Debt and Bargaining Outcomes: Evidence from U.S. Hospitals

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Abstract

Using the healthcare industry as a novel laboratory, I study whether a firm's use of debt enhances its bargaining power during negotiations with non-financial stakeholders. I find that reimbursement rates negotiated between a hospital and insurers for two homogeneous procedures are higher when the hospital has more debt. This relation is stronger among hospitals with less bargaining power relative to insurers ex ante. I provide direct evidence that debt improves a firm's bargaining outcomes.

JEL classification: G30, G32, G33.

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1 Introduction

Capital structure research traditionally focuses on the consequences of debt for a firm's financial stakeholders (i.e., shareholders and creditors). However, a firm's financial structure can also impact other agents including employees, customers, and suppliers (e.g., Titman (1984)). One strand of the literature has argued that debt may strengthen a firm's bargaining position vis-á-vis these "non-financial stakeholders," allowing the firm to extract more surplus at these stakeholders' expense (e.g., Bronars and Deere (1991) and Hennessy and Livdan (2009)). There is evidence that firms take on more debt when the benefits of augmenting their bargaining power are high, e.g. when bargaining with concentrated suppliers (Chu (2012) and Kale and Shahrur (2007)) and unions (Matsa (2010), Myers and Saretto (2015), and Yi (2016)).[1] However, no study has tested the direct implication of the argument whether leverage improves a firm's bargaining outcomes.

The primary challenge in investigating the effect of debt on bargaining is that researchers rarely observe measurable bargaining outcomes. Moreover, even if outcomes were observed, heterogeneity in the services or goods being bargained over would make assessing such an effect difficult. I use the healthcare industry as a novel laboratory to overcome this challenge. Three features in particular make the healthcare setting appealing. First, bargaining outcomes are observable via the prices negotiated between hospitals and insurers for medical procedures. Second, some of these procedures are standardized across hospitals, yet continue to have variation in prices. Third, cross-sectional variation in market characteristics and corporate structure allows me to test whether the sensitivity of bargaining outcomes to a hospital's debt varies with the bargaining power of hospitals along multiple dimensions.

While there is more than one theory that explain how debt can strengthen a firm's bargaining position with its non-financial stakeholders, the theory that best fits the healthcare industry is the threat of contagion distress costs (e.g., Perotti and Spier (1993) and Petersen and Rajan (1995)). Most insurers repeatedly transact with the same hospital. They have incentives to leave a hospital with sufficient surplus to safely meet its debt service obligations in order to protect future returns

[1] Related findings can be found both in the cash literature (see Klasa, Maxwell and Ortiz-Molina (2009)) and the earnings management literature (see DeAngelo and DeAngelo (1991)).

from the relationship. As a result, they may not push as hard for lower prices when they negotiate with a debt-laden hospital as when they negotiate with a less indebted hospital. I construct a simple model using this intuition to develop my hypotheses further in Section 3.[2]

To test whether debt affects bargaining outcomes, I use annual hospital balance sheet data and data on average annual Medicare reimbursement rates (i.e., prices) negotiated by hospitals for two medical procedures, colonoscopy without biopsy and lower gastrointestinal endoscopy. A number of doctors suggested that I focus on these procedures because, unlike almost all other procedures hospitals perform on Medicare patients, they have substantial variation in price, yet they are almost perfectly homogeneous in care across hospitals. The lack of variation in the nature of the procedure ensures that differences in prices are not driven by differences in quality or quantity of care. For other types of procedures, differences in the classification or type of care provided across hospitals could be systematically correlated with both reimbursement rates for the procedure and other hospital characteristics including capital structure, muddying inference. For example, one hospital may issue more debt and claim more severe emergency room visits, while another hospital may use less debt and be more conservative in classifying care.

I find that hospitals with higher leverage receive higher reimbursement rates. The economic magnitude of the relation is significant: A one standard deviation increase in a hospital's debt-to-assets ratio is associated with an 8.8% (3.6%) increase in the average margin it receives per colonoscopy (endoscopy). If endoscopies and colonoscopies are representative of average effects, then the corresponding increase over all procedures would be \$0.62-1.51 million in net income for the average hospital. These results are robust to controlling for a number of variables that might affect bargaining outcomes including hospital type, size, costs, market competition measures, and year fixed effects. I show similar results with hospital fixed effects, implying that time-invariant, unobserved hospital characteristics are not driving the result.

[2]The other common intuition from the literature is that debt commits a firm to pay part of the surplus created by successful negotiation to creditors in the form of interest payments. This commitment limits the amount of remaining surplus over which non-financial stakeholders can bargain. Theories based on this idea generally consider the capital structure choices of a downstream firm negotiating with an upstream firm or a firm bargaining with labor. As I discuss further in Section 3, such a theory may not fit a hospital bargaining with insurers well because the hospital is the upstream firm in this relationship.

While hospital fixed effects and a focus on the price of homogeneous procedures helps with identification, there remain a number of alternative explanations for the relation between reimbursement rates and leverage. For example, reverse causality may be a concern, as firms that are better at negotiating are likely to be more profitable and have the greatest need for debt tax shields (Tax Shield Hypothesis). Alternatively, hospitals may issue debt and use the proceeds to improve the quality of their facilities, enabling them to charge higher rates (Investment Hypothesis). Finally, "better run" hospitals may receive higher reimbursement rates and choose to operate with higher levels of debt to mitigate other agency concerns, e.g. excessive investment or managerial effort during negotiations (Corporate Governance Hypothesis).

In an effort to rule out these alternative explanations and further link the estimated price-leverage relation to the bargaining benefits of debt, I examine how the relation varies with a hospital's ex ante bargaining power. A hospital with relatively high bargaining power already extracts most of the surplus from its relationships with non-financial stakeholders, even without the pre-commitment effects of debt.[3] If debt allows a hospital to extract concessions from insurers, then the relation should be stronger when the hospital's bargaining power is weaker. Consistent with debt substituting for hospital bargaining power, I find that reimbursement rates are more sensitive to debt for hospitals with lower ex ante bargaining power, e.g. hospitals without a system affiliation, smaller hospitals, and those that are located in markets with more hospitals.

While this observation does not completely rule out alternative explanations for the relation between reimbursement rates and leverage, it is difficult to see why the alternative hypotheses would cause the magnitude of the relation to vary cross-sectionally with the bargaining proxies in the observed way. In particular, the Corporate Governance Hypothesis is difficult to reconcile with these results given that debt-induced effort incentives should not be stronger in stand-alone hospitals or smaller hospitals, nor in markets with more horizontal competition.

I exploit a unique feature of the healthcare industry to further address concerns that a demand for debt tax shields could be driving the relation between reimbursement rates and leverage. Some hospitals are for-profit, while others are nonprofit. Given that, nonprofit hospitals do not pay taxes,

[3] At the extreme, if the firm has 100% of the bargaining power, debt will not change the amount the firm receives.

any relation between reimbursement rates and leverage driven by tax incentives should not hold among nonprofit hospitals. Contrary to the Tax Shield Hypothesis, I find that the relation is more pronounced in nonprofit hospitals.

Under the Investment Hypothesis, the magnitude of the price-leverage relation should be more pronounced among hospitals with greater capital expenditures and more investment in property, plant and equipment. In practice, I find that the relation is similar in magnitude and persists among hospitals without capital expenditures or property, plant and equipment investment. In addition, the interaction of both variables and leverage is statistically insignificant, bolstering the evidence against the Investment Hypothesis.

In the final part of the analysis, I replicate the results of the extant literature by testing the relation between leverage and bargaining power. I find a negative relation between a hospital's debt-to-assets ratio and its bargaining power, as proxied by system affiliation, hospital size, and the number of hospitals in the local market. Overall, the evidence supports the argument that debt enhances a firm's bargaining outcomes with its non-financial stakeholders.

My paper relates to the strategic use of debt during bargaining with a firm's stakeholders. The bargaining benefits from debt are theorized in several settings including: during negotiations between suppliers and customers (Hennessy and Livdan (2009) and Chu (2012)); with labor (Bronars and Deere (1991) and Perotti and Spier (1993)); during merger negotiations (Israel (1991)); and in regulated industries bargaining with the government (Dasgupta and Nanda (1993)).

Empirical work has focused on the relation between firm leverage and bargaining power. Consistent with the trade-off theory of capital structure (See Harris and Raviv (1991)), firms tend to have more debt when bargaining with a stronger stakeholder unless the costs are sufficiently high. For example, Chu (2012) and Kale and Shahrur (2007) find that debt and supplier competition are substitutes. Further, Matsa (2010) shows that leverage is higher in firms from states with right-to-work laws. Examples of settings with sufficiently high costs include Schmalz (2015), who finds that small and financially constrained firms decrease their leverage and increase cash holdings after unionization. Similarly, Banerjee, Dasgupta and Kim (2008) find that customers in durable sectors

have lower leverage to encourage suppliers to commit more relationship-specific investments.

