

INSURER-HOSPITAL BARGAINING: NEGOTIATED DISCOUNTS IN POST-DEREGULATION CONNECTICUT*

Alan T. Sorensen*

March 30, 2001

Abstract

This paper uses unique data from the state of Connecticut to examine discounting patterns in the state's hospital industry for the years following deregulation (1995-1998). The data provide a rare opportunity to study payer-level differences in negotiated discounts for hospital services. In addition to presenting descriptive evidence on how discounts vary across payers, payer types, and hospital types, this study uses matched revenue data to analyze the economic determinants of discount magnitudes. Payer size appears to affect bargaining power, but the economic significance of the effect is small. The data exhibit patterns consistent with a bargaining explanation in which discount magnitudes depend critically on payers' abilities to channel patients to hospitals with which favorable discounts have been negotiated.

1 Introduction

Why do some insurance companies get much better deals than others when negotiating with hospitals?

Hospital-insurer bargaining has only become relevant within the last two decades. Prior to the 1980s, almost all hospitals set their charges unilaterally and were then reimbursed on a fee-for-service basis, so all third-party payers paid the same price for hospital services. Over the past two decades, however, deregulation of hospital pricing and the rise of managed care have led to a system in which hospitals typically negotiate reimbursement rates separately for each payer, and the resulting reimbursement rates vary substantially across payers.

Conventional wisdom holds that size confers bargaining power in these negotiations: payers that represent large volumes of patients are able to extract greater price concessions from hospitals than their smaller

*Department of Economics, University of California, San Diego; asorensen@ucsd.edu. Special thanks to Maryann Lewis and Karen Nolen of the Connecticut Office of Health Care Access for their help in assembling the discount data, and to Rhonda Johnson of CHIME, Inc. for making the charge data available. I am also grateful for helpful comments from Glenn Ellison, and Annette Jacobs, Nancy Rose, and Burton Weisbrod, and for outstanding research assistance from Steven Sumner.

rivals. Consequently, insurance companies have consolidated and small businesses have formed purchasing coalitions in order to gain bargaining clout.¹ Economic models suggest bargaining advantages for large payers may result from characteristics of hospitals' production functions or from oligopolistically competitive behavior among hospitals. The models of Stole and Zwiebel (1996) and Chitty and Snyder (1999) show that large buyers have a bargaining advantage over smaller buyers when the seller's gross surplus function is concave.² Snyder (1996) shows that large buyers may extract discounts in a dynamic oligopoly setting, since tacitly collusive prices for large purchasers must be reduced to prevent undercutting.³

Although size is commonly believed to be the principal determinant of bargaining clout, it cannot alone explain observed patterns in negotiated discounts. Pauly (1998) has noted (and the data here confirm) that even very small managed care organizations (MCOs) often negotiate substantial discounts from hospitals. This paper suggests the primary bargaining advantage of MCOs relative to traditional indemnity insurers is the superior ability of MCOs to channel patients to selected providers. Indemnity insurers do not restrict the set of providers whose services they will cover, so patients choose their doctors and hospitals freely. In contrast, MCOs gain control over patients' choices by limiting covered services to a restrictive provider network (so that patients obtaining services from doctors or hospitals outside of the network must do so at a much greater out-of-pocket expense). The degree of control exercised by a given MCO (what I will call the MCO's ability to "channel patients") depends on factors such as the restrictiveness of its network and the degree to which its coverage rates differ between in-network and out-of-network providers. A payer's ability to channel its patients should play a critical role in bargaining, since it determines the credibility of any threat to withdraw business from high-price providers. Nevertheless, previous empirical research has

¹In a recent survey of the changes in healthcare markets, Gaynor and Haas-Wilson (1999) suggest the merger wave of the 1990s was partly driven by hospitals' and payers' attempts to improve their bargaining positions. The perceived importance of size is also reflected in newspaper accounts of hospital consolidations, which commonly cite bargaining clout as a primary objective of the merging parties. (See, for example, (*Wall Street Journal* 1996) or (*New York Times* 1998).) Other motives for consolidating are explored in the case study by Barro and Cutler (1997).

²Stole and Zwiebel consider whether employees of a firm would rather negotiate collectively (i.e., unionize) or individually, and show that unions are preferred when the production technology is concave. Adapted to the present study, their model suggests that insurers will prefer to negotiate collectively (e.g., by consolidating) if hospitals' surplus functions are concave.

³The model is analogous to that of Rotemberg and Saloner (1986), with large buyers representing "booms" in demand.

largely ignored the role of patient-channeling in insurer-hospital negotiations.

Since hospitals and insurers typically regard negotiated reimbursement rates as sensitive market information, data on these rates are rarely made available to the public. Consequently, there has been little empirical analysis of variation in rates across payers. However, a number of previous studies have examined variation across hospitals. Melnick et. al. (1992) look at data on negotiated per diem rates across hospitals for California's largest PPO, focusing attention on the influence of hospital competition (as measured by Hirschman-Herfindahl indexes) on discounts.⁴ Brooks, Dor, and Wong (1997) examine payment rates for a specific hospital service (appendectomies) using a MEDSTAT database consisting of claims from employees of self-insured firms. Since their data cover only a narrow class of payers (for a large number of hospitals), the analysis rightly emphasizes market characteristics (e.g. hospital concentration) and hospital institutional arrangements (e.g. ownership type, affiliations) as determinants of *hospital* bargaining power.

In contrast with the aforementioned studies, this paper uses data for a large number of payers (at a small number of hospitals) and focuses on determinants of insurer bargaining power. To my knowledge, the only published study that directly addresses the determinants of insurer bargaining power is that of Staten, Umbeck, and Dunkelberg (1988). They argue that size alone does not confer the power to extract price concessions from hospitals—an insurer must be able to *credibly* threaten to send its patients elsewhere. Moreover, even managed care organizations may not be able to fully enforce such a threat, since patients may be more loyal to hospitals than they are to insurers.⁵ Whether the ability to channel patients to selected providers is sufficient to endow an insurer with bargaining power is, as the authors note, an empirical question.

This paper empirically examines the outcomes of hospital-insurer negotiations using unique data from

⁴Their finding of higher hospital concentration leading to higher prices (smaller discounts) is confirmed by Dranove et. al. (1993). Keeler et. al. (1999) address the same sets of questions using a richer panel dataset (again from California), showing that the impact of concentration on price has grown steadily over time.

