Financial Condition and Product Quality: The Case of Nonprofit Hospitals*

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Abstract

Financial constraints can cause firms to reduce product quality, especially when quality is difficult for consumers to observe. This paper tests this hypothesis in the context of nonprofit hospitals. Using large samples of heart attack patients and child deliveries, we test whether hospitals shift towards more intensive and more profitable treatment options as a result of a financial shock—the 2008 financial crisis—and whether the shock led to worse patient outcomes. We show that the crisis was followed by an unprecedented drop in hospital capital investments yet we find no overall effects on treatment choices or patient outcomes. These results are similar for nonprofits and for-profits. We find evidence that hospital governance, in particular separation of management and doctor decision-making, plays a role in shielding patients from undesirable shifts in quality in response to financial shocks.

1 Introduction

The question of how financing affects real choices has been central in corporate finance research. Much of this literature deals with shareholder-owned corporations, while nonprofits have generally been understudied.[1] Nonprofit organizations differ from for-profit firms in that they have no shareholders and profits cannot be distributed to capital providers. This suggests that their decision-makers have different incentives from those of for-profits. This paper focuses on the healthcare sector where nonprofit firms play a central role.

The paper examines the link between nonprofit hospitals' financial health and the quality of the medical treatment they provide. When external financing is costly, a firm experiencing a financial shortfall might resort to actions that boost its current (at the expense of future) cash flow (Fazzari, Hubbard and Petersen (1988)). Though most literature focuses on the consequences of financial frictions for capital investments, the same mechanisms can also affect product quality choice, pricing, output, or worker safety. A financially constrained firm may choose to skimp on quality to save cash today even if this hurts its reputation with consumers and lowers future revenues. This is a concern especially in industries in which consumers do not observe quality immediately or incur "switching costs" when changing suppliers. A number of studies test this hypothesis and find supportive evidence (Rose (1990), Maksimovic and Titman (1991), Phillips (1995), Chevalier (1995), Chevalier and Scharfstein (1995), Matsa (2011), Cohn and Wardlaw (2013)).

These empirical findings are based on for-profit firms, but they suggest that nonprofits might exhibit similar behavior. In this paper we examine whether negative financial shocks to hospitals, in particular nonprofits, have detrimental effects on the quality of the medical choices made by the associated physicians. Hospitals offer a unique setting to study the effects of financial constraints on product quality. First, the key ingredient of models such as Maksimovic and Titman (1991) – the difficulty for customers to observe quality – is a first order concern in the healthcare setting. Second, the stakes can be very high (from a policy or efficiency perspective), given that we consider interventions at critical moments of care – heart attacks and child delivery. Third, the healthcare setting provides highly detailed patient-level information that allows for precise measurement of quality (in the form of

[1] Recent corporate finance papers study various aspects of the nonprofit universities' endowments, including performance, payouts, allocation, and optimal size (Schoar, Lerner, and Wang (2008), Brown et al. (2014), Goetzmann and Oster (2012), Gilbert and Hrdlicka (2013)). Adelino, Lewellen, and Sundaram (2105) investigate nonprofit hospitals' investment.

deviations from "typical" treatment options for equivalent patients). Finally, the hospital industry is dominated by nonprofits, and many authors argue that the nonprofit organizational form evolved precisely to address information asymmetry problems in the product markets: in industries where quality cannot be perfectly observed, a nonprofit's muted incentives to maximize profits improve quality and lead to socially better outcomes (Arrow (1963), Easily and O'Hara (1983), Glaeser and Shleifer (2001)). This effect is likely reinforced in the hospital setting, as medical choices are made by physicians. The extent to which hospital administrators can influence those choices – either directly or through incentive systems – is likely more limited than in other sectors, such as airlines or supermarkets, that have been previously studied in the literature (Rose (1990), Chevalier and Scharfstein (1995), Matsa (2011)). Thus, the insights from these studies may not directly apply to nonprofits or the healthcare sector. Moreover, the cross-sectional differences in physician-hospital arrangements allow us to examine the role of these organizational features in dealing with quality-skimping incentives in both for-profits and nonprofits.

Our tests build on the extensive health economics literature on medical treatment choice. One insight from this literature is that more intensive treatment choices (such as heart surgery vs. a drug-based therapy) are in many settings more profitable to healthcare providers than the less intensive treatment choices. We test whether negative shocks to a hospital's financial health cause shifts towards the more intensive treatment choice. One key assumption for interpreting our tests is that such shifts would decrease treatment quality for the marginal patients, while benefiting hospitals financially in the short run.

We focus on two clinical choices that have been widely researched in health economics: the choice of the intensive vs. drug-based treatment of the heart attack (Acute Myocardial Infarction or AMI) patients, and the choice of the Cesarean section (C-section) vs. vaginal birth as a mode of child delivery. These settings are useful in our context for three reasons. First, both child delivery and AMI make up a significant fraction of hospital discharges and revenues. Based on the National Hospital Discharge Survey, child delivery and heart disease were the two most frequent diagnostic categories that together accounted for 24% of all 31.1 million hospital discharges in 2007. Second, there is a widespread consensus that the more intensive treatment options (C-sections in the case of child deliveries and heart surgery in the case of AMI treatment) are more lucrative to hospitals. In case of child delivery, this wedge has been frequently cited as one of the reasons for the "excessive" C-section rates in the U.S (see literature survey in Section 4.2). Third, detailed data on the medical condition of patients allows us to control for many clinical reasons for the intensive treatment choice, particularly in the case of C-sections, and thus focus on procedures that appear more discretionary.

We start by showing that the 2008 financial crisis had a large negative effect on nonprofit hospital financial health and caused significant reduction in capital investments. The crisis affected hospitals through three channels. First, most nonprofit hospitals hold large financial assets in the form of endowments, and income from these investments constitutes a significant fraction of hospitals' overall income. Moreover, most nonprofits' spending rules tie the funds available for spending to the recent performance of their endowments. The stock market crash in 2008 reduced the ratio of financial investments to fixed assets for the nonprofit hospitals in our sample from 56% in 2007 to 47% in 2008, a 17 percent decline. Second, the collapse of the credit market following the crash meant that hospitals had difficulties raising debt to cover those shortfalls. The growth rate in hospital fixed assets declines sharply from 7.9% in 2007 to 3.6% in 2009, and it remains depressed throughout the end of our sample period in 2011. Consistent with the evidence in Adelino, Lewellen, and Sundaram (2015), the contraction in investment after the financial crisis is stronger for hospitals with worse performance of their financial assets in 2008. Third, the economic downturn and increase in unemployment following the financial crisis likely reduced demand for hospital services, particularly from privately insured patients. Our main tests examine patterns in the medical treatment decisions around 2008, both in aggregate and as a function of the performance of hospital financial investments.

Turning to medical treatment choices, our central conclusion from this analysis is that the unprecedented shock to the hospitals' financial condition in 2008 and the subsequent economic downturn had little to no effect on treatment choices. We find weak evidence of treatment responses in a few sub-samples of hospitals and patients (discussed below), but the overall effects are generally insignificant. All regressions include a large set of covariates that are associated with treatment choice, such as patient age, gender, co-morbidities, and other risk factors. We consider both time-series patterns (given that the shock could have affected all hospitals homogeneously), and cross-sectional evidence based on hospital financial returns.

In the case of the heart attack patients, the rate of intensive cardiac treatment increases during our sample period, but the overall increase is unrelated to the 2008 financial returns, and it is driven entirely by small (below-median service revenues) hospitals. Small hospitals start off with AMI intensive treatment rates substantially below the national average (e.g., catheterization rates for small hospitals in our sample are 30.5% compared to 54.5% for large hospitals) and we cannot distinguish the increase in treatment from a linear trend over time (consistent, for example, with technological adoption or acquisition of skill by smaller hospitals). The intensive cardiac treatment rate at large hospitals, which account for 71% of patients in our sample, is flat throughout 2005-2011.

Our conclusions from the C-section analysis are largely consistent with the cardiac results. We find no evidence that the overall C-section rates increased post 2008, and if anything, there is evidence of a shift against C-section use. As in the case of heart attack patients, we include detailed controls that are associated with the probability of obtaining C-sections, such that concerns of changing patient population are highly unlikely to be important drivers of the results. Changes in C-section rates are also unrelated to the financial performance in 2008 on average. We find some evidence that the financial performance in 2008 affected treatment choices in a sub-sample of large hospitals in states with low average C-section rates. The C-section setting is complicated by several government agency and advocacy group initiatives aimed at reducing the C-section rate nationwide[2]. For example, starting in 2010, hospitals were encouraged to monitor and report their "low-risk patients" C-section rates. Small (low-intensity) hospitals seemed less willing to shift towards the lower (and arguably more desirable) C-section rate post-2008 when their financial returns were low.

The last set of tests shows that there are also no significant shifts in patient outcomes post 2008 using a set of five Patient Safety Indicators (PSI) provided by the Agency for Healthcare Research and Quality (AHRQ). These indicators measure adverse patient events following different types of medical interventions (such as, postoperative sepsis or perioperative hemorrhage), and are intended to measure the quality of care provided in hospitals. As with the level of treatment intensity, we find no differences in the incidence of these events before and after the crisis in the overall sample, and there is no systematic correlation between the post-crisis changes and the hospitals' financial shocks.

The general lack of quality of treatment response to the financial shock might seem surprising for at least three reasons. First, the 2008 financial and economic shock was unusually large and affected strongly hospitals' finances and investments. Second, there is much evidence in health economics that physicians' treatment choices respond to the more direct financial incentives, such as changes in prices or patient demand (see summary of this literature in Section 4.2). Third, previous research suggests that for-profit firms in other industries reduce product quality when their financial condition deteriorates.

This raises the question of which mechanisms are responsible for the lack of response in nonprofit hospitals. One natural hypothesis is that the nonprofit organizational form "works well" in the sense that its inherently weaker focus on profits shields consumers from undesirable shifts in quality. Another

[2] These rates are generally considered "too high" and the financial incentives to perform C-sections is often cited as one of the reasons, see discussion in Section 4.2.

factor might be the specific features of nonprofit hospitals' governance, in particular, the often loose relationship between hospitals and the key workers (physicians) that directly affect quality. Similarly, insurance companies, Medicare, and Medicaid reimbursement rules impose constraints on treatment choice that may contribute to the lack of response. Finally, culture and ethical and professional standards work against any quality responses to hospital-level financial shocks.

We explore the first two of these potential channels, starting with the nonprofit organizational form. Because for-profit hospitals do not have endowments, we do not have a good cross-sectional test that allows us to identify the causal effect of financial health on quality for this subset of hospitals. We do, however, compare treatment choices in nonprofit and for-profit hospitals, before and after the 2008 crisis. The crisis severely restricted hospitals' access to credit and increased their borrowing costs, which likely also affected for-profits. Consistent with this possibility, we show that for-profit hospitals reduced sharply their investment rates and salary growth post-2008, similarly to nonprofits. However, we find no evidence that for-profits increased their use of intensive procedures in the treatment of their patients, or that their response differed from that of nonprofits. This means that either the nonprofit form is not the main reason for the lack of treatment response to the financial shortfall, or that competitive pressures or industry norms in a market dominated by nonprofits effectively discipline the behavior of all firms.

To examine the role of contractual arrangements with physicians, we separate hospitals based on the degree of physician integration. Our assumption is that higher integration – particularly employment by the hospital – should lead to easier transmission of hospital shocks to treatment choices either through explicit (monetary) or implicit (career-based) incentives. We find some evidence that the more highly integrated hospitals increased their use of intensive treatments after 2008 relative to the less integrated hospitals. This effect is driven by privately insured, and thus generally more profitable patients, which suggests a financial motive. However, we do not find that the post-2008 increase in intensive treatments was stronger for hospitals experiencing especially poor returns on their financial assets in 2008, so we cannot link the shift in intensity directly to the severity of the financial shock. Nevertheless, the evidence suggests that looser relationships between hospitals and their physicians play a role in addressing the product-market related frictions in both nonprofit and for-profit firms. This is especially notable given the current trend towards stronger physician-hospital integration nationwide (Scott et al. (2016)).

The question of how (and to what extent) hospitals influence physicians' medical choices is difficult to answer directly, but anecdotal evidence suggests that such influence might be significant. In a recent

Wall Street Journal (*WSJ*) article examining discharge patterns, former hospital employees state that "their corporate bosses exerted pressure to discharge as often as possible during the most lucrative days" and that "doctors, pressured by hospital administrators, sometimes ordered extra care or services intended in part to retain patients until they reached their thresholds…".[3] Though such examples are striking, it is not clear a priori whether such pressures extend to the higher-stakes medical settings (such as treatment of heart attacks), or whether they can be linked to the hospitals' financial health. Our results suggest that physicians' choices in these settings are largely immune to the hospitals' financial pressures, especially when physicians and hospitals are more loosely aligned.

Finally, our overall findings of no (or weak) response of the critical-care treatments to the financial shock (and the fact that the findings apply to both for-profits and nonprofits), suggest a broader culture- or ethics-based explanation. A better understanding of such forces – both in healthcare and other sectors – is a worthwhile goal for future research.

This paper merges two strands of literature. Most directly, it contributes to the corporate finance research on the effects of financing constraints on product market choice. Rose (1990) finds that airlines' accident rates are negatively related to firms past financial performance (see also Phillips and Sertsios (2013)). Similarly, Phillips (1995) finds that firms in less competitive industries shrink output and increase profit margins following leveraged recapitalizations. Chevalier and Scharfstein (1996) show evidence from the supermarket industry that liquidity constraints induce firms to increase markups (and short-run cash flows) and to underinvest in market share during recessions. Chevalier (1995) finds similar evidence for supermarkets engaged in leveraged buyouts. Matsa (2011) shows that financial leverage increases supermarkets' inventory shortfalls – a measure of reduced product quality. Cohn and Wardlaw (2013) show that cash constraints negatively affect workers' safety – workplace accidents increase following negative shocks to firms' financial health.

Our paper also relates to the literature in health economics that examines medical choices, and how these choices respond to physician financial incentives such as reimbursements, patient demand, or malpractice insurance (summarized in Section 4). The paper most closely related to ours is Dranove, Garthwaith, and Ody (2016) who examine the effects of the 2008 financial crisis on hospitals' overall revenues and costs, the adoption of new technologies, and the provision of certain services. They find that the crisis negatively affected technology adoption and caused closures of some unprofitable services

[3] "Hospital Discharges Rise at Lucrative Times" by C. Weaver, A. Wilde Mathews, and T. McGinty, WSJ, 2/17/2015

(such as trauma centers), consistent with our finding of the overall reduction in capital investments post 2008. They find no effect on average costs or revenues. Our paper also uses the financial crisis to identify financial shocks, but we examine patient-level treatment choices and outcomes rather than overall revenues and costs.

This paper proceeds as follows. Section 2 provides background on treatment intensity in the heart attack and child delivery settings. Section 3 describes the data sources and the samples. Section 4 describes the effect of financial crisis and subsequent economic downturn on the hospitals financial performance and investment. Section 5 describes the results on the effects of hospitals' financial health on treatment intensity and patient safety. Section 6 focuses on the organizational form and physician arrangements. Section 7 concludes.

2 Background on C-sections and cardiac procedures

2.1 Background on cardiac procedures

A heart attack or acute myocardial infarction (AMI) is defined as a damage or death of part of the heart muscle caused by insufficient blood flow to the heart. The blood flow is usually impaired by a blockage of the coronary arteries. Heart attack patients may be treated non-invasively using drugs that dissolve possible blood clots (thrombolytics), or they may receive an invasive cardiac procedure to improve blood flow to the heart (revascularization). The invasive procedures are bypass surgery (Coronary Artery Bypass Graft, CABG) or angioplasty (Percutaneous Transluminal Coronary Angioplasty, PTCA). All patients who receive revascularization also receive an invasive diagnostic procedure (cardiac catheterization) that images blood flow and determines the location of the artery blockage. Chandra and Steiger (2008) note that catheterization is "a well-understood marker for surgically intensive management of patients" (p. 9; see also, MacClellan et al. (1994), MacClellan and Newhouse (1997)). Following this literature, we use catheterizations as a measure of AMI treatment intensity.

The choice between an invasive and a non-invasive treatment path involves many clinical factors, including the severity of the heart attack, patient age, and other diagnoses. Thus, some patients are medically more suitable to receive catheterizations than others. Our premise is that, for the marginal patient, the invasive treatment tends to be more profitable to hospitals than the non-invasive treatment.

Hospitals do not disclose true profits from specific procedures, and profits likely vary with the hospital's capacity, specialization, and patient mix. However, many studies and anecdotal evidence suggest that cardiac surgery is one of the most profitable medical services hospitals provide.[4] For example, Horowitz (2004) examines a variety of sources to determine the relative profitability of various hospital services and concludes that "cardiac surgery – including cardiac catheterization labs, angioplasty, and coronary artery bypass graft (CABG) – are widely known to be hospital profit centers."[5] (See also Dranove et al. (2013).) Consistently, the *New York Times* (*NYT*) reports evidence that doctors at a large for-profit hospital chain performed catheterizations on patients who did not need them, suggesting a profit motive ("Hospital Chain Inquiry Cited Unnecessary Cardiac Work," *NYT*, August 7th, 2012). Similarly, the *Wall Street Journal (WSJ)* quotes nonprofit hospital administrators arguing that for-profit providers "cherry pick" the lucrative cardiac services, which then hurts the nonprofits' bottom line (*WSJ,* June 22nd, 1999).

Extensive research in health economics investigates the medical and economic choices involved in treatment of heart attacks. Several studies focus on understanding the effects of the invasive treatments on patient outcomes and healthcare costs. McClellan and Newhouse (1997) examine hospitals that acquire capacity to provide intensive cardiac treatment, such as catheterizations or revascularizations. By comparing trends in these hospitals to those in non-adopters, they find modest improvements in patient survival rates and substantial increases in treatment costs as reported by hospitals to Medicare.[6] Cutler, McClellan, and Newhouse (2000) show that reimbursements for treatments of heart attacks vary substantially across insurance plans (e.g. they are about 40% lower for HMOs vs. traditional indemnity plans), but that services and patient outcomes are similar across plans. Molitor (2011) documents the variation in catheterization rates across 306 U.S. geographic regions and investigates how physician practice styles vs. local factors contribute to this variation. The paper shows that overall catheterization rates increased from 16% in 1992 to 52% in 2008, and that the cross-regional standard deviation was 8%. Using information on cardiologists moving across regions, he finds that much of that variation was

[4] Cuttler et al. (2001) report that in their sample of Medicare patients in 1994, Medicare reimbursement was $36,564 for a bypass surgery, $26,661 for angioplasty, $15,887 for catheterization only, and $10,155 for a non-invasive treatment. However, hospitals do not disclose the costs associated with these procedures, so profits cannot be determined.

[5] Her sources include medical and social science literature, Medicare Payment Advisory Commission and Prospective Payment Assessment Commission reports to Congress, as well as interviews with hospital administrators and doctors.)

[6] McClellan and Newhouse find a 5 percentage point increase in day-one survival rates for AMI patients in hospitals adopting catheterization capabilities. However, the effect seems to result "not from catheterization or revascularization but from correlated beneficial technologies at catheterization hospitals" (p. 63). McClellan et al. (1994) arrive at similar conclusions using a different methodology.

determined by local factors, such as hospital capacity or specialization, rather than physician-specific style.

Finally, Chandra and Staiger (2007) develop a model of specialization in healthcare in which productivity spillovers cause geographic areas to specialize in low- or high-intensity treatments. Consistent with the model, they find that AMI patients receiving catheterizations in high-intensity areas are medically less appropriate for intensive treatment. High-intensity areas exhibit higher overall survival returns from intensive treatment but appear less skilled in medical (i.e., non-intensive) treatment.