The only existing paper examining the impact of capital structure on negotiated outcomes is a study by Benmelech, Bergman, and Enriques (2012). They use variation in pension funding status for 12 airlines and find that financially distressed airlines receive greater pension concessions from labor than financially healthy airlines. My paper contributes to the literature on the bargaining benefits of debt along several dimensions. First, I provide the first evidence for the direct implication of the theory of the bargaining benefits of debt. Namely, bargaining outcomes for homogeneous goods are better for firms with more debt. Second, I provide evidence of the bargaining benefits of debt in the healthcare sector. Third, I show the bargaining benefits of debt for nonprofit firms.

My paper also contributes to the healthcare policy debate. Two major issues of utmost importance are the high cost of care and the lack of price transparency that contributes to these costs. There are a number of papers that examine the impact of market competition on prices in the healthcare industry.[4] Consistent with Nash bargaining, these papers find that reimbursement rates are decreasing in insurance market power and increasing in hospital market power. These results are consistent across a variety of settings (Dor, Grossman and Koroukian (2004), Brooks, Dor and Wong (1997), and Halberasma, Mikkers, Motchenkova, and Seinen (2011)). I contribute to this literature by linking the financial condition and structure of the hospital to its reimbursement rates from insurers. It is also worth mentioning that insurance companies have strict capital restrictions, which suggests they cannot employ the same tactics to increase their bargaining power. Policy makers may want to consider capital requirements on both hospitals and insurance companies to avoid this asymmetry.

2 Institutional Details

There are three corporate structures for U.S. hospitals: nonprofit, for-profit, and government. The majority are nonprofit who do not pay state or federal taxes, and rely on endowments and debt to raise capital. For-profit hospitals are investor-owned and pay taxes. Government hospitals

[4]See Gaynor and Voygt (2000) and Dranove and Satterthwait (2000) for surveys.

receive funding from state, local and federal governments, as well as by issuing debt. I exclude government hospitals in my analysis because of their alternative funding sources and different bargaining power dynamics. Nonprofit and government hospitals are legally required to provide free care to some patients. To pay for these patients, nonprofit hospitals have incentives to bargain aggressively with insured patients.

While the differences between for-profit and nonprofit hospitals are worth noting, there is an extensive literature that suggests that nonprofit hospitals act similarly to for-profit hospitals along a number of dimensions. After controlling for size and patient type, Wedig (1988) finds no difference in capital structure by corporate type. Bowman (2002) finds nonprofit hospitals borrow more when they receive endowments, consistent with optimizing leverage as if they follow the trade-off theory of capital structure. Similarly, Wedig et al (1996) find evidence that nonprofit hospitals issue debt until the point that benefits are offset by agency and bankruptcy risk. Duggan (2002) examines how hospitals respond to changes in their financial incentives in order to take advantage of state Medicare reimbursements and finds nonprofit hospitals respond similarly to for-profit hospitals.

The health insurance industry also contains three main organizational forms: private, employer, and government-sponsored. This paper focuses on Medicare, the government-sponsored program for the elderly and disabled. Medicare enrollees can choose either traditional Fee-for-service (FFS) Medicare or Medicare Advantage.[5] When patients have FFS Medicare, hospitals are reimbursed a fixed amount by the government for each of 7,000 services they provide. The Centers for Medicare and Medicaid uses an index to adjust these payments for geographic differences in cost of living. Hospitals have the option to request additional reimbursements from co-payments and supplemental insurance policies. These supplemental payments are the source of bargaining variation for FFS enrollees. Medicare Advantage patients are enrolled in managed care organizations who bargain with hospitals over the entire reimbursement amount independent of the FFS price. With a larger scope for negotiation, these payments vary more across hospitals. The data do not allow me to know the percentage of patients that are enrolled in FFS Medicare as opposed

[5]During my sample, approximately 75% of enrollees choose traditional FFS Medicare and 25% enroll in Medicare Advantage. The number of patients that choose Medicare Advantage has been increasing over time. FFS permits beneficiaries more flexibility in care, with greater cost sharing through higher deductibles and co-payments.

to Medicare Advantage on a hospital by hospital basis.

A primary determinant of reimbursement rates is the size of the hospital relative to the insurer/managed care organization.[6] Bigger hospitals (insurers) are able to demand higher (lower) reimbursement rates (Melnick et al. (1992), Brooks et al. (1997), and Halberasma et al. (2011)). Lewis and Pflum (2017) find that system membership is even more important than hospital size or market concentration in determining a hospital's bargaining power. Several other factors also affect a hospital's bargaining power, including: negotiation skill, hospital solvency, quality of care, mix of procedures, frequency of denied claims, and organizational status.

Contracts between hospitals and insurers can be very complex and typically include some combination of fee-for-service, per diem, or percentages of costs. Fee-for-service agreements are generally a percentage adjustment from a master reimbursement list, as opposed to separate negotiations per service. Negotiations occur every 1-3 years with provisions that allow both parties to renegotiate if there is a significant change in organization, such as a merger or a change in system affiliation.

I asked a number of healthcare professionals for procedure recommendations. The ideal procedures for this study are specific, frequently performed on Medicare enrollees, heterogeneous in costs, and homogeneous in care. The healthcare professionals that I talked with recommended colonoscopies and endoscopies because these procedures have all of the desired traits.

Medicare classifies the services that hospitals provide using ambulatory payment classifications (APCs). Some services are extremely specific, e.g. APC code 331 is a combined abdomen and pelvis catscan without contrast. Other services are denoted by levels, e.g. Levels 1-5 Type A or B Emergency visits. Hospitals can choose their own classification for services with levels as long as it is medically necessary and provides a reasonable classification based on the resources required. Colonoscopies without biopsy (APC code 158) and lower gastrointestinal endoscopies (APC Code 143) are two examples of specific procedures. These procedures are also frequently performed on Medicare enrollees. According to the CDC, there were 15 million endoscopies and colonoscopies

[6]Throughout the remainder of the paper, when I say insurance companies I am referring to both insurers and managed care organiziations.

performed in 2012 and these procedures accounted for 1.04% of Medicare Part B spending that year.

There is substantial heterogeneity in reported costs for most procedures. For example, CalPERS managed care organization reported that the cost of hip and knee replacements in 96 California hospitals ranged from $15,000 to $110,000 without substantial differences in quality. In response, they moved to "reference-based pricing" by setting a reference price of $30,000 for the standard joint replacement and requiring patients to pay for any excess costs. Subsequently, hospitals and device markets worked together to help hospitals qualify by price. Reference-based pricing is applied when price variation is surprisingly large for many providers of homogeneous quality. The procedures that I focus on are colonoscopies without biopsy (APC code 158) and lower gastrointestinal endoscopies (APC Code 143) because of their specificity, prevalence among Medicare patients, and subjection to reference-based pricing.

3 Empirical Predictions and Methodology

Firms have relationships with many non-financial stakeholders, including employees, customers, and suppliers. Each relationship creates surplus, which is divided between the firm and the stakeholder through bargaining over wages, prices, and/or other terms of trade. A firm increases its share of the surplus, and hence its total payoff from a relationship if it can commit itself to a tougher negotiating position prior to bargaining.

While there is more than one theory that explain how debt can strengthen a firm's bargaining position with its non-financial stakeholders, the theory that best fits the healthcare industry is the threat of contagion distress costs (e.g., Perotti and Spier (1993) and Petersen and Rajan (1995)). Most insurers repeatedly transact with the same hospital. They have incentives to leave a hospital with sufficient surplus to safely meet its debt service obligations in order to protect future returns from the relationship. As a result, insurers may not push as hard for lower prices when they negotiate with a debt-laden hospital as when they negotiate with a less indebted hospital.

There are at least three specific reasons why insurance companies might be concerned with a hospital's solvency. First, in markets with many hospitals, hospitals under distress are almost always acquired by other hospitals, and this consolidation reduces the bargaining power of insurance companies. Second, in markets with a limited number of hospitals, insurance companies have been known to reimburse hospitals at higher rates to keep healthcare in the community.[7] Third, insurers want to satisfy their customers, and distress costs may reduce the quality of care provided at a hospital. I formalize the contagion distress cost argument in a simple two period model.

A firm and stakeholder bargain over surplus that is normalized to 1 in each of two periods. For simplicity, there is no discounting. Without any frictions, the stakeholder will receive α each period and the firm will receive $1-\alpha$, which captures the percent of the surplus each party receives. Prior to the beginning of each period, the firm has an option to issue short-term debt due at the end of the period with cost c and probability of bankruptcy in the subsequent period of $1-p$ (in this case the relationship is terminated). The stakeholder observes the firm's debt issuance decision and has the option to forgo part of the surplus and receive γ ($< \alpha$) instead of α, which ensures the firm's solvency. I assume that $p\alpha > \gamma$, which means that the stakeholder will never forgo surplus in the second period and that it is not optimal for the firm to issue debt in the terminal period. This framework can be solved using backward induction.

In the second period, the firm will not issue debt by construction and the payoffs are α and $1-\alpha$ for the stakeholder and firm. If the firm chooses to issue debt in the first period, the decision to forgo will compare the guaranteed payoffs of $\gamma+\alpha$ with the risky payoff from bargaining aggressively $p(\alpha+\alpha)$. This implies that the stakeholder will forgo the surplus in period 1 if $p < \frac{\gamma+\alpha}{2\alpha}$. Intuitively, the stakeholder should be more willing to forgo the surplus if the probability of bankruptcy is sufficiently high and/or if the amount it has to forgo is sufficiently small. The firm will only issue debt if it knows that the stakeholder is willing to forgo the surplus and that the cost is smaller than the concession it will receive ($c < \alpha - \gamma$).

