Cost Shifting in California Hospitals:
What Is the Effect on Private Payers?

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Executive summary
The extent to which health care providers cost shift -- increase the price or markup charged to one group of patients in response to a decrease in another group's price or markup -- has been the subject of extensive and long-standing policy debates. In practice, cost shifting means that purchasers of private health insurance effectively pay a "tax" in order to finance the care of patients who are uninsured or covered by public insurance programs such as Medicare or Medicaid.

Despite the importance of this issue, the existing literature on cost shifting has significant limitations. Only two studies investigate the extent of cost shifting from the uninsured, and these have fundamental weaknesses. No study has yet analyzed the most recent data from California hospitals, to investigate whether cost shifting in the State has intensified or moderated in the 2000s.

This paper reviews the existing empirical literature on cost shifting and provides new estimates of the extent of hospital cost shifting in California. It uses hospital-level data from the California Office of Statewide Health Planning and Development (OSHPD) from 2000 to 2005 to estimate how the markups hospitals earn on Medicare, Medicaid, and indigent patients affect their markup on patients with a private payer, holding other characteristics of hospitals and their market environment constant.

The paper reports two key findings:
- Cost shifting from Medicare and MediCal is substantial. If, in 2005, the revenues for every California hospital's Medicare and MediCal patients would have been sufficient to cover these patients' costs, then private-payer patients' revenue-to-cost ratio would have declined by 10.8 percentage points, from 1.309 to 1.201.
- Cost shifting from the uninsured is minimal. If, in 2005, the revenues for every California hospital's indigent patients would have been sufficient to cover these patients' costs, then private-payer patients' revenue-to-cost ratio would have declined by 1.4 percentage points, from 1.309 to 1.295.

These findings have several implications for current policy debates. State health policy reforms that seek to cover the currently uninsured are unlikely to lead to significant reductions in private insurance premiums, at least due to decreases in cost shifting. In contrast, increases in public-program reimbursement rates could have an economically important impact on premiums.

Introduction

The extent to which health care providers cost shift -- increase the price or markup charged to one group of patients in response to a decrease in another group's price or markup -- has been the subject of extensive and long-standing policy debates (e.g., Ginsburg 2003; Lee et al. 2003; Morrisey 2003). In practice, cost shifting means that purchasers of private health insurance effectively pay a "tax" in order to finance the care of patients who are uninsured or covered by public insurance programs such as Medicare or Medicaid.

Empirical estimates of the extent of cost shifting have important implications for public policy. Evidence of cost shifting from the publicly-insured is used to support increasing Medicare and Medicaid reimbursement rates, on the grounds that the broad-based taxation necessary to finance higher public insurance payments is more equitable or more efficient than an effective tax on private insurance premiums. (An effective tax on private insurance premiums, for example, creates the incentive for employers and individuals to drop insurance coverage.) Evidence of cost shifting from the uninsured is used to support policies such as an employer or individual mandate, on the grounds that the mandate would expand coverage, reduce cost shifting, reduce private insurance premiums, and thereby cost less than simple estimates of the policy would suggest.

Despite the importance of this issue, the existing literature on cost shifting has significant limitations. This paper reviews the existing empirical literature on the topic and provides new estimates of the extent of hospital cost-shifting in California. It uses hospital-level data from the California Office of Statewide Health Planning and Development (OSHPD) from 2000 to 2005 to estimate how the markups hospitals earn on Medicare, Medicaid, and indigent patients affect their markup on patients with a private payer, holding other characteristics of hospitals and their market environment constant. With this information, the paper will investigate the economic importance of cost shifting overall and evaluate the extent to which cost shifting could be reversed by increasing payments for public insurance programs or uncompensated care.

The paper proceeds in five sections. Section I presents the economic theory behind cost shifting. Simple economic models show that cost shifting is possible in theory, but offer little guide to its importance in practice. Section II summarizes the empirical literature and outlines the important policy questions that remain. Although a large literature has investigated the extent of cost shifting, papers in this literature have left several questions unanswered. Section III describes the paper's data and empirical models. Section IV presents the results, and Section V concludes.

I.   Why cost shifting might occur: economic theory

Many economic models of the medical care industry are consistent with cost shifting. The simplest of these models seek to explain cost shifting in the hospital sector from public insurance programs such as Medicare and Medicaid, but their results apply to

other types of providers and to the uninsured as well. These models generally make four plausible assumptions:

1. hospitals seek to maximize the difference between revenues and costs;
2. private insurers take the reimbursement schedules of public insurance programs as given when they negotiate price and other contracting terms with hospitals;
3. hospitals have fixed costs of operation that are joint between privately- and publicly-insured patients; and
4. hospitals have some market power over privately-insured patients, but this power is limited by the threat of potential entry.

In these models, decreases in public insurer reimbursement rates typically lead to higher prices and markups for the privately insured. Public insurers must cover their patients' *marginal* costs[1]; if they did not, hospitals would refuse to treat them. However, public insurers can set reimbursements that do not cover all joint fixed costs. Because public insurers set reimbursements first, decreases in public insurers' reimbursements in this situation are viewed by private insurers as effective increases in hospitals' fixed costs. Increases in fixed costs can, in turn, lead to higher prices and markups.

More complex models of hospital behavior provide additional explanations for why cost shifting may occur. For example, hospitals may cost shift because their managers have objectives other than the maximization of revenues over costs, such as the provision of charity care (e.g., Dranove (1988)). In this case, hospitals may seek to recover more from private insurers in order to preserve their ability to achieve non-economic goals. In addition, regardless of their objectives, doctors and hospitals may be more able to cost shift in markets in which they have fewer competitors (e.g., Dranove and Satterthwaite 2000); less competition enables sellers to charge higher prices and obtain higher margins when they are bargaining with private insurers.

II.   Previous empirical research on the magnitude of cost shifting

National trends in hospital payment-to-cost ratios
Figures 1 and 2 present the national trends in hospital payment-to-cost ratios by payer that frame this debate. The figures report aggregate payment-to-cost ratios for privately-insured, Medicare, Medicaid, and uninsured patients. The figures are based on previously published data from the Medicare Payment Advisory Commission (MedPAC) for 1989-2001 and the American Hospital Association for 1989-2004, respectively (figure 2 reports ratios for privately-insured, Medicare, and Medicaid patients because the American Hospital Association does not publish data on payment-to-cost ratios for the uninsured).

The figures show that patients with private payers finance more than their proportionate share of costs. In 1992, at their high-water mark, the private-payer payment-to-cost ratio was 1.31 according to MedPAC (1.32 according to AHA). Medicare is the next-most generous payer (except for 1992 and 1993, according to MedPAC), with payment-to-cost ratios just below 1 through 1995; just above 1 from 1996-1999; and just below 1 after

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[1] Marginal cost is the cost of serving an additional patient.

1999. Nationally, Medicaid is close behind Medicare, with the uninsured significantly lower.

Of course, there may be many reasons other than cost shifting why hospitals earn more from private-payer than public-payer or uninsured patients. For example, hospitals may have market power, but be unable to exercise it against public payers (because of state- or nationwide fixed reimbursement rates) or the uninsured. Nonetheless, these simple descriptive statistics suggest that the cost shifting hypothesis deserves further examination.

Assessing the magnitude of cost shifting
Table 1 summarizes the findings of existing empirical studies relevant to the cost shifting debate. The studies are of three types.

