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The Effect of Expansions in Medicaid Eligibility on Hospital Financial Performance: Evidence from Medicare Cost Reports

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by

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Introduction

Financial performance is a critical factor that provides for the long-term sustainability of hospitals. “No margin, no mission” goes a saying in the industry, in reference to the fact that hospitals without healthy finances cannot fulfill missions of access to healthcare and providing quality patient care. Spurred by structural changes to how hospitals are financed initiated by the Affordable Care Act (ACA) and continuing flux in the American healthcare system, the determinants of hospital profitability has surfaced as a topic of interest amongst policymakers and scholars. Hospitals are pillars of any healthcare system, providing many services that smaller healthcare facilities cannot such as specialized diagnosis; advanced treatment and therapy for inpatients; and around-the-clock operations. Thus, their ongoing viability is in the public interest.

Hospitals in the United States are mostly financed by three sources (Centers for Medicare and Medicaid Services (CMS), 2016): private payers—health insurance companies and patients paying out-of-pocket; Medicare, for those over 65 years of age and working-aged Social Security Disability Insurance beneficiaries; and Medicaid, state-run health insurance programs for low-income families, children, the blind, elderly, and people with disabilities and, since the ACA, single adults located in states that have chosen to expand Medicaid. This quasi-public-private system results in differential pricing by hospitals, whereby customers are charged different prices for the same goods and services. In aggregate, health insurance companies and individuals paying out-of-pocket are charged the highest prices and cross-subsidize patients with public insurance which are often loss-generating. In 2014, hospitals had payment-to-cost ratios of 144% for private payers, 89% for Medicare, and 90% for Medicaid (American Hospital Association, 2016).

Eligibility for Medicaid is determined by household income levels. Eligibility, in terms of household income requirements, is generally more generous for children, the blind, elderly and individuals with disabilities, less so for parents, and miserly for childless adults. Prior to the ACA Medicaid expansions, the only insurance option for unemployed adults in the United States was purchase through health insurance markets for individuals—an option that often only provided limited coverage at exorbitant cost. Uncompensated care for hospitals—defined as bad patient debt and charity care— is a significant source of expense for hospitals. One common practice amongst the uninsured is to ignore routine medical care, visit emergency rooms if their health became critical, and then to default on the unaffordable hospital bills. Uncompensated care was equal to 5.3% of total hospital expenses in 2014.

Theoretically, reductions in the number of uninsured individuals through expansions in Medicaid eligibility should increase the profitability of hospitals vis-à-vis reductions in uncompensated care costs and additional reimbursement for patients newly covered by Medicaid. Different types of hospitals, however, have different levels of uncompensated care and serve different patient populations. Safety-net hospitals with greater amounts of uncompensated care and more uninsured patients should benefit the most from expansions in Medicaid coverage. Critical access hospitals (CAHs) and disproportionate share (DSH) hospitals are two types of hospitals with such characteristics.

As defined by the CMS, CAHs are small, rural hospitals, with less than 25 beds located at least 35 miles by primary roads from the nearest hospital. CAHs serve as critical sources of medical care for populations that would otherwise be underserved. These rural hospitals are more financially vulnerable than higher-volume, larger urban hospitals, serve older and poorer populations (Wishner et al, 2016), have historically delivered lower quality of care (Lutfiyya, et

al 2007; Joynt et al 2011), have higher amounts of uncompensated care. Similarly, disproportionate share hospitals are federally designated hospitals that that "serve a significantly disproportionate number of low-income patients and receive payments from the Centers for Medicaid and Medicare Services to cover the costs of providing care to uninsured patients" (Health Resources & Services Administration, 2017).

This analysis examines the economic effects of expansions in Medicaid eligibility on different types of hospitals. A difference-in-differences estimation approach is employed alongside hospital data from the Medicare Cost Reports (CMS, 2016) and Medicaid eligibility requirements from the Kaiser Family Foundation for a panel of US hospitals from 2000 to 2014. Under this quasi-experimental framework, hospitals are considered to be in treatment groups if Medicaid income eligibility limits in their states are greater than a pre-defined threshold.

There exists a large body of literature studying the effects of Medicaid expansions prior to and under the Affordable Care Act (ACA) (Antonisse et al, 2017). Key findings from the literature are that Medicaid expansions reduce the percent of the population that is uninsured (Miller 2017; Sommers, et al 2017), increase the affordability, access, and utilization of medical care (Miller, 2017; Sommers, 2016; Sommers et al, 2017), and improve health outcomes for affected populations (Sommers, 2017; Ohio Department of Medicaid, 2016). Reductions in uncompensated care costs for hospitals and increases in profitability have also been broadly reported (Dranove et al, 2017; Blavin, 2017). Only a limited number of papers have explored the heterogeneous economic effects of Medicaid expansion on different types of hospitals, and generally have focused exclusively on the ACA. This paper seeks to contribute to that literature by exploring how the finances of different types of hospitals were affected by expansions in

Medicaid coverage from 2000 to 2014, broadening the analysis to include expansions beyond those of just the ACA.

Results show heterogeneous effects on profitability for different types of hospitals. The largest effects are found for the two types of safety-net hospitals in our sample – CAHs and DSHs. These hospitals tend to serve more vulnerable patient populations and also tend to be more financially vulnerable. This has significant implications for policymakers contemplating changes to how hospitals are reimbursed. Results imply that safety-net hospitals are most impacted by changes to Medicaid coverage and that any reductions in coverage would disproportionately and negatively affect these hospitals.

