Total$)	log ($Loans$ 100–250K)	log ($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$	log($Patents$)	log(TM)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{j,i,t}$	0.022**									
	(0.011)									
$PE\,Buyout_{i,t}$		0.068***	0.036***	0.060***	0.042***	0.003	−0.091	−0.329***	−0.004	−0.033***
		(0.016)	(0.012)	(0.016)	(0.014)	(0.013)	(0.097)	(0.066)	(0.009)	(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 Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	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	171,821	170,114
Adj. R^2	0.577	0.803	0.679	0.838	0.945	0.950	0.213	0.215	0.937	0.927

Table A.9: 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 from 1993 to 1999. $CHS\,Hospital_{j,i}$ 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. $CHS\,Hospital_i$ 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. $Avg\,Premium_{j,t}$ 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 bankuptcies 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. 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:	$\log(Avg\,Prem)$	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CHS\,Hospital_{j,i} \times Post_t$	0.076***							
	(0.029)							
$CHS\,Hospital_i \times Post_t$		0.052**	0.008	0.055**	−0.309	−0.584***	−0.019	−0.031
		(0.024)	(0.019)	(0.026)	(0.232)	(0.132)	(0.021)	(0.020)
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Region×Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-
N	146,149	10,745	10,745	10,745	10,388	10,388	10,745	10,654
Adj. R^2	0.515	0.830	0.792	0.848	0.187	0.283	0.921	0.912

Table A.10: 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. $PE\,Buyout_{i,t}$ 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 bankuptcies 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. 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 ($Avg\,Prem$)	log($Ch\,7$)	log($Ch\,11$)	log($Total$)	log ($Loans$ 100–250K)	log ($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$	log($Patents$)	log(TM)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout_{j,i,t}$	0.012									
	(0.011)									
$PE\,Buyout_{i,t}$		0.059***	0.030***	0.051***	0.043***	0.004	−0.061	−0.327***	0.000	−0.022**
		(0.015)	(0.011)	(0.016)	(0.014)	(0.013)	(0.099)	(0.068)	(0.009)	(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-cohort FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region-Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-cohort FEs	Y	-	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-	-
N	1,425,290	153,690	153,690	153,690	153,711	153,711	170,516	170,516	175,576	173,869
Adj. R^2	0.577	0.804	0.680	0.838	0.946	0.950	0.210	0.238	0.937	0.927

Table A.11: 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. $CHS\,Hospital_i$ 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. $PE\,Buyout_{i,t}$ 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. $Ch\,7$ 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 bankuptcies 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

	$Ch\,7$	$Ch\,11$	$Total$	$Patents$	TM
	(1)	(2)	(3)	(4)	(5)
$CHS\,Hospital_i \times Post_t$	−0.006	0.158***	0.039	−0.019	−0.084**
	(0.041)	(0.046)	(0.035)	(0.047)	(0.038)
County FEs	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y
N	10,416	8,596	10,682	6,783	8,848

Panel B: Full Sample

	$Ch\,7$	$Ch\,11$	$Total$	$Loans$ 100–250K	$Loans$ >250K	$Patents$	TM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$PE\,Buyout_{i,t}$	0.166***	0.155***	0.155***	0.039**	0.028**	0.007	0.022
	(0.055)	(0.057)	(0.051)	(0.016)	(0.012)	(0.028)	(0.019)
County FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
N	144,326	115,079	149,843	150,964	149,426	121,471	154,139

Table A.12: 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. $CHS\,Hospital'_{j,i}$ 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. $CHS\,Hospital'_i$ 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. $Avg\,Premium_{j,t}$ 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 bankuptcies 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. 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:	$\log(Avg\,Prem)$	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CHS\,Hospital'_{j,i} \times Post_t$	0.019							
	(0.024)							
$CHS\,Hospital'_i \times Post_t$		0.001	0.004	0.017	0.030	−0.041	0.020	0.016
		(0.022)	(0.018)	(0.023)	(0.187)	(0.124)	(0.009)	(0.019)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-
N	146,551	10,388	10,388	10,388	10,010	10,010	10,372	10,388
Adj. R^2	0.516	0.846	0.811	0.862	0.149	0.226	0.985	0.934

Table A.13: 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 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). $PE\,Buyout'_{i,t}$ 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. $Ch\,7$ 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 bankuptcies 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. 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, 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log ($Loans$ 100–250K)	log ($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$	log($Patents$)	log(TM)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\,Buyout'_{j,i,t}$	−0.006									
	(0.013)									
$PE\,Buyout'_{i,t}$		0.012	−0.000	0.013	0.004	0.004	−0.020	−0.132	0.012	−0.009
		(0.014)	(0.013)	(0.015)	(0.013)	(0.012)	(0.129)	(0.091)	(0.010)	(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 FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-	-
N	919,471	73,472	73,472	73,472	73,663	73,663	84,077	84,077	87,500	86,604

Table A.14: 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 from 1993 to 2020. $CHS\,Hospital_{j,i}$ 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. $CHS\,Hospital_i$ 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. $Avg\,Premium_{j,t}$ 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 bankuptcies 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. 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:	$\log(Avg\,Prem)$	$\log(Ch\,7)$	$\log(Ch\,11)$	$\log(Total)$	$Emp\,Growth$	$Estab\,Growth$	$\log(Patents)$	$\log(Trademarks)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CHS\,Hospital_{j,i} \times Post_t$	0.086***							
	(0.028)							
$CHS\,Hospital_i \times Post_t$		0.038*	0.036**	0.036	−0.574***	−0.330***	−0.037**	−0.051***
		(0.021)	(0.017)	(0.022)	(0.194)	(0.121)	(0.017)	(0.019)
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-
N	89,850	13,486	13,486	13,486	12,838	12,838	13,486	13,346
Adj. R^2	0.565	0.840	0.816	0.857	0.178	0.251	0.934	0.920