This framework can be extended to T periods with similar results. In the final period the firm will never issue debt. The decision in period T-1 is identical to the two period model because the

[7] See https://www.cbsnews.com/news/rural-hospitals-big-insurance-reimbursements-chestatee-regional

stakeholder is considering whether or not to give up part of the surplus for one period to ensure solvency in the final period. If it is willing to forgo part of the surplus in T-1, it will also be willing to give up the surplus in all prior periods because the potential lost surplus in bankruptcy is greater with more periods remaining. If the stakeholder is unwilling to forgo the surplus in period T-1, ($p > \frac{\gamma+\alpha}{2\alpha}$), it still may be willing to give up the surplus in an earlier period. Following backward induction, it would be willing to forgo the surplus in T-2 if $p < \frac{\gamma+2\alpha}{3\alpha}$. Again, once it is willing to forgo the surplus in this period, it will also be willing to do so in all prior periods. Therefore, the period (T-n) in which the stakeholder is first willing to forgo the surplus will have both of the following inequalities hold, $p > \frac{(n-1)\alpha+\gamma}{n\alpha}$ and $p < \frac{\gamma+n\alpha}{(n+1)\alpha}$. It follows that a firm which issues debt and receives concessions from its stakeholder will receive more of the surplus than a firm that does not issue debt.

Hypothesis 1 *Firms with more debt will receive better bargaining outcomes.*

The impact of debt on a firm's bargaining outcomes varies with its bargaining power in the absence of leverage. A firm with relatively high bargaining power in a relationship already obtains most of the surplus, even without the pre-commitment effects of debt. At the extreme, a monopolist firm already receives the entire surplus during negotiations and the use of debt conveys no additional bargaining benefits. I show this impact more formally using the model. The effect of α on the sensitivity of bargaining outcomes to debt can be seen by examining the partial derivative with respect to α of the difference of the payoffs for a firm with debt that receives concessions compared to a firm without debt. In the two period setup the second period payoffs are always the same so the difference comes from the payoffs in the first period, $(1-\gamma) - c - (1-\alpha)$.[8] The partial derivative with respect to α is positive, which implies that the sensitivity of bargaining outcomes to debt is increasing in the stakeholder's bargaining power.

Hypothesis 2 *The effect of debt on bargaining outcomes is stronger for firms with lower bargaining power.*

[8] In the T period framework this difference is going to depend on the period in which the stakeholder is first willing to forgo the surplus. Regardless, the partial derivative with respect to α is positive.

Although debt may be useful for committing a firm to a tough bargaining position, the use of debt also exposes a firm to a number of potential direct and indirect financial distress costs. Other bargaining models contrast this benefit with a variety of costs including: bankruptcy costs (Dasgupta and Nanda (1993)), moral hazard problems (Dasgupta and Sengupta (1993)), and underinvestment due to debt overhang (Perotti and Spier (1993) and Hennessey and Livdan (2009)). Given these costs, a firm logically only uses debt to gain bargaining power if the benefit is high or if these costs are sufficiently low.

The costs and benefits of debt are captured by the marginal period in which a firm finds it optimal to stop issuing debt. The marginal period is determined in the model by solving for n in $p > \frac{(n-1)\alpha+\gamma}{n\alpha}$. The solution is $n^* = \frac{\alpha-\gamma}{\alpha(1-p)}$. Taking the partial derivative with respect to α leaves $\frac{\gamma}{\alpha^2(1-p)}$, which is strictly positive. This result implies the number of periods in which firms use debt increases in their stakeholder's ex ante bargaining power. Thus, the final prediction that arises from the model suggests a relation between a firm's use of debt and its bargaining power.

Hypothesis 3 *Firms use more debt when they have lower ex ante bargaining power.*

Most of the literature on the bargaining benefits from debt focuses on the relation between leverage and bargaining power. Matsa (2010) uses exogenous variation in right-to-work laws to show that firms tend to have higher leverage when unions are stronger, i.e., when the bargaining benefits are greater. On the other hand, Schmalz (2015) and Simintzi, Vig and Volpin (2015) find that firms actually decrease their leverage in the face of unionization and greater employment protection.

The intuition that motivates most of the bargaining benefits of debt literature (e.g. Myers (1977), Hennessy and Livdan (2009)) is that debt commits a firm to pay part of the surplus created by successful negotiation to creditors in the form of interest payments. This commitment limits the amount of remaining surplus over which non-financial stakeholders can bargain. The intuition is demonstrated using a simple example. A firm and its stakeholder are bargaining over the division of \$100 of surplus at the end of the period. Before bargaining takes place, the firm borrows \$60 to

be repaid at the end of the period with, for simplicity, a 0% interest rate and pays the proceeds out to shareholders as a dividend. The maximum amount the stakeholder can receive is $40 and, under Nash bargaining with equal bargaining power, the stakeholder only receives $20 instead of the $50 they would receive absent the use of debt. Theories based on this idea generally consider the capital structure choices of a downstream firm negotiating with an upstream firm or a firm bargaining with labor. Such a theory may not fit a hospital bargaining with insurers well because the hospital is the upstream firm in this relationship.

4 Data

The primary data source is from American Hospital Directory (AHD), which compiles the Medicare Outpatient Limited Data Set and Cost Reports to summarize data on total annual revenue, reported costs, and number of procedures performed by APC. My analysis relies on data from AHD on endoscopies and colonoscopies for all hospitals from 2008 to 2012. I use this time frame in an effort to maintain a consistent regulatory environment.[9] The data includes annual profile, geographic, and balance sheet data that AHD assembles and cleans from the Centers for Medicare and Medicaid.

I supplement the AHD data with data from several sources. I use data from the Centers for Medicare and Medicaid including a regional index on adjustments to government payments, a list of teaching hospitals that are associated with a university, and additional balance sheet data for 2006-2011. U.S. News provides an annual list of the top hospitals in the country across specialties. I use two Metropolitan Statistical Area (MSA) measures, an age breakdown from the 2010 Census, and health insurance market competition from American Medical Association annual reports. I combine hospital specific data via unique Medicare identifiers and MSA data using metropolitan codes.

[9]On December 20, 2006 President Bush signed the Tax Relief and Health Care Act of 2006, which affected the physician portion of Medicare reimbursement rates and quality standards for hospital outpatient departments. These laws change hospital reimbursement rates and costs differently depending on the existing physician fee schedule and quality scores. Any impact from these laws should be incorporated in hospital balance sheets and negotiations by the end of 2007. The Affordable Care Act was signed in March 2010, but mandates on insurance exchanges began October 2013. These mandates changed the patient mix, insurance premiums and relative reimbursement rates.

There are approximately 6,000 hospitals in each of the five years, creating almost 30,000 hospital-year observations for the basic corporate and geographic variables. Of these, approximately 40% of the hospitals are general acute care facilities and have the necessary pricing data.[10] Finally, the insurance competition data is only available for the metropolitan areas, eliminating around 30% of the remaining observations. I require that hospitals perform Medicare colonoscopies or endoscopies, report necessary financial data, and are located in an MSA. The main sample contains a total of 1,837 general acute care hospitals with 7,797 hospital-year and 13,355 hospital-year-procedure observations. In secondary analysis, I contrast this sample with 5,987 observations outside MSAs.

Summary statistics can be found in Table 1 and variable definitions in Appendix A. All continuous variables are winsorized at the 1% and 99% level because some hospitals report near 0 assets yielding outlier leverage ratios.[11] Average endoscopy payments are $110 more than colonoscopy payments, while average endoscopy costs are only $19 more than colonoscopy costs. Taken together, margins are higher for endoscopies and this discrepancy is one reason that hospitals perform more endscopies while outsourcing some colonoscopies to clinics. Only 5,561 hospital-years contain colonoscopy data, and the average hospital in my sample performed 444 endoscopies and 89 colonoscopies.

The mean (median) leverage, defined as total long-term liabilities scaled by total assets, is 0.274 (0.305), which is similar to the Compustat universe. Of the hospitals in this sample, 75.6% are nonprofit and the remaining 24.4% are for-profit. Two common measures of hospital quality are whether the hospital is associated with a university (33.5%) and/or if the hospital makes one of U.S. News' top specialty lists (4.6%).

The first proxy for more bargaining power is if a hospital partners with other hospitals ($\mathbb{1}$*(System)*); 79.4% of hospitals in the sample are part of a hospital system. The second measure of bargaining power is the Herfindahl-Hirschman Index of insurance companies by metropolitan area

[10] Other hospitals either refuse Medicare patients or include specialty hospitals such as a cancer or psychiatric hospital.

[11] For example, one hospital-year observation with near zero assets reports leverage of 275,159. Winsorizing helps to eliminate potential errors in variables and ensure that regression results are not driven by outlier observations.