Studies of the first type, summarized in the top panel of Table 1, estimate the magnitude of uncompensated care costs. Studies of this type contribute to the cost shifting debate because uncompensated care costs provide an upper bound on the extent of cost shifting from the uninsured to private payers. Uncompensated care costs provide only an upper bound on, not an estimate of, the cost shift because the financial burden of uncompensated care is unlikely to be borne fully by private payers. Instead, it is likely to be shared between private payers, doctors, hospitals, and other participants in health care markets. (The widespread concern that uncompensated care costs are bankrupting hospitals is itself evidence that providers bear part of the costs.[2])

Hadley and Holahan (2003) estimate the value of uncompensated care provided in the US in 2001. They begin by estimating that people who were uninsured at any time in 2001 consumed $98.9 billion in care. Of the $98.9 billion, they estimate that $38 billion was financed by public or private insurance (because many people who are uninsured at some point during a year are also insured at some point), $26.4 billion was paid out of pocket, and $34.5 billion was not paid for by any of these sources.

Using two independent sources of data, they estimate that $30.6 billion in government resources are available to finance the $34.5 billion in care for the uninsured that would otherwise be uncompensated. Thus, they calculate that the total volume of uncompensated care is $3.9 billion (= 34.5 - 30.6). On a base of private health insurance spending on health services in 2001 of $497.7 billion,[3] their estimate translates into a maximum cost shift of 0.8 percent (= (34.5 - 30.6) / 497.7).

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[2]As studies by MEDPac (2005) and others (reviewed in MedPAC 2005) point out, hospitals subjected to financial pressure have slower growth in their costs. To the extent that this is true, part of the burden of uncompensated care, which increases financial pressure, would be borne by hospitals or their employees. Labor unions, for example, could be in a weaker position to bargain for wage increases when negotiating with a financially-distressed hospital. Along these lines, hospital boards may be less willing to approve compensation increases or expand service offerings when financial times are tough.

[3] See CMS (2006a), Table 4.

Two other studies of this type directly link uncompensated care with the extent of cost shifting. Harbage and Nichols (2006) estimate that an upper bound on the increase in health insurance premiums due to uncompensated care for the uninsured is about 10% in California, or $1,186 for a typical family health insurance plan in 2006.

However, this study suffers from several conceptual errors which lead it to overstate the magnitude of the cost shift.[4] First, it incorrectly calculates the dollar volume of uncompensated care provided to uninsured persons. Its method is equivalent to multiplying the number of uninsured *at any point during the year* by care received by people uninsured *for the entire year*. In doing so, the Foundation mistakenly treats every person who was uninsured *at any point during the year* as if they were uninsured *for the entire year*. According to the California Health Interview Survey (CHIS), a typical uninsured person in California lacks insurance for an average duration of 9.1 months.[5] Thus, by assuming that a typical uninsured person is uninsured for 12 months instead of 9.1 months, it overstates the dollar volume of care received by the uninsured by 32%.

Second, it fails to account for any government payments currently paid to health care providers to defray the costs of uncompensated care. It recognizes that several federal, state, and local government programs provide California hospitals and safety-net clinics with compensation to defray the costs of caring for the uninsured. *Yet, the study ultimately fails to incorporate compensation from any government programs in its estimate of the maximum cost shift.* There are legitimate differences of opinion about how much government programs currently provide to defray the costs of care for the uninsured. However, the correct number is clearly not zero. The Medicaid Disproportionate Share (DSH) Program, for example, was designed for two purposes: to subsidize care for Medicaid beneficiaries and to defray the costs of uncompensated care for the uninsured.[6] In a recent study by the UCLA Center for Health Policy Research, Kominski et al. (2005) calculate that government programs made indirect payments of $3.6 billion in 2005 to providers in California to finance care for the uninsured.

Families USA (2005) estimates that private employer-sponsored insurance premiums in 2005 were 8.5 percent higher nationwide (or $922) and 10.6 percent higher in California (or $1,160) because of the cost of care for the uninsured. They begin with an estimate of the nationwide cost of care for the uninsured not financed by private insurance or out-of-pocket of $43.1 billion in 2005, which is slightly smaller than but similar to the estimate in Hadley and Holahan (2003).[7]

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[4] Cogan, Gunn, Kessler, and Lodes (2007) identify the errors, and show that a back-of-the-envelope estimate of the upper bound of the cost shift is 2.8 percent. The explanation of the two principal errors, below, is taken from that paper.

[5] California Health Interview Survey, 2005, through the AskCHIS webtool (http://www.chis.ucla.edu/main/DQ2/default.asp). The webtool reports estimates of the number of uninsured persons by duration of uninsurance, measured in intervals. I calculate the mean duration by using the mid-point of each interval weighted by the number of persons in that interval.

[6] See, for example, Wynn et al. (2002), Huen (1999), and Coughlin and Lisa (1997).

[7] If Hadley and Holahan's 2001 estimate of the cost of care for the uninsured not financed by private insurance or out-of-pocket of $34.5 billion is inflated by the 2001-05 increase in national health spending

Although Families USA (2005) does not contain conceptual errors, the statistics underlying its calculations are at odds with those from other published sources. (The Institute for Health Policy Solutions (2006) also raises this concern in a similar review.[8]) First, the volume of private insurance premiums reported by Families USA -- the principal component of the base onto which the costs of uncompensated care are shifted -- is significantly lower than publicly-available government statistics indicate, which makes their estimate of the magnitude of the cost shift significantly greater.[9] They report premiums to be $343.9 billion in 2005 (Families USA's Appendix Table 1). However, according to the Centers for Medicare and Medicaid Services (CMS) (2006b, Table 12), actual total private health insurance premiums in 2005 were $694.4 billion.

Second, Families USA's estimate of government payments to finance health care for the uninsured is significantly lower than other estimates of the same quantity. Their estimate of these payments nationwide ($14.2 billion in 2005 dollars) is approximately one-third of Hadley and Holahan's lower-bound estimate ($41.4 billion in 2005 dollars).[10] Families USA's description of their estimation process is similar to but less specific than Hadley and Holahan's, and Families USA provides no explanation for the difference in the two results. In addition, their estimate of these payments for California ($1.7 billion in 2005 dollars) is approximately half of the estimate in Kominski et al. (2005).

Replacing Families USA's statistics with those from other published sources has economically important implications for their estimate of the cost shift. Simply using the publicly-available base of insurance premiums from CMS (2006b) reduces their estimate by more than half, to 4.2 percent = (43.1 - 14.2) / 694.4.

The middle panel of Table 1 summarizes studies of the second type. These studies estimate the effect of Medicare, Medicaid, and other markups on the private-payer markup, holding constant other characteristics of the hospital and health care market environment. However, none of them identify the independent effect of the revenue shortfall from uninsured or indigent patients on the private-payer markup.

These studies all find a negative correlation between private-payer and other patient markups, i.e., evidence of cost shifting. Three of the studies are based on California data. Clement (1997) finds evidence of cost shifting in the 1980s and 1990s, especially from

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reported by the CMS (2006b) Table 1 (from $1469.6 to $1987.7 billion), then their estimate would be $46.7 billion in 2005 dollars.

[8] See Institute for Health Policy Solutions (2006), footnote 25.

[9] Their estimate is also lower than the estimate I obtained using the method they claim they used. Families USA claims to estimate total private insured spending as the product of 82% of the single-person average employer premium and the number of people with employer-sponsored and individual insurance. Families USA reports that average single premiums in 2005 were $4,065. The National Health Interview Survey reports that, at any point in time in 2005, 68.4% of the approximately 255 million people under 65 had private health insurance, or 174,420,000. 174,420,000 * 4,065 * 0.82 = $581.4 billion > $343.9 billion.

