The (going) public option: Equity market financing in the hospital industry

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Abstract

We examine the role of public equity financing in the hospital sector. We find that the transition to public equity markets by hospital systems leads to dramatic and persistent increases in profitability, net income, and net patient revenues for the system's individual hospitals following the initial public offering. This increase in revenues is accompanied by expansions in both capacity and equipment, allowing hospitals to accommodate more patients and increase service offerings. The results additionally show that recently public systems use the raised capital to accelerate acquisitions of hospitals located in close geographic proximity to hospitals already owned by the system. The expanded network of the system can help to explain the large observed increase in profits after going public—greater regional market power enhances the system's bargaining posture with insurers, allowing them to demand higher reimbursement rates, thereby driving up prices for hospital services. These results improve our understanding of how access to public equity markets influences the healthcare landscape.

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1 Introduction

Hospitals are critical for public health, with inpatient hospital admissions typically comprising more than 10% of the U.S. population in a given year.[1] Despite their importance, hospitals often find themselves in precarious financial situations. Indeed, healthcare defaults on municipal bonds comprise 20% of all bond defaults, second only to housing. Likewise, with their thin (and often negative) profit margins and large fixed expenses, hospital bankruptcies and closures have proliferated in recent years.[2] Securing financing is therefore of utmost importance for any hospital system. Like other for-profit enterprises, for-profit hospitals can utilize public equity markets—selling equity shares in the hospital on a public exchange—to enhance their financial situations.

The transition to public equity markets can provide unique advantages for a hospital system. The initial public offering (IPO) can lead to a substantial cash infusion when shares are taken to market. Unlike debt financing, managers have considerable discretion over how to use equity sale proceeds, including, for example, expansions, acquisitions, meeting obligations, renovations, and hiring talented employees. Moreover, following the IPO, the hospital system has continued access to public equity markets, allowing the hospital system to quickly raise capital when the need arises through additional equity issues. This access can be an important lifeline for hospitals in periods of heightened financial distress. At the same time, being publicly traded can induce short-termism among hospital managers, leading to suboptimal long-term decisions. For example, the pressure to deliver profits for shareholders may lead managers to take actions, such as aggressive cost-cutting, that reduce the care quality for the hospital's patients. The goal of this study is to understand how access to public equity markets shapes hospital financial and operational decisions, as well as their provision of care. This investigation will therefore allow us to better understand how public equity financing influences the healthcare landscape.

We first examine how individual hospitals change after their system goes public through an IPO using a staggered difference-in-differences (DID) specification. Strikingly, we find a substantial improvement in financial performance: affected hospitals experience increases in profitability, net income (profit), and net patient revenues following the IPO. For example, recent publicly-traded hospitals exhibit a 62.6% increase in net income per inpatient discharge. The increase in profitability and revenues is accompanied by greater resource uti-

[1] For example, in 2022, the U.S. saw over 33 million inpatient hospital admissions (American Hospital Association (2024)). The numbers are similar for recent years.

[2] Healthcare bankruptcies amounted to 11% of all Chapter 11 bankruptcy filings in 2023 (Johnson and Dempsey (2023)). Since 1990, it is estimated that 15% of hospitals have closed (Carroll (2019)).

lization and investment activity: recently public hospitals increase capacity with the addition of more beds and improve services with equipment purchases and renovations. Along with these improvements, hospitals buttress employment, with sizable increases in total salary expense and total employee hours, driven by increases in nursing staff. We correspondingly observe a 17.2% increase in inpatient admissions for affected hospitals following the expanded capacity and service offerings, consistent with the increases in net patient revenues.

Recently-public hospitals also improve cost efficiency after going public, as evidenced by a significant decline in cost-to-charge ratios and total expenditures per inpatient discharge. Furthermore, affected hospitals are able to dramatically reduce their usage of debt and therefore their reliance on credit markets, which implies fewer resources devoted to servicing debt (Aghamolla et al. (2024)). These changes help to explain the increase in profit margins for recently-public hospitals. Additionally, in terms of quality of care, we find no significant changes in 30-day readmission or mortality rates following the transition to public equity markets. These findings suggest that affected hospitals are able to improve revenues and profitability largely without sacrificing quality of care.

The dynamics of the improvements we document suggest that the changes are directly attributable to the hospital system undertaking an IPO. In particular, we find that hospitals which are part of systems that go public exhibit parallel trends compared to other hospitals prior to the IPO, and in the years immediately following the IPO exhibit sharp changes in outcomes. Furthermore, the effects of going public do not appear to be transitory, but rather are persistent at least ten years following the IPO.

Two natural questions arise from this analysis: (*i*) How do hospitals achieve the large revenue and profit gains after going public?; and relatedly, (*ii*) What do recently-public hospitals do with the raised capital? With regard to the first question, as discussed above, we provide evidence that affected hospitals improve resource utilization and cost-efficiency following the transition to public equity markets. However, we additionally investigate whether these hospitals are also increasing revenues through higher prices. While we cannot observe negotiated prices between insurers and hospitals, we proxy for prices using employer-sponsored health insurance premiums paid by firms operating in the areas that affected hospitals are located in. (Payments for hospital services comprise the largest expenses for health insurers.) We find evidence that hospitals are indeed raising prices—health insurance premiums paid by affected firms rise by an economically sizable 5.9%, in line with insurers passing on increased hospital service prices to the firms they contract with. This is consistent with the observed increases in net income from patient services and net patient revenue. Naturally,

however, insurers are hesitant to raise reimbursement rates for hospital services. To better understand how publicly-traded hospitals can negotiate such price increases following the IPO, we examine decisions at the hospital system level after the IPO decision using a similar methodology as above.

The results indicate that public hospital systems significantly increase acquisition activities after going public. Importantly, we find that these acquisitions are more likely to be of hospitals in areas that the hospital system already operates and often within close proximity (25 miles) of another hospital that the system already owns. This allows hospital systems to build monopoly power and thus enhance their bargaining posture with insurers within an area. These results and those mentioned above imply that publicly-traded hospital systems use the raised capital to expand service offerings and renovations, but also to expand the system's network. The increased bargaining power allows systems to demand higher reimbursement rates from insurers, thereby driving up profitability and profits.

Continued access to equity market funding appears crucial for these hospital systems to expand in this way. In particular, in years when the system acquires another hospital, capital raised from stock issuances (i.e., seasoned equity offerings) increases by 61.7%. At the same time, we do not see any increases in debt issuance.[3]

In the final part of our main analysis, we explore an alternative way that hospitals can gain access to public equity markets—by being acquired by publicly-traded systems. Since hospital acquisitions may more generally affect hospital outcomes and healthcare markets, we consider the marginal effect of acquisitions by publicly-traded hospital systems relative to other hospital acquisitions. Through this analysis, we find results that are consistent with our IPO analysis. More specifically, we find that publicly-traded systems are more effective in improving the target hospital's finances compared to other acquisitions. This includes significantly higher net income per patient discharge and profit margin relative to other acquisitions. To achieve these gains, publicly-traded systems adopt the practices from their IPOs, whereby acquired hospitals expand capacity, allowing for and resulting in greater inpatient volume. Likewise, there is a substantial debt reduction in the acquisition, as compared to other acquisitions, which can facilitate the expansion as it allows the acquired hospital to reinvest its earnings. Finally, in line with our IPO analysis, we do not find any significant difference in care quality outcomes for acquisitions by publicly-traded hospital systems compared to other acquisitions.

[3]Moreover, as we describe below, unlike the leveraged buyouts employed in other for-profit acquisitions, hospitals acquired by a publicly-traded system exhibit a pronounced *decrease* in debt following the acquisitions.

To provide additional texture to our results, we consider heterogeneity in hospital responses. As the main channel driving the operational changes we document is the capital inflow and access to equity markets that the IPO brings, we examine heterogeneity based on financial constraints and to proceeds generated by the IPO. As the cash raised from the IPO and continued access to public equity markets eases financial constraints for hospitals, the more ex-ante financially constrained hospitals should exhibit a stronger response to the influx of capital. We test for treatment heterogeneity in three ways: partitioning the treatment group based on IPO proceeds, cash balance prior to the IPO, and net debt prior to the IPO, all scaled by total assets in the year before the IPO to account for size. The results indicate a differential response to the transition to public equity markets based on pre-IPO financial constraints. In particular, hospitals which are ex-ante more financially constrained exhibit more pronounced changes in revenue generation and resource utilization, with stronger increases in profitability, net income per patient, hospital capacity in terms of beds, and inpatient admissions. Conversely, hospitals which are less financially constrained prior to the IPO focus more on internal improvements, such as upgrading equipment or facilities and improving cost ratios. These results suggest that pre-IPO financial constraints are critical to a hospital's post-IPO strategy. Moreover, financially constrained hospitals use the capital to buttress capacity and admissions to ensure financial stability in future periods through higher internally generated capital.

A potential concern with our analysis is that our treatment and control hospitals differ in ways that may affect our inferences. While we show that the parallel trends assumption holds in our setting, for robustness we re-run our main analysis using a tightly matched sample of treated and control hospitals. We find very similar results across our main outcome variables.

Our study is related to a number of areas. A recent literature at the intersection of healthcare and finance considers the effect of financial markets on healthcare provision and operations. These include the role of hospital endowments (Adelino et al. (2015), Dranove et al. (2017), Adelino et al. (2022)), access to debt financing (Aghamolla et al. (2024)), government subsidy gaming by hospitals (Gupta et al. (2024b)), and private equity buyouts (e.g., Gondi and Song (2019), Bruch et al. (2020), Offodile II et al. (2021), Liu (2022), Gao et al. (2023), and Gupta et al. (2024a), among others). We contribute to this literature by being the first paper, to our knowledge, to document the unique effects of access to public equity markets on hospital financial and operational decisions. A related stream of literature considers the effects of hospital acquisitions and mergers, including on healthcare quality (Ho and Hamilton (2000), Beaulieu et al. (2020)), the labor market (Dranove and

Lindrooth (2003), Prager and Schmitt (2021)) and prices (e.g., Dafny (2009), Gowrisankaran et al. (2015), Capps et al. (2018), Dafny et al. (2019)). We contribute to this literature in two ways. First, we show that post-acquisition behavior of hospitals targeted by publicly-traded systems differs considerably from that of other acquired hospitals. Second, we document that the transition to public equity markets can contribute to hospital system consolidation, as continuous access to public equity financing facilitates the system's ability to acquire nearby hospitals.

This study is also related to the literature on IPOs. Due to data limitations, few papers consider the post-IPO decisions of firms relative to being privately held. Exceptions include Aggarwal and Hsu (2014) and Bernstein (2015), who use U.S. patent data to examine the innovation consequences of going public, Borisov et al. (2021), who examine firm employment growth following the IPOs, and Aghamolla and Thakor (2022), who examine IPO and project decisions of drug development firms in response to disclosure regulation. Another strand of literature investigates the differences between publicly-owned and privately-owned companies, such as Brav (2009), Saunders and Steffen (2011), Asker et al. (2015), and Sheen (2020). One challenge in these literatures is that data on private firms is generally limited, which may limit our understanding of how going pubic affects firm decisions. Using hospital-level data, we are able to observe specific changes that occur in a variety of operating and financial decisions at a granular level following the going-public decision. As such, the present study contributes to our understanding of the real effects of the transition to public equity markets.

