Leverage and Bargaining Benefits: Evidence from U.S. Hospitals

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Abstract

I use the health care industry as a novel laboratory in which to study a firm's strategic use of debt to enhance their bargaining power during negotiations with non-financial stakeholders. I show that reimbursement rates negotiated between a hospital and insurers for a specific procedure are higher when the hospital has more debt. I also show that this effect is stronger when hospitals have less bargaining power relative to insurers ex ante, and that hospitals take on more debt when they have less bargaining power. I exploit differences in state laws generating plausibly exogenous variation in hospital bargaining power to further strengthen identification. This is the first paper to provide direct evidence that debt improves a firm's bargaining outcomes.

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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 with which it transacts, 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 it to extract more surplus at these stakeholders' expense (e.g., Bronars and Deere (1991)). While evidence that firms take on more debt when facing stronger non-financial stakeholders (Matsa (2010) and Agrawal and Matsa (2013), among others) is suggestive, the underlying mechanism has never been directly tested. That is, there is no direct evidence that debt actually impacts bargaining outcomes.[1]

The primary challenge in investigating the effect of debt on bargaining is that econometricians rarely observe measurable bargaining outcomes. Moreover, even if outcomes are observed, heterogeneity in the services or goods being bargained over in most settings would make assessing such an effect difficult. This paper uses the health care industry as a novel laboratory to overcome this challenge. Two features in particular make this setting appealing. First, the availability of data on prices negotiated between hospitals and insurers for specific medical procedures, at least some of which are almost perfectly homogeneous, makes it possible to surmount the data limitation. Second, cross-sectional variation in market structure and state laws makes it possible to test whether the sensitivity of bargaining outcomes to a hospital's debt varies with the ex ante bargaining power of hospitals along multiple dimensions.

The ability of debt to strengthen a firm's bargaining position with non-financial stakeholders can be seen in several ways. Most simply, debt commits firms to pay part of the surplus created by successful negotiation to creditors in the form of interest payments. This limits the amount of remaining surplus over which non-financial stakeholders can bargain.[2] In a more dynamic sense, because non-financial stakeholders typically transact with a firm repeatedly over time, their future

[1] Benmelech, Bergman, and Enriques (2012) present evidence that financially distressed airlines are able to extract pension concessions from employee labor unions. However, this is an extreme case. Most firms that take on debt never become financially distressed.

[2] This is the argument made in Myers (1977) and Hennessy and Livdan (2009), among others.

payoffs depend on the firm's continued health and existence. They therefore have incentives to leave a highly-leveraged firm with sufficient surplus in order to avoid financial distress and possibly dissolution, which would reduce the stakeholders' future payoffs (e.g., Perotti and Spier (1993)). I develop these hypotheses further in Section 3.

I test the hypothesis that debt affects bargaining outcomes using 2008-2012 annual hospital balance sheet data and data on reimbursement rates (i.e., prices) negotiated by hospitals for a specific medical procedure, colonoscopy without biopsy.[3] Controlling for hospital and metropolitan statistical area (MSA) characteristics as well as hospital fixed effects to account for other factors that might affect bargaining outcomes, hospitals receive higher reimbursement rates when they have higher debt ratios. The economic magnitude of the relation is significant: A one standard deviation increase in a hospital's book leverage is associated with an approximately 5% increase in the average margin it receives per colonoscopy.

I focus on colonoscopy without biopsy in my analysis as opposed to other medical procedures because, unlike most procedures hospitals perform, it is straightforward with minimal clinical variation. This ensures that differences in prices are due to variation in bargaining as opposed to differences in quality or quantity of care.[4] For other types of procedures, differences in the care provided across hospitals could be systematically correlated with both reimbursement rates for the procedure and other hospital characteristics including capital structure, muddying inference.

While focusing on the price of a homogeneous procedure helps to eliminate one potential source of endogeneity, there remain a number of alternative explanations for the relation between leverage and reimbursement rates. For example, manager skill may be an omitted variable in that more skilled hospital managers might both be able to negotiate higher prices and choose to operate with higher leverage for a variety of reasons, including tax motives. Another concern is the causality could run in the opposite direction because, holding costs and volume fixed, higher prices imply higher income, increasing the benefits of debt tax shields. The robustness of the results to

[3] These prices are for Medicare patients and include all payments received by the hospital. The source of bargaining variation is discussed in more detail in Section 2.

[4] Additional care or complications during a colonoscopy lead to alternative classifications and therefore will not be included in my sample.

controlling for hospital fixed effects helps to address these concerns by ensuring that any omitted factor must be time-varying within hospitals to explain them. However, this does not rule out the possibility of such time-varying factors. It is also possible that debt affects reimbursement rates for reasons unrelated to bargaining power. For example, hospital managers may be motivated to bargain hard with insurers for higher reimbursement rates when the hospital is highly-leveraged, consistent with Jensen's (1986) argument that the threat of bankruptcy created by debt disciplines managers.

To seek further evidence that the estimated price-leverage relation is driven by the bargaining benefits of debt as opposed to these other explanations, I test if the effect is stronger among the hospitals that have the greatest bargaining benefits, those that lack ex ante bargaining power. The bargaining benefits from debt are decreasing in a firm's ex ante bargaining power because a firm with relatively high ex ante bargaining power already obtains most of the surplus, even without the pre-commitment effects of debt.[5] I use three measures of a hospital's ex ante bargaining power: its market share, partnership status with other hospitals (which can consolidate bargaining power), and the concentration in the local insurance market. I find reimbursement rates are more sensitive to hospital leverage when a hospital has a low market share, is not part of a hospital system, and when insurers are more concentrated in the hospital's geographic market. Each of these results supports the argument that debt is more useful as a source of bargaining power when a firm has relatively weak ex ante bargaining power.

A natural concern with this evidence, as well as the evidence in prior papers, is that ex ante bargaining power is potentially endogenous with respect to capital structure decisions. To further test the bargaining benefits from the use of debt, I take advantage of differences in state laws concerning insurance premium requirements. 17 states require insurance companies to price supplemental insurance policies identically for healthy and more expensive disabled individuals. This pooling requirement acts like a tax on the insurer and commits part of the surplus to these expensive patients, increasing the insurer's bargaining power, similar to the bargaining benefits of debt. With lower ex ante bargaining power, hospitals have a stronger incentive to use strategic

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

leverage when they deal with insurers subject to these laws. Consistent with this intuition, I find that the effect of leverage on negotiation outcomes is stronger in these states. This variation in bargaining power can plausibly be treated as exogenous with respect to reimbursement rates and leverage, which provides additional confidence that the bargaining benefit of debt drives the price-leverage relation I document.

Tax-based alternative explanations are especially a concern, as tax minimization motives play a major role in capital structure theory. I bolster the evidence against alternative tax based explanations by exploiting a unique feature of the health care industry. Some hospitals are for-profit entities, while others are non-profit organizations. As non-profit hospitals do not pay taxes, any relation between leverage and negotiated prices driven by tax incentives should hold only among for-profit hospitals. Contrary to this argument, I find that, if anything, the relation is stronger in not-for-profit hospitals. Overall, the evidence supports the argument that debt enhances a firm's negotiation outcomes with its non-financial stakeholders.

To date the literature on the bargaining benefits of debt has focused on the capital structure decisions of firms because negotiation outcomes are difficult to observe, especially for a broad cross section of firms.[6] Consistent with the prior literature, I find that a hospital's leverage is negatively related to its ex ante bargaining power using the same three measures of bargaining power as before, as well as the differences in state laws. Specifically, I find that hospital leverage is negatively related to hospital market share, positively related to local insurer concentration, lower when the hospital is a member of a system, and higher if they operate in a state with these pooling laws. In addition to confirming findings from the labor literature, this further validates my use of these measures of bargaining power as a source of predicted cross-sectional variation in the sensitivity of reimbursement rates to leverage.

My paper relates to the literature on the strategic use of leverage during bargaining with a firm's stakeholders. The bargaining benefits from debt are theorized in several settings including during negotiations with labor (Bronars and Deere (1991); Perotti and Spier (1993)); merger nego-

[6]For example, Agrawal and Matsa (2013), Matsa (2010), Klasa, Maxwell, and Ortiz-Medina (2009), and Myers and Saretto (2011).

tiations (Israel (1991)); regulated industries bargaining with the government (Dasgupta and Nanda (1993)); and between suppliers and customers (Hennessy and Livdan (2009) and Chu (2012)). The majority of the empirical work has focused on bargaining with labor, in particular the relation between firm leverage and unionization rates. For example, Matsa (2010) uses differences in state laws to show that leverage is higher in firms with employee friendly union laws.[7] There is one paper, Benmelech, Bergman, and Enriques (2012), that studies negotiation outcomes for firms under financial distress. Specifically, it examines wage concessions in 12 airlines that have different funding status and exposure to PBGC bankruptcy guarantees. They find distressed airlines receive greater pension concessions from labor. My contribution is I can isolate the effect of leverage on negotiation outcomes for firms to help isolate the direct bargaining benefits of debt.

My paper also contributes to the health care policy debate. Two major issues of utmost importance are the high cost of care and lack of price transparency that may contribute to these costs. There are a number of papers that examine the impact of market competition on prices in the health care industry.[8] Consistent with Nash bargaining, these papers find reimbursement rates are decreasing in insurance market power and increasing in hospital market power. These results are consistent across a variety of settings including with micro-level data from California (Dor, Grossman and Koroukian (2004)); with appendectomies acting as an alternative homogeneous operation (Brooks, Dor and Wong (1997)); and in the Netherlands (Halberasma, Mikkers, Motchenkova, and Seinen (2011)). My paper contributes to the health care debate by showing that other facts affect pricing beyond market competition measures.

In Section 2, I explain salient features of the health care industry. Section 3 describes the empirical predictions and strategy. I describe the data in Section 4. Empirical results are in Section 5 and I conclude in Section 6.