2.2 Background on C-sections

Based on the 2007 National Hospital Discharge Survey, child delivery was the number one reason for hospitalizations in the U.S., accounting for 4.1 million of all hospital discharges in that year. Of those discharges, 1.4 million were for delivery by Caesarian section, making C-section one of the most frequently performed major surgical procedures in the U.S. The frequency of C-sections increased dramatically over the past few decades. Gruber and Owings (1996) report that C-sections accounted for 5.5% of deliveries in 1970 and that the rate increased four-fold over the subsequent 30 years, reaching over 23% in 1991. The rise in C-sections continued at a slower pace over the subsequent two decades, and it is now close to 30%.

A widespread view among researchers and public health experts is that the current C-section rate in the U.S. is too high: though many C-sections are performed for medically good reasons (such as prior C-section, breech presentation, or fetal distress), it appears that a significant fraction do not improve health outcomes and may even increase certain risks to the mother and the infant (see Gruber and Ownings (1996), Currie and MacLeod (2006) and others). Citing these reasons, the U.S Department of Health and Human Services set an objective to reduce the C-section rate nationally by ten percentage points by 2020.[7]

Financial incentives of healthcare providers are often cited as one of the key reasons for the high and rising C-section rates in the U.S (along with malpractice lawsuits and technological improvements in

[7] U.S. Department of Health and Human Services. Healthy People 2020 Topics & Objectives: Maternal, Infant, and Child Health. A similar efforts were made by the Joint Commission – a nonprofit organization that accredits and certifies health care organization (see The Joint Commission, "Improving performance on perinatal care measures." The Source, July 2013) and by the American College of Obstetricians and Gynecologists (see American College of Obstetricians and Gynecologists (ACOG) Committee on Practice Bulletins. ACOG Practice Bulletin. No. 107. Induction of Labor. Obstetrics & Gynecology, 2009114:386-97

the diagnosis of birth complications). Reimbursement rates for C-sections – by both Medicaid and private insurers – are typically much higher than those for vaginal deliveries. Though C-sections are likely more costly to providers (for example, they require longer hospital stay), in general, they are also more profitable (see, for example, Keeler and Brodie (1993)). This is also the assumption we maintain throughout this paper.

Importantly for our analysis, a number of state and national agencies and advocacy groups have been encouraging health care providers to reduce C-section rates, and these pressures intensified in recent years (*New York Times*, 3/12/2014).[8] In 2010, the Leapfrog Group began asking hospitals to voluntarily report statistics on early elective deliveries which are associated with higher C-section rates.[9] Also in 2010, the Joint Commission – a nonprofit organization that accredits and certifies health care organizations – recommended that hospitals report statistics on early elective deliveries and C-section rates among first-time mothers. In 2012, the commission announced that reporting will become mandatory for large hospitals in 2014.[10] In August 2009, the state of Washington equalized Medicaid reimbursement rates for "uncomplicated" C-sections and vaginal deliveries in an effort to reduce financial incentives to perform C-sections. As we discuss in Section 5.2, these developments likely affected the overall trends in C-section rates during our sample period.

Similar to cardiac surgery, C-sections are one of the most frequently studied procedures in health economics. One of the pervasive findings is the large unexplained variation in C-section rates across geographic areas. For example, Baiker et al. (2006) find in their 1996-1998 sample of large U.S. counties that C-section rates for newborns with normal birth weight range from 13.4% to 26%, and much of this variation cannot be explained by the patient-level variables (such as complications of labor) or other county-, hospital-, and state-level factors.

A number of studies investigate the importance of provider financial incentives in the C-section choice. In an early study, Stafford (1987) finds that C-section rates are higher for privately insured patients than Medicaid insured patients, suggesting a financial motive. Gruber and Owings (1996) show that state-level declines in fertility rates during 1970-1982 were associated with increases in C-section rates. They argue that this was caused by obstetrician/gynecologists shifting towards the more highly

[8] The *New York Times*, 3/12/2014, "Reducing Early Elective Deliveries" by Tina Rosenberg.

[9] That is, deliveries prior to the 39 week of gestation performed without a medical reason. The group cited recent clinical evidence that links these deliveries to worse health outcome for both mothers and infants. See Clark et al. (2009) and Signore (2010). See also the Leapfrog Group Factsheet, March 2011.

[10] The Joint Commission, "Improving performance on perinatal care measures." The Source, July 2013

reimbursed Cesarean delivery as demand for their services declined. Gruber, Kim, and Mayzlin (1999) find that higher Medicaid reimbursements for Cesarean delivery relative to vaginal delivery are associated with higher C-section rates, again consistent with physicians' choices responding to the fee differentials. Alexander (2013) finds consistent results looking at changes in Medicaid reimbursements. Johnson (2013) finds that mothers that are physicians are less likely to have a C-section than other highly-educated mothers, and that the difference diminishes for hospitals owned by HMOs (that is, hospitals with weaker financial incentives to perform C-sections).

Besides shifts in demand and reimbursements, researchers have also explored the effects of changes in malpractice insurance on C-section rates. Currie and MacLeod (2006) shows that, contrary to common belief, tort reforms that limit physician malpractice risk increase C-section rates. This is consistent with the marginal C-section being riskier than the vaginal birth. Frakes (2013) also documents large shifts in C-section rates in response to state-level changes in malpractice standard rules.

In this paper, we test whether a negative shock to hospitals' financial condition cause shifts towards the more intensive, and arguably more profitable, treatments of patients, such as C-sections and invasive cardiac procedures.

3 Sample and data

3.1 Data sources

Hospital financial statement data comes from the Healthcare Cost Report Information System (HCRIS). HCRIS contains information from cost reports submitted annually to the Center for Medicare and Medicaid Services (CMS) by all Medicare-certified institutional providers, including hospitals. The reports contain detailed data on facility characteristics, utilization, and cost, and also include financial statement information, which we use in our tests. Data on physician arrangements comes from the American Hospital Association (AHA) Annual Survey Database and was provided to us by The Dartmouth Institute for Health Policy and Clinical Practice.

The patient level data come from The Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). The HCUP databases have been developed through a partnership between the federal government, the states, and the healthcare providers sponsored by the Agency for Healthcare Research and Quality. The SID databases contain detailed patient discharge data for all community hospitals of the participating states. The data is translated into a common format to facilitate comparisons across states. All patients, including Medicaid, Medicare, privately insured and uninsured patients are included in the database.

3.2 The HCRIS sample

We start with a sample of 3,272 nonprofit hospitals (19,843 hospital-year observations) from 2005-2011 available on HCRIS. To be included in the sample, we require that the hospital has a minimum of one million dollars in revenues and fixed assets above one million dollars. For the investment regressions in Tables 2 and 3, we eliminate the top and bottom 1% of observations in the dependent variables (growth in total fixed assets, buildings, equipment, and salaries) to minimize the influence of data errors, hospital mergers and closures. The final requirement that all independent variables in Table 2A are non-missing leaves us with the final sample for the asset growth regressions of 3,098 nonprofit hospitals (18,094 hospital-year observations). Leaving out the crisis year of 2008 yields 3,091 nonprofit hospitals (15,466 hospital-year observations).

The descriptive statistics for the HCRIS sample are given in Table 1. In the full sample (top panel), the average nonprofit hospital has net revenues of 164 million dollars and fixed assets of 82.3 million dollars (the medians are 80.7 and 35), the average ratio of net debt to fixed assets is 0.26 and the average ratio of financial investments to fixed assets is 0.53 (the medians are 0.23 and 0.29). The mean ratio of operating income to fixed assets was -0.02 (the median was -0.01), and the mean annual growth rates in fixed assets and net revenues were both 0.06 (the medians were 0.05).

The bottom panel of Table 1 shows descriptive statistics for the sub-sample of hospitals in the seven states for which we have patient-level SID data: Arizona, California, Florida, Maryland, New Jersey, New York, and Washington. This sample consists of 739 hospitals and 4,379 hospital-year observations. The hospitals are somewhat larger than those in the full sample (for example, the average service revenue is 232 million dollars vs. 164 million dollars in the full sample), have somewhat higher financial leverage and lower ratio of financial investments to fixed assets. Measures of capital investments are similar across the two samples.

3.3 The SID samples of child deliveries and heart attacks

The tests involving patient-level information are based on a subsample of hospitals in the seven states for which we have SID data: Arizona, California, Florida, Maryland, New Jersey, New York, and

Washington in the years 2005 through 2011. The diagnosis and procedure codes in SID are based on the International Statistical Classification of Diseases (ICD-9-CM).

The AMI sample includes 1,071,550 admissions to 451 nonprofit hospitals. As in Chandra and Staiger (2008), we measure the use of an intensive AMI therapy with an indicator for whether an AMI patient receives a cardiac catheterization, an invasive diagnostic procedure described in more detailed in Section 4.1. In our sample, 49% of AMI patients receive catheterizations. For the regressions in Tables 5 and 6, we limit the sample to hospital-years with at least 50 AMI admissions and an average catheterization rate during our sample period of at least 2%. This results in 1,006,958 admissions to 313 nonprofit hospitals. The number of admissions is 859,875 in regression that exclude the year 2008.

The full sample of child delivers includes 4,853,365 admissions to 378 nonprofit hospitals, 33.5% of which are C-sections. Following Baiker, Buckles, and Chandra (2006), Alexander (2013) and others, we exclude patients with previous C-sections because for these admissions, the C-section probability is close to one (it is 91.4% in our sample). This results in 4,085,253 admissions, 22.6% of which are C-sections. Finally, for the regressions in Tables 8 and 9 we limit the sample to hospitals with at least 50 delivery patients and an average C-section rate during our sample period of at least 2%. This results in a sample of 4,085,035 admissions to 294 nonprofit hospitals. The number of admissions is 3,495,620 in regressions that exclude the crisis year 2008. We follow Frakes (2013) to identify risk factors and complications associated with the probability of obtaining a C-section such as maternal age, breech presentation, multiple deliveries, or placenta previa, and we include indicators for these conditions as control variables in all regressions.

3.4 The SID samples of Patient Safety Indicators

We measure patient outcomes using a set of five Patient Safety Indicators (PSI) provided by the Agency for Healthcare Research and Quality (AHRQ). The purpose of the indicators is to flag adverse events resulting from patient exposure to the healthcare system that are highly preventable, and thus indicate potential errors or quality concerns (for example Postoperative Sepsis (PSI13)). The algorithm to construct the indicators from the HCUP data was developed by the University of California, San Francisco (UCSF)-Stanford Evidence-Based Practice Center (EPS), in collaboration with the University of California at Davis, and the project was commissioned by the AHRQ. The development process involved several stages, starting with identifying over 200 potential indicators, empirically testing their validity, reviewing the clinical literature, and finishing with a review of the indicators by multiple clinical panels (Encinosa and Bernard (2005)).[11] Of the 19 PSI indicators currently provided by AHRQ, we limit our analysis to indicators for which the frequency of the adverse event in our sample is higher than 0.5%. We exclude PSI03 (Pressure Ulcer Rate) because the underlying algorithm changed in 2009. The final list of the six remaining indicators is in Table 11.

4 Financial crisis, hospital financial assets, and capital investments

Our main tests rely on the shock to nonprofit hospitals' financial condition caused by the financial crisis of 2007-2008. The U.S. stock market declined nearly 50% by the end of 2009 from its peak in late 2007 and syndicated bank lending dropped by 47% in the fourth quarter of 2008 relative to the fourth quarter of 2007 (Ivashina and Scharfstein (2009)). The financial crisis affected nonprofit hospitals in three important ways. First, nonprofit hospitals hold large financial assets, such as endowments, and the value of those assets declined significantly during the 2008 stock market crash. Figure 1 shows that the ratio of financial investments to fixed assets reported on HCRIS declined from 0.56 in 2007 to 0.47 in 2008, a 17% decline.[12] This decline had a direct effect on the hospitals' cash flows. Even prior to 2008, most nonprofit hospitals report significant operating losses (also in Figure 1) and the need to rely on income from financial investments to offset those losses. Additionally, most nonprofit hospital spending rules tie funds available for spending to the past market values of the nonprofits' endowments (see Adelino, Lewellen and Sundaram (2015)), so a decline in the value of financial assets in 2008 had a direct impact on those funds, constraining hospital spending and investments.

Second, the credit crunch of 2008 increased borrowing costs and limited hospitals' access to credit. Nonprofit hospitals rely heavily on borrowing to finance investments and day-to-day operations. The ratio of financial debt to fixed assets prior to the financial crisis (in 2007) was 0.58 for the average hospital in our sample (the ratio of financial debt minus temporary investments was 0.3). A report by Wells Fargo Securities (2011) shows that there were close to 550 bond issues by nonprofit hospitals in 2007, accounting for over $40 billion in aggregate proceeds. A substantial fraction of hospital bond issues prior to the crisis were variable-rate bonds (47% of the issues in 2007 were fixed rate, WFS

[11] The development process is described in: http://www.qualityindicators.ahrq.gov/Modules/psi_resources.aspx. For the algorithm to construct the indicators see: AHRQ, "Patient Safety Indicators: Technical Specifications," March 2008 and AHRQ, "Quality Indicators Software Instructions, SAS QI, Version 5.0," March 2015.

[12] The actual drop in the financial assets' value might have been larger if not all financial investments reported on HCRIS were marked-to-market.

(2011)), so many hospitals experienced a dramatic increase in borrowing costs as bond yields rose in 2008.[13]

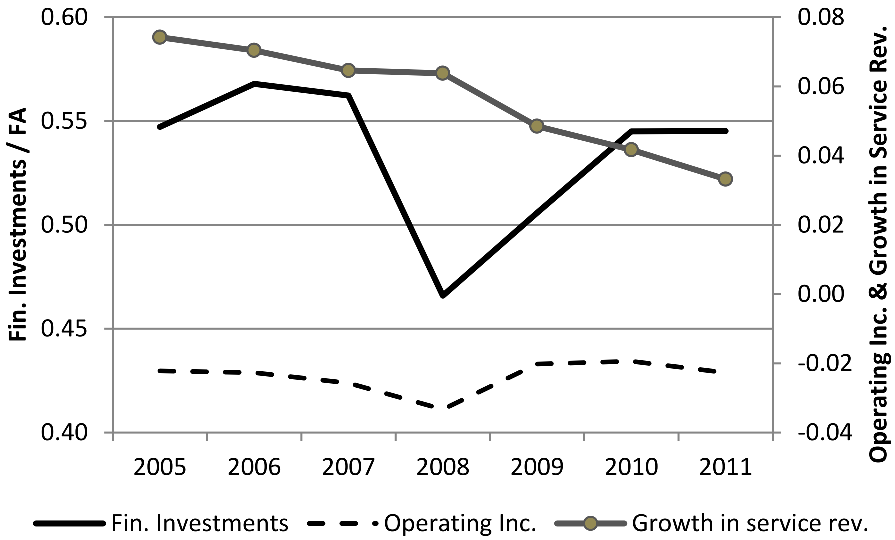

Fig. 1: Nonprofit hospitals' financial performance from 2005-2011. The sample includes 3,272 nonprofit hospitals from 2005 through 2011. Financial Investments is the dollar amount of financial investments scaled by fixed assets. Operating Income is the difference between service revenue and service expenses scaled by lagged net fixed assets. Service Revenue is revenue from medical services.

Third, the economic downturn following the financial crisis likely led to a decline in the demand for hospital services and in patient revenues. The Bureau of Labor and Statistics reports that the unemployment rate increased from 5% in December of 2007 to 9.9% in December of 2009, which meant that many Americans lost their employment based health insurance. As a result, more patients might have scaled back demand for healthcare services, were unable to pay for those services, or sought coverage through Medicaid. According to the U.S. Census Bureau, the proportion of Americans with employment based health insurance reached a bottom of 56.1% in 2009, declining from 59.8 in 2007. At the same time, the proportion of Americans insured through Medicaid increased from 13.4% in 2007

[13] Consistent with these effects, a survey by the American Hospital Association (AHA) reports that a significant fraction of the surveyed hospitals experience some negative consequences of the credit crunch, including increased interest expense for variable-rate bonds (33% of hospitals), increased collateral requirements (12%), inability to issue bonds (11%), and difficulty refinancing auction rate debt or roll-over or renew credit (11% and 10%). Moreover, 60% of the surveyed hospitals with defined benefit pension plans (or 31% of all surveyed hospitals) report a need to increase pension funding levels as a result of the losses on their financial investments. American Hospital Association (November 2008). "Rapid Response Survey, The Economic Crisis: Impact on Hospitals."

and 15.7% in 2009.[14] Reflecting these trends, Figure 1 shows that operating profitability declined in 2008, but recovered to the pre-crisis levels in the subsequent year. Growth in service revenue exhibits a steady downward trend throughout our sample period with a somewhat larger decline in 2009.

4.1 Financial crisis and nonprofit hospital investment

Though our main focus is on the immediate effects of the crisis on treatment quality, we begin by exploring changes in various components of hospital spending, such as growth in fixed assets, and spending on buildings, equipment, and salaries to provide a more complete picture of the hospitals' response to the financial crisis.

Adelino, Lewellen and Sundaram (2015) show that hospitals tend to reduce capital investment in response to cash flow shocks, suggesting that we should observe large investment cuts post 2008. Figure 2 shows that this is, in fact, the case. In the figure, hospital average investment (capital expenditure) rate – measured as the growth in fixed assets – increases from 6.5% in 2005 to 7.9% in 2007, and then declines abruptly reaching 3.6% in 2009. There is a similarly large drop in spending on equipment and salary growth. Spending on buildings seems to decline more gradually. This is perhaps not surprising since large construction projects involve long-term planning and are more difficult to adjust in response to short-term financial or demand shocks.

The regressions in Table 2A examine the statistical significance of these patterns. In the table, the dependent variables are three measures of investment – growth in fixed assets, buildings, and equipment (scaled by lagged fixed assets) – and growth in salaries. The dependent variables include a linear time trend and a dummy variable *Post_Crisis* set to one for the years 2009-2011 and set to zero for the years 2005-2007 (the crisis year 2008 is excluded from the panel). All regressions include lagged operating income, revenue growth and size (measured as the log of service revenue) to control for the time-varying operating cash flows and investment opportunities. In addition, the regressions in the right panel include hospital fixed effects.

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[14] To mitigate the effects of the recession on Medicaid, The American Recovery and Reinvestment Act (ARRA), enacted in February of 2009, provided financial relief of $103 billion to the state Medicaid programs. Based on the Kaiser Commission on the Medicaid and the Uninsured survey, the ARRA funds helped prevent reimbursement rate increases in several states (47 states report rate increases and 21 states reported rate reductions in 2009, and the numbers are 36 and 39 for 2010).

