The Social Cost of Liquidity Disclosure: Evidence from Hospitals*

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Abstract

We study the social costs of liquidity transparency in the context of non-profit U.S. hospitals. We find that, following a reform that mandates non-profits to disclose more information about their liquidity, hospitals with ex-ante low liquidity take actions to improve their liquidity. They do so by boosting their revenues and profit margins at the expense of service quality. Specifically, we show that these additional cash flows are generated by admitting more patients and charging higher payments. The higher payments reflect a higher propensity to overtreat patients with longer hospital stays and unnecessarily intensive diagnosis processes. These operational changes generate welfare costs such as delays in administering procedures for life-threatening diseases.

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1 Introduction

Liquidity management is crucial to ensure that firms are able to respond to unexpected economic fluctuations. Indeed, recent examples highlight the role of firms' liquidity in responding to unexpected events ranging from financial crises (Campello et al., 2011) to global pandemics (Fahlenbrach et al., 2021). Weak liquidity in the corporate sector can impose negative externalities on the economy, which motivates regulators to intervene and impose transparency regulations about firms' liquidity.[1] While liquidity transparency has received considerable attention among policymakers, we know surprisingly little about the real effects of liquidity transparency, that is, how liquidity transparency affects firms' behavior and consumer welfare. In this paper, we leverage a recent regulatory intervention that mandates non-profit hospitals to disclose more information about their liquidity to examine the real effects of liquidity disclosure on hospitals' behavior and the implications for patient welfare.

Non-profit entities constitute a large portion of the U.S. economy (Adelino et al., 2015). Non-profits have to prepare financial statements following the standards set by the Financial Accounting Standards Board (FASB). For a long time, the relevant standards were those set by the FASB in 1993. Under these standards, non-profit entities had to report three categories of net assets: temporarily restricted, permanently restricted, and unrestricted. A concern with this classification was that it created confusion as to the meaning of "unrestricted," with stakeholders believing that unrestricted net assets had no restrictions whatsoever, while in fact it meant that they had no restrictions from donors but could be facing other contractual restrictions (e.g., if the asset is used as a collateral in a loan). This lack of transparency made it difficult to assess the non-profits' effective liquidity, with stakeholders possibly over-estimating the amount of unrestricted assets available to meet short-term financial obligations.

To mitigate this challenge, the FASB updated its standards in 2016. The revised standards are set forth in the FASB's "Presentation of Financial Statements of Non-for-Profit Entities" (ASU 2016-14). They require non-profits to distinguish between their net assets

[1]In particular, transparency regulations constitute an important pillar of banks' regulatory environment, which has spurred a vibrant literature that examines the costs and benefits of transparency regulations for banks and the implications for financial stability (e.g., Goldstein and Sapra, 2014; Goldstein and Leitner, 2022).

with and without donor restriction, thereby making it clear that other restrictions could exist. Furthermore, the new standards require non-profit entities to disclose quantitative and qualitative information on how the organization manages its liquid resources. Essentially, the new standards allow stakeholders to better assess the liquidity of non-profit entities.

We exploit this regulatory change to study how liquidity transparency affects non-profits' outcomes. Among those entities, we focus on non-profit hospitals for multiple reasons. First, while the non-profit sector accounts for over 20% of the U.S. economy, hospitals account for over 60% of non-profit revenues and expenses. Second, hospitals fit into the traditional liquidity management framework, as they also make profit-driven operational and investment decisions (Adelino et al., 2015). Third, hospitals have a well-defined social responsibility, that is, providing healthcare services to the general public. Conceptually, non-profit hospitals balance profit-maximization against social benefits (Newhouse, 1970; Arrow, 1978). In this regard, our setting allows us to examine how a regulatory change in liquidity transparency affects this trade-off.

The regulatory change ("treatment") applies to all non-profit hospitals. To obtain a counterfactual, we exploit cross-sectional heterogeneity in exposure to the treatment. Specifically, we allocate non-profit hospitals into a treatment (control) group if their cash holdings, scaled by total assets, were below (above) the median in the year preceding the FASB regulation. The intuition is that the regulatory change will have a stronger impact on hospitals with an initially worse liquidity ratio, as the newly disclosed information might reveal the fragility of their liquidity management. More specifically, their newly disclosed unrestricted liquid resources might fall below standard thresholds in debt contracting.

While this setup does not substitute for the ideal experiment—in which non-profit hospitals would be randomly assigned to the treatment status—our control group is likely to provide an informative counterfactual. In particular, we show that the treatment and control groups are on the same trend prior to the regulatory change based on a large set of observables. This allows us to rule out a large set of alternative interpretations that would be unrelated to liquidity transparency.

To conduct this analysis, we first collect consolidated accounting data on non-profit hospitals from Form 990, a publicly available tax form that non-profit organizations have to file under section 501(c) of the U.S. tax code. This yields a sample of 14,986 hospital-year observations covering 2,079 unique hospitals from 2011–2019.[2] We start our empirical analysis by examining how the regulatory change affected hospitals' ability to raise outside financing. Using a difference-in-differences methodology, we find that the treated hospitals issue less debt post-treatment and reduce their leverage ratios. There are two interpretations of this result. First, it could be that lending institutions were, on average, incorrectly assessing the liquidity of hospitals prior to the regulatory change; the increased transparency revealed fragilities in the hospital's effective liquidity, leading financial institutions to be more conservative in their lending. Second, the treated hospitals might refrain from seeking debt financing, as they anticipate that the revealed fragilities would make them illegible for debt financing at their desired contract terms. In either scenario, the hospitals are likely to face pressure to improve their liquidity going forward.

Having established that the treated hospitals suffered adverse financing consequences from the increased liquidity disclosure, we then examine how they adjusted their behavior in response. As discussed above, one may expect the treated hospitals to take actions to increase their liquidity. This is indeed what we observe. In the years that followed the regulatory change, the treated hospitals increased their cash holdings by about 2.2% to 2.6% of total assets. This increase in liquidity was brought about by an increase in revenues and profits.

What actions did the treated hospitals take to generate more revenues and higher profit margins? To shed light on this question, we examine which operational changes were made at the hospital facility level. The facility-level data are obtained from the Centers for Medicare & Medicaid Services (CMS). Our difference-in-differences estimates confirm that patient revenues significantly increased at the treated hospitals' facilities. To generate higher patient revenues, hospitals can use multiple levers. At the extensive margin, we find that patient admissions increased by 2.4%. At the intensive margin, we find that healthcare services became more expensive as the average net payment increased by about 2.7% per patient discharge.

[2] In this paper, "hospital" refers to the institution itself (analogous to the firm level for for-profit companies). In finer analysis, we consider "hospital facilities," which refer to the actual clinics (analogous to the establishment level).

In our last set of tests, we investigate the factors behind this change in pricing as well as the consequences for patients. To do so, we use granular data at the patient level, which we obtain from the State Inpatient Databases (SID) of the Healthcare Cost and Utilization Project (HCUP). Specifically, we focus on three major diseases (heart attack, heart failure, and pneumonia). These three medical conditions are commonly used as quality benchmarks by CMS (e.g., MedPac, 2013). For this analysis, our dataset consists of over 3 million patient visits from 2011-2019 pertaining to the 2,079 unique hospitals in our sample. This analysis uncovers three main patterns related to pricing and treatments.

First, using our difference-in-differences methodology at the patient level, we observe an increase in the amount on the medical bills charged to patients who are treated for a heart attack, heart failure, or pneumonia. This increase is not significant at conventional levels, however. Finer analyses show that this lack of significance masks a reallocation effect. Indeed, when breaking down our estimates by patient types, we find an opposite effect between Medicare and non-Medicare patients. Specifically, we find that prices charged to Medicare patients decreased by 2.7% while prices charges to non-Medicare patients increased by 6%. Among the non-Medicare patients, the effect is driven by patient under Medicaid (+8.0%) and covered by private insurance (+6.4%), while we detect no significant effect for uninsured patients.

Second, we examine whether the increase in prices is driven by overtreatment. Our difference-in-differences estimates indicate that patients stay longer in the hospital when they are treated for a heart attack, heart failure, or pneumonia. Similar to what we observe for prices, we find that the length of stay increased for non-Medicare patients (especially those under Medicaid or private insurance) and decreased for those under Medicare. An increased length of stay could be driven by an increase in non-medical charges and/or an increase in medical treatment. We find that, on average, the time between admission and the first medical procedure increased for non-Medicare patients and decreased for Medicare patients. This is consistent with hospitals admitting more patients—in line with what we observe at the facility level—and potentially increasing unnecessary diagnosis procedures to generate additional revenues.

Finally, we directly examine whether the increased length of stay is explained by a more intensive diagnosis process. Following Chandra and Staiger (2007), we focus on heart attack and examine a specific diagnostic procedure: the utilization of invasive cardiac catheterization method for diagnosing heart attack patients. We find that non-Medicare patients in hospitals that belong to our treatment group are 3.3% more likely to receive such procedure following the regulatory change. This increase is very large, representing a 6.5% increase from the unconditional probability of 50.6%. However, this increased reliance on this diagnosis procedure does not translate into additional treatment, since non-Medicare patients became less likely to receive the actual treatment for artery blockage (i.e. receiving a percutaneous coronary intervention or a coronary artery bypass grafting , or both) following the catheterization diagnosis procedure. These results suggest that treated hospitals lowered their standards to perform intensive diagnosis, thereby increasing the amount charged to non-Medicare patients in order to boost their revenues and profits.

Overall, our findings indicate that, following the regulatory change, treated hospitals felt compelled to generate more cash to increase their liquidity. Doing so led them to reconsider the trade-off between profitability and social benefits, putting more weight on profit maximization at the expense of patient welfare.

This study contributes to the literature in several ways. First, we contribute to the growing literature at the intersection between healthcare and finance. In particular, Adelino et al. (2015) examine the link between hospitals' financial assets and their investment behavior. They find that hospitals' capital expenditures increase when the hospitals' endowment achieves positive returns, and that the sensitivity is stronger for financially constrained hospitals. Other studies focus on the implications of the 2008 financial crisis for hospitals' behavior. Dranove et al. (2017) find that only hospitals with market power increased their prices. Relatedly, Adelino et al. (2022) document a shift in medical choices in favor of more intensive treatments. Our study complements this literature by focusing on the real effects of liquidity disclosure, highlighting how stricter transparency requirements incentivize hospitals to generate additional revenues and profits by treating more patients and modifying how patients receive care.