2 Institutional background – Access to public equity markets

Privately-held firms apply for an IPO by first filing a registration (form S-1) statement, which includes financial and other business information (such as the prospectus), with the Securities and Exchange Commission (SEC). Following this, the firm conducts the book-building phase, which typically involves marketing the issuance to institutional investors, allowing the firm to collect demand information to determine the price range of the offering. The firm and its underwriters then settle on the final offer price and the shares are issued.

The transition to public equity markets can confer several advantages to the issuing hospital system. Unlike debt financing, proceeds raised from the offering can be used at the discretion of managers with no strings attached. The cash infusion can be used, for

example, towards hospital expansion, renovations, and acquisitions of equipment and other hospitals or healthcare facilities. Moreover, the hospital system has continued access to public equity markets following the initial offering, in the form of seasoned equity offerings (SEOs), allowing the system to revisit public markets and issue new shares for additional equity financing.[4] Continuous access to the equity market can be critical in periods of cash shortfalls when the hospital must service its debt or risk payment default. Access to equity markets can therefore provide a "lifeline" to the hospital system which can protect it in periods of negative income shocks—the publicly-traded system can always issue new shares.

Furthermore, going public affords the hospital increased access to other sources of financing. These include easier and less expensive access to corporate public bond markets, as publicly-traded hospitals have already undertaken the regulatory processes for securities compliance and, through the IPO process, have established relationships with major banks (as underwriters for the offering) that can facilitate issuance of the bond (Kovner and Wei (2014)). Moreover, the hospital's exposure from the book-building process that advertises the offering can generate interest from other investors, such as venture capital firms, which newly publicly-traded firms often utilize for financing (Iliev and Lowry (2020)).

Other benefits of going public include enhanced governance, diversification by investors, and greater transparency and certification, which can also lower debt costs (Lowry et al. (2017)). Of course, going public has several downsides as well. These include enhanced capital market pressure to meet performance measures, increased costs associated with public disclosure requirements, and increased scrutiny by regulators.

3 Research design and data

3.1 Research design

In order to explore how public equity markets affect hospitals, we examine the outcomes of individual hospitals before and after the system to which the hospital belongs undertakes an initial public offering (IPO), compared to hospitals that remain privately-owned. This allows us to infer how the transition to public equity ownership and the resulting capital raised influences the operations of hospitals.

[4]Such share dilution is at the expense of existing shareholders, however public firms have considerable latitude in the frequency and degree to which they issue new shares (Gao and Ritter (2010)).

More specifically, we run the following regression specification for hospital i in year t:

$$Y_{i,t} = \alpha + \beta IPO_{i,j,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \tag{1}$$

In regression (1), $IPO_{i,j,t}$ is an indicator variable that takes a value of one if hospital system j, which hospital i belongs to, has undertaken an IPO within the past five years, and zero otherwise. Our post-estimation window is therefore restricted to five years following a hospital system IPO. We restrict control firms (i.e., firms for which $IPO_{i,j,t} = 0$) to be those that are not-yet-treated as of time t. The variable $Y_{i,t}$ represents outcomes for hospital i in year t, and μ_i and τ_t denote hospital and year fixed effects, respectively. With the inclusion of hospital fixed effects, regression (1) is a staggered difference-in-differences (DID) specification that examines changes in hospital outcomes once a hospital changes from non-publicly-traded to publicly-traded due to a hospital system IPO, compared to hospitals that remain non-publicly-traded.

The focus of our main specification is on isolating changes in hospital outcomes around the initial public offering of the system the hospital belongs to. However, a hospital may become publicly-traded because it was a part of a system that became publicly-traded through an IPO, or because the hospital was acquired by a system that was already publicly-traded. In estimating regression (1), we therefore omit hospitals that become public through other means, such as being acquired by a publicly-traded hospital system. We separately consider this acquisition channel though an additional specification that explores when hospitals are acquired by publicly-traded hospital systems compared to other hospital acquisitions.

To permit an apples-to-apples comparison of hospital operations, we focus on short-term acute care hospitals. Moreover, to provide a closer counterfactual via the control group, for robustness we show that our results are robust to a matched sample of for-profit hospitals.

3.2 Data and Summary Statistics

Our main hospital-level data come from the Healthcare Provider Cost Reporting Information System (HCRIS), which is provided by the U.S. Centers for Medicare & Medicaid Services (CMS). The HCRIS database contains yearly information on hospital characteristics and operations for Medicare-certified hospitals (thus covering nearly all hospitals in the U.S.), including financial characteristics and operational information. Examples of financial characteristics include a hospital's assets and revenues; examples of operational information include hospital bed capacity, discharges, and employment information. We use all available

reported information on hospitals from the HCRIS database from 1997 to 2022. We focus on short-term acute care hospitals, excluding providers such as government-owned hospitals (e.g., Veterans Affairs hospitals) and clinics.

In order to examine health outcomes and care quality, we supplement this dataset with information at the hospital-level from two additional databases. The first is the CMS Hospital Compare program, which includes risk-adjusted rates of unplanned 30-day readmissions. Readmissions are frequently used as indicators of the effectiveness of hospital treatment, with higher readmission rates typically implying lower quality of care. We additionally use data on risk-adjusted 30-day mortality rates. We track readmission and mortality rates for three key acute conditions that are common indicators: acute myocardial infarction (AMI, i.e., heart attack), heart failure, and pneumonia.

The second database comes from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) data, a survey administered by CMS to a random sample of adult patients after discharge. The HCAHPS data therefore captures patients' subjective perceptions of care quality provided by hospitals. Examples of questions administered include how well pain has been controlled, whether a patient would recommend the hospital to other patients, communication with hospital staff (nurses and doctors), the clarity of discharge information and instructions, the cleanliness of the hospital, how quiet the hospital is, and the overall rating the patient would give to the hospital. Scores typically run from 1 (worst) to 3 (best), and we thus scale scores out of 3.[5]

We identify publicly-traded hospital systems using data from the Compustat database. For each publicly-traded hospital system in our dataset, we manually match that system to Compustat and obtain the date that the system went public. We also obtain data on stock and debt issuance by publicly-traded hospital systems from Compustat.

Finally, we collect data on hospital mergers and acquisitions from the Health Care Pricing Project.[6] This includes data from 2001 to 2014 that identifies which hospitals were acquired or were acquirers of other hospitals and the years of the acquisitions.

Our final sample consists of 73,753 hospital-year observations for 4,551 individual hospitals. Over our main sample period from 1997 to 2022, 961 hospitals are part of publicly-traded hospital systems at some point. Of these, 250 hospitals are treated hospitals (i.e., become publicly-traded via an IPO). Over our acquisition sample period from 2001 to 2014,

[5]For survey questions that require a response of either "Yes" or "No," we use the proportion of survey respondents answering "Yes" to the question.

[6]The dataset is downloaded directly from the project's website: https://healthcarepricingproject.org.

an additional 229 hospitals are acquired by a publicly-traded hospital system.[7] Table 1 provides summary statistics for the key variables in our analysis.

4 Hospital IPOs

4.1 Results

We first examine financial outcomes following the transition to public equity markets for individual hospitals that were part of hospital systems at the time of the system's IPO. Table 2 provides the results for specification (1). In column (1) of Table 2, we first observe that hospital profitability significantly improves. Profit margins rise by 8.5 percentage points following the hospital's shift to public markets, an economically large increase in hospital profitability.[8] Likewise, net income per patient discharge increases by approximately $751 per patient subsequent to going public, as shown in column (2), amounting to a 62.6% increase relative to the sample mean.[9] We find similar effects with regard to net income from patient services per discharge in column (3). As net income (or profit) is revenue minus costs, we examine these variables as well to better understand the increase in profitability. We see in column (4) that net patient revenue increases by 45.7%, suggesting that hospitals substantially ramp up revenue generation following the IPO. At the same time, hospital cost-to-charge ratios decline by 2.4 percentage points (column 5), which amounts to a 6.5% decrease relative to the sample mean. A decrease in cost-to-charge ratios implies that publicly traded hospitals operate more efficiently by reducing expenses in the years after the IPO. As an alternative measure of cost efficiency, we also examine total expenses scaled by the number of discharges in column (6). Consistent with the decline in cost-to-charge ratios, we see a significant decline in expenditures per discharge of $5,144, which equates to a 16.1% reduction relative to the sample mean.

In columns (7) and (8) of Table 2, we examine how the transition to public equity markets affects hospitals' use of financing sources. We find a large and significant drop in the use of debt, both short-term and long-term (i.e., notes payable), by treated hospitals. This suggests

[7] The remaining publicly-traded hospitals went public well before the beginning of our sample period in 1997.

[8] Profit margin is defined as net income divided by gross income, where gross income is net patient revenues plus investment income.

[9] Net income is equal to gross income minus total costs. We cannot take log of net income as some observations for this variable are negative. As such, to mitigate the impact of extreme observations, we winsorize net income and net patient income scaled by discharges at the 5% level. The results are similar when we winsorize at the 1% level, albeit the coefficients have larger magnitudes.

that the ability of hospitals to tap into equity financing reduces their need to rely on debt financing, and the potentially negative operating consequences that come with it (Aghamolla et al. (2024)).

The above results indicate that hospitals increase both efficiency and revenues to boost profitability after transitioning to public equity markets. To better understand how hospitals are able to achieve these profit increases, we next examine operating decisions in Panel A of Table 3. First, we observe that hospitals expand their operations by increasing capacity. In particular, total available bed days increases by 9.0% following the IPO (column 1), resulting in about 11 more beds per hospital. This allows hospitals to accommodate a larger number of admitted patients and thus generate greater revenues through inpatient admissions. Moreover, hospitals increase inpatient discharges following the IPO (column 2) by 17.2%, amounting to about 1,267 more admitted patients per recently public hospital per year.[10] We next examine the hospital Case Mix Index (CMI), which measures the average severity of Medicare inpatient diagnoses for a given hospital-year. In column (3), we see a significant reduction in the CMI, implying that affected hospitals are lowering the standard for admission and admitting patients with less severe conditions.

Increased revenue generation and profitability can also be influenced through higher reimbursement rates by private insurers for hospital services. As negotiated prices with insurers are proprietary, we proxy for the effect of hospital service prices using employer-sponsored health insurance premiums—the cost of health insurance policies—paid by businesses that operate in the same area as a treated hospital. The reasoning behind this measure is that higher negotiated prices with insurers for hospital services will be passed through to businesses in the form of higher health insurance premiums for plans that have the hospital in their network.[11] More specifically, we run a similar DID specification to our hospital-level regression (1), but at the firm level, setting IPO equal to one if a firm is located in a county where a hospital was part of an IPO within the last five years, and zero otherwise (including only not-yet-treated firms in the control group). We find an economically sizable increase of 5.9% in firm-level insurance premiums paid by businesses following hospital IPOs in areas where treated hospitals are located (column 4). This result indicates that recently-public

[10] We have an annual average of 7,368 discharges and thus an increase of $7,368 \times 0.172 = 1{,}267$ discharges per treated hospital per year.