[10] If Hadley and Holahan's 2001 estimate of government spending on care for the uninsured of $30.6 billion (see Exhibit 5) is inflated by the change in the health spending as above, then their estimate would be $41.4 billion in 2005 dollars.

the Medicare program, but that cost shifting declined over time. Zwanziger, Melnick, and Bamezai (2000) find that revenues per privately-insured patient increase when revenues per MediCal or Medicare patient decline, holding constant the differences in the cost and type of services received by different patient populations. They also find that private-payer revenues per patient are more responsive to Medicare than to MediCal revenues per patient, which they attribute at least in part to the fact that Medicare covers a greater share of hospital costs than MediCal. Zwanziger and Bamezai (2006) update their earlier study with similar methods and data through 2001. They conclude that cost shifting from Medicare and MediCal to private payers accounted for 12.3 percent of the increase in private-payer revenues per patient from 1997-2001.

Several other studies of this type analyze national or other states' data. Zuckerman (1987) analyzes national hospital survey data from 1980 and 1982 and finds that commercial markups are positively related to an "index of financial need," i.e., the inverse of a hospital's markup on all activities other than commercially-insured patient care, although this relationship is only statistically significant in some models. Dranove (1988) finds evidence that hospitals shifted costs to private insurers in response to Medicaid payment cuts in Illinois in the early 1980s. Dobson, DaVanzo, and Sen (2006) find a positive correlation across states in privately-insured patients' 2001 payment-to-cost ratio and an index of uncovered costs of Medicare, Medicaid, and uninsured patients (they do not separately identify the extent of cost shifting from members of these three groups).

One study, summarized in the bottom panel of Table 1, is of a third type. Dranove and White (1998) find that hospitals with higher proportions of Medicare and MediCal patients experienced greater declines in private-payer revenue-cost markups over the 1983-1992 period. According to their reasoning, because public-payer revenue-cost markups were declining over this period, hospitals with more publicly-insured patients experienced greater growth in shortfalls on publicly-insured patients, and therefore should have had greater growth in private-payer markups, if cost shifting were occurring. They therefore conclude that cost shifting from public payers was unimportant.

However, they assume that hospitals that serve mainly publicly-insured versus privately-insured patients are otherwise similar, holding observable characteristics constant, which may be incorrect. For example, if hospitals with more publicly-insured patients experienced lesser increases in quality or amenities unobserved to the researcher, then their private-payer markups could have declined more, even if cost shifting were occurring. Alternatively, as the authors themselves point out, their result could falsely reject the hypothesis of cost shifting because different types of hospitals bore different levels of cost-containment pressures from managed care over this period.

Limitations of existing studies
Despite this extensive debate, several important policy questions about cost shifting remain unanswered. No evidence exists on the extent to which uncompensated care costs are actually shifted to private payers. Two studies seek to estimate an upper bound on the uncompensated-care cost shift, but they have fundamental weaknesses. No study has yet

analyzed the most recent data from California hospitals, to investigate whether cost shifting in the State has intensified or moderated in the 2000s.

Finally, no work has sought to calibrate the sensitivity of estimates of the extent of cost shifting to assumptions about the magnitude of federal, state, and local payments to hospitals for uncompensated care. Both Medicare and Medicaid provide significant supplemental DSH payments to hospitals that serve a disproportionate share of low-income or socioeconomically-disadvantaged patients. As discussed above, the purpose of these payments is ambiguous. One goal of the DSH program is to help cover the costs of uncompensated care for the uninsured, who are likely overrepresented at hospitals that serve disadvantaged patients. To the extent this is true, DSH payments should be counted as revenues for uncompensated care patients before calculating the extent to which these patients' costs are shifted to private payers. Another goal of the DSH program is to supplement payments for patients covered by public insurance, who are also likely overrepresented at hospitals that serve disadvantaged patients. To the extent this is true, DSH payments should be counted as revenues for Medicare and Medicaid patients before calculating the extent to which these patients' costs are shifted.

This paper addresses these unanswered questions. It uses regression models to separately identify the extent to which private payers bear the burden of revenue shortfalls on Medicare, MediCal, and uncompensated-care patients. It uses comprehensive data on California hospitals through 2005. Finally, it estimates the extent of cost shifting under a range of assumptions about the amount of public financing for uncompensated care.

III.   Data and empirical models

Data
This paper uses two hospital-level data files from the California OSHPD.[11] First, it uses the OSHPD annual hospital financial data from fiscal years 2000 to 2005.[12] These data provide information for every California hospital on payments and charges for patients covered by Medicare, MediCal, County Indigent Care programs, and private payers (third parties plus payers not otherwise classified). The data also provide information on payments and charges for patients who are classified by hospitals as indigent. With this information, I calculate total patient-care costs for each hospital as equal to total operating expenses less other operating revenue. I then calculate patient-care costs by payer for each hospital as equal to total patient-care costs times the share of charges attributable to the payer at the hospital.

The OSHPD financial data also provide information on the characteristics of hospitals, including the number of acute-care beds, number of discharges, location, ownership status (for-profit, nonprofit, or public), and teaching status. With this information, I

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[11] I focus on hospitals for two reasons: hospitals provide the bulk of uncompensated care (see, for example, Hadley and Holahan (2003)), and there is no comprehensive source of physician-level data on uncompensated care and revenues by payer.
[12] These data can be downloaded free of charge from
http://www.oshpd.ca.gov/HQAD/Hospital/financial/hospAF.htm.

construct three categorical variables measuring hospital size (over 300 beds, 100-299 beds, less than 100 beds), a variable measuring the county's private managed-care insurance penetration (the proportion of private-pay discharges with a managed care plan as the primary payer) to measure the extent of purchaser cost-containment efforts in the area, and the county's Hirschman-Herfindahl index (the sum across hospitals in a county of each hospital's county-level squared bed share) to measure the extent of hospital market power.

Finally, the OSHPD financial data provide information about the magnitude of DSH payments received under the MediCal program under a law originally introduced as Senate Bill 855 (SB855). In California, these payments to hospitals include payments made by the hospitals to the state, also known as intergovernmental transfers (IGTs).[13] SB855 DSH payments net of IGTs received by each hospital, then, are equal to the difference between its SB855 DSH payments and IGT payments made by the hospital pursuant to SB855. However, hospitals only report the total of all of their IGTs; they do not report their SB855 IGTs separately. I therefore estimate each hospital's SB855 IGTs as equal to its total IGTs times the statewide share of SB855 IGTs in the total.

Second, it uses data on the OSHPD hospital case mix index for 2000 to 2005. This index is a measure of the relative cost or resources needed to treat the mix of patients admitted to each California hospital during a calendar year. The regression models use it to control for differences in patient populations in estimating the relationships between payment-to-cost ratios.[14]

Table 2 presents the year-by-year sum across hospitals of revenues and costs by payer. I restrict the sample to hospitals that are classified by OSHPD as general acute and comparable, and that do not have negative revenues of any type. The first panel of the table presents data on revenues; the second panel presents data on costs; and the third panel presents revenue-to-cost ratios. According to the top panel, the distribution of hospital revenues by payer in California roughly reflects the distribution of hospital spending nationwide as of 2005. Public payers (Medicare, MediCal, DSH, and County Indigent Programs) account for 52.2 percent of hospital revenues in California as compared to 56.8 percent nationwide.[15] The second striking feature of the table is the relative magnitude of the costs of treating patients in different groups. The costs of either Medicare or MediCal patients dwarf the costs of indigent patients of all types.