Second, our results contribute to the literature on liquidity disclosure. Most of this literature focuses on the liquidity disclosure of financial intermediaries. Using the historical setting of the National Banking Era, Granja (2018) finds that the adoption of disclosure regulations that allow investors to assess banks' financial position improved the stability of the banking sector. However, transparency about banks' financial position does not necessarily translate into net benefits. For example, theoretical studies argue that disclosing banks' stress tests (i.e., their expected resilience to economic shocks) can have adverse consequences, as it may induce sub-optimal lending behavior by banks and excessive and inefficient reactions to public news by market participants (Goldstein and Sapra, 2014; Goldstein and Leitner, 2022). Empirically, Kleymenova (2018) finds that the mandatory disclosure of banks' liquidity leads to both benefits (reduced cost of capital) and costs (increasing the holding of liquid assets and decreasing the holding of risky assets). Our setting uniquely relies on a regulatory intervention by the FASB that increased the precision of liquidity disclosure for non-profit organizations. As such, it allows us to branch away from the financial sector and focus on patient-level outcome (e.g., prices and quality of treatment) that can be tied more directly to social welfare. Overall, our results suggest that, when capital providers (banks) had under-estimated the quality of hospitals' liquidity, an increase in liquidity transparency leads to adverse financing consequences that, in turn, induce hospitals to change their operating behavior to generate more revenues and profits at the expense of patient welfare.

Third, our results speak to the broader literature on the real effects of reporting. This literature—which spans accounting, economics, and finance—is very large. It examines the consequences of reporting mandates in various contexts including restaurant hygiene (Jin and Leslie, 2003; Ho et al., 2019), healthcare (Dranove et al., 2003; Kolstad, 2013), environmental disclosures (Bonetti et al., 2023; Tomar, 2023), human rights along the supply chain (She, 2022), mining accidents (Christensen et al., 2017), and consumer lending (Stango and Zinman, 2011).[3] However, despite this abundant literature, we lack evidence on the impact of reporting mandates on social welfare (Ball, 2023). In this regard, and referring to reporting mandates, Leuz and Wysocki (2016) note that "we lack evidence on externalities, social costs and benefits, and market-wide or network effects." By leveraging granular patient-level data in an industry (healthcare) that is subject to an inherent trade-off between profits and social benefits, we document a negative effect of transparency about financial information

[3]See Dranove and Jin (2010) and Leuz and Wysocki (2016) for recent reviews of this literature.

(namely, liquidity) on the quality of care. In this regard, our results complement the findings of Dranove et al. (2003), Lu (2012), and Eyring (2020), who show that increased transparency about medical practices induces a reallocation of effort *within* care services toward the more transparent dimensions at the expense of other dimensions.[4]

2 Institutional Setting

Non-for-profit hospitals prepare (consolidated) financial statements. These financial statements are routinely used by various stakeholders, including board members, lenders, credit support providers, rating agencies, donors, suppliers, bondholders, government agencies, and the public at large.[5] In the United States, the Financial Accounting Standards Boards (FASB) oversees the standard-setting process for generally accepted accounting principles (GAAP). Non-for-profit entities are subject to general accounting standards along with for-profit entities (e.g., revenue recognition rules) and to specific accounting standards to account for the uniqueness of their business model. In particular, in 1993, the FASB issued the Statement of Financial Accounting Standards No. 117, the main standard dedicated to non-for-profit entities.

In financial accounting applied to for-profit entities, the balance sheet is prepared such that the total assets of the organization are equal to the liabilities plus the equity. Non-for-profits do not have owners. Thus, they do not have equity in their balance sheet. Instead, the bottom line of their balance sheet is called net assets, which is the difference between the organization's assets and liabilities. Net assets essentially constitute the resources left to the non-profit organizations after covering their liabilities. Recognizing the fundamental changes in non-profit operations over the past decades, the FASB established a Not-for-Profit Advisory Committee (NAC) in 2009 to advise on how to best update financial reporting practices for non-for-profit entities.

The NAC extensively surveyed practitioners and opened a call for comments. Profession-

[4]By contrast, recent studies show that transparency about hospitals' *quality of services* fosters competition and, in turn, improves the quality of care (e.g., Kepler et al., 2023).

[5]Similarly, Breuer et al. (2023) shows that absent public equity markets, financial statements of private European firms are frequently downloaded by various contracting and non-contracting stakeholders.

als voiced concerns about reporting for donations and its impact on the perceived liquidity of non-for-profit entities. A specificity of non-for-profit entities is that they often receive large amounts of donations. Importantly, not all donations are equals. Some donations come with restrictions in terms of usage or timing.[6] Historically, accounting standards organized net assets into three categories: unrestricted, temporarily restricted and permanently restricted.

Critics of this classification argue that it caused some confusion among stakeholders. For example, in a comment letter addressed to the FASB, Nonprofit Finance Fund, a lender and advisor for non-for-profits entities qualified the 1993 FASB categorization as a "confusing nomenclature". Similarly, a comment letter from Cherry Bekaert LLP, an independent Certified Public Accounting (CPA) firm, notes that stakeholders have difficulty in understanding the differences between those three categories. The main concern was that stakeholders had trouble understanding an entity's exposures to risks due to cash flow shocks and its liquidity management strategies, preventing them from making informed investing, lending, giving, and other capital allocation decisions. Prior to the regulation, many stakeholders interpreted the term "unrestricted" as if the assets had no contractual, legal, or any other type of restriction. However, the *de facto* meaning was "neither permanently restricted nor temporarily restricted by donor-imposed stipulations."[7] In both cases, creditors, donors, grantors, and other users could reach the wrong conclusion about an entity's financial flexibility and liquidity. Ultimately, the NAC suggested four areas of improvement, and three of them targeted cash availability and liquidity.

In response to these recommendations, the FASB issued Accounting Standards Update (ASU) 2016-14, "Presentation of Financial Statements of Not-for-Profit Entities" in August 2016. This is the first major update in accounting for non-for-profit entities since 1993. The change in accounting standards was specifically motivated by the complexities about the use of the currently required three classes of net assets and the resulting deficiencies in the transparency and utility of the information provided to assess non-for-profit entities' liquidity. The regulation imposed two main reporting changes.

First, the new standards combine temporarily and permanently restricted net assets into

[6] For example, donations can be earmarked exclusively to acquire new equipment or to support research activities.

[7] Assets could for example be restricted because of their use as collateral in loan agreements.

net assets with donor restrictions and renames "unrestricted net assets" as "net assets without donor restrictions," thereby making it clear that those restrictions refer only to donations and do not include other types of restrictions. Organizations should report the change in net assets for both categories over the year. Second, it requires non-for-profit entities to provide quantitative and qualitative information about the liquidity and availability of financial assets to meet needs for general expenditures and satisfy existing obligations within one year of the date of the statement of financial position. This includes discussing restrictions in short-term assets above and beyond restrictions arising from donors.[8]

To illustrate the changes induced by the regulation, we present extracts from the 2016 financial statements of Providence Health in Appendix B.1. Providence Health is a multi-state healthcare organization servicing the states of Alaska, California, Montana, New Mexico, Oregon, Texas, and Washington with 50 hospitals and over 800 clinics. Their balance sheet now clearly distinguishes net assets with or without donor restrictions. Furthermore, they added a new section compared to their 2015 financial statements that includes a summary table of liquidity indicators (Appendix B.2), such as accounts receivable days, days of cash on hand, and different cash ratios. In addition, the organization discussed how unrestricted cash reserves changed from the previous years. In Appendix B.3, we provide another example by reproducing the liquidity report of the New York Presbyterian Hospital for the fiscal years ending in 2018 and 2019. This report contains detail information about broad cash restrictions above and beyond donors restrictions, including for example mortgage escrow account and professional liability insurance reserve.

Overall, the FASB argues that these changes will simultaneously reduce the complexity and increase the informativeness of the non-for-profit financial statements when it comes to assessing organizations' liquidity risks. We argue that this regulation might have adverse consequences for hospitals with low liquidity. By increasing the precision of the information about their (lack of) liquidity, this may reduce the ability of low liquidity hospitals to obtain

[8]The new standard also no longer requires non-for-profit entities to present a cash flow statements using the indirect method if the organization reports using the direct method. The standard imposes to report investment return net of external and direct internal investment expenses and no longer requires disclosure of those netted expenses. Finally, the standard also requires that, in the absence of explicit donor stipulations, organizations should use the placed-in-service approach for reporting expirations of restrictions on gifts of cash or other assets to be used to acquire or construct a long-lived asset.

external financing, or increase their cost of capital and the tightness of their contractual terms. In turn, this may generate incentives for non-for-profit hospitals to focus on improving their newly disclosed liquidity ratio to satisfy current and/or future contractual agreements, even if doing so is at the expense of service quality.[9] In fact, the comment letter from Nonprofit Finance Fund made a similar argument, stating that "the requirement to disclose liquidity measures in the audited financial statements could have the same effect, and cause nonprofit leaders to work toward a better liquidity position so the notes to their financial statements will present a more favorable liquidity picture in future years." Conceptually, this argument is consistent with a the theoretical literature arguing that non-profit hospitals trade off profitability with social responsibility (e.g. Newhouse, 1970; Arrow, 1978).

3 Data

3.1 Data Sources

We collect the accounting information of non-profit hospitals from Form 990, a publicly available tax form that non-profit organizations have to file with the IRS under section 501(c) of the U.S. tax code.[10] Our sample period consists of the tax years that end between 2011 and 2019. We start in 2011 to account for the Patient Protection and Affordable Care Act (ACA) of 2010 that revised the conditions that non-profit hospitals have to meet in order to qualify as tax-exempt for the tax years beginning after March 23, 2010.[11] We end the sample in 2019 to ensure that our sample does not overlap with the Covid pandemic that brought about a massive disruption of the healthcare sector.

[9]Using public documents from the legal case between Accessone Medcard, Inc and UNC Health Care System, we found anecdotal evidence that liquidity ratios are part of non-for-profit debt contracting agreements. This specific contract stipulates that "The provider must maintain days of cash on hand of not less than 75 days at the end of each fiscal quarter." Further evidence from the Eastern Tennessee Hospital System suggests that liquidity ratios are calculated excluding restricted assets.

[10]In Form 990 ("Return of Organization Exempt from Income Tax"), non-profits are required to report selected items from their balance sheet and income statement. Ideally, we would have access to the more comprehensive accounting information from the hospitals' financial statements. However, these data are difficult to obtain since non-profits are not required to provide audited financial statements to the public beyond what they report in Form 990.

[11]In particular, the ACA requires non-profit hospitals to complete a community health needs assessment (CHNA) every three years and adopt an implementation strategy to meet the community health needs identified through the CHNA.

Each non-profit organization with gross receipts above \$200,000 or total assets above \$500,000 needs to file Form 990 with the IRS. Following Adelino et al. (2015), we identify hospitals as those filers whose NTEE (National Taxonomy of Exempt Entities) code is E21 (community health systems), E22 (general hospitals), or E24 (specialty hospitals). A filer can be either a hospital organization or a standalone hospital facility. In the former case, the organization reports the name and address of each hospital facility under the organization in Schedule H of Form 990. We require that the organization has at least one facility (or itself in the case of a standalone hospital facility) with a match in the Healthcare Cost Report Information System (HCRIS) database maintained by the Center for Medicare and Medicaid Services (CMS).[12] The HCRIS database provides information on facility characteristics and utilization, along with the financial statements of each facility. The data are very detailed. For example, the database distinguishes between revenues from inpatient and outpatient services, and reports the number of admissions by different payers (e.g., insurers). For ease of exposition, we refer to each hospital organization as "hospital" and each facility in HCRIS as "hospital facility." Each hospital is identified by its Employer Identification Number (EIN) from Form 990, and each hospital facility is identified by its CMS Certification Number (Provider ID) from the HCRIS database. With the above criteria, our final sample consists of 2,079 unique hospitals and 2,982 unique hospital facilities from 2011-2019.