[11] Aghamolla et al. (2023) provide evidence that hospital price changes can affect health insurance premiums. To run this test, we first collect data on firm-level premiums, using Form 5500 filings, which include information on health insurance premiums paid by all firms in the U.S. that have at least 100 employees. For each firm for which we have filing data, we determine the total health insurance premiums paid by that firm; we winsorize firm-level premiums at the 5% level to account for extreme outliers.

hospitals are indeed raising reimbursement rates with private insurers, thus boosting their net patient revenues, following the transition to public equity markets. We discuss the mechanisms for these price increases in Section 5.

In Panel B of Table 3, we examine investment and employment decisions by hospitals. We additionally find that, along with the expansion in hospital bed capacity noted above, recently-public hospitals invest significantly in capital expenditures. In particular, affected hospitals acquire or lease more equipment, as total equipment increases following the IPO (column 1). Likewise, in column (2), we observe an increase in capital devoted to lease improvements, which can represent, for example, expansions or renovations of leased buildings (hospitals often lease their real estate). In columns (3)–(6), we investigate employment decisions. We observe a significant increase in total salary expense and the total number of paid employment hours.[12] Examining further the drivers of this increase, we find that nursing staff salaries and employment hours substantially increase by 19.8% and 23.9%, respectively.[13] These results suggest that hospital systems use the raised capital from the IPO in part towards strengthening service offerings through medical equipment purchases (such as MRI machines), improved facilities, and a larger staff.

We next examine whether being publicly-traded affects the propensity that a hospital shuts down its operations entirely, a pervasive concern in the U.S., with 15% of hospitals estimated to have closed since 1990 (Carroll (2019)). We define $Closed_{i,t}$ as an indicator variable equal to one if hospital i closes in year t, and zero otherwise, estimated using our main specification (1). In column (7), we observe a negative and significant effect on the propensity of hospital closure after going public. This means that hospitals are less likely to close once they are part of systems that are publicly traded. This result is consistent with hospitals having continued access to equity market financing, which hospitals can tap into during periods of financial distress. Likewise, the lower rate of closure aligns with treated hospitals' reduced reliance on debt financing, helping to mitigate the risk of insolvency.

An important question is whether patient and quality of care outcomes are affected following the transition to public equity markets. While the previous results suggest that hospitals are able to improve aspects of their operations due to the inflow of capital, the focus on financial profitability demanded by external shareholders in financial markets may not be aligned with the optimal provision of care for patients. In Panel A of Table 4, we

[12]This increase is consistent with increases in employment growth that have been documented following IPOs more broadly; see Borisov et al. (2021).

[13]We do not find significant changes in total salaries or employment hours for interns and residents or contract physicians, suggesting that hospitals are relying on expanding their nursing staff to support expanded services, such as through nurse practitioners.

examine readmission and mortality rates for three key conditions that are tracked by CMS—pneumonia, acute myocardial infarction (heart attack), and heart failure—and are commonly used measures of hospital quality of care by both government agencies and researchers. A readmission is defined as an unplanned return to hospitalization within 30 days of the patient's discharge from a previous hospital stay, while a mortality is defined as a patient death the occurs within 30 days of discharge or during the inpatient stay. We do not find significant changes across all readmission and mortality measures.

We next consider patient satisfaction following discharge in Panel B of Table 4. These scores are from surveys administered by CMS to randomly selected patients from within 48 hours to six weeks following discharge. We largely do not observe significant systematic changes in patient experiences following the hospital's IPO. Exceptions include a significant increase in ratings for communication with doctors and information provided following discharge, consistent with earlier results regarding expansions of the medical staff after going public. At the same time, we observe a reduction in patient satisfaction regarding cleanliness of the hospital, which is likely due to the greater inpatient admissions by affected hospitals.

To summarize the above findings, hospitals which transition to public equity markets ramp up profitability through increased revenue generation and cost efficiency. The capital infusion from the offering allows the hospitals to increase capacity and accommodate more patients, thereby raising revenues. At the same time, affected hospitals buttress their nursing staff, acquire more equipment, and improve facilities, thus strengthening service offerings. These changes allow the hospital to command higher prices with insurers, further driving up revenues, and thus profits, for hospitals following the public offering. Quality of care, conversely, does not exhibit a noticeable decline, suggesting that affected hospitals do not sacrifice quality of care. These results illustrate that hospitals focus on expansion and improving financial returns following the transition to equity markets, and this is not at the expense of care quality.

4.2 Parallel Trends

Inference for our results rests on the assumption that treated and control hospitals exhibit parallel trends prior to treated hospitals becoming publicly traded. Given the issues related to interpreting dynamic treatment effects in staggered DID designs noted in the econometrics literature, we plot parallel trends by calculating dynamic effects over a window of $t-4$ to $t+4$ using the procedure of Callaway and Sant'Anna (2021), with "not-yet-treated" hospitals as the control group.

Figure 1 provides parallel trend graphs for our main outcome variables relating to hospital finances, operations, investment, and employment. The graphs show that the differences between the treated and control hospitals are largely insignificant and do not exhibit discernible trends prior to the transition to public equity markets for affected hospitals. However, immediately following the IPO, the outcomes of treated hospitals diverge from the control hospitals.

4.3 Long-run Effects

A natural question is how persistent the positive effects of becoming public are to a hospital, and whether the effects revert within a period of time. To explore this question, we recalculate our dynamic treatment effects using the procedure of Callaway and Sant'Anna (2021) but over a window of ten years in the post-estimation period.[14] The treatment effects are plotted in Figure 2. The results show that the effects we document are persistent through at least ten years following the IPO. These results suggest that the transition to public equity markets fundamentally changes hospital finances and operations.[15]

5 Mechanisms

The results in Section 4 show that going public is a game-changer for hospitals and leads to substantial changes in financial and operating performance. Two important questions arise from this analysis. The first is how hospitals are able to achieve the large profit and price increases after going public. The preceding analysis provided evidence of expansion of capacity and equipment purchases, along with the corresponding increase in hospital staff. These improvements provide the hospital justification to demand higher reimbursement rates from insurers. We further investigate the mechanisms by which hospitals increase their bargaining posture to better understand the profit and price increases observed after the IPO.

The second question, which is related to the first, pertains to the fundamental action of going public—what do hospital systems do with the raised capital? Understanding the consequences of the large capital influx and the continuous access to equity financing will allow

[14] We redefine our treatment variable, $IPO_{i,j,t}$, to take a value of one if hospital system j, which hospital i belongs to, has undertaken an IPO within the past ten years, and zero otherwise (including only not-yet-treated hospitals in the control group).

[15] Table A.1 in the Appendix provides the corresponding regression estimates, analogous to our main specification (1).

us to better understand how public equity financing influences the healthcare landscape. We investigate these questions with additional analyses in a number of ways below.

5.1 Hospital Systems Analysis

5.1.1 Acquisition Decisions by Publicly-traded Hospital Systems

To more fully understand the consequences of going public, we examine decisions at the hospital system-year level. Our empirical specification compares outcomes for publicly-traded hospital systems to non-publicly-traded systems:

$$Y_{j,t} = \alpha + \beta Public_{j,t} + \mu_j + \tau_t + \varepsilon_{j,t}, \tag{2}$$

where $Public_{j,t}$ is an indicator variable that takes a value of one if hospital system j is publicly traded, and zero otherwise. The parameters μ_j and τ_t denote system and year fixed effects, respectively. As noted by Cameron and Trivedi (1996, 2013), linear regression models may introduce biases in estimates involving count variables. Therefore, for the count variables in our analysis, we estimate regression (2) using a Poisson specification.

We first examine composition changes in the system—acquisitions of other hospitals and closures—following the public offering. These results are presented in Table 5. In column (1), we find that hospital systems increase their acquisition activity by 182.1% after going public.[16] At the same time, treated systems are significantly *less* likely to close a constituent hospital (column 2); this aligns with the hospital-level results reported in Panel B of Table 3 of reduced closure propensity. The net effect is an increase in system size, with total facilities significantly increasing, as shown in column (3).[17] These results are consistent with hospital systems using their raised capital and access to equity markets to expand operations through acquisitions.

We examine features of the acquisitions further in the remaining columns of Table 5. As noted above, the hospital system's ability to negotiate prices upward with insurers depends on their bargaining posture. A hospital system that owns more hospitals within a given coverage area is therefore in a stronger position to demand reimbursement rate increases for hospital services. To explore this channel, in columns (4) to (6), we consider acquisitions within a 25 to 75 mile radius of another hospital that the system already owns. In column (4),

[16] This is calculated as $(\exp[1.037]-1)\times 100$, as the analyses reported in Table 5 use a Poisson specification.

[17] We additionally find that acquisition activity increases only for short-term acute care hospitals and not for other kinds of healthcare facilities (e.g., long term care, rehabilitation, children's hospitals) following the IPO. These results are available upon request.

we find that the system increases acquisition activity by 133.5% within 25 miles of another system hospital. The effect is even stronger within 50 and 75 miles of a current system hospital, with increases of over 207% following the system becoming public. These results help to explain the large price and profit increases observed in the hospital-level analysis; systems increase acquisition activity and do so in areas where they can expand their network and build monopoly power, providing these systems with a stronger bargaining posture to raise prices with insurers.

5.1.2 Sources of Financing used by Publicly-traded Hospital Systems

We next investigate the sources of financing that publicly-traded hospital systems use to fund the acquisitions. In addition to the capital raised during the IPO, publicly-traded systems have continuous access to public equity markets and can raise equity capital by issuing new shares. We test for the amount of debt or equity share issuance in acquisition years relative to non-acquisition years. The results are reported in Table 6 and show that systems raise 61.7% more equity financing in acquisition years relative to non-acquisition years (column 1). Conversely, systems do not take on more debt to finance the acquisition (column 2). Consequently, systems primarily rely on equity capital to finance their acquisitions.

Collectively, these results imply that hospital systems use their raised capital and continuous access to public equity markets to substantially expand their network of hospitals. Moreover, the acquisitions are often made in closer geographic proximity to hospitals that the system already owns, allowing the system to build market power in certain areas and then leverage this greater bargaining posture to negotiate higher prices for hospital services with insurance companies. These expansions help to explain the large increases in profits and prices of affected hospitals documented in Section 4. Furthermore, publicly traded systems can use equity financing to help fund the acquisitions, allowing for more rapid expansion without the constraints of debt financing.

5.2 Hospitals Acquired by Publicly-traded Systems

As shown above, hospital systems more aggressively pursue acquisitions of other individual hospitals following the public offering. To better understand the unique advantages that access to public equity markets affords hospital systems, and the mechanisms through which they achieve profit increases, we examine how financial and operating decisions are affected at the hospital-year level after a hospital is acquired by a publicly-traded system. Since hospital acquisitions are common in the healthcare industry, we specifically investigate the

additional changes following the acquisition of a hospital by a publicly-traded system relative to acquisitions by systems that do not have access to public equity markets. Specifically, we consider the following specification at the hospital-year level:

$$Y_{i,t} = \alpha + \beta_1 Public\,Acquisition_{i,j,t} + \beta_2 Acquisition_{i,j,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \tag{3}$$

In equation (3), $Public\,Acquisition_{i,j,t}$ is an indicator variable equal to one if, as of year t, hospital i was acquired by a publicly-traded system j within the past five years, and zero otherwise. $Acquisition_{i,j,t}$ is an indicator variable equal to one if, as of year t, hospital i was acquired by system j within the past five years, and zero otherwise. $Public\,Acquisition_{i,j,t} = 0$ and $Acquisition_{i,j,t} = 0$ only for not-yet-treated firms. The coefficient β_1 therefore captures the average additional effect on the outcome $Y_{i,t}$ from being acquired by a publicly-traded system relative to the general effect from being acquired.