[7] In addition to the empirical work in the above models, other empirical papers include Klasa, Maxwell, and Ortiz-Medina (2009), and Myers and Saretto (2011).

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

2 Institutional Details

Traditionally, families and individuals purchase health insurance through an employer, which they use to receive health care with some minimal cost sharing via co-payments and deductibles. Hospitals provide care to patients and then receive reimbursement rates based on negotiated contracts with policy holders' insurance companies. This system of financing has faced substantial criticism because of rising costs. Part of the issue is patients face moral hazard problems because the marginal cost to patients of extra care is small, and they are therefore likely to over-consume such care. Meanwhile, health providers are compensated for the care they provide and may have incentive to provide this extra care even if they believe it will not help.[9]

In an effort to alleviate these issues, the insurer market was altered with the advent of managed care organizations (MCOs), such as health maintenance organizations (HMOs) or preferred provider organizations (PPOs).[10] These organizations try to provide "smarter" (preventative) care and minimize the moral hazard problem by restricting the care their patients receive. They contract with specific doctors and hospitals over the type of care they will provide in exchange for a steady stream of patients.[11] This relatively new system of financing combines the separate aspects of traditional health care into one overarching entity and reduces the number of interactions between parties. MCOs contract directly with employers who pay premiums for their entire workforce to join these organizations. Similarly, insurers contract with hospitals through these organizations over reimbursement rates, and this has led to consolidation in the health insurance market, resulting in 67% of metropolitan areas having an insurer with a market share greater than 50% by November 2012.[12]

Hospitals have also recently undergone substantial consolidation. 57% of all US acute care hospitals are now part of a hospital system, two or more hospitals that are either jointly owned,

[9] In fact, there is evidence that extra care leads to worse health outcomes.

[10] HMO plans rely on more cost sharing with patients through co-payments while PPO plans generally rely on a large deductible and coinsurance. The latter programs are significantly cheaper because the patient pays for the majority of the "first dollars".

[11] While bargaining between hospitals and insurers is less common, the bargaining mechanism is the same with HMOs and for simplicity I continue to refer to this as hospital-insurer bargaining.

[12] 2012 edition of AMA's Competition in Health Insurance: A Comprehensive Study of U.S. Markets

operated, or managed by a central organization.[13] Hospitals in a system tend to be located in close proximity to one another, and a system provides a number of benefits to the hospitals in it. These include minimizing fixed costs and consolidating bargaining power, which provides greater market power during negotiations over reimbursement rates.

The negotiation process between hospitals and insurance companies is extremely complicated both initially and upon renegotiation. Negotiation outcomes depend on each party's market power, the quality and mix of care provided by the hospital, and the frequency with which the insurance company denies claims. The final contracts are typically hundreds of pages with specific payment rates for thousands of procedures. Lewis and Pflum (2014) argue that the negotiation skill required is one of the leading reasons for the substantial variation in reimbursement rates across hospitals. Negotiations typically take place on an annual basis or when a significant change arises in the hospitals' organization such as a merger or a change in system affiliation.

This paper focuses on Medicare, which is the U.S. government subsidized health insurance program for Americans aged 65 and older and for some younger people with disabilities. Enrollees can choose either traditional Fee-For-Service (FFS) Medicare or Medicare Advantage.[14] FFS permits beneficiaries more flexibility in care because there are no restrictions on the health care provider they use, but there is greater cost sharing through higher deductibles and uncapped co-payments. Most FFS members mitigate the potential unlimited out of pocket expense by purchasing supplemental insurance known as Medigap policies. FFS Medicare has a provider fee schedule for over 7000 services with reimbursement rates adjusted for geographic differences in cost of living.[15]

Hospitals have the option to decline FFS Medicare, accept the fee schedule after geographic adjustment, or request additional reimbursements.[16] In the last case, the supplemental reimbursement amounts are bargained over by Medigap insurers as part of their entire negotiation process.

[13] http://www.aha.org/research/rc/stat-studies/fast-facts.shtml

[14] Approximately 75% of enrollees choose traditional FFS Medicare and 25% enroll in Medicare Advantage.

[15] The fee schedule is priced on a Resource Based Relative Value Scale (RBRVS) or more simply the resources required for the procedure. RBRVS is based on three Relative Value Units: physician work (52%), practice expense (44%), and malpractice expense (4%). Hospitals can also receive supplemental payments for extreme costs which I control for by winsorizing continuous variables.

[16] Virtually all general acute care hospitals accept Medicare and so it is unlikely this would bias my sample in any way.

Bargaining variation for FFS patients is limited to the supplemental payments because the base rate is set and paid for by the U.S. government. Medicare Advantage patients are enrolled in MCOs and they bargain with hospitals over the entire reimbursement amount independent of the FFS price. With a larger scope for negotiation, these prices tend to have greater variation across hospitals. In the next section, I explain the motivation and empirical strategy.

3 Empirical Predictions and Methodology

Firms have relationships with many non-financial stakeholders, including employees, customers, and suppliers. Each relationship a firm has 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. Debt has been identified as a potentially powerful device for committing a firm to a tough negotiating position. A simple way to see this is that debt represents represents a hard commitment to pay out part of the surplus to creditors in the form of interest payments, which limits the amount available during negotiations.

This can be seen more formally in a simple example. Firms A and B each bargain over the division of $100 of surplus with an outside stakeholder. Before bargaining takes place, firm B issues debt requiring it to pay $40 to a creditor and pays the proceeds out to shareholders as a dividend. This leaves only $60 of available surplus over which firm B and its outside stakeholder can bargain. Assuming Nash bargaining with equal bargaining power, firm A's shareholders receive $50, while firm B's shareholders receive $70 ($30 from negotiation and $40 from the dividend).[17]

A more nuanced view of the bargaining benefit from the commitment to creditors is there may be contagion distress costs for the stakeholder. Failure of a firm to make its contractual interest payments generally results in bankruptcy, which not only imposes significant costs on shareholders, but also potentially on the stakeholder. Bankruptcy might result in closure, which will terminate

[17]This intuition is the motivation in Myers (1977), Hennessy and Livdan (2009), Dasgupta and Sengupta (1993), and Dasgupta and Nanda (1993).

the firm's relationship with the stakeholder, reducing the number of relationships the stakeholder is receiving surplus from (Perotti and Spier (1993)). Therefore, the stakeholder may be willing to accept less of the surplus because that is less costly than the potential contagion distress costs.

In the health care sector in particular, there are a number of reasons why insurance companies are concerned with the leverage of a hospital. Insurers want to satisfy their customers, and distress costs may reduce the quality of care provided or in the extreme case close a hospital, limiting the menu of options available for their patients. Bankruptcy can be equally effective as a threat for pure profit maximizing motives because the consolidation in the hospital market can reduce the bargaining power of the insurance company as the hospital concentration increases. The first prediction I test then is that hospitals with more debt receive higher payments from insurers for colonoscopies. I test this prediction by estimating the following equation:

$$BargainingOutcome_{i,t} = \alpha + \beta_1 Leverage_{i,t} + \beta_2 X_{i,t} + \gamma_t + \epsilon_{i,t} \quad (1)$$

The variable $BargainingOutcome$ is the average annual reimbursement rate for colonoscopies as described in detail in the data section. *Leverage* is the book leverage of the hospital, $X_{i,t}$ contains a variety of potentially time-varying hospital and MSA controls, and γ_t is a set of year dummy variables. I include hospital fixed effects in some specifications to account for time-invariant unobserved hospital characteristics. However, as I show in Section 4, within-hospital variation in leverage over time is somewhat limited, dampening statistical power in hospital fixed effects regressions. A positive and significant β_1 is evidence that firms with higher leverage, ceteris paribus, receive better bargaining outcomes.

The impact of leverage on a firm's bargaining power should vary with the ex ante bargaining power the firm enjoys i.e., its bargaining power in the absence of leverage. A firm with relatively high ex ante 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, whereas

a firm with low bargaining power receives a greater increase from the portion of the surplus that is removed. Hennessy and Livdan (2009), among others, formalize this argument in a model. My second prediction, then, is that the relationship between a hospital's leverage and payments from insurers for colonoscopies is stronger for hospitals with lower ex ante bargaining power. To test this prediction, I split the sample based on different measures of ex ante hospital bargaining power, and estimate (1) separately for each. If debt aids more in negotiation when ex ante hospital bargaining power is low, then β_1 should be larger for low than for high ex ante bargaining power subsamples.

I implement this test using three measures of ex ante bargaining power defined in the next section: the hospital's market share in a given MSA (*MktShare*), the concentration of the insurance industry in the MSA (*HHI_Insurer*), and whether or not the hospital is a member of a system (*System*). I split the sample in two based on the median MSA value of *MktShare*, above or below 0.25 *HHI_Insurer* (definition of highly concentrated industry by the FTC and DOJ), and whether *System* is zero or one. A hospital has more bargaining power when it has a larger share of a market, as it has greater monopsony power. Hospitals have more bargaining power when insurers are less concentrated, as the insurers will compete among themselves driving reimbursement rates higher. Finally, a hospital has more bargaining power when it is a member of a system, as systems concentrate the bargaining power of multiple hospitals.

One potential problem is that these measures may proxy for hospital characteristics that predict different sensitivities of reimbursement rates to leverage for reasons that have nothing to do with differences in ex ante hospital bargaining power. I help alleviate this concern by using state laws that can plausibly be treated as exogenous with respect to reimbursement rates and leverage that affects the bargaining power of hospitals. 17 states require insurance companies to price supplemental insurance policies identically for healthy and more expensive disabled individuals. This pooling requirement acts like a tax on the insurer and commits part of the surplus to these expensive patients, increasing insurer's bargaining power, similar to the commitment benefits of debt. I use this difference in state laws to test if the effect of leverage on negotiation outcomes is concentrated in hospitals with lower ex ante bargaining power.