We further augment our dataset with detailed microdata at the patient-visit level from the State Inpatient Database (SID) maintained by the Healthcare Cost and Utilization Project (HCUP). Since the SID covers all inpatient visits at almost all hospitals in the participating states, a single state typically has over half a million annual observations. To obtain an informative sample, we focus on patient visits due to three major diseases: heart attack (acute myocardial infarction), heart failure, and pneumonia, which we identify using the SID database's diagnosis codes AMI, HF, and PN, respectively. These three diseases are commonly used as quality benchmarks by the CMS in value-based purchasing program such as the Hospital Readmissions Reduction Program (see, e.g., Ryan et al., 2017). For each patient visit, we collect information on hospital charges, length of stay, in-hospital new

[12]The crosswalk between Form 990 and the HCRIS database is obtained from the Community Benefit Insight API.

conditions, as well as the patient's Charlson Comorbidity Index (predicting the ten-year mortality likelihood for a patient with comorbid conditions), age, gender, race, and ZIP code. In total, our dataset includes over 3 million patient visits at the hospital facilities in our sample.

The patient-level data allow us to characterize which operational changes are made following the regulatory change in liquidity transparency. Among the three major diseases we consider, we delve deeper into the heart attack category to examine the type of procedures received by heart attack patients. Heart attacks are frequently studied in the literature as a way to assess the diagnosis and treatment intensity (e.g. Chandra and Staiger, 2007; Adelino et al., 2022). In the diagnosis stage, physicians typically rely on non-invasive methods such as electrocardiogram, blood tests, and echocardiogram. However, physicians may instead opt for an invavise method called cardiac catheterization. During this procedure a long, thin tube (catheter) is inserted into an artery, usually from the patient's leg and guided to the heart. Dye flows through the catheter to help the arteries appear more clearly on images made during the test. As an invasive procedure, catheterization has potential risks including bleeding, infection, blood clots and (in rare instances) heart attack or stroke. Similar to the diagnosis process, the treatment of heart attacks can be either invasive or non-invasive. Clot buster medications such as thrombolytics or fibrinolytics can break up the blood clots and restore blood flows without any invasive surgical procedures. Alternatively, a percutaneous coronary intervention (PCI) can be performed during the cardiac catheterization process. In this case, the catheter will inflate a tiny balloon to widen the blood artery and a stent may be placed to keep the artery open. A coronary artery bypass surgery (CABG) involves taking a healthy blood vessel from the chest or leg area and connect it below the blocked heart artery to restore blood flows. While invasive procedures are substantially more expensive than non-invasive procedures, their benefits and appropriateness have been questioned (e.g. McClellan and Newhouse, 1997; Chandra and Staiger, 2007). Moreover, anecdotal evidence suggests that hospitals may overrely on invasive procedures as a way to increase their revenues.[13] In our analysis, we use the reliance on invasive procedures—catheterization and PCI—as a way to to assess the hospitals' propensity to overdiagnose and overtreat patients,

[13]See, e.g., "Hospital chain inquiry cited unnecessary cardiac work," *New York Times*, August 6, 2012.

respectively, following the regulatory intervention.

3.2 Summary Statistics

Table 1 provides summary statistics at the hospital (Panel A), hospital facility (Panel B), and patient (Patent C) level. As can be seen, the average hospital in our sample has total assets of \$406 million, of which 10.8% are in the form of cash reserves. The average hospital facility has total assets of \$306 million and accommodates about 39,000 patients for overnight stays, charging roughly \$3,100 per visit. Finally, the average patient (in a given visit) is about 60 years old and stays about 4.4 days at the facility. About 57% are female, 15% Black, and 10% Hispanic. Among those patients who are hospitalized for a heart attack, about 51% undergo invasive diagnostics procedures (Catherer) and 54% undergo invasive treatment procedures (PCI).

Finally, Figure 1 plots the distribution of hospitals (Panel A) and hospital facilities (Panel B) across U.S. states. Not surprisingly, more populates states tend to have a larger share of hospitals and hospital facilities.

4 Methodology

To examine how liquidity transparency affects hospitals' behavior, we estimate a difference-in-differences specification around the FASB regulation of 2016 ("treatment"). We exploit cross-sectional heterogeneity in the treatment exposure to obtain a counterfactual. Specifically, we allocate non-profit hospitals into the treatment (control) group if their cash holdings, scaled by total assets, were below (above) the median in the year preceding the FASB regulation. Intuitively, we would expect the regulatory change to have a stronger impact on hospitals with an initially worse liquidity ratio, as the newly disclosed information might reveal the fragility of their liquidity management.

To implement this difference-in-differences methodology, we estimate the following regression:

$$Y_{i,t} = \beta Treated_i \times Post_t + \gamma' X_{i,t-1} + \mu_i + \eta_t + \varepsilon_{i,t}, \tag{1}$$

where i indexes hospitals and t indexes years. $Y_{i,t}$ is the dependent variable of interest. $Treated_i$ is an indicator variable equal to one for hospitals in the treatment group, that is, hospitals whose average $Cash/TA_{i,t}$ in the pre-treatment years is below the sample median. $Post$ is an indicator variable equal to one for the post-treatment years, that is, the tax years that end after the FASB regulation of August 2016. $X_{i,t-1}$ is the vector of control variables. We estimate regression (1) with and without controls. When using controls, we follow Adelino et al. (2015) and include in $X_{i,t-1}$ service revenue growth, operating income over net fixed assets, and the logarithm of total revenues, all lagged by one year. These controls account for differences in growth, profitability, and size that may confound our results. In all regressions, we include hospital (μ_i) and year (η_t) fixed effects to account for unobserved heterogeneity at the hospital level and nationwide trends that may affect hospital outcomes during our sample period, respectively. In finer analyses, we further include state by year fixed effects to account for state-specific trends that may confound our results (e.g., concurrent state-level healthcare reforms). In all regressions, we cluster standard errors at the hospital level.

In Table 2, we provide a characterization of the treatment and control groups. We do so by reproducing the statistics from Table 1 separately for both groups in the pre-treatment years. By construction, the liquidity ratio is substantially lower in the treatment group (3.5% compared to 18.3% in the control group). In addition, the treated hospitals tend to be larger and service more patients. Aside from these differences, the two groups are roughly comparable. In particular, they have similar profit margins (Panel A), similar pricing practices (Panel B), and a very similar clientele (Panel C). In Figure 2, we further plot the share of treated hospitals by state. While the distribution is not uniform across states, we observe no clear clustering in specific U.S. regions.

As Table 2 illustrates, there are significant ex ante differences between the treated and control hospitals. These differences arise naturally in our setting, since we do not have a randomized assignment of hospitals into the two groups. Due to these differences, a potential challenge is that the two groups might be on different trends prior to the regulatory intervention, which in turn could confound our results. Nevertheless, we show that this concern is mitigated. Specifically, we examine the possibility of pre-trends along a large set of covariates. When doing so, we consistently find no evidence for pre-trends, which indicates that the two groups behave in a similar fashion prior to the treatment.

5 Results—Hospitals and Hospital Facilities

5.1 Financing

We start our analysis by examining how the regulatory change affected hospitals' ability to raise external financing. To do so, we estimate regression ((1)) using as dependent variable debt issuance scaled by total assets (*FinancialDebtIssuance/TA*). The results are presented in columns (1)-(3) of Table 3. Column (1) refers to the specification without controls. In column (2), we include controls. In column (3), we further include state by year fixed effects to account for time-varying unobservables at the state level. As can be seen, treated hospitals issue less debt following the regulatory change. The point estimates range between -0.005 and -0.006, which corresponds to a reduction in debt issuance by 0.5% to 0.6% of total assets. This indicates that the increased transparency revealed fragilities in the hospitals' effective liquidity, which hindered their ability to raise additional financing.

5.2 Cash Holdings

The results from Table 3 indicate that, following the regulatory change, treated hospitals are less able to raise external financing. This could be due to lenders becoming more reluctant to provide additional financing, or hospitals refraining from seeking additional financing until corrective actions are taken. In either scenario, hospitals are likely facing pressure to improve their liquidity going forward.

In Table 4, we examine whether the treated hospitals improve their liquidity post-treatment. To do so, we estimate regression (1) using the ratio of cash to total assets (*Cash/TA*) as dependent variable. As is shown, we find that treated hospitals significantly increased their liquidity following the treatment. In all three specifications, the point estimate is large and highly significant. It ranges between 0.022 and 0.026, which corresponds to an an increase in liquidity by 2.2% to 2.6% of total assets.

In Figure 3, we characterize the treatment dynamics. To do so, we estimate a variant of regression (1), in which we estimate the treatment effect on a annual basis.[14] We then plot the year-by-year coefficients along with their 95% confidence intervals. As can be seen, the treatment effect starts to materialize in the first year after the treatment, and is even stronger in the subsequent years. Importantly, we find no evidence for pre-trends. That is, all pre-treatment coefficients are small in economic terms and statistically insignificant. This indicates that both the treatment and control groups are on the same trend prior to the treatment.

5.3 Revenues and Expenses

The evidence provided so far suggests that, when required to be more transparent about their liquidity, hospitals with lower ex ante liquidity take actions to improve their liquidity. How do they manage to do so? To shed light on this question, we first examine measures of operating performance. In columns (1)-(2) of Table 5, we find that the treated hospitals significantly boost their revenues, as measured by the ratio of service revenues to total assets (*ServRev/TA*). The economic magnitudes are large. The point estimates of $0.042 - 0.045$ imply that the treated hospitals increase their revenues by 4.2% to 4.5% of their total assets.

Naturally, higher revenues need not translate into higher profits if expenses increase in a similar fashion. In columns (3)-(4), we examine the ratio of expenses to total assets (*Exp/TA*). As can be seen, expenses increase significantly as well, but the magnitudes are smaller. Specifically, the point estimates of $0.031 - 0.035$ indicate that expenses increase by 3.1% to 3.5% of total assets.

In columns (5)-(6), we examine the implications for profitability, as measured by the ratio of operating income to total assets (*OpIncome/TA*). Consistent with our findings for revenues and expenses, we find that the treated hospitals achieve higher profitability post-intervention. The point estimates of $0.012 - 0.011$ imply that operating profits increase by

[14] Specifically, we estimate the following specification:

$$Y_{i,t} = \sum_{n \neq 2015}^{2011 \leq n \leq 2019} \beta^n \mathbf{I}\left(Year_t = n\right) \times Treated_i + \gamma' X_{i,t-1} + \mu_i + \eta_t + \varepsilon_{i,t},$$

where $\mathbf{I}(.)$ is the indicator function. The base year is 2015, that is, the year prior to the treatment.

1.1% to 1.2% of total assets. In columns (7)-(8), we show that this finding is robust if we use operating margin, defined as the ratio of operating income to service revenues (*ProfitMargin*), in lieu of *OpIncome/TA*.

