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# Medicare upcoding and hospital ownership

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**Abstract**

Many hospitals in the 1990s many hospitals were accused of "upcoding" patient diagnostic related groups (DRGs) to increase Medicare reimbursements. We find that between 1989 and 1996, the percentage point share of the most generous DRG for pneumonia and respiratory infections rose by 10 points among not-for-profit hospitals, 23 points among for-profit hospitals, and 37 points in hospitals converting to for-profit status. Not-for-profit upcoding was also higher in markets with a larger for-profit hospital share. Upcoding appears to reflect both risk-taking by administrators and a closer alignment between the goals of the administration and the behavior of the clinical staff.


*JEL classification:* I1

*Keywords:* For-profit; Not-for-profit; Hospital organization; Medicare; Upcoding

## 1. Introduction

During the 1990s, many hospitals were accused by the federal government of upcoding, where an elderly patient's diagnostic related group (DRG) was shifted to yield a higher reimbursement from the Medicare system. The most visible case was brought by federal investigators against the Columbia/HCA (now HCA) chain of for-profit hospitals in 1997. In this paper, we use a comprehensive sample of Medicare claims data to examine at the national level whether and how hospital ownership and market structure affected upcoding behavior during 1989–1997.

A variety of studies have posited that for-profit and not-for-profit hospitals operate according to different objective functions (Newhouse, 1970; Pauly and Redisch, 1973;

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Lakdwawalla and Philipson, 1998; Horwitz, 2003). Detecting significant differences in actual hospital behavior across ownership status has been more difficult, with one survey concluding: "Overall, the evidence suggests that for-profit and private not-for-profit hospitals are far more alike than different (Sloan, 2000, p. 1168)."[1] In the case of upcoding, however, we find that for-profit and not-for-profit hospitals were not alike. Between 1989 and 1996, the percentage of admissions for respiratory disease coded with the most expensive DRG rose by 10 percentage points among not-for-profit hospitals, 23 percentage points among for-profit hospitals, and by 37 percentage points among hospitals that had converted from not-for-profit to for-profit status between 1989 and 1993. Since 1996, there has been a dramatic decline in upcoding ratios, with the greatest drop among for-profit hospitals.

One potential explanation for why for-profit hospitals were more active in upcoding is a secular increase in the severity of illness, particularly among for-profit patients. Another potential hypothesis for the rise in upcoding is that for-profit hospitals became much better at managing financial transactions by using computers and specialized software, so that the observed trends represent an improvement in financial efficiency by a reduction in "downcoding" rather than an increase in upcoding. Note that either hypothesis implies the absence of legal malfeasance.

A third hypothesis is that similar levels of upcoding may have occurred across for-profit and not-for-profit hospitals, but because the upcoding for pneumonia received the greatest attention through media coverage of the Columbia/HCA investigations, empirical studies relying solely on pneumonia upcoding are biased towards finding higher upcoding among for-profit hospitals.[2] In this view, upcoding occurred consistently across the for-profit and not-for-profit sector, but each sector specialized in particular diseases.

We did not find support for any of these three hypotheses. Differential upcoding by for-profits was not because of sicker patients or attenuation in "downcoding" caused by more efficient billing systems. A variety of other audits conducted by the government and by non-government researchers have found ex post that chart data could not support the severity of disease actually billed for. Upcoding took the form of *presumptive* diagnosis; while there was no documentation that the patient actually had the disease, it could not definitely be ruled out. Nor did we find evidence favoring "reporting bias" towards finding for-profit upcoding behavior; upcoding for stroke, a disease not closely associated with the Columbia/HCA chain, was also greater among for-profit hospitals.

What then can upcoding tell us about how for-profit and not-for-profit differ? In a simple altruism model (Newhouse, 1970), not-for-profit hospital administrators could be tempted to upcode as much as their for-profit brethren; by expanding their budget they could afford even more socially valuable but unprofitable health care services.[3] A 'signaling' model, in which not-for-profit administrator salaries are loosely tied to profitability to ensure they

[1] More recently, Gaynor and Vogt (2003) have estimated demand elasticities separately among for-profit and not-for-profit hospitals, although the simulated responses of for-profit and not-for-profit hospitals to a merger of hospitals in the market were quite similar. Horwitz (2003) showed that for-profit hospitals were more likely to offer profitable services (such as open heart surgery) and less likely to offer unprofitable services (such as a psychiatric emergency care).

[2] Not just for-profit hospitals were accused of upcoding. Several well respected not-for-profit academic medical centers were accused of coding irregularities as well (e.g., King, 2000).

[3] We follow the structure of models describing not-for-profit hospital behavior in Malani et al. (2003).

do not cut corners on quality (Glaeser and Shleifer, 2001; Erus and Weisbrod, 2003) is more consistent with laggard rates of upcoding among not-for-profit hospitals. However, the empirical evidence is not consistent with the related Hansmann (1980) hypothesis that not-for-profit institutions should exert a moderating influence on for-profits operating in the same market. Instead, we find that not-for-profit hospitals were more likely to engage in upcoding when they operated in markets with high for-profit penetration, supporting a "reverse Hansmann" view (Cutler and Horwitz, 2000; Duggan, 2002). More difficult still to explain is why all hospitals in the South—for-profit, not-for-profit, and government—experienced a more rapid growth in upcoding than other parts of the county, given that Medicare is fundamentally a federal program.

Upcoding sheds light on a dimension that has been largely forgotten in the literature: the balance of power between the administrative and clinical staff. As Harris (1997) has emphasized, hospitals are best described as the common physical location of two largely separate financial organizations: the core hospital administration and the physician-run clinics. The tension between the two groups occurs because hospital administrators must defer to physicians with regard to clinical decisions, yet those decisions in turn ultimately determine the profitability (or solvency) of the hospital. Pauly and Redisch (1973) distinguished between for-profit hospitals, where physicians either share residual hospital revenue or received salaries, and not-for-profit hospitals, where "no administrator can afford to incur the displeasure of the medical staff . . . " (p. 89). For upcoding to occur, administrators must be willing to engage in ex ante risky but potentially profitable behavior, and physicians must acquiesce by approving (and until 1995, signing) the DRG claims submitted by the hospital to Medicare.

Anecdotal evidence supports this distinction. Duggan (2002) found that the percentage of physicians on for-profit hospital governing boards was double the percentage on not-for-profit boards—thus helping to ensure that the goals of the clinic were consistent with the goals of the administrators (see also Alexander et al., 1986; Gray, 1991).[4] A particularly effective strategy to align physician and administrator's goals was to bring in physicians as equity partners. When one formerly not-for-profit hospital was purchased by Columbia, 20% of the equity was sold to physicians in $15,000 blocks (Barciela, 1993). Perhaps not coincidently, within a year the percentage of pneumonia patients with the most expensive DRG jumped from 31 to 76% (Gottlieb et al., 1997). In short, the evidence on upcoding is consistent with the view that hospital ownership matters most for the balance of power between administrators and clinical staffs.