⁵That is, if an insurer removes a hospital from its network of covered providers, patients may choose to switch insurers instead of switching hospitals. See Melnick et. al. (1992) for a nice discussion of the role played by patients' allegiance in insurer-hospital bargaining.

the state of Connecticut. In addition to providing an overview of discounting patterns, this study seeks to identify the importance of payer characteristics in determining discount magnitudes⁶ The basic results are unsurprising: I find that HMOs and PPOs extract larger discounts than traditional indemnity plans, and that discounts are increasing in payer size (as measured by total county charges). However, the data suggest that size *per se* is not the critical determinant of discount magnitudes. I present evidence that patterns in discounts and revenue allocations are consistent with a bargaining explanation based on payers' differential abilities to channel patients to selected providers. In particular, charges incurred by MCOs tend to be highly skewed toward hospitals with which favorable discounts have been negotiated, and more highly skewed allocations tend to be associated with larger discounts. Indemnity insurers' charges tend to be incurred more symmetrically across competing hospitals in a city. Results from an econometric model suggest patient channeling is relatively more important than payer size in determining discount magnitudes; in particular, the impact on discounts of a one standard deviation increase in a payer's ability to channel patients⁷ is roughly eight times larger than the impact of an equivalent increase in payer size.

2 Background and Data

2.1 Deregulation

In 1994, Connecticut became one of the last U.S. states to deregulate hospital pricing. The impetus for deregulation came from a U.S. District Court case, in which the judge ruled that Connecticut's method of shifting the costs of uncompensated care to non-governmental payers conflicted with federal laws. The ruling held that a self-insured union health plan did not have to pay the mandated 19% surcharge on hospital services (for the state uncompensated care pool) because doing so would violate the federal Employee Retirement Income Security Act. As a result of the conflict, Connecticut was faced with the possibility of losing \$150 million in federal Medicaid funds.

⁶Defining discounts is a tricky data issue since they reflect percentages of list prices, which are notoriously problematic. I discuss this in more detail in section 2.2

⁷As defined by the magnitude of its patient reallocation response to disparities in offered discounts.

The state legislature responded quickly with a deregulation plan that was signed into law on April 1, 1994. During the previous two decades, hospital rates had been set by a regulatory board. Discounts were limited to 3.5 percent and had to be offered to all payers if offered at all. After the 1994 legislation, hospitals could set prices freely, and *all* payers could negotiate separately with hospitals.

2.2 Discount Data

The legislation also required that all negotiated agreements between hospitals and payers be filed with a new agency, the Connecticut Office of Health Care Access (OHCA). Although the exact terms of the agreements are confidential, hospitals must file separate schedules listing overall discounts by payer, and this information is public. At the time of the data collection, Connecticut was unique among states in collecting and making available discount information at the payer level.

The data used for this paper come from schedules filed by each of the 32 acute-care hospitals in Connecticut for the years 1995-1998. The schedules list gross charges and payments for every commercial payer with which the hospital had a negotiated agreement. The difference between charges and payments is called the “contractual allowance,” and is what I will call the “discount” throughout the remainder of the paper. Here it is important to note that gross charges reflect list prices, which almost never reflect the actual prices paid. However, they often constitute the benchmark upon which discounts are based. Using the contractual allowance to represent the discount is similar to the approach taken by Dranove et. al. (1993) in their study of California hospital prices. Over 160 payers negotiated discounts with one or more Connecticut hospitals during the period covered by the data. Payers are identified by company and type: for instance, Aetna’s indemnity, PPO, and HMO plans are treated as three separate payers in the data. Table 1 lists the hospitals along with some of their basic characteristics.

The data do not provide details about the specific form of the negotiated arrangements, but some features of the contracts are reported to be fairly general. A typical arrangement will specify a fee schedule based

on broad diagnoses, an overall percentage discount off fee-for-service rates, or some combination of the two. Although some agreements may only specify discounts in certain departments, it is more common for the discount arrangements to be comprehensive. Risk-sharing is uncommon, occurring in only 2-5% of the cases.⁸

Although unique in its ability to analyze across-payer variation in hospital discounts, this study suffers from two significant data difficulties relative to the studies mentioned in the introduction. First, Connecticut only makes discount data available at the aggregate level—that is, the discounts are computed as the percentage difference between total charges incurred and total actual payments to the hospital. Thus, the discounts in the data are weighted averages of service-specific discounts. This complicates comparisons of discounts across payers or across hospitals, since the intensity of use for a particular service (the weights in the weighted average) may vary across hospitals for a given payer, as may the service-specific discounts. Ideally, one would like to compare discounts across payers for narrowly defined hospital services⁹

The second difficulty inherent in this study is that hospitals' listed rates may vary, so that reported discounts may reflect percentages of unequal bases. For instance, if two hospitals charge \$200 and \$180 (respectively) for the same procedure, and a payer negotiates a 10 percent discount at the first of these hospitals but no discount at the other, the data will indicate that the payer has a more favorable discount agreement with the first hospital even though it pays the same price at either facility. However, for this study the impact of this data problem may be limited. The issue poses no problems for comparing discounts across payers for a given hospital, which is the primary focus of this study. In the empirical models, hospital fixed effects can absorb any across-hospital variation in list prices. Moreover, since list prices are the default reimbursement rates for payers with no power to negotiate discounts, discounts relative to list prices may

⁸This information about the form of the discount arrangements was learned in conversations with Maryann Lewis at OHCA, who at the time of the data collection was responsible for reviewing the actual contracts.

⁹The study by Brooks, Dor, and Wong (1997) focuses on appendectomies, so that clean price comparisons can be made. Unfortunately, their data cover only a narrow set of payers, and procedure-specific discount data across a larger number of payers are unavailable (to my knowledge).

be the most accurate measure of bargaining power even when list prices vary across hospitals. To the extent that differences in list prices reflect differences in hospital quality, the discount variable in fact represents precisely the variable we're interested in. In terms of the example mentioned above, even though a payer might pay the same amount (\$180) for a service at two different hospitals, the discount at the \$200 hospital indicates greater bargaining power *vis a vis* that hospital if its higher list price reflects superior quality in some dimension (e.g., better doctors or more convenient location).