Conceptual Framework & Background

The hypothesis is that hospitals receive financial benefits from expansions of Medicaid coverage vis-à-vis reductions in uncompensated care volume. Increases in Medicaid coverage and reductions in uncompensated care as a result of expansions in Medicaid eligibility are well-established by the literature and other studies. However, the majority of research thus far has focused only on the effects of the ACA Medicaid expansions. Where this paper attempts to contribute is by examining the financial and economic effects of Medicaid expansions beyond that of just the ACA, and whether these effects are heterogeneous across different types of hospitals, and safety-net hospitals in particular.

Medicaid is a government insurance program that is jointly funded by state and federal governments by managed by the states. States determine eligibility requirements for beneficiaries, regulate what services are covered, and set payment and reimbursement regimes for hospitals. This heterogeneity in Medicaid policy allows for identification of the effects of

expansions in Medicaid eligibility on hospital profitability. From 2000 to 2014, many states loosened Medicaid eligibility requirements. In 2000, only 7 states (including the District of Columbia) had family income eligibility for children above 250% of the federal poverty level. By 2014, 29 states did.

Children and adults both form large fractions of the Medicaid population. In FY2013, children formed nearly half of the Medicaid beneficiary population at 46% of the total while adults formed 29% of the total (Medicaid and CHIP Payment and Access Commission, 2013). Medicaid eligibility is also more generous for children than it is for adults. The median eligibility limit in 2014 across all states was 255% of the FPL for children and 138% for parents; 138% of the FPL was only $27,310 for a family of 3 in that year. Adults that qualify for Medicaid are extremely poor and have few to no other options for health insurance coverage.

One pervasive feature of the structure of hospital reimbursement in the United States is that hospitals price discriminate amongst different customers (Reinhardt, 2006). Every hospital has what is known as a chargemaster, a lengthy list of the hospital's prices for "every single procedure performed in the hospital and for every supply item used during those procedures" (ibid). The prices billed by the hospital to patients and insurance companies, however, often bear no relationship to what the hospital actually receives as payment. The "true" prices paid by private insurance companies are actually usually set via private negotiation between hospitals and the insurance companies, often as percentage discounts off chargemaster prices.

By contrast, payments by Medicare are set as flat-fees per case based on what are known as schedules of "diagnosis-related groups" (DRGs). Medicaid payment methods vary from state-to-state. Most states reimburse inpatient payments as a percentage of Medicare DRGs, or as flat

per diem payments. Hospitals are effectively rendered price takers for Medicare and Medicaid patients and have little control over what they receive from these government insurers. Overall, hospitals operate at a loss when treating Medicare and Medicaid patients. According to the American Hospital Association, reimbursement-to-cost ratios for Medicaid patients averaged about 0.7 in 2014 and 0.9 for Medicare patients while commercial patients averaged 1.7. Medicaid accounted for 18% of total national spending on hospital care in 2015 (CMS, 2016).

Perversely, uninsured patients are usually charged the highest prices for hospital care. These are the same patients most likely to be poor, unhealthy, and require more expensive medical care. Many default on the expensive hospital bills. Hospitals absorb these charges as bad debt or uncompensated care expense. These costs can be a large financial burden on hospitals, averaging about 6% of total hospital expenses in 2013 (AHA, 2016).

Different hospitals are likely to respond differently to expansions in Medicaid coverage. Hospitals serving higher proportions of uninsured patients are likely to benefit the most from expansions in Medicaid eligibility. As Medicaid eligibility is expanded, uninsured individuals enroll in state Medicaid programs, reducing uncompensated care expenses and improving operating and financial results. Hospitals in wealthier service areas with wealthier patient bases and low uninsured populations are likely to experience diminished effects expansions in Medicaid coverage on financial results.

The Centers for Medicare and Medicaid Services (CMS) has several official provider type designations that allow qualifying safety-net hospitals to be reimbursed using retrospective, cost-based methods instead of by DRGs. By CMS definition, critical access hospitals are rural hospitals with no more than 25 acute care inpatient beds located at least 35 miles from the

nearest hospital by primary road. They must provide 24/7 emergency care services and maintain an annual average length of stay of 96 hours or less for acute care patients. Similarly, disproportionate share hospital designation requires a DSH patient percentage (Medicare and Medicaid, non-Medicare patients) higher than 15% of total patient days. Because CAHs and DSHs have more uninsured patients than other hospitals, they are likely to receive greater benefits from expansions in Medicaid eligibility limits and coverage (Dobson et al, 2016).

Literature Review

There is a large body of literature studying the effects of Medicaid expansions under the Affordable Care Act. A literature review conducted by Antonisse et al. (2017) found no less than 108 studies published between January 2014 and January 2017 examining this issue. Key findings from the literature are that the ACA Medicaid expansions had positive effects on insurance coverage and uninsurance rates, access to medical care, utilization, affordability, and health outcomes.

In an article using survey data from three states, Sommers et al. (2017) found that, by the end of 2016, the uninsurance rate had dropped by more than 20 percentage points in two expansion states (Kentucky and Arkansas) relative to a nonexpansion state (Texas). They also found that, for previously uninsured people who now were covered by Medicaid, this change was associated with a 41-percentage-point increase in having a usual source of care, 23-percentage-point increase in "excellent" self-reported health, and improvements in the affordability of care.

Similarly, Miller and Wherry (2017) used data from the National Health Interview survey to examine whether the ACA Medicaid expansions were associated with changes in insurance coverage, health care use, and health among low-income adults. They found that uninsurance

rates were reduced in expansion states relative to nonexpansion states (difference-in-differences estimate, −8.2 percentage points; P<0.001) and that rates of Medicaid coverage increased (15.6 percentage points; P<0.001). They also found decreases in reports of inability to afford needed follow-up care and in reports of worry about paying medical bills.

