

Health Care Capital Financing Agencies: The Intergovernmental Roles of Quasi-Government Authorities and the Impact on the Cost of Capital

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During the decade 1983–1992, approximately \$1.4 trillion of municipal bonds were sold in 87,000 in separate issues, primarily to finance capital projects for education, electric power, transportation, health care, housing, and other public and private purpose activities. Approximately two-thirds of these financings were originated by financing authorities, quasi-government agencies which are the creation of state legislature. Despite the growing role played by quasi-public authorities in capital finance, their impacts have not been studied systematically. We first describe the issuers of tax-exempt debt in the health sector and then derive measures for describing the mix of issuers between state and local levels, and between both government and quasi-government sectors. We present abbreviated test results of the impact that different mixes have on the cost of capital. First, competition is good: using a Herfindahl index analysis we show that states with less concentrated issuers have a lower cost of capital than those with a more concentrated market, including state-level finance monopolies. On the other hand, we cannot assert unequivocally that market deconcentration, in and of itself, should be a goal. For instance, there are economies of scale in the health care finance industry that allow larger (often state-level) issuers to lower the cost of capital.

INTRODUCTION: BOND ISSUERS AND THE MUNICIPAL BOND MARKET

Despite the fact that most municipal bonds in the U.S. are issued by quasi-public authorities, we know very little about how these authorities work. States differ drastically in the

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level of decentralization of the relevant finance functions. They also probably differ in the level of competition inherent in the institutional arrangements the state governments themselves create through political processes. There are three basic state regimes: In the health care sector, for instance, twelve states have virtual state-level monopolies; nineteen have only local issuers; and nineteen have both state-level and local issuers. There has been little systematic exploration of the general impact of quasi-public authorities on either the cost of capital or the selection and shape of public and non-profit projects that receive financing. We present results that indicate that concentration of the issuers at the state level raises the cost of capital, but at the same time issuer size and experience may lower it. So, while there is some evidence of the potential benefits of decentralization, it is not unqualified, and the true effects are certainly complex and difficult to unravel. There has been no exploration of the impact of these three state-level arrangements, nor of the political or regulatory policies that might increase competition in the industry, and thus, lower the cost of capital in the health care sector.

Health care financing agencies are either state and local governments which choose to issue health care bonds (e.g., Pueblo County, Colorado, or the State of Ohio) or quasi-government entities usually known as health care financing authorities (e.g., Wisconsin Health and Educational Facilities Authority or the Texarkana Health Facilities Development Corporation) which are created by state and local governments specifically to issue tax-exempt health care bonds. The generic term for both types is "health care financing agency," and we have chosen to use the word "authorities" to refer specifically to the quasi-government entities. This article first describes the issuers of tax-exempt debt in the health sector and then derives measures for describing the mix of these issuers among both state and local levels and between both government and quasi-government sectors. The policy regime for health care capital finance is set at the state level, and varies greatly from state to state. This variation occurs with respect to two main characteristics: 1) the extent to which financing is centralized at the state level or decentralized to the local level and 2) the extent to which financing is performed by government or quasi-government entities. As a consequence of these variations, the regimes also vary in terms of 1) the concentration of the market for bonds in one, a few, or many potential issuers and 2) (potentially) the level of competition inherent in the market's institutional arrangements. Thus, we raise a fundamental question: Do differences in the market structure of this industry across states lead to differences in the interest rates on the debt that the health care financing agencies issue on behalf of hospitals? We present abbreviated results from an attempt to answer this question employing two widely-used measures of concentration: the four-firm concentration ratio and the Herfindahl index.

During the decade 1983–1992, approximately \$1.4 trillion of municipal bonds were sold in 87,000 separate issues, primarily to finance capital projects for education, electric power, transportation, health care, housing, and other public and private purpose activities.¹ Approximately two-thirds of these financings were originated by financing authori-

1. Bond Buyer. *The Bond Buyer 1994 Yearbook*. New York: Thompson Publishing Corporation, 1994.

ties, quasi-public agencies that are created by state legislatures.² In some cases, the authorities are simply conduits for financings, doing no more than issuing bonds, turning the proceeds over to the project beneficiary, and often ceasing to exist once the financing is complete. In other cases, the authorities may become permanent state or local agencies, actively pursuing and shaping projects and working with potential beneficiaries to plan capital projects. However, the authorities may refuse to issue bonds for some projects and beneficiaries, citing, for example, concerns over the creditworthiness of the beneficiary. This article focuses on the health care sector but will yield insights for other sectors in which quasi-government authorities play a role in capital finance.

While hospitals and other health care institutions receive the proceeds from bond offerings, they do not issue or sell the bonds. The bonds are issued on their behalf by a financing agency and sold to (or by) an underwriter (i.e., an investment banker) who in turn resells them. Proceeds from the bond sale are then transferred to the health care institution, on whose behalf the bonds were issued, to meet the purpose of the bond offering.³ In addition, financing agencies arrange interest payments and repay the bonds with monies received from the health care institution. However, the role of the health care financing agency may go far beyond that of a simple conduit for funds, as we discuss.

To our knowledge, there has never been a study of health care financing agencies. We have been unable to find a single study of health care financing agencies in the social science and health services research literature, and there are only passing references to them in the health care capital financing literature.⁴ In this article, we discern a taxonomy of

2. Author's calculation from various issues of the Bond Buyer Yearbook 1988 to 1995, excluding general purpose bond issues.

3. This procedure is necessary in order to satisfy Internal Revenue Service rules allowing interest payments to pass to investors free from the federal income tax (i.e., tax advantaged). Tax advantaged bonds can be issued at lower interest rates than their taxable counterparts. For decades, state and local government agencies have used the proceeds from bond offerings to finance public health care and public hospital capital projects. However, in a 1963 ruling by the Internal Revenue Service, hospitals classified as 501 (C)-3 private, nonprofit institutions were permitted to issue tax-exempt bonds under the condition that the hospital transfer ownership to a unit of government when the debt is repaid. Thus, the voluntary hospital sector could finance capital projects with tax-exempt debt, although the nonprofit hospitals did not view tax-exempt financings favorably. If hospitals could find a mechanism which would allow tax-exempt bonds to be issued on their behalf on more favorable terms (than the eventual loss of their facility!), and if there existed agencies which would issue the bonds, the hospitals would have access to low-cost, long-term financing for large capital projects. Of course, a mechanism was developed, although we have not seen references to its origins.