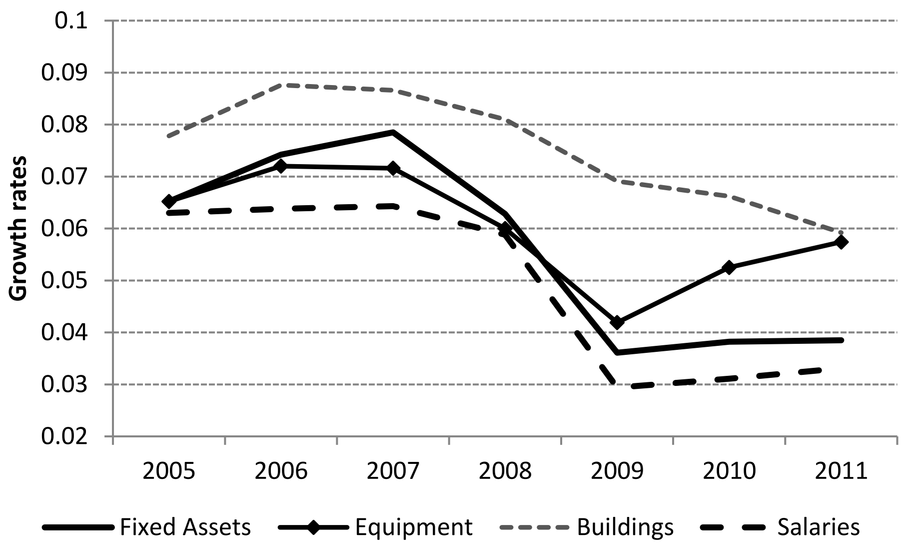


Fig. 2: Nonprofit hospitals' investment from 2005-2011. The sample includes 3,272 nonprofit hospitals from 2005 through 2011. The figure shows growth rates in Fixed Assets, Equipment and Buildings, each scaled by lagged fixed assets, and growth in salaries. *Fixed Assets* is gross land, buildings, and equipment minus accumulated depreciation. *Equipment* includes cars and trucks, major movable equipment, minor equipment, and minor nondepreciable equipment.

Similar to Figure 2, the regressions show a large and abrupt decline in spending rates post 2008 for all components of spending. Based on the left panel with hospital fixed effects, growth in fixed assets declines by 4.8% post-2008, which corresponds to a 61% drop relative to the 2007 level. The effects are similar for spending on equipment and spending on salaries (4.3% and 3.8%), and all three coefficients are significant at the 1% level. The decline is smaller (1.6%) for growth in buildings and it is significant at the 10% level. The estimates are similar when hospital fixed effects are excluded. They are also largely similar when the analysis is limited to the seven states used in the patient-level analysis in Table 2B.

As discussed earlier, the financial crisis and the subsequent recession could have affected hospital investments and product market choices through multiple channels. This includes the "financial channel", i.e., the immediate effect of the stock market crash and the credit crisis on the hospitals' financial condition and access to credit, but also the longer-term demand effects caused by the economic downturn and the rise in unemployment. In addition, the legal and regulatory uncertainties leading up to the signing of Obamacare in March of 2010 might have contributed to the decline in investment rates.

To isolate a component of the financial channel, Table 3 repeats the regressions in Table 2 including a measure of the performance of hospital financial investments in 2008 and the interaction of this measure with the post-2008 dummy. We measure the performance of financial investments as the investment income in 2008 scaled by lagged fixed assets (*Inv_inc08*) The regressions include dummy variables for the second and the third terciles of this measure and the interactions of these tercile dummies with the *Post_Crisis* indicator. All regressions also include year fixed effects and the time-varying hospital characteristics. Hospital fixed effects are included in the left panel.

Based on Table 3A, the post-crisis investment decline was significantly lower for hospitals with better 2008 investments performance. Based on the left panel, growth in fixed assets in the post- vs. the pre-crisis period was 4.3% higher for hospitals in the top tercile of *Inv_Inc08* compared to hospitals in the bottom tercile (the t-statistic in column three is 3.9), thus reversing the average post-crisis drop in asset growth estimated in Table 3A. Interestingly, we find a similarly strong interaction effect of *Post_Crisis* with the third tercile of *Inv_Inc08* for the growth rate in buildings (the coefficient of 4.0% and a t-statistic of 4.2) and weaker and statistically insignificant effects for growth in equipment and growth in salaries (coefficients of 0.7% and 0.4% and t-statistics of 0.9 and 1.2).

Combined with the evidence in Table 2A, this suggests that the cutbacks in equipment and salaries spending following the financial crisis were large and uniform across all hospitals in our sample, i.e., even hospitals that incurred less significant financial losses in 2008. These across-the-board spending cuts were likely caused by the tightened credit constraints in 2008 and, possibly, by the subsequent economic downturn that affected the industry as a whole. In contrast, the decisions to scale back larger investment projects, captured by our measures of buildings and fixed-assets growth, were highly sensitive to the performance of the hospitals' financial assets in 2008: hospitals with better performance were able to continue these projects at their pre-crisis rate, while hospitals with poor performance scaled back. Given that large projects might be more costly to halt or reverse, our results suggest that hospitals might have done so only when financial constraints were extremely tight. Finally, based on Tables 2B and 3B, the general patterns are similar when we limit the sample to the seven states we use for the patient-level analysis.

5 Financial crisis and patient treatment

5.1 Evidence on cardiac treatment

This section describes the evidence on the use of catheterizations around the financial crisis in 2008. Our sample of 1,071,440 heart attack patients is described in Table 4. The average patient is 70 years old, 43% of patients are female, and 63% of patients are insured by Medicare (private insurance represents 24% of the sample and Medicaid 6.2%). Of all heart attack patients admitted to the hospital, 49% receive catheterizations. Consistent with previous evidence on the variation of treatment choice across regions, the catheterization rates in our data vary from 41.5% in Maryland to 55.4% in Arizona.

In addition to the raw catheterization rates, we construct a patient-level measure of adjusted catheterizations, using a logit regression of the catheterization indicator on dummies for patient race, sex, insurance status, and age group. This is an important element of this study, namely that we can consider detailed patient-level controls to compute "excess" catheterizations, and address the issue of quality of treatment while controlling for patient mix. The adjusted or "excess" catheterization rates range from -6.6% in Maryland to 5.6% in Arizona. Splitting the hospitals at the median of service revenues shows that catheterizations are substantially more frequent in large hospitals than small hospitals (54.5% vs. 30.5% for raw catheterizations and 4.8% vs. -16.2% for adjusted catheterizations). Thus, hospital size is strongly positively linked to the intensity of the cardiac treatment, consistent with the specialization argument in Chandra and Staiger (2007).

Turning to the time-series patterns, Figure 3 shows that the overall catheterization rates increased somewhat during our sample period, but that the increase was caused entirely by small and generally less intensive hospitals. For large hospitals, both the raw and the adjusted rates remained flat throughout our sample period (close to 51% and 5%, respectively). Since 77.2% of patients in our sample were treated at large hospitals, this means that treatment choice was basically unchanged during this period. In contrast, small hospitals experienced a 13 percentage point increase in catheterization rates during our sample period: for example, the rates were close to 28% in 2007 and 2008, and they increased to 31% in 2009 and 34% in 2010.

Table 5 shows regressions of the catheterization dummy on a time trend and a post-crisis indicator equal to one for years 2009-2011 and equal to zero for years 2005-2007. All regressions are clustered at the hospital level. This specification excludes 2008 from the panel, and Appendix Table A1 presents similar regressions with 2008 included as the pre-crisis year. Patient characteristics and hospital fixed effects are included in the left panel; the right panel excludes hospital fixed effects. The regressions mirror the evidence from Figure 3: based on the left panel, small hospitals exhibit a significant increase in catheterization rates of 1.3 percentage points a year during our sample period. Controlling for the time trend, there was a 2.0 percentage point increase in catheterization rates post crisis, though the effect is not statistically significant when 2008 is excluded from the panel. The effect is statistically significant when 2008 is included in the pre-period in Table A1 (the t-statistics are 1.9 for all hospitals and 2.4 for small hospitals in columns 1 and 3). Large hospitals show no significant trend and a smaller and

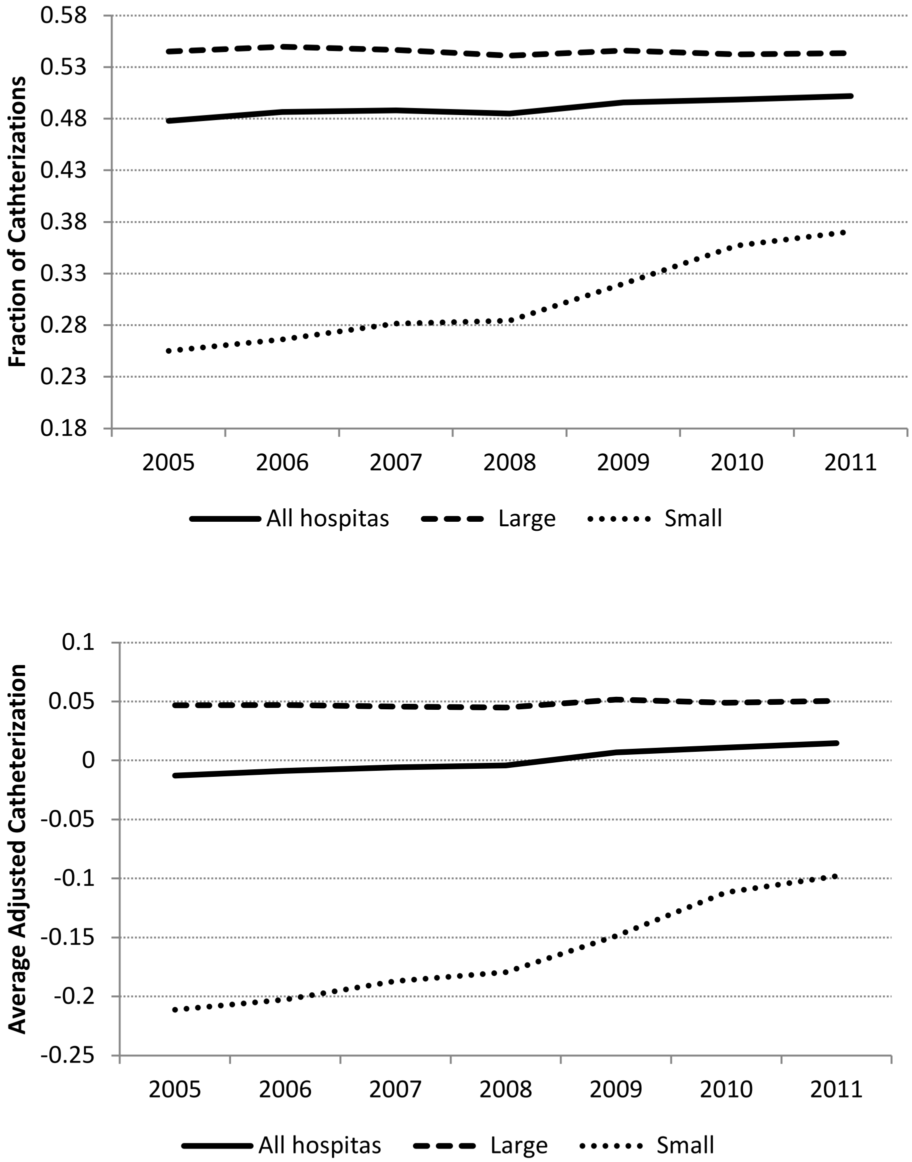


Fig. 3: Catheterizations frequency for heart attack patients from 2005-2011. The sample consists of 1,071,550 heart attack admissions to 451 nonprofit hospitals in seven states (listed in Table 4) from 2005 to 2011. Large and small hospitals are hospitals with the above- and below-median service revenues in the prior year. Adjusted catheterization is the difference between the patient's catheterization indicator (equal to one when the patient receives catheterization) and his predicted probability of catheterization from a logit regression of the catheterization dummy on dummy variables for the patient's age group, sex, race, and insurance status.

statistically insignificant post-crisis effect, independently of specification (in Table 5, it is 0.4% with a t-statistic of 0.7).

Table 6 interacts the *Post_Crisis* indicator with the dummies for the second and the third terciles of investment returns in 2008. We run separate regressions in the full sample of cardiac patients (Panel A) and the sub-sample of privately insured, and thus generally more profitable, patients (Panel B). The regressions include year dummies, patient attributes and time-varying hospital characteristics from Table 4. There is no evidence that the post-crisis increase in catheterization rates for small hospitals was caused by the subset of hospitals with low investment returns in 2008: the interactions of *Post_Crisis* with the indicator for the third return tercile are close to zero in regressions with and without hospital fixed effects. There is some evidence that large hospitals with high returns in 2008 reduced catheterization rates after the crisis (relative to large hospitals with low returns), but the effect is statistically significant only in the full-sample regression with no hospital fixed effects. Including year 2008 in the pre-crisis period yields similar results (Table A2).

Overall, the evidence in this section suggests that the financial crisis had little to no effect on treatment decisions for the majority of the AMI patients. Smaller hospitals may have responded by increasing intensity, but the effect was modest (2 percentage points relative to the baseline 49% catheterization rate). Even for those hospitals, however, it is not clear whether the shift was harmful to patients. As we discuss earlier, such harmful effects would occur if the financial shock moved hospitals away from their optimal intensity level (as in Chandra and Staiger (2008)). Since small hospitals start off with catheterization rates significantly below the national average, this assumption might not hold in this sub-sample. To gain further insight into this question, Section 5.3 examines direct effects of the crisis on patient safety outcomes.

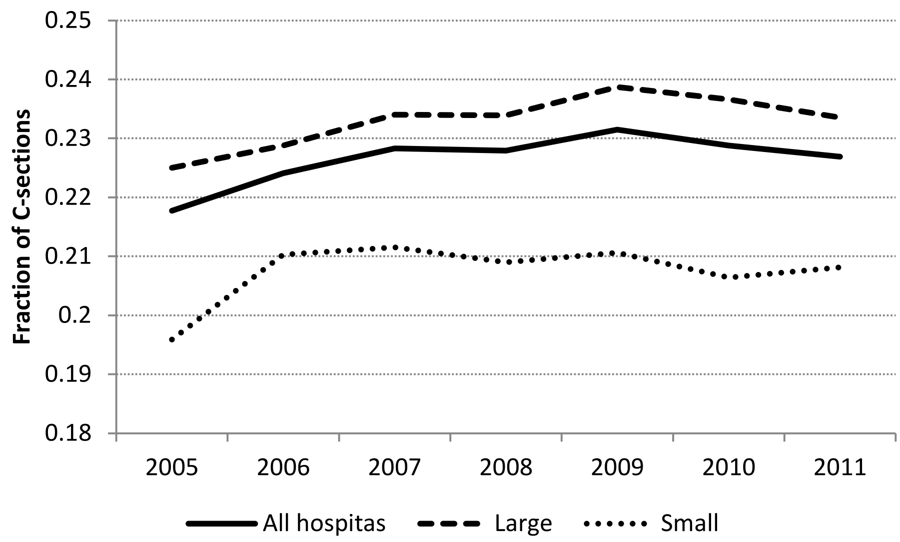
5.2 Evidence on C-sections

In this section we repeat the analysis in Tables 5 and 6 using the choice of a C-section vs. vaginal birth as the more intensive treatment option. The C-section rate in our sample of 4,085,253 admissions, which excludes secondary C-sections, is 22.6%, consistent with prior literature (e.g. Alexander (2013)). As with the cardiac sample, we construct an adjusted C-section rate by regressing the C-section dummy on a range of indicators for birth complications, mother's age, race, insurance status, and other diagnoses (described in more detail in Section 2.3). 53.4% of the patients in our sample are covered by private insurance and 41.3% are covered by Medicaid. As with catheterizations, we can think of these adjusted (or "excess") C-section rates as keeping patient mix fixed, and capturing deviations from the average treatment.

There are two important differences between the child delivery setting and the cardiac analysis in the previous section. First, in the case of child deliveries, our sample period coincided with a number of initiatives by various government agencies and advocacy groups aimed at reducing the nationwide rates of C-sections and early elective deliveries (these developments are summarized in Section 4.2). Thus, the overall trend in the use of C-sections during this period likely reflects the hospitals' response to these efforts, in addition to any financial incentives caused by the financial crisis. Though the combined effect of these competing forces is ambiguous, our cross-sectional predictions remain unchanged: if a hospital's financial condition affects the treatment choice, hospitals with poorer financial performance during the financial crisis should show less willingness to lower their C-section rates post 2008 in response to the non-pecuniary pressures. Moreover, the financial crisis is sudden and largely unexpected (in contrast to the ongoing pressures from the advocacy groups), so our time-series tests using trends and a post-2008 indicator should still be able to pick up sudden shifts in the C-section rates post 2008. We test these hypotheses in Tables 8 and 9.

Another noteworthy difference to the cardiac setting is that, in the case of child deliveries, treatment intensity (that is, the propensity to use C-sections) is less strongly linked to hospital size – our broad indicator of treatment intensity used in the previous section. Based on Table 7, small hospitals are less likely to perform C-sections than large hospitals, but the difference is relatively small (it is 20.7% vs. 23.3% for raw C-sections, and it is -0.6% vs. 0.02% for adjusted C-sections). In the tables below, we present separate results for small vs. large hospitals, but we also use an alternative indicator of intensity which is based on the hospital's location in high- vs. low-intensity states. In our sample – as in previous studies – the geographic variation in C-section rates is significant: the raw C-section rates vary from 18.5% in Arizona to 25.7% in Florida and New Jersey, and the adjusted rates vary from -3.4% in Washington to 2.4% in Florida.

Finally, as we mention in Section 4.2, the state of Washington equalized the Medicaid reimbursement rates for C-sections and vaginal deliveries in August of 2009 in an effort to reduce the use of C-sections. Since this likely lowered the hospitals' financial incentives to perform C-sections in the post-crisis period, we run robustness tests that exclude the state of Washington in Appendix Tables A5 and A6.



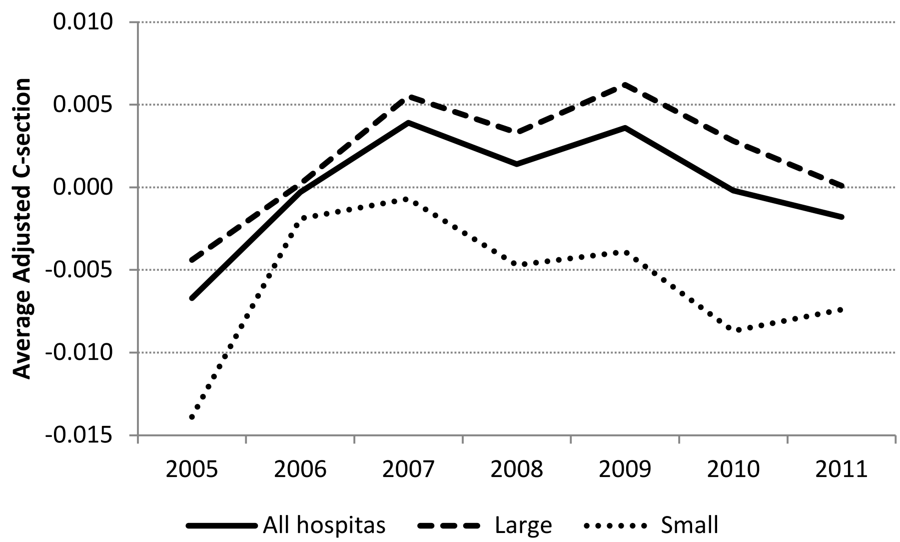


Fig. 4: C-sections frequency for child deliveries from 2005-2011. The sample consists of 4,085,253 child delivery admissions to 378 nonprofit hospitals in seven states (listed in Table 7) from 2005 to 2011. Large and small hospitals are hospitals with the above- and below-median service revenues in the prior year. Adjusted C-section is the difference between the patient's C-section indicator (equal to one when the patient receives a C-section) and her predicted C-section probability from a logit regression of the C-section dummy on dummy variables for the birth complications and mother's diagnoses listed in Table 7, the mother's age group, race, and insurance status.