(*HHI Insurance*). A hospital's bargaining power is higher in markets with more insurers competing against one another. To make hospital bargaining power increasing in *HHI Insurance*, I multiply it by -1.

The third proxy for bargaining power is the relative size of the hospital (*Market Share*). The average market share is 22%; a tenth of hospitals have a market share greater than 50%, and another tenth less than 2%.[12] The fourth measure of bargaining power is based on the number of hospitals within a MSA. Vast differences exist in hospital markets, with some containing only a few hospitals and others containing many hospitals with smaller market shares. Hospitals have more bargaining power if there is less horizontal competition, as proxied by an indicator equal to one if the number of hospitals in the MSA is lower than the sample median ($\mathbb{1}$*(# of Hospitals<13)*).[13] The fifth measure of more bargaining power is if a hospital is located outside an MSA ($\mathbb{1}$*(Rural)*). A recent CBS article reports that insurance providers reimburse rural hospitals at higher rates in order to keep healthcare in these communities.[14]

Table 2 contains a pairwise correlation matrix for the bargaining power proxies, *Leverage* and *Payment*. The market-power measures have relatively low correlation coefficients ranging from -0.159 to 0.236 except *Market Share* and $\mathbb{1}$*(# of hospitals < 13)* with a correlation of 0.517. These low correlations are beneficial to the analysis for two reasons. First, the multiple proxies build confidence that I am able to capture the multidimensional aspects of a true bargaining power measure. Second, using five different proxies helps overcome the endogeneity concerns for any one proxy.

Table 3 examines how corporate status impacts the variables of interest. Summary statistics of for-profit and nonprofit hospitals are found in Panels A and B. On average, for-profit hospitals receive smaller payments for both endoscopies and colonoscopies, but they have substantially lower costs and higher margins. Only 57% of for-profit hospitals that perform Medicare endoscopies perform Medicare colonoscopies, while 76% of nonprofit hospitals do. Nonprofit hospitals have much

[12]This difference is not simply rural versus urban areas because all of the hospitals in my main sample are located in MSAs.

[13]Table B1 in the appendix shows similar results using other cutoffs.

[14]https://www.cbsnews.com/news/rural-hospitals-big-insurance-reimbursements-chestatee-regional/

higher average leverage: 0.348, as opposed to 0.042 in for-profit hospitals. For-profit hospitals are smaller, score worse on both quality measures, have less-volatile earnings, have higher net income, and are more likely to be a part of a hospital system.

Hospital leverage and market competition measures tend to be sticky in the short-term, which may diminish the power of within-hospital tests given the five-year sample. Table 4 examines the variation using a variance decomposition of *Leverage*, *Payment* for both colonoscopies and endoscopies, *Market Share*, *1(No System)* and *HHI Insurer* by group (hospital, MSA, year, and state). The results show how much of the variation for each variable is explained by the differences within a group as opposed to between groups. Endoscopy payments have much more variation than colonoscopy payments between and within all groups. The within-hospital variation for the bargaining measures is minimal, e.g. 5% of the variation for system status is within hospitals and 95% is between hospitals. Approximately one-third of the variation in leverage and colonoscopy payments and half of the endoscopy payment variation is within hospitals. Similarly, only 41% of the variation in colonoscopy payments is within-MSA. The lack of within-hospital and MSA variation limits the power of regressions with hospital and MSA fixed effects, especially for the bargaining power proxies. As a result, most of the analysis will rely on the cross-section.

5 Results

5.1 Benefits of Leverage

I test the first hypothesis that hospitals with more debt receive higher payments by estimating the following equation:

$$Payment_{i,t} = \alpha + \beta_1 Leverage_{i,t-1} + \beta_2 X_{i,t-1} + \gamma_t + \epsilon_{i,t-1} \tag{1}$$

Payment is the average annual reimbursement rate for colonoscopies and endoscopies. *Leverage*

is the book leverage of the hospital, $X_{i,t-1}$ contains a variety of potentially time-varying hospital and MSA controls, γ_t is a set of year dummy variables, and standard errors are clustered by hospital.[15] All right-hand side variables except *Cost* and *# of procedures* are lagged one year to help mitigate reverse causality concerns. Table 5 reports the results. Columns 1, 2 and 5 include a procedure fixed effect, while Columns 3 and 4 examine each procedure separately and Column 5 includes hospital fixed effects.

In all specifications, the coefficient on *Leverage* is positive and statistically significant. This shows that hospitals with more debt receive higher reimbursement rates. Using the coefficient estimates in the third and fourth columns with separate procedures, a hospital with a one standard deviation increase in leverage, ceteris paribus, receives \$4.71 (=.561*8.393) and \$3.28 (=.561*5.681) more per endoscopy and colonoscopy performed. Hospitals and insurance companies effectively bargain over surplus - i.e., the value created after taking into account the costs of performing a procedure (*Payment - Cost*). The average surplus is \$129.20 for endoscopies and \$37.50 for colonoscopies. Therefore, a one standard deviation increase in leverage is associated with 3.6-8.8% higher margins.

The average sample net income is \$17.2 million. If Medicare endoscopies and colonoscopies are representative of average effects, then the corresponding increase for all procedures would be \$0.62-1.51 million in net income for the average hospital. The estimates of the impact of leverage on reimbursement rates likely represent a lower bound on the average impact across all procedures for two reasons. First, unlike most other procedures, endoscopies and colonoscopies are sufficiently straightforward that they can be performed at outpatient clinics, who compete with hospitals. This competition and reference-based pricing drives prices down and limits the scope for bargaining in these procedures. Second, FFS Medicare bargaining variation is limited to supplemental payments, whereas hospitals bargain over the entire reimbursement rates for regular patients.

Returning to Table 5, Column 1 is a cross-sectional regression with *Geo Adj Factor* as the only additional control. Prices vary a lot by region, as seen by the large and significant coefficient

[15] Table B2 reports similar results with standard errors clustered at the hospital and year level. I don't use this as the main specification because there are only four residual degrees of freedom given the five year sample.

on *Geo Adj Factor*. If I include it as the only independent variable in this regression, it explains approximately 40% of the variation in payments. Columns 2-5 contain all additional controls. Hospital costs are a major factor in reimbursement rates and this importance is reflected by the coefficients on *Cost* which are positive and statistically significant. This hospital-specific variation is in addition to the regional variation captured that is by *Geo Adj Factor*. The number of procedures that a hospital performs is correlated with the reimbursement rates that it receives, as suggested by the positive coefficient on *# of Procedures*.

The coefficients on *Capital Expenditures* are positive and statistically significant for the endoscopy subsample and with hospital fixed effects, which suggests hospitals can improve reimbursement rates by investing in their facilities. The cross-sectional coefficients on *(-) HHI Insurer* and *Log(Beds)* are positive and statistically significant, consistent with the healthcare literature and bargaining models. All else being equal, hospital payments are increasing in size and lower when bargaining with more concentrated insurers.[16] The coefficients on a measure of quality, $\mathbb{1}$*(US News Ranked)*, are positive and generally statistically significant at conventional levels, implying hospitals that are ranked receive $5-10 more per procedure.

Given that I am focusing on two similar procedures, it is possible that differences in prices could be due to differences in demographics. In particular, colonoscopies and endoscopies are recommended for individuals starting at the age of 45, and hospitals in areas with a greater population of older individuals could receive greater payments per procedure because there is greater demand. The coefficients on *% Over 45* are positive and statistically significant, consistent with demographics impacting reimbursement rates.

As suggested by the Variance Decomposition, Column 5 shows weaker results when including hospital fixed effects. The coefficient on *Leverage* is approximately one-third the size of the cross-sectional coefficient from Column 2, yet continues to be statistically significant at the 10% level. The estimate for $\mathbb{1}$*(System)* is positive and significant at the 10% level, suggesting that it is a good measure of bargaining power.

[16] Table B3 presents similar results with insurer market concentration split by Health Maintenance Organizations and Preferred Provider Organizations separately. The American Medical Association coverage of the two types of insurance has increased over time, but is still missing in 30% of the hospital-years.

5.2 Bargaining Power and Leverage

There are non-bargaining reasons why reimbursement rates and hospital leverage may be correlated. For example, profitable hospitals may operate with more debt to take advantage of tax-shields (Tax Shield Hypothesis). Alternatively, hospitals may issue debt and use the proceeds to improve the quality of their facilities, enabling them to charge higher rates (Investment Hypothesis). Finally, better-run hospitals may receive higher reimbursement rates and choose to operate with higher levels of debt to mitigate other agency concerns, e.g. excessive investment or managerial effort during negotiations á la Jensen (1986) (Corporate Governance Hypothesis). To provide evidence that this result is due to the bargaining benefits of debt as opposed to these other possibilities, I turn to the second hypothesis that the *Payment-Leverage* relation is stronger for hospitals with less bargaining power. To test this hypothesis, I interact five bargaining power proxies with *Leverage* in the following equation:

$$\begin{aligned} Payment_{i,t} = \alpha + \beta_1 Leverage_{i,t-1} + \beta_2 BargainingPower_{i,t-1} \\ + \beta_3 Leverage \times BargainingPower_{i,t-1} + \beta_4 X_{i,t-1} + \gamma_t + \epsilon_{i,t-1} \end{aligned} \quad (2)$$

If, as hypothesized, debt is a less important factor in negotiations when bargaining power is high, then β_3 should be negative and statistically significant. All specifications mirror Column 2 from Table 5 with year fixed effects, hospital clustered standard errors, and additional controls omitted for brevity. Table 6 contains the results for each of the five proxies.