While debt may be useful for committing a firm to a tough bargaining position, it is also

well understood that the use of debt exposes a firm to a number of potential direct and indirect financial distress costs. 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. My third prediction and the prediction that the literature has focused on is that hospitals adopt more leverage when they have lower ex ante bargaining power with insurers. I test this prediction by estimating the following equation:

$$Leverage_{i,t} = \alpha + \beta_1 BargainingPower_{i,t} + \beta_2 X_{i,t} + \gamma_t + \epsilon_{i,t} \tag{2}$$

I use the same three measures of ex ante bargaining power as regressors on which I split the sample to test the second prediction (*MktShare*, *HHI_Insurer*, *System*) as well as an indicator if the hospital is located in states with the pooling laws. Again, $X_{i,t}$ contains a variety of potentially time-varying hospital and MSA controls, and all specifications include year fixed effects. In addition, I include hospital fixed effects in some specifications. If hospitals use more debt when they have less bargaining power, leverage will be higher when a hospital has lower market share, is not part of a system, deals with concentrated insurers, or operates in a state with pooling laws on supplemental insurance policies.

4 Data

I use three main data sources from 2008-2012 to study whether hospitals use debt to enhance their bargaining power during negotiations with insurance companies.[18] American Hospital Directory (AHD) collects average reimbursement rates along with corporate, geographic and financial data on hospitals that file Medicare claims reports. In addition, AHD obtains proprietary information on the system affiliation of each hospital via a web scraper. The Centers for Medicare and

[18] I use this time frame because the data is expensive, procedure classifications were changed in 2007 and some data is only available a year later.

Medicaid (CMS) publish the initial uncleaned claims reports and indices that are used to adjust government payments. Finally, the American Medical Association (AMA) publishes an annual report on the market competition features of insurance companies within MSAs. Figure 1 shows a map of the United States, and the dark green sections indicate the MSAs for which there is sufficient data to run the above specifications.

(Insert Figure 1 Here)

I link hospital specific data using a unique medicare identifier with the metropolitan data via metropolitan codes. There are approximately 6,000 hospitals in each of the five years, creating approximately 30,000 observations for the basic corporate and geographic variables. Of these, approximately one-third of the hospitals are general acute care facilities and have the necessary pricing data.[19] Finally, the insurance competition data is only available for the metropolitan areas, eliminating around 30% or approximately 3,000 of the remaining observations. After requiring that hospitals perform Medicare colonoscopies, report necessary financial data, and are located in an MSA with insurance market competition measures, the sample contains a total of 1,746 general acute care hospitals with 6,818 hospital-year observations.[20]

Table 1 provides summary statistics for the variables included in the empirical specifications. Since hospitals consolidate via system affiliations in part to enhance their market power, it is important to calculate their market power based on their system affiliation.[21] *MktShare* is defined as the number of staffed beds within the system scaled by the total number of staffed beds within the MSA.[22] This measure of monopsony power is the first measure I use for the ex ante bargaining power of a hospital. Vast differences exist in the hospital markets as some are dominated by a single system of hospitals and others consist of a dispersed group of hospitals with smaller market shares. These differences can be observed in the fact that the average *MktShare* is 22% and yet

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

[20] All continuous variables are winsorized at the 1% level to eliminate potential errors in variables and ensure that regression results are not driven by outlier observations.

[21] Unfortunately, system affiliation is backfilled by AHD and I use their saved references to correct changes in affiliation throughout the sample.

[22] This is the standard measure of market power used in the health care literature.

more than 10% of the hospitals have a market share greater than 50%, while an equal amount have market shares less than 2%.[23]

The second measure of ex ante hospital bargaining power that I use is whether the hospitals are part of a system. Around 75% of the hospitals in my sample have a partnership with other hospitals, and they are represented by the indicator variable *System*. Hospitals that are part of a system with other hospitals tend to have higher ex ante bargaining power because they bargain collectively, leveraging their combined market shares as if they were one bigger institution (Lewis and Pflum (2014)). The third measure of ex ante hospital bargaining power is based on the local market concentration of the insurance companies. A firm's bargaining power is higher when dealing with dispersed stakeholders because of the price pressure from the horizontal market. *HHI_Insurer* is the Herfindahl-Hirschman Index of insurance companies as reported in the annual AMA reports for each metropolitan area.

(Insert Table 1 Here)

Leverage is the primary financial variable of interest and is defined as total long-term liabilities scaled by a hospital's total assets. I also use an alternative definition *NetLeverage*, which is total long-term liabilities minus cash scaled by total assets. Hospitals on average hold about 5% of their assets in cash as evidenced by the difference between *Leverage* and *NetLeverage*. The average of 0.254 is very similar to the 0.261 found for the Compustat firms by Matsa (2010), but the standard deviation of 0.376 is quite a bit larger than the 0.164 in his sample. *NonProfit*, *Profit*, and *Government* are dummy variables based on the hospital's corporate classifications. Nearly 70% of the hospitals are not-for-profit, and the rest are split between for-profit (18%) and government hospitals (12%). This variation in corporate structure is useful to disentangle the use of leverage for bargaining benefits and for interest tax shields. Capital structure theory posits firms with greater income volatility have incentives to reduce their leverage to minimize distress costs. In order to control for this possibility, I use *NetIncomeVol*, defined as the standard deviation of annual net income in millions for the five year sample.

[23]This difference is not simply rural versus urban areas because all hospitals are located in MSAs.

I study reimbursement rates for the procedure colonoscopy without biopsy (APC code 158), which is ideal to employ for this study because it is a straightforward, homogeneous, and frequently-performed operation for Medicare enrollees around the country.[24] The negotiation outcome, *AvPayment*, is the average payment received for this procedure by the hospital for all patients that are enrolled in Medicare including the base payment rate as calculated by the group of Medicare physicians and adjustment factors, along with extra payments from co-payments, deductibles, and third-party insurers. *AvCost* is the average annual hospital cost of a colonoscopy, which I use as a control in the negotiation outcome regressions and *NumProcedures* is the number of colonoscopies performed at each hospital in a year. *AvPayment* and *AvCost* have similar means of around $500, but the variation in *AvCost* is much higher.[25] The average margin defined as *AvPayment* minus *AvCost* per procedure is $36, which is the benchmark I use to interpret the economic magnitude of the results.

In addition to publishing financial data on Medicare hospitals, CMS publishes a number of other indices. *Teaching* is an indicator variable equal to one if the hospital is associated with a university and I control for it in all empirical tests.[26] *GeoAdjFactor* is an index that is used to adjust base fee schedules for the different costs of care arising from cost of living between metropolitan areas for FFS reimbursement rates.[27]

Most FFS Medicare enrollees purchase a supplemental Medigap policy to limit the potentially unlimited out-of-pocket risk stemming from co-payments. While Medicare is primarily for individuals 65 and older, approximately one in six enrollees is a younger person eligible because of a disability or End-State Renal Disease (ESRD).[28] These individuals tend to require more care, are more expensive, and therefore, without restriction insurance companies charge them more for

[24]Complications and additional care are classified by an alternative code ensuring prices are not due to differences in care. The base FFS rate for this procedure in 2008 was $500.02.

[25]I would like to use a Nash bargaining model with negotiation outcomes as a function of the cost and list price, but the high frequency in which costs are actually higher than reimbursement rates precludes this test. One reason costs may frequently be higher than payments is hospitals may differ in how they allocate fixed costs to procedures and so I rely on the average annual payment.

[26]Given the unique partnership structure the health care literature controls for a hospital's status in empirical work. I also do so to ensure these universities are affecting the hospitals' balance sheet.

[27]The exact calculation is two thirds of the fee scheduled scaled by the adjustment factor plus one third of the unscaled base rate.

[28]http://www.medicareresources.org/basic-medicare-information/what-is-medicare/

Medigap policies than they do older individuals.[29] However, 17 states require insurance companies to price Medigap policies identically for enrollees without regard to age.[30]

The mandated equality of premia acts as a tax on the insurance companies when pricing these Medigap policies, and this effectively transfers part of the surplus from the hospital-insurer relationship to the younger more expensive individuals, similar to precommiting part of surplus to creditors. The transfer increases the bargaining power of the insurance companies and weakens the ex ante bargaining power of the hospital. Therefore, the strategic benefits of debt are greater and hospitals in these states should consequently operate with more leverage than those in other states, other things being equal, if hospitals use debt to enhance bargaining power. I use these laws that can plausibly be treated as exogenous with respect to reimbursement rates and leverage as variation in bargaining power to test the sensitivity of bargaining outcomes to hospital leverage. The orange states in Figure 2 are the ones with these laws.

(Insert Figure 2 here)

One potential concern with treating these differences in laws as exogenous is that there is a slant to states in the Northeast. I attribute this to a propensity for public policies that provide goods for the disadvantaged in these states. The concern with using these laws as exogenous variation in ex ante bargaining power is there could be factors correlated with both hospital capital structure and negotiated prices between hospitals and insurance companies, unrelated to the bargaining benefits of leverage, that differ systematically across regions. It is unclear and difficult to articulate what these differences might be.[31] Noting this caveat, I treat these laws as a source of differences in bargaining power that is exogenous with respect to reimbursement rates and leverage.

Table 2 contains a cross-correlation matrix for the primary variables of interest. Not surprisingly, *Leverage* and *NetLeverage* are highly correlated with a correlation coefficient of 0.978. The

[29] See CMS's 2014 "Choosing a Medigap Policy" p.40.

[30] These states are: Connecticut, Hawaii, Illinois, Kansas, Massachusetts, Maryland, Maine, Minnesota, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, and South Dakota.

[31] I would like to do a matching exercise with these states, but unfortunately, the clustering causes a problem similar states without these laws nearby.

predictions for the use of strategic leverage due to ex ante bargaining power are the opposite for *MktShare* and *HHI_Insurer*, yet the correlation is 0.221 which suggests subsample regressions based on these variables are testing different proxies for a hospital's ex ante bargaining power. *GeoAdj-Factor* has a correlation with *AvPayment* that is extremely high, 0.754, because it is the primary factor to adjust for regional differences in cost of care. In contrast, the remaining variables have relatively low correlations with one another.