4. See, for example, Nemes, Judith. "Some Bond Authorities Fight Disclosure Rules," *Modern Health care*, 22, No. 24 (June 15, 1992), 33-34; Nemes, Judith. "Dealing with the Authorities," *Modern Health care*, 21, No. 41 (October 14, 1991a), 22-29; and Nemes, Judith. "Hospital Bond Deals Often Overpriced—Study," *Modern Health care*, 21, No. 27 (July 8, 1991b), 40-41. In addition, for a related discussion of a health care specific capital construction program, see Stern, Stephen J., and William M. Sage. "The California Health Facility Construction Loan Insurance Program," *Municipal Finance Journal*, 13, No. 1, 1994, 30-50. However, the agency discussed by Stern and Sage is not an issuing entity for debt and is much narrower in its scope than, say, the California Health Facilities Authority. It does not, for instance, focus on

health care capital financing agencies, particularly with respect to the intergovernmental mix of issuers outlined above. We then discuss the impacts of this taxonomy and the concentration of market structure on the cost of capital.

HISTORICAL DESCRIPTION OF HEALTH CARE BOND ISSUERS & PROCEDURES

The financing agencies are responsible for matching hospitals with investment bankers (i.e., the underwriters who will sell the bonds). Although it is the hospital which ultimately agrees to an underwriter, the financing agency chooses the pool of underwriters from which the hospital must select. The pool can vary in size, change over time, and may be unrestricted for some agencies. Also, the financing agency can influence and may even decide whether the bond deal will proceed as a competitive issue (based on sealed bids by acceptable underwriters), a negotiated issue (where the hospital chooses a particular underwriter from a pool of acceptable ones), or a private placement (where the underwriter is bypassed altogether). While the choices given to the hospitals by the financing agencies are interesting because of their potential impact on hospitals' capital costs, they are equally interesting as, potentially, the outcome of competition among financing agencies. This is because on a state or local basis there may be more than one financing agency from which the hospital is permitted to choose. So, the hospital chooses the financing agency (which is a virtual statewide monopoly in twelve states), and then the hospital chooses an underwriter based on those acceptable to the financing authority.

It is not melodramatic to indicate that for the past two decades, health care financing agencies have been one of the most powerful, albeit hidden, forces shaping the health care system. Yet, they emerged from state and local legislatures, in acts and amendments to acts, simply as a response to Internal Revenue Service rulings which allow public and non-profit institutions to obtain capital at lower cost than their private, for-profit counterparts. Most health care capital now comes from the sale of tax-exempt health care bonds.⁵

hospitals. We wish to thank Stephen Stern and Terry Partington (Deputy Executive Director of the California Health and Educational Facilities Authority) for their insight into the relationship between CAL-MORTGAGE and the California Health and Educational Facilities Authority.

5. As other sources of health care capital have dwindled, notably philanthropy, internal reserves, and government grants, tax-exempt debt has become the principal source of capital. For hospitals, in particular, tax-exempt bonds have become the single most important source of capital, accounting for about 70 percent of all hospitals' capital financing. See discussions in Cohodes, Donald R., and Brian M. Kinhead. *Hospital Capital Formation in the 1980s*. Baltimore: Johns Hopkins University Press, 1984; James L. Elrod, Jr., and James A. Wilkinson. *Hospital Project Financing and Refinancing under Prospective Payment*. Chicago: American Hospital Publishing, Inc., 1985; and Vladek, Bruce. "Capital Issues, Capital Punishment." *United Hospital Fund President's Letter* (May 1987). Moreover, tax-exempt debt is growing in importance for other institutional health care providers such as nursing homes, continuing care residences, and mental health facilities.

Health care bonds in 1993 accounted for about 11 percent of the nation's municipal bond market, and an average of 10 percent during the 1980–1993 period.⁶ Over the same period, \$179 billion (in constant 1982–4 dollars) of health care bonds were issued in about 8,800 separate financings (see Table 1). We believe that few public finance and health services researchers and policymakers are aware of these agencies, and we believe that many of the features of the tax-exempt capital acquisition process, in general, are not well understood. This, we feel, is an unfortunate oversight in the public finance and health services research literatures.

Table 1 describes health care bond issues by issuer type.⁷ In particular, we are concerned with issuers that we can classify as government and quasi-government. The government issuers are described in the table under three categories: State, County, and City/Town/Village. The quasi-government issuers, on the other hand, are: District, State Authority, and Local or County Level Authority.⁸

Elrod and Wilkinson write that “[s]everal states have active state health care financing authorities whose services can be extremely valuable. These authorities are familiar with

6. Bond Buyer. *The Bond Buyer 1994 Yearbook*. New York: Thomson Publishing Corporation, 1994.

7. Note that the data used in this paper are derived from a database we have constructed of all new issues of municipal securities (new financings and refinancings) from 1980–1993. The data were purchased from Securities Data Company (SDC) and each bond issue is an observation. The empirical analysis in this project is based on approximately 6,000 new hospital bond financings (whose proceeds are used to invest in land, plant, and fixed and moveable equipment) and refinancings (whose proceeds are used to retire existing debt prior to maturity) for the period from 1980 through 1993. Thus, the empirical analysis excludes non-hospital health care bonds, such as bonds for nursing homes, except where indicated. Data on issue characteristics are merged with hospital, national, state, and local market-area characteristics from a variety of sources. State and year-specific descriptors of the industry that issues hospital bonds (for example, the number of issuers and the percentage of real par value accounted for by the four largest issuers) are constructed from the SDC data base. Information on the fees charged by the financing authorities are taken from a survey of the authorities that was conducted as part of the project. For a more detailed description of the database, an appendix is available from the authors.

8. Note that the inclusion of districts is somewhat problematic since they represent issuers linked generally to a single hospital. However, districts share with the other two types of quasi-governmental issuers the fact that they are sanctioned by state legislature and they are clearly not pure government issuers. A further discussion of this issue lies outside the scope of the present study, and since districts play a smaller role, particularly with respect to relative par value of total issues, their inclusion in the quasi-government sector does not significantly change our discussion. In addition, as part of our study, we implemented a survey of all quasi-public issuers, and our survey includes districts. Thus, all together, we surveyed 1,290 (220+115+955) quasi-government finance authorities for information on: finance activities and services performed, governance structure, fees and charges, and selection of underwriters. Of these, 999 issued bonds for at least one hospital from 1980–1993. The response rate of 36 percent in terms of issuers was relatively modest. The respondents, however, accounted for 65 percent of all issues done by the survey universe and for 71 percent of their real par value. These response rates are much more impressive. They indicate that our survey includes most of the large issuers both in terms of the number of bond deals and their total par value. Clearly, the small issuers who responded to the survey may not be representative of the universe of small issuers. The only survey data used for our empirical analysis related to the fees charged by bond issuers and enabled us to compute accurately the cost of capital for each bond issue.