Four of the five bargaining power interactions are negative and statistically significant, providing compelling evidence for the second hypothesis. Specifically, the *Payment-Leverage* relation is stronger for stand-alone hospitals, smaller hospitals, and hospitals with more horizontal competition, either within MSAs or comparing rural and urban areas. The coefficients on *Leverage* remain positive, similar in magnitude, and statistically significant in all five models.

While these results do not completely rule out alternative explanations for the relation between leverage and reimbursement rates, it is difficult to see why the alternative hypotheses would cause the strength of the relation to vary cross-sectionally with the bargaining proxies in the observed way. In particular, the Corporate Governance Hypothesis is difficult to reconcile with these results given that debt induced effort incentives should exist for all hospitals, as opposed to primarily in markets with more competition, stand-alone hospitals, and smaller hospitals.

One potential concern about drawing a causal bargaining conclusion from the *Payment-Leverage* relation arises from tax-based motives for the use of debt (Tax Shield Hypothesis). Taxes are among the most important determinants of capital structure decisions. Tax motives could drive a positive relation between leverage and payment under a reverse causality story because, holding costs and volume fixed, higher prices imply higher income, increasing the benefits of debt tax shields. I mitigate this concern by exploiting a unique feature of the healthcare industry: nonprofit hospitals who are not subject to state or federal taxes. Therefore, if tax shield incentives drive the observed *Payment-Leverage*, it should not be observed among nonprofit hospitals.

Table 7 reports the results from regressions where I split hospitals by corporate status (Columns 1 and 2) and a pooled regression with $\mathbb{1}$*(Profit)* and *Leverage* interacted (Column 3). These regressions mirror past specifications with year fixed effects, hospital clustered standard errors, and controls omitted for brevity. The coefficient on *Leverage* is significant in all specifications, but is six times larger in nonprofit hospitals, and the interaction between $\mathbb{1}$*(Profit)* and *Leverage* is negative and statistically significant. These results suggest that this relation is not driven by the Tax Shield Hypothesis. The weaker relation in for-profit hospitals might be because they can issue equity to reduce leverage making the contagion distress argument less credible.

Another plausible story is the Investment Hypothesis, whereby hospitals issue debt and use the proceeds to improve their facilities, leading to a relation between *Payment* and *Leverage*. Under this scenario, one would expect the relation to be more pronounced among hospitals that invest in their facilities. I use capital expenditures and investment in property, plant and equipment to test this hypothesis. These two variables each capture a distinct aspect of investment because they only have a pairwise correlation of 0.05.

Columns 1 and 4 of Table 8 examine the *Payment-Leverage* relation among hospitals without capital expenditures and property, plant and equipment investment, while Columns 2 and 5 repeats the analysis on hospitals with positive capital expenditures and property, plant and equipment investment. Columns 3 and 6 use the entire sample and includes the interaction of leverage with each measure. The coefficients on *Leverage* remain similar in magnitude and statistically significant in all regressions, and the interactions of leverage with capital expenditures and property, plant and equipment are insignificant. These results suggest that the *Payment-Leverage* relation is not driven by the Investment Hypothesis. While these tests do not rule out the validity of these alternative hypotheses, the preponderance of evidence suggests the existence of the bargaining benefits of debt.

5.3 Predicting the Use of Leverage

Most of the literature on the bargaining benefits from debt focuses on the relation between leverage and bargaining power. I examine this relation in this setting, i.e. whether hospitals with lower bargaining power operate with higher leverage. I test the third hypothesis by estimating the following equation using the same five measures of bargaining power I used to test the second hypothesis:

$$Leverage_{i,t} = \alpha + \beta_1 BargainingPower_{i,t} + \beta_2 X_{i,t} + \gamma_t + \epsilon_{i,t} \tag{3}$$

If hospitals use less debt when bargaining power is high as I predict, then β_1 should be negative and statistically significant. Each bargaining proxy is estimated separately in Columns 1-5 of Table 9 and then pooled together in Column 6. All specifications include year fixed effects and standard errors clustered at the hospital level.

Mirroring Table 6, four out of five bargaining proxy coefficients are negative and statistically significant. Using the coefficients from the columns with each proxy included separately, I find that, ceteris paribus, hospitals in a system have 0.088 lower leverage, hospitals in MSAs with a below-median number of hospitals have 0.06 lower leverage, rural hospitals have 0.07 lower leverage,

and a one standard deviation increase in a hospital's market share would decrease leverage by .039 (=0.224x-0.176) from a mean of 0.274. The coefficients from the control variables suggest that hospitals that are for-profit and those with higher income tend to have lower leverage.

6 Conclusion

In this paper, I use the healthcare industry as a novel setting to test the bargaining benefits from debt. The existing empirical evidence relies on indirect evidence that leverage is higher when negotiating with stakeholders that have more bargaining power. There is a lack of direct evidence that leverage affects negotiation outcomes because negotiation outcomes are rarely observed, especially for homogeneous goods in a broad cross-section of firms. I find that hospitals with more leverage receive higher reimbursement rates for two homogeneous procedures. This finding provides direct evidence that firms receive better bargaining outcomes when they have higher leverage.

The bargaining benefits of debt are predicted to be greatest when a firm otherwise lacks bargaining power. Consistent with debt substituting for hospital bargaining power, I find that reimbursement rates are more sensitive to debt for hospitals without a system affiliation, smaller hospitals, and hospitals in markets with more competition. I show that bargaining benefits from debt exist for nonprofit hospitals and hospitals without capital expenditures or investments in property, plant and equipment, which helps to alleviate concerns that the relation between bargaining outcomes and leverage is completely driven by tax shields or borrowing for investment. Lastly, I find a hospital's leverage is negatively related to its bargaining power. In summary, this paper provides direct evidence of the bargaining benefits of debt during negotiations with a firm's non-financial stakeholders.

References

Banerjee, Shantanu, Sudipto Dasgupta, and Yungsan Kim, 2008, Buyer–supplier relationships and the stakeholder theory of capital structure, *the Journal of Finance* 63, 2507–2552.

Benmelech, Efraim, Nittai K. Bergman, and Ricardo J. Enriquez, 2012, Negotiating with labor under financial distress, *Review of Corporate Finance Studies* 1, 28–67.

Bowman, Woods, 2002, The uniqueness of nonprofit finance and the decision to borrow, *Nonprofit Management and Leadership* 12, 293–311.

Bronars, Stephen G. and Donald R. Deere, 1991, The threat of unionization, the use of debt, and the preservation of shareholder wealth, *The Quarterly Journal of Economics* 106, 231–254.

Brooks, John M., Avi Dor, and Herbert S. Wong, 1997, Hospital-insurer bargaining: An empirical investigation of appendectomy pricing, *Journal of Health Economics* 16, 417–434.

Chu, Yongqiang, 2012, Optimal capital structure, bargaining, and the supplier market structure, *Journal of Financial Economics* 106, 411–426.

Dasgupta, Sudipto and Vikram Nanda, 1993, Bargaining and brinksmanship: Capital structure choice by regulated firms, *International Journal of Industrial Organization* 11, 475–497.

Dasgupta, Sudipto and Kunal Sengupta, 1993, Sunk investment, bargaining and choice of capital structure, *International Economic Review* 34, 203–220.

DeAngelo, Harry and Linda DeAngelo, 1991, Union negotiations and corporate policy: A study of labor concessions in the domestic steel industry during the 1980s, *Journal of Financial Economics* 30, 3–43.

Dor, Avi, Michael Grossman, and Siran M. Koroukian, 2004, Hospital transaction prices and managed-care discounting for selected medical technologies, *American Economic Review* 94, 352–356.

Dranove, David and Mark A. Satterthwaite, 2000, The industrial organization of health care markets, *Handbook of Health Economics* 1, 1093–1139.

Duggan, Mark, 2002, Hospital market structure and the behavior of not-for-profit hospitals, *RAND Journal of Economics* 33, 433–446.

Gaynor, Martin and William B. Vogt, 2000, Antitrust and competition in health care markets, *Handbook of Health Economics* 1, 1405–1487.

Halbersma, RS, MC Mikkers, Evgenia Motchenkova, and I. Seinen, 2011, Market structure and hospital-insurer bargaining in the Netherlands, *The European Journal of Health Economics* 12, 589–603.

Harris, Milton and Artur Raviv, 1991, The theory of capital structure, *the Journal of Finance* 46, 297–355.

Hennessy, Christopher A. and Dmitry Livdan, 2009, Debt, bargaining, and credibility in firm-supplier relationships, *Journal of Financial Economics* 93, 382–399.

Israel, Ronen, 1991, Capital structure and the market for corporate control: The defensive role of debt financing, *The Journal of Finance* 46, 1391–1409.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.