The time-series of C-section rates are depicted in Figure 4. Based on the figure, the raw rates increased modestly from 21.8% in 2005 to 23.2% in 2009 (continuing an upward trend from early 1970s (Gruber and Owings (1996)) and then declined slightly to 22.7% in 2011. The regressions in Table 8 confirm this pattern: they show a small but statistically significant increase in C-section rates of 0.1% a year during our sample period, and controlling for the time trend, a small and statistically insignificant decline of about 0.3% in the post crisis period (t-statistics of -1.4 in column one and -1.52 in column four). All regressions are clustered at the hospital level.

Table 9 tests whether hospitals that were more strongly affected by the financial crisis – as measured by their investment returns in 2008 – showed a weaker tendency to reduce C-sections post 2008. As for cardiac procedures, we regress the C-section indicator on a Post-Crisis dummy and its interactions with the second and the third return tercile dummies. In Panel B, we run separate regressions for the sub-sample of private patients. In general, the interaction coefficients are small and statistically insignificant, consistent with our previous conclusions that a hospital's financial condition played little role in the treatment choice.

To explore this pattern further, we examine separately the sub-sample of high- and low-intensity hospitals as the two groups may have responded differently to the financial and non-financial shocks. Table 10 shows separate regressions for hospitals in states with below-average and above-average adjusted C-section rates. We exclude California from this analysis because its residual rate is close to zero, and, in a subset of regressions, we also exclude Washington because of the Medicaid reform in 2009. Interestingly, we find that hospitals in the low-intensity states reduced their C-section rates further in the post-2008 period. In this sub-sample, the coefficient on the *Post-Crisis* dummy indicates a decline of 1.4% post 2008 with a t-statistic of -3.14 (column one). The decline in the high-intensity states was smaller (0.4% in column one) and statistically insignificant. The interactions of *Post_Crisis* with the return tercile dummies suggest that financial performance in 2008 had some effect on the subsequent shift in the choice of treatment, particularly for large hospitals. Based on column 3, the coefficient on the interaction of *Post_Crisis* with the third-tercile dummy is -0.015 with at t-statistic of -2.18, suggesting that the large hospitals reduced their C-section rates only if their investment performance in 2008 was good.

To summarize, the evidence in this section reinforces our conclusions from the cardiac analysis: in general, hospitals show no tendency to shift towards the more intensive and more profitable treatments in response to the negative financial shock. In fact, in the case of child deliveries, the intensive treatment rate declined rather than increased post 2008, likely reflecting the nationwide pressures to limit C-section use. Financial condition of a hospital played a limited role in this shift: we find evidence that poor financial performance during the financial crisis constrained some hospitals from reducing their C-section rates to the, arguably, socially more desirable levels.

5.3 *Evidence on patient safety*

Our final set of tests investigates the effects of the hospital financial shortfalls caused by the 2008 financial crisis on patient outcomes measured using the Patient Safety Indicators (PSI) provided by the AHRQ. Examining patient outcomes is interesting in our setting because they represent direct measures of quality of medical services. There are at least two channels through which patient outcomes, and in particular the incidence of the adverse events captured by the PSI, could deteriorate as a result of a negative financial shock to a hospital. First, a financial shortfall can induce a hospital to scale back on capital investments (such as equipment or technology) and medical staff, both of which could adversely affect the quality of care. In fact, a number of studies have documented a positive relation between reductions in nursing staff and the incidence of patient safety events (see survey in Stanton and Rutherford (2004)). Given the large cuts in capital investments and salaries following the 2008 financial crisis documented in Section 4, it is reasonable to expect some adverse effects on patient outcomes. The second channel through which the financial crisis could affect patient outcomes is via (financially motivated) shifts in medical treatment choices, which is the mechanism we explore in the previous subsections. To the extent that the previous analysis 4 failed to detect these effects, this section offers an alternative test.

As described in Section 2.4, the PSI are designed to track the incidence of highly preventable negative health outcomes resulting from patients' exposure to the healthcare system. They were developed to identify potential patient safety concerns in hospitals and other healthcare organizations. Each indicator focuses on a particular clinical setting and is defined for a corresponding subset of patients. For example, PSI #9 (Perioperative Hemorrhage or Hematoma Rate) tracks the incidence of hemorrhage or hematoma in a broad sample of surgical patients, while PSI #19 (Obstetric Trauma Rate – Vaginal Delivery Without Instrument) focuses on vaginal delivery discharge patients. As explained in Section 2.4 out of the 19 indicators provided by the AHQR, we examine a subset of five indicators with incident rates higher than 0.5% and with a sample size larger than 100,000 patients across all hospitals in our SID sample during 2005-2011.

Table 11, Panel B shows the incidence of each patient safety event in our sample, and Figure 5 shows the time-series of each indicator around the financial crisis of 2008. The sample of patients for each indicator is different based on the set of patients that are "at-risk", as defined by AHRQ itself. Figure 5 shows no evidence of an abrupt increase in patient safety concerns post 2008: the indicators exhibit fairly smooth time trends, with the exception of PSI_12 which declines in 2010. This general pattern also emerges from the regression analysis in Table A7. The regressions are analogous to those in Tables 5 and 8 for the cardiac and C-section analyses. The dependent variable in each regression is an indicator for the adverse event, and the independent variables include the *Post_Crisis* dummy, the time trend, and a set of patient level controls and hospital fixed effects (in the left panel). As before, standard errors are clustered at the hospital level in all regressions. The regressions reveal negative time trends for some of the indicators, but the coefficients on the *Post_Crisis* dummy in the overall sample and in the subsample of large hospitals are insignificant and close to zero. For small hospitals, the coefficients are positive for four out of the five indicators, (t-statistics ranging from 0.9 to 1.5 in the left panel), suggesting a weak post-crisis increase in the incidence of safety events.

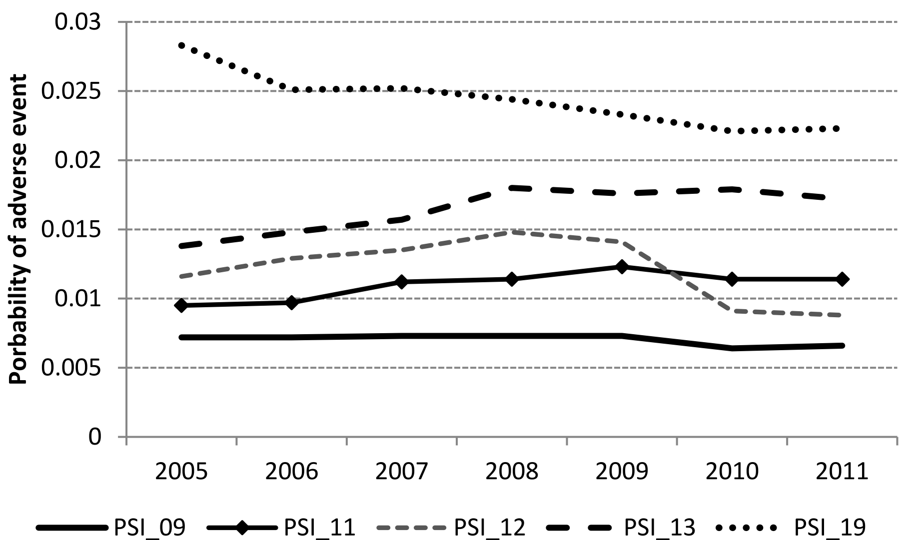


Fig. 5: Patient Safety Indicators (PSI) for 2005-2011. The figure shows the time-series of five patient safety indicators for the sample of hospitals in the seven states for which we have SID data. The indicators are described in Table 11. They are Perioperative Hemorrhage or Hematoma Rate, (#9), Postoperative Respiratory Failure Rate (#11), Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate (#12), Postoperative Sepsis Rate among elective surgical discharges (#13), and Obstetric Trauma Rate – Vaginal Delivery Without Instrument (#19).

Finally, in Table 12, *Post_Crisis* is interacted with the second and the third tercile dummies for our measure of the hospital's financial investments' performance in 2008. As in the cardiac and the C-section analyses, these regressions exclude the time trend and include year fixed effects and the time-varying hospital-level controls. The results are mixed. For two out of the five PSI measures, we find that hospitals with better financial performance in 2008 were able to reduce the incidence of the adverse safety events in the post-crisis period relative to hospitals with worse financial performance: the coefficients on the interactions of *Post_Crisis* with *Inv_Inc08_T3* are negative and statistically significant for PSI #9 and #19 in the full samples and in the sub-samples of large hospitals. However, for the remaining three PSI indicators, the interaction effects are either not statistically significant or positive and marginally statistically significant.

To summarize, our full-sample analysis shows no evidence that patient safety worsened following the crisis, and there is also no systematic correlation between the post-crisis change and the hospitals' financial performance in 2008. We find some evidence that safety events in small hospitals became more frequent after 2008, but the effect is statistically weak, and is unrelated to the 2008 financial returns.

6 Organizational form and physician integration

The evidence so far shows that, in spite of the large financial shock to nonprofit hospital finances, we see no consistent evidence that physicians changed the treatment of patients in response to the shock. In this section, we explore whether the responses differed depending on hospitals' organizational form and their relationship with physicians.

6.1 Nonprofit vs. for-profit hospitals

The for-profit organizational form implies a bigger focus on financial performance and potentially stronger incentives to reduce quality in response to a negative financial shock. In this section, we test whether the 2008 financial shock affected medical treatment choices at for-profit hospitals. Finding a response for for-profits (but not nonprofits) would suggest that the nonprofit organizational form helps prevent such quality shifts in hospitals. Working against finding this effect, however, is the fact that for-profits might have been less strongly affected by the financial crisis than nonprofits. Though they likely suffered from the reduction in credit market access, for-profits may have been less affected by the stock market crash because they do not own endowments and, in general, rely less heavily on financial assets to finance their day-to-day operations.

Our overall sample consists of 1,895 for-profit hospitals from 2005 to 2011 (9,947 observations). As shown in Table A8 in the Appendix, the average for-profit hospital is relatively small: it has $24.4 million in assets and $62.7 million in revenues, compared to $82.3 and $164.0 million for nonprofits. Only 13% of for-profit hospitals report having financial investments (our definition of financial investments excludes cash balances and temporary investments), compared to 63% of nonprofits. Investment income represents 1% of total assets for for-profits that report it (38% of total), compared to 3% of total assets for nonprofits with investment income (69% of total). For-profits are substantially more profitable than nonprofits: the ratio of operating profits to lagged fixed assets is 14% for for-profits compared to -2% for nonprofits. The average growth in buildings as a fraction of lagged fixed assets is 3% for for-profits compared to 8% for nonprofits, and the corresponding growth rates for equipment are 8% vs. 6%.

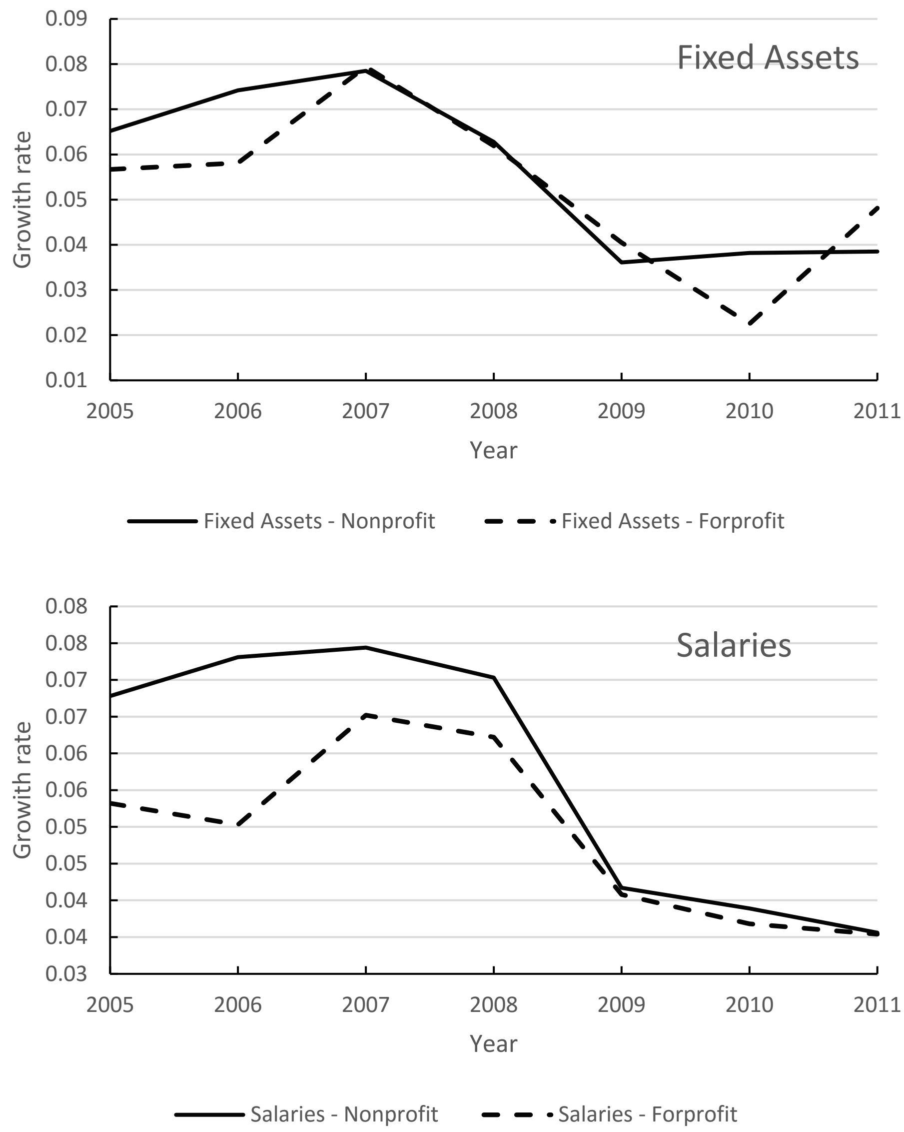


Fig. 6: Nonprofit and for-profit hospitals' investment from 2005-2011. The sample includes 3,272 nonprofit hospitals and 1,895 for-profit hospitals from 2005 through 2011. The figure shows the average growth rates in Fixed Assets and Salaries for each hospital group by year. Fixed Assets is gross land, buildings, and equipment minus accumulated depreciation.

Figure 6 shows that for-profits reduced their capital expenditures after 2008, similarly to nonprofits, though the effect on salaries appears less pronounced. The multivariate regressions in Table 13, Panel A show similar patterns after controlling for a time trend, time-varying hospital characteristics and hospital fixed effects. Based on the first three columns, the for-profits' investment rates declined significantly post 2008: the decline was 4.9% for fixed assets, 4.6% for equipment, and an insignificant 1% for buildings (all expressed as a fraction of fixed assets). Growth in salary declined by 2.9%. Based on unreported regressions, we find that the effects were not significantly different for for-profits than for nonprofits, with the exception of salary growth, which was one percentage point lower (with a t-statistic for the difference of 1.84)[15]. These results suggest that, despite their weaker reliance on financial assets, for-profits also scaled down investments and salary growth following the 2008 financial crisis. Likely channels for these effects are the contraction in credit supply in 2008 and the anticipated loss in patient revenues due to the subsequent economic downturn.

We next examine the effects of the crisis on patient treatment in the post- vs. pre-crisis period. We cannot implement cross-sectional regressions using the shock to hospital financial assets because, as we discuss above, for-profit hospitals do not have endowments that are prevalent for nonprofits. Table 13, Panel B shows the results from catheterization regressions similar to those in Table 5. In the first two columns, the sample consists of 191,277 heart attack admissions to for-profit hospitals for years 2005-2011. The dependent variable equals one if the patient receives catheterization, and each regression includes the time trend and a dummy variable equal to one for the post-crisis years 2009-2011 (year 2008 is excluded). Based on the regression in column 1, for-profit hospitals increased their propensity to perform catheterizations during our sample period by one percentage point a year, which is similar to the trend estimated for small nonprofit hospitals in Table 5. (As a reference point, the average catheterization rate in 2007 is 48% for for-profits compared to 49% for nonprofits and 28% for small nonprofits). However, controlling for the trend, there is no evidence that the catheterization rate increased after 2008: the coefficient on the post-crisis dummy is positive but close to zero. The lack of differential response for for-profits vs. nonprofits is also apparent from the regression in column 2 estimated on the full sample of admissions and including a dummy variable for admissions to for-profit hospitals as well as interactions of this dummy with the post-crisis indicator and the time trend.

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[15] The regressions are similar to those in Table 13, Panel A, except that they are run on the full sample of for-profits and nonprofits and include a for-profit dummy and its interaction with *Post-Crisis* and, separately, with the time trend.

Finally, the regressions in columns 3 and 4 explore the for-profit and nonprofit hospitals' treatment of privately insured (and thus likely more profitable) patients vs. other patients post 2008. Each regression includes a dummy variable for private patients and its interactions with *Post-Crisis* and the time trend. Based on column 3, there is no evidence that for-profit hospitals shifted towards a more intensive treatment of private vs. other patients after the financial crisis, especially compared to nonprofit hospitals. There is weak evidence of such shift for nonprofits: the coefficient on the interaction of *Private* with *Post-Crisis* in column 4 is positive and significant with a t-statistic of 1.9. We explore this effect in more detail in Section 6.2.[16]

Overall, the evidence in Table 13 suggests that for-profit hospitals did not increase the use of the more intensive and generally more profitable medical treatments after 2008. Instead, both for-profits and nonprofits responded by reducing spending on capital investments, such as building construction and equipment purchases, and by slowing down growth in salaries (nonprofits more so than for-profits). The lack of response in treatment quality for for-profits is especially interesting given the common argument that in information sensitive industries such as healthcare, the for-profit organizational form is inefficient because financial shocks can lead to "hidden" shifts in quality.

6.2 *Physicians-hospital integration*

One reason why treatment choices are unresponsive to hospitals' financial condition might be that physicians' incentives are only loosely aligned with those of the hospital. In this section we test this hypothesis by examining treatment responses at hospitals in which physicians are employees of the hospital and are therefore most closely integrated in the organization.

The data on physician arrangements with the hospital comes from the American Hospital Association (AHA) Annual Survey Database. The survey covers the universe of U.S. hospitals and includes, among other things, information on hospital organizational structure, services, staffing and physician arrangements. The survey reports hospital participation in eight types of physician arrangements, which are usually grouped into three major categories: no affiliation, employment affiliation, and contractual non-employment affiliation ((Madison (2004), Scott et al. (2016)). The latter can take on a variety of forms: in some cases, the hospital enters into a contract with physicians who

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[16] As we discuss in Section 4, the pre-post crisis analysis is more difficult to interpret for C-section because of the confounding effect of political pressures to reduce C-section rates, which might have had different effects on for-profits vs. nonprofits. However, in unreported regressions similar to those in Table 13, find no evidence that for-profits increased C-section rates more post-2008 than nonprofits.

agree to perform services at the hospital but otherwise remain independent (e.g., they own independent practices, negotiate separate contracts with insurers, etc.). In other cases, the hospital forms a joint venture with physicians or establishes a separate legal entity that provides various services to physicians, including management or marketing services or negotiating contracts with insurers. Such entities might also set physician compensation or establish common standards of quality (Dynan, Bazzoli, and Burns (1998)).