The bottom panel of the table presents revenue-to-cost ratios by payer, calculated under two polar assumptions about the purpose of DSH payments. Private-payer and Medicare ratios are unaffected by these assumptions; they appear in the first two rows of the panel. The lower rows of the panel highlight the importance of how DSH payments are treated

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[13] IGTs are the way that the state of California raises the matching funds that the federal government requires as a condition of receipt of DSH payments.

[14] These data can be downloaded free of charge from http://www.oshpd.ca.gov/HQAD/PatientLevel/index.htm. An explanation of the data can be found at http://www.oshpd.state.ca.us/hqad/PatientLevel/CMI/ExampleCalculation.pdf.

[15] 0.522 = ($13,821 + $7,722 + $636 + $959) / ($21,016 + $148 + $13,821 + $7,722 + $636 + $959); national figure from CMS (2006b, Table 6).

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to any assessment about the extent of cost shifting. Crediting DSH payments to MediCal, not surprisingly, leads to increases in MediCal revenue-to-cost ratios and therefore to decreases in the maximum possible cost shift from that program's patients; conversely, crediting DSH payments to indigent patients leads to increases in indigent-patient revenue-to-cost ratios and therefore to decreases in the maximum possible cost shift from that population.[16]

Empirical models
The paper's regression models assess how private-payer revenue-to-cost ratios change in response to uncompensated care and public-payer revenue-to-cost ratios, holding constant the characteristics of hospitals and geographic areas. These models are of the form

$$PPRC_{ijt} = \alpha + \theta_t + \beta^1 MCRRC_{ijt} + \beta^2 MCDRC_{ijt} + \beta^3 CIPRC_{ijt} + \beta^4 OTHINDRC_{ijt} +$$
$$\beta^5 MCRRCmis_{ijt} + \beta^6 MCDRCmis_{ijt} + \beta^7 CIPRCmis_{ijt} + \beta^8 OTHINDRCmis_{ijt}$$
$$+ \gamma COUNTYCHAR_{jt} + \delta HOSPCHAR_{ijt} + \varepsilon_{ijt}$$

where
i indexes hospitals
j indexes counties
t indexes years
PPRC is private-payer revenue-to-cost ratio
θ is a vector of time fixed effects
MCRRC is Medicare revenue-to-cost ratio, MCRRC=0 if a hospital's Medicare costs=0
MCDRC is MediCal revenue-to-cost ratio, MCDRC=0 if a hospital's MediCal costs=0
CIPRC is County Indigent Program revenue-to-cost ratio, CIPRC=0 if a hospital's
     County Indigent Program costs = 0
OTHINDRC is other indigent patient revenue-to-cost ratio, OTHINDRC = 0 if a
     hospital's other indigent costs=0
MCRRCmis = 1 if a hospital's Medicare costs=0, 0 otherwise
MCDRCmis =1 if a hospital's MediCal costs=0, 0 otherwise
CIPRCmis = 1 if a hospital's County Indigent Program costs=0, 0 otherwise
OTHINDRCmis = 1 if other indigent costs=0, 0 otherwise
COUNTYCHAR is a vector of three county characteristics
     RURAL = 1 if a rural hospital, 0 otherwise
     HHI is the Hirschman-Herfindahl index, defined as above
     MANCAREPEN is the managed-care penetration ratio, defined as above
HOSPCHAR is a vector of six hospital characteristics
     PUBLIC = 1 if public hospital, 0 otherwise
     FP = 1 if forprofit, 0 otherwise
     TEACH = 1 if teaching hospital, 0 otherwise
     LARGE = 1 if hospital has over 300 beds
     MEDIUM = 1 if hospital has 100-299 beds
     PATMIX is the OSHPD patient case mix index

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[16] By the nature of the DSH program, there is no definitive way to allocate payments pursuant to it to any particular program. In the models that assume that DSH payments are to be allocated to indigent patients, I allocate the payments between County Indigent Program and other indigent patients in proportion to each patient group's costs.

ε is a mean-zero i.i.d. error term.

I estimate several variants on this basic model. First, I estimate the model counting DSH payments purely as a form of MediCal revenues, then reestimate the model counting DSH payments purely as support for indigent patients. (The correct treatment of DSH payments is undoubtably somewhere between these two polar cases.)   Second, I include county fixed effects (i.e., a separate constant term α for each county) and omit RURAL (which does not vary over time). Third, I include hospital fixed effects (i.e., a separate constant term α for each hospital) and omit RURAL and all of the hospital characteristics except PATMIX (the only hospital characteristic that varies over time).

IV.   Results

Table 3 presents estimates from the regression model above using the OSHPD data for the 2000-05 period. One column of the table represents results from one regression. Columns (1)-(3) present estimates from regressions that count DSH payments purely as a form of MediCal revenues; columns (4)-(6) present estimates that count DSH payments purely as support for indigent patients. Columns (1) and (4) present estimates from models with a single constant term α. Columns (2) and (5) present estimates from models with county fixed effects. Columns (3) and (6) present estimates from models with hospital fixed effects. The coefficients of interest appear in the first four rows. These coefficients represent the percentage-point effect on private-payer revenue-to-cost ratios of a one-percentage-point increase in the indigent, MediCal, and Medicare revenue-to-cost ratios, respectively.

There is evidence of at most a small cost shift from indigent to private patients. The first two rows show that a hospital's indigent patients' revenue-to-cost ratios have a small effect on its private-payer revenue-to-cost ratio. County Indigent Program patients' ratio does not significantly affect the private-payer ratio in any of the models. Other indigent patients' ratio significantly affects the private-payer ratio in only one model -- the model with hospital fixed effects, where DSH is credited to MediCal. According to the model with hospital fixed effects (column (3)), if the revenue-to-cost ratio for Other Indigent Patients were increased by 10 percentage points, private-payer revenue-to-cost ratios would fall by 0.285 percentage points, a small effect given that the average private-payer revenue-to-cost ratio in the sample was 1.160 (not in any table).   However, even this small effect disappears when DSH payments are credited to County Indigent Program and other indigent patients (columns (4)-(6)).

Revenue-to-cost ratios of Medicare and MediCal patients, in contrast, have larger and statistically significant effects on the private-payer ratio. According to the model underlying column (3), a 10 percentage point increase in Medicare patients' revenue-to-cost ratio leads to a 3.795 percentage point decrease in the private-payer revenue-to-cost ratio; a 10 percentage point increase in MediCal patients' revenue-to-cost ratios leads to a 1.695 percentage point decrease in the private-payer revenue-to-cost ratio.

The effects of other hospital and county-level characteristics are consistent with basic economic theory and previous empirical studies (see, e.g., Zwanziger, Melnick, and Bamezai 2000). For-profit hospitals have higher private-payer revenue-to-cost ratios than private nonprofit hospitals; public hospitals have lower ratios. Hospitals with more-severely ill patients (higher case mix indices) have higher private-payer revenue-to-cost ratios than hospitals with less-severely ill patients; hospitals in counties with more competitive markets (lower Hirschman-Herfindahl indices) have lower private-payer revenue-to-cost ratios (significantly only in models that do not control for county or hospital fixed effects); and hospitals in counties with higher levels of managed-care penetration have lower private-payer revenue-to-cost ratios.