Kale, Jayant R and Husayn Shahrur, 2007, Corporate capital structure and the characteristics of suppliers and customers, *Journal of Financial Economics* 83, 321–365.

Klasa, Sandy, William F. Maxwell, and Hernán Ortiz-Molina, 2009, The strategic use of corporate cash holdings in collective bargaining with labor unions, *Journal of Financial Economics* 92, 421–442.

Lewis, Matthew S and Kevin E Pflum, 2017, Hospital systems and bargaining power: evidence from out-of-market acquisitions, *The RAND Journal of Economics* 48, 579–610.

Matsa, David A., 2010, Capital structure as a strategic variable: Evidence from collective bargaining, *The Journal of Finance* 65, 1197–1232.

Melnick, Glenn A., Jack Zwanziger, Anil Bamezai, and Robert Pattison, 1992, The effects of market structure and bargaining position on hospital prices, *Journal of Health Economics* 11, 217–233.

Myers, Brett W and Alessio Saretto, 2015, Does capital structure affect the behavior of nonfinancial stakeholders? an empirical investigation into leverage and union strikes, *Management Science* 62, 3235–3253.

Myers, Stewart C., 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147–175.

Perotti, Enrico C. and Kathryn E. Spier, 1993, Capital structure as a bargaining tool: The role of leverage in contract renegotiation, *The American Economic Review* 83, 1131–1141.

Petersen, Mitchell A. and Raghuram G. Rajan, 1995, The effect of credit market competition on lending relationships, *The Quarterly Journal of Economics* 110, 407–443.

Schmalz, Martin C, 2018, Unionization, cash, and leverage Working Paper, University of Michigan.

Simintzi, Elena, Vikrant Vig, and Paolo Volpin, 2015, Labor protection and leverage, *Review of Financial Studies* 561–591.

Titman, Sheridan, 1984, The effect of capital structure on a firm's liquidation decision, *Journal of Financial Economics* 13, 137–151.

Wedig, Gerard J., 1988, Health status and the demand for health: results on price elasticities, *Journal of Health Economics* 7, 151–163.

Wedig, Gerard J., Mahmud Hassan, and Michael A. Morrisey, 1996, Tax exempt debt and the capital structure of nonprofit organizations: An application to hospitals, *The Journal of Finance* 51, 1247–1283.

Yi, Irene, 2016, Slashing liquidity through asset purchases: Evidence from collective bargaining Working Paper.

Table 1: Summary Statistics

This table contains the aggregate summary statistics. *Payment*, *Cost* and *Units* are from 2008-12 and the remaining variables are from 2007-2011. Variable definitions can be found in Appendix A. All continuous variables are winsorized at the 1% and 99% levels.

VARIABLES	(1) N	(2) mean	(3) sd	(4) p50	(5) p10	(6) p90
Endoscopy Payment	7,794	628.9	92.27	624.8	511.8	752.3
Endoscopy Cost	7,794	499.7	239.2	448.8	252.7	805.4
Endoscopy N	7,794	443.5	468.1	298	62	999
Colonoscopy Payment	5,561	518.5	59.48	511.8	448.6	599.6
Colonoscopy Cost	5,561	481.0	237.8	429.6	236.9	793.0
Colonoscopy N	5,561	89.14	111.5	51	16	201
Leverage	7,797	0.274	0.561	0.305	0	0.747
Net Income Volatility	7,797	0.062	0.198	0.041	-0.070	0.220
Net Income	7,797	16.82	21.47	9.153	2.488	37.93
Log(Beds)	7,797	5.333	0.852	5.416	4.234	6.317
Geo Adj Factor	7,797	0.912	0.070	0.896	0.841	1.031
Capital Expenditures	7,797	0.183	92.31	3.924	-47.76	62.17
PP&E	7,797	0.457	0.474	0.341	0	1.070
$\mathbb{1}$(Profit)	7,797	0.244	0.429	0	0	1
$\mathbb{1}$(US News Ranked)	7,797	0.046	0.208	0	0	0
$\mathbb{1}$(Teaching)	7,797	0.335	0.472	0	0	1
(-) HHI Insurer	7,797	0.313	0.125	0.277	0.194	0.466
$\mathbb{1}$(System)	7,797	0.794	0.404	1	0	1
Market Share	7,797	0.221	0.224	0.156	0.013	0.518

Table 2: Correlations

This table contains a cross-correlation matrix for *Payment*, *Leverage*, and the five bargaining power measures: *1(System)*, *(-) HHI Insurer*, *Market Share*, *1(Rural)*, and $\mathbb{1}$*(# of Hospitals<13)*. All variable definitions can be found in Appendix A.

	Payment	Leverage	$\mathbb{1}$(System)	HHI Insurer	Market Share	$\mathbb{1}$(Rural)	$\mathbb{1}$(# of Hospitals $<$ 13)
Payment	1						
Leverage	0.079	1					
$\mathbb{1}$(System)	-0.016	-0.104	1				
(-) HHI Insurer	0.236	0.006	0.015	1			
Market Share	-0.119	-0.065	0.202	-0.159	1		
$\mathbb{1}$(Rural)	-0.024	0.006	-0.022	0.032	0.03	1	
$\mathbb{1}$(# of Hospitals $<$ 13)	0.181	0.076	-0.056	0.204	0.517	-0.030	1

Table 3: Summary Statistics by Corporate Type

This table contains the summary statistics for the relevant variables by corporate type. Panel A contains summary statistics within for-profit hospitals and Panel B for nonprofit hospitals. Variable definitions can be found in Appendix A. All continuous variables are winsorized at the 1% and 99% level.

VARIABLES	(1) N	(2) mean	(3) sd	(4) p50	(5) p10	(6) p90
Endoscopy Payment	1,902	608.4	83.97	608.1	502.7	714.9
Endoscopy Cost	1,902	431.7	207.9	395.6	211.0	688.5
Endoscopy N	1,902	282.4	328.7	172	38	646
Colonoscopy Payment	1,082	499.2	53.59	496.4	436.3	564.2
Colonoscopy Cost	1,082	392.8	194.9	359.1	189.8	625.6
Colonoscopy N	1,082	52.81	62.42	32	14	111
Leverage	1,902	0.042	0.962	0.094	-1.399	0.993
Net Income	1,902	0.128	0.283	0.093	-0.109	0.446
Net Income Volatility	1,902	10.22	13.65	6.576	1.740	20.84
Log(Beds)	1,902	4.932	0.977	5.165	3.526	5.966
Geo Adj Factor	1,902	0.891	0.059	0.880	0.837	0.989
Capital Expenditures	1,902	1.110	43.73	1.905	-10.56	20.66
PP&E	1,902	0.441	0.443	0.365	0	1.023
𝟙(US News Ranked)	1,902	0.008	0.091	0	0	0
𝟙(Teaching)	1,902	0.171	0.376	0	0	1
(-) HHI Insurer	1,902	-0.317	-0.142	-0.275	-0.194	-0.486
𝟙(System)	1,902	0.857	0.350	1	0	1
Market Share	1,902	0.169	0.168	0.126	0.00871	0.371

VARIABLES	(1) N	(2) mean	(3) sd	(4) p50	(5) p10	(6) p90
Endoscopy Payment	5,892	635.5	93.85	631.6	515.0	764.3
Endoscopy Cost	5,892	521.6	244.4	466.8	273.8	843.3
Endoscopy N	5,892	495.5	493.9	348	79	1090
Colonoscopy Payment	4,479	523.2	59.90	516.3	452.4	606.4
Colonoscopy Cost	4,479	502.3	242.3	448.1	254.0	826
Colonoscopy N	4,479	97.92	118.8	58	17	217
Leverage	5,895	0.348	0.308	0.326	0.007	0.690
Net Income	5,895	0.040	0.156	0.035	-0.061	0.142
Net Income Volatility	5,895	18.95	23.04	11.23	2.748	45.04
Log(Beds)	5,895	5.463	0.764	5.509	4.431	6.405
Geo Adj Factor	5,895	0.919	0.072	0.898	0.851	1.031
Capital Expenditures	5,895	-0.116	103.2	5.893	-70.77	76.12
PP&E	5,895	0.463	0.483	0.332	0	1.086
𝟙(US News Ranked)	5,895	0.058	0.233	0	0	0
𝟙(Teaching)	5,895	0.388	0.487	0	0	1
(-) HHI Insurer	5,895	-0.312	-0.119	-0.280	-0.194	-0.461
𝟙(System)	5,895	0.774	0.418	0	1	1
Market Share	5,895	0.237	0.237	0.169	0.015	0.547

Table 4: Variance Decomposition

This table contains the Variance Decomposition of *Payment* for Colonoscopies and Endoscopies, *Leverage*, *Market Share*, *(-) HHI Insurer* and $\mathbb{1}$*(System)*. The first two rows show the overall mean and standard deviation while the subsequent rows split the variation by between group and within group. The groups are Hospitals, Metropolitan Statistical Areas, Years, and States.