TABLE 1
All Health care Bond Issues by Issuer Type, 1980–1993

Issuer Type	# of Issues	# of Issuers	Total Real Par Value (millions of 1982–4 dollars)	Average Real Par Value (millions of 1982–4 dollars)	% General Obligation Bonds	% Negotiated
Government						
State	62	9	2,248.95	36.273	32.26	51.61
County	1104	427	15,095.90	13.674	20.56	79.80
City, Town, or Village	1384	643	17,328.54	12.521	7.37	88.01
Quasi-Gov't						
District	472	220	6,035.17	12.786	40.25	78.39
State Authority	2576	115	76,035.70	29.517	0.58	93.13
Local or County Level Authority	3075	955	59,064.48	19.208	2.24	92.46
Other						
Native American Tribe	1	1	2.60	2.597	100.00	100.00
University	62	26	2,420.10	39.034	3.23	66.13
Not-for-Profit Cooperative	36	29	662.25	18.396	8.33	75.00
Total/Avg.	8,772	2,425	178,893.68	20.394	7.17	89.06

the project finance process and are active issuers of tax-exempt bonds. This position enables them to help hospitals assemble a financing team, investigate borrowing options, negotiate legal terms and conditions, prepare for bond rating agency presentations, and close the bond issue in an efficient manner.”⁹ This suggests that there is variation in the participation and efficiency of financing agencies, perhaps in a way which affects the costs of capital. Certainly, one way to delineate this variation, at the state level, is to observe the proportion of real par value of bonds in the sector flowing through government versus quasi-government entities, and the proportion of real par value in each category of finance entities flowing through state versus local level entities. We do this in the next section.

9. Elrod and Wilkinson, pp. 37–38.

Typically, the procedure for financing through an authority is as follows: The financing authority is given title to the facility for the life of the bond issue and leases it back to the health care institution. The institution, in turn, pays rent on the lease which is equal to the debt service on the bond. In addition to leaseback arrangements, this may be accomplished by loan or installment sale mechanisms. When the bond is retired, ownership title returns to the health care institution.

From the hospitals' perspective, there are obvious advantages to having access to tax-exempt capital markets. However, it is not clear why, on balance, the benefit to hospitals was also advantageous to state and local governments that would become identified with these financings. They, too, borrowed in tax-exempt bond markets. Problems with a hospital's debt would draw attention to the state and local area debt and, perhaps, jeopardize state and local-area credit ratings. Also, new tax-exempt hospital bonds would add to the total supply of tax-exempt bonds and raise capital costs for all tax-exempt issuers. Brown writes that "[o]nce investment brokerage firms convinced state legislatures to establish bonding authorities that could issue tax-exempt bonds on behalf of hospitals without requiring hospitals to pass ownership title to the state, access to capital increased even more dramatically."¹⁰ We do not know of evidence that links investment bankers with the creation of the authorities, and Brown does not cite any, although it is reasonable to expect that expansion of the market for hospital bonds is in their interest. Cohodes and Kinkead write, similarly, that "[r]esponding to appeals from hospital industry and the investment banking houses, state legislatures created finance authorities to issue tax-exempt bonds on behalf of hospitals."¹¹ And, they observe, "[i]t is ironic that perhaps the most important capital subsidy in the hospital industry sprang not from the federal government but from state legislature. Moreover, this occurred with little or no public debate, or analysis of the implications for public policy objectives."

In general, the budgetary and political advantages for state and local governments to do bond deals through authorities are clear. Richard Sandomir provides this telling quotation from former New York State Governor Mario Cuomo regarding the potential use of a sports finance authority to finance a new baseball stadium: "Theoretically and practically, the state can borrow the money. But politically, when you present your budget, you don't have to say, 'I borrowed \$800 million for a stadium. The authority did it.' It's off budget."¹² Authorities help governments circumvent debt caps and requirements for referenda. They may also help them provide services now for which the bills come due later.

Whatever the causes, actors, and methods in this capital policy, two results are clear: the agencies were created and the primary source of health care capital is now tax-exempt capital markets. As mentioned above, presently there are twelve states with hospital finance au-

10. Jonathan Betz Brown. *Health Capital Financing*. Ann Arbor, Michigan: Health Administration Press, 1988, p. 15.

11. Cohodes and Kinkead, p. 19.

12. Richard Sandomir. "Sports Agency Suggested to Handle Yankees." *The New York Times*, Metro Section, March 28, 1996.

thorities that have monopolies for issuing tax-exempt bonds. There are nineteen states where hospitals can select from state-level authorities or an alternative, local issuer. The remaining states have only non-state-level issuers.¹³ Overall, non-state-level issuers issued 67 percent of tax-exempt hospital bonds issued during 1993. This distribution of financing authorities is significant for the research we have undertaken. We have, in effect, a natural experiment in the issuing of hospital bonds, health care bonds, and, for that matter, municipal bonds, in general. There are states with statewide monopoly issuers; states with statewide issuers and local competitor issuers; and states with only local competitor issuers.¹⁴

We know from our discussions with investment bankers, financing authority officials, and other key players in this market that there can be intense competition among financing authorities for the “right” to issue a hospital’s bonds. After all, the authorities were created for the purpose of issuing bonds, and they derive fee income and revenues, in general, from the issuance of bonds. An example of concern with fees and competition has recently surfaced in the debate over whether state authorities should have disclosure rules for their hospital bond issues that are trading in the secondary market. As Nemes reports in *Modern Health care*, disclosure would require more staff at state authorities, and “[t]he additional staffing would translate into higher issuance fees for hospital issuers (i.e., the state authorities).”¹⁵ Moreover, “[t]he other concern expressed by some statewide hospital financing authority executives relates to the possibility they might lose some issuing business to local and county authorities”

Taken together, these anecdotes imply legitimate concerns over the level of competition in issuing health care debt for capital projects. As stated above, this issuing takes place in fifty-one different state-level regimes (including the District of Columbia). Do the alternative market structures of finance authorities affect the interest rates on the bonds they issue? This is the most important long-run question of the research undertaken.

13. The twelve monopoly states are CO, CT, ID, MA, MD, MT, NH, RI, SD, VT, and WA. The nineteen states with state-level and local authorities are AZ, CA, DE, GA, IL, IN, KY, LA, MI, MO, MS, NC, NE, NJ, NY, OK, TX, WI, and WV. The District of Columbia is counted as a state regime in this study.