Reductions in uncompensated care costs for hospitals and increases in profitability were also broadly reported. In the literature review conducted by Antonisse et al (2017), 19 papers found that hospitals in Medicaid expansion states experienced reductions in uninsured hospital visits and uncompensated care costs while providers in non-expansion states had little or no decline in uninsured visits and uncompensated care.

Camilleri (2017) found that ACA Medicaid expansions significantly reduced hospital provision of uncompensated care in 2014. In particular, within expansion states, DSH hospitals saw reductions beyond those experienced by non-DSH hospitals, reducing the variation in the provision of uncompensated care between hospitals that treat a disproportionate share of low-income patients and those that do not. Similarly, Sommers (2015) found that "more generous Medicaid eligibility and reimbursement policies improved [safety net] hospitals' ability to recoup costs".

Cunningham (2016) found that the ACA expansions of Medicaid coverage had significant effects on hospital finances and payer mix—the overall share of revenues from different payers. Because hospitals are reimbursed at different rates by different payers, shifts in payer mix can dramatically affect hospital profitability. They cite "a number of reports [showing] increases in Medicaid discharges and declines in uninsured or self-pay discharges for hospitals located in states that implemented the Medicaid expansion. In contrast, hospitals located in states

that did not expand Medicaid are not seeing these large shifts in payer mix." According to the authors, hospital margins are "influenced by numerous factors, the health care and policy environment is in flux, and some hospitals will be better able to adapt to these changes than others."

By contrast, few papers have studied the economic effects of pre-ACA Medicaid expansions on hospitals. Davidoff, et al (2000) found declines in uncompensated care after expansions in state Medicaid coverage. Two studies examined the determinants of hospital profitability. The first, Gapenski (1993), found that managerial and patient-mix variables were primary predictors of profitability. Structural factors beyond the control of managers, such as organizational and community characteristics, appeared to be less important in influencing profitability. The second, Bai and Anderson (2016), found that for-profit hospitals, higher markups, system affiliation, or regional power tended to be associated with higher profits. Hospitals that treated a higher proportion of Medicare patients, had higher expenditures per adjusted discharge, were located in counties with a high proportion of uninsured patients, or were located in states with a dominant insurer or greater health maintenance organization (HMO) penetration had lower profitability than hospitals that did not have these characteristics.

A separate literature documents the vulnerability of safety-net hospitals, including CAHs, DSHs, and other safety-net hospitals. Reiter, et al (2015) found that CAHs have poorer patient populations, higher uncompensated care expense, and weaker financial profiles than other types of hospitals. A spate of rural hospital closures motivated the research in Wisher et al, (2016) which found that "a number of factors contributed to the [closures], including aging, poor, and shrinking populations, high uninsured rates and a payer mix dominated by Medicare and

Medicaid, economic challenges in the community, aging facilities, outdated payment and delivery system models, and business decisions by corporate owners/operators".

Dobson et al (2016) found that DSH hospitals and other safety-net hospitals had uncompensated care costs and Medicaid revenue twice the level of other acute-care hospitals in 2015. The authors also found that DSH and other safety-net hospitals provided 33 percent of all inpatient days for Medicaid patients and nearly 30 percent of uncompensated care across all hospitals. Sommers (2015) examined 98 large, urban safety net hospitals, concluding that "more inclusive Medicaid eligibility and higher Medicaid reimbursement rates positively predicted safety net revenue-to-cost ratio", results consistent with those presented in this paper.

Blavin (2017) examines the effects of the ACA Medicaid expansions on the financial performance of different types of hospitals. He finds that, after the 2014 Medicaid expansion, "both operating margins and excess margins increased among hospitals in expansion states relative to hospitals in nonexpansion states. Mean annual operating margins in expansion states increased by 0.8 percentage points in FY 2014 and 1.9 percentage points in FY 2015, but operating margins in nonexpansion states declined by 0.6 percentage points in FY 2014 and increased by 0.8 percentage points in FY 2015," results consistent with those found in this paper.

Like Blavin (2017), this paper examines the economics effects of Medicaid expansions on different types of hospitals using a differences-in-differences estimation framework and Medicare Cost Reports data. This paper has many parallels to Blavin (2017) but departs and builds on that paper and the literature in three key ways: by expanding the time period analyzed; by expanding the analysis to include differential Medicaid eligibility requirements and timing of

expansions across different states; and by better identifying the types of hospitals most likely to be impacted by Medicaid expansions.

This paper better identifies those types of hospitals by using pre-defined provider designations from the CMS. Differential effects were found by Blavin (2017) for urban versus rural hospitals and for small versus large hospitals. These classifications are proxies for the CMS hospital types used in this paper. CAHs are, by definition, small and rural hospitals and DSH hospitals tend to be urban hospitals with vulnerable patient populations. Teaching hospitals, also controlled for in our analysis, are shown to be generally large hospitals with academic affiliations. Use of these CMS hospital types should better identify which hospitals are most impacted by changes to Medicaid eligibility.

We find the most significant effects are for CAHs and DSH hospitals, which have been shown by the literature to be associated with weaker financial profiles, more vulnerable patient populations, have higher rates of uninsurance, and greater uncompensated care expense.

Data and Methods

The Medicare Cost Reports is the primary data source for the analysis (CMS, 2015). The dataset contains aggregate information reported to the CMS by hospitals and is the most comprehensive hospital-specific dataset publicly available. It contains a wealth of data on hospital financials, utilization, geography, case-mix, and other characteristics. The sample period analyzed is from 2000 to 2014. Data on state Medicaid eligibility limits are from an annual survey conducted by the Kaiser Commission on Medicaid and the Uninsured (2016). The survey offers an in-depth profile of state Medicaid and Children's Health Insurance Program (CHIP) eligibility requirements, overall enrollment levels, and cost sharing policies.