## 2. Hospital ownership and upcoding for pneumonia, 1989–1998

We first consider the primary hypothesis of whether upcoding ratios differ by hospital ownership. The primary analysis is from the 20% MEDPAR file of Medicare claims data

[4] As well, at least one of the large for-profit chains provided vacation bonuses to physicians meeting targets for referrals (Brubaker, 2001). On the other hand, Gray (1991, p. 385) in random site visits to hospitals during the 1980s did not find a correlation between hospital ownership and relations between administrators and clinical staff.

for each year 1989 through 1998 with information at the individual level with a hospital identification code. The ownership status of the hospital was determined from the American Hospital Association Yearbook in 1989, 1993, and 1996, and matched to the Medicare claims data by the use of the Medicare provider number. If ownership status was the same in each of the three years 1989, 1993, and 1996, the hospital was deemed to exhibit stable ownership status. Our primary interest is in the ratio of hospital discharges for DRG 79, respiratory infections and inflammations with complications (with a DRG reimbursement weight of 1.65), relative to the sum of discharges for the set of four DRGs that together comprise general respiratory ailments: 79 plus 80 (respiratory infections without complications, DRG weight of 0.90) plus 89 (pneumonia, with complications, DRG weight of 1.09) plus 90 (pneumonia, without complications, DRG weight of 0.68). With reimbursements per 1.0 DRG equal to roughly US$ 4000 during the mid-1990s depending on the location of the hospital (US Congress, 1996, Appendix A), the incentive to upcode from the other three DRGs to DRG 79 was at least US$ 2000 per discharge.

Fig. 1 shows the upcoding ratio by ownership status of hospitals, where the aggregated data extends through 1998. Among stable not-for-profit hospitals, the upcoding ratio rises from 20% in 1989 to 30% in 1996, with a drop back to 25% in 1998. For-profit hospitals experienced more rapid growth in upcoding, from 28% in 1989 to 52% in 1996, followed by a very sharp decline to 32% in 1998—not much different from where they were in 1989. Finally, the pattern for government hospitals is nearly identical to not-for-profit hospitals during this period.

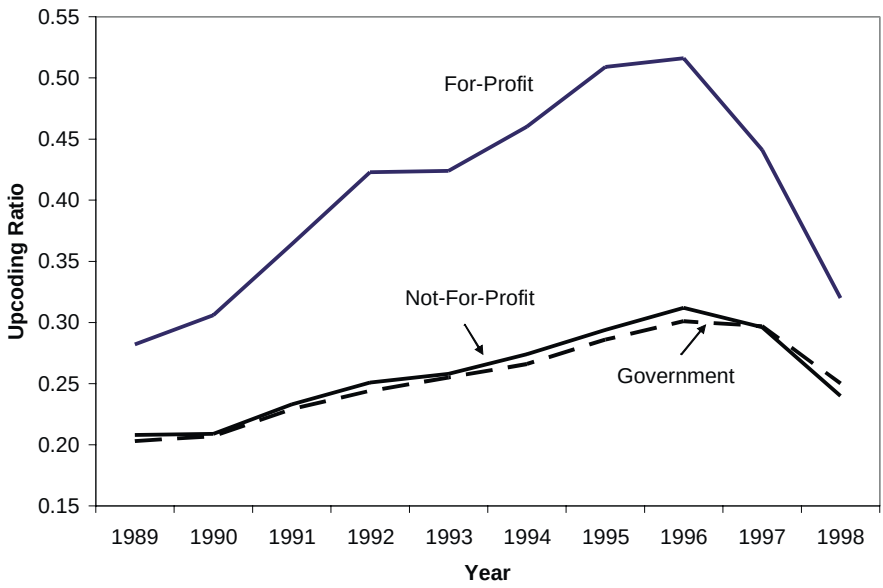


Fig. 1. The upcoding ratio by ownership status of hospital, 1989–1998. *Note*: All hospitals exhibit stable ownership patterns (for-profit, not-for-profit, and government) in 1989, 1993, and 1996. Upcoding is measured as the ratio of DRG 79 to the sum of DRGs 79, 80, 89, and 90.

Table 1
Severity of illness for patients with pneumonia and pulmonary complications, by hospital ownership, 1989–1998

| | Charlson index of comorbidities for DRGs 79, 80, 89, 90 | | | One-month mortality for DRGs 79, 80, 89, and 90 | | |
|---|---|---|---|---|---|---|
| | Not-for-profit hospitals | For-profit hospitals | Government hospitals | Not-for-profit hospitals | For-profit hospitals | Government hospitals |
| 1989 | 0.97 | 0.92 | 0.89 | 0.184 | 0.180 | 0.180 |
| 1990 | 0.99 | 0.93 | 0.92 | 0.170 | 0.170 | 0.171 |
| 1991 | 1.00 | 0.95 | 0.93 | 0.172 | 0.174 | 0.173 |
| 1992 | 1.11 | 1.04 | 1.02 | 0.167 | 0.175 | 0.170 |
| 1993 | 1.15 | 1.12 | 1.08 | 0.171 | 0.175 | 0.167 |
| 1994 | 1.22 | 1.18 | 1.12 | 0.168 | 0.174 | 0.170 |
| 1995 | 1.27 | 1.19 | 1.16 | 0.168 | 0.178 | 0.167 |
| 1996 | 1.30 | 1.22 | 1.18 | 0.170 | 0.176 | 0.167 |
| 1997 | 1.31 | 1.22 | 1.19 | 0.172 | 0.177 | 0.164 |
| 1998 | 1.32 | 1.24 | 1.20 | 0.170 | 0.183 | 0.168 |

*Note*: All hospitals exhibit stable ownership patterns (for-profit, not-for-profit, and government) in 1989, 1993, and 1996.

## 3. Was upcoding the consequence of sicker patients?

We need to rule out two potential explanations for the rapid increase in DRG case-mix for pulmonary complications and stroke that we consider below. The first is an increased severity of disease; if hospitalized patients became sicker over time, it would be justified that the severity coding would increase. The first two columns in Table 1 show the Charlson index that provides an index of the number of complications for patients admitted with pulmonary complications and pneumonia (the four DRGs) combined;[5] at this aggregated level we were able to include data through 1998. There is a steady upward growth in measured comorbidities across all three hospital types. So at face value, it would appear that these trends support the hypothesis that simply increasing disease severity lead to the upward trend in DRG severity.