In Figure 4, we examine the treatment dynamics with respect to profitability. The dynamics is similar to what we observed in Figure 4 for liquidity. That is, we find no evidence for pre-trends, the effect starts to materialize in the first post-treatment year, and it is even stronger in the subsequent years.

5.4 Hospital Facilities

What operational changes did the treated hospitals make to generate more revenues and higher profit margins? To examine this question, we exploit the granularity of our data at the facility level. We do so in Table 6. In columns (1)-(2), we start by replicating the analysis from columns (1)-(2) of Table 5 using as dependent variable net patient revenues, scaled by total assets, at the facility level (*PatRev/TA*).[15] As can be seen, net patient revenues increase significantly at the treated hospitals' facilities. The point estimates of $0.044 - 0.048$ imply that net patient revenues increase by 4.4% to 4.8% of the facility's total assets, which is in line with what we observed at the hospital level.

Patient revenues can be categorized into inpatient and outpatient revenues. (Inpatient care refers to patients who stay overnight at the facility; outpatient care refers to patients who do not.) CMS requires hospitals to report detailed information about inpatient services, which we utilize in columns (3)-(8). First, in columns (3)-(4), we confirm that inpatient revenues (*InpatRev/TA*) increase as well. The point estimates of $0.021 - 0.022$ correspond to an increase in inpatient revenues by 2.1% to 2.2% of the facility's total assets. This increase in impatient revenues can be due to an increase in both quantity and price. We examine both margins in columns (5)-(8). First, in columns (5)-(6), we use as dependent variable the logarithm of the number of patients admitted to inpatient services, *log(Patients)*. As is shown, the treated hospitals' facilities accommodate 2.4% additional patients for inpatient

[15]We focus on net patient revenues as they are more likely to capture the actual cash flows of healthcare services. This is because total revenues from the CMS cost reports are defined as the total charges for services as they appear on the medical bills. However, hospitals cannot fully collect these amounts due to contractual allowances with the payers and patient discounts. Net patient revenues account for this difference.

services following the intervention.[16]

Second, we examine price changes in columns (7)-(8). Following Dafny (2009), we define *Price* as the average net inpatient revenue per discharge for non-Medicare patients. The rationale for excluding Medicare patients is that hospitals have no discretion over the prices charged to these patients, since the government regulates the reimbursement rates for Medicare patients.[17] Using *log(Price)* as dependent variable, we find that the treated hospitals' facilities receive payments per discharge that are 2.4% to 2.6% higher after the intervention. Given the average *Price* of $\$3,059$ among the treated hospitals' facilities (Table 2), this corresponds to a higher payment per discharge of \$73 to \$80.

Technically, *Price* in columns (7)-(8) represents a weighted average of the payment per discharge for privately insured and Medicaid patients based on the number of admissions for both insurance types. Nonetheless, Medicaid patients represent only a small number of hospital admissions. In keeping with the literature, we argue that this measure reflects the negotiated prices paid by private insurers. In this regard, our results imply that hospitals partially pass the cost of increasing liquidity to the payers.[18]

6 Results—Patient-Level Evidence

In the previous section, we established that, after the change in accounting standards, low-liquidity hospitals obtain less debt financing compared to high-liquidity hospitals. The pressure caused from the disclosure of detailed information about their liquidity position presumably induced those hospitals to improve their liquidity. Thus, we document that they increase their cash balance. To do so, they increase profits by admitting more patients and charger higher prices per patient. In this section, we use granular data at the patient-visit

[16]The existing literature documents that hospitals can increase admissions by hiring physicians to increase referrals (Kocher and Sahni, 2011; Lin et al., 2021), or lowering the standard for converting emergency room visits to hospital overnight stays (Aghamolla et al., 2021).

[17]To compute emphPrice, we first calculate the non-Medicare net inpatient revenues as the net patient revenues from inpatient discharges minus the amount received for Medicare services. We then divide this number by the number of non-Medicare inpatient discharges. See the online appendix of Lewis and Pflum (2017) for a detailed definition of the above items in the CMS cost reports.

[18]This can happen directly through renegotiation with insurers, as hospitals frequently do after mergers (e.g., Ho, 2009; Gowrisankaran et al., 2015), private equity buyouts (Liu, 2021), and major adjustment in the hospitals' salaries (Evans, 2022). Hospitals can also indirectly increase reimbursement through upcoding by assigning patients to more lucrative diagnosis groups (Dafny, 2005).

level from the HCUP database to understand the effects at the intensive margins.

The main difference with the previous section is that we move from panel data at the hospital-year (or hospital facility-year) level to patient-level experiences. We cannot track the same patient over time since the HCUP data de-identify each patient visit for privacy concerns. Instead, we exploit the granularity of the data covering the details of patient visits to hospitals where they receive care. Specifically, we estimate the following regression:

$$Y_{i,k,d,t} = \alpha + \beta Treated_i \times Post_t + \gamma' X_{i,t-1} + \eta' Z_{k,t} + \delta_{i,d} + \mu_t + \varepsilon_{i,k,d,t}. \quad (2)$$

In the above equation, $Y_{i,k,d,t}$ measures the payment or treatment characteristics of patient k visiting hospital i due to condition d (AMI, HF, or PN) in year t. We define $Treated_i \times Post_t$ and control for (lagged) hospital-level features in the same way as in Equation (1). In addition, we control for patient characteristics including age, gender, ethnicity (Black, Hispanic, or others), and the Charlson Comorbidity Index. The latter variable accounts for the ex-ante mortality risk. $\delta_{i,d}$ is the granular hospital $\times$ disease fixed effects, absorbing unobserved local disease conditions. Year fixed effects are included as before.

6.1 Medical Bills

We start by investigating whether hospital charge a different price to patients admitted for heart attack, heart failure, or pneumonia post-regulation. We tabulate our results in Table 7. In column (1), our difference-in-differences coefficient is positive but not statistically significant at conventional levels. In column (2), we augment our specification with control variables. Our point estimate remains stable and statistically insignificant. We next refine our analysis and split our effect based on insurance types. In column (3), we compare Medicare ($Medicare_k = 1$) with non-Medicare ($Non\_Medicare_k = 1$) patients. Our point estimates suggest that a reallocation effect is taking place. Indeed, we find that prices charged to Medicare patients decreased by 2.7% while prices charges to non-Medicare patients increased by 6.1%.

Our results in column (3) suggests hospitals are charging higher prices to non-Medicare patients. Given that the average charge per patient is around \$48,000, we estimate that medical bills in affected hospitals will increase by almost \$3,000.[19] The rationale for this result is that hospitals face substantial regulatory pressures for Medicare patients. For example, Medicare reimbursement is non-negotiable and decided unilaterally by the CMS. In the prospective payment system, the reimbursement is per-visit fixed, determined by patient conditions (the diagnosis-related group) and local labor costs. As a result, the reimbursement does not depend on the number of procedures and length of stay. To further refine our analysis, we split the non-Medicare group into three categories of insurance status: Medicaid, privately insured, and uninsured. Our results in column (4) suggest that post-regulation, hospitals in our treatment group charge a higher price to Medicaid (+8.0%) and privately insured patients (+6.4%). This result is consistent with the prior literature suggesting that charges and prices to privately insured patients reflect a negotiation between the hospital and the insurer. Negotiation over reimbursement is common in practice, particularly after mergers and acquisitions (e.g. Dafny, 2009; Dafny et al., 2019; Lewis and Pflum, 2017). In reality, hospitals leverage increasing bill charges to negotiate a higher reimbursement amount from private insurers, ultimately forcing the patients to pay a greater private insurance premium as a result of high hospital markups (Bai and Anderson, 2015; Murray, 2013). Indeed, Cooper et al. (2019) document that healthcare spending by privately insured has very low correlations with federal-regulated Medicare payment rates, and many hospitals' inpatient cases have privately-insured prices set as a fraction of hospitals' charges.

6.2 Timing

In our next analysis, we examine whether the increase in prices is potentially driven by differences in the way hospitals deal with patients. We perform this analysis since Baker et al. (2019) show that prospective payment is less widespread in commercial insurance, and a non-trivial fraction of privately-insured bills are explained by factors other than patients' diagnoses. For example, the intensity of services provided is a relevant factor if the insurance

[19] It is important to note that our outcome variable, *Charge*, represents the total amount billed by the hospital. The actual payment, commonly labelled "price" in the healthcare literature, depends on insurer reimbursement and out-of-pocket copays by patients. The difference between the amount charged and the final price can be substantial. For example, Cooper et al. (2019) estimate that charges are between 170% and 242% of the transaction prices for different inpatient procedures.

uses fee-for-service (quantity-based) reimbursement. We focus on two dimensions, the overall length of stay and the time lapsed before receiving care. We tabulate our results in Table 8. In column (1), our difference-in-differences estimate indicates that, on average, patients visiting treated hospitals do not stay longer when they are treated for a heart attack, heart failure, or pneumonia post-regulation. However, our results suggest that a reallocation is again at play. Similar to what we observe for prices, our estimates in column (2) reveal that the length of stay increased for non-Medicare patients and decreased for those under Medicare. In column (3), we find that this effect is again driven by patients under Medicaid or private insurance.

We posit that an increased length of stay could be driven by an increase in non-medical charges and/or an increase in medical treatment. In column (4), we fail to find that, on average, the time between admission and the first medical procedure changed for treated versus control hospitals post-regulation. In columns (5) and (6), however, we find that the time between admission and the first medical procedure increased for non-Medicare patients (Medicaid, privately insured) and decreased for uninsured patients and patients under Medicare. This result is consistent with hospitals admitting more patients—in line with what we observe at the facility level——and potentially increasing unnecessary diagnosis procedures to generate additional revenues for the group of patients where there is more flexibility to charge for additional medical services.

6.3 Care

In our last set of analyses, we directly examine whether the increased length of stay is explained by a more intensive diagnosis process that precedes the actual medical treatment. To do so, we focus on heart attack and examine a specific diagnostic procedure: the utilization of invasive cardiac catheterization method for diagnosing heart attack patients. We follow Chandra and Staiger (2007) and examine whether hospitals become more aggressive in the diagnosis phase, and whether this translates into actual medical procedures or not. We tabulate our results in Table 9. In column, we find that, on average, the aggressive diagnosis procedure (catheterization) increases by 2%, though the coefficient is marginally significant (t-stat of 1.65). However, when splitting patients by insurance status in column (2), our estimation reveals that non-Medicare patients in hospitals that belong to our treatment group are 3.3% more likely to receive such procedure following the regulatory change. In column (3), our estimation indicates that most of the increase is concentrated among the group of privately insured patients, with a coefficient of 4.2%. The effect is economically meaningful as it represents an 8.3% increase of the unconditional catheterization rate. Since catheterization must be performed in a supervised hospital setting, patients may need to be admitted in the night before the test for preparation, and in the night afterward for post-procedure monitoring. Therefore, a higher utilization of catheterization would lead to increased length of stay observed in Table 8.