2.3 Charge Data

The schedules hospitals submit to OHCA only list revenues from payers who had negotiated agreements. In order to complete the picture of revenue allocation across hospitals for each payer, I acquired additional data from the Connecticut Hospital Association (CHA) listing charges incurred by all payers at 31 of the 32 hospitals included in the OHCA data.¹⁰

Data on charges were merged with data on discounts for the analysis of discounts as a function of payers' differential abilities to channel patients (Sections 3.2-3.3). Coding differences in the datasets complicated the matching process, and some payers had to be dropped since information was either missing or incomplete. For the descriptive tables that follow in Section 3.1, I use the full set of 135 payers that negotiated at least one hospital agreement in the years 1995-1998. For the analyses that require information about payer charges at all hospitals (regardless of whether an agreement was negotiated or not), I use only the 57 payers for which the OHCA discount data and CHA revenue data could be reliably matched.

3 Empirical Analysis

3.1 General Patterns in Negotiated Discounts

To provide a general idea of the discount magnitudes, Table 2 shows quantiles of the discount distribution for the 2,740 payer-hospital agreements represented in the OHCA data. Not every payer negotiates agreements

¹⁰Revenue information for Griffin Hospital was not available from CHA for 1995-1996.

with every hospital; for example, the volume of business done by small payers in some cities may not warrant the cost of negotiating an agreement, so they just settle for paying list prices. Also, aggressive HMOs sometimes negotiate with two competing hospitals in a city, but sign an agreement with only one of them. Since the data report discounts only for hospital-payer pairs that negotiated and filed an agreement with OHCA, either of the above examples would result in a “missing” hospital-payer pair. The distributions represented in Table 2 should therefore be interpreted as the distributions of discounts *conditional* on having negotiated and signed an agreement.

As the table indicates, most negotiated discounts in 1995 (the year immediately following deregulation) were modest: over half of the agreements resulted in aggregate discounts of less than 4 percent. However, discount magnitudes increased sharply in subsequent years. Large discounts are not uncommon: in 1998, over one quarter of the hospital-payer negotiations resulted in discounts of over 35 percent.

The general perception in the healthcare industry is that negotiated contracts between hospitals and payers are the rule rather than the exception. However, the data suggest that some payers incur charges at hospitals with which no discounting arrangement has been negotiated and signed. Of the payer-hospital pairs represented in the CHA revenue data, roughly 85 percent do not report discount arrangements. However, according to the revenue data, relationships under negotiated agreements account for approximately 60 percent of total non-government charges in the state. The implication is that payers who negotiate tend to represent relatively large patient bases, and they tend to negotiate with the hospitals they use most.

Table 3 summarizes the variation in discount magnitudes across hospitals and payers. Discounts can vary widely across payers at any given hospital: the largest discounts are roughly 5-10 times larger than the smallest discounts at most hospitals. Discounts also appear to vary substantially across hospitals, as can be seen by comparing (for instance) the median discount across hospitals.¹¹ Table 4 summarizes discounts by payer type: managed care organizations like HMOs and PPOs negotiate larger discounts (on average) than

¹¹However, note that this variation in discount magnitudes across hospitals may partly reflect differences in the hospitals’ “list prices,” as discussed in Section 2.2.

indemnity insurers. Interestingly, however, the table indicates that indemnity plans also receive substantial discounts in some cases. One possible reason for this is that many insurers offer multiple health plans, so that some payers can leverage the bargaining clout of their HMO and PPO plans to get discounts for their indemnity patients.¹²

Table 5 presents results from linear regressions using the negotiated discount (measured as a percentage) as the dependent variable; the table provides a rough quantitative description of how discounts depend on payer characteristics. Only data from hospital-payer pairs that filed an agreement with OHCA are included, so the results should again be interpreted as being conditional on a contract being negotiated and signed. The results confirm the pattern suggested by Table 4: HMOs, PPOs, and self-insured employers all negotiate better discounts on average than traditional indemnity plans (the omitted category), while discounts received by third-party administrators¹³ are slightly smaller. Agreements negotiated by HMOs lead to aggregate discounts that are on average 14 percentage points larger than those received by traditional indemnity plans. Somewhat surprisingly, payers designated as PPOs in the data do not appear to fare much better than indemnity insurers at the bargaining table: on average, discounts for PPOs are only 2 percentage points better than those for indemnity plans. The results also suggest a time trend: average negotiated discounts increased monotonically in each year following deregulation.

An indicator variable for “geographically isolated” hospitals is included in the regression as a control for hospital bargaining power. As Staten et. al. (1988) point out, hospitals that serve as sole providers of inpatient care in their areas have a strong bargaining position, since even managed care plans will have difficulty persuading their enrollees to travel long distances to alternative hospitals.¹⁴ The regression results

¹²Also, payers labeled in the data as “indemnity” insurers may not be indemnity insurers in the traditional sense—many plans that are referred to as indemnity plans still make distinctions between “in-network” and “out-of-network” providers. Insurers cannot be as cleanly categorized as Table 4 suggests; because of this, the nominal distinction between indemnity plans, HMOs, and PPOs is essentially dropped in the analysis presented in section 3.3.

¹³Third-party administrators are organizations that administer an insurance contract for a self-insured group but do not have financial responsibility for paying claims. They typically contract with self-insured firms, although they also often contract with indemnity insurers to provide claims processing and billing services.

¹⁴The article by Staten et. al. found that hospitals with no within-county rivals were significantly less likely to submit bids for inclusion in the network of a newly formed Blue Cross PPO, presumably because they could expect to be included regardless of

confirm this intuition: at hospitals with no rivals within a 10-mile radius (22 percent of the hospitals in the sample), negotiated discounts are on average 14-20 percentage points lower.

The second and third columns of the table report results from specifications that include a measure of payer size. Conventional wisdom in the health care industry is that “volume is king”—that is, large payers enjoy substantial bargaining power *vis a vis* hospitals, perhaps because hospitals often have excess capacity to fill. Economists have debated whether size alone can confer market power in hospital-insurer negotiations;¹⁵ the evidence here suggests that larger payers indeed enjoy an advantage in bargaining, but the advantage is small. Here, payer size is measured as the payer’s total charges in the hospital’s county, and is intended to capture differences in the amounts of potential business different payers could generate for a hospital. Since the amount of business a payer generates in a county may depend in part on the discounts negotiated in that county, the payer size variable may be regarded as jointly endogenous with the dependent variable. Column 3 of the table therefore shows estimates from an instrumental variables regression in which average payer size across all other counties is used as an instrument. The estimated coefficient on payer size increases slightly. The point estimate suggests that increasing a payer’s hospital payments in a county by 20 percent (*ceteris paribus*) would enable that payer to extract an additional one quarter of a percentage point in discount negotiations with hospitals. Although this effect is statistically distinguishable from zero, its apparent economic significance is very small.¹⁶

3.2 Channeling and Bargaining Clout

The results of the previous section suggest that size alone cannot explain the wide variation in discounts across payers. Why then are some payers able to extract much larger discounts than their rivals? One straightforward economic explanation of variation in discounts is based on payers’ different abilities to

whether or not they offered a discount.