The analysis employs a differences-in-differences estimation approach to rest for the impact of Medicaid expansions on net profit margins. Standard errors are clustered at the hospital level to correct for potential serial correlation problems as outlined in Bertrand et al (2003). The primary specification is defined as follows:

$$Profit\ Margin_{it} = Treatment_{it} + Hospital\ Characteristics_{it} + Year_t + State_i + U_{it}$$

In the quasi-experimental framework, a hospital *i* is considered to be in the treatment group if their state expands Medicaid income eligibility limits beyond a pre-defined threshold. The indicator post equals one for hospitals in the years *t* after their state expanded Medicaid. This specification is analogous to a "traditional" two-period difference-in-differences framework, which typically have indicators for treatment groups, pre-treatment periods, post-treatment periods, and an interaction between the treatment indicator and the post-treatment period. Two different eligibility limits and thresholds are used in separate regressions: using eligibility requirements for children in families of three and for parents in families of three, expressed as percentages of the federal poverty level (FPL). For regressions using the children's eligibility requirement, we consider a hospital to be in the treatment group when income eligibility limits in their state are greater than or equal to 250% of the federal poverty level. For adults, the treatment group threshold is equal to 138% of the FPL. Thresholds are set higher for children than for adults to reflect the relative generosity of Medicaid eligibility for children.

From 2000 to 2014, treatment groups increased in size relative to control groups as states expanded Medicaid coverage past the chosen thresholds. Using the children's eligibility limit, 38% of all observations are in the treatment group by 2014 compared to 22% of observations under the eligibility limit for parents (table 1). Tables 2 and 3 present historical Medicaid income

eligibility requirements for all states and Medicaid eligibility requirements that were generous enough for the treatment group. Other summary statistics for key variables are presented in table 1. There are about 4,000 unique hospitals in the sample across 15 years of data, totaling approximately 54,000 hospital-year observations.

Excess profit margin is the primary measure of profitability in the analysis, defined as net operating and non-operating income divided by total revenues. In the sample, profit margins are approximately normally distributed with a mean of 3.7% and a standard deviation of 10.4%, indicative of the significant variation in profitability across different hospitals (figure 1 and table 1).

The primary specification, however, does not reveal potentially heterogeneous financial effects of Medicaid expansion for different types of hospitals. As described above, CAHs and DSH hospitals may benefit more from expansions in Medicaid eligibility and coverage. The heterogeneity of these effects is captured using the second model below. In this hospital characteristics (HC) model, we add interaction terms between the difference-in-difference estimator and different types of hospitals to the primary specification. The HC model is defined as:

$$Profit\ Margin_{it} = Treatment_{it} + Hospital\ Characteristics_{it} + Treatment_{it} * Hospital\ Characteristics_{it} + Year_t + State_i + U_{it}$$

Table 4 presents the frequency of the three different CMS provider types used in the analysis: critical access hospitals, disproportionate-share hospitals, and teaching hospitals. Indicators for two other CMS provider type designations, sole community hospitals and

Medicare-dependent hospitals are excluded from the analysis; these two hospital types influenced regression results negligibly, and Medicare-dependent hospitals were just 4% of the overall sample.

CAHs are an exclusive category. Only 92 observations were CAHs and also either a teaching hospital or a DSH hospital. Some hospitals had both DSH hospital designation and teaching hospital designation, with about 11,000 observations included in both categories (table 4). Teaching hospitals also tended to be larger. Of the 13,119 observations with teaching hospital designation in our sample, 8,939 (68%) were large hospitals, with greater than 200 patient beds (table 4).

Results

As noted earlier, several articles have found that the ACA-related expansions of Medicaid increased the utilization of medical care by individuals previously without insurance. Data in our sample yields similar results, implying that the treatment group definitions selected here are well-identified. Effects on Medicaid utilization are statistically significant using the children's eligibility treatment definition, where hospitals in the treatment group are associated with 1,100 more Medicaid patient days (table 5). Effects are statistically insignificant using the parent's eligibility treatment. This may be due to limitations of the data or unknown characteristics about the relationship between prior (non-ACA) Medicaid expansions and healthcare utilization.

Results for the primary specification are presented in table 7, where net profit margins are regressed (separately) on the two different differences-in-differences estimators; CMS hospital type designations; number of hospital beds; and fixed effects for time and U.S. state. Hospitals in

the treatment group are associated with statistically significant increases in profitability—0.5-percentage-points using the children's eligibility limit ($p < 0.05$, standard error = 0.231) and 0.6-percentage-points using the parent's eligibility limit ($p < 0.01$, standard error = 0.199). The results imply that expansions in Medicaid coverage are associated with significant increases in profitability for the average hospital. The primary specification, however, does not identify potentially heterogeneous effects on different types of hospitals.

Regression results for the hospital characteristics model, which do identify heterogeneous effects on profitability, are presented in table 8. These heterogeneous effects are captured using interaction terms between the different hospital types and the difference-in-difference estimators. Specifically, we create interaction terms between the treatment group and no CMS hospital type designation; the treatment group and CAHs; treatment group and teaching hospitals; and the treatment group and DSH hospitals.

Results show that safety-net hospitals—CAHs and DSH hospitals—in the treatment group are associated with the largest gains in profitability from expansions in Medicaid eligibility into treatment groups. The coefficient on hospitals in the treatment group that are not safety-net hospitals or teaching hospitals is not statistically different from 0. Profitability effects are most pronounced for CAHs, which are associated with profitability increases of 1.7-percentage-points using the children's limit ($p<0.01$; standard error (SE) = 0.352) and 1.9-percentage-points using the parent's limit ($p<0.1$; SE =0.362). DSH hospitals are associated with a 0.6-percentage-point increase in profitability ($p<0.05$, standard error of .312) in the regression using the parent's eligibility limit, and statistically insignificant using the children's limit.