Table 4 translates the estimates in column (3) of Table 3 into two measures of the extent of cost shifting to private payers.[17] The first column of the table presents (with 95% confidence intervals) the expected changes in *the average hospital's* private-payer revenue-to-cost ratio that would result from a policy change that increased the revenues of indigent, MediCal, and Medicare patients (respectively) from their 2005 level to equal their costs; the second column presents the expected changes in *the aggregate hospital services* private-payer revenue-to-cost ratio. The first column illustrates the effect on the average hospital of each policy change; the second column illustrates the effect on the hospital sector as a whole.

The first row of the table shows that increasing every hospital's revenues for County Indigent Program and other indigent patients to equal their cost would lead to an expected 2.04 percentage point decrease in the average hospital's private-payer revenue-to-cost ratio and a 1.38 percentage point decrease in the aggregate private-payer revenue-to-cost ratio. The upper 95 percent confidence bounds on the estimates of the effect of the cost shift from indigent patients of 3.86 and 3.07 percentage points, respectively, put an upper limit on the magnitude of the premium reductions that might result from reforming the current system to explicitly finance all of the costs of uncompensated care.

The second and third rows of the table show that the magnitudes of MediCal and Medicare cost shifting are each two to three times larger than the magnitude of cost shifting from the uninsured. Increasing every hospital's revenues for MediCal patients to equal their cost would lead to an expected 4.04 percentage point decrease in the average hospital's private-payer revenue-to-cost ratio and a 4.82 percentage point decrease in the aggregate private-payer revenue-to-cost ratio; for the comparable Medicare policy experiment, the consequences for the average hospital's and the aggregate private-payer revenue-to-cost ratios would be 4.36 percentage points and 6.03 percentage points, respectively.

Figure 3 shows, for 2005, the economic importance of cost shifting overall and each of the cost shift's component parts. The leftmost bar on the graph shows graphically one of the key findings from Table 2: in aggregate, hospital revenues from private payers in

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[17] The estimates underlying column (3) are based on the most comprehensive set of controls (hospital and time fixed effects) and the assumption about the purpose of DSH payments most likely to lead to an estimated cost shift from indigent patients.

2005 exceeded those patients' costs by 30.9 percentage points. Of the 30.9 percentage point markup over costs, 12.2 percentage points -- or, approximately 40 percent (= 0.122 / 0.309) -- were due to cost shifting.[18] That is, if every hospital's 2005 revenues for indigent, MediCal, and Medicare patients would have been increased enough to cover those patients' costs, then the private-payer revenue-to-cost ratio would have declined by 12.2 percentage points (from Table 4, 0.122 = 0.0138+0.0482+0.0603). In other words, approximately 60 percent of the markup over costs that private payers pay is due to factors other than cost shifting. Of the 12.2 percentage points, Medicare patients are the most significant contributor, with MediCal patients close and indigent patients far behind.

Validity checks
To investigate whether these results were due to the assumption that the relationship between the revenue-to-cost ratios was linear, I re-estimated the models underlying Table 3, substituting the natural logarithm of each revenue-to-cost ratio for its level. The coefficients (standard errors) of the four parameters of interest from the hospital-fixed-effects version of this model (corresponding to column (3)) are as follows:

	Coefficient (standard error)
Ln(other indigent revenue/cost)	-0.0011 (.0049)
Ln(county indigent revenue/cost)	-0.0182 (.0079)
Ln(MediCal revenue/cost)	-0.0733 (.0171)
Ln(Medicare revenue/cost)	-0.2841 (.0343)

These coefficients represent the percentage effect on private-payer revenue-to-cost ratios of a one-percent increase in the indigent, MediCal, and Medicare revenue-to-cost ratios, respectively.

I first compared the policy implications from the logarithmic specification above to the policy implications from the levels specification presented in Table 4. The logarithmic specification implies that the expected changes in the average hospital's private-payer revenue-to-cost ratio from increasing indigent and MediCal revenue-to-cost ratios are smaller than the expected changes in Table 4, but that the expected change from increasing the Medicare revenue-to-cost ratio is larger than the expected change in Table 4. In particular, the expected decline in the average hospital's private-payer revenue-to-cost ratio from increasing county and other indigent patients' revenues to cover their costs is approximately 1.0 percentage points (as compared to 2.04 percentage points); the expected decline from increasing MediCal revenues to cover its costs is approximately 3.3 percentage points (as compared to 4.04 percentage points); and the expected change from increasing Medicare revenues to cover its costs is approximately 5.3 percentage points (as compared to 4.36 percentage points).[19]

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[18] An alternative way of evaluating the economic importance of the cost shift is to express it as a share of the total revenue shortfall for publicly-financed and indigent patients. In dollar terms, private payers paid $1,959 million in 2005 as result of cost shifting (=0.122 * $16,058 from Table 2).   This amounts to 40 percent of the total revenue shortfall above, because 0.40 = $1,959 / ($28,202 - $23,286) = $1,959 / [($13,821+$7,722+$636+$148+$959) - ($15,894+$10,355+$1,510+$443)].
[19] For example, increasing county and other indigent patients' revenues to cover their costs would lead to a decrease in ln(private-payer revenue/cost) of -.0011*2005 average ln(other indigent revenue/cost) +

I also compared the estimates from the logarithmic specification to those reported by Zwanziger and Bamezai (2006), the existing study that used data and methods most similar to mine.[20] The logarithmic specification's estimates of the cost shift are larger, but of the same order of magnitude. According to Zwanziger and Bamezai (2006), a one percent increase in revenue per MediCal patient leads to a 0.04 percent decrease in revenue per privately-insured patient; a one percent increase in revenue per Medicare patient leads to a 0.17 percent decrease in revenue per privately-insured patient. According to the logarithmic specification, a one percent increase in revenue per dollar of MediCal cost leads to a 0.07 percent decrease in revenue per dollar of privately-insured cost; a one percent increase in revenue per dollar of Medicare cost leads to a 0.28 percent decrease in revenue per dollar of privately-insured cost.

V.   Conclusion

Assessing the extent to which doctors and hospitals cost shift is an important policy issue. Many models of the medical care industry are consistent with cost shifting, but they say little about the real-world magnitude of the problem. To the extent that cost shifting from public insurance programs such as Medicare and Medicaid is important, savings in public funds from reductions in these programs' reimbursement rates may be offset by an increase in the "hidden tax" on private insurance premiums. To the extent that cost shifting from the uninsured is important, the true cost of coverage expansions from employer and individual mandates such as those passed or proposed in Massachusetts and California may be offset by a reduction in the hidden tax.

Despite this policy importance, the existing empirical studies on the extent of cost shifting leave many questions unanswered. This study fills these gaps. It uses regression models to assess how private-payer revenue-to-cost ratios respond to changes in uncompensated care and public-payer revenue-to-cost ratios, holding constant the characteristics of hospitals and geographic areas. It therefore estimates the extent to which private payers actually bear the cost of uncompensated care and public-payer revenue shortfalls. It uses data from general acute-care California hospitals for 2000 to 2005 that includes information on the revenues and costs of Medicare, MediCal, and indigent patients.

The paper reports two key findings. First, cost shifting from Medicare and MediCal is substantial. Although cost shifting from these public insurance programs does not

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-.0182*2005 average ln(county indigent revenue/cost), or -.0011*-.9373 + -.0182*-.3949 = .008. This translates into an approximate decrease of 1.0 percentage points in the average private-payer revenue/cost ratio from a 2005 base of 1.256 (not in any table), because exp(-.008 + ln(1.256)) = 1.246.