Based on Panel A of Table 14, 38% of hospitals in our sample report having no contractual or employment relationship with at least some of their staff physicians as of 2008. This compares with 41% reporting an employment relationship and 34% reporting a contractual relationship. Similarly, 45% of hospitals report having a high-integration arrangement with at least some of their physicians based on the classification developed in Dynan, Bazzoli, and Burns (1998). This could involve either an employment or a close contractual relationship.[17] Large hospitals as well as teaching hospitals or academic centers are generally more integrated. For example, the high-integration dummy is, on average, 0.50 for large hospitals vs. 0.38 for small hospitals in our sample, split at the median based on the size of service revenues. Similar to prior studies, we find that integration increased during our sample period: hospitals that report having a high-integration arrangement increased from 29% in 2005 to 48% in 2011. One limitation of the physician arrangement indicators in Panel A is that they do not tell us the fraction of a hospital's physicians involved in each type of arrangement. However, starting in 2010, the AHA reports the number of their privileged physicians (that is, physicians with privileges to refer a patient to the hospital and/or perform services at the hospital) that are employed by the hospital, have an individual or a group contract with the hospital, or none of the above. Based on Panel B in Table 14, 14.8% of privileged physicians are employed, 7.7% have individual contracts, 22.3% have a group contract, and 49.4 had no contractual or employment relationship with the hospital.

Several authors argue that higher-integration models, such as employment or close contractual arrangements, can align physician and hospital incentives.[18] This may happen through several channels, including physician compensation contracts creating incentives to offer services that are more profitable to the hospital. Hospitals might also directly monitor the quality and the cost effectiveness of those

[17] Dynan, Bazzoli, and Burns (1998) find that contractual arrangements involving a Management Service Organization were usually highly integrated.

[18] Baker Bundorf, and Kessler (2014) argue that though legal restrictions prohibit hospitals from directly paying doctors for referrals, vertical integration allows them to circumvent these restrictions. By employing or contracting with physicians, hospitals can induce them to increase procedures, diagnostic testing, or other services at their facilities.

services or require that physicians adhere to certain quality standards. Moreover, physicians involved in hospital management or governance may have direct stakes in their organizations' financial health. Prior literature finds mixed evidence on the effects of hospital-physician integration. For example, Madison (2004) finds that hospitals that adopt the integrated salary model increase procedure rates in the treatment of heart attacks though the effects are small and there is no change in the patient outcomes. Similarly, Scott et al. (2016) find no effect of hospitals' switches to physician employment on mortality rates, readmission rates, or length of stay, and Ciliberto and Dranove (2006) find no effect on hospital charges. However, Baker, Bundorf, and Kessler (2014) find that increases in hospital-physician integration are associated with higher payments received for services to privately insured patients. These prices are distinct from hospital charges and represent actual payments made either by insurance companies or by patients in the form of copayments or deductibles. This finding could mean that integrated hospitals negotiate better terms with insurers, or that they are able to offer more highly compensated services to their patients.

In contrast to the previous studies, which examine changes in outcome variables around hospitals' decisions to strengthen physician integration, we test whether treatment of patients responds to an exogenous shock to the hospital's financial condition, and in particular, whether this response varies with the degree of integration. Our main hypothesis is that the more tightly integrated physicians are more likely to shift towards profitable treatments after the hospital experiences a financial shortfall. As a starting point, in Table 15, Panel A we run regressions of the catheterization dummy on the *Post-Crisis* indicator, similar to those in Table 5, but include a measure of integration (*INTEG*), its interaction with *Post-Crisis*, and separately with the time trend. In columns 1-3 of Panel A, we measure integration using the Dylan et al. indicator for physician employment or close contractual arrangements. To capture the finer variation in the degree of integration, columns 4-6 use the fraction of privileged physicians that are employed by the hospital.

Generally, we find evidence that the more integrated hospitals increased catheterization levels after 2008 relative to the less integrated hospitals. Based on the left panel, the interaction of *INTEG* with *Post-Crisis* is positive in the full sample, but it is statistically significant only in the subsample of large hospitals. Within the large-hospital subsample, integrated hospitals increased their catheterization rates by 2.5% post 2008 relative to the low-integration hospitals (the t-statistic of 2.3). The effect is negative and not significant for small hospitals, which, based on Table 14, are less likely to be integrated. The results become stronger when we use the finer measure of integration, the percentage of privileged physicians employed by the hospital. In the right panel, the interaction of *Post_Crisis* with this measure is positive and significant in the full sample and in the sample of large hospitals (t-statistics of 2.78 and 2.7), and it is similar in magnitude though statistically not significant in the sub-sample of small hospitals (t-statistic of 1.6).

In Panel B of Table 15, we explore whether these effects differ for privately-insured vs. other patients. The earlier analysis in Section 6.1 suggests that private patients in nonprofit hospitals experienced stronger increases in catheterizations post-2008 (Table 13, column 4). If the differential treatment of private patients was caused by the financial shock to the hospital, the effect should be stronger for hospitals able to exert more influence on physicians, which would be the case in the more integrated organizations. In Panel B, we split the nonprofit sample into high- and low-integrated sub-samples based on the dummy indicating physician employment or a close contractual arrangement. Within each sub-sample, we estimate regressions similar to those in Panel A of Table 15, except that we include an indicator for private patients, *Private*, and its interactions with the *Post-Crisis* dummy and the time trend. We find that the interaction of *Private* with *Post-Crisis* is positive and significant only in the sub-sample of high-integration hospitals, consistent with our hypothesis. For example, based on the first column, high-integration hospitals increased catheterizations post-crisis by 2.6 percentage points more for private patients compared to non-private patients (t-statistic of 2.6). We find no differential effect on private vs. non-private patients for non-integrated hospitals: the coefficients on the interaction term are close to zero in all regressions. After splitting each sub-sample based on size, we find that the results for the high-integration sub-sample are again driven by larger, and generally more integrated, hospitals.

Finally, in Panel C of Table 15, we test whether the high-integration hospitals increased cardiac treatment intensity more strongly when their financial assets performed especially poorly in 2008. We find no evidence that this was the case: as in the previous regressions, the interactions of *Post-Crisis* with the return tercile dummies are insignificant in all columns. One explanation for the lack of significant interactions might be that the crisis affected hospitals through multiple channels, in particular through the credit channel and the subsequent economic downturn, and thus, caused a major financial shock even for hospitals with less significant losses on their endowments. Our earlier finding that for-profit hospitals, which do not hold endowments, contracted their investment growth post 2008 similarly to nonprofits, is consistent with this interpretation.

To summarize, the findings in Table 15 suggest that integrated hospitals responded more strongly to the 2008 financial shock by increasing treatment intensity of their cardiac patients. Consistent with a financial motive, the increase was stronger for privately insured, and thus likely more profitable patients.

However, we find no evidence that the shift was related to the severity of the negative shock to the hospital's financial assets. Overall, the findings suggest that hospital-physician integration played a role in the transmission of financial stress to treatment choices, though we cannot directly attribute these effects to financial constraints caused by the contraction of endowments.

7 Conclusions

A large corporate finance literature examines the interaction between firms' financing and their product market choices. One of the central findings is that, when quality is imperfectly observed by consumers, financially constrained firms have incentives to lower their product quality to increase cash flows in the short run. A number of studies find evidence of such "quality skimping" by for-profit firms. This paper investigates whether these product-market effects of financing constraints extend to the healthcare sector, which is dominated for nonprofits. We test whether financial shortfalls at nonprofit hospitals affect the quality of medical treatment choices made by the associated physicians. We focus on two high-stakes medical settings that have been widely explored in health economics: heart attacks and child delivery. In both cases, the more intensive treatment choice – heart surgery in case of heart attacks and C-section in case of child delivery – tends to be more profitable to hospitals. We test whether physicians shift towards these more intensive treatment options when the hospital's financial condition deteriorates. Our assumption is that such shifts in quality – induced by the hospitals' financial shortfalls – would be detrimental to patients.

We use the 2008 financial crisis to identify financial shocks. The crisis had a large negative impact on the hospitals' financial health through multiple channels: the stock market crash lowered the value of the hospitals' financial assets (we observe a 17% decline in the value of those assets from 2007 to 2009); the credit crunch restricted the hospitals' access to credit and increased interest expense on existing loans; the subsequent economic downturn and rise in unemployment likely lowered demand for hospital services, particularly from privately insured patients. We show that, immediately following the crisis, hospitals substantially scaled down their investments (measured using buildings, equipment, and fixed assets growth), and reduced salary growth, and that the decline in investment growth was stronger for hospitals with worse performance of financial assets in 2008.

The central finding of the paper is that the quality of the physicians' treatment choices for the heart attack and child delivery patients remained largely unaffected by the crisis, in spite of the large shock to the hospitals' financial health in 2008. In the case of cardiac patients, we find a slight increase in the intensive treatment rate (measured as the rate of catheterizations) during our sample period, but the overall increase is unrelated to the 2008 financial returns, and the effect is driven entirely by small hospitals that started off with intensity levels significantly below the national average. For large hospitals, catheterization rates were essentially flat throughout 2005-2011. A similar picture emerges from the C-section analysis, or from examining direct measures of treatment quality based on Patient Safety Indicators (PSI).

Our results stand in stark contrast to the previous literature on the effects of financial constraints on product quality, and we examine two potential explanations for these findings. The first explanation is that the nonprofit organizational form works well at counteracting the adverse effects of financial shocks to hospitals on the quality-of-treatment choices, at least in the high-stakes medical contexts we examine. However, we find no support for this hypothesis from examining the for-profit hospitals' response to the financial crisis, which was generally similar to that of nonprofits. The second hypothesis is that certain features of the hospitals' governance – in particular, the greater separation between management and physicians – helps shield patients from the undesirable effects of the hospitals' financial shocks. We find some support for this hypothesis: hospitals with closer ties to their physicians (such as employment) increased treatment intensity post-2008, especially for their privately insured patients. These results suggest that a looser association between a firm's management and its key workers can counteract the product market frictions in industries in which product quality is difficult to observe. If managers are more concerned about short-term financial results, their weaker ability to exert pressure on workers shields customers from "hidden" quality shifts. Since such arrangements are available to both for-profits and nonprofits, they are an alternative way (in addition to the nonprofit organizational form) to deal with these incentive problems.

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Table 1: Descriptive statistics for the HCRIS sample. The sample in Panel A includes 3,272 nonprofit hospitals from 2005 through 2011. The sub-sample in Panel B includes 704 hospitals in the seven states for which we have SID data (AZ, CA, FL, MA, NJ, NY, WA). The financial data come from HCRIS, Schedule G. *Fixed Assets* is gross land, buildings, and equipment minus accumulated depreciation. *Service Revenue* is revenue from medical services. *Net Debt* is total financial debt (bonds and bank loans) minus cash and temporary securities scaled by net fixed assets. *Financial Investments* is the dollar amount of financial investments scaled by net fixed assets. *Investment Income* is income on financial investments scaled by lagged fixed assets. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Investments Income* is income from financial investments from statement of revenues in Schedule G scaled by lagged net fixed assets. *Equipment* includes cars and trucks, major movable equipment, minor equipment, and minor nondepreciable equipment.

	Mean	Median	Std	P5	P95	N
Panel A: All States						
Fixed Assets (in millions)	82.30	35.00	140.00	1.28	313.00	19,726
Service Revenue (in millions)	164.00	80.70	235.00	7.69	590.00	19,843
Net Debt	0.26	0.23	0.63	-0.87	1.40	17,911
Financial Investments	0.53	0.29	0.63	0.00	2.08	12,422
Investments Income	0.03	0.01	0.05	0.00	0.15	13,590
Operating Income	-0.02	-0.01	0.16	-0.35	0.25	19,281
Growth in Fixed Assets	0.06	0.00	0.18	-0.12	0.44	18,743
Growth in Equipment	0.06	0.05	0.13	-0.15	0.31	15,692
Growth in Buildings	0.08	0.03	0.17	-0.08	0.45	17,418
Growth in Salaries	0.05	0.05	0.06	-0.05	0.15	15,378
Growth in Sales	0.06	0.05	0.08	-0.08	0.21	19,232
Panel B: Seven SID States						
Fixed Assets (in millions)	111.00	59.40	162.00	3.98	407.00	4,354
Service Revenue (in millions)	232.00	155.00	282.00	14.10	708.00	4,379
Net Debt	0.32	0.30	0.65	-0.80	1.51	4,168
Financial Investments	0.40	0.16	0.56	0.00	1.65	2,554
Investments Income	0.03	0.01	0.04	0.00	0.12	3,001
Operating Income	-0.04	-0.02	0.16	-0.36	0.21	4,295
Growth in Fixed Assets	0.06	0.01	0.17	-0.11	0.43	4,193
Growth in Equipment	0.06	0.05	0.13	-0.15	0.28	3,612
Growth in Buildings	0.08	0.03	0.16	-0.08	0.44	4,002
Growth in Salaries	0.06	0.06	0.05	-0.03	0.15	4,121
Growth in Sales	0.06	0.06	0.08	-0.07	0.21	4,283

Table 2A: Hospital investments around the 2008 financial crisis. The table shows OLS regressions of hospital investments and salary expenditures on the post-crisis dummy and control variables. The sample consists of nonprofit hospitals during 2005-2011. The dependent variables are change in fixed assets, change in equipment spending, or change in spending on buildings, each scaled by lagged fixed assets, or change in spending on salaries scaled by lagged salaries. The *Post-Crisis* dummy is set to one for years 2009-2011 and is set to zero for years 2005-2007 (year 2008 is excluded). Trend is the linear time trend. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Service Revenue* is revenue from medical services. *Revenue Growth* is the growth in revenues from medical services. Standard errors are clustered by hospital. T-statistics are in parentheses.

	Fixed Assets	Equipment	Buildings	Salaries	Fixed Assets	Equipment	Buildings	Salaries
Post-Crisis	-0.048***	-0.043***	-0.016*	-0.038***	-0.050***	-0.042***	-0.018**	-0.039***
	(-5.89)	(-6.10)	(-1.88)	(-14.65)	(-6.92)	(-6.99)	(-2.51)	(-16.73)
Trend	0.007***	0.009***	0.001	0.006***	0.004**	0.006***	-0.000	0.003***
	(3.26)	(4.56)	(0.63)	(7.34)	(2.56)	(4.48)	(-0.20)	(5.13)
Operating Income	0.146***	0.086***	0.077***	0.070***	0.053***	0.040***	0.027***	0.015***
	(5.50)	(4.13)	(3.38)	(7.23)	(4.92)	(4.36)	(2.88)	(4.00)
Revenue Growth	0.004	0.014	-0.036	0.114***	0.092***	0.052***	0.022	0.190***
	(0.15)	(0.62)	(-1.41)	(11.37)	(4.96)	(3.40)	(1.24)	(25.18)
Log(Service Revenue)	-0.088***	-0.052***	-0.049***	-0.073***	0.004***	-0.006***	0.004***	0.001**
	(-4.12)	(-3.29)	(-2.66)	(-8.23)	(2.92)	(-5.62)	(3.80)	(2.54)
Intercept	1.639***	0.973***	0.977***	1.376***	-0.015	0.152***	0.009	0.017*
	-0.048***	-0.043***	-0.016*	-0.038***	-0.050***	-0.042***	-0.018**	-0.039***
Hospital FE	Yes	Yes	Yes	Yes	No	No	No	No
N	15466	12942	14403	12674	15466	12942	14403	12674

Table 2B: Hospital investments around the 2008 financial crisis: SID states. The table shows OLS regressions of hospital investments and salary expenditures on the post-crisis dummy and control variables. The sample consists of nonprofit hospitals during 2005-2011. The dependent variables are change in fixed assets, change in equipment spending, or change in spending on buildings, each scaled by lagged fixed assets, or change in spending on salaries scaled by lagged salaries. The *Post-Crisis* dummy is set to one for years 2009-2011 and is set to zero for years 2005-2007 (year 2008 is excluded). Trend is the linear time trend. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Service Revenue* is revenue from medical services. *Revenue Growth* is the growth in revenues from medical services. Standard errors are clustered by hospital. T-statistics are in parentheses.

	Fixed Assets	Equipment	Buildings	Salaries	Fixed Assets	Equipment	Buildings	Salaries
Post-Crisis	-0.055***	-0.052***	-0.007	-0.032***	-0.054***	-0.048***	-0.005	-0.033***
	(-3.37)	(-3.61)	(-0.44)	(-6.62)	(-3.73)	(-3.85)	(-0.32)	(-7.47)
Trend	0.009**	0.010***	-0.001	0.003**	0.007**	0.009***	-0.002	0.001
	(2.08)	(2.74)	(-0.27)	(2.16)	(2.10)	(3.19)	(-0.70)	(0.65)
Operating Income	0.133**	0.085*	-0.032	0.071***	0.092***	0.075***	0.032	0.033***
	(2.16)	(1.79)	(-0.67)	(4.18)	(3.47)	(3.74)	(1.41)	(4.13)
Revenue Growth	0.019	0.063	-0.002	0.113***	0.098**	0.092***	0.017	0.190***
	(0.32)	(1.34)	(-0.04)	(5.94)	(2.40)	(2.79)	(0.41)	(12.27)
Log(Service Revenue)	-0.057	-0.027	-0.017	-0.055***	0.006**	-0.003	0.005**	0.001
	(-1.39)	(-0.96)	(-0.54)	(-3.62)	(2.18)	(-1.15)	(2.23)	(1.51)
Intercept	1.108	0.517	0.408	1.085***	-0.069	0.075*	-0.006	0.027
	(1.46)	(1.03)	(0.69)	(3.86)	(-1.29)	(1.68)	(-0.13)	(1.49)
Hospital FE	Yes	No	Yes	No	Yes	No	Yes	No
N	3513	3031	3361	3318	3513	3031	3361	3318

Table 3A: Hospital investments around the 2008 financial crisis: interaction with investments income in 2008. The table shows OLS regressions hospital investments and salary expenditures on the post-crisis dummy and control variables. The sample consists of nonprofit hospitals during 2005-2011. The dependent variables are change in fixed assets, change in equipment spending, or change in spending on buildings, each scaled by lagged fixed assets, or change in spending on salaries scaled by lagged salaries. The *Post-Crisis* dummy is set to one for years 2009-2011 and is set to zero for years 2005-2007 (year 2008 is excluded). *Investment Income 2008* is the tercile rank for the 2008 investments income assigned by year. *Investment Income* is income on financial investments scaled by lagged fixed assets. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Service Revenue* is revenue from medical services. *Revenue Growth* is the growth in revenues from medical services. Standard errors are clustered by hospital. T-statistics are in parentheses.

	Equipment	Buildings	Fixed Assets	Salaries	Equipment	Buildings	Fixed Assets	Salaries
Post_Crisis*Inv_Inc08_T2	0.007	0.024**	0.012	0.003	0.003	0.018**	0.012	0.004
	(0.837)	(2.509)	(1.094)	(0.802)	(0.451)	(2.259)	(1.256)	(1.280)
Post_Crisis*Inv_Inc08_T3	0.007	0.040***	0.043***	0.004	0.004	0.037***	0.046***	0.005*
	(0.845)	(4.193)	(3.933)	(1.193)	(0.580)	(4.520)	(4.735)	(1.803)
Inv_Inc08_T2					0.001	-0.015**	-0.008	0.001
					(0.199)	(-2.309)	(-1.020)	(0.688)
Inv_Inc08_T3					0.007	-0.016***	-0.020***	-0.001
					(1.348)	(-2.654)	(-2.759)	(-0.661)
Operating Income	0.148***	0.123***	0.198***	0.078***	0.051***	0.026*	0.058***	0.012**
	(5.414)	(3.743)	(5.164)	(6.884)	(4.134)	(1.905)	(4.007)	(2.236)
Revenue Growth	0.011	-0.073**	-0.001	0.116***	0.065***	0.022	0.117***	0.199***
	(0.390)	(-2.292)	(-0.019)	(8.635)	(3.280)	(0.959)	(4.770)	(20.313)
Log(Service Revenue)	-0.078***	-0.051*	-0.103***	-0.078***	-0.006***	0.003**	0.002	0.001*
	(-3.754)	(-1.930)	(-3.197)	(-5.380)	(-4.172)	(1.996)	(1.449)	(1.915)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Hospital FE	Y	Y	Y	Y	N	N	N	N
N	8264	9021	9577	7722	8264	9021	9577	7722

Table 3B: Hospital investments around the 2008 financial crisis: interaction with investments income in 2008: SID states. The table shows OLS regressions hospital investments and salary expenditures on the post-crisis dummy and control variables. The sample consists of nonprofit hospitals during 2005-2011. The dependent variables are change in fixed assets, change in equipment spending, or change in spending on buildings, each scaled by lagged fixed assets, or change in spending on salaries scaled by lagged salaries. The *Post-Crisis* dummy is set to one for years 2009-2011 and is set to zero for years 2005-2007 (year 2008 is excluded). *Investment Income 2008* is the tercile rank for the 2008 investments income assigned by year. *Investment Income* is income on financial investments scaled by lagged fixed assets. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Service Revenue* is revenue from medical services. *Revenue Growth* is the growth in revenues from medical services. Standard errors are clustered by hospital. T-statistics are in parentheses.