Conclusions

This analysis finds that expansions in Medicaid eligibility are associated with increases in hospital profitability with critical access hospitals and disproportionate share hospitals being associated with the largest increases. The results provide insight into how different types of hospitals respond to increases or reductions in Medicaid eligibility. For policymakers considering scaling back the expansions in Medicaid enacted under the ACA, these findings suggest that any such reductions would disproportionately and negatively affect safety-net hospitals.

A wealth of research has already demonstrated that safety-net hospitals are financially weaker than other hospitals; serve more vulnerable populations, with more Medicaid, uninsured, and low-income patients; and are critical sources of care for poor and rural communities and the healthcare system at large. Other factors not explored by this analysis that could affect the overall effects on profitability are Medicaid reimbursement levels; the acuity of a hospital's patient case-mix; and whether or not the hospital is a provider of highly-specialized clinical services.

This paper parallels but expands on Blavin (2017) in two key ways: by expanding the analysis to include Medicaid expansions outside of the Affordable Care Act and by better identifying the types of hospitals most likely to be impacted by changes to Medicaid eligibility and. It achieves the former by expanding the time periods analyzed to FY2000 through FY2014 and by defining Medicaid expansions as expansions in Medicaid eligibility past pre-defined thresholds. Better identification of hospital types is achieved by using the CMS hospital type designations for critical access hospitals—which are small and rural—and DSH hospitals—which serve disproportionately more Medicaid patients. Blavin (2017), by contrast, examines

differential effects for urban versus rural hospitals and for small hospitals versus large hospitals, essentially the same variation already adequately captured by the CMS hospital designations.

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Figure 1: Distribution of Net Profit Margins

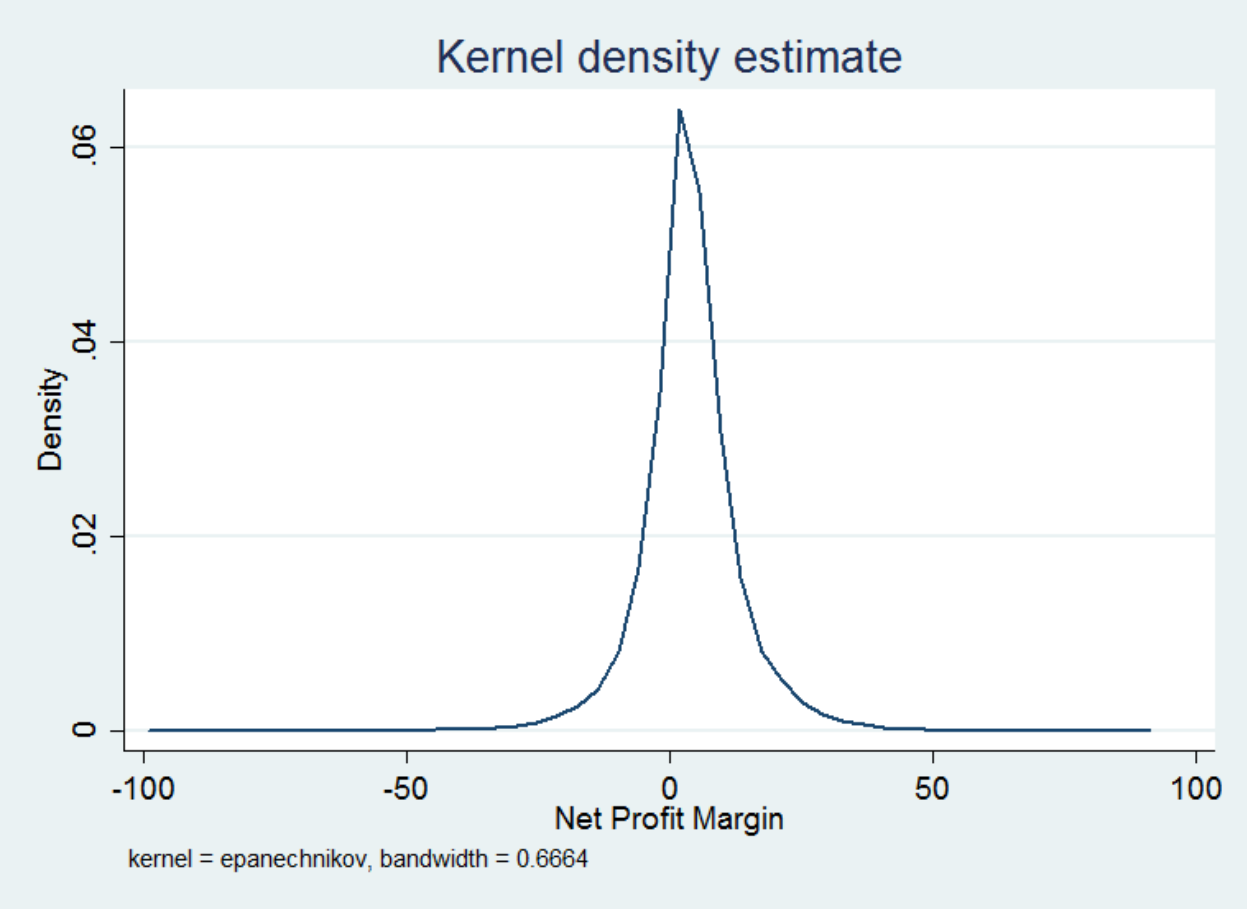

Table 1: Summary Statistics

Variable	Frequency	(%)
Hospital-Years	53,138	100
# in Treatment Group Using:		
Children's Eligibility Limit	20,268	38
Parent's Eligibility Limit	11,786	22