14. In describing these alternative market structures, we use the terms monopoly and competition because they are used in the health care finance literature (for example, Nemes 1991a). That is, we attempt not to use them with prejudice. Indeed, as we discuss in more detail below (and as others have also discussed, see Grossman, Goldman, Gershberg, Kocagil, Thompson, and Renn. *Economic Analyses of Health Care Financing Authorities*. Final Report, Grant #R01 HS06095-04, Agency for Health Care Policy and Research, USDHHS, November 1996, Section IV), state health care finance authorities may compete with other state authorities and state and local governments in monopoly states. Moreover, as Grossman *et al.* *Economic Analyses . . .* (1996, Section V) point out, economic theory does not necessarily predict an inverse relationship between the number of issuers in a state and either fees charged by issuers or interest rates.

15. Nemes, “Some Bond Authorities Fight Disclosure Rules,” pp. 33–34. We thank an anonymous referee for pointing out that the issue of potential disclosure is less one of initiation by agencies, state/local governments, or even the beneficiaries than it is in response to SEC secondary market disclosure requirements. Yet, the point remains that there has been some attention paid to accountability of quasi-government finance authorities.

TOWARDS A TAXONOMY OF STATE-LEVEL BOND ISSUER REGIMES

The previous section described and categorized health care bond issuers, and raised questions relevant to their activities, especially with regard to the state-level mix of different kinds of issuers. We now turn our attention to a few simple measures developed to help begin generating answers. We present a few simple measures of centralization and decentralization that show the vast differences in state-level health care finance regimes and institutional arrangements. Tables 2–5 present three proportions that motivate this project.

Proportion #1 is the Quasi-Public Authority Share of the Total Health Care Bond Market.¹⁶ It is computed by dividing the par value of Quasi-Government issues by the par value of the Total (Quasi-Government + Government) Health Care Bond Market.

Proportion #2 is the Local Authority Share of Total Quasi-Public Bond Issues. It is computed by dividing the par value of issues through Districts plus Local or County Level Authorities by the par value of Total (District + Local or County Level Authority + State Authority) Quasi-Government bond issues.

Proportion #3 is the Local Government Share of Total Government Issues. It is computed by dividing the par value of issues through Local (County + City/Town/Village) Government issuers by the par value of Total (County + City/Town/Village + State) Government issues.

Looking at the 1980–1993 averages in Table 2 as an example of how to interpret these proportions, we see that approximately 80 percent of the total par value of health care bonds was issued by quasi-government authorities. Of that 80 percent, a little less than half (46 percent) flowed through local authorities while slightly more than half (54 percent) flowed through state authorities. Finally, of the approximately 20 percent of total par value issued directly by pure governments, nearly all (93.5 percent) flowed through local governments. State governments play a relatively small role as direct issuers of health care bonds. As far as trends over the fourteen-year period are concerned, there does appear to be a slight rise from 1980 to 1985 in the role of quasi-public authorities, but it is far from striking.¹⁷ The local authority share of total quasi-public bond issues fluctuates above and below the period average of 46 percent, and it is difficult to discern a clear time-related trend. The local government share of total government issues rises considerably from 1980 to 1985, and then remains high from that point on. Still, at the

16. Recall that the quasi-government issuers were earlier defined as three categories of issuers shown in Table 1: Districts, State Authorities, and Local or County Level Authorities. The government issuers were defined as state, county, or city/town/village government issuers. The analysis thus excludes Universities, Native American Tribes, and not-for-profit cooperatives. So, while we use the term “Total Health Care Bond Market” for the aggregate sum of all six categories of issuers, actually this is not quite the case. Still, given the relatively small size of the excluded issuers, the term seems justified.

17. Remember that, in anticipation of the 1986 tax law changes, 1985 was a very big and important year in the bond market. 1986 was consequently very light, and the market took a few years to rebound to its 1984 levels.

TABLE 2
Nationally Aggregated Taxonomy of Issuer Types 1980–1993

Year	Proportion #1: Quasi-Public Authority Share of Total Health Care Bond Market (%)	Proportion #2: Local Authority Share of Total Quasi-Public Bond Issues (%)	Proportion #3: Local Government Share of Total Government Issues (%)	Real Par Value of Quasi-Public Authority Issues (millions real \$ 1982–4)
1980–1993 Avg.	80.3	46.1	93.5	141,135.35
1980	69.3	47.5	87.7	2,689.50
1981	78.2	48.2	87.3	4,362.50
1982	75.9	41.8	72.0	7,219.02
1983	74.3	55.1	85.9	7,578.71
1984	83.2	53.5	96.5	8,314.06
1985	83.1	46.3	98.9	24,135.43
1986	82.2	54.0	100.0	6,742.23
1987	76.7	44.1	93.2	8,723.64
1988	79.2	47.2	98.3	8,806.25
1989	83.0	39.3	94.4	10,385.48
1990	82.7	38.8	97.8	8,817.50
1991	80.9	48.1	98.3	10,927.32
1992	81.5	44.3	94.1	13,460.44
1993	80.1	44.7	95.3	18,973.30

national level, the trends are not clear, and it is thus necessary to turn to a state-level analysis, where we clearly see that states show highly variable mixes between government and quasi-government issues, as well as the jurisdictional level at which the issues took place.

Table 3 gives the same three proportions for states selected to paint a picture of the range of the mix of financing structures. Looking, for instance, at Proportions #1 and #2, Connecticut, Massachusetts, and Rhode Island show either a total or near-total dominance by state-level authorities (and while the tables do not show the number of authorities, they are dominated by a single issuer). In those instances where pure governments do issue, it occurs only at the local level (Proportion #3). While it may appear that this occurs only in relatively small New England states, Table 3 shows a very similar pattern in 1993 for the much larger Midwest State of Illinois.