	Equipment	Buildings	Fixed Assets	Salaries	Equipment	Buildings	Fixed Assets	Salaries
Post_Crisis*Inv_Inc08_T2	0.008	0.062***	0.036*	0.001	0.007	0.044***	0.029	0.002
	(0.507)	(3.557)	(1.735)	(0.184)	(0.510)	(2.850)	(1.530)	(0.336)
Post_Crisis*Inv_Inc08_T3	-0.011	0.050***	0.033	0.001	-0.011	0.041**	0.031	-0.001
	(-0.635)	(2.667)	(1.505)	(0.134)	(-0.778)	(2.416)	(1.590)	(-0.101)
Inv_Inc08_T2					-0.009	-0.035***	-0.028**	-0.002
					(-0.852)	(-2.884)	(-1.988)	(-0.499)
Inv_Inc08_T3					0.010	-0.033***	-0.036**	-0.001
					(0.876)	(-2.705)	(-2.414)	(-0.270)
Operating Income	0.139**	-0.021	0.167**	0.064***	0.097***	0.027	0.112***	0.029**
	(2.100)	(-0.368)	(2.130)	(2.771)	(3.607)	(0.943)	(3.194)	(2.519)
Revenue Growth	0.055	-0.024	0.016	0.121***	0.079*	0.021	0.105*	0.197***
	(0.924)	(-0.342)	(0.213)	(4.931)	(1.864)	(0.392)	(1.895)	(10.702)
Log(Service Revenue)	-0.037	0.019	-0.028	-0.066**	-0.005*	0.003	0.003	0.001
	(-0.897)	(0.458)	(-0.500)	(-2.305)	(-1.651)	(0.923)	(0.844)	(1.042)
Year FE	Y	Y	Y	Y	N	Y	N	Y
Hospital FE	Y	Y	Y	Y	N	N	N	N
N	8264	9021	9577	7722	1896	2087	2169	2037

Table 4: Descriptive statistics for the SID heart attack sample. The sample consists of 1,071,550 heart attack admissions to 451 nonprofit hospitals in seven states (listed in the bottom panel) from 2005 to 2011. Heart attacks (Acute Myocardial Infarction, AMI) are identified based on the ICD-9-CM diagnosis code '410'. *Catheter* is an indicator for whether the patient received cardiac catheterization during his hospital stay. We use the Clinical Classifications Software (CCS) for ICD-9-CM, procedure code 47 to identify catheterizations. *Predicted Cath* is the predicted probability of catheterization from a logit regression of *Catheter* on dummy variables for the patient's age group, sex, race, and insurance status. *Adjusted Cath* is *Catheter* minus *Predicted Cath*. Large and small hospitals are hospitals with the above- and below-median service revenues in the prior year.

	All Hosp.	Large	Small
Catheter	0.490	0.545	0.305
Predicted Cath.	0.490	0.497	0.468
Adjusted Cath.	0.000	0.048	-0.162
White	0.693	0.675	0.756
Black	0.085	0.088	0.073
Hispanic	0.097	0.102	0.083
Private Ins.	0.241	0.253	0.200
Medicaid	0.062	0.065	0.055
Medicare	0.629	0.613	0.680
Self-pay	0.042	0.042	0.040
No-charge	0.004	0.005	0.003
Other-pay	0.022	0.022	0.023
Female	0.425	0.416	0.457
Age	70.050	69.551	71.742
N	1,071,550	827,482	244,068

	Arizona	California	Florida	Maryland	New Jersey	New York	Washington
Catheter	0.554	0.526	0.543	0.415	0.431	0.431	0.515
Predicted Cath.	0.498	0.496	0.492	0.481	0.482	0.474	0.522
Adjusted Cath.	0.056	0.030	0.050	-0.066	-0.051	-0.043	-0.007
Private Ins.	0.206	0.246	0.204	0.255	0.272	0.205	0.337
Medicaid	0.084	0.085	0.049	0.063	0.022	0.090	0.049
Medicare	0.631	0.604	0.652	0.630	0.638	0.664	0.552
Self-pay	0.027	0.036	0.050	0.039	0.063	0.026	0.036
No-charge	0.001	0.000	0.015	0.002	0.000	0.001	0.008
Other-pay	0.050	0.029	0.031	0.011	0.005	0.013	0.017
Female	0.408	0.418	0.410	0.454	0.437	0.444	0.408
Age	69.530	69.946	69.732	69.188	70.812	71.037	69.660
N	84,083	250,030	222,404	118,110	179,420	138,466	79,037

Table 5: Regressions of the catheterization choice for the SID sample of heart attack patients. The sample includes hospital admissions for the Acute Myocardial Infarction (AMI). The table shows OLS regressions of the indicator variable for whether the patient received catheterization during his hospital stay. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Trend* is the time trend. The control variables include indicators for the patient's race, sex, insurance status, and age group. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp	Large	Small	All Hosp	Large	Small
Post_Crisis	0.005	0.004	0.020	0.006	0.003	0.013
	(1.017)	(0.704)	(1.403)	(0.958)	(0.545)	(0.651)
Trend	0.003*	0.000	0.013***	0.002	-0.000	0.014**
	(1.860)	(0.171)	(2.951)	(1.173)	(-0.048)	(2.606)
White	-0.019***	-0.017***	-0.021**	-0.030***	-0.014	-0.052**
	(-3.835)	(-3.094)	(-2.459)	(-2.715)	(-1.202)	(-2.021)
Black	-0.087***	-0.089***	-0.064***	-0.105***	-0.091***	-0.167***
	(-14.122)	(-13.083)	(-6.117)	(-8.128)	(-7.246)	(-5.795)
Hispanic	-0.006	-0.008	0.010	0.007	0.014	-0.006
	(-1.209)	(-1.327)	(0.865)	(0.632)	(1.217)	(-0.209)
Medicaid	-0.097***	-0.100***	-0.078***	-0.100***	-0.103***	-0.070***
	(-18.326)	(-16.683)	(-9.106)	(-12.445)	(-12.025)	(-4.182)
Medicare	-0.095***	-0.098***	-0.079***	-0.100***	-0.097***	-0.091***
	(-19.824)	(-17.509)	(-12.515)	(-15.608)	(-13.135)	(-9.403)
Self-pay	-0.005	-0.003	0.000	-0.010	-0.011	0.017
	(-0.907)	(-0.597)	(0.001)	(-1.630)	(-1.588)	(1.164)
No-charge	0.029**	0.025*	0.052***	0.063***	0.068***	0.011
	(2.439)	(1.908)	(2.881)	(4.207)	(5.765)	(0.272)
Other-pay	-0.036***	-0.034***	-0.038***	-0.030***	-0.029***	0.000
	(-5.093)	(-4.105)	(-3.404)	(-2.826)	(-2.701)	(0.015)
Female	-0.040***	-0.042***	-0.029***	-0.052***	-0.051***	-0.051***
	(-23.813)	(-21.680)	(-10.646)	(-26.699)	(-22.335)	(-15.899)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
N	859806	700472	159334	859806	700472	159334

Table 6: Regressions of catheterization choice for the SID sample of heart attack patients: interaction with investments income in 2008. The sample includes hospital admissions for Acute Myocardial Infarction (AMI). The table shows OLS regressions of the indicator variable for whether the patient received catheterization during his hospital stay. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for the patient's race, sex, insurance status, and age group, the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp	Large	Small	All Hosp	Large	Small
Panel A: All patients						
Post_Crisis*Inv_Inc08_T2	0.023	0.001	0.042	0.021	0.013	0.070*
	(1.314)	(0.096)	(1.003)	(1.243)	(0.801)	(1.731)
Post_Crisis*Inv_Inc08_T3	-0.012	-0.019	-0.006	-0.024	-0.038*	0.017
	(-0.761)	(-1.238)	(-0.153)	(-1.245)	(-1.914)	(0.418)
Inv_Inc08_T2				-0.037	-0.002	-0.107
				(-1.285)	(-0.082)	(-1.407)
Inv_Inc08_T3				-0.022	0.002	-0.056
				(-0.610)	(0.045)	(-0.664)
Hospital FE	Y	Y	Y	N	N	N
Patient controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	513146	404485	108661	513146	404485	108661
Panel B: Privately insured patients						
Post_Crisis*Inv_Inc08_T2	0.027	0.010	0.027	0.030	0.022	0.071
	(1.221)	(0.568)	(0.391)	(1.568)	(1.138)	(1.270)
Post_Crisis*Inv_Inc08_T3	-0.011	-0.022	-0.014	-0.015	-0.032	0.039
	(-0.623)	(-1.341)	(-0.222)	(-0.669)	(-1.453)	(0.672)
Inv_Inc08_T2				-0.056*	-0.023	-0.117
				(-1.722)	(-0.857)	(-1.162)
Inv_Inc08_T3				-0.046	-0.017	-0.099
				(-1.082)	(-0.381)	(-1.020)
Hospital FE	Y	Y	Y	N	N	N
Patient controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	122179	99446	22733	122179	99446	22733

Table 7: Descriptive statistics for the SID sample of child deliveries patients. The sample consists of 4,085,253 child delivery admissions to 378 nonprofit hospitals in seven states (listed in the bottom panel) from 2005 to 2011. Child delivery is identified based on the ICD-9-CM diagnosis code 'V27'. *C-section* is an indicator for whether the delivery was via a Cesarean section. We use the ICD-9-CM, procedure codes 740, 741, 742, 744, and 7499 to identify C-sections. *Predicted C-section* is the predicted probability of a C-section from a logit regression of *C-section* on dummy variables for the birth complications and mother's diagnoses listed below, the patient's age group, race, and insurance status. *Adjusted C-section* is *C-section* minus *Predicted C-section*. Large and small hospitals are hospitals with the above- and below-median service revenues in the prior year.

	All Hospitals	Large	Small
C-section	0.226	0.233	0.207
Predicted C-section	0.226	0.231	0.213
Adjusted C-section	0.000	0.002	-0.006
Hypertension	0.081	0.084	0.072
Previa	0.018	0.019	0.015
Early_Labor	0.073	0.079	0.056
Complications_Mother	0.377	0.386	0.352
Multi_Kids	0.016	0.018	0.010
Breech	0.080	0.082	0.075
Cord_Prolapse	0.003	0.003	0.003
Rupture	0.000	0.000	0.000
White	0.431	0.421	0.461
Black	0.112	0.123	0.079
Hispanic	0.267	0.255	0.301
Private Insurance	0.534	0.559	0.462
Medicaid	0.413	0.392	0.474
Medicare	0.003	0.003	0.004
Self_Pay	0.027	0.025	0.033
No_Charge	0.001	0.001	0.001
Other_Pay	0.021	0.019	0.027
Age	27.916	28.241	26.960
N	4,085,253	3,049,558	1,035,695

	Arizona	California	Florida	Maryland	New Jersey	New York	Washington
C-section	0.185	0.213	0.257	0.232	0.257	0.235	0.192
Predicted C-section	0.215	0.215	0.233	0.246	0.238	0.228	0.226
Adjusted C-section	-0.030	-0.001	0.024	-0.014	0.018	0.007	-0.034
Private Insurance	0.456	0.495	0.462	0.571	0.692	0.563	0.589
Medicaid	0.453	0.469	0.470	0.397	0.218	0.400	0.381
Medicare	0.003	0.002	0.004	0.003	0.003	0.005	0.003
N	387,074	1,249,239	682,905	388,935	515,775	541,340	319,985

Table 8: Regressions of the C-section choice for the SID sample of child deliveries. The sample includes hospital admissions for the child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Trend* is the time trend. The control variables include indicators for birth complications, mother diagnoses, race, sex, insurance status, and age group. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis	-0.003	-0.004	-0.003	-0.004	-0.002	-0.012
	(-1.409)	(-1.378)	(-0.745)	(-1.523)	(-0.579)	(-1.522)
Trend	0.001**	0.001**	0.001*	0.001**	0.001	0.003
	(2.418)	(1.996)	(1.761)	(2.180)	(1.328)	(1.637)
Hypertension	0.181***	0.179***	0.185***	0.178***	0.176***	0.184***
	(61.464)	(53.126)	(34.704)	(51.532)	(43.558)	(32.987)
Previa	0.329***	0.320***	0.362***	0.328***	0.318***	0.363***
	(51.883)	(43.146)	(39.770)	(50.217)	(41.764)	(39.094)
Early_labor	0.020***	0.023***	0.008**	0.019***	0.021***	0.010***
	(8.967)	(8.961)	(2.524)	(8.325)	(8.074)	(2.815)
Complications_Mother	0.046***	0.047***	0.043***	0.038***	0.040***	0.034***
	(29.932)	(24.967)	(19.001)	(20.728)	(17.990)	(12.283)
Multi_Kids	0.214***	0.210***	0.231***	0.215***	0.211***	0.231***
	(36.948)	(32.529)	(21.256)	(34.513)	(30.448)	(20.202)
Breech	0.579***	0.578***	0.581***	0.580***	0.579***	0.582***
	(74.214)	(60.318)	(52.875)	(70.795)	(57.425)	(50.170)
Cord_Problems	0.417***	0.404***	0.456***	0.417***	0.404***	0.456***
	(27.395)	(21.458)	(24.642)	(29.079)	(23.132)	(22.721)
Rupture	0.419***	0.421***	0.405***	0.424***	0.422***	0.426***
	(9.383)	(8.047)	(4.755)	(9.588)	(8.211)	(4.967)
White	-0.004	-0.005	0.001	0.002	-0.000	0.010
	(-1.588)	(-1.650)	(0.294)	(0.437)	(-0.016)	(1.400)
Black	0.021***	0.023***	0.017***	0.035***	0.035***	0.036***
	(6.122)	(5.644)	(4.196)	(5.802)	(5.107)	(4.238)
Hispanic	-0.010***	-0.008***	-0.012***	0.016***	0.017**	0.018**
	(-4.290)	(-2.960)	(-3.549)	(2.743)	(2.272)	(2.092)
Medicaid	-0.032***	-0.034***	-0.026***	-0.042***	-0.046***	-0.029***
	(-19.099)	(-16.577)	(-11.654)	(-13.377)	(-11.982)	(-7.013)
Medicare	0.022***	0.024***	0.018**	0.010	0.009	0.015*
	(4.069)	(3.413)	(2.218)	(1.481)	(1.084)	(1.793)
Self_Pay	-0.056***	-0.059***	-0.048***	-0.051***	-0.054***	-0.039***
	(-19.629)	(-18.082)	(-9.999)	(-12.413)	(-10.727)	(-6.556)
No_Charge	-0.041***	-0.047***	-0.016	-0.065***	-0.075***	-0.017
	(-4.787)	(-4.901)	(-1.004)	(-4.164)	(-4.298)	(-0.776)
Other_Pay	-0.010***	-0.010***	-0.009**	-0.025***	-0.029***	-0.012
	(-4.194)	(-3.487)	(-2.160)	(-5.133)	(-4.909)	(-1.492)
Hospital FE	Y	Y	Y	N	N	N
Patient Age FE	Y	Y	Y	Y	Y	Y
N	3495620	2601662	893958	3495620	2601662	893958

Table 9: Regressions of the C-section choice for the SID sample of child deliveries: interaction with investments income in 2008. The sample includes hospital admissions for child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for birth complications, mother's diagnoses, race, sex, insurance status, and age group, the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Panel A: All patients						
Post_Crisis*Inv_Inc08_T2	0.001	0.005	-0.004	-0.001	-0.002	0.007
	(0.252)	(0.905)	(-0.514)	(-0.211)	(-0.278)	(0.564)
Post_Crisis*Inv_Inc08_T3	-0.002	-0.004	0.003	-0.003	-0.008	0.011
	(-0.399)	(-0.720)	(0.346)	(-0.754)	(-1.510)	(1.153)
Inv_Inc08_T2				-0.005	-0.011	0.016
				(-0.468)	(-0.842)	(1.078)
Inv_Inc08_T3				-0.002	0.001	0.000
				(-0.292)	(0.134)	(0.007)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	2046077	1491580	554497	2046077	1491580	554497
Panel B: Privately insured patients						
Post_Crisis*Inv_Inc08_T2	0.002	0.006	-0.002	-0.001	-0.007	0.016
	(0.497)	(0.927)	(-0.209)	(-0.198)	(-0.614)	(1.164)
Post_Crisis*Inv_Inc08_T3	-0.002	-0.004	0.003	-0.005	-0.008	0.009
	(-0.467)	(-0.613)	(0.345)	(-0.945)	(-1.400)	(0.893)
Inv_Inc08_T2				0.003	0.004	0.017
				(0.302)	(0.312)	(1.094)
Inv_Inc08_T3				-0.006	-0.001	-0.004
				(-0.667)	(-0.087)	(-0.317)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	1065328	802951	262377	1065328	802951	262377

Table 10: Regressions of the C-section choice for the SID sample of child deliveries for high- and low-intensity states. The sample includes hospital admissions for child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. The regressions in Panel A include the same control variables as in Table 8. The regressions in Panel B include the same control variables as in Table 9. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. States are split into low-intensity and high-intensity based on their adjusted C-section rates in the pre-crisis period. Standard errors are clustered by hospital. T-statistics are in parentheses.