In columns (4) to (6), we find that the increased reliance on this aggressive diagnosis procedure does not translate into additional treatment, since non-Medicare patients become less likely to receive the actual treatment for artery blockage (i.e. a percutaneous coronary intervention or coronary artery bypass grafting) following the catheterization diagnosis procedure. The significant results consistently hold across all the specific non-medicare insurance groups with economic magnitudes ranging from 0.012 to 0.017 procedures. These results suggest that treated hospitals lowered their standards to perform intensive diagnosis, thereby increasing the amount charged to non-Medicare patients in order to boost their revenues and profits.

7 Conclusion

In this paper, we study the social costs of liquidity transparency in the context of non-profit U.S. hospitals. We leverage a change in accounting standards for non-profit entities introduced by the FASB in 2016. This change in standards imposes non-profit entities to disclosure more quantitative and qualitative information about their liquidity. We compare non-profit hospitals that had low versus high liquidity before the change in standards. We find that hospitals with ex-ante low liquidity take actions to improve their liquidity. They do so by boosting their revenues and profit margins at the expense of service quality. Specifically, we show that these additional cash flows are generated by admitting more patients and charging higher payments. The higher payments reflect a higher propensity to overtreat patients with longer hospital stays and unnecessarily intensive diagnosis processes. These operational changes generate welfare costs such as delays in administering procedures for life-threatening diseases.

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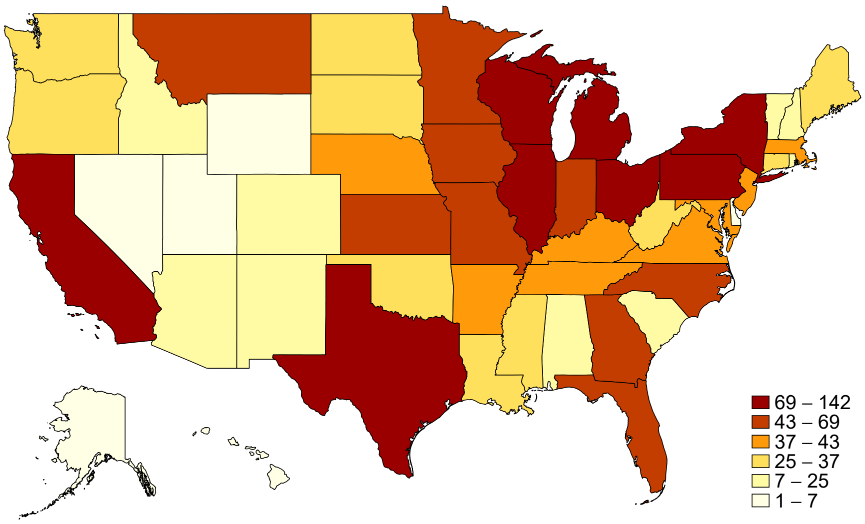
Figure 1: Geographic Distribution of Hospitals and Hospital Facilities

This figure plots the number of hospitals (Panel a) and hospital facilities (Panel b) across U.S. states.

(a) Number of Hospitals by State



(b) Number of Hospital Facilities by State

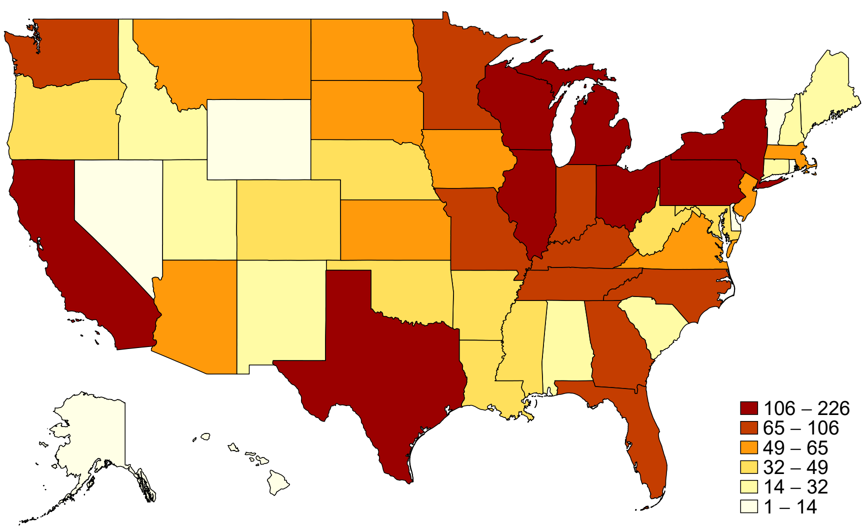
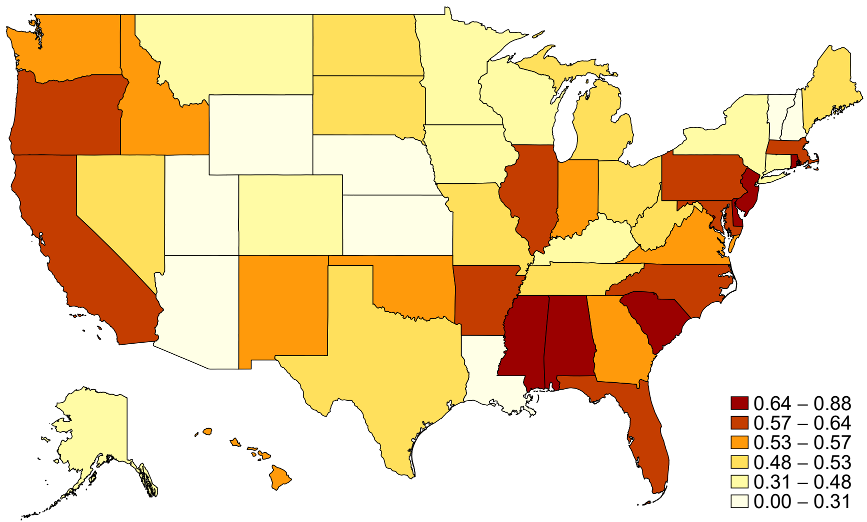


Figure 2: Geographic Distribution of Treated vs. Control Hospitals and Hospital Facilities

This figure plots the fraction of hospitals (Panel a) and hospital facilities (Panel b) in the treatment group across U.S. states.

(a) Fraction of Treated Hospitals by State



(b) Fraction of Treated Hospital Facilities by State

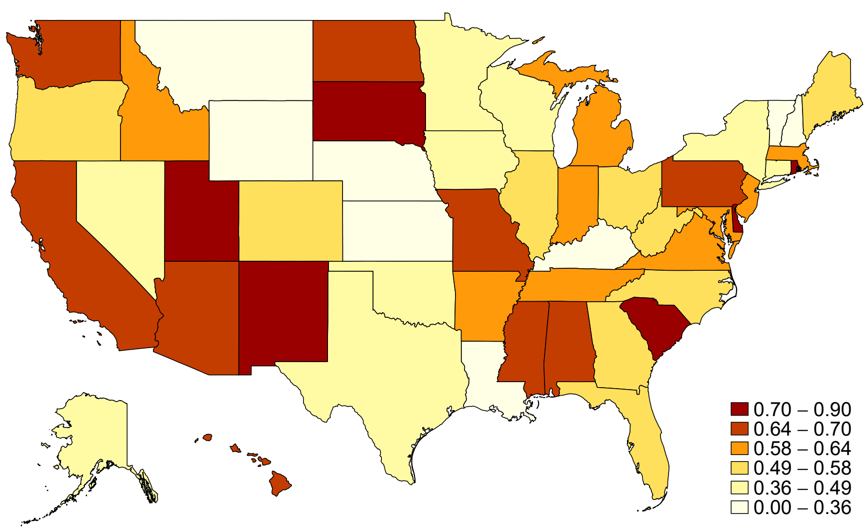


Figure 3: Treatment Dynamics of $Cash/TA$

This figure plots the treatment dynamics with respect to $Cash/TA$ at the hospital level. The base year is 2015, that is, the year prior to ASU 2016-14. 95% confidence intervals are indicated by the solid lines.

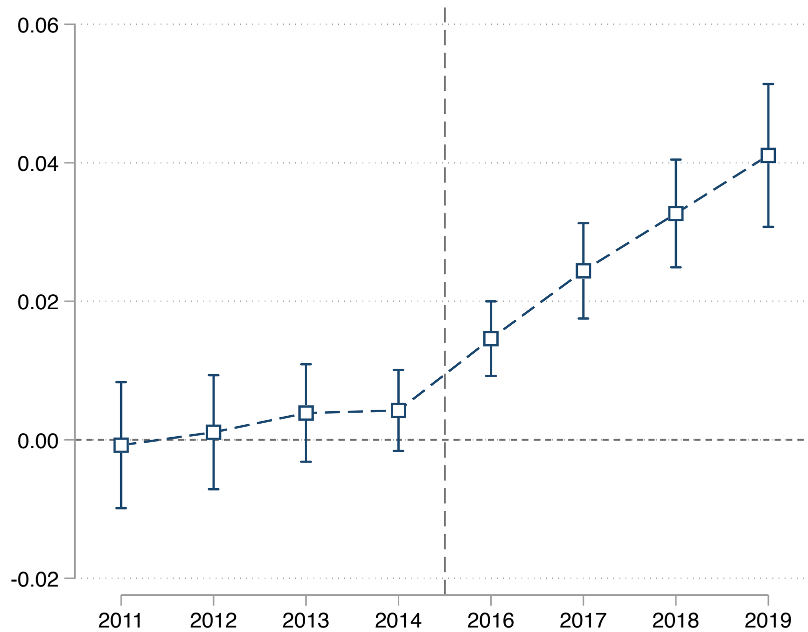


Figure 4: Treatment Dynamics of $OpIncome/TA$

This figure plots the treatment dynamics with respect to $OpIncome/TA$ at the hospital level. The base year is 2015, that is, the year prior to ASU 2016-14. 95% confidence intervals are indicated by the solid lines

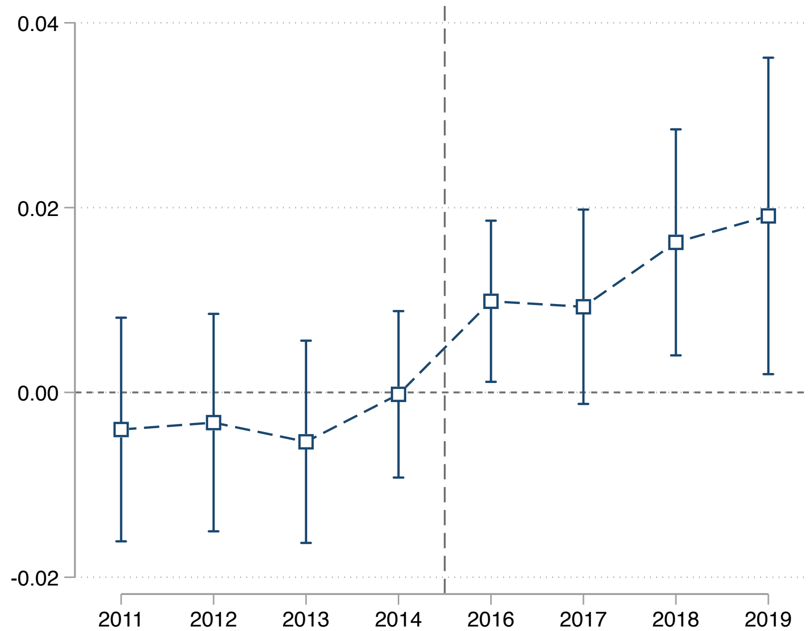
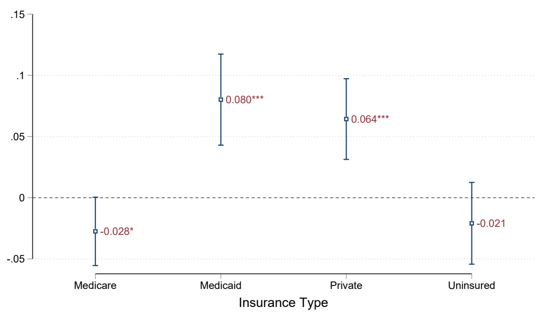


