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The Effects of the ACA's Medicaid Expansion
and Woodwork Effect on Hospital Finances

by

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Abstract

A major component of the 2010 Patient Protection and Affordable Care Act (ACA) was the expansion of Medicaid eligibility to childless adults below 138% of the Federal Poverty Level. Medicaid enrollment increased significantly in states that expanded eligibility, and it also increased in states that did not expand eligibility. This increased take-up of insurance by individuals who were previously eligible for Medicaid is known as the "woodwork effect." With a significant number of individuals now enrolled, this paper asks if those individuals were more likely to utilize hospital services and whether their increased utilization affected hospital finances. Hospital financial data from all acute care hospitals in California, Florida, and Texas is used to estimate a dynamic difference-in-differences (DD) instrumental variables model where the "treated group" includes hospitals with higher shares of Medicaid visits pre-ACA (i.e., safety-net hospitals), and the "control group" includes hospitals with lower shares of Medicaid visits (i.e., non-safety-net hospitals). The results show that safety-net hospitals had relatively more Medicaid visits post-ACA, but these increases were offset by decreases in visits from uninsured patients and patients with private insurance. Therefore, safety-net hospitals did not experience better financial performance as measured by operating profits compared to non-safety-net hospitals. The results suggest that increased Medicaid demand does not necessarily equate to increased profits, especially if there are changes in patient composition, such as crowding out of private-pay patients.

1 Introduction

Under the ACA, states were given the option to expand Medicaid starting in 2014. It was estimated that 11 million people became newly eligible in 2015 by the expansion (Rudowitz et al. 2016). Due to the media attention and publicity surrounding the ACA, Medicaid enrollment increased even in non-expansion states, which is known as the "woodwork effect;" people who were previously eligible for Medicaid "came out of the woodwork" to sign up for coverage from 2008 to 2013. The "woodwork effect" accounted for thirty percent of Medicaid enrollment increases in the post-ACA period (Frean et al. 2017). It has been shown that when people gain health insurance coverage, they are more likely to utilize hospital resources, particularly inpatient and outpatient care (RAND HIE). Much of the literature surrounding the ACA has focused on how the Medicaid expansion has affected the uninsurance rate and healthcare utilization. However, much less work has examined the effects of the ACA on hospital finances. This paper asks whether the ACA affected Medicaid patient demand for hospital care, and whether greater demand from Medicaid patients affected hospital finances in the post-ACA period.

Since state Medicaid programs typically set lower provider reimbursement rates than other health insurers, this paper asks how the increase in Medicaid enrollment has affected hospital finances since 2009. One hypothesis is that hospital profits could increase if uncompensated care decreases and net demand for hospital services increases. With Medicaid expansions, individuals who were previously unable to pay for hospital services became eligible for Medicaid, thus decreasing uncompensated care costs. Dranove et al. 2016 show that uncompensated care costs decreased more in hospitals in states that expanded Medicaid compared to hospitals in states that did not expand. Uncompensated care costs declined the most in hospitals that treat a high share of low-income patients (Camilleri 2017). Additionally, the individuals who enrolled in Medicaid utilized more hospital resources, particularly preventative services (Simon et al. 2017), which could have positively affected hospital profits.

On the other hand, increases in Medicaid enrollment could decrease hospital profits if Medicaid reimbursements are lower than the marginal cost of treating patients. Consequently, any gains from an increase in demand for hospital services from Medicaid patients could be offset by low reimbursement rates. In addition, the ACA called for a reduction in the federal Medicaid Disproportionate Share Hospital (DSH) allotments targeted towards states with low percentages of uninsured people. Although these reductions have not been implemented, the reductions would likely negatively affect hospital finances. In California, for example, the decreases in uncompensated care costs may not offset the DSH reductions, which would result in hospital financial losses of up to \$1.5 billion (Neuhausen et. al 2014).

In a related paper, Blavin (2016) estimates the association between the Medicaid expansion in

2014 and hospital finances by comparing states that expanded to those that did not. He found that hospitals in states that expanded had significantly increased Medicaid revenue, decreased uncompensated care costs, and improvements in profit margins compared to hospitals in states that did not expand. These findings were emphasized for hospitals that had high uninsurance rates prior to the ACA. The Blavin (2016) paper is unique because it does not exclusively focus on uncompensated care costs, but rather it examines overall hospital performance nationwide. In considering factors such as the uninsurance rate and payer mix, its results suggest that expanding Medicaid could benefit hospitals financially.