(Insert Table 2 here)

In order to help better understand the features of this unique setting I present summary statistics for the variables measured at the MSA level for years 2008, 2010, and 2012 in Table 3. *MedianLev* is the median hospital leverage within each MSA and has declined from its peak in 2008 during the financial crisis. *MedianPay* and *MedianCost* are defined as the median annual payments and costs within each MSA and have each been increasing over the sample period. I include year fixed effects in all regressions, which ensures all of the identification comes within a year and helps eliminate spurious time trends. The number of MSAs in the sample increases over time because the AMA has included more areas in each edition of its studies.[32] The distribution of corporate type and the number of hospitals is fairly constant over the sample.

(Insert Table 3 here)

Firm leverage and market competition measures tend to be sticky in the short term which may affect the power of within firm tests given I use a five-year sample. In order to test if this is a concern for my sample, Table 4 contains a variance decomposition of *Leverage*, *AvPayment*, *MktShare*, and *Insurer_HHI* by group (hospital, MSA, system affiliation, year, and state). This shows how much of the variation for each variable is explained by the differences within a group as opposed to between groups. The within firm variation in leverage and average payments is one third to one half of the variation across firms and this difference is even larger for the market competition

[32]Results are robust to specifications requiring that each MSA be present for all studies.

measures. This lack of within hospital variation limits the power of fixed effects regressions that rely on within firm variation.[33]

(Insert Table 4 here)

5 Results

This section presents the results of my empirical analysis. First, I investigate whether hospitals with more leverage receive higher reimbursement rates from insurers by estimating equation (1). I then test if this effect is stronger when hospitals have weaker ex ante bargaining power. Next, I look for evidence that hospitals are more apt to use debt to gain bargaining power when they lack ex ante bargaining power by estimating equation (2).

5.1 Benefits of Leverage

Table 5 presents a series of regressions based on equation (1). The dependent variable in each regression is a hospital's average negotiated colonoscopy price for the year. All specifications include year fixed effects and $GeoAdjFactor$, Medicare's geographical price adjustment, which has a major impact on price variation across metropolitan areas. Standard errors are clustered at the hospital level. The first three columns use *Leverage* as the variable of interest and the last three use *NetLeverage*. Columns 1 and 4 are the baseline regression without additional controls. The only variable in this column other than $GeoAdjFactor$ and the year fixed effects is the hospital's leverage. Columns 2 and 5 contain an indicator if the insurance market is not highly concentrated, *Low_HHI*, and hospital controls including hospital size, corporate type, average cost per procedure, income volatility, and teaching status. Finally, Columns 3 and 6 include hospital fixed effects. Standard errors in this and all later tables are shown in parentheses below the point estimates, and are clustered at the hospital level.

[33]The lack of within firm variation for the market concentrations measures is unsurprising and only limits the power of the leverage regressions.

(Insert Table 5 here)

In all specifications, the coefficient on leverage is positive, similar in magnitude and statistically significant. This shows that firms with higher leverage do in fact receive better negotiation outcomes. Using the coefficient estimates in the third column with hospital fixed effects, a hospital with a one standard deviation increase in leverage, ceteris paribus, receives \$1.74 (=.366*4.758) more per procedure performed.[34] Hospitals and insurance companies effectively bargain over surplus - i.e., the value created after taking into account the costs of performing a procedure. One back of the envelope way to measures the magnitude is by examining the average hospital profit (payment received minus cost) per colonoscopy performed, which is \$36.10. Thus a \$1.74 increase in payment received translates into approximately a 5% increase in profit per procedure.[35]

Moreover, 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 (e.g., heart surgeries), colonoscopies are sufficiently straightforward that they can be performed at outpatient clinics, which then compete with hospitals in performing them. This competition drives prices down and limits the scope for bargaining for these procedures.[36] Also, variation is smaller for FFS Medicare patients because the fee schedule and *GeoAdjFactor* are set by the panel of physicians, limiting the portion of the procedure that is bargained over to supplemental payments, whereas they bargain over the entire reimbursement rates for regular patients. In addition, the true economic magnitude for the hospital would be determined by summing over each of the 7,000 procedures in which hospitals and insurance companies negotiate reimbursement rates.

The coefficient on *GeoAdjFactor* is very large and has a t-statistic above 60 because it is the index used to adjust prices between MSAs. If I include it as the only independent variable in this regression, it explains over 50% of the variation in payments.[37] There are still differences in

[34] The corresponding magnitude for *NetLeverage* is \$1.47.

[35] 4.1% for *NetLeverage*.

[36] Hospital executives with whom I had conversations make this argument.

[37] Coefficients on the other independent variables are similar with alternative specifications including scaling *AvPayment* by *GeoAdjFactor* and including a squared term.

cost that are not being captured by this index, as is evident from the positive and statistically significant coefficient on *AvCost*. In addition, teaching hospitals and those that perform more procedures receive higher average reimbursement rates, ceteris paribus.

Of course this result alone does not imply a causal interpretation that debt improves bargaining power because there are a variety of potential endogeneity concerns. For example, hospitals may use more debt to alleviate moral hazard problems and ensure their executives exert higher effort during negotiations, which leads to better bargaining outcomes. In order to provide further evidence this result is due to bargaining power, I test the second prediction that the bargaining benefits of leverage are larger when a hospital has lower ex ante bargaining power. In order to test this, I split the hospitals between those that have higher and lower ex ante bargaining power and estimate equation (1).

Specifically, I split the hospitals into two groups along three dimensions, *MktShare*, *System*, and *HHI_Insurer*. The low ex ante bargaining power groups are those that those that are not a part of a hospital system, have a below median *MktShare* within a MSA-year, and hospitals in a MSA with insurer concentration above 0.25.[38] Table 6 shows results from repeating the regressions estimated in Table 5 with *Leverage* as the independent variable of interest. Panel A shows the cross sectional results for regressions without hospital fixed effects (as in Table 5, Column 2), while Panel B shows the results for regressions with hospital fixed effects (as in Table 5, Column 3).[39]

(Insert Table 6 here)

In Panel A the coefficients on *Leverage* are only statistically significant different than 0 for hospitals with low ex ante bargaining power and the magnitudes are up to three times higher for these subsamples than those for the full sample in the previous table. Further, the coefficients for the low ex ante bargaining power subsamples are statistically different than the high ex ante bargaining power subsamples when the sample is split on system status, p-value of 0.032, and hospital market

[38] According to the 2010 Horizontal Merger Guidelines published by the DOJ and FTC, this is the cutoff for classification of extremely concentrated markets.

[39] Similar results are found using *NetLeverage* as opposed to *Leverage*.

share, p-value of 0.015. These results bolster the interpretation that the leverage affects bargaining power because there is no reason to believe this relationship is stronger for hospitals that lack ex ante bargaining power if the effect was driven by a moral hazard problem.

In Panel B, the *Leverage* coefficient is still statistically different than zero only for the low market share and concentrated insurance company subsets. However, the coefficient on *Leverage* in the system subsample is now positive and statistically significant, while the coefficient in the no-system subsample becomes statistically insignificant. That being said, the only coefficients on *Leverage* that are statistically different than each other is for hospitals split on the median *MktShare*. The fact that these coefficients are smaller may be due to the lack of variation in the time series for hospital leverage as shown in the variance decomposition especially given the sample is split in half. Other coefficients in these subsample regressions are very similar to those found in Table 5 for the entire sample. Together these results suggests that leverage affects bargaining outcomes more for the subset of hospitals that are predicted to benefit most from the strategic use of leverage.

(Insert Figure 3 here)

In order to further examine the magnitude for these groups I plot the coefficients for *Leverage* from the cross sectional regressions based on equation (1) in Figure 3. The first black line shows the coefficient for the regression based on all hospitals (Column 2 from Table 5). The remaining lines split the hospitals based on the three measures of ex ante bargaining power with the red lines being the hospitals with lower bargaining power and the blue lines being the counterparts with higher bargaining power (coefficients from Panel A of Table 6). This figure shows the bargaining benefits are larger for the subset of hospitals that lack ex ante bargaining power. One concern is that leverage is jointly set with these measures of ex ante bargaining power. In order to help rule out this concern, I test how leverage is affected by differences in state laws that can plausibly be treated as exogenous with respect to reimbursement rates and leverage for a hospital's ex ante bargaining power.

I do this by splitting the sample into hospitals in states with and without Meidgap pooling laws, and estimate equation (1) for each of the resulting subsamples. The results of these tests are reported in the four columns of Table 7. Columns 1 and 2 use *Leverage* and Columns 3 and 4 use *NetLeverage* as the dependent variable. The coefficients on each measure of hospital leverage are positive and statistically significant in states with Medigap laws (Columns 2 and 4). They are positive, but smaller and statistically insignificant in states without such laws (Columns 1 and 3). The difference between coefficients for *Leverage* has a p-value of 0.14, while the difference in coefficients for *NetLeverage* has a p-value of 0.07. The combination of these tests suggest that hospitals in states with these laws are more likely to use strategic leverage.

(Insert Table 7 here)

Of course there are several other concerns that need to be considered. In particular, one concern is that price differences are not driven by bargaining and instead are due to differences in care. The primary reason that I use a straightforward homogeneous procedures with little clinical variation is to control for such concerns. In addition, I control for the average hospital cost for these procedures and the results hold in the presence of hospital fixed effects. Another concern with using a sample during the financial crisis is that reimbursement rates could have a mechanical relationship with the macro economy. The use of year fixed effects in all regressions should account for the effects of any time variation in aggregate prices with the identification coming from the cross section.

Another potential concern about the price-leverage relation arises from tax-based motives for the use of debt. Taxes are among the most important determinants of capital structure decisions. Tax motives could drive a positive relation between leverage and prices for two reasons. First, there may be a reverse causality concern because, holding costs and volume fixed, higher prices imply higher income, increasing the benefits of debt tax shields. Second, manager skill may be an omitted variable in that more skilled hospital managers might both be able to negotiate higher prices and choose to operate with higher leverage in order to obtain more tax shields.