In Panel A of Table 7, columns (1) and (2), we observe that hospitals acquired by public systems generate markedly higher profit margins and net patient income per inpatient discharge as compared to other acquisitions and hospitals that do not experience an acquisition. We likewise observe relative increases in discharges and available bed days (columns 3–4), both of which are positive and larger in magnitude than the average declines exhibited by other acquired hospitals. These results suggest that public systems adopt their practices from the IPO for their acquisitions to ramp up revenue generation through increased capacity and utilization, and do so more effectively than other acquired hospitals. Hospitals acquired by public systems also become significantly more cost efficient (column 5), whereas cost efficiency decreases for other acquired hospitals. Hospitals acquired by public systems also see a large decrease in debt, as illustrated in columns (6) and (7), consistent with the lower reliance on debt financing that access to equity markets brings.

Further operating decisions related to investment and employment are reported in Panel B of Table 7. The results align with our earlier findings in Section 4. We observe relative increases in lease improvements and total equipment (columns 1 and 2). In terms of employment, hospitals acquired by public systems significantly increase total salaries and total employment hours of the nursing staff relative to other acquired hospitals (columns 3–7). Finally, in Table 8, we largely do not observe significant differences in the quality of care following public system acquisitions, consistent with the analysis in Section 4.

Overall, the above findings point to public systems being more effective in revenue generation and resource utilization with their acquired hospitals, to a larger degree than is observed in acquisitions by other hospital systems. Moreover, hospital systems adopt the

changes made at the time of the IPO for their newly acquired hospitals after going public across a variety of dimensions.

6 Heterogeneity and Robustness

6.1 Treatment Heterogeneity

A key channel through which hospitals are able to achieve the documented operational changes is through the inflow of capital and the easing of financial constraints that comes from access to public equity markets. To provide further evidence in support of this channel, we consider a number of heterogeneity tests.

We first examine heterogeneity in hospital responses based on IPO proceeds. We hypothesize that hospitals that are part of systems that raise more proceeds during the IPO have greater financial flexibility after the IPO due to a larger capital inflow. As such, these hospitals should exhibit more pronounced changes in operations following the IPO. To test this, we separate our treatment effect based on the proceeds the hospital system receives from undertaking the IPO. We first collect proceeds for each hospital system IPO. We then partition our treatment variable based on whether the hospital is part of a system that generated above- or below-median IPO proceeds, scaled by total asset value of the system in the year prior to the IPO to account for size.[18]

The results are provided in Table 9. In line with the above conjecture, we find stronger income effects for the high-proceeds group, with larger changes in profit margin, net patient income per inpatient admission, inpatient discharges, and hospital capacity. Interestingly, however, the low-proceeds group exhibits more pronounced increases in lease improvements and equipment, along with greater nursing salary expenditure and hours. The low-proceeds group also more prominently reduces debt following the IPO. These results suggest that hospitals with greater capital raised from the IPO focus more heavily on expansion to strengthen resource utilization, such as more beds for inpatient volume and higher inpatient admissions, while hospitals with less proceeds use the raised capital more towards upgrading facilities and service offerings and paying down debt.

Along similar lines, we next consider heterogeneity in cash balances prior to the transition to public equity markets. The reasoning is similar to the previous test, whereby hospitals with less cash prior to the IPO would have this constraint relaxed after the IPO, thus

[18]The results are not sensitive to the scaling (see Appendix Table A.2) and are also consistent when scaled using other measures of system size.

facilitating the hospital's ability to make operational changes. Consistent with the above test, we split based on whether the hospital is part of a treated system with an above- or below-median cash balance in the year prior to the IPO (again scaled by total assets to account for size). The results, presented in Table 10, are largely consistent with that of heterogeneity in proceeds: hospitals with a lower cash balance prior to the IPO generate larger income effects and focus more on expanding capacity and buttressing resource utilization through higher admissions, while hospitals with larger cash balances prior to the IPO focus more on internal improvements and paying down debt. We additionally find similar effects when consider heterogeneity in net debt prior to the IPO; hospitals with above-median debt, and thus more financially constrained prior to the IPO, focus more on increasing profitability, income, and capacity, while the less constrained group (below-median debt) exhibit more pronounced responses in internal developments, like lease improvements and equipment.

Collectively, the results from our heterogeneity tests indicate a differential approach by hospitals following the IPO. While all recently-public hospitals see significant increases in profitability and income, these changes are more pronounced for hospitals that have an improvement in financial flexibility after the IPO, resulting in the capital being used more towards expansions to drive revenue increases, such as greater capacity for inpatient volume. Hospitals that are less financially constrained after the IPO instead use the raised capital more towards investments—purchasing equipment, upgrading facilities, and paying down debt. These results also indicate that pre-IPO financial constraints are critical to a hospital's post-IPO strategy; hospitals that are more financially constrained prior to the IPO, such as with lower cash balances or greater debt, more heavily focus on revenue generation in the post-IPO period. This finding is consistent with financially constrained hospitals with using the proceeds to increase financial stability in future periods through internally generated capital.

6.2 Robustness: Matched Sample

A potential concern is that the hospitals that transition to public equity markets can be significantly different from those that remain private. Although the fact that our treated and control hospitals exhibit parallel trends prior to the IPOs suggests that our inferences are valid in this context, we nonetheless further address this concern by re-estimating our main specification, regression (1), using a propensity score matched sample. Specifically, we perform a cohort match where we match each treated hospital (hospitals that are part of systems that went public via an IPO) with up to five control hospitals (hospitals that

are not part of a publicly-traded hospital system). We perform the match as of the year prior to the treated hospital going public and match based on bed days (as a proxy for size and capacity), net patient revenue (to match based on financial condition), and we further restrict our sample to only for-profit hospitals (to more closely align the financial incentives of the treatment and control groups). The final matched sample consists of 68 treated hospitals and 261 control hospitals. Table A.3 provides a balance test between the treated and control hospitals for the various outcome variables in our study. As the table shows, the match is close between the treatment and control groups, with all variables but one having insignificant differences between the two groups.

Table 12 provides estimation results for regression (1) with the matched sample. As the matched sample is constructed using cohorts, we therefore estimate regression (1) using OLS via a stacked cohort specification (e.g., Gormley and Matsa (2011), Cengiz et al. (2019), Deshpande and Li (2019)), including hospital-cohort and year-cohort fixed effects. Our results with this test are very similar to our main results, reinforcing our previous findings.

7 Concluding remarks

In this paper, we examine the effect of public equity markets on hospital outcomes. We examine changes in hospital operations after a hospital's system undertakes an initial public offering. We additionally explore when hospitals are acquired by publicly-traded hospital systems. The results show that hospitals invest in improving resource utilization and service offerings, by expanding patient capacity, equipment purchases, and renovations. At the same time, these hospitals markedly ramp up revenue generation, primarily through higher prices for patient services. To achieve these revenue gains, hospital systems expand their network and enhance their bargaining posture with the acquisitions of hospitals in closer proximity to hospitals already owned by the system. We additionally do not observe decreases in the quality of care provided. Our findings help to shed light on how access to public equity financing shapes the healthcare landscape. We observe a pronounced shift in hospital operations following the going-public decision.

These findings can also help to partially explain the broader shifts documented in healthcare in the U.S. This includes the large observed rise in healthcare costs in the past two decades. Access to equity financing appears to have partly contributed to these rising healthcare costs, with publicly-traded hospitals raising the cost of hospital services, which constitutes the largest component of healthcare costs for insurers. An increase in prices is also

typically not only constrained to the focal hospital, but can result in other nearby hospitals within the insurer's network demanding higher reimbursement rates as well. This occurs because insurers cannot risk losing a local hospital from their network, which can result in more patients going to other, more expensive hospitals within their coverage.

Finally, the transition to public equity markets can also have benefits for the healthcare landscape. For one, publicly-traded systems do not close hospitals more often after going public and instead exhibit a significant decrease in the rate of closure. Access to equity markets can allow the system to quickly access financing by issuing new shares in periods of financial distress. Moreover, the hospitals acquired by publicly-traded systems significantly reduce their debt loads compared to other for-profit acquisitions. The rise in hospital bankruptcies—resulting from hospitals being unable to meet their debt burdens—and efforts to prevent them have become increasingly prominent in public policy discussions. Turning to public equity markets can potentially be a useful avenue to alleviate financing constraints and thus lower the chance of closure through bankruptcy.

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Figure 1: Parallel Trends

This figure provides parallel trends for hospitals that are part of systems that went IPO compared to other hospitals. Dynamic treatment effects are estimated following Callaway and Sant'Anna (2021).

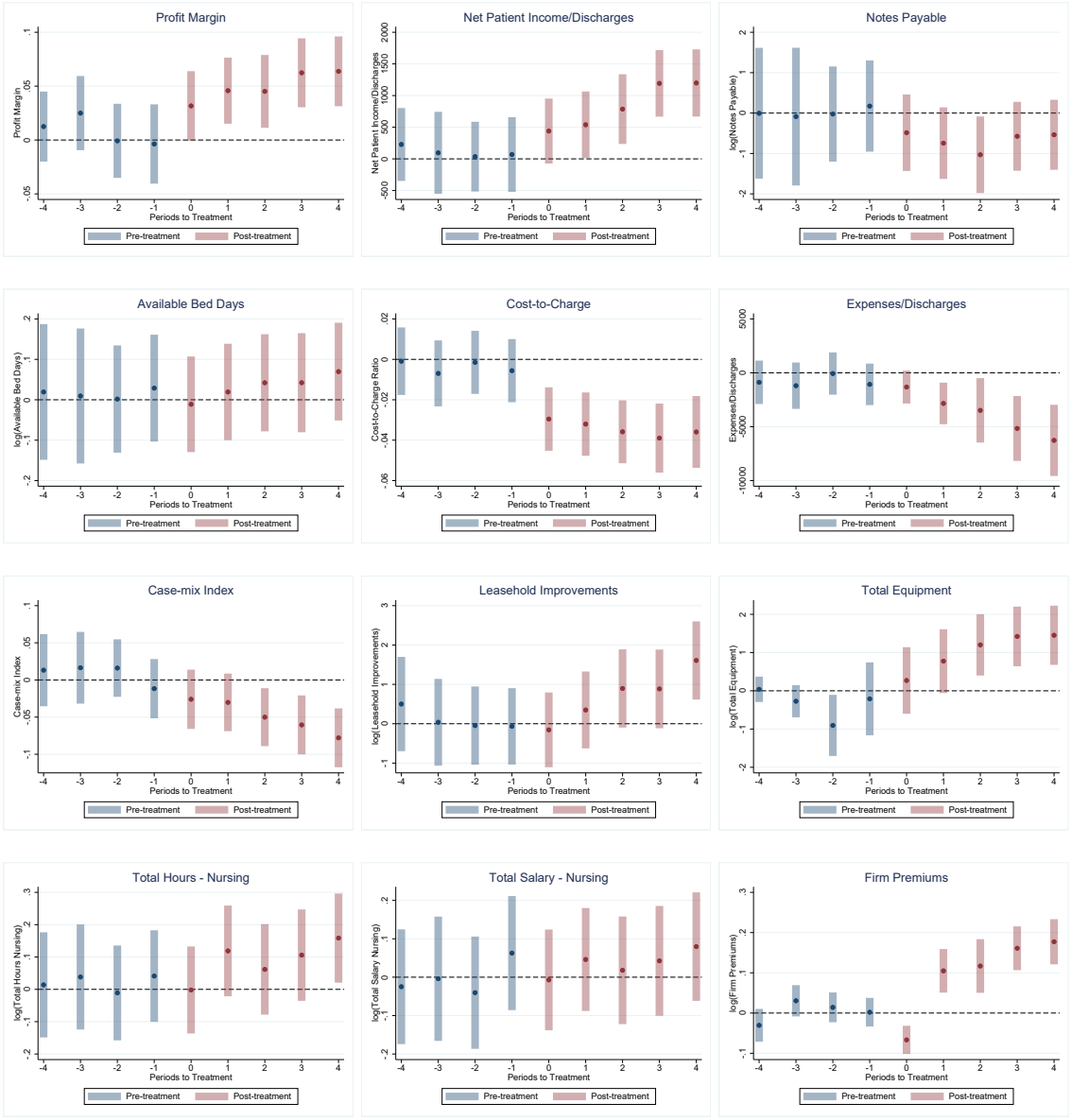


Figure 2: Long-run Dynamic Effects

This figure provides long-term treatment effects for hospitals that are part of systems that went IPO compared to other hospitals. Dynamic treatment effects are estimated following Callaway and Sant'Anna (2021).