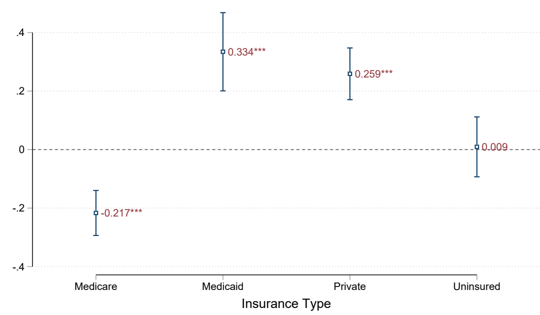
Figure 5: Treatment Effects on Patient Visits Based on Insurance Types

This figure plots the coefficients of the treatment effects by detailed insurance types in Tables 7, 8, and 9. 95% confidence intervals are indicated by the solid lines.

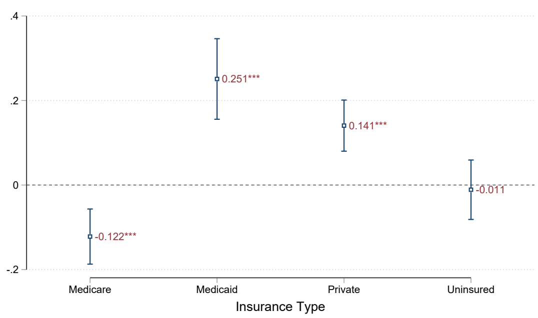
(a) Coefficient Dynamics of $Log(Charge)$



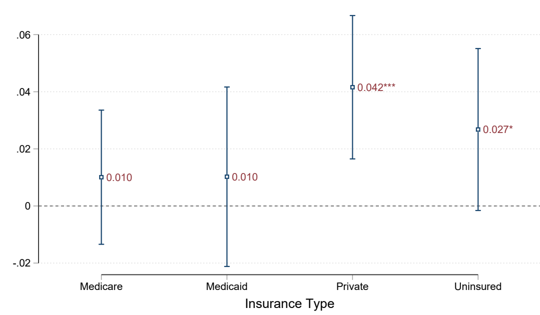
(b) Coefficient Dynamics of LOS



(c) Coefficient Dynamics of $PrDay$



(d) Coefficient Dynamics of $Catheterization$



(e) Coefficient Dynamics of PCI

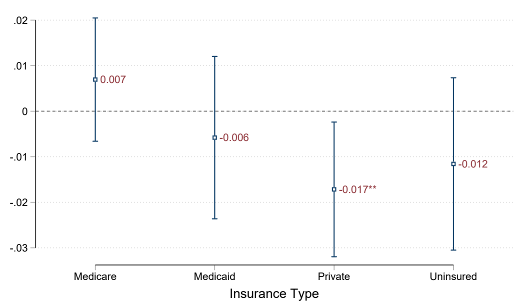


Table 1: Summary Statistics

This table exhibits the summary statistics in our sample. We first collect Form 990 data from the IRS and use the hospital subsample. Hospital Employer Identification Numbers (EINs) are identified and linked to the CMS Certification Number (Provider ID) from the Community Benefit Insight API. We first calculate each hospital's average cash to total assets ratio ($Cash/TA$) strictly before the shock (2016). The treatment (control) group is defined as those with an average before-shock $Cash/TA$ below (above) the sample median, i.e., the low-cash (high-cash) group. Panel A summarizes the variables at the hospital level. $Post$ equals one if the ending tax period is after August 2016 and zero otherwise. $Treated$ equals one if the hospital belongs to the treatment group and zero otherwise. $Post \times Treated$ is the interaction between $Post$ and $Treated$. The definitions of the other variables can be found in Appendix A. All the ratio variables at the hospital level in Panel A are winsorized at 1% and $PatRev/TA$, $InpatRev/TA$ and $Price$ at the facility level in Panel B are winsorized at 2.5% due to a nosier data input.

Panel A: Summary Statistics at the Hospital Level

	N	*Mean*	*Std. Dev.*	*Median*	*p5*	*p95*
$Post \times Treated$	15,004	0.204	0.403	0.000	0.000	1.000
$\Delta FinancialDebt/TA$	14,998	0.002	0.090	−0.004	−0.071	0.121
$Leverage$	14,900	0.211	0.196	0.187	0.000	0.592
$Cash/TA$	14,983	0.108	0.120	0.066	0.000	0.366
$ServRev/TA$	14,998	1.128	0.637	0.960	0.444	2.359
Exp/TA	14,998	0.968	0.577	0.817	0.356	2.098
$OpIncome/TA$	14,998	0.159	0.148	0.137	−0.033	0.429
$ProfitMargin$	14,995	0.146	0.112	0.148	−0.037	0.323
$TA\,(mil)$	14,999	406.014	797.693	128.790	6.786	1660.520
$TotalRev\,(mil)$	14,999	328.006	574.368	125.616	11.445	1300.340
$FinancialDebt\,(mil)$	14,999	88.015	203.579	14.217	0.000	422.578

Panel B: Summary Statistics at the Hospital Facility Level

	N	*Mean*	*Std. Dev.*	*Median*	*p5*	*p95*
$Post \times Treated$	20,714	0.228	0.419	0.000	0.000	1.000
$TA\,(mil)$	20,305	305.632	749.747	104.657	5.870	1,075.550
$PatRev/TA$	20,310	1.190	0.690	1.005	0.408	2.645
$InpatRev/TA$	20,188	0.458	0.319	0.377	0.090	1.145
$Patient$	20,636	38,594.600	55,278.970	17,607.010	1,049.000	144,352.700
$Price$	16,766	3,121.558	2,190.717	2,639.734	753.718	7,636.452

Panel C: Summary Statistics at the Patient Visit Level

	N	*Mean*	*Std. Dev.*	*Median*	*p5*	*p95*
$Post \times Treated$	3,329,844	0.225	0.417	0.000	0.000	1.000
$Charge$	3,333,321	48,573.620	79,852.350	26,481.000	5,898.000	155,509.000
LOS	3,333,764	4.381	4.052	3.000	1.000	13.000
$Catheter$	1,011,658	0.506	0.500	1.000	0.000	1.000
$InvasiveTreat$	607,889	0.703	0.464	1.000	0.000	1.000
Age	3,333,702	59.961	23.234	65.000	21.000	91.000
$Female$	3,333,596	0.574	0.494	1.000	0.000	1.000
CCI	3,333,809	1.393	1.328	1.000	0.000	4.000
$Black$	3,333,809	0.151	0.358	0.000	0.000	1.000
$Hispanic$	3,333,809	0.101	0.302	0.000	0.000	1.000
$Medicare$	3,333,809	0.510	0.500	1.000	0.000	1.000
$Medicaid$	3,333,809	0.183	0.386	0.000	0.000	1.000
$Private$	3,333,809	0.254	0.436	0.000	0.000	1.000
$Uninsured$	3,333,809	0.052	0.222	0.000	0.000	1.000

Table 2: Ex-ante Characteristics of the Treatment and Control Group

This table compares the ex-ante characteristics of the treatment and control groups in the years (2010 – 2015) before the ASU 2016-14. The variable definitions are in Table 1. The treatment (control) group is defined as those with an average before-shock $Cash/TA$ below (above) the sample median, i.e., the low-cash (high-cash) group. *Diff.* is the difference between the means of the treatment and control groups. Standard errors are clustered at the hospital level. t-stats and p-values of the differences are provided in the last two columns.

Panel A: Ex-ante Characteristics at the Hospital Level

	Treat Obs.	*Control Obs.*	*Treat Mean*	*Control Mean*	*Diff.*	*t-stat*	*p-value*
$\Delta FinancialDebt/TA$	4,004	4,002	0.005	0.003	0.002	1.10	0.269
$Leverage$	3,961	3,983	0.224	0.221	.004	0.81	0.418
$Cash/TA$	3,999	3,998	0.035	0.183	−0.148	−41.40	0.000
$ServRev/TA$	4,004	4,002	1.086	1.135	−0.049	−1.87	0.061
Exp/TA	4,004	4,002	0.933	0.975	−0.042	−1.76	0.079
$OpIncome/TA$	4,004	4,002	0.151	0.162	−0.011	−1.88	0.061
$ProfitMargin$	4,003	4,000	0.144	0.148	−0.004	−0.93	0.355
$TA\,(mil)$	4,004	4,002	504.538	264.998	239.540	6.91	0.000
$TotalRev\,(mil)$	4,004	4,002	385.621	231.037	154.584	6.23	0.000
$FinancialDebt\,(mil)$	4,004	4,002	113.826	60.476	53.350	5.90	0.000

Panel B: Ex-ante Characteristics at the Hospital Facility Level

	Treat Obs.	*Control Obs.*	*Treat Mean*	*Control Mean*	*Diff.*	*t-stat*	*p-value*
$TA\,(mil)$	6,239	4,749	330.248	216.671	113.578	2.51	0.012
$PatRev/TA$	6,236	4,746	1.224	1.115	0.108	3.26	0.001
$InpatRev/TA$	6,209	4,706	0.512	0.425	0.087	5.45	0.000
$Patient$	6,411	4,766	44,505.740	32,125.790	12,379.960	5.45	0.000
$Price$	5,535	3,706	3,058.975	3,005.514	53.461	0.45	0.655

Panel C: Ex-ante Characteristics at the Patient Visit Level

	Treat Obs.	*Control Obs.*	*Treat Mean*	*Control Mean*	*Diff.*	*t-stat*	*p-value*
$Charge$	855,006	979,047	46,691.750	45,300.400	1,391.348	0.41	0.681
LOS	855,048	979,412	4.366	4.423	−0.057	−0.42	0.672
$Catheter$	276,250	305,604	0.471	0.440	0.031	1.81	0.070
$InvasiveTreat$	167,214	170,351	0.713	0.709	0.005	0.34	0.731
Age	855,048	979,407	58.854	59.727	−0.873	−0.86	0.389
$Female$	855,058	979,405	0.594	0.594	0.001	0.08	0.935
CCI	855,060	979,421	1.372	1.377	−0.004	−0.10	0.920
$Black$	855,060	979,421	0.158	0.132	0.026	1.32	0.186
$Hispanic$	855,060	979,421	0.099	0.100	−0.001	−0.05	0.958
$Medicare$	855,060	979,421	0.490	0.506	-0.015	-0.920	0.360
$Medicaid$	855,060	979,421	0.192	0.187	0.005	0.350	0.725
$Private$	855,060	979,421	0.262	0.257	0.005	0.330	0.742
$Uninsured$	855,060	979,421	0.056	0.050	0.006	1.580	0.116