This concern is partially alleviated given the effect of leverage continues to hold with hospital fixed effects and there is no reason to expect these tax based incentives would be stronger for the hospitals that lack ex ante bargaining power. I bolster the evidence against this concern by exploiting a unique feature of the health care industry, the presence of both for-profit and nonprofit hospitals. For-profit hospitals pay federal and state corporate income taxes, just as any other for-profit corporation does. Nonprofit hospitals, on the other hand, are not subject to state or federal taxes. If tax incentives drive the observed relation between payments and leverage, this relation should only be observed among for-profit hospitals. I therefore estimate equation (1) for subsamples consisting of for-profit and not-for-profit hospitals separately. Table 8 presents the results.

(Insert Table 8 here)

Columns 1 and 3 show results without and with hospital fixed effects respectively, in for-profit hospitals, while Columns 2 and 4 show the results for non-profit hospitals. Contrary to tax motives driving the relation between payments and leverage, the relation actually holds only among non-profit hospitals in the cross section. When hospital fixed effects are included, the coefficient on leverage is similar in for-profit and non-profit hospitals, but neither coefficient is statistically different from 0. The relation between pricing and leverage in not-for-profit hospitals is difficult to reconcile with alternative explanations based on tax motives.

The fact that bargaining benefits only appear in not-for-profit hospitals for the cross-sectional tests brings up its own potential issues. This may be because the number of for-profit hospitals in my sample is relatively small, raising concerns about power in the for-profit sample. In addition, for-profit hospitals are more likely to be in a large system of hospitals, which would strengthen their ex ante bargaining power. With more bargaining power, the bargaining benefits of debt are reduced and so these hospitals are also predicted to be less likely to use strategic leverage.

There are other differences worth noting between for-profit and not-for-profit hospitals, specifically not-for-profit hospitals have no equity holders. This may reduce their profit maximizing motives or change their financial incentives in other ways. There is an extensive literature that

suggests that is not the case and nonprofit hospitals act similar to for-profit hospitals. Bowman (2002) finds not-for-profit hospitals borrow more when they receive endowments, consistent with optimizing leverage as if they follow the trade-off theory of capital structure. In addition, Duggan (2002) uses responses to changes in regulation and finds nonprofit hospitals respond similarly to for-profit hospitals. Lastly, non-profit are legally required to provide free care to some patients, and thus are forced to bargain aggressively with insured patients to ensure they make up for lost resources and remain a going concern.[40]

5.2 Predicting the Use of Leverage

The literature on the bargaining benefits from debt documents a relationship between leverage and unions. Recently, Matsa (2010) uses exogenous variation in right to work laws to show firms tend to have higher leverage when unions are strongest or in other words, the bargaining benefits are greater. I seek confirmation of this result in the health care setting by testing whether hospitals with lower ex ante bargaining power, proxied for by a lower market share, a lack of partnerships with other hospitals, dealing with more concentrated insurers markets, and operating in a state with laws on supplemental insurance policies, have higher leverage.

Specifically, using equation (2), a negative coefficient on *MktShare*, *System*, (1-*HHI_Insurer*), and *NoLaws* would be consistent with the prior literature. Results are shown in Table 9. All specifications include year fixed effects and standard errors clustered at the hospital level. In the first three columns I use *Leverage* and the last three columns I use *NetLeverage* as the dependent variable. Columns 1 and 4 contains the baseline univariate regression. In addition, Columns 2 and 5 include hospital controls for size, corporate type, income volatility and teaching status. Finally, Columns 3 and 6 include hospital fixed effects.

(Insert Table 9 here)

In all specifications, the coefficients of interest are negative consistent with hospitals that

[40]This argument was made during an interview I had with an executive for a nonprofit hospital.

have weaker ex ante bargaining power taking on more leverage and except for a few coefficients on *HHI_Insurer*, the coefficients are all statistically significant at conventional levels. Using the cross-sectional coefficients from the second column with all of the controls, I find that, ceteris paribus, a one standard deviation increase in a hospital's market share would decrease leverage by 0.04 (=0.23*(-0.16)) from a mean of 0.3, and a one standard deviation increase in (1-*HHI_Insurer*) decreases hospital leverage by 0.016 (=0.125*0.128). Ceteris paribus, a partnership with other hospitals has 0.056 lower leverage than a stand-alone hospital. Finally, a hospital in states without pooling laws tend to have .0749 lower leverage than hospitals in states without these laws. The economic significance of the coefficients from the *NetLeverage* are similar. Each of these results is consistent with hospitals using more leverage when they lack ex ante bargaining power.

6 Conclusion

In this paper, I use a novel setting, the health care industry, to test the bargaining benefits from debt during negotiations with a firm's non-financial stakeholders. In testing this theory, existing empirical evidence has relied on indirect evidence that leverage is higher when negotiating with strong stakeholders, for example unions. There is a lack of direct evidence that leverage effects negotiation outcomes because negotiation outcomes are rarely observed, especially for a broad cross-section of firms. I find that hospitals with more leverage receive higher reimbursement rates for a homogeneous procedure (colonoscopies) and this is the first direct evidence that firms receive better bargaining outcomes when they have higher leverage.

Given that there are costs associated with debt, trade-off theory predicts that leverage is more likely to be used to enhance bargaining power when the benefits are greatest, specifically when a firm otherwise lacks bargaining power. Consistent with this notion, I find negotiation outcomes are more sensitive to leverage for subsets of hospitals that have lower ex ante bargaining power; those with a below-median market share, stand-alone hospitals, and hospitals that operate in a market with an insurer HHI above 0.25. In order to help alleviate the concern that ex ante bargaining power is endogenous with respect to capital structure decisions, I use differences in state laws

concerning insurance premium requirements as plausibly exogenous variation in bargaining power with respect to reimbursement rates and leverage to confirm this result. In addition, I show the bargaining benefits from debt exist for nonprofit hospitals, which helps to alleviate concerns that the relationship between leverage and bargaining outcomes is driven by tax motives.

Lastly, I confirm capital structure decisions of these hospitals are consistent with the prior literature by showing leverage is decreasing in a firm's ex ante bargaining power. I find hospital leverage is negatively related to a hospital's market share, positively related to insurer concentration in a market, lower when the hospital is a member of a system, and higher if they are in a state with pooling insurance premium requirements. I conclude this is direct support for the bargaining benefits of debt during negotiations with a firm's non-financial stakeholders.

References

Agrawal, Ashwini K. and David A. Matsa, 2013, Labor unemployment risk and corporate financing decisions, *Journal of Financial Economics* 108, 449–470.

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 Jounral of Economics* 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* 203–220.

Dor, Avi, Michael Grossman, and Siran M. Koroukian, 2004, Hospital transaction prices and managed-care discounting for selected medical technologies, *American Economic Review* 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* 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 hospitalinsurer bargaining in the netherlands, *The European Journal of Health Economics* 12, 589–603.

Hennessy, Christopher A. and Dmitry Livdan, 2009, Debt, bargaining, and credibility in firmsupplier 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.

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

Lerner, Josh, Antoinette Schoar, and Jialan Wang, 2008, Secrets of the academy: The drivers of university endowment success, *The Journal of Economic Perspective* 207–222.

Lewis, Matthew and Kevin Pflum, 2014, Hospital systems and bargaining power: evidence from out-of-market acquisitions.

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

Myers, Brett W. and Alessio Saretto, 2010, Union strikes and the impact of non-financial stakeholders on capital structure, *SSRN eLibrary* .

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* 1131–1141.

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

Figure 1: Metropolitan Areas

This table contains a map of the metropolitan and micropolitan statistical areas in the US. The darker green shades are the metropolitan statistical areas and the markets in which I run all the tests.