There are three reasons, however, why this hypothesis is unlikely to be correct. First, as is shown in Table 1, there is a gradual decline in mortality rates among these patients by year, and by hospital ownership status. How can mortality be declining consistently across ownership type if the severity of disease is rising? One could argue that technological progress in the treatment of pneumonia has steadily improved, leading to a downward trend in mortality while patients are still getting sicker. While somewhat farfetched, we can still rule out this second hypothesis by examining differential growth rates in upcoding, and differential growth rates in the Charlson index, by hospital ownership. According to this "dif-in-dif" approach, for-profit hospitals the ownership category with the most rapid growth in upcoding should have also experienced the most rapid growth in their Charlson index. However, we find no evidence for this hypothesis; there are no significant differences in the growth rate of the Charlson index across hospital types. Finally, the hypothesis that severity

[5] These include the coded presence of heart attacks, congestive heart failure, peripheral vascular disease, dementia, chronic pulmonary disease, diabetes, cancer, liver disease, and connective tissue disease, among others.

of disease explains the rise in upcoding fails badly in explaining the trends between 1996 and 1998; the Charlson index climbs or flattens out while DRG upcoding plummets. In short, the Charlson index likely reflects DRG bracket creep (as discussed below), but there is no evidence that pneumonia patients are sicker in 1998 than in 1989.

## 4. Did upcoding reflect more efficient billing and coding practice?

Studies using data from the 1980s found downcoding as likely as upcoding, and there were modest differences by hospital ownership status (Hsia et al., 1992). Just 2 years after the introduction of Medicare's Prospective Payment System, a 1985 Rand Corporation study found that an unexpected increase in the Medicare Case Mix Index (which determines DRG payments to hospitals) was largely attributable to changes in documentation and coding practices (Carter and Ginsburg, 1985). That study did not address the appropriateness of those coding practices, but prophetically raised the question of whether this "DRG creep" was a "one-time adjustment to an environment in which thorough coding encouraged, or a phenomenon of continual inflation in the CMI caused by aggressive coding practices."

Dafny (2002) found evidence of upcoding using a natural experiment in 1988 where Medicare no longer automatically reimbursed at higher rates for enrollees 70 years and older. She found a sharp differential increase in the coded severity of this group, particularly relative to the control group under age 70, providing strong support for a pure upcoding response by hospitals. Using the more recent Cardiovascular Health Study data, Psaty et al. (1999) found only 62.5% of Medicare coding for heart failure could be validated ex post using their detailed chart information; they estimated upcoding just for cardiovascular disease accounted for nearly US$ 1 billion in additional annual Medicare costs.

Perhaps hospitals (and for-profit hospitals in particular) simply became more efficient at billing for Medicare services (e.g., Sear, 1991). In this second view, federal prosecutors deemed more aggressive claims to be "upcoding" after the fact, and the larger hospital chains were pressured into settling claims to avoid long and protracted trials. Distinguishing among these hypotheses requires some institutional background, first with respect to the process of Medicare billing, and second with respect to the clinical issues involved in the coding of pneumonia.

Medicare bills are prepared by claims coders, who use the hospital charts and the diagnostic (ICD-9) codes input by physicians to map the patient condition into a specific DRG. There is considerable latitude with regard to which elements of the hospital chart are entered in the Medicare claims form, and how to map physician entries to a final DRG code, particularly with regard to the presence of complications. Until 1995, the physician needed to sign every DRG claim, and while that requirement has since been removed, the physician still holds legal responsibility for Medicare billing accuracy.[6]

[6] Each physician must attest to the statement that "Medicare payment to hospitals is based in part on each patient's principal and secondary diagnoses and the major procedures performed on the patient as attested to by the patient's attending physician by virtue of his or her signature in the medical record. Anyone who misrepresents, falsifies, or conceals essential information required for payment of federal funds may be subject to fine, imprisonment, or civil penalty under applicable federal laws." 42 C.F.R. § 412.46 (quoted from Blount and Gold, 1999).

During the early 1990s, computerized programs for Medicare coders gradually replaced the preexisting manual entry methods. These computer programs prompted coders to enter comorbidities and complications, and provided feedback on which complications allowed the hospital to increase DRG billing. Twila Weiszbrod, Medical Records Director of the East Adams Rural Hospital in Ritzville, WA described in 1993 her IRP Inc. coding program:

> The software greatly simplifies the process of selecting complications by reminding the user that no complications have yet been entered, determining whether each item entered qualifies as a complication, and suggesting possibilities. In many cases, these complications are items the person doing the coding manually may not consider. For example, we had a man admitted with pneumonia. He also had diabetes mellitus type II. This seemed like it would be a complication. I was surprised to find that it did not qualify. So, I entered the next item on the chart—low sodium—and found it did.[7]

The resulting increase in Medicare billings (and presumably, severity of disease as measured by comorbidities) is consistent with a more benign view of "DRG bracket creep" where coding administrators are better able to search medical records looking for reimbursable conditions.

We distinguish between upcoding and DRG creep based on whether ex post examination of the medical record by expert coders would cause revisions to the DRG. In the case of Twila Weiszbrod above, it seems unlikely that her coding of pneumonia with complications would have been overturned on review. On the other hand, a study by the Office of Inspector General at Health and Human Services used blinded case reviews by coding experts and found that 35% of DRG 79 claims were upcoded in 1996 (HHS, 1998).[8] This was not simply a for-profit hospital phenomenon, since fewer than 10% of the hospitals identified were for-profit hospitals.

Of course, our data does not allow for explicit clinical review, and so we also identify upcoding by rapid secular changes in the coding with no apparent clinical justification. For example, 1992 was the last year that the Cedars Medical Center in Miami operated as an independent hospital before being acquired by Columbia. In that year, 31% of patients with pneumonia were billed for the highest-paying DRG 79 (Gottlieb et al., 1997). After being purchased by Columbia in 1993, that percentage jumped to 76%, and by 1995 it was 93%. In 1993, 20% of the purchase price of the acquired hospital was funded by shares in equity sold to physicians in US$ 15,000 blocks (Barciela, 1993). By contrast, in 1995 the not-for-profit Jackson Memorial, across the street, was billing just 28% of its patients for DRG 79 (Gottlieb et al., 1997).

Why did upcoding swing up so dramatically in the 1990s, and why was it concentrated in a relatively small number of diseases? To understand why requires a brief review of the clinical aspects of diagnosing these diseases. First, the diagnosis of bacterial pneumonia can be straightforward, relying on classic symptoms (e.g., fever, cough and sputum production) in conjunction with the typical X-ray signature of pneumonia in the lungs. If

[7] See http://www.irpsys.com/articles/tw_rura.htm. Accessed 1 October 2003.