	Mean
Medicaid Utilization (% of Total Patient Days)	11.7%
Medicaid Patient Days	5,183
Net Patient Revenue	$138.6 million
Net Profit Margin	3.7%
Beds	152

Table 2: Medicaid Income Eligibility Limits, as a Percent of FPL, for Children in Families of Size Three

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
US	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.35	2.41	2.38	2.35	2.55	2.55	2.55
AL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.17	3.17	3.17
AK	2.00	2.00	2.00	2.00	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.08	2.08	2.08
AZ	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.40	1.40	1.40	1.52	1.52	1.52
AR	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.16	2.16	2.16
CA	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.66	2.66	2.66
CO	1.85	1.85	1.85	1.85	1.85	2.00	2.00	2.00	2.05	2.05	2.50	2.50	2.50	2.65	2.65	2.65
CT	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.23	3.23	3.23
DE	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.17	2.17	2.17
DC	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.24	3.24	3.24
FL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.15	2.15	2.15
GA	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.52	2.52	2.52
HI	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.13	3.13	3.13
ID	1.50	1.50	1.50	1.50	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.90	1.90	1.90
IL	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.18	3.18	3.18
IN	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	2.50	2.55	2.55	2.55
IA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.80	3.80	3.80
KS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.41	2.41	2.38	2.32	2.50	2.47	2.44
KY	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.18	2.18	2.18
LA	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	2.50	2.55	2.55	2.55
ME	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.13	2.13	2.13
MD	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.22	3.22	3.22
MA	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.05	3.05	3.05
MI	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.17	2.17	2.17
MN	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.88	2.88	2.88
MS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.14	2.14	2.14
MO	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.05	3.05	3.05
MT	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.75	1.75	2.50	2.50	2.50	2.50	2.66	2.66	2.66
NE	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	2.00	2.00	2.00	2.00	2.18	2.18	2.18

NV	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05
NH	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.23	3.23	3.23
NJ	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.55	3.55	3.55
NM	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	3.05	3.05	3.05
NY	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	4.00	4.00	4.00	4.00	4.00	4.05	4.05	4.05
NC	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.16	2.16	2.16
ND	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.60	1.60	1.60	1.60	1.75	1.75	1.75
OH	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.11	2.11	2.11
OK	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	2.10	2.10	2.10
OR	1.70	1.70	1.85	1.85	1.85	1.85	1.85	1.85	1.85	3.00	3.00	3.00	3.00	3.05	3.05	3.05
PA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.19	3.19	3.19
RI	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.66	2.66	2.66
SC	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	2.00	2.00	2.00	2.00	2.00	2.13	2.13	2.13
SD	1.40	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.09	2.09	2.09
TN	9.99	9.99	1.85	1.85	1.85	1.85	1.85	2.50	2.50	2.50	2.50	2.50	2.50	2.55	2.55	2.55
TX	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.06	2.06	2.06
UT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05
VT	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.18	3.17	3.17
VA	1.85	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05
WA	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.05	3.17	3.17
WV	1.50	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.50	2.50	3.00	3.00	3.05	3.05	3.05
WI	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	3.00	3.00	3.00	3.00	3.00	3.06	3.06	3.06
WY	1.33	1.33	1.33	1.33	1.85	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05

Notes: Highlighted values indicate years in which income eligibility limits exceeded 250% of the FPL, our pre-defined threshold. Data from the Kaiser Family Foundation.

Table 3: Medicaid Income Eligibility Limits, as a Percent of FPL, for Parents in Families of Size Three