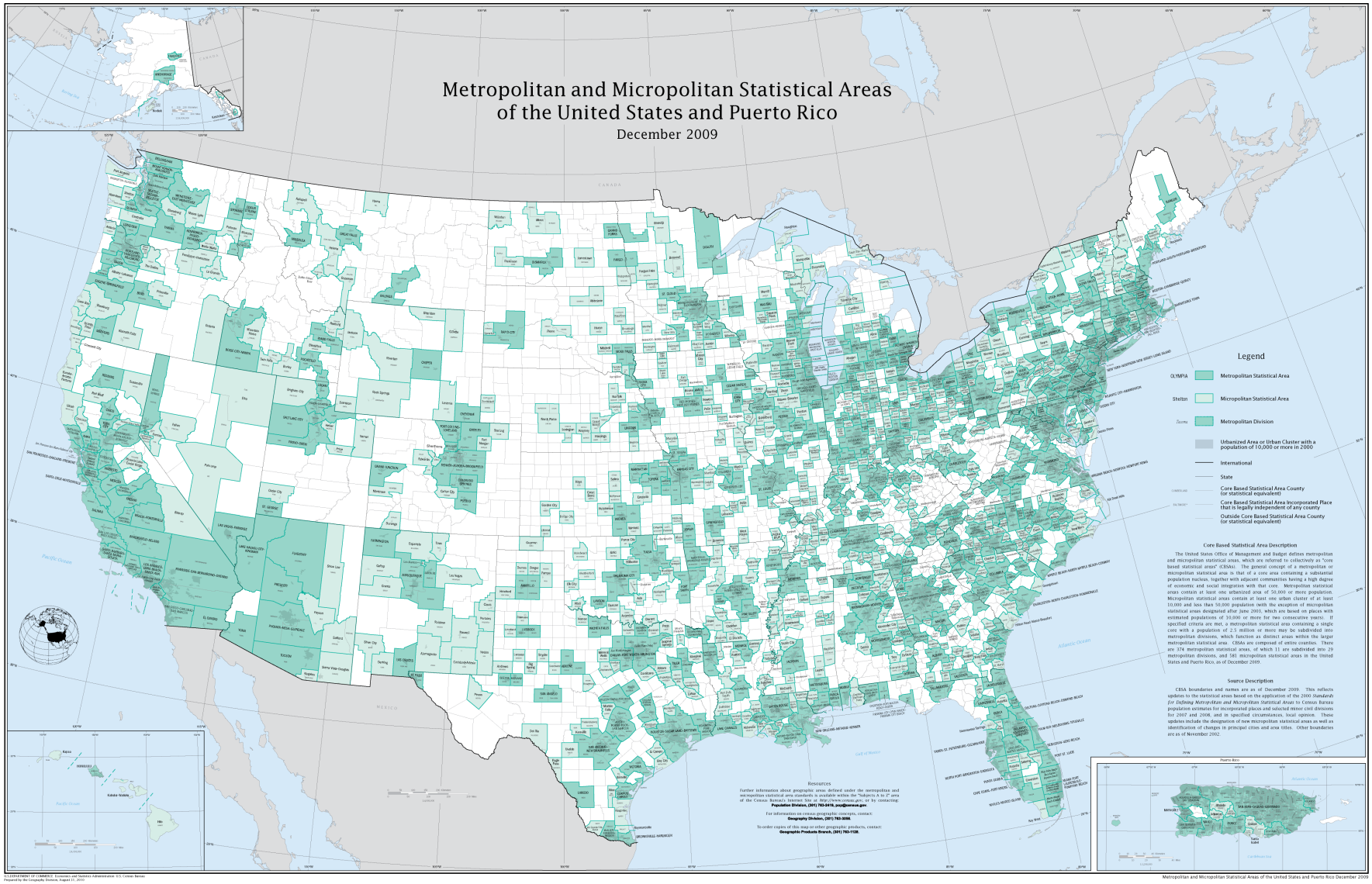

Figure 2: Laws on Medigap Policies

This table contains a map of the states and whether they have restrictions on the prices for Medigap policies. Orange states are the states that restrict insurance companies to price policies identically for older and younger disabled patients

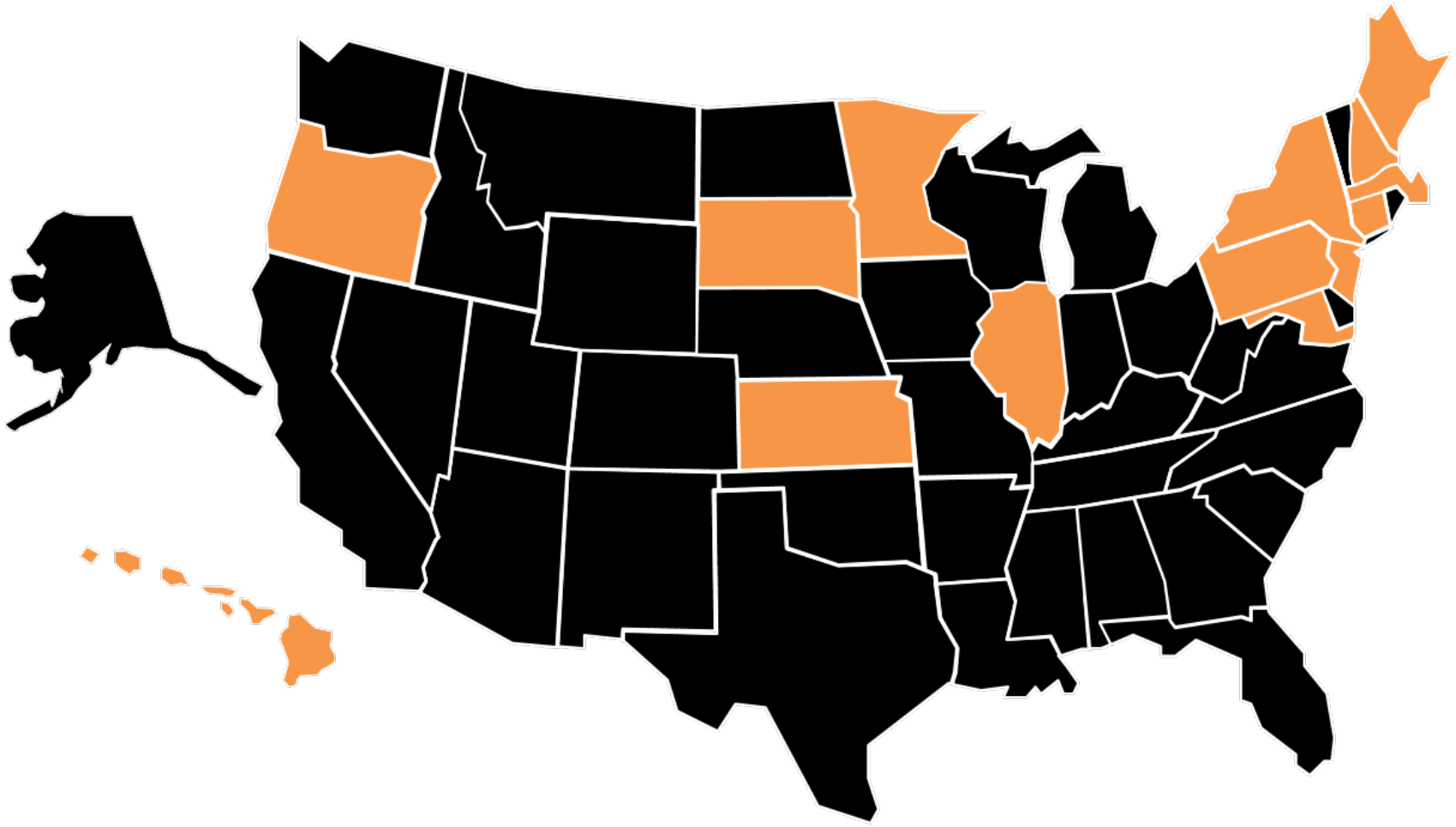

Figure 3: Subsample Regression Plots

This is a plot of the cross sectional coefficients of *Leverage* from equation 1 in regressions on *AvPayment*. The first plot is the coefficient for the entire sample. The red plots are subsample regressions for the hospitals with lower ex ante bargaining power as proxied by the three measures: below median *MktShare*, *NoSystem*, and *HHI_Insurer* less than 0.25. The blue plots are the corresponding regressions for hospitals with higher ex ante bargaining power.