¹⁵See the articles by Staten et. al. (1987, 1988) and Pauly (1987).

¹⁶It is possible that payer size affects discount magnitudes nonlinearly. For instance, payers may enjoy size-related bargaining advantages only if they are very large relative to rival payers. However, results from unreported regressions (available from the author) incorporating various forms of nonlinearity yield very little evidence of this kind of relationship between discounts and payer size.

channel their patients to one hospital vs. another. As in any bargaining situation, a payer's threat to "take its business elsewhere" is critical, and an increase in a payer's ability to channel patients is analogous to an increase in the credibility of that threat. Industry insiders often call this the ability to "move market share," and its strategic role in negotiating discounts is widely recognized.

Why should payers differ in their abilities to channel patients to chosen providers? The simplest answer is that insurance plans vary in the degree to which members control their choice of hospital: since consumers' preferences over "freedom of choice" vary, health plans differentiate themselves in consumer markets along this very dimension. The defining feature of a true indemnity plan, for example, is that covered services are reimbursed equally regardless of the provider, thus giving the patient maximal choice. In contrast, consumers who enroll in managed care organizations commit themselves to a more limited set of providers, since MCOs explicitly attempt to direct patients to particular providers. Many MCOs utilize the "gatekeeper" concept, requiring patients needing hospital services to first go through a primary care provider. These primary care providers can be required to refer patients only to particular hospitals. Also, the health plan can stipulate that charges are fully covered for providers within a defined network, and that charges outside of the network are either covered on less favorable terms or not covered at all.

Even managed care organizations of similar formats generally differ in their abilities to channel. Physicians who refer patients to hospitals may have admitting privileges at multiple hospitals and heterogeneous preferences over where they like to refer their patients. In general, therefore, controlling the referral decisions of participating physicians requires costly implementation of incentives. Directing the choices of patients is also costly, since patients may choose out-of-network providers even if the coverage is less generous. Perhaps most importantly, patients may switch health plans if a plan chooses to exclude their preferred doctor or hospital from its network.

A simple bargaining model illustrates the importance of channeling for extracting discounts. Consider an insurer whose enrollees are expected to require S units of service in a market with two hospitals. Assume

both hospitals are equally attractive to patients, and they would share the market equally in the absence of any channeling efforts by the insurer. The insurer solicits bids from the two competing hospitals: each is to offer a discount d , and the winning bidder will receive a proportion γ of the insurer's total patient charges ($\frac{1}{2} \leq \gamma \leq 1$). The parameter γ indexes the degree to which the payer can channel its patients: $\gamma = \frac{1}{2}$ implies that the payer has no control over patients' decisions; $\gamma = 1$ implies the payer can send all of its patients to one provider, completely excluding the other.

Assume that unit costs (c) are distributed uniformly on the $[0,1]$ interval, and that hospitals know only their own costs. Normalizing the price of a unit of hospital service to 1, we can write hospital i 's expected profits as follows:

$$E[\pi_i] = \Pr[d_i > d_j] ((1 - d_i) - c_i) \gamma S + (1 - \Pr[d_i > d_j]) (1 - c_i) (1 - \gamma) S . \quad (1)$$

If hospital i wins by offering a discount d_i , it provides γS units to the payer at a price of $1 - d_i$. If hospital j wins the bidding, hospital i serves only $(1 - \gamma)S$ units, but receives the full price. (Assume the payer only signs a discount agreement with the winning bidder.)

It can be shown that the (symmetric) equilibrium bidding strategy in this simple model is as follows:

$$d_i^* = (1 - c_i) \left(1 - \frac{1}{2\gamma} \right) . \quad (2)$$

The discount offered by a given hospital varies between 0 (for $\gamma = \frac{1}{2}$) and $(1 - c)/2$ (for $\gamma = 1$), and is monotonically increasing in γ . That is, payers that can commit to channeling a greater portion of their business to the winning bidder will command larger discounts. Notice that the actual discounts offered depend on the cost parameter c : lower costs imply larger discounts, since the "prize" (more patient volume) is more attractive (profits per unit are higher) when costs are low.

This model obviously abstracts from the complexities of actual bargaining between hospitals and in-

surers, but it illustrates how the ability to “move market share” can influence the bargaining outcome and suggests the kinds of discount v. patient allocation patterns we should expect to see in the data. If discount magnitudes are driven primarily by payers’ abilities to channel patients, we expect to see skewed patient allocation patterns for payers that receive large discounts. For instance, a payer with a high γ will have a large discount at one hospital and incur a large proportion of its charges there, while having a zero discount at the other hospital and incurring very few charges there. For payers with low γ ’s, patient allocation across the two hospitals would be more equal, and the negotiated discount at the favored hospital will be relatively small. The model also suggests patterns we do *not* expect to see in the data: for instance, large discounts associated with unskewed patient allocations, or small discounts associated with skewed patient allocations.

As a simple check of whether the data are consistent with this bargaining story, we can look at the joint distribution of discounts and market shares for different types of payers. Managed care organizations (HMOs and PPOs) can be regarded as having high γ ’s: that is, these payers’ health plans impose constraints on patient choice and enable channeling of patients to selected providers. As argued previously, for these kinds of payers we expect to see large discounts associated with large shares of incurred charges, and small (zero in the model) discounts associated with small shares. Moreover, we expect to see very few of these payers allocating their business evenly across hospitals. In the joint distribution of discounts and shares of charges, we expect to see most of the density in the two extremes: <low discount, low share of charges> and <high discount, high share of charges>.

Unlike managed care organizations, traditional indemnity plans have low γ ’s: indeed, a true indemnity plan has virtually no control over patient decisions, and therefore cannot credibly commit to channel its patients to a particular provider. We therefore expect these plans’ discounts to be relatively small, and their allocation of charges across hospitals to be roughly symmetric. That is, in the joint distribution of discounts and shares of charges, we expect to see most of the density concentrated in the <low discount, mid-range share> region.