Table 3: The Effects of Liquidity Transparency Shock on Debt

This table shows the effects of the liquidity transparency shock on different types of debt. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_i$ equals one if hospital i belongs to the treatment group and zero otherwise. $Post_t \times Treated_i$ is is the interaction between $Post_t$ and $Treated_i$. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)*. Fixed effects are included and indicated. Standard errors are clustered at the hospital level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	Financial Debt Issuance/TA			***Leverage***		
$Post_t \times Treated_i$	−0.006**	−0.006**	−0.005*	−0.008*	−0.008*	−0.009*
	(−2.16)	(−2.24)	(−1.75)	(−1.71)	(−1.71)	(−1.70)
$ServRevGrowth_{i,t-1}$		0.002	−0.001		0.017	0.019
		(0.18)	(−0.08)		(1.25)	(1.37)
$OpIncome/NFA_{i,t-1}$		0.019***	0.020***		−0.019***	−0.020***
		(5.37)	(5.39)		(−3.80)	(−3.85)
$Log(TotalRev)_{i,t-1}$		−0.008	−0.009*		0.011	0.011
		(−1.44)	(−1.69)		(1.05)	(1.03)
Year FEs	Y	Y	–	Y	Y	–
Hospital FEs	Y	Y	Y	Y	Y	Y
State × Year FEs	N	N	Y	N	N	Y
N	15,032	14,980	14,972	14,883	14,832	14,824
R^2	0.120	0.125	0.157	0.810	0.811	0.820

Table 4: The Effects of Liquidity Transparency Shock on Cash Ratios

This table shows the effects of liquidity transparency shock on hospital cash ratios. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_i$ equals one if hospital i belongs to the treatment group and zero otherwise. $Post_t \times Treated_i$ is is the interaction between $Post_t$ and $Treated_i$. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)*. Fixed effects are included and indicated. Standard errors are clustered at the hospital level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)
		Cash/TA	
$Post_t \times Treated_i$	0.023***	0.022***	0.026***
	(7.72)	(7.66)	(8.18)
$ServRevGrowth_{i,t-1}$		−0.013	−0.009
		(−1.59)	(−1.01)
$OpIncome/NFA_{i,t-1}$		0.016***	0.015***
		(4.28)	(3.97)
$Log(TotalRev)_{i,t-1}$		0.010*	0.009
		(1.69)	(1.47)
Year FEs	Y	Y	–
Hospital FEs	Y	Y	Y
State × Year FEs	N	N	Y
N	15,019	14,968	14,960
R^2	0.784	0.785	0.798

Table 5: The Effects of Liquidity Transparency Shock on Revenues and Expenses

This table shows the effects of the liquidity transparency shock on hospital revenues and expenses. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_i$ equals one if hospital i belongs to the treatment group and zero otherwise. $Post_t \times Treated_i$ is is the interaction between $Post_t$ and $Treated_i$. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)*. Fixed effects are included and indicated. Standard errors are clustered at the hospital level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ServRev/TA		***Exp/TA***		***OpIncome/TA***		***ProfitMargin***	
$Post_t \times Treated_i$	0.042***	0.045***	0.031***	0.035***	0.012***	0.011***	0.006**	0.005*
	(3.08)	(3.18)	(2.59)	(2.76)	(3.22)	(2.82)	(2.29)	(1.93)
$ServRevGrowth_{i,t-1}$	0.117***	0.104***	0.096***	0.080**	0.013	0.018	0.006	0.012
	(3.11)	(2.69)	(2.93)	(2.34)	(0.99)	(1.41)	(0.56)	(1.01)
$OpIncome/NFA_{i,t-1}$	0.079***	0.075***	0.008	0.009	0.068***	0.064***	0.041***	0.039***
	(4.10)	(4.08)	(0.52)	(0.56)	(10.83)	(10.77)	(10.05)	(9.39)
$Log(TotalRev)_{i,t-1}$	−0.027	−0.021	−0.012	−0.007	−0.018*	−0.017*	0.002	0.001
	(−0.68)	(−0.56)	(−0.33)	(−0.20)	(−1.74)	(−1.69)	(0.18)	(0.12)
Year FEs	Y	–	Y	–	Y	–	Y	–
Hospital FEs	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FEs	N	Y	N	Y	N	Y	N	Y
N	14,980	14,972	14,980	14,972	14,980	14,972	14,976	14,968
R^2	0.852	0.863	0.865	0.873	0.710	0.730	0.750	0.762

Table 6: The Effects of Liquidity Transparency Shock on Hospital Facility Operational Decisions

This table shows the effects of liquidity transparency shock on operational decisions at the hospital facility level. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_j$ equals one if hospital facility j belongs to the treatment group and zero otherwise. $Post_t \times Treated_j$ is is the interaction between $Post_t$ and $Treated_j$. In columns (1) and (2), $PatRev/TA_{j,t}$ is defined as net patient revenues over total assets for hospital facility j in year t. In columns (3) and (4), $InpatRev/TA_{j,t}$ is defined as net inpatient revenues over total assets for hospital facility j in year t. In columns (3) and (4), $Log(Patient)_{j,t}$ is defined as the logarithm of total patients for hospital facility j in year t. In columns (5) and (6), $Log(Price)_{j,t}$ is defined as the logarithm of price for hospital facility j in year t. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)* at the hospital level. Fixed effects are included and indicated. Standard errors are clustered at the hospital facility level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8))
	$PatRev/TA$		$InpatRev/TA$		$Log(Patient)$		$Log(Price)$	
$Post_t \times Treated_j$	0.048***	0.044***	0.022***	0.021***	0.024**	0.024**	0.027**	0.024*
	(3.34)	(2.94)	(3.73)	(3.41)	(2.43)	(2.30)	(2.02)	(1.66)
$ServRevGrowth_{i,t-1}$	0.040	0.032	0.008	0.005	0.013	0.004	0.013	0.003
	(1.10)	(0.85)	(0.52)	(0.29)	(0.58)	(0.19)	(0.38)	(0.07)
$OpIncome/NFA_{i,t-1}$	0.039**	0.032*	0.010	0.006	0.013	0.005	−0.022	−0.020
	(2.31)	(1.91)	(1.41)	(0.89)	(1.42)	(0.60)	(−1.56)	(−1.38)
$Log(TotalRev)_{i,t-1}$	−0.035	−0.023	−0.003	0.001	0.113***	0.122***	0.036**	0.044***
	(−1.25)	(−0.82)	(−0.27)	(0.06)	(7.18)	(7.84)	(2.53)	(2.82)
Year FEs	Y	–	Y	–	Y	–	Y	–
Facility FEs	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FEs	N	Y	N	Y	N	Y	N	Y
N	20,269	20,247	20,144	20,122	20,597	20,575	16,682	16,661
R^2	0.783	0.795	0.829	0.837	0.985	0.986	0.869	0.877

Table 7: The Effects of Liquidity Transparency Shock on Patient Charges

This table shows the effects of liquidity transparency shock on patient charges. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_j$ equals one if hospital facility j belongs to the treatment group and zero otherwise. $Post_t \times Treated_j$ is is the interaction between $Post_t$ and $Treated_j$. $Charge_{i,k,d,t}$ is the total charges for patient k visiting hospital i for condition d in year t. $Medicare_k$, $Non\_Medicare_k$, $Medicaid_k$, $Private_k$ and $Uninsured_k$ indicate whether patients are covered by Medicare, non-Medicare (including uninsured) plans, Medicaid, private insurances or uninsured, respectively. Control variables are included in columns (2) – (4), including (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)* at the hospital level, and patient age, gender, Charlson Comorbidity Index, and ethnicity. Fixed effects are included and indicated. Standard errors are clustered at the hospital level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)
	Log(Charge)			
$Treated \times Post$	0.016	0.019		
	(1.050)	(1.247)		
$Treated \times Post \times Medicare$			−0.027*	−0.028*
			(−1.895)	(−1.934)
$Treated \times Post \times Non\_Medicare$			0.061***	
			(3.688)	
$Treated \times Post \times Medicaid$				0.080***
				(4.231)
$Treated \times Post \times Private$				0.064***
				(3.827)
$Treated \times Post \times Uninsured$				−0.021
				(−1.229)
Controls	N	Y	Y	Y
Year FEs	Y	Y	Y	Y
Hospital × Disease FEs	Y	Y	Y	Y
Insurer FEs	N	N	Y	Y
N	3,329,341	3,329,021	3,327,496	3,327,496
R^2	0.45	0.50	0.50	0.50

Table 8: The Effects of Liquidity Transparency Shock on Length of Stay and Procedure Delays

This table shows the effects of liquidity transparency shock on patient charges and length of stay. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_j$ equals one if hospital facility j belongs to the treatment group and zero otherwise. $Post_t \times Treated_j$ is is the interaction between $Post_t$ and $Treated_j$. $Charge_{i,k,d,t}$ is the total charges for patient k visiting hospital i for condition d in year t. $LOS_{i,k,d,t}$ is the length of stay for patient k visiting hospital i for condition d in year t. $PrDay_{i,k,d,t}$ is the number of days between admission and the first procedure. $Medicare_k$, $Non\_Medicare_k$, $Medicaid_k$, $Private_k$ and $Uninsured_k$ indicate whether patients are covered by Medicare, non-Medicare (including uninsured) plans, Medicaid, private insurances or uninsured, respectively. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)* at the hospital level, and patient age, gender, Charlson Comorbidity Index, and ethnicity. Fixed effects are included and indicated. Standard errors are clustered at the hospital level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
		LOS			***PrDay***	
$Treated \times Post$	0.033			−0.011		
	(0.790)			(−0.326)		
$Treated \times Post \times Medicare$		−0.215***	−0.217***		−0.168***	−0.170***
		(−5.505)	(−5.532)		(−4.672)	(−4.703)
$Treated \times Post \times Non\_Medicare$		0.261***			0.104***	
		(5.241)			(2.936)	
$Treated \times Post \times Medicaid$			0.334***			0.177***
			(4.914)			(3.356)
$Treated \times Post \times Private$			0.259***			0.089***
			(5.757)			(2.755)
$Treated \times Post \times Uninsured$			0.009			−0.066*
			(0.181)			(−1.892)
Controls	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Hospital × Disease FEs	Y	Y	Y	Y	Y	Y
Insurer FEs	N	Y	Y	N	Y	Y
N	3,329,464	3,327,933	3,327,933	2,058,816	2,057,681	2,057,681
R^2	0.10	0.10	0.10	0.06	0.06	0.06