Variable	Colon Pay	Endo Pay	Leverage	Market Share	(-) HHI Insurer	$\mathbb{1}$(System)
Overall Mean	518.5	628.9	0.274	0.221	-0.313	0.794
Overall S.D.	59.5	92.3	0.561	0.224	0.125	0.404
Between Hospital	54.3	65.5	0.521	0.223	0.115	0.406
Within Hospital	28.4	66.9	0.233	0.031	0.051	0.020
Between MSA	48.9	60.5	0.283	0.265	0.137	0.306
Within MSA	34.8	69.9	0.508	0.12	0.051	0.355
Between Year	26.7	72.4	0.049	0.005	0.024	0.009
Within Year	54.7	66.9	0.560	0.224	0.123	0.404
Between State	40.6	50.8	0.202	0.105	0.099	0.156
Within State	42.0	76.1	0.536	0.212	0.090	0.393
N	5561	7794	7797	7797	7797	7797

Table 5: Payment on Leverage

This table contains regressions with *Payment* as the dependent variable with *Leverage* as the independent variables of interest. The independent variables are lagged one year with the exception of *Cost* and *# of procedures* which are contemporaneous. Each specification contains year fixed effects, *Geo Adj Factor* and standard errors clustered at the hospital level. Column 1 is a cross-sectional regression with procedure fixed effects. Column 2 adds all other controls. Columns 3 and 4 separately examine endoscopies and colonoscopies. Column 5 includes hospital fixed effects. All variable definitions are in Appendix A. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment	(4) Payment	(5) Payment
Leverage	9.729***	7.567***	8.393***	5.681***	1.986*
	(6.87)	(5.36)	(5.64)	(3.26)	(1.70)
𝟙(Colonoscopy)	-111.655***	-108.399***			-110.282***
	(-126.50)	(-86.32)			(-96.40)
Geo Adj Factor	557.937***	512.196***	555.512***	444.659***	
	(36.68)	(32.38)	(32.31)	(26.14)	
Cost		0.038***	0.037***	0.040***	0.003
		(8.22)	(7.26)	(8.09)	(1.01)
Capital Expenditures		0.004	0.021***	-0.001	0.011***
		(0.90)	(3.54)	(-0.20)	(3.61)
(-) HHI Insurer		56.462***	69.333***	46.563***	-7.086
		(8.10)	(9.25)	(6.12)	(-1.16)
# of Procedures		0.007***	0.008***	0.013*	0.006***
		(3.38)	(3.82)	(1.74)	(3.20)
𝟙(Profit)		-2.557	-2.598	-1.557	7.273
		(-1.26)	(-1.15)	(-0.66)	(1.61)
Log(Beds)		3.409***	3.914***	2.096	-1.759
		(2.65)	(2.84)	(1.47)	(-0.75)
Net Income		0.444	2.294	-0.041	-1.994
		(0.11)	(0.56)	(-0.01)	(-0.89)
Net Income Volatility		-0.017	-0.037	-0.002	
		(-0.29)	(-0.58)	(-0.04)	
𝟙(System)		0.447	0.220	0.361	13.939*
		(0.19)	(0.09)	(0.14)	(1.72)
𝟙(Teaching)		1.737	1.233	2.749	
		(0.79)	(0.51)	(1.16)	
% Over 45		0.727***	0.706***	0.747***	
		(4.02)	(3.65)	(3.61)	
𝟙(US News Ranked)		8.316*	10.293**	5.444	-3.107
		(1.90)	(2.01)	(1.28)	(-1.20)
Observations	13,355	13,355	7,794	5,561	13,329
R-squared	0.708	0.728	0.714	0.524	0.887
Firm Fixed Effects	No	No	No	No	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Endoscopy	Colonoscopy	Full

Table 6
Leverage Interacted with Bargaining Power Proxies

This table includes a series of cross-sectional regressions with *Payment* as the dependent variable and *Leverage* interacted with five bargaining power proxies: 𝟙*(System)*, *(-) HHI Insurer*, *Market Share*, 𝟙*(# Hospitals<13)*, and 𝟙*(Rural)*. This table includes year fixed effects, standard errors are clustered at the hospital level and the same controls as Table 5 which are omitted for brevity. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment	(4) Payment	(5) Payment
Leverage	6.549***	10.971***	9.525***	3.234*	8.386***
	(4.65)	(3.24)	(4.14)	(1.93)	(6.04)
𝟙(System)	6.927**	0.456	5.464**	-1.246	-0.144
	(2.12)	(0.19)	(2.35)	(-0.57)	(-0.08)
(-) HHI Insurer	56.165***	53.216***	41.761***	34.563***	
	(8.07)	(7.60)	(6.61)	(5.61)	
Market Share			-43.509***		
			(-9.49)		
𝟙(# Hospitals < 13)				-25.517***	
				(-14.72)	
𝟙(Rural)					-4.952***
					(-3.04)
𝟙(System) x Leverage	-16.957**				
	(-2.27)				
(-) HHI Insurer x Leverage		10.788			
		(1.21)			
Market Share x Leverage			-13.374*		
			(-1.72)		
𝟙(# Hospitals<13) x Leverage				-4.893**	
				(-2.10)	
𝟙(Rural) x Leverage					-12.405***
					(-5.12)
Observations	13,355	13,355	13,355	13,355	19,542
R-squared	0.729	0.728	0.739	0.746	0.730
Additional Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	No
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Period	Full	Full	Full	Full	Full

Table 7: Leverage Interacted with Corporate Status

This table contains cross-section regressions with *Payment* as the dependent variable. Column 1 includes nonprofit hospitals, Column 2 includes for-profit hospitals and Column 3 interacts *Leverage* with $\mathbb{1}$*(Profit)* in the full sample. Variable definitions can be found in Appendix A. All regressions include year fixed effects, controls omitted for brevity and standard errors clustered at the hospital level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment
Leverage	18.794***	3.039**	19.479***
	(5.49)	(2.24)	(5.74)
1(Profit)			1.316
			(0.60)
1(Profit) x Leverage			-16.405***
			(-4.66)
Observations	10,371	2,984	13,355
R-squared	0.721	0.766	0.730
Additional Controls	Yes	Yes	Yes
Firm Fixed Effects	No	No	No
Year Fixed Effect	Yes	Yes	Yes
Sample	Nonprofit	Profit	Full

Table 8: Leverage Interacted with Capital Expenditures and PP&E

This table contains cross-section regressions with *Payment* as the dependent variable. Columns 1 and 4 focus on hospitals with non-positive Capital Expenditures and PP&E. Columns 2 and 5 focus on hospitals with positive Capital Expenditures and PP&E. Columns 3 interact Leverage with Capital Expenditures and PP&E in the full sample. Variable definitions are in Appendix A. All regressions include year fixed effects, controls omitted for brevity and standard errors clustered at the hospital level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment	(4) Payment	(5) Payment	(6) Payment
Leverage	5.195***	8.396***	7.535***	7.004***	7.600***	7.974***
	(2.62)	(5.22)	(5.35)	(2.94)	(5.33)	(4.86)
Cap Ex	-0.006	0.023	-0.002			
	(-0.59)	(1.18)	(-0.33)			
Cap Ex x Leverage			0.021			
			(1.40)			
PP&E				71.880	-2.308	-2.393*
				(0.51)	(-1.21)	(-1.65)
PP&E x Leverage						-0.783
						(-0.60)
Observations	3,473	9,882	13,355	2,495	10,860	13,355
R-squared	0.710	0.735	0.728	0.736	0.724	0.728
Firm Fixed Effects	No	No	No	No	No	No
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Sample	(-/0) Cap Ex	(+) Cap Ex	Full	(-/0) PP&E	(+) PP&E	Full

Table 9: Leverage on Bargaining Power

This table contains regressions with *Leverage* as the dependent variable. Columns 1-5 include 𝟙*(System)*, *(-) HHI Insurer*, *Market Share*, 𝟙*(# Hospitals<13)*, and 𝟙*(Rural)*. Column 6 includes the first four proxies together. All regressions include year fixed effects and standard errors clustered at the hospital level. Variable definitions can be found in Appendix A. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Leverage	(2) Leverage	(3) Leverage	(4) Leverage	(5) Leverage	(6) Leverage
𝟙(System)	-0.088***					-0.079***
	(-4.63)					(-4.08)
(-) HHI Insurer		0.039				-0.021
		(0.50)				(-0.27)
Market Share			-0.176***			-0.100*
			(-4.62)			(-1.94)
𝟙(# Hospitals<13)				-0.060***		-0.041
				(-2.86)		(-1.56)
𝟙(Rural)					-0.070***	
					(-3.94)	
Capital Expenditures	0.000	0.000	0.000	0.000	0.000*	0.000
	(0.84)	(0.75)	(0.70)	(0.83)	(1.92)	(0.86)
𝟙(Profit)	-0.214***	-0.222***	-0.236***	-0.224***	-0.206***	-0.224***
	(-5.98)	(-6.15)	(-6.46)	(-6.25)	(-7.49)	(-6.10)
Net Income	-1.024***	-1.031***	-1.014***	-1.020***	-0.958***	-1.008***
	(-10.69)	(-10.66)	(-10.53)	(-10.53)	(-11.84)	(-10.55)
𝟙(Teaching)	-0.028	-0.035	-0.032	-0.037	-0.017	-0.028
	(-1.27)	(-1.55)	(-1.42)	(-1.64)	(-0.91)	(-1.27)
𝟙(US News Ranked)	0.020	0.012	0.001	-0.005	0.025	0.001
	(0.76)	(0.46)	(0.05)	(-0.17)	(0.99)	(0.05)
Observations	7,797	7,797	7,797	7,797	11,435	7,797
R-squared	0.191	0.188	0.192	0.190	0.176	0.196
Firm Fixed Effects	No	No	No	No	No	No
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full	Full	Full

Appendices

A Variable Definitions

Table A1: Variable Definitions
This table contains the definitions and descriptions of the variables used in the paper.