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
US	0.68	0.68	0.71	0.71	0.69	0.67	0.65	0.63	0.68	0.64	0.64	0.63	0.64	1.38	1.38	1.38
AL	0.21	0.21	0.20	0.20	0.19	0.19	0.26	0.26	0.25	0.24	0.24	0.24	0.23	0.16	0.18	0.18
AK	0.79	0.79	0.81	0.81	0.81	0.81	0.81	0.81	0.85	0.81	0.81	0.81	0.78	1.28	1.46	1.43
AZ	1.07	1.07	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.06	1.06	1.06	1.06	1.38	1.38	1.38
AR	0.21	0.21	0.20	0.20	0.20	0.19	0.18	0.18	0.17	0.17	0.17	0.17	0.16	1.38	1.38	1.38
CA	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.06	1.38	1.38	1.38
CO	0.42	0.42	0.47	0.47	0.39	0.38	0.67	0.66	0.66	0.66	1.06	1.06	1.06	1.38	1.38	1.38
CT	1.57	1.57	1.07	1.07	1.07	1.57	1.57	1.91	1.91	1.91	1.91	1.91	1.91	2.01	2.01	1.55
DE	1.22	1.22	1.20	1.20	1.17	1.07	1.07	1.06	1.21	1.21	1.20	1.19	1.20	1.38	1.38	1.38
DC	2.00	2.00	2.00	2.00	2.00	2.00	2.07	2.07	2.07	2.07	2.07	2.06	2.06	2.21	2.21	2.21
FL	0.66	0.66	0.63	0.63	0.62	0.60	0.58	0.56	0.55	0.53	0.59	0.58	0.56	0.35	0.34	0.34
GA	0.62	0.62	0.59	0.59	0.58	0.56	0.55	0.53	0.52	0.50	0.50	0.49	0.48	0.39	0.38	0.37
HI	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.38	1.38	1.38	1.38
ID	0.33	0.33	0.32	0.32	0.31	0.30	0.43	0.42	0.28	0.27	0.39	0.39	0.37	0.27	0.27	0.26
IL	0.56	0.56	0.83	0.83	1.40	1.92	1.92	1.91	1.85	1.85	1.91	1.91	1.39	1.38	1.38	1.38
IN	0.31	0.31	0.30	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.36	0.24	0.24	0.24	0.24	1.39
IA	0.87	0.87	0.84	0.84	0.82	0.79	0.77	0.89	0.86	0.83	0.83	0.82	0.80	1.38	1.38	1.38
KS	0.40	0.40	0.39	0.39	0.38	0.37	0.36	0.34	0.34	0.32	0.32	0.32	0.31	0.38	0.38	0.38
KY	0.75	0.75	0.71	0.71	0.70	0.68	0.66	0.64	0.62	0.62	0.62	0.59	0.57	1.38	1.38	1.38
LA	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.20	0.26	0.25	0.25	0.25	0.24	0.24	0.24	0.24
ME	1.57	1.57	1.57	1.57	1.57	1.57	2.07	2.06	2.06	2.06	2.00	2.00	2.00	1.05	1.05	1.05
MD	0.43	0.43	0.41	0.41	0.40	0.39	0.38	0.37	1.16	1.16	1.16	1.16	1.22	1.38	1.38	1.38
MA	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.38	1.38	1.38
MI	0.63	0.63	0.61	0.61	0.59	0.58	0.61	0.61	0.66	0.64	0.64	0.63	0.64	1.38	1.38	1.38
MN	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.15	2.15	2.15	2.15	2.05	1.38	1.38
MS	0.38	0.38	0.36	0.36	0.35	0.34	0.33	0.32	0.46	0.44	0.44	0.44	0.29	0.29	0.28	0.27
MO	1.07	1.07	0.84	0.84	0.82	0.42	0.40	0.39	0.26	0.25	0.37	0.36	0.35	0.24	0.23	0.22
MT	0.69	0.69	0.67	0.67	0.65	0.64	0.62	0.60	0.58	0.56	0.56	0.55	0.54	0.52	0.51	1.38

NE	0.55	0.55	0.57	0.57	0.56	0.60	0.58	0.59	0.58	0.58	0.58	0.57	0.58	0.55	0.55	0.63
NV	0.90	0.90	0.88	0.88	0.87	0.84	0.86	0.94	0.91	0.88	0.88	0.87	0.84	1.38	1.38	1.38
NH	0.62	0.62	0.61	0.61	0.60	0.58	0.56	0.55	0.51	0.49	0.49	0.49	0.47	0.75	1.38	1.38
NJ	2.00	2.00	0.42	0.42	0.41	1.00	1.15	1.33	2.00	2.00	2.00	2.00	2.00	1.38	1.38	1.38
NM	0.58	0.58	0.71	0.71	0.69	0.67	0.65	0.63	0.69	0.67	0.67	0.85	0.85	1.38	1.38	1.38
NY	1.33	1.33	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.38	1.38	1.38
NC	0.62	0.62	0.59	0.59	0.57	0.56	0.54	0.52	0.51	0.49	0.49	0.49	0.47	0.45	0.45	0.44
ND	1.10	1.10	0.94	0.94	0.69	0.67	0.65	0.63	0.62	0.59	0.59	0.59	0.57	1.38	1.38	1.38
OH	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	1.38	1.38	1.38
OK	0.48	0.48	0.46	0.46	0.45	0.44	0.43	0.50	0.48	0.47	0.53	0.53	0.51	0.48	0.46	0.44
OR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.40	0.40	0.40	0.39	1.38	1.38	1.38
PA	0.56	0.56	0.66	0.66	0.66	0.63	0.61	0.59	0.36	0.34	0.46	0.46	0.58	0.38	1.38	1.38
RI	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.91	1.81	1.81	1.81	1.81	1.81	1.38	1.38	1.38
SC	1.00	1.00	0.98	0.98	0.97	0.97	0.97	1.00	0.90	0.89	0.93	0.91	0.89	0.67	0.67	0.67
SD	0.65	0.65	0.63	0.63	0.61	0.59	0.58	0.56	0.54	0.52	0.52	0.52	0.50	0.54	0.53	0.52
TN	0.81	0.81	1.00	1.00	1.00	0.81	0.80	0.80	1.34	1.29	1.27	1.26	1.22	1.11	1.03	1.01
TX	0.32	0.32	0.34	0.34	0.33	0.30	0.29	0.28	0.27	0.26	0.26	0.26	0.25	0.19	0.19	0.18
UT	0.55	0.55	0.53	0.53	0.53	0.50	0.49	0.47	0.68	0.44	0.44	0.44	0.42	0.47	0.46	0.45
VT	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.91	1.91	1.91	1.91	1.91	1.91	1.38	1.38	1.38
VA	0.31	0.31	0.37	0.37	0.36	0.31	0.31	0.31	0.30	0.29	0.31	0.31	0.30	0.52	0.45	0.39
WA	0.86	0.86	0.86	0.86	0.86	0.81	0.79	0.76	0.77	0.74	0.74	0.73	0.71	1.38	1.38	1.38
WV	0.28	0.28	0.39	0.39	0.38	0.37	0.36	0.35	0.34	0.33	0.33	0.32	0.31	1.38	1.38	1.38
WI	1.85	1.85	1.85	1.85	1.92	1.92	1.92	1.91	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
WY	0.65	0.65	0.62	0.62	0.60	0.59	0.57	0.55	0.54	0.52	0.52	0.51	0.50	0.59	0.58	0.57

Notes: Highlighted values indicate years in which income eligibility limits exceeded 250% of the FPL, our pre-defined threshold. Data from the Kaiser Family Foundation.