On the other hand, Texas and Florida show a very different taxonomy. Texas is also dominated by quasi-government authorities, but nearly exclusively by local authorities. When pure governments do issue, that too is only at the local level. The state government

TABLE 3
Taxonomy of Issuer Types in Selected States 1980 & 1993

State	Proportion #1: Quasi-Public Authority Share of Total Health care Bond Market (%)		Proportion #2: Local Authority Share of Total Quasi-Public Bond Issues (%)		Proportion #3: Local Government Share of Total Government Issues (%)	
	1980	1993	1980	1993	1980	1993
Texas	100.0	100.0	100.0	90.2	n/a	n/a
Florida	93.3	69.5	100.0	100.0	100.0	100.0
Massachusetts	100.0	81.7	0.0	0.0	n/a	100.0
Rhode Island	100.0	100.0	0.0	0.0	n/a	n/a
Connecticut	100.0	97.1	0.0	0.0	n/a	100.0
California	72.8	70.5	100.0	31.1	100.0	100.0
Colorado	80.0	85.6	0.0	16.4	100.0	100.0
Illinois	77.3	92.8	0.0	0.1	100.0	100.0
Indiana	88.4	92.8	100.0	27.3	100.0	100.0
Ohio	0.0	11.4	n/a	80.2	72.9	88.7
50-state avg.	69.3	80.1	47.5	44.7	87.7	95.3

n/a indicates that there were no relevant issues; thus, the proportion would be 0/0.

never issues bonds directly. Though not quite as extreme, Florida too is dominated by local quasi-government issuers. Thus, these results hold up one's expectations for two states well-known for their anti-regulatory state-level practices. California and Colorado show a range of government and quasi-government issuing, with quasi-government generally tending to issue a larger share. Both states tend to rely much more on state rather than local quasi-government entities, but again government issues, when they occur, are done at the local level. Indiana is a particularly interesting example in terms of the dynamic between state and local quasi-government issuers: while quasi-government issuers have dominated over pure government issuers, there was no state authority until 1984. The state authority was created in 1984, and then rather rapidly took over the lion's share of the market. Ohio stands alone as an example of a state where not only do governments dominate over quasi-government issues, but also the state government did, at least in the early 1980s, play a significant role. Even in 1993, the 11.3 percent share of government issues by the state government (Proportion #3, $100 - 88.7 = 11.3$) is a figure higher than found in other states. On the other hand, of those issues done through the quasi-government sector, the tendency is slightly toward local authorities (Proportion #2, 44.7 percent state or 55.3 percent local).

TABLE 4
California—Taxonomy of Issuer Types, 1980–1993

Year	Proportion #1: Quasi-Public Authority Share of Total Health Care Bond Market (%)	Proportion #2: Local Authority Share of Total Quasi-Public Bond Issues (%)	Proportion #3: Local Government Share of Total Government Issues (%)
1980	72.8	100.0	100
1981	66.7	12.2	100
1982	65.5	14.5	100
1983	68.1	17.2	100
1984	62.4	29.9	100
1985	63.6	19.3	100
1986	88.5	23.1	100
1987	49.5	17.5	100
1988	76.6	19.8	100
1989	76.6	28.6	100
1990	78.0	18.4	100
1991	61.7	14.1	100
1992	65.8	25.1	100
1993	70.5	31.1	100

We turn briefly to the trends in a few states over time to show in more detail how they can both differ and change. Tables 4 and 5 present the trends over time in California and Texas, respectively. As mentioned above, these two states have very different finance regimes. California was highly decentralized until 1981, when the state’s health finance authority made its first issue. After that, state-level authorities quickly dominated the market. Texas, on the other hand, has been consistently decentralized.

Thus, we could begin to conceive of a taxonomy of health care financing agencies that would roughly categorize states along the lines cited in Table 6.

INITIAL RESULTS OF ANALYSIS OF THE EFFECTS OF ISSUER CONCENTRATION

While the above taxonomy helps us understand the nature of state-level health care capital finance regimes, the inevitable question must be asked: So what? We believe this effort is important for two main reasons. First, we would like to test the impact that different taxonomies have on the cost of health care capital. Second, we would like to explore the

TABLE 5
Texas—Taxonomy of Issuer Types, 1980–1993

Year	Proportion #1: Quasi-Public Authority Share of Total Health Care Bond Market (%)	Proportion #2: Local Authority Share of Total Quasi-Public Bond Issues (%)	Proportion #3: Local Government Share of Total Government Issues (%)
1980	100.0	100.0	n/a
1981	80.8	100.0	100
1982	96.6	100.0	100
1983	100.0	93.6	n/a
1984	99.3	97.7	100
1985	100.0	91.9	n/a
1986	93.3	98.2	100
1987	100.0	97.3	n/a
1988	99.6	84.4	100
1989	97.2	94.8	100
1990	99.8	99.8	100
1991	99.6	99.8	100
1992	100.0	95.9	n/a
1993	100.0	90.2	n/a

n/a indicates that there were no relevant issues; thus, the proportion would be 0/0.

causes of development of each state's taxonomy, presuming that the development is not entirely random. Why do states look like they do? We will return to this second topic briefly in the conclusions. For the moment, we will concentrate on the impact different taxonomies have on the cost of health care capital.

TABLE 6
Possible Categorization of States by Issuer Type

	Government Role	Quasi-Government Role
Centralized	Moderate, Strong, or Dominant	Moderate, Strong, or Dominant
Decentralized	Moderate, Strong, or Dominant	Moderate, Strong, or Dominant

We have extended Grossman *et al.* in a manner that examines the impact of market structure on the cost of capital.¹⁸ More specifically, we have utilized two widely-used measures of concentration: the four-firm concentration ratio and the Herfindahl index.¹⁹ The former is defined as the fraction of industry output accounted for by the four largest producers. The latter is defined as the sum of the squared share of each producer in total output.²⁰ For both measures, real par value is used as output in this context. Using a large sample of our database for all health care bonds issued from 1980 to 1993, we have incorporated these measures into regression analyses of the determinants of the cost of capital (as measured by the True Interest Cost, or TIC) for hospital bond issues.

We have performed a series of regressions with the TIC as the dependent variable. Independent variables include Issue and Issuer Characteristics (including the Issuer's history of real par values and all standard characteristics of bond issues); National Characteristics (including the rate and variability of treasury bonds); State Characteristics (including the two measures of market concentration, and state tax rates); County Characteristics (including unemployment and urbanization data); and Hospital Characteristics (including Medicare and Medicaid shares and profitability margins). We report here results based on a sub-sample of all hospital bond issues for 1980 to 1993 by government and quasi-government issues for which the most complete TIC data (inclusive of fees charged) have been collected, $n=4576$.²¹ Here, we report the findings regarding the effect of market share only, and use them to raise questions for future investigation.

All coefficients are positive and statistically significant. These results imply that reductions in concentration lower the cost of capital; thus, decentralized states are better off.²² Moreover, we calculate that a one standard deviation increase in issuers or reduction in

18. Grossman, Michael, Fred Goldman, Susan Nesbitt, and Pamela Mobilia. "Determinants of Interest Rates on Tax-Exempt Hospital Bonds," *Journal of Health Economics*, 12 (1993), 385–410. For additional studies on the determinants of the cost of capital in the health care sector, see Eileen Austen, Hope Corman, and Gregory LiCalzi. "The Determinants of Net Interest Cost in Negotiated Underwriting of Tax-Exempt Hospital Bonds." *American Business Review*, 3, No. 2 (Jan. 1986), 16–20; Carpenter, Caryl E. "The Marginal Effect of Bond Insurance on Hospital, Tax-Exempt Bond Yields." *Inquiry*, 28 (Spring 1991), 67–73; and Cleverley, William O., and William H. Rosegay. "Factors Affecting the Cost of Hospital Tax-Exempt Revenue Bonds." *Inquiry*, 19 (Winter 1982), 317–326.