To check for these patterns in the present data, we can consider five cities in Connecticut that can be roughly characterized as having two major competing hospitals: Bridgeport (with Bridgeport and St. Vincent's hospitals), Hartford (Hartford and St. Francis), New Haven (St. Raphael and Yale), Stamford (Stamford and St. Joseph's), and Waterbury (St. Mary's and Waterbury). For payers that negotiated at least one discount agreement in a market, we can use the CHA revenue data matched with the discount data to observe how the allocation of patient charges relates to relative discounts.

Figure 1 shows a bivariate kernel density estimate of the <discount, share of charges> pairs for managed care organizations (HMOs and PPOs combined). The patterns are consistent with what we'd expect based on a channeling story: the density peaks at two extremes: low discounts with low shares of charges, and high discounts with high shares of charges. Relationships in which payers allocate a large share of their charges to a hospital offering a low discount are relatively rare in the data, as are relationships in which a small share is associated with a large discount.

Figure 2 shows an analogous graph for indemnity plans. Here the pattern is much different. Consistent with the proposition that indemnity plans' inability to channel patients weakens their ability to extract discounts, virtually all of the density is in the low discount range. However, allocations of charges appear to be more skewed than we would expect for indemnity plans. In principle, charges incurred by indemnity payers in a city should be roughly symmetric across hospitals, or at least reflect patients' underlying preferences for the competing hospitals. In some cases, however, payers classified as indemnity plans appear to be allocating all of their charges at one hospital in a city. Such an outcome is unlikely to result from the aggregation of patients' decisions.¹⁷ This apparent anomaly in the data arises primarily among the smallest indemnity payers; the patient allocation patterns of indemnity payers in the top three quartiles of payer size (as measured by total county charges) appear much less skewed.

¹⁷A possible explanation is that these payers are only nominally classified as "indemnity" plans, and are still able to somehow channel their patients. However, if these plans have an ability to channel patients, this ability should be reflected in higher discounts.

3.3 Quantifying the Impact of Channeling on Discounts

Apart from the occasional skewness of indemnity plans' charge allocations, the densities in Figures 1 and 2 appear broadly consistent with the predictions of a bargaining model in which payers' abilities to channel patients are key determinants of discount magnitudes. In order to measure the quantitative impact of channeling ability on discount magnitudes, we can estimate a system in which a payer's ability to channel—which is unobservable to the econometrician—is reflected in its responsiveness to discount differences across hospitals within the same market. In particular, consider the following empirical model of discounts and patient allocations across hospitals:

$$DISCOUNT_{ijt} = \alpha_1 SIZE_{ijt} + \alpha_2 \gamma_i + \sum_{t=1996}^{1998} \phi_t + \sum_{h=1}^9 \theta_h D_{ijt}^h + \epsilon_{ijt} \quad (3)$$

$$SHARE_{ijt} = \overline{SHARE}_{jt} + \gamma_i \Delta DISCOUNT_{ijt} + \eta_{ijt} \quad (4)$$

$DISCOUNT_{ijt}$ is the maximum discount negotiated by payer i in market j in year t . The maximum discount received in a market is analogous to the discount offered by the winning bidder in the model outlined previously. $SIZE_{ijt}$ is included to control for the impact of payer size on bargaining power, as discussed in section 3.1, and is measured as the (natural logarithm of) total charges incurred by the payer in market j in year t . The ϕ 's and θ 's are year and hospital fixed effects, respectively (D_{ijt}^h is a dummy variable equal to one if payer i 's maximum negotiated discount in market j in year t was with hospital h), and ϵ_{ijt} is a mean-zero stochastic error.¹⁸

The dependent variable in the second equation is the share (between 0 and 1) of payer i 's charges incurred at the hospital that offered the best discount. \overline{SHARE}_{jt} is the “benchmark” share we would expect the hospital to obtain, and is measured as the hospital's overall revenue share across all payers (including

¹⁸Note that one year ($t=1995$) and one hospital ($h = 10$) are omitted in equation 3. This is due to the fact that the γ_i “contains” a constant; i.e., in the estimation, γ_i is estimated as a constant plus 22 payer fixed effects.

federal programs like Medicare). The share of a payer's charges allocated to the higher-discount hospital depends on the difference in the discounts offered by the city's competing hospitals, $\Delta DISCOUNT_{ijt}$, with the payer's sensitivity to such discount differences indexed by γ . This parameter is intended to capture differences in payers' abilities to channel: health plans with tightly controlled provider networks will tend to have relatively high γ 's (i.e., have the ability to respond to discount differences by channeling patients to the hospital offering the best discount), while indemnity plans that leave the choice of provider to the patient should have relatively low γ 's. The importance of a payer's channeling ability in determining discount magnitudes is represented by the parameter α_2 in the discount equation. Note that the payer-specific γ terms are left as free parameters to be estimated.

Table 6 reports estimates of the two-equation system using data from the five cities mentioned previously as having two major competing hospitals.¹⁹ The model was estimated by generalized method of moments (GMM) using orthogonality conditions with respect to the stochastic noise terms as moment restrictions.²⁰ The first panel of the table lists the estimated parameters of the discount equation (equation 3). Since the magnitude of $\Delta DISCOUNT$ in a particular market may be endogenously determined with patient allocations in that market, payers' average discount differences in other cities ($\overline{\Delta DISCOUNT_{-j}}$) were used as instruments for $\Delta DISCOUNT_j$ in columns two and three of the table. These instruments are valid if the discount differences facing a payer tend to be correlated across cities, but idiosyncratic shocks to share allocations in a given city (η) are independent of discount differences in other cities.

The second panel of Table 6 shows averages of the estimated payer-specific channeling parameters (the γ 's from equation 4). The pattern of estimates is consistent with what we would expect: HMOs and PPOs

¹⁹In order to reduce the number of parameters to be estimated, only data from 23 of the largest payers in these cities were used in the estimation. When data from all payers are used, the point estimates are very similar to the ones shown in Table 6, but the standard errors are larger. (This presumably results from the number of observations not increasing commensurately with the number of parameters to be estimated, since data is more sparse for smaller payers.)