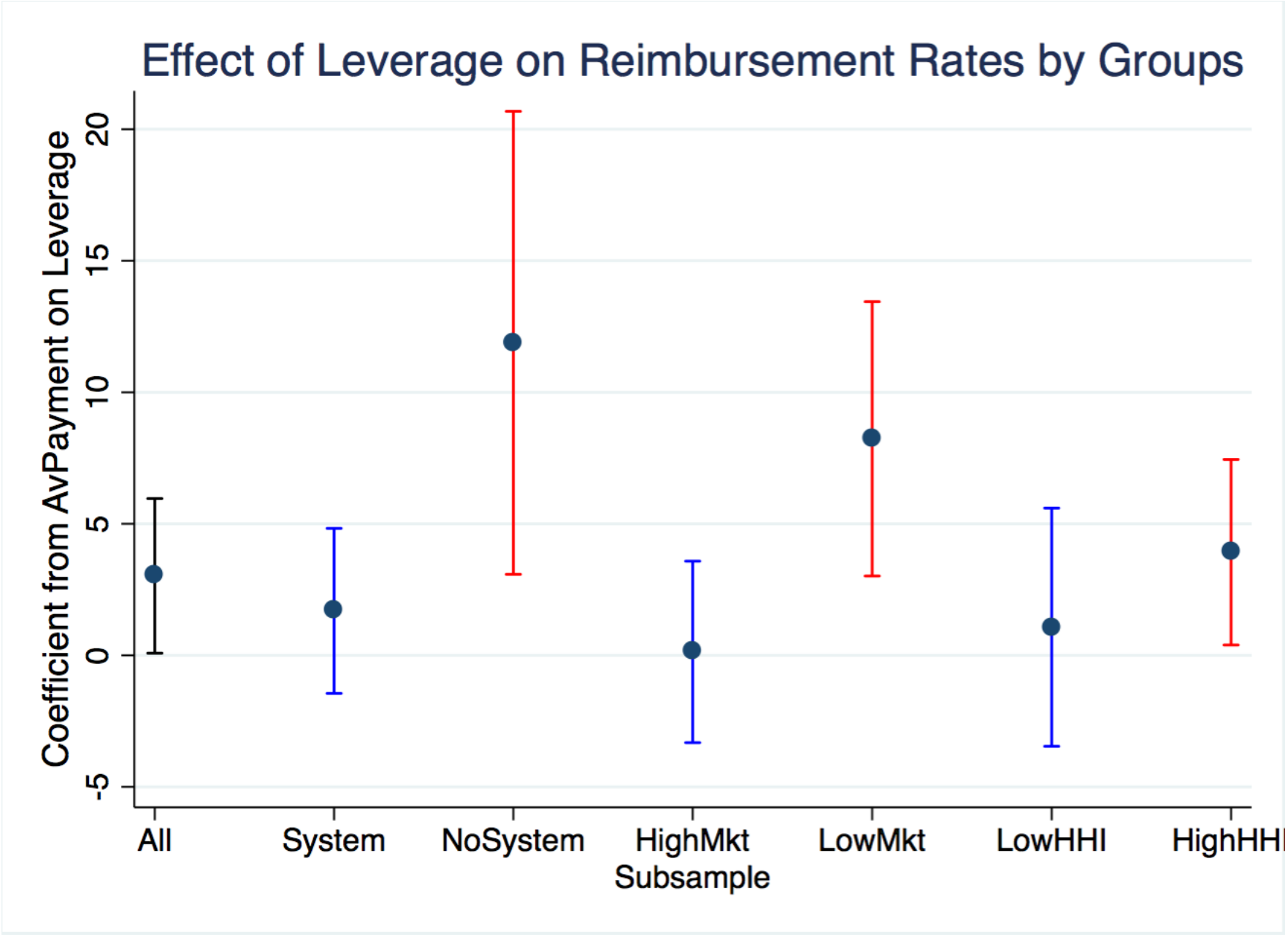

Table 1: Summary Stats

This table contains the summary statistics for the relevant variables. *Leverage* is the book value of leverage for the hospital defined as total long term liabilities scaled by total assets. *NetLeverage* is the net book value of leverage for the hospital defined as total long term liabilities minus cash scaled by total assets. *NumBeds* is the number of staffed beds within the hospital, a common measure of hospital size. *MktShare* is the total number of staffed beds within the system MSA scaled by the total number of beds within the MSA. *HighMkt* is an indicator equal to one if the hospital has an above median market share within that MSA-year. *System* is an indicator variable equal to one if the hospital is part of a hospital system and zero otherwise. *HHI_Insurer* is the Herfindahl-Hirschman Index for both HMO and PPO insurance participation published by the American Medical Association. *LowHHI* is an indicator equal to one if the local insurance market competition is less than 0.25. *NonProfit* is an indicator variable equal to one if it is equal to one if it is an accredited teaching hospital. *Profit* is an indicator variable equal to one if the hospital is a for-profit corporation. *Government* is a dummy variable equal to one if the hospital is a government hospital. *NetIncomeVol* is the annual hospital volatility of net income in millions. *AvPayment* is the average annual payments received from all parties for colonoscopies performed on Medicare patients. *AvCost* is the average annual cost reported by the hospital for colonoscopies past year. *NumProcedures* is the number of colonoscopies performed by the hospital in that year. *Teaching* is an indicator variable equal to one if the hospital is a teaching hospital. *GeoAdjFactor* is the adjustment published b the centers for Medicare and Medicaid to adjust payments for differences in cost of living. All continuous variables are winsorized at the 1% level.

	count	mean	p50	sd	p10	p90
Leverage	6818	0.301	0.303	0.366	0.000	0.696
NetLeverage	6818	0.254	0.255	0.376	-0.024	0.663
NumBeds	6818	296.605	231.500	249.868	68.000	599.000
System	6818	0.754	1.000	0.431	1.000	0.000
MktShare	6818	0.226	0.155	0.230	0.016	0.537
HHI_Insurer	6818	0.313	0.278	0.125	0.201	0.454
NonProfit	6818	0.699	1.000	0.459	0.000	1.000
Profit	6818	0.179	0.000	0.383	0.000	1.000
Government	6818	0.122	0.000	0.328	0.000	1.000
NetIncomeVol	6818	14.401	7.850	16.548	1.955	37.778
AvPayment	6818	514.761	508.844	56.709	446.310	595.727
AvCost	6818	478.562	430.567	223.615	238.408	790.323
NumProcedures	6818	86.828	51.000	106.215	16.000	195.000
Teaching	6818	0.367	0.000	0.482	0.000	1.000
GeoAdjFactor	6818	1.000	0.964	0.115	0.891	1.195

Table 2: Correlations

This table contains the summary statistics for the relevant variables. *Leverage* is the book value of leverage for the hospital defined as total long term liabilities scaled by total assets. *NetLeverage* is the net book value of leverage for the hospital defined as total long term liabilities minus cash scaled by total assets. *HHI_Insurer* is the Herfindahl-Hirschman for both HMO and PPO insurance participation published by the American Medical Association. *MktShare* is the total number of staffed beds within the system-MSA scaled by the total number of beds within the MSA. *System* is an indicator variable equal to one if the hospital is not part of a hospital system and zero otherwise. *NumBeds* is the number of staffed beds within the hospital, a common measure of hospital size. *AvPayment* is the average annual payments received from all parties for colonoscopies performed on Medicare patients. *AvCost* is the average annual cost reported by the hospital for colonoscopies they perform on Medicare patients. *GeoAdjFactor* is the adjustment published b the centers for Medicare and Medicaid to adjust payments for differences in cost of living. *NonProfit* is an indicator variable equal to one if it is equal to one if it is an accredited teaching hospital. *Profit* is an indicator variable equal to one if the hospital is a for-profit corporation.

Variables	Leverage	NetLeverage	HHI_Insurer	MktShare	System	NumBeds	AvPayment	AvCost	GeoAdjFactor	NonProfit	Profit
Leverage	1.000										
NetLeverage	0.978	1.000									
HHI_Insurer	0.013	0.007	1.000								
MktShare	-0.082	-0.073	0.221	1.000							
System	-0.094	-0.070	-0.043	0.179	1.000						
NumBeds	-0.011	0.010	-0.020	0.142	-0.131	1.000					
AvPayment	0.116	0.115	-0.261	-0.189	0.018	0.034	1.000				
AvCost	0.125	0.119	-0.083	-0.087	0.069	0.001	0.319	1.000			
GeoAdjFactor	0.130	0.131	-0.279	-0.256	0.007	0.033	0.757	0.302	1.000		
NonProfit	0.171	0.150	-0.090	0.056	-0.094	0.116	0.152	0.127	0.172	1.000	
Profit	-0.187	-0.159	0.023	-0.118	-0.110	-0.186	-0.119	-0.167	-0.137	-0.711	1.000

Table 3: Summary Stats by MSA

This table contains the summary statistics for the relevant variables at the MSA level. Panel A contains summary statistics from 2008, B from 2010, and C from 2012. *PctProfit* is equal to the percentage of all hospitals that are for-profit hospitals, *PctNonprofit* is equal to the percent of hospitals that are nonprofit, and *PctGovt* is the percent of hospitals that are government hospitals. *MedianPay* is the median reimbursement rate that hospitals receive in the MSA. *MedianCost* is the median cost that hospitals pay for colonoscopies in the MSA. *MedianLev* is the median leverage of each hospital in the respective MSA. *HHI_Insurer* is the Herfindahl-Hirschman Index for both HMO and PPO insurance participation published by the American Medical Association.

Panel A: 2008	count	mean	p50	sd	p10	p90
HHI_Insurer	276	0.382	0.339	0.163	0.218	0.606
MedianPayment	276	465.313	454.135	44.206	422.434	518.066
MedianCost	276	413.463	382.684	150.997	246.931	612.569
MedianLev	276	0.201	0.199	0.181	0.006	0.420
TotalHospitals	276	10.678	5.000	16.922	2.000	26.000
PctGovt	276	0.204	0.101	0.273	0.000	0.646
PctProfit	276	0.166	0.085	0.216	0.000	0.446
PctNonProfit	276	0.631	0.726	0.328	0.000	1.000
Panel B: 2010	count	mean	p50	sd	p10	p90
HHI_Insurer	303	0.333	0.303	0.139	0.202	0.506
MedianPayment	303	502.755	491.733	48.300	453.892	564.857
MedianCost	303	441.242	414.160	160.238	271.799	656.785
MedianLev	303	0.218	0.203	0.193	0.001	0.451
TotalHospitals	303	11.429	6.000	18.022	2.000	28.000
PctGovt	303	0.189	0.090	0.260	0.000	0.592
PctProfit	303	0.175	0.106	0.207	0.000	0.441
PctNonProfit	303	0.636	0.720	0.321	0.024	1.000
Panel C: 2012	count	mean	p50	sd	p10	p90
HHI_Insurer	317	0.334	0.298	0.137	0.201	0.501
MedianPayment	317	534.167	522.829	58.225	477.174	609.870
MedianCost	317	467.044	439.364	169.181	280.000	685.072
MedianLev	317	0.175	0.175	0.198	0.000	0.425
TotalHospitals	317	11.224	6.000	17.778	2.000	27.000
PctGovt	317	0.184	0.076	0.255	0.000	0.606
PctProfit	317	0.192	0.110	0.224	0.000	0.486
PctNonProfit	317	0.624	0.691	0.322	0.027	1.000

Table 4: Variance Decomposition

This table contains the Variance Decomposition of *NetLeverage*, *AvPayment*, *MktShare*, and *HHI_Insurer*. 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, System Affiliations, and States.

Variable	**Leverage**	**AvPayment**	**MktShare**	**Insurer_HHI**
Overall Mean	0.301	514.8	0.226	0.313
Overall S.D.	0.366	56.7	0.23	0.125
Between Hospital	0.363	51.6	0.225	0.118
Within Hospital	0.133	27.6	0.031	0.043
Between MSA	0.227	45.6	0.265	0.138
Within MSA	0.325	33.4	0.122	0.044
Between Year	0.012	26.7	0.008	0.025
Within Year	0.366	51.6	0.23	0.123
Between System	0.323	52.4	0.041	0.037
Within System	0.213	29.4	0.229	0.124
Between State	0.14	40.1	0.126	0.094
Within State	0.348	39.5	0.214	0.084

Table 5: Payment on Leverage

This table contains regressions with *AvPayment* as the dependent variable with *Leverage* and *NetLeverage* as the independent variables of interest for the first and last three columns respectively. All columns contain year fixed effects and *GeoAdjFactor* with standard errors clustered at the hospital level. Columns two and four are cross sectional estimates with additional hospital and MSA controls. Columns three and six include hospital fixed effects. All variable definitions are in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)
	AvPayment	AvPayment	AvPayment	AvPayment	AvPayment	AvPayment
Leverage	4.615***	3.144**	4.749**			
	(3.10)	(2.08)	(2.40)			
NetLeverage				4.019***	2.677*	3.924**
				(2.80)	(1.86)	(2.25)
GeoAdjFactor	374.6***	368.3***		374.8***	368.4***	
	(70.44)	(64.05)		(70.43)	(64.03)	
AvCost		0.0122***	0.0192***		0.0122***	0.0192***
		(4.75)	(5.56)		(4.77)	(5.55)
NonProfit		3.177*			3.226*	
		(1.72)			(1.75)	
NumBeds		0.00306	0.00462***		0.00297	0.00462***
		(1.22)	(2.67)		(1.19)	(2.67)
Profit		0.299			0.190	
		(0.13)			(0.08)	
System		-1.591	8.609		-1.653	8.775
		(-1.07)	(1.05)		(-1.11)	(1.08)
LowHHI		-1.322	-0.574		-1.336	-0.569
		(-1.17)	(-0.56)		(-1.18)	(-0.55)
HighMkt		-1.467	-0.201		-1.500	-0.219
		(-1.17)	(-0.12)		(-1.19)	(-0.13)
NumProcedures		0.0115**	-0.00235		0.0114**	-0.00236
		(2.35)	(-0.35)		(2.33)	(-0.35)
Teaching		3.057**			3.059**	
		(2.24)			(2.24)	
NetIncomeVol		-0.0745*			-0.0749*	
		(-1.79)			(-1.80)	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	Yes
N	6818	6818	6818	6818	6818	6818
adj. R^2	0.743	0.747	0.653	0.743	0.747	0.653