	Low Intensity States (AZ, MD)						High Intensity States (NJ, FL, NY)					
	All Hosp.	Large	Small	All Hosp.	Large	Small	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis	-0.014***	-0.014**	-0.013	-0.014***	-0.011**	-0.018**	-0.004	-0.005	-0.003	-0.001	0.000	-0.004
	(-3.137)	(-2.579)	(-1.660)	(-2.991)	(-2.143)	(-2.035)	(-1.122)	(-1.157)	(-0.446)	(-0.167)	(0.026)	(-0.423)
Trend	0.004***	0.004***	0.004**	0.004***	0.003***	0.005**	0.002**	0.002*	0.002	0.001	0.001	0.002
	(3.757)	(2.907)	(2.128)	(3.640)	(2.825)	(2.361)	(2.337)	(1.978)	(1.550)	(1.137)	(0.549)	(0.967)
Hospital FE	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N
N	663272	494750	168522	663272	494750	168522	1020261	786020	234241	1020261	786020	234241
Post_Crisis*Inv_Inc08_T2	0.004	0.003	0.009	0.004	0.006	0.006	0.001	0.003	-0.005	-0.003	-0.003	0.001
	(0.521)	(0.358)	(0.611)	(0.515)	(0.588)	(0.395)	(0.098)	(0.299)	(-0.343)	(-0.308)	(-0.295)	(0.087)
Post_Crisis*Inv_Inc08_T3	-0.007	-0.012**	0.001	-0.010	-0.010*	-0.010	0.003	0.005	-0.001	0.003	0.000	0.010
	(-1.035)	(-2.488)	(0.096)	(-1.407)	(-2.081)	(-0.632)	(0.412)	(0.516)	(-0.081)	(0.414)	(0.033)	(0.677)
Hospital FE	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N
N	342598	246836	95762	342598	246836	95762	527799	398990	128809	527799	398990	128809

Table 11: Patient Safety Indicators (PSI): summary statistics. The table shows the five PSI indicators used in Tables 12 and 13 and their means (incidents rates) for all, large, and small hospitals in our sample. Large and small hospitals are hospitals with the above- and below-median service revenues in the prior year. The indicators are computed using the patient level SID database for the seven states in our sample. The algorithm for each indicator is described in: AHRQ, Patient Safety Indicators: Technical Specifications, March 2008. The AHRQ algorithm provides all ICD-9-CM diagnosis codes to identify the sample of patients to be used in the computation of each indicator, and all diagnosis codes to identify the adverse events for these patients. We screen each patient in our sample for these diagnoses to identify the samples and to compute the PSI indicators. Panel A shows the descriptions of the indicators, and Panel B reports the incidence of each adverse event in the respective sample and the sample size.

Panel A: PSI Descriptions

PSI #	Description
09	Perioperative Hemorrhage or Hematoma Rate
11	Postoperative Respiratory Failure Rate
12	Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate
13	Postoperative Sepsis Rate (among Elective Surgical Discharges)
19	Obstetric Trauma Rate – Vaginal Delivery Without Instrument

Panel B: PSI means and sample sizes

PSI #	All		Large		Small	
	Mean	N	Mean	N	Mean	N
09	0.007	1,794,927	0.008	1,441,541	0.005	353,386
11	0.011	617,137	0.011	496,732	0.010	120,405
12	0.012	1,906,595	0.013	1,532,810	0.009	373,785
13	0.016	151,471	0.016	123,040	0.017	28,431
19	0.024	594,800	0.025	442,159	0.023	152,641

Table 12: Regressions of the Patient Safety Indicators (PSI): interaction with investments income in 2008. The construction of the patient samples and the corresponding PSI indicators for are described in Table 11. The table shows OLS regressions of the indicator variable for a given PSI indicator, where the indicator is set to one when the adverse patient outcome occurs and is equal zero otherwise. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for patient characteristics and comorbidity factors described in AHRQ, Quality Indicators Empirical Methods, November 2014 (p. 22), the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
PSI_09						
Post_Crisis*Inv_Inc08_T2	-0.000	0.000	-0.001	-0.000	0.000	-0.001
	(-0.144)	(0.220)	(-0.954)	(-0.276)	(0.007)	(-1.084)
Post_Crisis*Inv_Inc08_T3	-0.001**	-0.002**	-0.001	-0.001*	-0.001**	-0.001
	(-2.037)	(-2.380)	(-0.588)	(-1.796)	(-2.050)	(-0.671)
N	906779	707356	199423	906779	707356	199423
PSI_11						
Post_Crisis*Inv_Inc08_T2	0.000	-0.000	-0.001	-0.000	-0.000	-0.001
	(0.064)	(-0.210)	(-0.561)	(-0.415)	(-0.187)	(-0.327)
Post_Crisis*Inv_Inc08_T3	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000
	(-0.796)	(-0.829)	(-0.416)	(-1.227)	(-1.501)	(-0.128)
N	309439	239916	69523	309439	239916	69523
PSI_12						
Post_Crisis*Inv_Inc08_T2	0.002*	0.002	-0.002	0.001	0.002*	-0.001
	(1.747)	(1.541)	(-1.000)	(1.603)	(1.710)	(-0.440)
Post_Crisis*Inv_Inc08_T3	0.002*	0.002*	-0.002	0.002*	0.002**	-0.001
	(1.747)	(1.806)	(-1.336)	(1.959)	(2.075)	(-0.721)
N	964769	754305	210464	964769	754305	210464
PSI_13						
Post_Crisis*Inv_Inc08_T2	0.002	0.002	0.007	0.003	0.002	0.007
	(0.812)	(0.471)	(1.009)	(1.098)	(0.474)	(1.214)
Post_Crisis*Inv_Inc08_T3	0.002	0.003	-0.000	0.002	0.002	0.003
	(0.585)	(0.795)	(-0.055)	(0.908)	(0.502)	(0.586)
N	77640	60608	17032	77640	60608	17032
PSI_19						
Post_Crisis*Inv_Inc08_T2	0.001	-0.001	0.007**	0.001	-0.002	0.009**
	(0.752)	(-0.683)	(2.263)	(0.621)	(-1.181)	(2.605)
Post_Crisis*Inv_Inc08_T3	-0.004*	-0.006***	0.003	-0.004**	-0.006***	0.004
	(-1.888)	(-2.739)	(0.994)	(-2.094)	(-2.653)	(1.175)
N	300313	218482	81831	300313	218482	81831
Patient-level controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
Hospital FE	Y	Y	Y	N	N	N

Table 13: For-profit hospital investment and cardiac treatment intensity around the 2008 financial crisis. Panel A shows OLS regressions of for-profit hospital investments and salary expenditures on the post-crisis dummy and control variables. The sample consists of for-profit hospitals during 2005-2011. The dependent variables are change in fixed assets, change in equipment spending, or change in spending on buildings, each scaled by lagged fixed assets, or change in spending on salaries scaled by lagged salaries. The *Post-Crisis* dummy is set to one for years 2009-2011 and is set to zero for years 2005-2007 (year 2008 is excluded). Trend is the linear time trend. The time-varying controls are defined in Table 2. Panel B shows regressions of the catheterization choice for the SID sample of hospital admissions for the Acute Myocardial Infarction (AMI). The dependent variable is an indicator for whether the patient received catheterization during his hospital stay. The independent variables are defined in Table 5. The hospital samples consist of for-profits (columns 1 and 3), nonprofits (column 4), and both (column 2). *For-profit* is a dummy variable for for-profit hospitals. *Private* is a dummy variable for patients with private insurance. In both panels, standard errors are clustered by hospital. T-statistics are in parentheses.

Panel A: Investment regressions: for-profit hospitals

	Fixed Assets	Equipment	Buildings	Salaries
Post-Crisis	-0.049**	-0.046***	-0.010	-0.029***
	(-2.023)	(-3.046)	(-0.721)	(-5.310)
Trend	0.013**	0.007*	0.006*	0.007***
	(2.139)	(1.646)	(1.675)	(5.056)
Hospital FE	Y	Y	Y	Y
Time-varying controls	Y	Y	Y	Y
N	7,114	5,993	5,306	6,275

Panel B: Catheterization regressions: for-profit and nonprofit comparison

	For-profits	All Hospitals	For-profits	Nonprofits
Post-Crisis	0.003	0.005	0.004	0.002
	(0.199)	(1.013)	(0.289)	(0.346)
Trend	0.010***	0.003*	0.009**	0.003*
	(2.724)	(1.879)	(2.392)	(1.746)
Post-Crisis*For-profit		0.001		
		(0.098)		
Trend*For-profit		0.006		
		(1.427)		
For-profit		-0.019		
		(-0.555)		
Post-Crisis*Private			-0.006	0.012*
			(-0.342)	(1.850)
Trend*Private			0.004	0.000
			(1.071)	(0.289)
Private			0.225**	0.024
			(2.357)	(0.691)
Patient controls	Y	Y	Y	Y
Hospital FE	Y	Y	Y	Y
N	191,277	1,051,083	191,277	859,806

Table 14: Physician arrangements descriptive statistics. Panel A shows descriptive statistic for hospital participation in different types of physician arrangements as reported in the American Hospital Association (AHA) annual survey in 2008. Each variable is an indicator equals to one if the hospital has the arrangement with at least some of its physicians, and it equals zero otherwise. MSO stands for Management Service Organization. Panel B shows descriptive statistics for the fraction of all privileged physicians under each arrangement as reported in the AHA survey in 2010 (first available year).

Panel A: Fraction of hospitals engaging in each type of physician arrangements

	All hospitals	Large	Small	Academic Centers	Teaching
Employment or MSO	0.45	0.50	0.38	0.67	0.51
Employment	0.41	0.47	0.33	0.67	0.47
Contractual arrangements	0.34	0.35	0.33	0.50	0.35
No integration	0.38	0.34	0.44	0.25	0.32
N	307	174	133	12	134

Panel B: Fraction of privileged physicians in a hospital under each arrangement

	Mean	Median	STD	P25	P75	N
Employed	0.15	0.04	0.25	0.00	0.00	224
Individual contract	0.08	0.00	0.20	0.00	0.00	225
Group contract	0.22	0.14	0.26	0.02	0.00	225
Not employed or under contract	0.49	0.59	0.34	0.01	0.00	225

Table 15: Regressions of the catheterization choice for the SID sample of heart attack patients: hospital integration with physicians. The sample includes hospital admissions for the Acute Myocardial Infarction (AMI). The table shows OLS regressions of an indicator variable for whether the patient received catheterization during his hospital stay. *Post-Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Trend* is the time trend. Panel A shows regressions run on the full sample of non-profit hospitals. *INTEG* is a measure of hospital integration defined in the table heading. Panel B shows regressions run separately on sub-samples of integrated and non-integrated hospitals, classified based on the indicator for employment relationship or MSO. *Private* is an indicator for privately insured patients. Panel C shows regressions run on the sub-sample of integrated hospitals. *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. The control variables are described in Table 5. Standard errors are clustered by hospital. T-statistics are in parentheses.

Panel A: The post-crisis response: interaction with measures of hospital integration

	INTEG = 1 if hospital has employment relationship or MSO			INTEG = % of privileged physicians that are employed		
	All Hosp.	Large	Small	All Hosp.	Large	Small
Post-Crisis	-0.001	-0.011	0.025	-0.012*	-0.011	-0.013
	(-0.190)	(-1.357)	(1.278)	(-1.818)	(-1.494)	(-1.015)
Post-Crisis*INTEG	0.011	0.025**	-0.038	0.075***	0.075***	0.087
	(1.064)	(2.308)	(-1.497)	(2.771)	(2.697)	(1.592)
Trend	0.003	0.002	0.007	0.004**	0.003	0.010**
	(1.595)	(0.895)	(1.582)	(2.041)	(1.525)	(2.323)
Trend*INTEG	-0.002	-0.004	0.014	-0.011	-0.024***	0.006
	(-0.563)	(-1.297)	(1.597)	(-1.520)	(-3.709)	(0.534)
Patient controls	Y	Y	Y	Y	Y	Y
Hospital FE	Y	Y	Y	Y	Y	Y
N	742473	590534	151939	551083	440334	110749

Panel B: The post-crisis response: interaction of the patient's insurance status for high-integration vs. low-integration hospitals

	High integration hospitals			Low integration hospitals		
	All Hosp.	Large	Small	All Hosp.	Large	Small
Post-Crisis	0.005	0.008	-0.008	-0.002	-0.011	0.026
	(0.652)	(0.958)	(-0.430)	(-0.230)	(-1.210)	(1.169)
Post-Crisis*Private	0.026**	0.030***	-0.002	-0.002	-0.004	0.029
	(2.586)	(2.844)	(-0.059)	(-0.156)	(-0.373)	(0.935)
Private	-0.091	-0.148	0.264***	0.033	0.035	0.133
	(-0.822)	(-1.354)	(6.762)	(1.133)	(1.416)	(0.607)
Trend	0.002	-0.001	0.024***	0.002	0.000	0.009
	(0.825)	(-0.519)	(2.786)	(0.918)	(0.191)	(1.496)
Trend*Private	-0.003	-0.003	0.007	0.006**	0.007**	0.004
	(-1.164)	(-1.124)	(1.105)	(2.582)	(2.609)	(0.651)
Patient controls	Y	Y	Y	Y	Y	Y
Hospital FE	Y	Y	Y	Y	Y	Y
N	370220	321950	48270	334940	264276	70664

Panel C: Interactions with investment income in 2008: integrated hospitals

	All Hosp	Large	Small	All Hosp	Large	Small
Post_Crisis*Inv_Inc08_T2	0.029	0.005	0.048	0.018	0.006	0.083
	(1.147)	(0.282)	(0.665)	(0.714)	(0.318)	(1.103)
Post_Crisis*Inv_Inc08_T3	0.013	-0.013	0.040	-0.001	-0.029	0.067
	(0.449)	(-0.475)	(0.559)	(-0.022)	(-1.369)	(0.894)
Inv_Inc08_T2				0.002	0.027	-0.021
				(0.060)	(0.717)	(-0.183)
Inv_Inc08_T3				0.008	0.029	0.055
				(0.170)	(0.578)	(0.421)
Hospital FE	Y	Y	Y	N	N	N
Patient controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	217177	178900	38277	217177	178900	38277

Appendix - Table A1: Regressions of the catheterization choice for the SID sample of heart attack patients; year 2008 included as a pre-crisis year. The sample includes hospital admissions for the Acute Myocardial Infarction (AMI). The table shows OLS regressions of the indicator variable for whether the patient received catheterization during his hospital stay. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2006-2008. *Trend* is the time trend. The control variables include indicators for the patient's race, sex, insurance status, and age group. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp	Large	Small	All Hosp	Large	Small
Post_Crisis	0.006*	0.003	0.020**	0.008**	0.005	0.022
	(1.851)	(0.845)	(2.348)	(2.072)	(1.249)	(1.593)
Trend	0.003**	0.001	0.014***	0.001	-0.001	0.014***
	(1.982)	(0.526)	(3.502)	(0.951)	(-0.431)	(2.673)
White	-0.013***	-0.012**	-0.012*	-0.022**	-0.008	-0.043
	(-2.811)	(-2.334)	(-1.754)	(-2.136)	(-0.710)	(-1.641)
Black	-0.079***	-0.082***	-0.054***	-0.098***	-0.085***	-0.161***
	(-13.243)	(-12.489)	(-5.538)	(-7.721)	(-6.947)	(-5.328)
Hispanic	-0.000	-0.003	0.020**	0.013	0.017	-0.000
	(-0.021)	(-0.524)	(2.107)	(1.134)	(1.586)	(-0.002)
Medicaid	-0.097***	-0.100***	-0.081***	-0.100***	-0.102***	-0.073***
	(-18.025)	(-16.270)	(-9.450)	(-12.311)	(-11.783)	(-4.467)
Medicare	-0.096***	-0.099***	-0.080***	-0.100***	-0.098***	-0.089***
	(-20.277)	(-17.812)	(-12.759)	(-15.759)	(-13.273)	(-9.279)
Self-pay	-0.004	-0.002	-0.001	-0.010	-0.009	0.016
	(-0.845)	(-0.456)	(-0.078)	(-1.519)	(-1.359)	(1.109)
No-charge	0.031**	0.027*	0.053**	0.066***	0.071***	0.021
	(2.287)	(1.784)	(2.188)	(4.354)	(5.729)	(0.506)
Other-pay	-0.035***	-0.033***	-0.038***	-0.031***	-0.030***	-0.006
	(-4.863)	(-3.887)	(-3.645)	(-3.077)	(-2.809)	(-0.233)
Female	-0.040***	-0.042***	-0.028***	-0.052***	-0.051***	-0.049***
	(-23.654)	(-21.621)	(-10.035)	(-27.192)	(-22.735)	(-15.124)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
N	862555	702828	159727	862555	702828	159727

Appendix - Table A2: Regressions of catheterization choice for the SID sample of heart attack patients: interaction with investments income in 2008; year 2008 included as a pre-crisis year. The sample includes hospital admissions for Acute Myocardial Infarction (AMI). The table shows OLS regressions of the indicator variable for whether the patient received catheterization during his hospital stay. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2006-2008. *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for the patient's race, sex, insurance status, and age group, the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp	Large	Small	All Hosp	Large	Small
Post_Crisis*Inv_Inc08_T2	0.021	0.006	0.036	0.023	0.007	0.062
	(1.436)	(0.476)	(0.942)	(1.628)	(0.562)	(1.474)
Post_Crisis*Inv_Inc08_T3	-0.014	-0.018	-0.016	-0.023	-0.035*	0.010
	(-1.056)	(-1.397)	(-0.481)	(-1.429)	(-1.949)	(0.256)
Inv_Inc08_T2				-0.027	0.007	-0.102
				(-1.003)	(0.284)	(-1.243)
Inv_Inc08_T3				-0.011	0.000	-0.050
				(-0.323)	(0.000)	(-0.629)
White	-0.012*	-0.011*	-0.005	-0.013	-0.010	-0.003
	(-1.966)	(-1.676)	(-0.501)	(-1.029)	(-0.768)	(-0.086)
Black	-0.079***	-0.083***	-0.045***	-0.110***	-0.101***	-0.141***
	(-9.873)	(-9.482)	(-3.467)	(-8.201)	(-7.832)	(-3.594)
Hispanic	0.004	0.001	0.028**	-0.000	0.001	-0.008
	(0.741)	(0.182)	(2.111)	(-0.033)	(0.088)	(-0.196)
Medicaid	-0.092***	-0.094***	-0.080***	-0.092***	-0.097***	-0.059***
	(-11.526)	(-10.235)	(-7.299)	(-7.649)	(-7.359)	(-3.305)
Medicare	-0.095***	-0.098***	-0.079***	-0.097***	-0.096***	-0.087***
	(-14.629)	(-12.557)	(-9.938)	(-10.280)	(-8.646)	(-8.180)
Self-pay	-0.005	-0.002	-0.005	-0.004	-0.011	0.025
	(-0.739)	(-0.302)	(-0.416)	(-0.510)	(-1.123)	(1.455)
No-charge	0.019	0.006	0.079***	0.053***	0.057***	0.061
	(0.983)	(0.264)	(2.668)	(2.957)	(3.921)	(1.183)
Other-pay	-0.043***	-0.043***	-0.037***	-0.029**	-0.033**	0.017
	(-4.750)	(-3.904)	(-2.845)	(-2.141)	(-2.232)	(0.708)
Female	-0.040***	-0.043***	-0.028***	-0.052***	-0.052***	-0.047***
	(-19.345)	(-17.665)	(-8.362)	(-21.880)	(-17.940)	(-12.835)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	519664	408847	110817	519664	408847	110817