[8] This estimate is likely to be an upper bound, however, since most hospitals in the sample had already been identified as high risk.

a sputum sample is obtained, the finding of "Gram-positive" bacteria usually constitutes simple bacterial pneumonia (DRG 89 or 90), because the more common Gram-positive organisms are usually responsive to antibiotics. The finding of "Gram-negative" bacteria moves the diagnosis into the more complex DRGs 79 and 80, since Gram-negative organisms are generally more aggressive and can cause more severe illness. For many patients, however, the diagnosis of pneumonia is problematic. The sputum sample may be non-diagnostic, or the X-ray findings may not be typical of pneumonia. The pneumonia-like condition may arise out of an exacerbation of heart disease or chronic obstructive pulmonary disease (COPD), making the diagnosis of simple pneumonia difficult. In addition, the symptoms of viral or mycoplasmal pneumonia may overlap with those of other conditions.

The inherent uncertainty in diagnosis provided fertile ground for consultants advising hospitals on how to maximize Medicare billing. In the case of pneumonia, because it is often difficult to identify Gram-positive or negative bacterial pneumonia through blood or sputum cultures, some consultants suggested to hospitals that they might use other clinical characteristics as proxies. Since the more serious Gram-negative infections are most likely to occur in aged, debilitated patients with fever, purulent sputum, elevated white blood cell counts, and certain X-ray findings, any patient with these characteristics—according to the consultants—would be presumed to have Gram-negative pneumonia.[9] By 1996, at least one consultant was still advising hospitals to code for the high paying DRG 79 *in the absence of a positive culture*, as long as the physician has documented a Gram-negative illness.[10] It is this distinction that is critical to understanding the upcoding phenomenon—the belief that hospitals could receive higher reimbursements for a presumptive, not actual diagnosis, so long as the physician went along with the diagnosis.

Did hospital administrators (or physicians) know they were taking a risk? Certainly by 1996, there were indications of investigations by the Department of Justice into overly aggressive upcoding for DRG 79 (Hale, 1996). As well, there is anecdotal evidence of coders who quit their jobs rather than follow the "unethical" directives of hospital administrators.[11] But even when hospitals believed their consultants were within the limits of the law, going ahead with aggressive upcoding suggests a taste for risk. Rai (2001) has argued that "... risk seekers would test the limits of a vague law, and those who were risk averse might be chilled from engaging in desirable behavior" (p. 581) where "desirable" in this context is with respect to the hospital's current net revenue.

[9] Some of these consultants were the subject of federal probes in the 1990s and turned over the names of hospitals they advised to the government for further investigation (Morris, 2001).

[10] Italics are quoted from Hale (1996). The historical background for this advice came from a coding publication called the Coding Clinic, which is sponsored in part by the American Hospital Association. In 1988, a coding clinic article described the characteristics of gram negative pneumonia, and suggested that observing such features in the patient entitles one to diagnose presumptively DRG 79. This interpretation was explicitly rejected in a later Coding Clinic issue in 1993, yet the advice in Hale (1996) is more in the spirit of the 1988 approach to coding for DRG 79.

[11] Hundley (1999) interviewed Paul Ellie, the owner of placement agency for Medicare coders: "'A number of people in hospitals all over the country quit their jobs because they were being asked to do things that were unethical,' Ellie said. In some cases, he notes that coders found their bosses were changing their work to beef up the bill."

## 5. For-profit upcoding and "reporting bias"

One possible source of bias is that we chose pneumonia in part because of the investigation into Columbia/HCA; this reporting bias might lead one to expect higher upcoding among for-profits. To test this hypothesis, we also considered the fraction of cases that were coded for stroke and transient ischemic attack (TIA); these were illnesses that did not figure in the Columbia/HCA investigation but which have been identified by the government as potential sources of upcoding (HHS, 1998).

While a stroke is a neurovascular event that causes impairment of motor or sensory function within the central nervous system, transient ischemic attacks can cause the same symptoms, but by definition the symptoms of a TIA resolve within 24 h. Stroke symptoms may resolve completely as well, and, since it may be difficult to time the onset of symptoms, the diagnosis may be subjective. Since the DRG for stroke excluding TIAs (DRG 14) pays substantially more than the DRG that includes TIAs (DRG 15) there are strong financial incentives for upcoding from DRG 15 to DRG 14.

Between 1989 and 1996 at the peak of upcoding, the ratio of the higher reimbursement DRG 14, relative to the sum of DRG 14 plus DRG 15, rose from 71 to 72% for not-for-profit hospitals, and from 71 to 73% for government hospitals. By contrast, the same ratio rose from 69 to 77% among stable for-profit hospitals, or at least four times the increase among the other hospital categories. In sum, upcoding for stroke exhibits a similar pattern, although not quite so pronounced as for respiratory diseases and pneumonia.

## 6. Market interaction between for-profit and not-for-profit hospitals

A different topic is the nature of the interaction among for-profit and not-for-profit hospitals in the same markets. Our definition of markets is simply the town or city in which the hospital is located, and thus follows the structure of Hospital Service Areas (HSAs) as used in the *Dartmouth Atlas of Health Care* (Wennberg and Cooper, 1999). There are 3436 HSAs in the United States, with the largest number of HSAs being single hospitals in a town or city, but with the majority of people being located in the larger HSAs with more than one hospital. The primary purpose for defining HSAs in the *Dartmouth Atlas* is to define zip-code-based regions that correspond to the primary catchment areas for the hospital(s) in the region. One advantage of this approach is that the definition of markets is exogenous to the marketing strategy or quality of the hospital, short of physically moving the hospital to a different location. The disadvantage is that markets will be measured with error, for example in the cases where hospitals in adjacent towns may compete for market share.

The market share of for-profit, not-for-profit, and government hospitals are determined by the ratio of total hospital discharges at the outset of the analysis in 1989. We categorize the HSAs into four groups: those with no for-profit market share, those with positive but less than 25% market share, those with 25–50% market share, and those with more than 50% market share.[12] We also merge the hospital-level data set with cost data from the Medicare

[12] Our ownership data comes from the AHA during 1989, 1993, and 1996 and is merged with Medicare hospital identifiers.

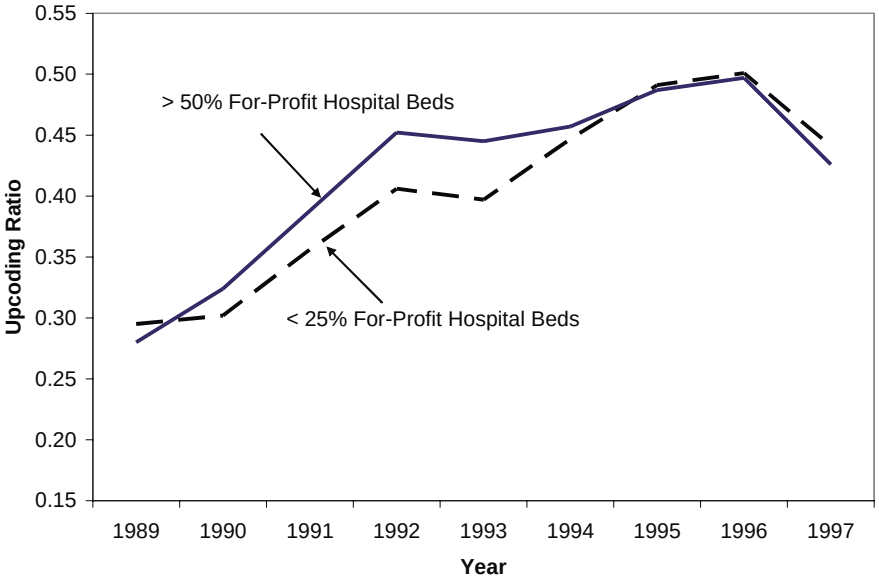


Fig. 2. The upcoding ratio of for-profit hospitals, by for-profit market share in the region, 1989–1997. *Note*: Upcoding is measured as the ratio of DRG 79 to the sum of DRGs 79, 80, 89, and 90.