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01

Table 6: Payment Subsamples on Leverage

This table contains regressions with *AvPayment* as the dependent variable for subsets of the hospitals. All columns contain year fixed effects and *GeoAdjFactor* with standard errors clustered at the hospital level. Panel A contains ordinary least squares regressions and Panel B contains hospital fixed effects. The first column in each panel contains hospitals that are affiliated with a system and the second column contains hospitals with no system affiliation. The third column contains hospitals with below median *MktShare* within the MSA-year and column four contains hospital that are above median. The fifth column contains those with *HHI_Insurer* below 0.25 and the final column those above 0.25

Panel A: OLS						
	(1)	(2)	(3)	(4)	(5)	(6)
	System	NoSystem	LowMktShare	HighMktShare	LowHHI	HighHHI
Leverage	1.692	11.88***	8.228***	0.135	1.069	3.918**
	(1.06)	(2.64)	(3.10)	(0.08)	(0.46)	(2.17)
AvCost	0.0144***	0.00440	0.00185	0.0189***	0.0165***	0.00879***
	(5.42)	(0.78)	(0.45)	(6.45)	(3.74)	(3.26)
GeoAdjFactor	369.6***	362.5***	353.2***	376.1***	378.0***	355.0***
	(55.19)	(34.01)	(40.52)	(55.38)	(45.29)	(49.74)
System			-1.953	-0.202	-2.315	-1.034
			(-0.99)	(-0.09)	(-0.87)	(-0.64)
HighMkt	-0.750	-5.260**			-2.499	-0.515
	(-0.52)	(-1.97)			(-1.16)	(-0.36)
LowHHI	-1.512	-1.360	0.555	-2.393*		
	(-1.17)	(-0.57)	(0.29)	(-1.78)		
NumProcedures	0.0120**	0.0152	0.00637	0.0147**	0.0200**	0.0127**
	(2.37)	(1.03)	(0.74)	(2.56)	(2.20)	(2.35)
adj. R^2	0.746	0.752	0.752	0.747	0.741	0.725
Panel B: Firm FE						
	(1)	(2)	(3)	(4)	(5)	(6)
	System	NoSystem	LowMktShare	HighMktShare	LowHHI	HighHHI
Leverage	5.041**	3.017	8.051**	3.273	2.658	5.309**
	(2.43)	(0.48)	(2.34)	(1.45)	(0.91)	(2.07)
AvCost	0.0226***	0.0113*	0.0153***	0.0218***	0.0270***	0.0131***
	(5.44)	(1.89)	(2.80)	(4.71)	(3.88)	(3.57)
System			17.98*	-13.55***	28.41***	2.158
			(1.78)	(-11.91)	(20.07)	(0.31)
HighMkt	0.934	-2.983			-5.139	2.675
	(0.46)	(-1.01)			(-1.57)	(1.24)
LowHHI	-0.120	-1.805	-1.713	-0.724		
	(-0.10)	(-0.87)	(-0.91)	(-0.58)		
NumProcedures	-0.000587	-0.00757	-0.0141	0.00621	0.0166	-0.00345
	(-0.08)	(-0.42)	(-1.25)	(0.72)	(1.05)	(-0.45)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	5140	1678	2621	4197	2592	4226
adj. R^2	0.646	0.675	0.652	0.653	0.545	0.685

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01

Table 7: State Law Regressions

This table contains regressions with average payment as the dependent variable. All regressions include year fixed effects and standard errors clustered at the state level. Columns one and two are subsample regressions on negotiation outcomes for hospitals without and with Medicare *SamePremium* requirements respectively with *Leverage* as the coefficient of interest while columns three and four use *NetLeverage*.

	(1)	(2)	(3)	(4)
	AvPayment	AvPayment	AvPayment	AvPayment
Leverage	1.125	6.793*		
	(0.67)	(1.95)		
NetLeverage			0.670	7.213**
			(0.42)	(2.15)
AvCost	0.00631**	0.0175***	0.00640**	0.0175***
	(2.07)	(3.96)	(2.10)	(3.95)
NonProfit	1.256	5.351	1.283	5.222
	(0.66)	(0.95)	(0.67)	(0.92)
Profit	-2.622	9.998	-2.727	9.711
	(-1.11)	(1.53)	(-1.16)	(1.49)
GeoAdjFactor	367.9***	347.8***	367.9***	347.7***
	(56.87)	(30.25)	(56.91)	(30.20)
System	-1.667	0.0548	-1.718	-0.0428
	(-0.95)	(0.02)	(-0.98)	(-0.02)
LowHHI	-2.939**	4.308*	-2.940**	4.275*
	(-2.20)	(1.94)	(-2.20)	(1.92)
HighMkt	0.00146	-3.239	-0.0381	-3.263
	(0.00)	(-1.43)	(-0.03)	(-1.44)
Teaching	3.046**	2.212	3.015*	2.222
	(1.97)	(0.91)	(1.95)	(0.92)
NetIncomeVol	-0.0935**	0.0522	-0.0938**	0.0486
	(-2.08)	(0.72)	(-2.08)	(0.67)
State Laws	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
N	4754	2064	4754	2064
adj. R^2	0.717	0.734	0.717	0.734

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01

Table 8: Payment on Leverage by Corporate Type

This table contains regressions with *AvPayment* as the dependent variable for subsets of hospitals based on their corporate status. Columns one and three only contain the subset of for-profit hospitals while columns two and four include nonprofit hospitals. In addition, the last two columns include hospital fixed effects.

	(1)	(2)	(3)	(4)
	Profit	NonProfit	Profit	NonProfit
Leverage	-0.189	5.627**	3.992	2.786
	(-0.09)	(2.54)	(1.60)	(0.85)
AvCost	0.0188***	0.0115***	0.0243**	0.0196***
	(2.72)	(3.83)	(2.44)	(4.66)
NumBeds	-0.00227	0.00351	-0.0423	0.00450***
	(-0.23)	(1.24)	(-0.71)	(3.24)
GeoAdjFactor	387.5***	363.5***		
	(26.13)	(53.46)		
LowHHI	-1.605	-0.772	0.279	0.726
	(-0.60)	(-0.58)	(0.10)	(0.61)
HighMkt	2.963	-2.517	4.149	-2.073
	(1.03)	(-1.64)	(0.72)	(-1.02)
NumProcedures	0.00480	0.0109**	-0.0577**	0.00408
	(0.37)	(2.03)	(-2.11)	(0.54)
System	-5.433	-0.270		8.918
	(-1.43)	(-0.15)		(1.09)
Teaching	7.680**	2.084		
	(2.16)	(1.33)		
NetIncomeVol	-0.179	-0.0653		
	(-0.91)	(-1.38)		
Year FE	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes
N	1221	4763	1221	4763
adj. R^2	0.672	0.753	0.541	0.674

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01

Table 9: Leverage on Bargaining Power

This table contains regressions with hospital leverage and net leverage as the dependent variable for the first and last three columns respectively. All regressions include year fixed effects and standard errors clustered at the hospital level. The first column contains the four variables of interest *MktShare*, *HHI_Insurer*, *System*, and *NoLaws*. The second and fourth column contain other MSA level controls and hospital controls, and the third and final column contains hospital fixed effects. Variable definitions can be found in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)
	Leverage	Leverage	Leverage	NetLeverage	NetLeverage	NetLeverage
MktShare	-0.109***	-0.129***	-0.118***	-0.100***	-0.120***	-0.114***
	(-3.23)	(-3.79)	(-3.47)	(-2.89)	(-3.44)	(-3.29)
(1-HHI_Insurer)	-0.0971	-0.114*	-0.0792*	-0.0816	-0.0996	-0.0799*
	(-1.56)	(-1.83)	(-1.83)	(-1.27)	(-1.55)	(-1.77)
System	-0.0555***	-0.0498***	-0.0547***	-0.0371**	-0.0366**	-0.0390**
	(-3.65)	(-3.20)	(-3.18)	(-2.37)	(-2.30)	(-2.31)
NoLaws	-0.0819***	-0.0749***		-0.0880***	-0.0808***	
	(-4.54)	(-4.15)		(-4.80)	(-4.42)	
PctProfit	-0.283***	-0.146**	-0.143***	-0.262***	-0.148**	-0.154***
	(-4.60)	(-2.37)	(-3.11)	(-4.13)	(-2.31)	(-3.24)
PctGovt	-0.0202	0.0331	-0.0320	0.000495	0.0496	-0.0361
	(-0.48)	(0.67)	(-0.81)	(0.01)	(0.97)	(-0.90)
NumBeds		-0.0000542	-0.00000865		-0.0000295	0.00000311
		(-1.47)	(-0.53)		(-0.79)	(0.20)
Teaching		-0.00156			-0.000816	
		(-0.09)			(-0.05)	
NonProfit		0.0575**	0.0121		0.0561**	0.00320
		(2.55)	(0.53)		(2.46)	(0.14)
Profit		-0.0898**			-0.0629*	
		(-2.47)			(-1.70)	
NetIncomeVol		0.000543			0.000800	
		(1.09)			(1.59)	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	Yes
N	6818	6818	6818	6818	6818	6818
adj. R^2	0.043	0.062	0.042	0.035	0.048	0.034

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01