Table A.15: 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 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. $Ch\,7$ 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 bankuptcies 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. 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, 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\ Growth$	$Estab\ Growth$	log($Patents$)	log(TM)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$PE\ Buyout_{j,i,t}$	0.057***									
	(0.017)									
$PE\ Buyout_{i,t}$		0.106***	0.022	0.094***	0.089***	0.065***	−0.406***	−0.617***	−0.0003	−0.003
		(0.024)	(0.019)	(0.027)	(0.020)	(0.022)	(0.155)	(0.106)	(0.015)	(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 FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-	-	-
N	555,711	37,561	37,561	37,561	37,581	37,581	53,815	53,815	56,367	55,764

Table A.16: 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. $Post\,2006_t$ is an indicator variable that takes a value of 1 if t is year 2006 or later, and 0 otherwise. $Emp\,Growth$ 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. Loan variables represent the logarithm of the number of small business loans of a given size in county i 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 bankuptcies 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HCA_{j,i,2004} \times Post\,2006_t$	0.038**							
	(0.018)							
$HCA_{i,2004} \times Post\,2006_t$		0.101***	0.024	0.078***	0.028	0.000	−0.106	−0.330***
		(0.025)	(0.015)	(0.025)	(0.020)	(0.018)	(0.163)	(0.116)
Unit of Analysis	Firm-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
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	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
Adj. R^2	0.545	0.811	0.770	0.822	0.943	0.952	0.257	0.237

Table A.17: 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. $Post\,2006_t$ 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. Loan variables represent the logarithm of the number of small business loans of a given size in county i 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 bankuptcies 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$EmpGrowth$	$EstabGrowth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HCA_{j,i,2004} \times Post\,2006_t$	0.005							
	(0.018)							
$HCA_{i,2004} \times Post\,2006_t$		0.096***	0.025	0.077***	0.038*	0.014	−0.206	−0.730***
		(0.025)	(0.016)	(0.026)	(0.021)	(0.020)	(0.181)	(0.133)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Region×Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry×Year FEs	Y	-	-	-	-	-	-	-
N	229,210	15,808	15,808	15,808	15,806	15,806	15,152	15,152
Adj. R^2	0.551	0.810	0.769	0.822	0.944	0.952	0.238	0.247

Table A.18: 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 bankuptcies 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.

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

Table A.19: 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. $Post\,2006_t$ is an indicator variable that takes a value of 1 if t is year 2006 or later, and 0 otherwise. $Emp\,Growth$ 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. Loan variables represent the logarithm of the number of small business loans of a given size in county i 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 bankuptcies 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HCA'_{j,i,2004} \times Post\,2006_t$	−0.005							
	(0.015)							
$HCA'_{i,2004} \times Post\,2006_t$		0.004	−0.010	−0.016	−0.013	−0.004	0.218	−0.129
		(0.025)	(0.014)	(0.025)	(0.019)	(0.017)	(0.154)	(0.111)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	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
Adj. R^2	0.551	0.799	0.759	0.815	0.948	0.955	0.235	0.186

Table A.20: 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. $Post\,2006_t$ is an indicator variable that takes a value of 1 if t is year 2006 or later, and 0 otherwise. $Emp\,Growth$ 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. Loan variables represent the logarithm of the number of small business loans of a given size in county i 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. 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$HCA_{j,i,2004} \times Post\,2006_t$	0.028*							
	(0.017)							
$HCA_{i,2004} \times Post\,2006_t$		0.125***	0.031**	0.116***	0.061***	0.047***	−0.282*	−0.520***
		(0.023)	(0.014)	(0.024)	(0.018)	(0.017)	(0.159)	(0.115)
Unit of Analysis	Firm-year	County-year	County-year	County-year	County-year	County-year	County-year	County-year
County FEs	-	Y	Y	Y	Y	Y	Y	Y
Year FEs	-	Y	Y	Y	Y	Y	Y	Y
Firm FEs	Y	-	-	-	-	-	-	-
Industry × Year FEs	Y	-	-	-	-	-	-	-
N	167,463	18,506	18,506	18,506	18,472	18,472	17,660	17,660
Adj. R^2	0.554	0.798	0.754	0.810	0.944	0.952	0.239	0.211

Table A.21: 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. $Post\,2006_t$ is an indicator variable that takes a value of 1 if t is year 2006 or later, and 0 otherwise. $HDI\,High_{i,2006q4}$ 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. $Ch\,7$ 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 bankuptcies 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. $Emp\,Growth$ 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. 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($Ch\,7$)	log($Ch\,11$)	log($Total$)	log($Loans$ 100–250K)	log($Loans$ >250K)	$Emp\,Growth$	$Estab\,Growth$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$HDI\,High_{i,2006q4} \times HCA_{i,2004} \times Post\,2006_t$	0.149***	0.009	0.156***	−0.008	0.013	−1.161***	−1.055***
	(0.054)	(0.033)	(0.055)	(0.042)	(0.037)	(0.372)	(0.277)
$HCA_{i,2004} \times Post\,2006_t$	0.091***	0.032*	0.064**	0.035	0.010	−0.086	−0.245*
	(0.028)	(0.017)	(0.029)	(0.024)	(0.022)	(0.192)	(0.130)
$HDI\,High_{i,2006q4} \times Post\,2006_t$	0.083**	0.071***	0.085**	0.048*	0.057**	−0.826***	−0.688***
	(0.037)	(0.021)	(0.036)	(0.027)	(0.025)	(0.229)	(0.157)
County FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	-	-
N	15,792	15,792	15,792	15,790	15,790	15,136	15,136
Adj. R^2	0.808	0.769	0.820	0.943	0.952	0.232	0.228