Cost Reports for 1993 to test for the impact of financial distress on upcoding behavior. The year 1993 was selected as the year just prior to the sharpest rise in upcoding, and is thus largely free of endogeneity by which hospital upcoding aggressiveness would mitigate subsequent financial distress. For each hospital, we calculated the ratio of total patient revenue to the sum of direct costs plus capital costs attributed to plant and equipment. We created five quintiles in order of most distressed (quintile 1) to least distressed (quintile 5) and introduced them as independent variables to allow for nonlinear effects.

### *6.1. Market structure and upcoding: a cross-sectional analysis*

Table 2 (and Figs. 2 and 3) delineates upcoding for pneumonia and pulmonary complications according to the ownership of the hospital as well as the 1989 share of for-profit hospital discharges in the HSA. The first four columns show upcoding ratios for stable not-for-profit hospitals without any for-profit hospitals in the same town or city (Column 1), with a market share between 0 and 25% (Column 2), 25–50% (Column 3), and over 50% (Column 4). The next three columns provide upcoding ratios in for-profit hospitals (the shaded columns), while the final four columns provide ratios for government hospitals. The results suggest a generally monotonic impact of for-profit market share on the upcoding behavior of not-for-profit *and* government hospitals, but with little impact of for-profit market shares on upcoding behavior of for-profits.

Focusing on for-profit hospitals for the moment, consider Fig. 2, which shows upcoding ratios for two types of for-profits; one group in largely not-for-profit markets, and

Table 2
Upcoding ratio[a], by ownership status and market structure, 1989–1997

| Market share | Private not-for-profit | | | | For-profit | | | Government | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | FP = 0% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% | FP = 0% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% |
| 1989 | 0.195 | 0.215 | 0.236 | 0.200 | 0.295 | 0.270 | 0.280 | 0.198 | 0.216 | 0.244 | 0.264 |
| 1990 | 0.198 | 0.222 | 0.245 | 0.229 | 0.302 | 0.291 | 0.324 | 0.201 | 0.216 | 0.219 | 0.285 |
| 1991 | 0.219 | 0.242 | 0.276 | 0.288 | 0.356 | 0.350 | 0.388 | 0.217 | 0.261 | 0.230 | 0.318 |
| 1992 | 0.232 | 0.259 | 0.311 | 0.331 | 0.406 | 0.412 | 0.452 | 0.231 | 0.284 | 0.269 | 0.297 |
| 1993 | 0.242 | 0.270 | 0.335 | 0.330 | 0.397 | 0.433 | 0.445 | 0.243 | 0.280 | 0.251 | 0.362 |
| 1994 | 0.252 | 0.281 | 0.343 | 0.375 | 0.447 | 0.477 | 0.457 | 0.253 | 0.313 | 0.269 | 0.361 |
| 1995 | 0.270 | 0.306 | 0.363 | 0.433 | 0.491 | 0.550 | 0.487 | 0.270 | 0.320 | 0.323 | 0.431 |
| 1996 | 0.282 | 0.333 | 0.378 | 0.372 | 0.501 | 0.551 | 0.497 | 0.294 | 0.337 | 0.317 | 0.425 |
| 1997 | 0.286 | 0.313 | 0.341 | 0.352 | 0.441 | 0.456 | 0.426 | 0.275 | 0.333 | 0.300 | 0.345 |

[a] Upcoding fraction is calculated as DRG 79/(DRG 79 + DRG 80 + DRG 89 + DRG 90).

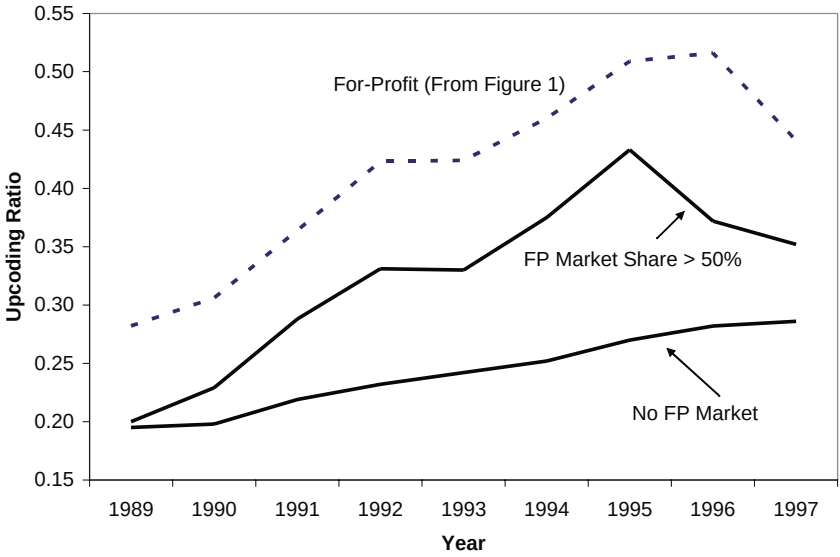


Fig. 3. The upcoding ratio of not-for-profit hospitals, by for-profit market share in the region, 1989–1997. *Note*: Upcoding is measured as the ratio of DRG 79 to the sum of DRGs 79, 80, 89, and 90.

the other group in largely for-profit markets. There is little substantive difference in their upcoding behavior, casting doubt on the proposition that a high fraction of not-for-profit (or government) hospitals exert a moderating influence on the upcoding behavior of for-profits.

Fig. 3, on the other hand, shows that the upcoding behavior of not-for-profits appears to be sensitive to the fraction of (1989) discharges in the market from for-profit hospitals. The not-for-profit (and government) hospitals in markets with more than 50% for-profit market share are much closer in their behavior to the for-profits in their markets, a result consistent with the "reverse Hansmann" hypothesis (Cutler and Horwitz, 2000).