19. For example see Tirole, Jean. *The Theory of Industrial Organization*. Cambridge, Massachusetts: MIT Press, 1988; or Scherer, F. M., and David Ross. *Industrial Market Structure and Economic Performance*. Third Edition. Boston: Houghton Mifflin Company, 1990.

20. The Herfindahl index ranges from 1 in the case of pure monopoly to $1/n_j$ in the case of n_j firms, each of which produces the same output. The fewer the number of firms and the more concentrated output is among them, the larger is the value of the index.

21. See the appendix for a brief presentation of the model and results. An additional appendix is available from the authors with an extended exposition of the model and results.

22. Technically, we should probably use the term "deconcentrated" rather than "decentralized," since it is entirely possible for a state to have many state-level issuers, which would thus be picked up by the measures of concentration. However, in practice, deconcentrated states are also decentralized because they have local issuers. Therefore, the term "decentralization" is also appropriate.

TABLE 7
Market Structure OLS Regression Coefficients
(Dependent Variable = TIC, including fees charged; t-stat in parentheses)

	Regression (1)	Regression (2)
Concentration Ratio	0.367 (4.840)	
Herfindahl Index		0.087 (3.340)

concentration reduces the TIC by approximately twelve basis points. While this may appear small at first, the effect is larger than that associated with a one standard deviation increase in the hospital's overall operating margin or its potential profitability under Medicare's prospective payment system. It is approximately equal to the premium associated with the inclusion of a call provision. Moreover, the cost of a bond's aggregate debt service during its life of twenty to thirty years to maturity is several times its par value. A reduction in the interest rate of only a few basis points could yield substantial savings over time. For example, a ten basis-point reduction would have subtracted \$200 million from the costs of the 1,152 hospital bonds issued in 1993.²³

CONCLUDING DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

While these results are certainly thought-provoking, we cannot yet say "bond issuer concentration is unequivocally bad." In fact, we also report that issuer experience lowers the cost of capital, which implies that larger, more experienced issuers (which promote market concentration) have some advantages. We calculate that one standard deviation increase in issuer experience leads to approximately a six-basis-point reduction in the TIC.²⁴ Taken to-

23. This is the present value of the reduced interest cost. For another summary measure of the impact of concentration on interest rates, we calculate the TIC would fall thirty-one basis points if each issuer in a state had approximately the same share in real par value.

24. While this effect may seem modest, it is consistent with some of the work of Robert Bland, who also has shown that the relationship between issuer experience and interest rates is far from clear-cut. Bland, Robert L. "The Interest Cost Savings from Experience in the Municipal Bond Market," *Public Administration Review*, January/February 1985, 233-237, reports that experience lowers interest rates and argues that "[n]ot only are experienced issuers better informed, but they will also be better negotiators" (p. 234), and our findings are consistent; however, we still find that negotiation raises the interest rate. Roden, Peyton Foster, and Robert L. Bland. "Issuer Sophistication and Underpricing in the Negotiated Municipal Bond Market," *Journal of Financial Research* 9, No. 2, Summer 1986, 163-170, also report that issuer sophistication reduces interest costs. On the other hand, Bland, Robert L. "The Interest Savings from Optimizing Issue Size and Frequency of Participation in the Municipal Bond Market," *Public Budgeting and*

gether, these results lead us to three main gaps in our understanding of healthcare capital finance authorities. We will need to fill these gaps in order to understand the true impact of market structure on the cost of capital and, thus, develop realistic policy recommendations.

- 1) *We need to better understand the nature of competition between issuers.* First, are local authorities sometimes the equivalent of local monopolies? In other words, if a state has many local issuers, can a hospital seek bond issued with authorities outside of its local jurisdiction? What is the nature of competition between state and local level authorities in those states in which both are operating? This is a critical question: Do beneficiaries perceive that they have a choice between local and state-level authorities? Do local authorities benefit from closer working relationships with beneficiaries? Do local authorities emphasize maximizing profits less than state authorities do?
- 2) *What goals do states have when they establish their financing regimes?* Are larger, state-level issuers in more concentrated markets pursuing (or are they *designed* by state policymakers *in order* to pursue) goals other than simply issuing debt to hospitals at the lowest cost? Is a slightly higher cost of capital perhaps a price paid for the pursuit of some other economic development goals?
- 3) *What policy changes could affect market structures?* Any policy changes would obviously have to consider the varied histories of market structure in each state. Still, is there a role for federal policy? This is especially important given that much of the recent health care debate focused on shifting control from federal government to state and local governments and increasing the amount of competition in the market. For this reason, it is surprising that this debate has largely ignored the tax-exempt hospital bond market. The evolution of this market since the late 1960s, described in this article, provides a natural experiment to study the effects of some of these potential changes.

Thus, it will be important to explore the causes of development of each state's taxonomy, presuming that the development is not entirely random. Why do states look like they do? This will require the development of political economy theory that would allow us to use measures such as the proportion of state versus local control of the market as dependent variables in quantitative analysis. Finally, however, we feel that given the size of the sector (\$31 billion in 1993 alone) and the near complete lack of either description or analysis at the level of the bond issuers, the taxonomy and results presented in this study paint a far clearer picture than currently available of how health care capital is financed in an era where the health sector is clearly a salient concern.

Appendix: Full Regression Model of Determinants of Hospital Bond Cost of Capital

Our article highlights the effects of two common measures of market concentration, the Herfindahl index and the concentration ratio, on the cost of health care capital. The de-

Finance 4, No. 4, Winter 1984, 53–59, suggests that the “greater the supply of bonds bearing the issuer’s name, the greater amount of search by underwriters for the most willing investors and, thus, the higher the interest rate” (p. 53). This is particularly relevant given our measure of issuer’s experience as shown in the appendix. However, we do not find that issuer experience as measured by the par value of previous issues raises the cost of capital. We find that it lowers it. Clearly this is an area for fruitful additional research.

pendent variable is the cost of capital, for which we use True Interest Cost (TIC). See Grossman *et al.* (1996) for a full definition of and computation method for the TIC. Nearly all of the necessary data for the TIC were contained in our SDC database described in the study. However, in order to most accurately compute the TIC, we needed to know the fees that were charged by the finance authorities. This information was not available, so we devised and implemented a national survey of all health care finance authorities to determine the level of fees charged.