Table 1: Summary Statistics

This table provides summary statistics for the main variables in the analysis at the hospital-year level. *Net Patient Revenue* is gross patient revenue less contractual allowances and discounts. *Profit Margin* is net income divided by gross income, and is winsorized at the 1% level. *Net Income/Discharges* is total gross income minus total costs scaled by total discharges, and is winsorized at the 1% level. *Net Patient Income/Discharges* is net income from patient services scaled by total discharges, and is winsorized at the 1% level. *Cost-to-Charge* is total costs divided by total charges, and is winsorized at the 5% level. *Expenses/Discharges* is total expenses scaled by total discharges, and is winsorized at the 1% level. *Notes Payable* are notes due and payable longer than one year. *Short Term Loans* are loans coming due in the next 12 months. *Available Bed Days* is the total number of bed days available. *Discharges* is the number of inpatient adult and pediatric discharges. *Case Mix Index* signifies the average severity of Medicare patient conditions. *Equipment* is the total value of hospital equipment. *Firm Premiums* are total employer-sponsored health insurance premiums at the firm level, winsorized at the 5% level. *Lease Improve* is expenditures for leasehold improvements. *Total Salary Costs* is the general cost of all salaries. *Total Hours* is total hours worked by all employees. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Total Hours Nursing* is total hours worked by nursing staff. *Closed* is an indicator variable that takes a value of 1 if the subsequent year is the final year of operation, and zero otherwise. *Pneumonia Readm Rate*, *AMI Readm Rate*, and *HF Readm Rate* are the rates of unplanned 30-day readmissions for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. *Pneumonia Mortality Rate*, *AMI Mortality Rate*, and *HF Mortality Rate* are 30-day mortality rates for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. Scores are the average rating scaled by the highest possible rating for each category: cleanliness (*Clean Score*), doctor communication (*Doc Comm Score*), nurse communication (*Nurse Comm Score*), explanation of care (*Explain Score*), helpfulness (*Help Score*), recovery information (*Info Score*), pain control management (*Pain Score*), quietness (*Quiet Score*), whether the patient would recommend the hospital (*Recommend Score*), and overall (*Overall Score*).

Variable	N	Mean	Std Dev	p25	Median	p75
Profit Margin	88,202	0.031	0.134	−0.014	0.036	0.092
Net Income/Discharges	88,682	1,176.215	3,072.722	−253.857	619.376	2,105.629
Net Patient Income/Discharges	88,734	−534.204	3602.731	−1,498.709	−139.513	1,031.384
Net Patient Revenue	89,693	136,214,187.80	222,719,078.20	23,035,146	64,769,560	162,392,448
Cost-to-Charge	65,344	0.353	0.186	0.220	0.314	0.439
Expenses/Discharges	88,727	30,119.90	36,496.28	12,512.40	19,114.32	31,765.24
Notes Payable	36,902	43,695,131.55	108,753,564.2	1,444,957.625	9,351,269.5	38,897,900
Short Term Loans	45,942	3,997,217.235	16,018,425.83	351,430.719	1,063,127.375	3,019,180
Available Bed Days	88,872	45,150.33	44,940.60	11,315.00	32,485.00	62,769.50
Discharges	88,734	7,079.733	38,887.01	1,157	3,990	9,834.824
Case Mix Index	72,769	1.426	0.331	1.206	1.377	1.607
Firm Premiums	861,945	1,800,029	2,089,708	458,913	1,067,168	2,161,876
Equipment	89,693	58,421,892.41	127,169,520.70	5,312,060	20,431,048	63,302,152
Lease Improve	89,693	3,307,555.708	23,225,776.820	0.00	0.00	768,402
Total Salary Costs	88,920	14,279,341.98	25,082,270.2	2,721,348.875	6,739,829.75	16,127,060.00
Total Hours	75,974	2,043,032.64	4,684,762.92	580,810.56	1,276,437.31	2,537,295.75
Total Salary Nursing	74,704	1,403,837.03	2,167,637.90	369,573.58	754,230.72	1,605,879.75
Total Hours Nursing	73,120	42,114.71	254,199.63	12,639.78	23,292.61	47,498.70
Closed	89,447	0.007	0.086	0.000	0.000	0.000
Pneumonia Readm Rate	40,392	0.174	0.016	0.163	0.172	0.182
Pneumonia Mortality Rate	40,660	0.134	0.028	0.112	0.131	0.154
AMI Mortality Rate	23,953	0.177	0.02	0.161	0.173	0.191
AMI Mortality Rate	29,454	0.145	0.019	0.13	0.145	0.159
HF Readm Rate	38,098	0.228	0.021	0.214	0.226	0.242
HF Mortality Rate	40,458	0.116	0.016	0.105	0.115	0.126
Clean Score	43,229	0.879	0.040	0.853	0.88	0.907
Doc Comm Score	43,230	0.92	0.026	0.903	0.920	0.937
Nurse Comm Score	43,230	0.911	0.030	0.897	0.913	0.930
Explain Score	43,200	0.811	0.043	0.787	0.81	0.837
Help Score	43,224	0.855	0.048	0.827	0.853	0.883
Info Score	43,226	0.850	0.052	0.820	0.860	0.890
Pain Score	28,661	0.876	0.028	0.863	0.877	0.893
Quiet Score	43,229	0.831	0.052	0.797	0.830	0.863
Recommend Score	43,228	0.885	0.043	0.86	0.887	0.913
Overall Score	43,228	0.872	0.045	0.847	0.877	0.902

Table 2: Hospital Financial Outcomes Following IPOs

This table shows financial outcomes at the hospital-year level following hospital system IPOs. IPO is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. $Profit\,Margin$ is net income divided by gross income. $Net\,Income/Discharges$ is total gross income minus total costs scaled by total discharges. $Net\,Patient\,Income/Discharges$ is net income from patient services scaled by total discharges. $Net\,Patient\,Revenue$ is gross patient revenue less contractual allowances and discounts. $Cost\text{-}to\text{-}Charge$ is total costs divided by total charges. $Expenses/Discharges$ is total expenses scaled by total discharges. $Notes\,Payable$ are notes due and payable longer than one year. $Short\text{-}Term\,Loans$ are loans coming due in the next 12 months. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Dep. Variable:	$Profit\,Margin$	$Net\,Income$ $/Discharges$	$Net\,Patient\,Income$ $/Discharges$	log($Net\,Patient$ $Revenue$)	$Cost\text{-}to\text{-}Charge$	$Expenses$ $/Discharges$	log($Notes$ $Payable$)	log($Short\text{-}term$ $Loans$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IPO	0.085***	751.4***	1,325***	0.457**	−0.024*	−5,144***	−1.906***	−0.884***
	(0.018)	(187.710)	(221.145)	(0.178)	(0.013)	(1,096)	(0.372)	(0.264)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.030	1,201	-702.20	145,014,499.60	0.369	31,944	48,487,275.98	4,343,736.55
N	71,990	72,514	72,551	73,381	53,093	72,545	30,430	39,420
R^2	0.443	0.460	0.516	0.858	0.905	0.736	0.737	0.664

Table 3: Hospital Operating Decisions Following IPOs

This table shows operating decisions at the hospital-year level following hospital system IPOs. Panel A examines admission outcomes, while Panel B examines price, investment, and employment outcomes. IPO is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. $Available\,Bed\,Days$ is the total number of bed days available. $Discharges$ is the number of discharges. $Case\,Mix\,Index$ signifies the average severity of Medicare patient conditions. $Firm\,Premiums$ are total employer-sponsored health insurance premiums at the firm level. $Equipment$ is the total value of hospital equipment. $Lease\,Improve$ is expenditures for leasehold improvements. $Total\,Salary\,Costs$ is the general cost of all salaries. $Total\,Hours$ is total hours worked by all employees. $Total\,Salary\,Nursing$ is total expenditures on salaries for nursing staff. $Total\,Hours\,Nursing$ is total hours worked by nursing staff. $Closed$ is an indicator variable that takes a value of 1 if the subsequent year is the last year of operation, and zero otherwise. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Admissions and Hospital Beds

Dep. Variable:	log(*Available Bed Days*)	log(*Discharges*)	*Case Mix Index*	log(*Firm Premiums*)
	(1)	(2)	(3)	(4)
IPO	0.090***	0.172***	−0.019*	0.059***
	(0.035)	(0.045)	(0.011)	(0.013)
Hospital FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
Y Mean	45,798	7,368	1.432	1,762,129
N	72,669	72,551	58,129	789,925
R^2	0.933	0.948	0.891	0.657

Panel B: Investment and Employment

Dep. Variable:	log(*Equipment*)	log(*Lease Improve*)	log(*Total Salary Costs*)	log(*Total Hours*)	log(*Total Salary Nursing*)	log(*Total Hours Nursing*)	*Closed*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO	1.597***	2.691***	0.090***	0.070*	0.198***	0.233***	−0.006***
	(0.450)	(0.622)	(0.0278)	(0.0361)	(0.061)	(0.063)	(0.002)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	63,725,913.49	3,227,227.894	15,678,936.48	2,244,277.133	1,511,087.571	44,726.966	0.007
N	73,417	73,417	72,677	60,809	59,695	58,252	68,950
R^2	0.535	0.581	0.938	0.893	0.878	0.833	0.181