One could argue that these patterns among not-for-profits are the consequence of for-profits being able to avoid the sickest patients. In other words, for-profits could attempt to attract healthier patients through location of clinics or new hospital facilities, resulting in increasingly sicker patients flowing to not-for-profit and government hospitals.[13] The sicker patients in turn would explain the higher fraction of DRG 79 coding, rather than upcoding per se. However, Appendix Table A.1 shows mortality rates broken out by hospital ownership and for-profit market share; there is no clear pattern of change in mortality rates among not-for-profits (or government hospitals) according to the market share of for-profit hospitals. It seems unlikely that changes in the true case-mix can explain the sharp variations in upcoding observed during this time period.

[13] For example, Norton and Staiger (1994) found for-profit hospitals admitted similar fractions of uninsured patients conditional on location, but that for-profit hospitals also located in areas with fewer uninsured patients.

We also consider a regression analysis with the sample of all hospitals with stable not-for-profit and government ownership during 1989–1997. The covariates are:

(a) *Regional variables*: Census regions for the Northeast, Midwest, West, and South, plus a fifth region represented by Florida, California, Georgia, and Texas because of their heavy for-profit hospital penetration[14] each of which is interacted with the year dummy variables. The excluded category is Northeast hospitals in 1989.
(b) *For profit market share*: The fraction of hospitals in the HSA that are owned by for-profit hospitals (either 0%, positive but less than 25, 25–50%, or greater than 50%), again interacted with year dummy variables.
(c) *Miscellaneous*: Financial distress quintiles, and dummy variables for government ownership; these are not interacted with year.

Coefficient estimates are presented in Appendix Table A.2. The first and second columns provide predicted average and median upcoding ratios for the baseline not-for-profit hospital in 1989–1997 normalized to the Northeast region and with no for-profit hospitals in the market. There is a steady and significant growth in upcoding ratios throughout this period, even after controlling for government ownership (modest differences in upcoding, as we saw earlier) and for the financial distress variable. Interestingly, the coefficients on the financial distress quintiles are the reverse of what might be expected; hospitals with the greatest apparent financial health in 1993 are those more likely to experience a rise in upcoding. Perhaps hospitals with available funds were the ones most likely to invest in computer systems and consultants encouraging higher levels of upcoding.

As shown in Columns 3 and 4 of Table A.2, an increase in upcoding is predicted when we change only the share of for-profit hospitals, from zero to over 50%, but hold the region constant.[15] There is a substantial increase in predicted upcoding of as much as 9.8% in 1995 for the least-squares regression, although none of the coefficients are significant at the 0.05 level individually. However, the quantile regressions (Column 4 versus Column 2) show effects of similar magnitude, but for these, the differences are significant during relevant years of 1994–1996.

Finally, in Columns 5 and 6 of Table A.2, we consider just the OLS estimated regional effects. The impact of Southern states *excluding* Florida, Georgia, and Texas is quite modest and not significant in the OLS regressions except in one year. However, among not-for-profits, being located in one of these three states or California is highly predictive of more active upcoding efforts. In sum, these regressions suggest that not-for-profit upcoding behavior is affected by the market share of for-profit hospitals and region. If the definition of the market is indeed too restrictive, then some part of the regional effects may be attributable to (unmeasured) competition with or emulation of for-profit hospitals in nearby towns or cities. If the market definition is too loose, then the regional effects will be biased downward and reflected instead in the market-level influences on upcoding.

[14] For example, of the 59 not-for-profit or government hospitals that compete in HSAs with greater than 50% for-profit market share, 40 hospitals are in one of these four states.

[15] There are no markets in the Northeast with more than 50% for-profit hospital discharges, but the results and significance would be similar if we chose another region as a baseline.

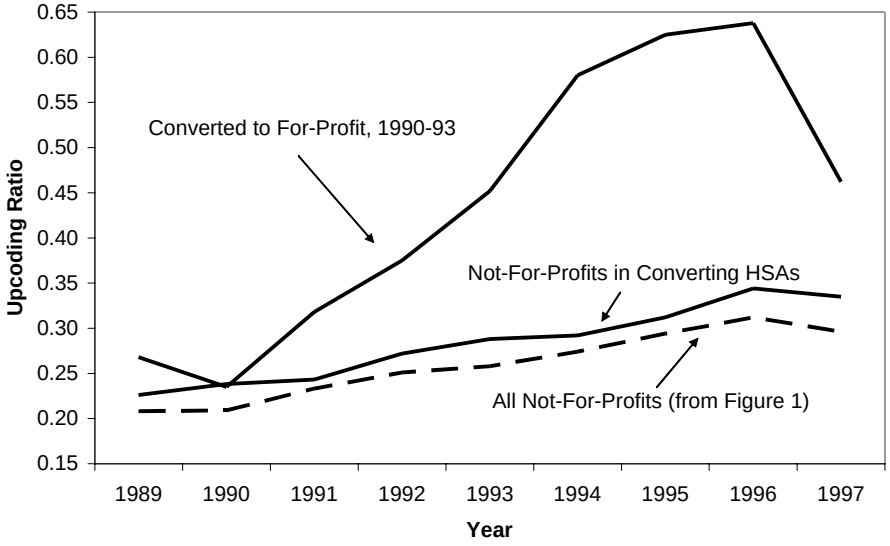


Fig. 4. The upcoding ratio of hospitals converting to for-profit status, and non-converting hospitals in the same region. *Note*: Upcoding is measured as the ratio of DRG 79 to the sum of DRGs 79, 80, 89, and 90.

A related question is the influence of the for-profit market share and region on the upcoding behavior of for-profit hospitals. We also ran a regression similar to that presented in Table A.2 limited to for-profit hospitals (not reported), and find that there does not appear to be any significant influence of market share on for-profit upcoding behavior, as suggested by Fig. 2. On the other hand, there are dramatic differences in upcoding behavior of the (few) for-profits in the Northeast compared to other regions. While the predicted increase in for-profit upcoding between 1989 and 1996 (holding other factors constant) was 19% in the Midwest, 38% in the South, and 33% in the West, the prediction in the Northeast is negative and not significantly different from zero.

### *6.2. Market structure and upcoding: a time-series analysis of hospital conversions*

We next consider the behavior of hospitals that experienced a conversion from not-for-profit (or government) to for-profit status between 1989 and 1993. We consider both the upcoding ratios for those hospitals, and the upcoding ratio in the *stable* not-for-profits in the same HSAs. That is, the dynamic counterpart of the static comparisons above would be that not-for-profits might be more likely to increase upcoding when a hospital in their region converts from not-for-profit (or government) to for-profit.