Table 4: Tabulation of Hospital Types

Teaching Hospitals and Other Hospital Types

	DSH Hospital		
Critical Access Hospital	No	Yes	Total
No	2,073	10,978	13,051
Yes	67	1	68
Total	2,140	10,979	13,119

Non-Teaching Hospitals and Other Hospital Types

	DSH Hospital		
Critical Access Hospital	No	Yes	Total
No	6,503	20,022	26,525
Yes	13,470	24	13,494
Total	19,973	20,046	40,019

Most Large Hospitals Are Teaching Hospitals

	Large Hospitals (> 200 Beds)		
Teaching Hospital	No	Yes	Total
No	34,900	5,119	40,019
Yes	4,180	8,939	13,119
Total	39,080	14,058	53,138

Table 5: Effects of Medicaid Expansions on Medicaid Utilization

	Medicaid Utilization (% of Total Patient Days)		Medicaid Patient Days	
	Children's Limit	Parent's Limit	Children's Limit	Parent's Limit
Treatment Effect	1.601***	-0.857***	630.0***	-281.4***
	(0.186)	(0.171)	(111.2)	(97.23)
Critical Access Hospital	2.063***	2.077***	3,074***	3,080***
	(0.406)	(0.406)	(283.3)	(283.4)
DSH-Eligible Hospital	7.794***	7.813***	2,253***	2,261***
	(0.352)	(0.352)	(251.1)	(251.2)
Teaching Hospital	2.711***	2.705***	2,443***	2,440***
	(0.386)	(0.386)	(350.7)	(350.8)
Beds	0.00103	0.00101	40.57***	40.56***
	(0.000918)	(0.000917)	(2.168)	(2.169)
Year Indicators	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes
Constant	14.56***	14.31***	-2,194***	-2,292***
	(1.897)	(1.895)	(655.8)	(656.3)
Observations	53,138	53,138	51,559	51,559
R-squared	0.276	0.275	0.608	0.608

Robust standard errors, clustered at the hospital-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effects of Medicaid Expansions on Medicaid Utilization for Different Hospitals

	(1)	(2)	(3)	(4)
	Medicaid Utilization (% of Total Patient Days)		Medicaid Patient Days	
	Children's Limit	Parent's Limit	Children's Limit	Parent's Limit
Treatment	-0.00388	-0.569	1,165***	507.7
	(0.491)	(0.484)	(357.2)	(338.6)
+ CAH Interaction	3.387***	-0.751	763.9***	181.1
	(0.485)	(0.467)	(170.8)	(189.3)
+ Teaching Interaction	1.143**	-0.703	817.4	-874.1**
	(0.515)	(0.428)	(513.0)	(381.3)
+ DSH Interaction	0.827**	-1.240***	176.0	-363.9
	(0.371)	(0.384)	(235.6)	(244.1)
Critical Access Hospital	0.954**	2.080***	3,139***	3,091***
	(0.452)	(0.446)	(314.0)	(296.9)
DSH-Eligible Hospital	7.583***	7.906***	2,513***	2,401***
	(0.427)	(0.391)	(304.8)	(280.2)
Teaching Hospital	2.508***	2.617***	2,268***	2,634***
	(0.402)	(0.406)	(412.4)	(374.7)
Beds	0.00112	0.000997	40.53***	40.50***
	(0.000915)	(0.000915)	(2.163)	(2.164)
Year Indicators	Yes	Yes	Yes	Yes
State Indicators	Yes	Yes	Yes	Yes
Constant	15.28***	14.29***	-2,304***	-2,409***
	(1.888)	(1.898)	(675.4)	(654.9)
Observations	53,138	53,138	51,559	51,559
R-squared	0.279	0.275	0.608	0.608

Robust standard errors, clustered at the hospital-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Primary Model: Effects of Medicaid Expansion on Profitability

	Net Profit Margin	
	Children's Eligibility Limit	Parent's Eligibility Limit
Treatment Effect	0.516**	0.641***
	(0.231)	(0.199)
Critical Access Hospital	-4.060***	-4.063***
	(0.397)	(0.397)
DSH-Eligible Hospital	-2.035***	-2.039***
	(0.311)	(0.311)
Beds	0.00520***	0.00521***
	(0.000703)	(0.000703)
Teaching Hospital	-0.608**	-0.613**
	(0.250)	(0.250)
Constant	6.579***	6.588***
	(1.593)	(1.596)
Year Indicators	Yes	Yes
State Indicators	Yes	Yes
Observations	53,138	53,138
R-squared	0.057	0.058

Robust standard errors, clustered at the hospital-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Hospital Characteristics Model: Effects of Medicaid Expansion on Profitability for Different Hospitals

	(1) Children's Eligibility Limit	(2) Parent's Eligibility Limit
Treatment	-0.659	-0.0518
	(0.575)	(0.619)
+ CAH interaction	1.721***	1.894***
	(0.352)	(0.362)
+ Teaching interaction	-0.0242	-0.110
	(0.373)	(0.300)
+ DSH interaction	0.232	0.612**
	(0.323)	(0.312)
Critical Access Hospital	-4.814***	-4.489***
	(0.474)	(0.439)
DSH-Eligible Hospital	-2.264***	-2.125***
	(0.361)	(0.336)
Teaching Hospital	-0.578*	-0.443
	(0.310)	(0.274)
Beds	0.00527***	0.00520***
	(0.000702)	(0.000701)
Constant	7.078***	6.710***
	(1.589)	(1.593)
Year Indicators	Yes	Yes
State Indicators	Yes	Yes
Observations	53,138	53,138
R-squared	0.059	0.058

Robust standard errors, clustered at the hospital-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1