Table 4: Quality of Care Following IPOs

This table shows quality of care outcomes at the hospital-year level following hospital system IPOs. Panel A examines readmission and mortality rates as outcomes, while Panel B examines patient satisfaction scores as outcomes. IPO is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. *Pnueumonia Readm Rate*, *AMI Readm Rate*, and *HF Readm Rate* are the rates of unplanned 30-day readmissions for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. *Pnueumonia Mortality Rate*, *AMI Mortality Rate*, and *HF Mortality Rate* are 30-day mortality rates for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. In Panel B, scores are the average rating scaled by the highest possible rating for each category: cleanliness (*Clean Score*), doctor communication (*Doc Comm Score*), nurse communication (*Nurse Comm Score*), explanation of care (*Explain Score*), helpfulness (*Help Score*), recovery information (*Info Score*), pain control management (*Pain Score*), quietness (*Quiet Score*), whether the patient would recommend the hospital (*Recommend Score*), and overall (*Overall Score*). Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Readmissions and Mortality

Dep. Variable:	*Pnueumonia Readm Rate*	*Pnueumonia Mortality Rate*	*AMI Readm Rate*	*AMI Mortality Rate*	*HF Readm Rate*	*HF Mortality Rate*
	(1)	(2)	(3)	(4)	(5)	(6)
IPO	−0.005	−0.004	−0.001	0.001	−0.007	−0.002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	0.173	0.134	0.176	0.144	0.227	0.116
N	32,562	32,684	19,063	22,916	30,395	32,116
R^2	0.623	0.769	0.826	0.735	0.705	0.551

Panel B: Patient Satisfaction

Dep. Variable:	*Clean Score*	*Doc Comm Score*	*Nurse Comm Score*	*Explain Score*	*Help Score*	*Info Score*	*Pain Score*	*Quiet Score*	*Recommend Score*	*Overall Score*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
IPO	−0.017***	0.005*	−0.001	−0.003	0.001	0.021***	0.002	−0.004	0.003	0.003
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.001)	(0.005)	(0.004)	(0.005)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.882	0.921	0.914	0.814	0.858	0.854	0.878	0.831	0.890	0.877
N	34,787	34,787	34,787	34,752	34,781	34,784	23,103	34,787	34,785	34,785
R^2	0.718	0.719	0.767	0.678	0.810	0.718	0.665	0.831	0.798	0.786

Table 5: Publicly-Traded Hospital System Decisions

This table analyzes hospital operation decisions by publicly-traded hospital systems compared to non-publicly systems. Regressions are estimated at the hospital system-year level using a Poisson specification. *Public* is an indicator variable that takes a value of one if the hospital system is publicly-traded as of the given year, and zero otherwise. The dependent variables are counts of the number of: hospitals acquired, hospitals closed, hospitals in the systems, and acquisitions within a geographical distance of a system's existing hospitals. The sample is from 2001 to 2014. Standard errors are clustered at the hospital system level, and hospital system and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Dep. Variable:	# Acquired	# Closed	# Total	# Acquisitions, 25 miles	# Acquisitions, 50 miles	# Acquisitions, 75 miles
	(1)	(2)	(3)	(4)	(5)	(6)
Public	1.037***	−1.132***	0.061*	0.848***	1.140***	1.122***
	(0.128)	(0.312)	(0.031)	(0.139)	(0.144)	(0.151)
System FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	0.467	0.151	7.693	0.222	0.287	0.319
N	2,387	1,073	4,715	1,810	2,107	2,197

Table 6: Publicly-Traded Hospital System Financing During Acquisitions

This table examines financing decisions of publicly-traded hospital systems in years when there are acquisitions compared to other years. *Hospital Acquisition* is an indicator variable that takes a value of one if the hospital system did an acquisition of a hospital in a given year, and zero otherwise. Only publicly-traded hospital systems are included. *Stock Issuance* is the dollar amount of proceeds from the sale of common and preferred stock. *Debt Issuance* is the dollar amount of proceeds from the issuance of long-term debt. The sample runs from 2001 to 2014. Standard errors are clustered at the hospital system level, and hospital system and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

	$\log(Stock\ Issuance)$	$\log(Debt\ Issuance)$
	(1)	(2)
Hospital Acquisition	0.617**	0.732
	(0.246)	(0.712)
System FEs	Y	Y
Year FEs	Y	Y
Y Mean	68.09	878.8
N	204	200
R^2	0.448	0.608

Table 7: Hospital Operating Decisions After Being Acquired by Publicly-traded Systems

This table explores how hospital operations change when hospitals are acquired by publicly-traded systems, compared to when they are acquired by other systems. Regressions are run at the hospital-year level. *Public Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a publicly-traded hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. Panel A examines hospital financial and bed outcomes, while Panel B examines hospital investment, employment, and debt outcomes. $Profit\ Margin$ is net income divided by gross income. $Net\ Patient\ Income/Discharges$ is net income from patient services scaled by total discharges. $Discharges$ is the number of inpatient adult and pediatric discharges. $Available\ Bed\ Days$ is the total number of bed days available. $Cost\text{-}to\text{-}Charge$ is total costs divided by total charges. $Lease\ Improve$ is expenditures for leasehold improvements. $Equipment$ is the total value of hospital equipment. $Total\ Salary\ Costs$ is the general cost of all salaries. $Total\ Hours$ is total hours worked by all employees. $Total\ Salary\ Nursing$ is total expenditures on salaries for nursing staff. $Total\ Hours\ Nursing$ is total hours worked by nursing staff. $Notes\ Payable$ are notes due and payable longer than one year. $Short\ Term\ Loans$ are loans coming due in the next 12 months. Regressions are run from 2001 to 2014. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials and Beds

Dep. Variable:	$Profit\ Margin$	$Net\ Patient\ Income/Discharges$	log($Discharges$)	log($Available\ Bed\ Days$)	$Cost\text{-}to\text{-}Charge$	log($Notes\ Payable$)	log($Short\text{-}Term\ Loans$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Public Acquired	0.020**	429.500***	0.066**	0.073***	−0.036***	−1.915***	−1.500***
	(0.009)	(164.500)	(0.028)	(0.020)	(0.005)	(0.411)	(0.254)
Acquired	−0.013***	−215.600**	−0.058***	−0.054***	0.005**	0.120	−0.170**
	(0.004)	(98.08)	(0.014)	(0.010)	(0.002)	(0.106)	(0.0725)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0295	-273.2	7,258	45,831	0.364	42,669,708	3,965,533.6
N	45,638	45,938	45,938	46,031	36,260	19,117	23,837
R^2	0.524	0.605	0.962	0.948	0.932	0.802	0.733

Panel B: Investment and Employment

Dep. Variable:	log($Lease\ Improve$)	log($Equipment$)	log($Total\ Salary\ Costs$)	log($Total\ Hours$)	log($Total\ Salary\ Nursing$)	log($Total\ Hours\ Nursing$)
	(1)	(2)	(3)	(4)	(5)	(6)
Public Acquired	0.579**	0.550*	0.044*	−0.002	0.288***	0.321***
	(0.280)	(0.322)	(0.024)	(0.036)	(0.047)	(0.056)
Acquired	−0.342***	−0.997***	−0.114***	−0.120***	−0.109***	−0.122***
	(0.0935)	(0.175)	(0.013)	(0.014)	(0.019)	(0.022)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	6,332,199.9	53,261,016	14,004,769	2,089,785.70	1,264,493.40	42,136.014
N	17,700	46,475	39,249	38,986	38,986	37,657
R^2	0.811	0.613	0.912	0.900	0.900	0.868

Table 8: Quality of Care following Acquisitions by Publicly-traded Systems Compared to Others

This table explores how hospital quality of care changes when hospitals are acquired by publicly-traded systems, compared to when they are acquired by other systems. *Public Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a publicly-traded hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. *Pnueumonia Readm Rate*, *AMI Readm Rate*, and *HF Readm Rate* are the rates of unplanned 30-day readmissions for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. *Pnueumonia Mortality Rate*, *AMI Mortality Rate*, and *HF Mortality Rate* are 30-day mortality rates for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. In Panel B, scores are the average rating scaled by the highest possible rating for each category: cleanliness (*Clean Score*), doctor communication (*Doc Comm Score*), nurse communication (*Nurse Comm Score*), explanation of care (*Explain Score*), helpfulness (*Help Score*), recovery information (*Info Score*), pain control management (*Pain Score*), quietness (*Quiet Score*), whether the patient would recommend the hospital (*Recommend Score*), and overall (*Overall Score*). Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Readmissions and Mortality

Dep. Variable:	*Pnueumonia Readm Rate*	*Pnueumonia Mortality Rate*	*AMI Readm Rate*	*AMI Mortality Rate*	*HF Readm Rate*	*HF Mortality Rate*
	(1)	(2)	(3)	(4)	(5)	(6)
Public Acquired	−0.003*	0.001	0.002	−0.002	−0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Acquired	0.001	0.000	0.000	0.001	0.0003	0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	0.179	0.117	0.190	0.155	0.238	0.115
N	18,825	21,732	11,653	15,597	18,163	20,812
R^2	0.694	0.626	0.778	0.662	0.758	0.645

Panel B: Patient Satisfaction

Dep. Variable:	*Clean Score*	*Doc Comm Score*	*Nurse Comm Score*	*Explain Score*	*Help Score*	*Info Score*	*Pain Score*	*Quiet Score*	*Recommend Score*	*Overall Score*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Public Acquired	0.003	0.001	−0.003	−0.004	−0.004	0.010**	−0.002	0.004	−0.004	−0.001
	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.003)
Acquired	−0.004***	−0.003***	−0.003***	−0.003***	−0.003***	−0.004***	−0.003***	−0.003***	−0.005***	−0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.875	0.920	0.905	0.804	0.849	0.833	0.875	0.824	0.883	0.865
N	20,748	20,748	20,748	20,728	20,743	20,745	20,736	20,748	20,747	20,746
R^2	0.803	0.795	0.836	0.757	0.858	0.780	0.716	0.882	0.862	0.845

Table 9: Treatment Effect Heterogeneity by IPO Proceeds Scaled by Total Assets

This table explores treatment effect heterogeneity by IPO proceeds scaled by total assets of the hospital system in the year prior to the IPO. Regressions are run at the hospital-year level. $IPO^{High\,IPO\,Proceeds}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the average IPO proceeds sclaed by total assets of the hospital system in the year prior to the IPO was above-median, and zero otherwise. $IPO^{Low\,IPO\,Proceeds}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the average IPO proceeds scaled by total assets of the hospital system in the year prior to the IPO was below-median, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. *Total Beds* is the total number of beds available for patient use. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. Panel A examines hospital financial and bed outcomes, while Panel B examines hospital investment, employment, and debt outcomes. *Profit Margin* is net income divided by gross income. *Net Patient Income/Discharges* is net income from patient services scaled by total discharges. *Discharges* is the number of inpatient adult and pediatric discharges. *Available Bed Days* is the total number of bed days available. *Cost-to-Charge* is total costs divided by total charges. *Lease Improve* is expenditures for leasehold improvements. *Equipment* is the total value of hospital equipment. *Total Salary Costs* is the general cost of all salaries. *Total Hours* is total hours worked by all employees. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Total Hours Nursing* is total hours worked by nursing staff. *Notes Payable* are notes due and payable longer than one year. *Short Term Loans* are loans coming due in the next 12 months. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials and Beds