The highest line in Fig. 4 shows the upcoding ratios for the 24 hospitals that converted between 1989 and 1993. Note that the upcoding ratio peaked at 63% in 1996, which was higher than the entire sample of stable for-profit hospitals in the US.[16] Clearly the

[16] However, this upcoding rate is about the same as the rate for stable for-profit hospitals in those converting HSAs.

converting hospitals experienced an increase in upcoding that is larger in magnitude than stable for-profits. However, Fig. 4 also shows that upcoding experienced much less change in the sample of stable not-for-profit and government hospitals located in the control group HSAs. The Cutler and Horwitz (2000) hypothesis would predict that the not-for-profit and government hospitals in the same HSA would be more likely to copy the upcoding behavior of the converting hospitals. That we do not observe this behavior may also reflect the converting hospitals simply being too small to affect the market-level norms, since the median converting hospital held only a 6% market share.

## 7. Conclusions and discussion

A long-standing debate is whether for-profit hospitals are different from not-for-profit hospitals in any substantive way beyond the fact that for-profits pay taxes on their profits. Here the gamut of opinion ranges widely, from the view that for-profit and not-for-profit hospitals are similar, to the view that for-profits differ, either because they are more efficient or because they provide lower quality or more expensive care.[17] In this paper, we have argued that the sharp differences in patterns of upcoding by hospital ownership during the 1990s reflected fundamental differences between for-profit and not-for-profit hospitals. These were not the consequence of differences in the health status of patients admitted to hospitals, nor were they reflecting efficient billing practices of for-profit hospitals. Nor were they not the consequence of media bias caused by the greater coverage of pneumonia upcoding in Columbia/HCA hospitals. How then might these variations in upcoding behavior shed light on why for-profit and not-for-profit hospitals are different?

Malani et al. (2003) have created a simplified taxonomy of three theoretical models of not-for-profit hospital behavior. The first is the presence of altruism or high ethical standards held by the owner or patron (Newhouse, 1970; Lakdwawalla and Philipson, 1998; Horwitz, 2003). The second type of model is one in which the clinical staff of the hospital fills the vacuum created by the absence of specific owners, and creates a cooperative to maximize their net income and working conditions (Pauly and Redisch, 1973). The third is that, because managers of the not-for-profit hospital are unable to withdraw revenue from the organization, not-for-profit status provides a signal to potential customers that such hospitals are less likely to shirk on quality or community responsibilities (Glaeser and Shleifer, 2001; Hansmann, 1980). In their comprehensive review of the empirical evidence, Malani et al. (2003) found the altruism model corresponded closest to the empirical evidence, followed closely by the signaling hypothesis, with the physician cooperative model trailing badly.

Our results suggest a somewhat different ranking of models. Upcoding behavior exhibits a close correspondence with tax evasion, where disputed tax returns are often settled quietly (with penalties), litigated, and only rarely the subject of criminal proceedings (e.g., Allingham and Sandmo, 1972; Yitzhaki, 1974; Slemrod and Yitzhaki, 2002). In this

[17] For a review of the literature, see Sloan (2000); also see Sloan et al. (2001), Taylor et al. (1999), Gaynor and Vogt (2003), Silverman et al. (1999), Woolhandler and Himmelstein (1999), and others.

approach, there is a gain in terms of increased revenue from aggressive upcoding, but there is also the risk of detection and, at a minimum, financial penalties and non-pecuniary damage to reputation. Distinguishing among these three general models of not-for-profit behavior thus should focus on the relative benefits and costs of upcoding by ownership status of the hospital.

In the altruism model, not-for-profit administrators should be as aggressive about collecting revenue from the Medicare program as for-profit hospitals, since by loosening the zero-profit constraint, the extra revenue allows the hospital to provide additional socially valuable but unprofitable services to deserving patients. Furthermore, one would expect to observe a difference between private not-for-profit hospitals, where the extra revenue stays in the hospital, and government hospitals where the revenue presumably flows back to the state capitol. Neither pattern was apparent in the data.[18]

The evidence on the market interaction of hospitals with regard to upcoding is, however, consistent with the Lakdwawalla and Philipson (1998) model. They argue that not-for-profit behavior (in their case, nursing homes) should exert no influence on the behavior of for-profits, since for-profits, with their tax liability and lack of charitable endowments, are by definition the marginal firm and hence determine market price and quality combinations. The reverse would not hold. If for-profit hospitals were able to increase marginal revenue through upcoding, they could force not-for-profit firms to compete through upcoding or other means, and thereby attenuating their "profit-deviating" behavior.[19] For example, one former senior vice president of Baptist Hospital, a not-for-profit in the (heavily for-profit) Nashville market, was quoted by Langley (1997) on the hospital's expansion plans: "We are no less inclined or more inclined to be nonprofit or for-profit—just whatever is to our advantage."

The signaling model also receives mixed empirical support. That not-for-profit administrators were less likely to upcode supports a model in which the incentives to upcode are blunted because compensation is less closely tied to profitability.[20] As well, not-for-profit hospitals may have feared that Medicare fraud investigations would do greater harm to the eleemosynary reputation or "trust capital" and thus be less likely to engage in upcoding. On the other hand, we would expect for-profit hospital chains with brand-name capital, in the sense of Klein and Leffler (1981), to face greater reputational penalties from detection. In the Klein and Leffler model, firms seek to signal quality by investing in capital that becomes worthless in the event of scandal or public disgrace, in this case the Columbia/HCA "brand." (Newly acquired hospitals would typically change their name to include the Columbia/HCA name.) On an ex post basis, the loss in reputation resulting from the 1997 investigation of several hospitals led to a sharp downward revision of the market value of the entire hospital chain, thus adversely affecting

[18] The altruism model could be saved if the owner or patron instilled a strong ethical norm (Horwitz, 2003), and these standards could extend to conservative billing practices.

[19] See also Arnould et al., 2000, who show that market HMO penetration is associated with not-for-profit salary packages that were more closely tied to financial performance.

[20] See for example Erus and Weisbrod (2003). The lack of high powered contracts in not-for-profit hospitals may be because the outputs of not-for-profits extend beyond financial performance and are much more difficult to measure (Baker, 2002).

even those Columbia/HCA hospitals not accused of upcoding or other irregularities.[21]

The Hansmann "signaling" hypothesis is that the dominance of not-for-profit institutions (in his case, nursing homes) would create either community norms or market pressures to help regulate the behavior of for-profit hospitals in the same market (Hansmann, 1980). There was no evidence of this direct Hansmann effect with regard to upcoding. However, we did find a "reverse-Hansmann" effect in the cross-sectional comparison, where not-for-profit firms were more likely to upcode in a market with more for-profit hospitals (Cutler and Horwitz, 2000). The reverse-Hansmann effect is (as noted above) more consistent with the altruism model than with a signaling model. However, we did not find this reverse-Hansmann effect in a dynamic setting; when a hospital converted to for-profit (and upcoding rose rapidly), the other hospitals in the market were no more likely to increase their upcoding relative to baseline, perhaps owing to bureaucratic inertia (Sloan, 2000) or to the modest size of the converting hospitals.