²⁰Specifically, I assume that $E \begin{bmatrix} Z_1' \epsilon \\ Z_2' \eta \end{bmatrix} = 0$, where Z_1 is a matrix including payer size and year, hospital, and payer dummies, and Z_2 is a matrix consisting of payer dummies interacted with $\Delta DISCOUNT_j$ (or $\overline{\Delta DISCOUNT_{-j}}$ in the instrumental variables specifications).

are considerably more responsive to discounts than are indemnity plans.²¹ The estimates imply significant across-payer variation in ability to channel (as measured by sensitivity to discount differences). For instance, a 10 percentage-point increase in $\Delta DISCOUNT$ would lead roughly to a 2 percentage-point increase in the hospital's share of a typical indemnity payer's total charges. This low level of sensitivity is not surprising, given that indemnity plans are structured in a way that limits a plan's ability to channel (e.g., choice of provider is left to the patient). In contrast, a typical HMO's response to the 10 percentage-point change in the discount difference would be to channel 9-10 percentage points more of its business to the hospital offering the favorable discount.

The "return" to this ability to channel patients is its impact on bargaining clout. The estimates of α_2 —the marginal effect of channeling ability on discounts—in columns one and two imply that increasing a payer's ability to channel (as measured by γ) by one standard deviation would lead to a 12.7 percentage-point increase in the discount that payer could negotiate. The effect is statistically significant, and its economic significance is very large relative to the apparent impact of payer size. In comparison with the 12.7 percentage-point change associated with a one standard deviation difference in channeling, increasing a payer's size by one standard deviation results in only a 2.3 percentage-point increase in the negotiated discount.

Intuition suggests the impact of channeling ability on bargaining power may be greatest for large payers; indeed, very small payers may have difficulty extracting discounts from hospitals even if they can commit all of their patients to one hospital over another. The model specification reported in column three of Table 6 accounts for this possibility by including an interaction between the estimated discount sensitivity parameters (γ) and payer size in the discount equation. The estimates provide weak support for the intuition: the coefficient on the interaction term is positive but statistically indistinguishable from zero. Taking the point estimates at face value, the implied role of channeling ability in determining discounts is even more

²¹The (unreported) point estimates appear reasonable, with $\hat{\gamma}$'s ranging from -0.04 to 1.24. The overall standard deviation of the estimated γ 's is 0.384.

pronounced than in the previous specifications. An increase of one standard deviation in channeling ability leads to a 22.3 percentage-point increase in the negotiated discount, compared with a 2.6 percentage-point increase for an equivalent change in payer size. However, it is clear from the noisiness of the point estimate that the data have difficulty identifying the separate effects of channeling ability and its interaction with payer size.²²

Other patterns in negotiated discounts alluded to in Section 3.1 are confirmed by the results in Table 6. For instance, the time trend in discounts is significantly positive, with discounts negotiated in 1998 being roughly 9-10 percentage points higher than in 1995 (on average). For the present discussion, the important conclusions to be drawn from the estimation results are that payers' abilities to channel vary considerably, and payers that are most responsive to discount advantages extract significantly better discounts than payers that cannot "move market share."

4 Conclusion

Deregulation of the hospital industry has led to an environment in which individual payers negotiate separately with each hospital to establish payer-specific payment rates. The basic fact revealed in the data is that negotiated discounts vary widely across payers and payer types. Size (as measured by a payer's total payments to hospitals in a market) appears to affect payer bargaining power, but by itself it cannot explain why some payers get much better deals than others. The econometric results of this study suggest the impact of a payer's size on bargaining clout is small relative to the impact of a payer's willingness and/or ability to channel its patients to selected hospitals. The greater relative importance of patient channeling helps explain why small managed care organizations are often able to extract deeper discounts from hospitals than very large indemnity insurers.

In a deregulated market for hospital services, the effects of selective contracting on bargaining power

²²The estimated channeling parameters ($\hat{\gamma}$) are positively correlated with payer size. This multicollinearity would explain the imprecision of the estimated coefficient on the interaction term.

contribute to the segmentation of the market for health insurance, in particular by facilitating the expansion of managed care plans. Once hospitals begin to set reimbursement rates separately by payer, health insurers who restrict their provider networks can negotiate substantial discounts and offer a lower-cost, lower-flexibility alternative to traditional indemnity plans. Consumer welfare may be increased to the extent that this segmentation helps “span” the heterogeneity in consumers’ preferences for flexibility in the choice of healthcare providers.

The discounting patterns described here are closely related to patterns that arise in other markets involving bilateral negotiations between small numbers of buyers and sellers. For example, hospitals and HMOs negotiate discounts from pharmaceutical manufacturers far exceeding the discounts offered to drugstore chains of equal or greater size. The superior bargaining clout of hospitals and HMOs relative to drugstores is attributable to their use of formularies, which enable them to solicit bids from competing manufacturers for an all-or-nothing contract. Drugstores, in contrast, typically stock their shelves with all competing brands of a drug, and cannot credibly threaten to withdraw their business from a manufacturer that fails to offer a discount.²³

More broadly, the discussion here also relates to vertical contracts between manufacturers and retailers: retailers can increase their bargaining clout *vis a vis* manufacturers by committing to stock only one brand of a product. Moreover, just as a health plan’s ability to “move market share” is limited if patients’ loyalties are with providers instead of insurers, the bargaining power a retailer may gain by committing to sell only one brand of a product depends on consumers’ willingness to simply patronize other stores.

²³See the work of Sara Ellison (1998) for a more thorough discussion of negotiated discounts in the wholesale market for pharmaceuticals.