[20] The estimates from the logarithmic specification are only roughly comparable to those in Zwanziger and Bamezai (2006). Zwanziger and Bamezai (2006) measure the effect of cost shifting in terms of *revenues per patient*; this paper measures the effect of cost shifting in terms of *revenues per dollar of cost*. However, because the average cost of a patient is similar across payers, the logarithmic estimates are roughly comparable. (In 2001 (the base year studied by Zwanziger and Bamezai), the average cost per MediCal, Medicare, and private pay patient was $10,847, $11,274, and $11,828, respectively (not in any table)).

explain all of 30.9 percentage-point markup that the privately insured paid in excess of their costs in 2005, it does explain 10.8 percentage points, or about 35 percent of it. That is, if the 2005 Medicare and MediCal revenues of every California general, acute-care hospital would have been increased enough to cover these patients' costs, then the aggregate private-payer revenue-to-cost ratio would have declined by 10.8 percentage points (see Table 4), from 1.309 to 1.201.

Second, cost shifting from the uninsured is minimal. If the 2005 revenues for every hospital's County Indigent Program and other indigent patients would have been increased to cover these patients' costs, then the aggregate private-payer revenue-to-cost ratio would have declined by 1.4 percentage points (with an upper 95 percent confidence bound of 3.07 percentage points, see Table 4), from 1.309 to 1.295.

These findings have several implications for current policy debates. State health policy reforms that seek to cover the currently uninsured are unlikely to lead to significant reductions in private insurance premiums, at least due to decreases in cost shifting. In contrast, increases in public-program reimbursement rates could have an economically important impact on premiums. This is a direct result of the disproportionate share of hospital costs financed by these programs, and the fact that the programs have been bearing a declining share of their patients' costs in California in the 2000s.

Whether public policy should seek to reverse the cost shift remains an open question. The fact that cost shifting from the uninsured has a minimal impact on premiums in aggregate does not necessarily mean that it is unimportant. In particular, this study estimates the consequences of the uncompensated-care cost shift for *the average* hospital; to the extent that these costs are not distributed uniformly across hospitals, the consequences of uncompensated care costs for *certain* hospitals, and their patients' private payers, may be significant.

In addition, the study does not determine whether policymakers should increase reimbursement rates for public insurance programs. On one hand, reducing cost shifting from these programs will reduce private health spending, and may also have other benefits. On the other hand, a given reduction in cost shifting would require an increase in public-program reimbursements of a much larger amount (because the cost shift is less than one-for-one). In turn, increasing public-program reimbursements requires additional government revenues, which requires higher income, property, or sales taxes, which themselves impose social costs due to the distortions inherent in any form of taxation. Understanding the terms of this tradeoff between the social costs of increasing public-payer reimbursement and the social costs of the cost shift should be a focus of informed debates over the cost shifting issue in the future.

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Figure 1: MedPAC Payment-to-Cost Ratio by Payer Category US Hospitals, 1989-2001

Source: MedPAC, June 2000, Report to the Congress: Selected Medicare Issues, Table C-12; MedPAC, March 2003, Report to the Congress: Medicare Payment Policy, Table D-13.
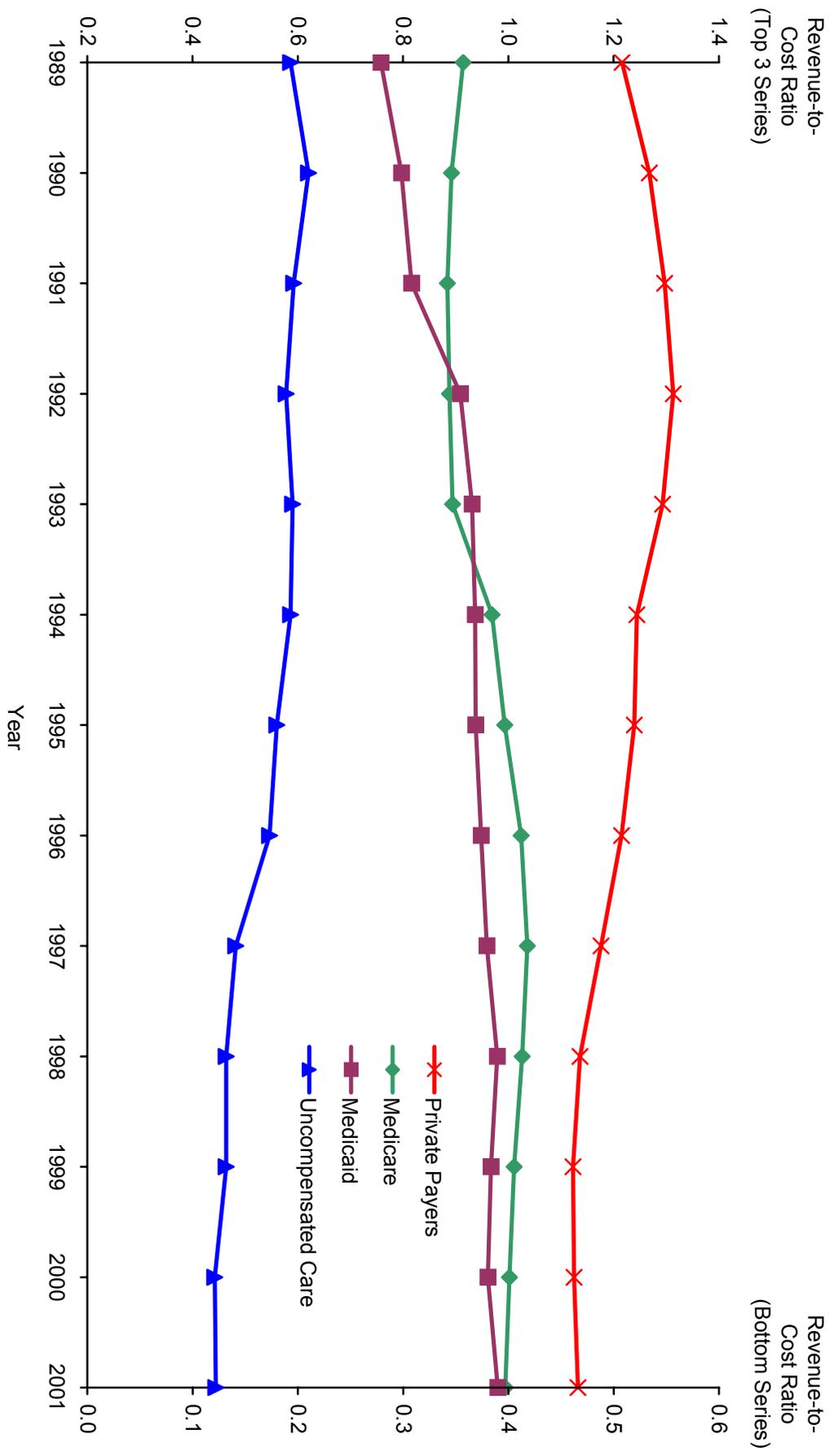
Figure 2: American Hospital Association Payment-to-Cost Ratio by Payer Category US Hospitals, 1989-2004

Source: American Hospital Association, 2006, Trendwatch: Chartbook 2006, Table 4.4.