To obtain information on fees charged by issuers and changes in fees over time, we conducted a survey of all issuers classified as state authorities, local authorities, and districts. The survey universe consisted of 999 issuers. Those receiving questionnaires issued 4,824 bonds whose total real par value amounted to \$130 billion in 1982–84 dollars during the period 1980 through 1993. Of the 999 issuers in the survey, 359 returned the questionnaire. Thus, the response rate of 36 percent in terms of issuers was relatively modest. The respondents, however, accounted for 65 percent of all issues done by the survey universe and for 71 percent of their real par value. These response rates are much more impressive. They indicate that our survey includes most of the large issuers both in terms of the number of bond deals and their total par value.

Regressions were estimated with a sample drawn from the 5,799 issues where TICs exclusive of fees can be computed. 1,213 issues were done by state and local authorities who received the survey and did not respond, and ten were done by issuers who responded but did not report information on fees. Thus, the sample ($n=4,576$) excludes these issues. Measures of the number of issuers and the concentration of par value among issuers are based on all 6,701 hospital issues in the full database. The mean and standard deviation of the dependent variable, the True Interest Cost inclusive of fee in the sample, are 8.223 and 2.340, respectively.

Table A1 presents the definitions, means, and standard deviations of the independent variables. Table A2 presents the standard OLS regression results. This model closely follows other common models of the determinants of interest rates and cost of capital for hospitals, most notably Grossman, Goldman, Nesbitt, and Mobilia (1993, see also Note 18). There are, however, a few variable definitions and omissions that may need additional discussion. First, while the database includes refinancings, a dummy for a refinancing was not significant and is therefore excluded from these results. Second, we do not know the number of competitive bids and therefore include only a dummy for those negotiated. While most studies include the number of bids, they are also generally limited to much smaller numbers of observations than we have.²⁵ Third, we do not include bond ratings because, given our detailed specification, we consider them to be endogenous. Regressions with the ratings included were not substantively different, however. Finally, we have not

25. For an example of a study that both includes the number of bids and has a relatively small number of observations, see Simonson, William, and Mark D. Robbins. "Does It Make a Difference Anymore? Competitive Versus Negotiated Municipal Bond Issuance," *Public Administration Review* 56, No. 1:57–64.

TABLE A1
Definitions, Means, and Standard Deviations of Independent Variables
(Entire sample of 5,799 issues. First figure is mean; second is standard deviation)

A. Issue and Issuer Characteristics

<p>Negotiated (0.910, 0.286)</p> <p>Private placement (0.029, 0.167)</p> <p>Call (0.856, 0.351)</p> <p>Put (0.106, 0.308)</p> <p>Fixed (0.883, 0.321)</p> <p>Length (24.594, 8.882)</p> <p>Multi (0.233, 0.423)</p> <p>Teach (0.126, 0.332)</p> <p>Pool (0.058, 0.233)</p> <p>Rank (10.366, 13.034)</p> <p>No rank (0.264, 0.441)</p> <p>General (0.074, 0.262)</p> <p>Issuer's history of real par values (707.021, 1486.450)</p>	<p>Dichotomous variables that identify negotiated issues and private placements, respectively; omitted category pertains to competitive issues</p> <p>Dichotomous variable that identifies callable issues</p> <p>Dichotomous variable that identifies puttable issues</p> <p>Dichotomous variable that identifies issues with fixed coupon rates</p> <p>Length in years between the date of final maturity and the date of issue</p> <p>Dichotomous variable that identifies issues for multi-hospital systems</p> <p>Dichotomous variable that identifies issues for hospitals that have teaching status</p> <p>Dichotomous variable that identifies pooled financings</p> <p>Rank of primary underwriter in terms of total par value of issues underwritten; ranges from one (highest par value) to fifty (lowest par value)</p> <p>Dichotomous variable that identifies issues in which primary underwriter is not one of the fifty leading underwriters</p> <p>Dichotomous variable that identifies general obligation bonds</p> <p>Total real par value of all previous issues in millions of 1982–84 dollars; includes nursing home and life care issues</p>
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B. National Characteristics

<p>T bond rate (9.032, 1.979)</p> <p>Variability (0.170, 0.114)</p>	<p>Yield on 30-year U.S. Treasury bond on week of issue as a percentage</p> <p>Standard deviation of previous variable based on an eight-week period ending with the week of issue</p>
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C. State Characteristics

<p>Concentration ratio (-0.248, 0.280)</p>	<p>Natural logarithm of four-largest-issuer concentration ratio based on real par value in issue year; logarithm of fraction of real par value accounted for by four largest issuers</p>
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TABLE A1 (continued)
Definitions, Means, and Standard Deviations of Independent Variables
(Entire sample of 5,799 issues. First figure is mean; second is standard deviation)

Herfindahl index (-1.202, 0.820)	Natural logarithm of Herfindahl index based on real par value; logarithm of sum of squared share of each issuer in total real par value
State income tax (0.052, 0.035)	State income tax rate in highest tax bracket as a fraction
Mandatory rate setting (0.102, 0.301)	Dichotomous variable that identifies issues in states with mandatory rate-setting programs
<i>D. County Characteristics</i>	
Unemployment ¹ (7.274, 3.013)	Unemployment rate of persons aged 16 and over as a percentage
Rural ¹ (0.192, 0.384)	Dichotomous variable that identifies rural counties
<i>E. Hospital Characteristics</i>	
Medicare share ¹ (0.448, 0.135)	Fraction of inpatient days accounted for by Medicare inpatient days
Medicaid share ¹ (0.097, 0.092)	Fraction of inpatient days accounted for by Medicaid inpatient days
Medicaid share* DRG ¹ (0.033, 0.064)	Fraction of inpatient days accounted for by Medicaid inpatient days multiplied by a dichotomous variable that identifies issues in states using a DRG reimbursement methodology under Medicaid
Medicaid share* other ¹ (0.047, 0.082)	Fraction of inpatient days accounted for by Medicaid inpatient days multiplied by a dichotomous variable that identifies issues in states using a Medicaid reimbursement system with prospective rate of increase controls or with negotiation and fixed contracting (Medicaid share* other); omitted category pertains to issues in states using retrospective cost-based reimbursement under Medicaid
Asset ratio ¹ (2.177, 1.862)	Ratio of total assets to total liabilities
Medicare share* PPS ¹ (0.041, 0.101)	Fraction of inpatient days accounted for by Medicare inpatient days multiplied by PPS profitability margin; interacted with a dichotomous variable that equals one for the years 1984 through 1988 since PPS began in October 1983
Operating margin ¹ (0.009, 0.058)	Net patient revenue minus operating expenses divided by net patient revenue
Hospital's history of real par values ¹ (63.019, 160.129)	Total real par value of all previous issues in millions of 1982-84 dollars