Finally, we found support for a variant physician cooperative model (Pauly and Redisch, 1973), but one that focuses more on the split between administration and clinical staff (e.g., Harris, 1997). Upcoding requires not simply administrators who direct coders to target profitable DRGs, but also physicians responsible for filling in the medical charts with the critical clinical information (whether included or excluded) that can be used to claim the more generous DRG. To get the clinical staff on board, some for-profit hospitals created high-powered incentives to increase revenue not just for their administrators, but also for physicians in the form of equity ownership (Gottlieb et al., 1997) or (allegedly) lavish vacations for clinicians and their families (Brubaker, 2001). The extent to which such incentives affected the quality of care, however, is not as well understood.

There is less theoretical guidance for why upcoding behavior should have differed so strongly across regional areas even within ownership type. Medicare is a federal program with nearly identical payments and penalties across all 50 states. Despite this common structure, for-profit administrators in different regions responded very differently to the incentives for upcoding. There may be parallels here with the regional variation literature (Wennberg and Cooper, 1999) where strong market-level or regional variations in practice patterns are observed. Perhaps administrators and physicians shift between for-profit and not-for-profit hospitals in the same market, and thus transfer billing practices across hospitals. Employees may also seek attachment with firms that provide the best match in terms of incentives, tradeoffs, and risk characteristics (e.g., Young, 1986; Wholey and Burns, 1991; Cutler and Seinfeld, 2000). In this case, observed differences in the behavior of for-profit and not-for-profit firms have less to do with interactions per se, and more to do with a selection story; those with the greatest taste for high and risky returns will tend to be the ones found working in regions with for-profit hospitals.

[21] In the month of March 1997, when investigations of Columbia/HCA upcoding (and other activities) became public, the stock value of the corporation dropped by 23%. Surprisingly, one newspaper investigation claimed that Columbia/HCA hospital managers were rewarded for upcoding as many DRGs as possible into the more generous "with complications" code compared to the "without complications" code (Lagnado, 1997). If so, they were acting as if they had already lost the brand name capital (see Tirole, 1996).

Table A.1
Mortality ratio, by ownership status and market structure, 1989–1997

| Market share | Private not-for-profit | | | | For-profit | | | Government | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | FP = 0% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% | FP = 0% | 0% < FP ≤25% | 25% < FP < 50% | FP > 50% |
| 1989 | 0.176 | 0.165 | 0.175 | 0.179 | 0.163 | 0.165 | 0.177 | 0.172 | 0.172 | 0.174 | 0.165 |
| 1990 | 0.161 | 0.156 | 0.164 | 0.168 | 0.158 | 0.156 | 0.162 | 0.158 | 0.170 | 0.156 | 0.159 |
| 1991 | 0.160 | 0.161 | 0.157 | 0.172 | 0.164 | 0.161 | 0.168 | 0.153 | 0.170 | 0.160 | 0.187 |
| 1992 | 0.152 | 0.161 | 0.173 | 0.155 | 0.163 | 0.149 | 0.171 | 0.159 | 0.165 | 0.157 | 0.139 |
| 1993 | 0.155 | 0.160 | 0.165 | 0.175 | 0.155 | 0.161 | 0.160 | 0.158 | 0.166 | 0.160 | 0.172 |
| 1994 | 0.156 | 0.154 | 0.155 | 0.180 | 0.168 | 0.160 | 0.163 | 0.157 | 0.169 | 0.142 | 0.155 |
| 1995 | 0.156 | 0.158 | 0.159 | 0.187 | 0.165 | 0.172 | 0.156 | 0.155 | 0.165 | 0.172 | 0.149 |
| 1996 | 0.156 | 0.162 | 0.170 | 0.139 | 0.169 | 0.165 | 0.160 | 0.157 | 0.167 | 0.162 | 0.132 |
| 1997 | 0.161 | 0.157 | 0.160 | 0.173 | 0.160 | 0.164 | 0.170 | 0.155 | 0.158 | 0.157 | 0.150 |

Less well understood is how for-profit hospitals chains differed with regard to their upcoding behavior, and the role they might have played in the diffusion of upcoding behavior. Despite these remaining questions and limitations of this study, we view upcoding as symptomatic of how for-profit and not-for-profit hospitals differ in managerial behavior and the organizational balance of power inside the hospital.

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## Appendix A

See Tables A.1 and A.2.

Table A.2
OLS and quantile regression models of upcoding among not-for-profit and government hospitals, 1989–1997

| | Base case: NFP in Northeast, 0% FP market share | | NFP in Northeast with >50% FP market share | | NFP in South[a] with 0% FP market share | NFP in TX, FL, GA, or CA with 0% FP market share |
|---|---|---|---|---|---|---|
| | OLS | Quantile | OLS | Quantile | OLS | OLS |
| Value in 1989 | 17.1 | 15.6 | 17.7 | 14.7 | 19.7[b] | 20.6[b] |
| Value in 1990 | 17.2 | 15.4 | 19.4 | 17.0 | 20.6 | 22.2 |
| Value in 1991 | 20.1[c] | 18.6[c] | 24.4 | 24.2[b] | 21.9 | 24.7 |
| Value in 1992 | 20.4[c] | 19.2[c] | 23.7 | 22.8 | 23.2 | 26.9[b] |
| Value in 1993 | 21.1[c] | 19.0[c] | 25.1 | 21.5 | 24.9 | 29.6[b] |
| Value in 1994 | 22.4[c] | 19.7[c] | 27.9 | 25.0[b] | 27.0 | 30.2[b] |
| Value in 1995 | 23.5[c] | 21.0[c] | 33.3 | 29.9[b] | 28.0 | 31.9[b] |
| Value in 1996 | 24.8[c] | 22.2[c] | 30.6 | 29.0[b] | 30.8[b] | 32.4[b] |
| Value in 1997 | 25.9[c] | 24.7[c] | 28.1 | 28.4 | 31.2 | 31.2 |
| Government hospital | −0.6[d] | −1.1[d] | | | | |
| Distress (Q2) | −0.6 | −0.9[d] | | | | |
| Distress (Q3) | 0.4 | −0.2 | | | | |
| Distress (Q4) | 2.1[d] | 1.3[d] | | | | |
| Distress (Q5) | 3.5[d] | 2.8[d] | | | | |

The dependent ratio is the percent upcoding measure (DRG 79 divided by DRGs 79, 80, 89, 90) by Hospital Service Area.

[a] Excludes Texas, Florida, and Georgia. Robust standard errors.

[b] Denotes the test of whether the level of upcoding in that region differs from upcoding in the benchmark Northeast region in each year. Included in the regression, but not reported, are variables for regional Midwest and West (excluding CA) dummy variables interacted with year, and coefficients for for-profit market share between 0 and 50% interacted with year.

[c] Is the 5% significance test of whether that year differs from 1989.

[d] Denotes significance at the 5% level.

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