Dep. Variable:	*Profit Margin*	*Net Patient Income /Discharges*	log(*Discharges*)	log(*Available Bed Days*)	*Cost-to-Charge*	log(*Notes Payable*)	log(*Short-Term Loans*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$IPO^{High\,IPO\,Proceeds}$	0.161**	2,086.000**	0.457***	0.317***	0.022***	−1.706***	−0.014
	(0.072)	(896.000)	(0.114)	(0.078)	(0.001)	(0.478)	(0.783)
$IPO^{Low\,IPO\,Proceeds}$	0.086***	1,263.000***	0.172***	0.066*	−0.040**	−2.132***	−1.291***
	(0.020)	(244.600)	(0.046)	(0.039)	(0.016)	(0.563)	(0.301)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0299	−703.7	7,372	45,803	0.369	48,500,000	4,348,000
N	71,840	72,401	72,401	72,519	53,020	30,379	39,376
R^2	0.443	0.517	0.948	0.933	0.905	0.737	0.664

Panel B: Investment and Employment

Dep. Variable:	log(*Lease Improve*)	log(*Equipment*)	log(*Total Salary Costs*)	log(*Total Hours*)	log(*Total Salary Nursing*)	log(*Total Hours Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)
$IPO^{High\,IPO\,Proceeds}$	1.916***	1.472*	0.252***	0.226***	−0.024	0.041
	(0.470)	(0.855)	(0.0737)	(0.085)	(0.107)	(0.130)
$IPO^{Low\,IPO\,Proceeds}$	3.029***	1.891***	0.092***	0.089**	0.255***	0.279***
	(0.694)	(0.502)	(0.027)	(0.035)	(0.061)	(0.066)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	3,233,000	63,800,000	15,700,000	2,247,000	1,513,000	44,779
N	73,267	73,267	72,527	60,663	59,549	58,107
R^2	0.581	0.535	0.938	0.893	0.878	0.833

Table 10: Treatment Effect Heterogeneity by Cash Balances Scaled by Total Assets

This table explores treatment effect heterogeneity by cash balances scaled by total assets of the hospital system in the year prior to the IPO. Regressions are run at the hospital-year level. $IPO^{High\,Cash}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the hospital system was above the median treated hospital system in terms of cash balance scaled by total assets in the year prior to the IPO, and zero otherwise. $IPO^{Low\,Cash}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the hospital system was below the median treated hospital system in terms of cash balance scaled by total assets in the year prior to the IPO, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. *Total Beds* is the total number of beds available for patient use. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. Panel A examines hospital financial and bed outcomes, while Panel B examines hospital investment, employment, and debt outcomes. *Profit Margin* is net income divided by gross income. *Net Patient Income/Discharges* is net income from patient services scaled by total discharges. *Discharges* is the number of inpatient adult and pediatric discharges. *Available Bed Days* is the total number of bed days available. *Cost-to-Charge* is total costs divided by total charges. *Lease Improve* is expenditures for leasehold improvements. *Equipment* is the total value of hospital equipment. *Total Salary Costs* is the general cost of all salaries. *Total Hours* is total hours worked by all employees. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Total Hours Nursing* is total hours worked by nursing staff. *Notes Payable* are notes due and payable longer than one year. *Short Term Loans* are loans coming due in the next 12 months. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials and Beds

Dep. Variable:	*Profit Margin*	*Net Patient Income /Discharges*	log(*Discharges*)	log(*Available Bed Days*)	*Cost-to-Charge*	log(*Notes Payable*)	log(*Short-Term Loans*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$IPO^{High\,Cash}$	0.077***	847.500***	0.090**	0.031	−0.047***	−2.311***	−1.383***
	(0.022)	(253.600)	(0.041)	(0.026)	(0.017)	(0.614)	(0.402)
$IPO^{Low\,Cash}$	0.123***	2,213.000***	0.395***	0.198**	−0.035*	−1.786***	−0.670
	(0.037)	(462.600)	(0.091)	(0.088)	(0.021)	(0.625)	(0.431)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0299	−703.7	7,372	45,803	0.369	48,500,000	4,348,000
N	71,840	72,401	72,401	72,519	53,020	30,379	39,376
R^2	0.443	0.517	0.948	0.933	0.905	0.737	0.664

Panel B: Investment and Employment

Dep. Variable:	log(*Lease Improve*)	log(*Equipment*)	log(*Total Salary Costs*)	log(*Total Hours*)	log(*Total Salary Nursing*)	log(*Total Hours Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)
$IPO^{High\,Cash}$	3.041***	2.383***	0.094***	0.050*	0.273***	0.269***
	(0.748)	(0.666)	(0.023)	(0.029)	(0.050)	(0.059)
$IPO^{Low\,Cash}$	2.684**	0.924**	0.135**	0.205***	0.174	0.269*
	(1.094)	(0.422)	(0.060)	(0.076)	(0.153)	(0.160)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	3,233,000	63,800,000	15,700,000	2,247,000	1,513,000	44,779
N	73,267	73,267	72,527	60,663	59,549	58,107
R^2	0.581	0.535	0.938	0.893	0.878	0.833

Table 11: Treatment Effect Heterogeneity by Net Debt Scaled by Total Assets

This table explores treatment effect heterogeneity by net debt scaled by the total assets of the hospital system in the year prior to the IPO. Regressions are run at the hospital-year level. $IPO^{High\,Net\,Debt}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the hospital system was above the median treated hospital system in terms of net debt scaled by total assets in the year prior to the IPO, and zero otherwise. $IPO^{Low\,Net\,Debt}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the hospital system was below the median treated hospital system in terms of net debt scaled by total assets in the year prior to the IPO, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. *Total Beds* is the total number of beds available for patient use. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. Panel A examines hospital financial and bed outcomes, while Panel B examines hospital investment, employment, and debt outcomes. *Profit Margin* is net income divided by gross income. *Net Patient Income/Discharges* is net income from patient services scaled by total discharges. *Discharges* is the number of inpatient adult and pediatric discharges. *Available Bed Days* is the total number of bed days available. *Cost-to-Charge* is total costs divided by total charges. *Lease Improve* is expenditures for leasehold improvements. *Equipment* is the total value of hospital equipment. *Total Salary Costs* is the general cost of all salaries. *Total Hours* is total hours worked by all employees. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Total Hours Nursing* is total hours worked by nursing staff. *Notes Payable* are notes due and payable longer than one year. *Short Term Loans* are loans coming due in the next 12 months. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials and Beds

Dep. Variable:	*Profit Margin*	*Net Patient Income /Discharges*	log(*Discharges*)	log(*Available Bed Days*)	*Cost-to-Charge*	log(*Notes Payable*)	log(*Short-Term Loans*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$IPO^{High\,Net\,Debt}$	0.095***	1,496.000***	0.252***	0.188***	−0.003	−2.228***	−0.536
	(0.038)	(453.200)	(0.086)	(0.057)	(0.011)	(0.474)	(0.599)
$IPO^{Low\,Net\,Debt}$	0.094***	1,306.000***	0.188***	0.064	−0.088***	−1.888***	−1.260***
	(0.023)	(282.900)	(0.052)	(0.044)	(0.028)	(0.671)	(0.316)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0299	−703.7	7,372	45,803	0.369	48,500,000	4,348,000
N	71,840	72,401	72,401	72,519	53,020	30,379	39,376
R^2	0.443	0.516	0.948	0.933	0.905	0.737	0.664

Panel B: Investment and Employment

Dep. Variable:	log(*Lease Improve*)	log(*Equipment*)	log(*Total Salary Costs*)	log(*Total Hours*)	log(*Total Salary Nursing*)	log(*Total Hours Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)
$IPO^{High\,Net\,Debt}$	1.246	1.584**	0.167***	0.081	0.067	0.128
	(1.135)	(0.649)	(0.055)	(0.065)	(0.112)	(0.114)
$IPO^{Low\,Net\,Debt}$	3.419***	1.926***	0.091***	0.111***	0.282***	0.301***
	(0.722)	(0.562)	(0.030)	(0.039)	(0.067)	(0.073)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	3,233,000	63,800,000	15,700,000	2,247,000	1,513,000	44,779
N	73,267	73,267	72,527	60,663	59,549	58,107
R^2	0.581	0.535	0.938	0.893	0.878	0.833

Table 12: Robustness: PSM Sample

This table shows hospital outcomes following hospital system IPOs for a propensity-score matched sample, using a stacked cohort differences-in-differences specification. Each treated hospital is matched with up to two control hospitals. *IPO* is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and zero otherwise. *Profit Margin* is net income divided by gross income. *Net Income/Discharges* is total gross income minus total costs scaled by total discharges. *Net Patient Revenue* is gross patient revenue less contractual allowances and discounts. *Cost-to-Charge* is total costs divided by total charges. *Available Bed Days* is the total number of bed days available. *Discharges* is the number of discharges. *Case Mix Index* signifies the average severity of Medicare patient conditions. *Firm Premiums* are total employer-sponsored health insurance premiums at the firm level; the dependent variable mean is winsorized at the 1% level. *Equipment* is the total value of hospital equipment. *Lease Improve* is expenditures for leasehold improvements. *Total Salary Costs* is the general cost of all salaries. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Pnueumonia Readm Rate*, *AMI Readm Rate*, and *HF Readm Rate* are the rates of unplanned 30-day readmissions for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. *Pnueumonia Mortality Rate*, *AMI Mortality Rate*, and *HF Mortality Rate* are 30-day mortality rates for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. In Panel B, scores are the average rating scaled by the highest possible rating for each category: recovery information (*Info Score*), pain control management (*Pain Score*), quietness (*Quiet Score*), whether the patient would recommend the hospital (*Recommend Score*), and overall (*Overall Score*). Standard errors are clustered at the hospital level, and hospital-cohort and year-cohort fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Operations

Dep. Variable:	*Profit Margin*	*Net Income /Discharges*	log(*Net Patient Revenue*)	*Cost-to-Charge*	log(*Available Bed Days*)	log(*Discharges*)	*Case Mix Index*	log(*Firm Premiums*)	log(*Equipment*)	log(*Lease Improve*)	log(*Total Salary Costs*)	log(*Total Salary Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
IPO	0.084***	657.9***	0.657**	−0.037***	0.068*	0.136**	−0.049***	0.059**	2.140***	2.655***	0.130***	0.198***
	(0.026)	(243.5)	(0.284)	(0.012)	(0.039)	(0.055)	(0.013)	(0.025)	(0.726)	(0.815)	(0.0329)	(0.0718)
Hospital-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	-0.008	268.7	57,702,714	0.328	36,816	5,067	1.324	1,625,421	16,181,159	927,684	6,117,277.17	525,155.59
N	1,556	1,566	1,569	473	1,567	1,566	1,483	82,931	1,569	1,569	1,549	1,440
R^2	0.592	0.667	0.686	0.962	0.869	0.927	0.931	0.729	0.533	0.629	0.961	0.922

Panel B: Quality of Care

Dep. Variable:	*Pnueumonia Readm Rate*	*Pnueumonia Mortality Rate*	*AMI Readm Rate*	*AMI Mortality Rate*	*HF Readm Rate*	*HF Mortality Rate*	*Info Score*	*Pain Score*	*Quiet Score*	*Recommend Score*	*Overall Score*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
IPO	0.003	−0.0004	0.002	0.006**	−0.009	−0.002	0.009	−0.002	−0.002	−0.0003	0.006
	(0.006)	(0.004)	(0.004)	(0.003)	(0.007)	(0.004)	(0.009)	(0.003)	(0.007)	(0.006)	(0.007)
Hospital-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.183	0.116	0.191	0.152	0.242	0.109	0.813	0.865	0.820	0.866	0.850
N	259	282	215	263	276	299	273	273	273	273	273
R^2	0.661	0.734	0.851	0.771	0.794	0.585	0.852	0.826	0.935	0.928	0.913