References

- Barro, J. and D. Cutler (1997, March). Consolidation in the medical care marketplace: A case study from Massachusetts. *NBER Working Paper #5957*.
- Brooks, J. M., A. Dor, and H. S. Wong (1997, August). Hospital-insurer bargaining: An empirical investigation of appendectomy pricing. *Journal of Health Economics* 16(4), 417–434.
- Chipty, T. and C. M. Snyder (1999, May). The role of firm size in bilateral bargaining: A study of the cable television industry. *Review of Economics and Statistics* 81(2), 326–340.
- Dranove, D., M. Shanley, and W. White (1993, April). Price and concentration in hospital markets: The switch from patient-driven to payer-driven competition. *Journal of Law & Economics* 36(1), 179–204.
- Ellison, S. F. (1998, July). What prices can tell us about the market for antibiotics. MIT Mimeo.
- Gaynor, M. and D. Haas-Wilson (1999, Winter). Change, consolidation, and competition in health care markets. *Journal of Economic Perspectives* 13(1), 141–164.
- Keeler, E. B., G. Melnick, and J. Zwanziger (1999, November). The changing effects of competition on non-profit and for-profit hospital pricing behavior. *Journal of Health Economics* 18(1), 69–86.
- Melnick, G. A., J. Zwanziger, A. Bamezai, and R. Pattison (1992, October). The effects of market structure and bargaining position on hospital prices. *Journal of Health Economics* 11(3), 217–233.
- New York Times* (12 January 1998). “Two hospitals announce completion of merger”.
- Pauly, M. (1987, March). Monopsony power in health insurance: Thinking straight while standing on your head. *Journal of Health Economics* 6(1), 73–81.
- Pauly, M. (1998, December). Managed care, market power, and monopsony. *Health Services Research* 33(5), 1439–1440.
- Rotemberg, J. and G. Saloner (1986, June). A supergame-theoretic model of price wars during booms. *American Economic Review* 76(3), 390–407.
- Snyder, C. M. (1996, Winter). A dynamic theory of countervailing power. *RAND Journal of Economics* 27(4), 747–769.
- Staten, M., W. Dunkelberg, and J. Umbeck (1987, March). Market share and the illusion of power: Can Blue Cross force hospitals to discount? *Journal of Health Economics* 6(1), 43–58.
- Staten, M., J. Umbeck, and W. Dunkelberg (1988, March). Market share / market power revisited: A new test for an old theory. *Journal of Health Economics* 7(1), 73–83.
- Stole, L. A. and J. Zwiebel (1996, March). Organizational design and technology choice under intrafirm bargaining. *American Economic Review* 86(1), 195–222.
- Wall Street Journal* (25 October 1996). “Sick wards: New York’s hospitals merge, cut and fret as deregulation nears”.

Table 1: Hospitals

County	Hospital	Beds		Census ^a		Outpatient visits ^b		Charges ^c	
		1995	1998	1995	1998	1995	1998	1995	1998
Fairfield	Bridgeport	376	346	279	242	142.7	146.7	242.2	306.1
	Danbury	344	284	241	169	219.2	205.9	260.6	295.2
	Greenwich	200	160	121	101	200.5	276.4	146.5	175.4
	Norwalk	240	285	210	186	142	145.5	228.9	230.5
	St. Joseph's	180	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	83.1	53
	St. Vincent's	289	259	280	217	78.5	142.5	235.5	255.9
	Stamford	245	256	178	163	113.9	144.7	172.6	216.4
Hartford	Bradley	74	74	40	35	34	76	38.2	40.7
	Bristol	160	79	109	76	176	116.8	110	129.7
	Childrens	76	123	<i>n.a.</i>	69	<i>n.a.</i>	99.1	30.5	85.1
	Dempsey	232	131	154	121	464.2	524.8	163.3	167.1
	Hartford	824	822	582	576	230	188.8	497.4	479.2
	Manchester	201	182	<i>n.a.</i>	92	0	175.1	144.3	188.6
	New Britain	294	258	<i>n.a.</i>	177	<i>n.a.</i>	256.3	177.7	230
	Rockville	95	102	<i>n.a.</i>	41	<i>n.a.</i>	58.3	72.1	93.1
	St. Francis	407	510	319	365	216.3	297.1	298	431.8
Litchfield	Hungerford	106	90	81	76	154.4	196	84.9	98.5
	New Milford	63	62	38	36	51.5	68.4	65.3	83.3
	Sharon	78	57	45	33	61.9	<i>n.a.</i>	52.5	49.1
Middlesex	Middlesex	149	119	120	99	449.4	809	166.1	187.8
New Haven	Griffin	160	160	104	76	91.6	98.4	122.3	159.1
	Milford	72	59	56	49	46.2	49.2	66.6	94.2
	St. Mary's	228	193	160	117	196.9	168.5	197.7	195.7
	St. Raphael	511	589	417	474	163.9	198.6	430.8	459.8
	Veterans	125	103	107	83	116.9	93.8	139.9	135.1
	Waterbury	252	246	181	151	<i>n.a.</i>	146.7	197.6	226.6
	Yale	778	735	602	557	331	377.5	675.4	763.8
New London	Backus	153	164	127	125	423	792.5	129.6	173.8
	Lawrence	250	228	172	173	92.2	101.2	179.8	232.5
Tolland	Johnson	89	89	52	47	51.8	70.2	57.5	69.6
Windham	Day Kimball	102	101	56	48	233.5	302.9	66.7	84.9
	Windham	92	78	55	46	83.1	101.9	75	89.2

^aCensus is the average daily number of inpatients receiving care.

^bIn thousands.

^cIn millions of dollars.

Table 2: **Distribution of Negotiated Discounts by Year**

Year	Number of Agreements	Discount Quantiles				
		.10	.25	.50	.75	.90
1995	609	.018	.030	.037	.168	.352
1996	714	.025	.030	.100	.257	.379
1997	711	.030	.049	.159	.336	.459
1998	706	.030	.060	.164	.355	.477

Table 3: Summary of Discounts by Hospital

Hospital	Payers ^a		Quantiles (95)			Quantiles (98)		
	1995	1998	.10	.50	.90	.10	.50	.90
Backus	21	26	.020	.030	.134	.025	.080	.260
Bradley	10	17	.020	.139	.423	.200	.300	.377
Bridgeport	13	25	.041	.156	.408	.050	.380	.505
Bristol	26	29	.025	.035	.279	.025	.118	.518
Childrens	16	16	.065	.065	.065	.086	.419	.520
Danbury	24	41	.005	.035	.040	.084	.113	.439
Day Kimball	13	16	.030	.030	.035	.030	.041	.229
Dempsey	29	21	.035	.126	.441	.101	.266	.430
Greenwich	20	24	.018	.035	.269	.025	.094	.449
Griffin	9	7	.073	.308	.438	.000	.066	.548
Hartford	22	22	.010	.110	.314	.145	.264	.354
Hungerford	20	20	.026	.090	.226	.021	.108	.341
Johnson	14	20	.230	.448	.531	.094	.274	.556
Lawrence	21	23	.015	.015	.123	.020	.078	.212
Manchester	19	16	.006	.061	.397	.106	.253	.449
Middlesex	22	21	.010	.015	.164	.007	.074	.312
Milford	5	11	.064	.325	.479	.035	.333	.516
New Britain	11	14	.012	.071	.162	.017	.217	.398
New Milford	14	15	.027	.101	.423	.120	.518	.578
Norwalk	22	32	.012	.030	.265	.022	.081	.262
Rockville	15	16	.025	.035	.445	.011	.269	.464
Sharon	6	14	.015	.118	.230	.122	.273	.403
St. Francis	26	34	.020	.030	.308	.030	.126	.402
St. Joseph's	7	8	.024	.285	.565	.020	.150	.446
St. Mary's	17	13	.022	.124	.191	.035	.264	.436
St. Raphael	35	41	.025	.030	.106	.030	.100	.398
St. Vincent's	24	45	.030	.030	.344	.030	.142	.414
Stamford	11	20	.035	.093	.324	.065	.228	.456
Veterans	35	25	.020	.030	.140	.023	.050	.172
Waterbury	23	24	.025	.030	.369	.072	.223	.455
Windham	21	9	.025	.030	.173	.009	.310	.449
Yale	38	41	.022	.030	.315	.023	.030	.400