Figure 3: Accounting for Private-Payer Revenue-to-Cost Margins California General Acute Care Hospitals, Fiscal Year 2005
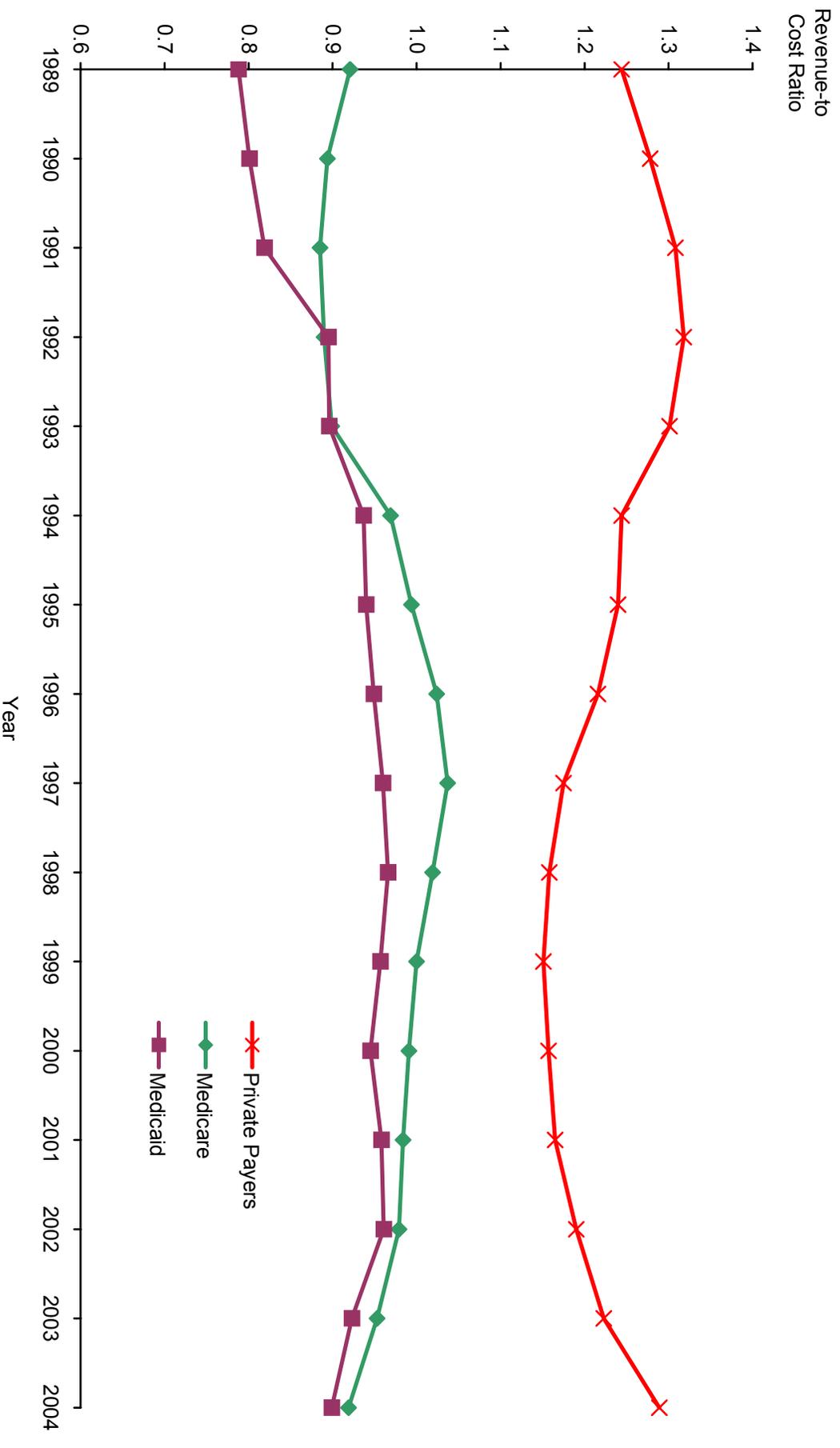
Source: OSHPD Hospital Annual Financial Data

Table 1: Empirical Studies
Relevant to the Cost Shifting Debate

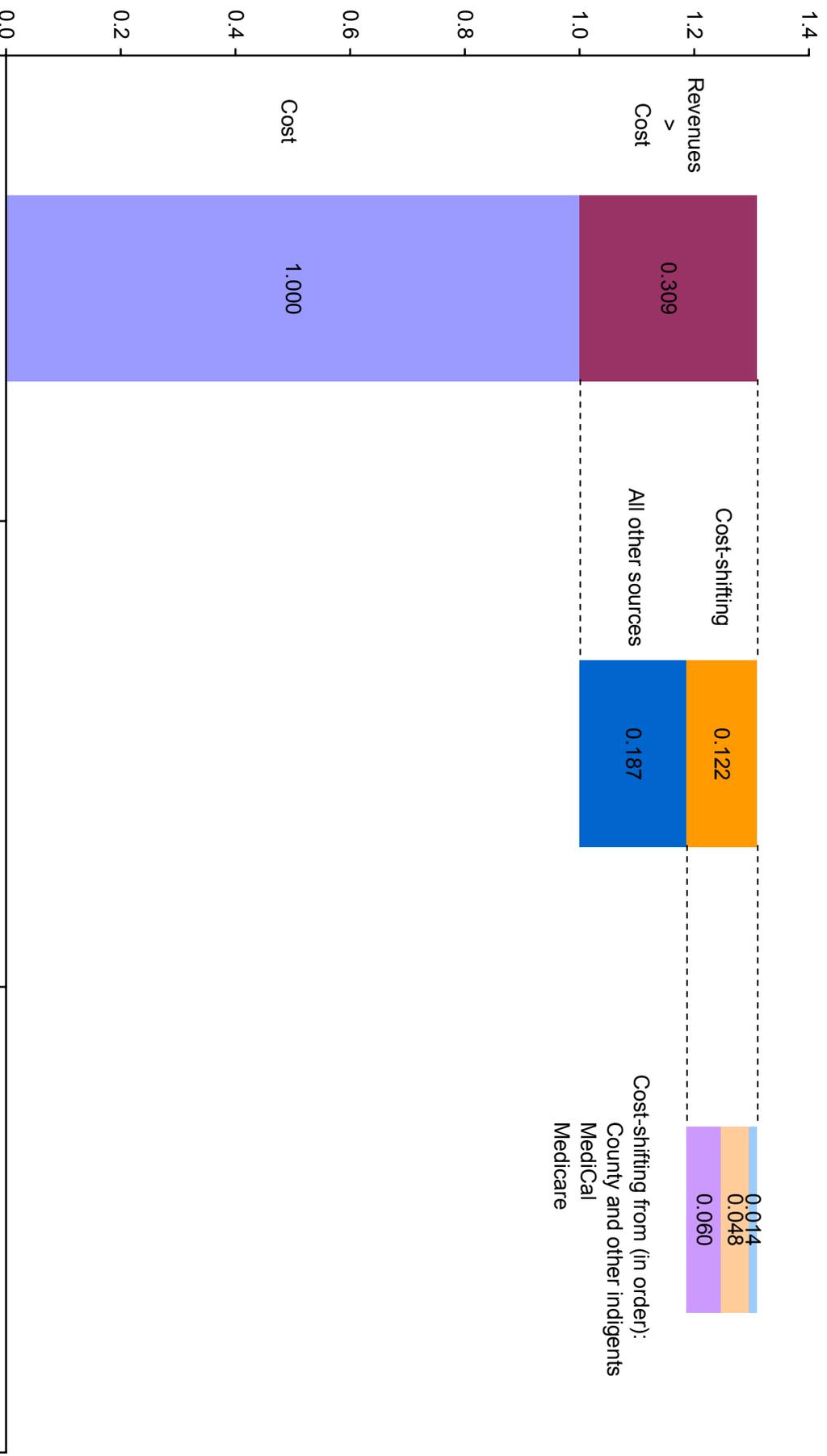| Study	Period and Sample	Finding
Studies assessing the magnitude of uncompensated care costs		
Hadley and Holahan (2003)	2001 All US	Uncompensated care costs ≈ $3.9 billion
Families USA (2005)	2002-04 All US	Uncompensated care costs ≈ 9% of premiums
Harbage and Nichols (2006)	2005 California	Uncompensated care costs ≈ 10% of premiums
Studies assessing the impact of Medicare, Medicaid, or other markups on hospitals' private-payer markups		
Zuckerman (1987)	1980-82 All US	(-) impact of markup on all activities other than commercially-insured patient care
Dranove (1988)	1981-82 Illinois	(-) impact of joint Medicare/Medicaid markup
Clement (1997)	1982-92 California	(-) impact of Medicare and (-) impact of Medicaid markups
Zwanziger, Melnick, and Bamezai (2000)	1983-91 California	Strong (-) impact of Medicare markup; weaker (-) impact of Medicaid markup
Dobson, DaVanzo, and Sen (2006)	2000 All US	(-) impact of markup on all non-commercially-insured patients
Zwanziger and Bamezai (2006)	1993-2001 California	(-) impact of Medicare and (-) impact of Medicaid markups
Studies assessing the impact of other factors associated with cost shifting on hospitals' private-payer markups		
Dranove and White (1998)	1983-92 California	No or weak (-) impact of trend in Medicare and Medicaid patient shares