Appendix: Additional tables

Table A.1: Long-run Effects

This table shows hospital outcomes in the long run following hospital system IPOs using a 10-year treatment window. *IPO* is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past ten years as of year t, and zero otherwise. *Profit Margin* is net income divided by gross income. *Net Income/Discharges* is total gross income minus total costs scaled by total discharges. *Net Patient Revenue* is gross patient revenue less contractual allowances and discounts. *Cost-to-Charge* is total costs divided by total charges, and is winsorized at the 5% level. *Available Bed Days* is the total number of bed days available. *Discharges* is the number of discharges. *Case Mix Index* signifies the average severity of Medicare patient conditions. *Firm Premiums* are total employer-sponsored health insurance premiums at the firm level. *Equipment* is the total value of hospital equipment. *Lease Improve* is expenditures for leasehold improvements. *Avg Salary* is total salary expenditures divided by the number of full-time equivalent employees on payroll. *Total Salary Costs* is the general cost of all salaries. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Pneumonia Readm Rate*, *AMI Readm Rate*, and *HF Readm Rate* are the rates of unplanned 30-day readmissions for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. *Pneumonia Mortality Rate*, *AMI Mortality Rate*, and *HF Mortality Rate* are 30-day mortality rates for pneumonia, acute myocardial infarction (AMI), and heart failure (HF), respectively. In Panel B, scores are the average rating scaled by the highest possible rating for each category: recovery information (*Info Score*), pain control management (*Pain Score*), quietness (*Quiet Score*), whether the patient would recommend the hospital (*Recommend Score*), and overall (*Overall Score*). Standard errors are clustered at the hospital level, and hospital-cohort and year-cohort fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials, Bed and Employment

Dep. Variable:	*Profit Margin*	*Net Income /Discharges*	log(*Net Patient Revenue*)	*Cost-to-Charge*	log(*Available Bed Days*)	log(*Discharges*)	*Case Mix Index*	log(*Firm Premiums*)	log(*Equipment*)	log(*Lease Improve*)	log(*Total Salary Cost*)	log(*Total Salary Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
IPO	0.0720***	502.7**	0.377**	−0.022*	0.101**	0.167***	−0.032**	0.079***	1.596***	3.018***	0.076**	0.195***
	(0.019)	(216.4)	(0.176)	(0.012)	(0.040)	(0.052)	(0.015)	(0.014)	(0.453)	(0.672)	(0.036)	(0.071)
Hospital-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0317	1,215	144,258,333	0.365	45,972	7,380	1.432	1,773,670	63,363,551	3,310,397	15,445,831	1,494,216
N	74,258	74,775	75,648	54,141	74,933	74,814	60,359	799,644	75,686	75,686	74,946	61,897
R^2	0.448	0.462	0.857	0.907	0.933	0.948	0.891	0.656	0.533	0.586	0.938	0.878

Panel B: Quality of Care

Dep. Variable:	*Pneumonia Readm Rate*	*Pneumonia Mortality Rate*	*AMI Readm Rate*	*AMI Mortality Rate*	*HF Readm Rate*	*HF Mortality Rate*	*Info Score*	*Pain Score*	*Quiet Score*	*Recommend Score*	*Overall Score*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
IPO	−0.004	0.001	−0.001	0.004	−0.010***	0.001	0.016***	−0.0002	−0.004	−0.001	0.00002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.002)	(0.006)	(0.004)	(0.004)
Hospital-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Cohort FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.173	0.134	0.176	0.144	0.227	0.116	0.854	0.878	0.830	0.890	0.877
N	33,294	33,477	19,682	23,621	31,120	32,904	35,543	23,374	35,546	35,544	35,544
R^2	0.622	0.771	0.824	0.736	0.704	0.552	0.718	0.665	0.831	0.800	0.787

Table A.2: Treatment Effect Heterogeneity by IPO Proceeds

This table explores treatment effect heterogeneity by IPO proceeds. Regressions are run at the hospital-year level. $IPO^{High\,IPO\,Proceeds}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the average IPO proceeds was above-median, and zero otherwise. $IPO^{Low\,IPO\,Proceeds}$ is an indicator variable that takes a value of one if hospital i is part of a hospital system that undertook an IPO within the past five years as of year t, and the average IPO proceeds was below-median, and zero otherwise. Hospitals are dropped from the sample if they undertook an IPO more than five years prior to year t. *Total Beds* is the total number of beds available for patient use. *Acquired* is an indicator variable that takes a value of one if the hospital was acquired by a hospital system within the past five years as of date t, and zero otherwise; hospital-year observations are dropped following each acquisition window unless another acquisition occurs. Panel A examines hospital financial and bed outcomes, while Panel B examines hospital investment, employment, and debt outcomes. *Profit Margin* is net income divided by gross income. *Net Patient Income/Discharges* is net income from patient services scaled by total discharges. *Discharges* is the number of inpatient adult and pediatric discharges. *Available Bed Days* is the total number of bed days available. *Cost-to-Charge* is total costs divided by total charges. *Lease Improve* is expenditures for leasehold improvements. *Equipment* is the total value of hospital equipment. *Total Salary Costs* is the general cost of all salaries. *Total Hours* is total hours worked by all employees. *Total Salary Nursing* is total expenditures on salaries for nursing staff. *Total Hours Nursing* is total hours worked by nursing staff. *Notes Payable* are notes due and payable longer than one year. *Short Term Loans* are loans coming due in the next 12 months. Standard errors are clustered at the hospital level, and hospital and year fixed effects are included, as indicated. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Panel A: Hospital Financials and Beds

Dep. Variable:	*Profit Margin*	*Net Patient Income /Discharges*	log(*Discharges*)	log(*Available Bed Days*)	*Cost-to-Charge*	log(*Notes Payable*)	log(*Short-Term Loans*)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$IPO^{High\,IPO\,Proceeds}$	0.123***	2,214.000***	0.388***	0.196**	−0.033*	−1.786***	−0.641
	(0.037)	(457.100)	(0.090)	(0.087)	(0.020)	(0.625)	(0.419)
$IPO^{Low\,IPO\,Proceeds}$	0.077***	837.700***	0.092**	0.031	−0.054***	−2.311***	−1.448***
	(0.022)	(255.200)	(0.041)	(0.026)	(0.017)	(0.614)	(0.414)
Hospital FEs	Y	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y	Y
Y Mean	0.0299	−703.7	7,372	45,803	0.369	48,500,000	4,348,000
N	71,840	72,401	72,401	72,519	53,020	30,379	39,376
R^2	0.443	0.517	0.948	0.933	0.905	0.737	0.664

Panel B: Investment and Employment

Dep. Variable:	log(*Lease Improve*)	log(*Equipment*)	log(*Total Salary Costs*)	log(*Total Hours*)	log(*Total Salary Nursing*)	log(*Total Hours Nursing*)
	(1)	(2)	(3)	(4)	(5)	(6)
$IPO^{High\,IPO\,Proceeds}$	2.711**	1.010**	0.132**	0.199***	0.170	0.253
	(1.081)	(0.426)	(0.060)	(0.075)	(0.151)	(0.158)
$IPO^{Low\,IPO\,Proceeds}$	3.027***	2.342***	0.095***	0.052*	0.275***	0.276***
	(0.753)	(0.670)	(0.023)	(0.029)	(0.050)	(0.059)
Hospital FEs	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Y Mean	3,233,000	63,800,000	15,700,000	2,247,000	1,513,000	44,779
N	73,267	73,267	72,527	60,663	59,549	58,107
R^2	0.581	0.535	0.938	0.893	0.878	0.833

Table A.3: PSM Balance Test

This table provides a balance test for differences between the matched sample of control hospitals and treated hospitals. The treatment group comprises of hospitals that are part of hospital systems that went public via IPO while the control group consists of propensity-score matched hospitals that are not part of a publicly-traded hospital system. Treatment and control means for the indicated variables are reported in columns (1) and (3), standard deviations in columns (2) and (4), and a t-test for the difference in column (5). For the differences in column (5), *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Variable	Control Mean	Control Std Dev	Treated Mean	Treated Std Dev	Difference
	(1)	(2)	(3)	(4)	(5)
$Profit\ Margin$	−0.026	0.196	−0.07	0.268	0.043
$Net\ Income/Discharges$	51.87	2,384.98	−363.864	2,409.124	415.7
$Net\ Pat\ Income/Discharges$	−827.591	3,153.617	−675.252	2,904.727	−152.3
$log(Net\ Patient\ Revenue)$	16.949	1.825	16.594	2.814	0.355
$Cost\ to\ Charge$	0.333	0.145	0.301	0.088	0.032
$log(Total\ Beds)$	4.417	0.92	4.355	0.499	0.062
$log(Available\ Bed\ Days)$	10.102	0.981	10.084	0.524	0.018
$log(Discharges)$	7.767	1.547	7.919	0.643	−0.152
$Case\ Mix\ Index$	1.323	0.359	1.286	0.285	0.037
$Expenses/Discharges$	16,307.94	25,488.46	10,637.82	4,595.75	5,670.13
$log(Notes\ Payable)$	14.747	2.325	14.831	2.457	−0.083
$log(Short\text{-}term\ Loans)$	13.290	1.994	12.470	2.008	0.820
$log(Equipment)$	14.414	4.534	11.735	7.049	2.678***
$log(Lease\ Improve)$	4.407	6.336	4.253	5.891	0.154
$log(Total\ Salary\ Costs)$	14.909	1.282	14.796	0.797	0.113
$log(Total\ Hours)$	13.222	1.289	13.161	0.598	0.061
$log(Total\ Salary\ Nursing)$	12.465	1.333	12.384	0.766	0.081
$log(Total\ Hours\ Nursing)$	9.200	1.491	9.177	0.661	0.022
$PN\ Readmission\ Rate$	0.188	0.014	0.187	0.014	0.002
$PN\ Mortality\ Rate$	0.118	0.022	0.117	0.012	0.001
$AMI\ Readmission\ Rate$	0.200	0.016	0.204	0.01	−0.004
$AMI\ Mortality\ Rate$	0.154	0.016	0.152	0.016	0.002
$HF\ Readmission\ Rate$	0.251	0.021	0.248	0.011	0.003
$HF\ Mortality\ Rate$	0.108	0.015	0.106	0.011	0.002
$Clean\ Score$	0.869	0.040	0.861	0.017	0.009
$Doc\ Comm\ Score$	0.915	0.027	0.907	0.016	0.007
$Nurse\ Comm\ Score$	0.898	0.033	0.894	0.013	0.004
$Explain\ Score$	0.788	0.048	0.784	0.013	0.005
$Help\ Score$	0.837	0.048	0.821	0.030	0.016
$Info\ Score$	0.808	0.059	0.800	0.023	0.008
$Pain\ Score$	0.870	0.028	0.866	0.016	0.003
$Quiet\ Score$	0.822	0.056	0.810	0.023	0.013
$Recommend\ Score$	0.871	0.053	0.859	0.022	0.012
$Overall\ Score$	0.855	0.055	0.837	0.024	0.018