Variable	Definition
Payment	The average payment the hospital received for the APC code from patients who are enrolled in Medicare including the base payment rate, co-payments, deductibles, and third-party insurers
Cost	Hospital's reported average cost for the APC code
# of Procedures	Number of procedures per APC code performed at the hospital that year
Leverage	Total long-term liabilities scaled by total assets
Log(Beds)	Log of the number of staffed beds
$\mathbb{1}$(Profit)	Indicator equal to one if the hospital's corporate status is for-profit and 0 if it is a nonprofit
Geo Adj Factor	Centers for Medicare and Medicaid index that adjusts FFS reimbursement rates for the variation in costs of care arising from cost of living between different states
$\mathbb{1}$(Teaching)	Indicator variable equal to one if the hospital is associated with a university
$\mathbb{1}$(US News Ranked)	Indicator equal to one if U.S. News reports the hospital as one of the top hospitals in a specialty for that year
Capital Expenditures	Change in assets plus depreciation in millions
PP&E	Sum of land improvement, building costs, and fixed equipment from Centers for Medicare and Medicaid Cost Reports Worksheet G, minus each corresponding depreciation scaled by total assets
Net Income	Net income scaled by total assets
Net Income Volatility	Standard deviation of annual net income in millions of dollars across the five-year sample period
% Over 45	Percent of the population over 45 within the MSA as of the 2010 U.S. census
$\mathbb{1}$(System)	Indicator equal to one if hospital has a partnership with other hospitals
Market Share	# of staffed beds scaled by the total # of staffed beds within the MSA

(-) HHI Insurer	MSA-level Herfindahl-Hirschman Index of insurance companies as reported in annual AMA reports multiplied by -1
$\mathbb{1}$(# of Hospitals<13)	Indicator equal to one if there are less than 13 hospitals in the MSA
$\mathbb{1}$(Rural)	Indicator equal to one if the hospital is located outside of a MSA

B Supplementary Tables

Table B1: Different Concentration Cutoffs

This table contains regressions with *Payment* as the dependent variable with *Leverage* as the independent variables of interest. The independent variables are lagged one year with the exception of *Cost* and *# of procedures* which are contemporaneous. All columns contain year fixed effects. Columns 1, 2, 3, and 4 include an indicator and the interaction of the indicator with Leverage for markets with 5, 10, 15, and 20 or fewer hospitals. All variable definitions are in Appendix A. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment	(4) Payment
Leverage	8.409***	8.348***	8.481***	8.939***
	(5.36)	(4.85)	(4.35)	(3.79)
1(# Hospitals<=5)	-20.249***			
	(-11.18)			
1(# Hospitals<=5) x Leverage	-5.041*			
	(-1.95)			
1(# Hospitals<=10)		-25.178***		
		(-15.07)		
1(# Hospitals<=10) x Leverage		-6.152***		
		(-2.65)		
1(# Hospitals<=15)			-25.634***	
			(-14.67)	
1(# Hospitals<=15) x Leverage			-4.864**	
			(-2.05)	
1(# Hospitals<=20)				-27.585***
				(-15.08)
1(# Hospitals<=20) x Leverage				-5.813**
				(-2.25)
Observations	13,355	13,355	13,355	13,355
R-squared	0.738	0.746	0.746	0.748
Firm Fixed Effects	No	No	No	No
Year Fixed Effect	Yes	Yes	Yes	Yes
Period	Full	Full	Full	Full

Table B2: Hospital and Year Clustered Standard Errors

This table contains regressions with *Payment* as the dependent variable with *Leverage* as the independent variables of interest. The independent variables are lagged one year with the exception of *Cost* and *# of procedures* which are contemporaneous. All columns contain year fixed effects, *Geo Adj Factor* and standard errors clustered at the hospital and year level. Column 1 is a cross-sectional regression with procedure fixed effects. Column 2 adds all other controls. Columns 3 and 4 separately examine endoscopies and colonoscopies. Column 5 includes hospital fixed effects. All variable definitions are in Appendix A. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment	(4) Payment	(5) Payment
Leverage	9.729***	7.567**	8.393***	5.681**	1.986
	(7.10)	(4.47)	(4.62)	(3.06)	(1.32)
1(Colonoscopy)	-111.655***	-108.399***			-110.282***
	(-5.55)	(-5.97)			(-6.46)
Geo Adj Factor	557.937***	512.196***	555.512***	444.659***	
	(17.10)	(14.86)	(12.62)	(17.43)	
Cost		0.038***	0.037***	0.040***	0.003
		(6.77)	(5.60)	(8.09)	(0.55)
Capital Expenditures		0.004	0.021	-0.001	0.011***
		(0.44)	(1.91)	(-0.12)	(4.66)
HHI Insurer		-56.462***	-69.333***	-46.563**	7.086
		(-5.36)	(-5.15)	(-4.26)	(0.77)
# of Procedures		0.007	0.008	0.013	0.006
		(1.14)	(1.49)	(1.14)	(0.73)
1(Profit)		-2.557	-2.598	-1.557	7.273
		(-1.07)	(-1.11)	(-0.45)	(1.67)
Log(Beds)		3.409*	3.914**	2.096	-1.759
		(2.67)	(2.80)	(1.55)	(-1.26)
Net Income		0.444	2.294	-0.041	-1.994
		(0.08)	(0.42)	(-0.01)	(-1.14)
Net Income Volatility		-0.017	-0.037	-0.002	
		(-0.28)	(-0.59)	(-0.04)	
1(No System)		-0.447	-0.220	-0.361	-13.939
		(-0.18)	(-0.08)	(-0.13)	(-2.01)
1(Teaching)		1.737	1.233	2.749	
		(0.80)	(0.53)	(1.17)	
% Over 45		0.727**	0.706**	0.747**	
		(3.87)	(3.63)	(3.54)	
1(US News Ranked)		8.316	10.293*	5.444	-3.107
		(1.95)	(2.18)	(1.30)	(-1.19)
Observations	13,355	13,355	7,794	5,561	13,329
R-squared	0.708	0.728	0.714	0.524	0.887
Firm Fixed Effects	No	No	No	No	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	Endoscopy	Colonoscopy	Full

Table B3: HMO/PPO Separately

This table contains regressions with *Payment* as the dependent variable with *Leverage* as the independent variables of interest. The independent variables are lagged one year with the exception of *Cost* and *# of procedures* which are contemporaneous. All columns contain year fixed effects, *Geo Adj Factor* and standard errors clustered at the hospital level. Column 1 includes HMO Insurer HHI, Column 2 includes PPO Insurer HHI and Column 3 includes both. All variable definitions are in Appendix A. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, with t-statistics reported in parentheses.

	(1) Payment	(2) Payment	(3) Payment
Leverage	7.658***	8.312***	7.616***
	(4.53)	(5.28)	(4.62)
1(Colonoscopy)	-119.569***	-118.134***	-119.125***
	(-83.88)	(-88.21)	(-83.71)
Geo Adj Factor	521.162***	528.372***	514.395***
	(29.44)	(32.03)	(28.96)
Cost	0.038***	0.034***	0.037***
	(7.85)	(7.40)	(7.66)
Capital Expenditures	0.012**	0.013**	0.011**
	(2.32)	(2.49)	(2.22)
# of Procedures	0.010***	0.011***	0.011***
	(4.00)	(4.63)	(4.37)
1(Profit)	-1.921	-2.413	-2.078
	(-0.85)	(-1.13)	(-0.92)
Log(Beds)	2.952**	3.663***	3.057**
	(2.10)	(2.75)	(2.20)
Net Income	3.306	3.889	2.336
	(0.70)	(0.84)	(0.49)
Net Income Volatility	0.008	-0.017	-0.001
	(0.13)	(-0.28)	(-0.01)
1(No System)	-0.448	-0.609	-0.615
	(-0.18)	(-0.25)	(-0.24)
1(Teaching)	1.941	1.624	1.950
	(0.80)	(0.70)	(0.81)
% Over 45	0.720***	0.659***	0.726***
	(3.58)	(3.58)	(3.66)
1(US News Ranked)	4.818	7.767*	5.187
	(1.02)	(1.65)	(1.10)
HHI Insurer HMO	-37.825***		-27.589***
	(-6.83)		(-5.32)
HHI Insurer PPO		-56.366***	-39.544***
		(-8.92)	(-5.88)
Observations	10,171	11,193	10,171
R-squared	0.725	0.728	0.727
Firm Fixed Effects	No	No	No
Year Fixed Effect	Yes	Yes	Yes
Sample	HMO	PPO	Full