TABLE A1 (continued)
Definitions, Means, and Standard Deviations of Independent Variables
(Entire sample of 5,799 issues. First figure is mean; second is standard deviation)

F. Unknowns

Hospital history of real par value unknown (0.141, 0.348)	Hospital name unknown; this variable and the next four are dichotomous indicators
Asset ratio unknown (0.290, 0.454)	Value of the asset ratio is unknown
PPS margin unknown (0.397, 0.489)	Includes cases where PPS margin is known but Medicare share is unknown
Operating margin unknown (0.347, 0.476)	Value of the operating margin is unknown
Other variable unknown (0.279, 0.449)	Identifies issues in which the unemployment rate, the rural indicator, the fraction of Medicare patients days, and the fraction of Medicaid patient days are unknown; if one variable is unknown, all are unknown

^aMean and standard deviation pertain to issues for which variable is known.

included a variable for issue size because we consider it to be an endogenous variable and we are presenting a reduced-form equation.

The concentration ratio is employed as a regressor in regression (1), while the Herfindahl index is employed in regression (2). The discussion of the results here is limited to the market structure effects as summarized by Table 7 in the main body of the text. Consider the regression coefficients for the TIC inclusive of fee. All have the expected signs and are statistically significant. To gauge the magnitude of the concentration effects, we consider how much the TIC inclusive of fee would fall if each issuer had approximately the same share in real par value. The concentration ratio and the Herfindahl index have means of 0.83 and 0.45, respectively. These are the means of the actual variables rather than the antilogarithms of the means of their logarithms, presented in Table A2. Based on the number of different issuers in the issue year, there were thirteen different issuers per state who issued bonds in a typical year in the period from 1980 through 1993. If each issuer had the same share in real par value, the Herfindahl index would equal 0.08, and the concentration ratio would equal 0.31. A two standard deviation reduction in the natural logarithm of the Herfindahl index would produce an actual index of 0.08, and a three standard deviation reduction in the natural logarithm of the concentration ratio would produce an actual ratio of 0.35. Therefore, we use a two standard deviation reduction in the case of the Herfindahl index and a three standard deviation reduction in the case of the concentration ratio.

TABLE A2
Determinants of Hospital Bond Cost of Capital: OLS Regression Coefficients
(Dependent Variable = TIC, True Interest Cost, including fees charged)
(t-statistic in parentheses, intercepts not shown, n=4,576)

	TIC Inclusive of Fee Regressions	
	(1)	(2)
<i>A. Issue and Issuer Characteristics</i>		
Negotiated	0.607 (6.87)	0.597 (6.74)
Private placement	0.816 (5.78)	0.804 (5.68)
Call	0.081 (1.36)	0.084 (1.41)
Put	-1.173 (-7.01)	-1.180 (-7.04)
Fixed	1.612 (10.05)	1.612 (10.03)
Length	0.022 (8.79)	0.022 (8.59)
Multi	-0.086 (-1.77)	-0.079 (-1.62)
Teach	-0.280 (-4.69)	-0.283 (-4.74)
Pool	-0.050 (-0.52)	-0.050 (-0.52)
Rank	0.008 (4.86)	0.008 (4.90)
No rank	0.424 (7.55)	0.424 (7.54)
General	-0.616 (-7.35)	-0.611 (-7.29)
Issuer's history of real par values	-0.00004 (-2.93)	-0.00004 (-2.86)
<i>B. National Characteristics</i>		
T bond rate	0.820 (63.97)	0.822 (64.16)
Variability	1.684 (8.41)	1.699 (8.47)

TABLE A2 (continued)
Determinants of Hospital Bond Cost of Capital: OLS Regression Coefficients
(Dependent Variable = TIC, True Interest Cost, including fees charged)
(t-statistic in parentheses, intercepts not shown, n=4,576)

	TIC Inclusive of Fee Regressions	
	(1)	(2)
<i>C. State Characteristics</i>		
State income tax	-2.980 (-5.28)	-2.831 (-5.02)
Mandatory rate setting	-0.020 (-0.28)	-0.013 (-0.18)
Concentration ratio	0.367 (4.84)	
Herfindahl index		0.087 (3.34)
<i>D. County Characteristics</i>		
Unemployment	0.017 (2.15)	0.016 (2.02)
Rural	0.084 (1.33)	0.102 (1.63)
<i>E. Hospital Characteristics</i>		
Medicare share	0.009 (0.05)	-0.001 (-0.01)
Medicaid share	1.068 (2.48)	1.128 (2.62)
Asset ratio	-0.027 (-2.13)	-0.026 (-2.03)
Medicare share* PPS	-0.903 (-3.64)	-0.872 (-3.51)
Medicaid share* DRG	-1.452 (-2.79)	-1.538 (-2.95)
Medicaid share* other	-1.207 (-2.62)	-1.286 (-2.79)
Operating margin	-1.274 (-3.08)	-1.258 (-3.04)
Hospital's history of real par values	-0.0004 (-3.24)	-0.0004 (-3.25)
<i>F. Unknowns</i>		
Hospital history of real par value unknown	-0.165 (-2.17)	-0.164 (-2.16)
Asset ratio unknown	-0.203 (-1.05)	-0.194 (-1.00)

TABLE A2 (continued)
Determinants of Hospital Bond Cost of Capital: OLS Regression Coefficients
(Dependent Variable = TIC, True Interest Cost, including fees charged)
(t-statistic in parentheses, intercepts not shown, n=4,576)

	TIC Inclusive of Fee Regressions	
	(1)	(2)
PPS margin unknown	0.041 (0.58)	0.046 (0.66)
Operating margin unknown	0.292 (3.67)	0.296 (3.72)
Other variable unknown	0.118 (0.52)	0.097 (0.43)
R-square	0.717	0.716
F-statistic	348.31	347.01

For the Herfindahl index, the average two standard deviation effect amounts to fourteen basis points for the TIC inclusive of fee. For the concentration ratio, the average three standard deviation effect amounts to thirty-four basis points for the TIC inclusive of fee. We view an average of the two figures for each TIC as the best estimate of the impact of inequality in market shares. Thus, departures from equality in market shares raise the TIC inclusive of fee by twenty-four basis points.

NOTE

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