Table 2: Revenues and Costs by Payer
California General Acute Care Hospitals, FY 2000 – 2005

($ in millions)

	2000	2001	2002	2003	2004	2005
Revenues						
Private Payer	$8,787	$13,741	$15,152	$17,747	$19,184	$21,016
Medicare	$7,457	$11,252	$11,908	$13,057	$12,866	$13,821
MediCal*	$4,364	$5,728	$6,222	$7,052	$7,381	$7,722
County Indigent Program	$486	$550	$591	$590	$534	$636
Other Indigent	$35	$43	$53	$86	$129	$148
SB855 Disproportionate Share (DSH) Payments Net of IGT's	$791	$903	$867	$775	$896	$959
Costs						
Private Payer	$8,476	$12,151	$12,787	$14,098	$14,965	$16,058
Medicare	$7,783	$11,443	$12,098	$14,040	$14,916	$15,894
MediCal	$5,271	$7,080	$7,859	$8,973	$9,530	$10,355
County Indigent Program	$1,303	$1,461	$1,418	$1,580	$1,582	$1,510
Other Indigent	$120	$197	$246	$320	$385	$443
Revenue to Cost Ratios						
Private Payer	1.037	1.131	1.185	1.259	1.282	1.309
Medicare	0.958	0.983	0.984	0.930	0.863	0.870
Crediting Net SB855 DSH Payments to MediCal						
MediCal	0.978	0.936	0.902	0.872	0.869	0.838
County Indigent Program	0.373	0.376	0.417	0.373	0.338	0.421
Other Indigent	0.295	0.216	0.217	0.267	0.336	0.333
Crediting Net SB855 DSH Payments to County and Other Indigent*						
MediCal	0.828	0.809	0.792	0.786	0.774	0.746
County Indigent Program	0.928	0.921	0.938	0.782	0.793	0.912
Other Indigent	0.851	0.761	0.738	0.676	0.792	0.824

Notes:

Fiscal year is defined as 7/1 – 6/30. For example, fiscal 2005 is 7/1/2004 – 6/30/2005. Since hospitals in the OSHPD database have different reporting periods (e.g. 1/1 – 12/31), the OSHPD data have been reformatted to the stated fiscal year periods to allow comparability across hospitals.

* MediCal revenues = net patient revenue traditional + net patient revenue managed care - DSH transfer (as defined by OSHPD) - SB855 DSH payments net of IGT's.

** When net SB855 DSH payments are credited to County and Other Indigent patients, they are apportioned between these groups on the basis of costs.

Table 3: Determinants of Private-Payer Revenue-to-Cost Ratios
California General Acute Care Hospitals, FY 2000 – 2005

	Crediting DSH to MediCal			Crediting DSH to County and Other Indigent		
	(1)	(2)	(3)	(4)	(5)	(6)
Hospital Characteristics						
Other Indigent patients	-0.0073	-0.0110	-0.0285 **	0.0000	0.0000	0.0000
revenue / cost	(0.0151)	(0.0150)	(0.0132)	(0.0000)	(0.0000)	(0.0000)
County Indigent patients	-0.0207	-0.0063	-0.0041	0.0001	0.0000	0.0003
revenue / cost	(0.0127)	(0.0128)	(0.0111)	(0.0001)	(0.0001)	(0.0002)
MediCal revenue / cost	-0.2762 **	-0.2645 **	-0.1695 **	-0.1832 **	-0.1784 **	-0.1740 **
	(0.0249)	(0.0248)	(0.0251)	(0.0258)	(0.0255)	(0.0252)
Medicare revenue / cost	-0.3404 **	-0.3129 **	-0.3795 **	-0.3513 **	-0.3329 **	-0.3865 **
	(0.0330)	(0.0329)	(0.0313)	(0.0331)	(0.0331)	(0.0313)
For-profit hospital	0.1485 **	0.1521 **		0.1462 **	0.1518 **	
	(0.0198)	(0.0206)		(0.0197)	(0.0204)	
Public hospital	-0.1695 **	-0.1186 **		-0.1562 **	-0.1087 **	
	(0.0230)	(0.0254)		(0.0241)	(0.0264)	
Teaching hospital	-0.0881 **	-0.0115		-0.0640 *	-0.0273	
	(0.0337)	(0.0345)		(0.0337)	(0.0340)	
Casemix	0.3874 **	0.4013 **	0.2130 **	0.3424 **	0.3688 **	0.1997 **
	(0.0292)	(0.0289)	(0.0796)	(0.0289)	(0.0286)	(0.0796)
County Characteristics						
HHI	0.2883 **	-0.1299	-0.1652	0.3079 **	-0.1475	-0.1573
	(0.0462)	(0.2099)	(0.1449)	(0.0447)	(0.2117)	(0.1453)
Managed care penetration	-0.1108 **	-0.1705 **	-0.1576 **	-0.1123 **	-0.1683 **	-0.1565 **
	(0.0439)	(0.0782)	(0.0532)	(0.0443)	(0.0786)	(0.0531)
Fixed Effects	Year	Year, County	Year, Hospital	Year	Year, County	Year, Hospital

Notes: Estimates in the table are from regressions that include all of the controls specified in equation in the text.
   N = 2064. * Significant at 90%. ** Significant at 95%.

Table 4: Extent of Cost-Shifting to Private Payers
California General Acute Care Hospitals, FY 2005

Policy Experiment	Expected Change in the Average Hospital's Private Payer Revenue-to-Cost Ratio [95% Confidence Interval]	Expected Change in the Aggregate Private Payer Revenue-to-Cost Ratio [95% Confidence Interval]
Increase revenues for county and other indigent patients to equal their cost	-0.0204 [-0.0386 , -0.0021]	-0.0138 [-0.0307 , 0.0032]
Increase revenues for MediCal patients to equal their cost	-0.0404 [-0.0522 , -0.0287]	-0.0482 [-0.0623 , -0.0342]
Increase revenues for Medicare patients to equal their cost	-0.0436 [-0.0507 , -0.0366]	-0.0603 [-0.0701 , -0.0506]

Note: Based on table 3, column (3); see text for explanation.

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