Appendix - Table A3: Regressions of the C-section choice for the SID sample of child deliveries; year 2008 included as a pre-crisis year. The sample includes hospital admissions for the child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2006-2008. *Trend* is the time trend. The control variables include indicators for birth complications, mother diagnoses, race, sex, insurance status, and age group. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis	0.000	-0.000	0.001	0.002	0.002	0.001
	(0.237)	(-0.174)	(0.455)	(1.074)	(1.121)	(0.203)
Trend	-0.000	-0.000	-0.001	-0.001*	-0.001	-0.002
	(-1.098)	(-0.706)	(-0.677)	(-1.661)	(-1.070)	(-1.200)
Hypertension	0.182***	0.180***	0.186***	0.179***	0.177***	0.185***
	(60.644)	(52.446)	(33.579)	(51.033)	(43.230)	(31.947)
Previa	0.329***	0.320***	0.361***	0.328***	0.319***	0.362***
	(51.583)	(42.946)	(37.921)	(50.002)	(41.646)	(37.228)
Early_labor	0.019***	0.022***	0.008**	0.018***	0.020***	0.010***
	(8.168)	(8.132)	(2.266)	(7.646)	(7.388)	(2.610)
Complications_Mother	0.047***	0.048***	0.045***	0.039***	0.041***	0.035***
	(29.744)	(24.742)	(19.367)	(20.609)	(17.903)	(12.183)
Multi_Kids	0.215***	0.211***	0.230***	0.216***	0.212***	0.231***
	(37.005)	(32.697)	(20.893)	(34.392)	(30.447)	(19.766)
Breech	0.575***	0.574***	0.576***	0.576***	0.575***	0.577***
	(72.394)	(58.844)	(51.181)	(68.737)	(55.713)	(48.701)
Cord_Problems	0.413***	0.394***	0.474***	0.412***	0.392***	0.474***
	(25.221)	(19.451)	(31.002)	(27.091)	(21.077)	(28.846)
Rupture	0.383***	0.396***	0.332***	0.388***	0.396***	0.356***
	(8.026)	(7.126)	(3.998)	(8.053)	(7.123)	(4.162)
White	-0.004	-0.005	0.001	0.001	-0.000	0.008
	(-1.412)	(-1.528)	(0.373)	(0.215)	(-0.088)	(1.082)
Black	0.021***	0.023***	0.017***	0.034***	0.035***	0.034***
	(6.183)	(5.654)	(4.207)	(5.684)	(5.044)	(4.107)
Hispanic	-0.009***	-0.007**	-0.012***	0.015**	0.017**	0.013
	(-3.772)	(-2.487)	(-3.620)	(2.551)	(2.311)	(1.524)
Medicaid	-0.033***	-0.035***	-0.027***	-0.043***	-0.047***	-0.030***
	(-19.214)	(-16.814)	(-11.696)	(-13.504)	(-12.163)	(-7.101)
Medicare	0.020***	0.022***	0.016**	0.007	0.007	0.012
	(3.459)	(2.830)	(2.119)	(0.999)	(0.714)	(1.429)
Self_Pay	-0.058***	-0.060***	-0.051***	-0.054***	-0.057***	-0.044***
	(-19.799)	(-17.786)	(-9.943)	(-13.078)	(-10.772)	(-8.044)
No_Charge	-0.043***	-0.049***	-0.015	-0.067***	-0.077***	-0.016
	(-5.478)	(-5.829)	(-0.764)	(-4.013)	(-4.242)	(-0.518)
Other_Pay	-0.012***	-0.013***	-0.009**	-0.027***	-0.032***	-0.012
	(-4.892)	(-4.367)	(-2.132)	(-5.321)	(-5.335)	(-1.446)
Hospital FE	Y	Y	Y	N	N	N
Patient Age FE	Y	Y	Y	Y	Y	Y
N	3498917	2609779	889138	3498917	2609779	889138

Appendix - Table A4: Regressions of the C-section choice for the SID sample of child deliveries: interaction with investments income in 2008; year 2008 included as a pre-crisis year. The sample includes hospital admissions for child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2006-2008. *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for birth complications, mother's diagnoses, race, sex, insurance status, and age group, the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis*Inv_Inc08_T2	0.001	0.003	-0.005	-0.000	0.001	0.002
	(0.318)	(0.749)	(-0.949)	(-0.075)	(0.143)	(0.248)
Post_Crisis*Inv_Inc08_T3	0.000	-0.000	-0.002	-0.003	-0.005	0.004
	(0.048)	(-0.095)	(-0.287)	(-0.698)	(-1.071)	(0.501)
Inv_Inc08_T2				-0.003	-0.016	0.022
				(-0.249)	(-1.194)	(1.547)
Inv_Inc08_T3				-0.002	-0.001	0.008
				(-0.187)	(-0.147)	(0.659)
Hypertension	0.180***	0.180***	0.181***	0.177***	0.175***	0.180***
	(44.350)	(36.506)	(29.963)	(36.755)	(30.252)	(27.928)
Previa	0.331***	0.324***	0.355***	0.330***	0.321***	0.355***
	(37.819)	(30.221)	(32.261)	(37.321)	(29.863)	(31.518)
Early_labor	0.021***	0.024***	0.009**	0.020***	0.023***	0.011**
	(6.930)	(6.698)	(2.100)	(6.263)	(5.900)	(2.301)
Complications_Mother	0.046***	0.048***	0.040***	0.038***	0.040***	0.033***
	(21.540)	(17.590)	(16.005)	(14.350)	(12.343)	(10.135)
Multi_Kids	0.214***	0.211***	0.224***	0.215***	0.212***	0.224***
	(28.755)	(25.225)	(15.890)	(26.949)	(23.592)	(15.358)
Breech	0.578***	0.580***	0.574***	0.578***	0.579***	0.573***
	(50.577)	(39.997)	(37.378)	(47.217)	(37.203)	(35.964)
Cord_Problems	0.403***	0.378***	0.473***	0.404***	0.378***	0.477***
	(15.480)	(11.486)	(23.083)	(16.474)	(12.554)	(21.799)
Rupture	0.399***	0.388***	0.417***	0.411***	0.393***	0.444***
	(5.787)	(4.390)	(4.948)	(5.997)	(4.569)	(5.022)
White	-0.006	-0.008	0.001	-0.003	-0.006	0.013
	(-1.548)	(-1.644)	(0.131)	(-0.472)	(-0.930)	(1.392)
Black	0.023***	0.024***	0.021***	0.027***	0.026***	0.035***
	(5.765)	(5.178)	(3.541)	(3.195)	(2.710)	(3.294)
Hispanic	-0.010***	-0.007**	-0.013***	0.005	0.006	0.008
	(-3.416)	(-2.293)	(-2.620)	(1.061)	(1.096)	(0.736)
Medicaid	-0.033***	-0.037***	-0.024***	-0.040***	-0.044***	-0.031***
	(-14.309)	(-12.759)	(-7.951)	(-9.446)	(-8.753)	(-5.737)
Medicare	0.028***	0.028***	0.028***	0.020***	0.019**	0.026**
	(4.835)	(3.892)	(2.688)	(2.944)	(2.281)	(2.409)
Self_Pay	-0.059***	-0.061***	-0.052***	-0.056***	-0.059***	-0.048***

	(-16.042)	(-15.241)	(-7.517)	(-12.542)	(-10.984)	(-7.781)
No_Charge	-0.051***	-0.060***	-0.009	-0.077***	-0.092***	-0.004
	(-6.677)	(-7.744)	(-0.344)	(-5.219)	(-6.202)	(-0.114)
Other_Pay	-0.013***	-0.015***	-0.008	-0.030***	-0.035***	-0.018*
	(-4.149)	(-4.095)	(-1.443)	(-4.794)	(-4.599)	(-1.937)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	2057071	1498525	558546	2057071	1498525	558546

Appendix – Table A5: Regressions of the C-section choice for the SID sample of child deliveries: Washington state excluded. The sample includes hospital admissions for the child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Trend* is the time trend. The control variables include indicators for birth complications, mother diagnoses, race, sex, insurance status, and age group. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis	-0.004*	-0.004	-0.003	-0.005*	-0.003	-0.008**
	(-1.657)	(-1.467)	(-0.822)	(-1.670)	(-0.820)	(-1.992)
Trend	0.002***	0.001	0.002***	0.002***	0.001	0.003***
	(2.744)	(1.615)	(2.888)	(2.629)	(1.362)	(3.064)
Hypertension	0.183***	0.179***	0.192***	0.181***	0.176***	0.192***
	(59.569)	(47.027)	(39.487)	(49.796)	(37.873)	(37.617)
Previa	0.331***	0.318***	0.360***	0.330***	0.316***	0.360***
	(48.919)	(36.448)	(43.467)	(47.191)	(35.157)	(42.441)
Early_labor	0.019***	0.024***	0.007**	0.018***	0.021***	0.010***
	(8.139)	(8.211)	(2.354)	(7.442)	(7.155)	(2.884)
Complications_Mother	0.046***	0.047***	0.045***	0.039***	0.040***	0.037***
	(28.554)	(21.542)	(19.395)	(20.220)	(15.612)	(13.005)
Multi_Kids	0.218***	0.213***	0.234***	0.219***	0.213***	0.234***
	(38.881)	(31.859)	(24.024)	(35.941)	(29.430)	(23.188)
Breech	0.587***	0.584***	0.593***	0.589***	0.586***	0.594***
	(76.541)	(56.080)	(58.713)	(72.680)	(52.965)	(56.800)
Cord_Problems	0.415***	0.417***	0.410***	0.415***	0.416***	0.415***
	(25.133)	(41.974)	(10.492)	(26.590)	(40.966)	(11.437)
Rupture	0.434***	0.469***	0.367***	0.438***	0.465***	0.383***
	(9.574)	(8.114)	(5.166)	(9.752)	(8.216)	(5.353)
White	-0.004	-0.007*	0.004	-0.008**	-0.007	-0.007
	(-1.190)	(-1.720)	(1.497)	(-2.285)	(-1.563)	(-1.522)
Black	0.021***	0.023***	0.020***	0.024***	0.026***	0.022***
	(6.064)	(4.963)	(4.440)	(4.346)	(3.604)	(3.501)
Hispanic	-0.009***	-0.006*	-0.011***	0.006	0.014*	-0.003
	(-3.579)	(-1.901)	(-3.540)	(1.183)	(1.664)	(-0.496)
Medicaid	-0.033***	-0.036***	-0.027***	-0.044***	-0.051***	-0.030***
	(-18.302)	(-14.368)	(-13.283)	(-13.302)	(-10.974)	(-8.328)
Medicare	0.022***	0.024***	0.020***	0.009	0.010	0.013
	(3.834)	(2.754)	(2.983)	(1.262)	(0.884)	(1.615)
Self_Pay	-0.056***	-0.059***	-0.050***	-0.054***	-0.055***	-0.046***
	(-19.360)	(-16.705)	(-10.660)	(-13.267)	(-9.539)	(-8.592)
No_Charge	-0.042***	-0.054***	-0.003	-0.068***	-0.089***	-0.005
	(-4.816)	(-6.219)	(-0.173)	(-4.373)	(-5.027)	(-0.238)
Other_Pay	-0.011***	-0.012***	-0.009***	-0.028***	-0.036***	-0.014**
	(-4.337)	(-3.426)	(-2.634)	(-5.442)	(-4.925)	(-2.121)
Hospital FE	Y	Y	Y	N	N	N
Patient Age FE	Y	Y	Y	Y	Y	Y
N	3221343	2061760	1159583	3221343	2061760	1159583

Appendix – Table A6: Regressions of the C-section choice for the SID sample of child deliveries: Washington state excluded. The sample includes hospital admissions for child delivery. The table shows OLS regressions of the indicator variable for whether the delivery was via a Cesarean section. *Post_Crisis* is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Inv_Inc08_T2* and *Inv_Inc08_T3* are dummy variables for the second and the third tercile of the hospital's return on financial investments in 2008. *Trend* is the time trend. The control variables include indicators for birth complications, mother's diagnoses, race, sex, insurance status, and age group, the time-varying hospital variables included in Tables 2 and 3 (operating cash flow, log(service revenue), and growth in service revenue in the prior year). Year fixed effects are included in all regressions. Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
Post_Crisis*Inv_Inc08_T2	0.001	0.004	-0.006	-0.000	0.007	-0.005
	(0.161)	(0.799)	(-0.960)	(-0.058)	(1.190)	(-0.579)
Post_Crisis*Inv_Inc08_T3	-0.001	-0.003	0.002	-0.003	-0.002	-0.001
	(-0.325)	(-0.573)	(0.322)	(-0.705)	(-0.337)	(-0.121)
Inv_Inc08_T2				-0.001	-0.023	0.017
				(-0.053)	(-1.487)	(1.340)
Inv_Inc08_T3				-0.003	0.001	-0.008
				(-0.356)	(0.092)	(-0.688)
Hypertension	0.181***	0.177***	0.189***	0.178***	0.172***	0.189***
	(43.797)	(32.968)	(31.463)	(36.242)	(26.897)	(30.203)
Previa	0.333***	0.320***	0.360***	0.331***	0.317***	0.360***
	(36.306)	(26.041)	(37.829)	(35.676)	(25.640)	(36.714)
Early_labor	0.020***	0.025***	0.009**	0.019***	0.023***	0.010**
	(6.540)	(6.458)	(2.150)	(5.967)	(5.688)	(2.443)
Complications_Mother	0.046***	0.047***	0.043***	0.038***	0.040***	0.036***
	(21.084)	(15.543)	(15.065)	(14.359)	(11.128)	(10.851)
Multi_Kids	0.218***	0.213***	0.229***	0.219***	0.214***	0.230***
	(30.321)	(24.976)	(17.877)	(28.335)	(22.936)	(17.346)
Breech	0.585***	0.582***	0.591***	0.584***	0.581***	0.590***
	(50.291)	(35.395)	(41.844)	(46.943)	(32.816)	(40.224)
Cord_Problems	0.407***	0.419***	0.390***	0.408***	0.416***	0.396***
	(15.988)	(28.063)	(7.018)	(16.882)	(28.733)	(7.302)
Rupture	0.426***	0.458***	0.376***	0.437***	0.463***	0.393***
	(6.815)	(5.366)	(4.216)	(7.151)	(5.651)	(4.320)
White	-0.005	-0.009	0.006	-0.009*	-0.007	-0.007
	(-1.166)	(-1.619)	(1.433)	(-1.820)	(-1.183)	(-1.465)
Black	0.024***	0.024***	0.026***	0.019**	0.022**	0.015**
	(5.791)	(4.712)	(4.435)	(2.415)	(2.192)	(2.146)
Hispanic	-0.009***	-0.007**	-0.009**	-0.000	0.000	-0.002
	(-3.120)	(-2.089)	(-2.040)	(-0.103)	(0.099)	(-0.294)
Medicaid	-0.034***	-0.039***	-0.026***	-0.042***	-0.049***	-0.031***
	(-13.643)	(-10.925)	(-9.479)	(-9.791)	(-8.717)	(-6.571)
Medicare	0.028***	0.032***	0.023***	0.020**	0.023**	0.013
	(4.587)	(3.938)	(2.801)	(2.578)	(2.296)	(1.130)
Self_Pay	-0.057***	-0.060***	-0.053***	-0.057***	-0.059***	-0.054***

	(-15.833)	(-13.474)	(-8.718)	(-12.963)	(-9.858)	(-11.073)
No_Charge	-0.048***	-0.059***	-0.013	-0.077***	-0.093***	-0.015
	(-5.050)	(-5.804)	(-0.885)	(-5.566)	(-6.209)	(-0.650)
Other_Pay	-0.011***	-0.012***	-0.009*	-0.030***	-0.038***	-0.015**
	(-3.410)	(-2.929)	(-1.861)	(-4.864)	(-4.396)	(-1.989)
Hospital FE	Y	Y	Y	N	N	N
Patient age FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-varying hosp. vars.	Y	Y	Y	Y	Y	Y
N	1953024	1233539	719485	1953024	1233539	719485

Appendix – Table A7: Regressions of the Patient Safety Indicators (PSI). The construction of the patient samples and the corresponding PSI indicators for are described in Table 11. The table shows OLS regressions of the indicator variable for a given PSI indicator, where the indicator is set to one when the adverse patient outcome occurs and is equal zero otherwise. Post_Crisis is a dummy variable equal one for the years 2009-2011 and equal zero for the years 2005-2007 (year 2008 is excluded). *Trend* is the time trend. The control variables include indicators for patient characteristics and comorbidity factors described in AHRQ, Quality Indicators Empirical Methods, November 2014 (p. 22). Hospital fixed effects are included in the first three columns. Standard errors are clustered by hospital. T-statistics are in parentheses.

	All Hosp.	Large	Small	All Hosp.	Large	Small
PSI_09						
Post_Crisis	0.000	-0.000	0.001	0.000	-0.000	0.001
	(0.465)	(-0.128)	(1.514)	(0.141)	(-0.491)	(1.566)
Trend	-0.000***	-0.000**	-0.000**	-0.000**	-0.000	-0.000**
	(-2.757)	(-2.002)	(-2.026)	(-2.166)	(-1.382)	(-2.050)
N	1538847	1233687	305160	1538847	1233687	305160
PSI_11						
Post_Crisis	0.000	0.000	0.002	-0.000	-0.001	0.002
	(0.553)	(0.014)	(1.270)	(-0.058)	(-0.528)	(1.073)
Trend	-0.000	-0.000	-0.001	-0.000	-0.000	-0.001
	(-1.300)	(-0.768)	(-1.345)	(-0.639)	(-0.014)	(-1.495)
N	528962	425443	103519	528962	425443	103519
PSI_12						
Post_Crisis	0.000	0.000	0.001	0.000	0.000	0.001
	(0.516)	(0.055)	(1.336)	(0.399)	(0.008)	(1.107)
Trend	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-10.161)	(-8.508)	(-5.647)	(-9.682)	(-8.288)	(-5.690)
N	1635325	1312624	322701	1635325	1312624	322701
PSI_13						
Post_Crisis	0.001	0.000	0.004	0.001	0.000	0.003
	(0.394)	(0.087)	(0.896)	(0.324)	(0.078)	(0.681)
Trend	0.000	0.000	-0.001	-0.000	0.000	-0.000
	(0.006)	(0.249)	(-0.760)	(-0.014)	(0.078)	(-0.222)
	129738	105561	24177	129738	105561	24177
PSI_19						
Post_Crisis	0.001	0.001	-0.001	0.001	0.001	-0.002
	(0.569)	(1.079)	(-0.438)	(0.523)	(1.050)	(-0.727)
Trend	-0.001***	-0.001***	-0.000	-0.001***	-0.001***	-0.000
	(-3.307)	(-3.802)	(-0.090)	(-3.331)	(-3.761)	(-0.040)
N	509012	377472	131540	509012	377472	131540
Patient-level controls	Y	Y	Y	Y	Y	Y
Hospital FE	Y	Y	Y	N	N	N

Appendix – Table A8: Descriptive statistics for the for-profit hospitals, HCRIS sample. The sample includes 1,895 for-profit hospitals from 2005 through 2011. The financial data come from HCRIS, Schedule G. *Fixed Assets* is gross land, buildings, and equipment minus accumulated depreciation. *Service Revenue* is revenue from medical services. *Net Debt* is total financial debt (bonds and bank loans) minus cash and temporary securities scaled by net fixed assets. *Financial Investments* is the dollar amount of financial investments scaled by net fixed assets. *Investment Income* is income on financial investments scaled by lagged fixed assets. *Operating Income* is the difference between service revenue and service expenses scaled by lagged net fixed assets. *Investments Income* is income from financial investments from statement of revenues in Schedule G scaled by lagged net fixed assets. *Equipment* includes cars and trucks, major movable equipment, minor equipment, and minor nondepreciable equipment.

	Mean	Median	Std	P5	P95	N
Fixed Assets (in millions)	24.4	8.3	41.3	0.3	98.2	9,947
Service Revenue (in millions)	62.7	28.9	86.4	6.2	232	9,998
Net Debt	0.36	0.03	1.74	-2.82	3.81	8,002
Financial Investments	0.28	0.03	0.56	0.00	1.65	1,306
Investments Income	0.01	0.00	0.02	0.00	0.07	3,766
Operating Income	0.14	0.09	0.37	-0.40	0.85	9,293
Growth in Fixed Assets	0.05	-0.03	0.33	-0.26	0.66	9,024
Growth in Equipment	0.08	0.04	0.20	-0.19	0.48	7,609
Growth in Buildings	0.03	0.00	0.15	-0.11	0.33	6,642
Growth in Salaries	0.05	0.04	0.08	-0.08	0.21	7,881
Growth in Sales	0.06	0.05	0.13	-0.15	0.33	9,265