Table 9: The Effects of Liquidity Transparency Shock on Diagnosis and Treatment Intensity

This table shows the effects of liquidity transparency shock on heart attack patient diagnosis and treatment intensity. $Post_t$ equals one if the tax period in calendar year t ends after August 2016 and zero otherwise. $Treated_j$ equals one if hospital facility j belongs to the treatment group and zero otherwise. $Post_t \times Treated_j$ is is the interaction between $Post_t$ and $Treated_j$. $Cathter_{i,k,d,t}$ indicates whether AMI patient receive cardiac catheterization. $InvasiveTreat_{i,k,d,t}$ counts the number of invasive treatment procedures that an AMI patient receives, including percutaneous coronary intervention (PCI), coronary artery bypass surgery (CABG), or both. . The last columns restrict the sample to patients with cardiac catheterization, i.e. $Cathter_{i,k,d,t} = 1$. $Medicare_k$, $Non\_Medicare_k$, $Medicaid_k$, $Private_k$ and $Uninsured_k$ indicate whether patients are covered by Medicare, non-Medicare (including uninsured) plans, Medicaid, private insurances or uninsured, respectively. Control variables include (lagged) *ServRevGrowth*, *OpIncome/NFA*, and *Log(TotalRev)* at the hospital level, and patient age, gender, Charlson Comorbidity Index, and ethnicity. Fixed effects are included and indicated. Standard errors are double clustered at the hospital level and diagnosis-related group level, and t-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	Catheter			***InvasiveTreat***		
$Treated \times Post$	0.020			−0.006		
	(1.646)			(−0.967)		
$Treated \times Post \times Medicare$		0.010	0.010		0.001	0.001
		(0.840)	(0.842)		(0.188)	(0.187)
$Treated \times Post \times Non\_Medicare$		0.033**			−0.013**	
		(2.526)			(−2.087)	
$Treated \times Post \times Medicaid$			0.010			−0.015*
			(0.640)			(−1.842)
$Treated \times Post \times Private$			0.042***			−0.012*
			(3.253)			(−1.833)
$Treated \times Post \times Uninsured$			0.027*			−0.017**
			(1.854)			(−2.162)
Controls	Y	Y	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y	Y	Y
Hospital FEs	Y	Y	Y	Y	Y	Y
Insurer FEs	N	Y	Y	N	Y	Y
N	1,009,741	1,009,237	1,009,237	606,716	606,430	606,430
R^2	0.15	0.15	0.15	0.08	0.08	0.08

Appendix

A Variable Definition

Table A.1: Variable Definitions

Panel A: Variables at the Hospital Level

Variable Name	*Definition*
$Post$	One if the ending tax period is after August 2016 and zero otherwise.
$Treated$	One if the hospital belongs to the treatment group and zero otherwise.
$\Delta FinancialDebt/TA$	Total financial debt changes over total assets.
$Leverage$	Total debt over total assets.
$Cash/TA$	Cash over total assets.
$ServRev/TA$	Program service revenues over total assets.
Exp/TA	The total functional expenses over total assets.
$OpIncome/TA$	Operating income over total assets.
$ProfitMargin$	The operating income divided by program service revenue.
$TA\,(mil)$	The total assets.
$TotalRev\,(mil)$	The total revenues.
$FinancialDebt\,(mil)$	The sum of the tax-exempt bond, secured mortgage and notes payable, and unsecured notes or loans.

Panel B: Variables at the Hospital Level

Variable Name	*Definition*
$PatRev$	The net patient revenues. Net patient revenue is defined as total charges minus contractual allowances and discounts on patients' accounts.
$InpatRev$	The net inpatient revenues.
$Patient$	The number of patients admitted to inpatient services per year.
$Price$	The average price of non-Medicare inpatient service.

Panel C: Variables at the Patient Visit Level

Variable Name	*Definition*
$Medicare$	Indicator whether patients are covered by Medicare plans.
$Non\_Medicare$	Indicator whether patients are covered by non-Medicare plans.
$Medicaid$	Indicator whether patients are covered by Medicaid plans.
$Private$	Indicator whether patients are covered by private insurance.
$Uninsured$	Indicator whether patients are uninsured.
$Charge$	The total charges for each visit.
LOS	The length of stay.
$PrDay_{i,k,d,t}$	The number of days between admission and the first procedure.
$Cathter$	Indicator whether AMI patient receives cardiac catheterization.
$InvasiveTreat$	Number of invasive treatment procedures that an AMI patient receives, including percutaneous coronary intervention (PCI), coronary artery bypass surgery (CABG), or both.
Age	The patient's age.
$Female$	Indicator whether the patient is female.
CCI	The Charlson Comorbidity Index.
$Black$	Indicator whether the patient is black.
$Hispanic$	Indicator whether the patient is Hispanic.

B Regulatory Examples

B.1 Balance Sheet Example by Providence Hospitals

Financial performance

The results discussed in this document are presented on a pro forma basis for the System. Data was derived by combining the consolidated year-to-date results of Providence Health & Services and St. Joseph Health assuming that operations of the two organizations were combined as of January 1, 2015. Certain immaterial adjustments have been made to conform financial statement presentations. Pro forma data includes the impact of affiliation related transactions, such as asset write-ups and the related amortization/depreciation of these assets, prior to the affiliation date of July 1, 2016. Management believes this pro forma data is the most useful presentation for evaluating and discussing current year operations in comparison to the prior year.

Year-to-date results

Balance Sheet	Providence St. Joseph Health (Pro Forma)			
PRESENTED IN MILLIONS	12-31-16	12-31-2015	12 MONTH CHANGE	CHANGE %
Current Assets:				
Cash and Cash Equivalents	782	885	(103)	(12%)
Short-term Management Designated Investments	875	1,139	(264)	(23%)
Accounts Receivable, Net	2,206	2,153	53	2%
Other Current Assets	1,449	1,047	402	38%
Current Portion of Funds Held by Trustee	109	55	54	98%
Total Current Assets	**5,421**	**5,279**	**142**	**3%**
Assets Whose Use is Limited:				
Management Designated Cash and Investments	8,091	7,361	730	10%
Funds Held by Trustee, Gift, Annuity, and Other	641	512	129	25%
Total Assets Whose Use is Limited	**8,731**	**7,873**	**858**	**11%**
Property, Plant & Equipment	**11,022**	**10,477**	**545**	**5%**
Total Other Assets	**1,118**	**1,220**	**(102)**	**(8%)**
Total Assets	**26,292**	**24,849**	**1,443**	**6%**
Current Liabilities:				
Short-term Debt and Current Portion of Long-term Debt	353	471	(118)	(25%)
Accounts Payable	584	555	29	5%
Accrued Compensation	1,104	924	180	19%
Other Current Liabilities	1,911	1,446	465	32%
Total Current Liabilities	**3,952**	**3,396**	**556**	**16%**
Long-Term Debt, Net of Current Portion	6,396	6,009	387	6%
Other Long-term Liabilities	2,149	2,039	110	5%
Total Liabilities	**12,497**	**11,444**	**1,053**	**9%**
Net Assets:				
Unrestricted	12,759	12,539	220	2%
Restricted Net Assets	1,035	866	169	20%
Total Net Assets	**13,795**	**13,405**	**390**	**3%**
Total Liabilities and Net Assets	**26,292**	**24,849**	**1,443**	**6%**

B.2 Liquidity Transparency Section Example by Providence Hospital

investment gains of $493 million in 2016, compared to year-to-date losses of $156 million in 2015. Investment income was partially offset by growth in other non-operating expenses such as pension settlement costs and innovation investments, which were $28 million and $44 million through December, respectively.

Capital and liquidity

Liquidity Indicators	Providence St. Joseph Health (Pro Forma)			
DATA PRESENTED YEAR TO DATE; $ FIGURES PRESENTED IN MILLIONS	12-31-16 ACTUAL	12-31-15 ACTUAL	YTD VAR	YTD VAR %
Accounts Receivable Days	45	46	(1)	(2%)
Days of Cash on Hand	168	177	(9)	(5%)
Long-term Debt to Capitalization	33.9	32.9	1.0	3%
Debt Service Coverage	1.8	3.2	(1.4)	(44%)
Cash to Debt Ratio	148.8	152.7	(3.9)	(3%)
Cash to Total Net Asset Ratio	0.76	0.75	0.01	1%

Unrestricted cash reserves totaled $9.7 billion as of December 31, 2016, up from $9.2 billion as of December 31, 2015. The increase was driven by cash generated from operations, investment gains and proceeds from financing transactions, partially offset by payments related to pension obligations, debt, and capital expenditures. Despite cash growth from prior year, higher costs associated with servicing additional volumes resulted in an overall four day decline in days of cash on hand.

In the third quarter of 2016, the System initiated a series of bond offerings which included the refinancing of certain tax-exempt bonds held by St. Joseph Health prior to the affiliation, executing on a plan to create a single obligated group. The aggregate offering included $448 million of California tax-exempt fixed rate bonds, $286 million of California tax-exempt fixed rate put bonds, $680 million of taxable fixed rate bonds, $100 million of taxable variable rate bonds and a few privately placed direct purchases with staggered tender dates. The offering unified the debt structures of the System at a more favorable cost of capital. While retirement of the existing debt resulted in $60 million in one-time losses on extinguishment of debt, the overall transaction will generate more than $25 million in annual interest savings.

Prior to the debt offering but subsequent to the affiliation of Providence Health & Services and St. Joseph Health, the three national credit rating agencies conducted their annual review process of the newly formed Providence St. Joseph Health. The agencies issued the following credit ratings:

- Fitch: "AA-"
- Standard and Poor's: "AA-"
- Moody's: "Aa3"

All three agencies issued a stable outlook based on the System's favorable enterprise profile and strong financial position. As further evidence of the System's financial strength, the recent bond offering demonstrated ample demand throughout the pricing process from investors.

B.3 Cash Restrictions Example by New York Presbyterian Hospital System

In this section, we provide the detailed decomposition of cash holdings for the New York Presbyterian Hospital (NYPH) for the year ended December 31, 2019 and 2018 follows (in thousands). An example of the category "Assets limited as to use – funds held under loan" is that NYPH executed a mortgage note with Prudential in September 2013. The proceeds of the loan were deposited into a construction escrow account and were used to construct an ambulatory care center and pay related costs. An example of the category "Assets limited as to use – funded self-insurance (professional liabilities): cash and cash equivalents" is that NYPH, along with a group of other healthcare providers, participated in the formation of captive insurance companies (the Captive) in 1978. Exposure for claims will be paid under a deposit program with the Captive.

	2019	**2018**
Cash and cash equivalents	\$359,292	\$590,045
Assets limited as to use – funds held under loan agreements: cash and cash equivalents	\$9,941	\$7,467
Assets limited as to use – funded self-insurance (professional liabilities): cash and cash equivalents	\$22,069	\$21,199
Assets limited as to use – donor restricted: cash and cash equivalents	\$13,830	\$13,313
Total cash and cash equivalents and restricted cash and restricted cash equivalents	\$405,132	\$632,024