^aThis is the number of payers that negotiated discounts with the hospital, not the total number of payers incurring charges at the hospital.

Table 4: OHCA Discount Data, Summary by Type of Payer

Type	Number	Mean	Weighted Mean ^a	Discount Quantiles		
				.10	.50	.90
Indemnity Insurer	30	.089	.152	.018	.034	.252
HMO	26	.283	.310	.068	.291	.478
PPO	40	.141	.157	.030	.100	.323
Employer	16	.122	.186	.020	.035	.357
Third-party administrator (TPA)	38	.123	.094	.020	.073	.306
Overall	150	.167	.233	.025	.106	.406

^a Weighted by total revenues upon which discount is based.

Table 5: Negotiated Discounts: Regression Results^a

	I	II	III ^b
Payer types:			
Employer	.043 (.013)	.053 (.014)	.049 (.015)
HMO	.154 (.007)	.142 (.007)	.136 (.007)
PPO	.020 (.008)	.024 (.007)	.023 (.008)
TPA	-.001 (.009)	.009 (.009)	.008 (.010)
ln(Payer Charges) ^c	—	.010 (.001)	.014 (.002)
Year = 1996	.032 (.007)	.032 (.007)	.032 (.007)
Year = 1997	.074 (.007)	.076 (.007)	.076 (.008)
Year = 1998	.089 (.008)	.092 (.008)	.093 (.008)
No Close Rivals ^d	-.206 (.060)	-.205 (.056)	-.145 (.026)
Constant	.205 (.060)	.198 (.055)	.137 (.026)
<i>N</i>	2,010	2,010	1,917
<i>R</i> ²	.468	.487	.480

^a Regression estimates using the negotiated discount as the dependent variable. Hospital fixed effects are included in each specification, but the estimates are suppressed to save space. Robust standard errors in parentheses.

^b Instrumental variables estimates using average payer charges in other counties as an instrument for the payer charges variable.

^c Payer charges are the total of all charges incurred by the payer in the county, in millions.

^d Dummy equal to one if there are no rival acute-care hospitals within ten miles of the hospital.

Table 6: Discounts and Channeling Ability: GMM estimates

	I	II	III
ln(Payer Charges) [α_1]	0.018 (0.006)	0.016 (0.006)	-0.048 (0.073)
Channeling parameter [α_2]	0.357 (0.036)	0.332 (0.038)	0.298 (0.033)
ln(Payer Charges) \times Channeling parameter	—	—	0.092 (0.099)
Year = 1996	0.038 (0.015)	0.040 (0.015)	0.026 (0.037)
Year = 1997	0.102 (0.015)	0.099 (0.016)	0.085 (0.029)
Year = 1998	0.091 (0.018)	0.097 (0.019)	0.070 (0.036)
Instrument for $\Delta DISCOUNT$?	No	Yes	Yes
Average estimated channeling parameters (γ), by payer type:			
HMO	0.86	0.90	0.95
PPO	0.56	0.65	0.85
Indemnity	0.21	0.23	0.21
Number of observations	306	293	293
Overidentifying Restrictions	21	19	18
Chi-square test (p -value)	60.7 (0.000)	51.5 (0.000)	48.7 (0.000)

GMM estimates of the system described by equations 3 and 4 in the text. Standard errors in parentheses. Hospital fixed effects are omitted to save space.

Figure 1: Joint Density of (Discount,Share) for MCOs

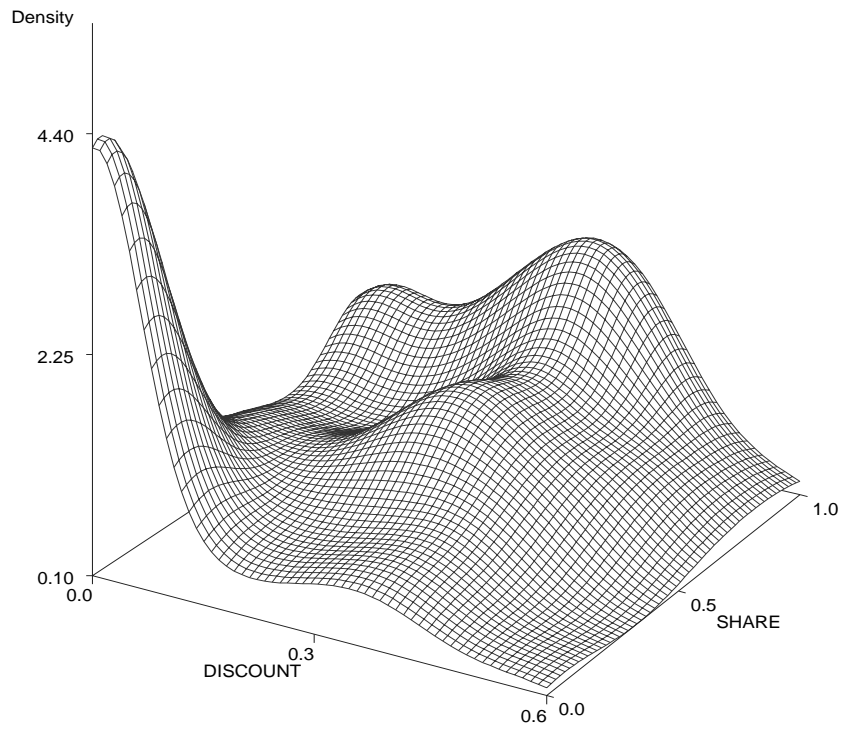


Figure 2: Joint Density of (Discount,Share) for Indemnity Plans