This paper uses a different identification strategy to determine the net effect of increased Medicaid enrollment on hospital finances and uses hospital financial data from California, Florida, and Texas from 2005-2016. Hospitals are sorted by the percentage of hospital visits made by Medicaid patients in the pre-ACA period (2005 to 2008), where hospital visits include inpatient, outpatient, and emergency department visits. Hospitals with high shares of visits by Medicaid patients are referred to as safety-net hospitals and hospitals with low shares are referred to as non-safety-net hospitals. But the most distinguishing factor is that this paper takes advantage of the variation induced by the woodwork effect in Florida and the Medicaid expansion in California to identify differences in Medicaid demand across hospitals within states. Texas hospitals serve as a control group because Texas neither had a "woodwork effect" nor did it expand Medicaid under the ACA. By comparing hospitals within states over time, the estimates are not confounded by trends in hospital finances that may differ across states.

The results show that new Medicaid demand at safety-net hospitals partially crowded out demand from uninsured and private pay patients. The increase in Medicaid visits was offset by decreases in visits from uninsured and private pay patients. Although operating profits increased substantially for both safety-net and non-safety-net hospitals from 2005 to 2016, there is no evidence that safety-net hospitals experienced better financial performance compared to non-safety-net hospitals. The results suggest that safety-net hospitals in these three states did not benefit financially from the increases in Medicaid enrollment, and that the overall increase in hospital profits over the time period is likely due to other factors.

2 Literature Review

The ACA significantly affected insurance coverage in the US because it gave states the option to expand Medicaid eligibility to childless adults with incomes below 138% of the Federal Poverty Level. In a preliminary analysis of the ACA, Sommers et al. (2014) focuses on states that expanded Medicaid coverage before 2014, such as California, Connecticut, Minnesota and Washington D.C. He found strong evidence of increased Medicaid coverage in Connecticut and positive, but weaker

evidence in Washington D.C. There was also evidence of some crowd-out of private coverage in Connecticut. Selden et al. 2017 compares states that expanded under the ACA to states that did not expand and found that the uninsurance rate for adults with family incomes of 100-138% of the FPL declined by 22 percentage points in expansion states (Selden et al. 2017). To date, 32 states have expanded Medicaid while 18 have not. Even though some states have not expanded, Medicaid enrollment has changed in some of those states as well.

The publicity related to the ACA caused some individuals who were already eligible for Medicaid to enroll in Medicaid, and this phenomenon is known as the "woodwork effect." There is evidence that the woodwork effect was present in all states to varying degrees, regardless of whether the state expanded Medicaid or not (Freaan et al. 2016; Decker et al. 2017). A woodwork effect was also observed in Massachusetts when it implemented its 2006 healthcare reform, and that reform had many of the same features as the ACA (Sonier et al. 2013). Freaan et al. 2016 show that the replacement of private coverage with public coverage ("crowd-out") did not occur, but rather the increase in private coverage in non-expansion states compared to expansion states was due to the fact that low-income people in non-expansion states received health insurance coverage through the ACA exchanges (Decker et al. 2017).

As the number of people who enroll in Medicaid increases, we might expect that they will utilize more hospital services (RAND HIE). In assessing changes in utilization among low-income adults after expanding either Medicaid or private insurance, Sommers et al. 2016 show that expansion of Medicaid and private coverage was associated with significant increases in outpatient utilization. One unanswered question is whether the increase in Medicaid patient demand for hospital services affected hospital finances.

The health economics literature has generated mixed results related to hospital financial performance following the Medicaid expansions. Blavin (2016) compares hospital finances in states that expanded Medicaid under the ACA versus states that did not expand Medicaid. He finds that hospitals in states that expanded Medicaid had significantly increased Medicaid revenue, decreased uncompensated care costs, and improvements in profit margins compared to hospitals in states that did not expand. One limitation of this study is that he only uses data up to fiscal year 2014, so he does not examine the effects of the expansion that occurred after January 1, 2014. Bazzoli (2016) assesses the effects of California's early Medicaid expansion program and finds that hospitals that treated the most uninsured patients prior to the ACA did not experience substantial benefit in reduced uninsured burden or better financial performance after the expansion.

Certain types of hospitals experienced improved financial performance as a result of the Medicaid expansions. For-profit hospitals benefitted with decreases in self-pay patients, increases in county covered patients, and reductions in charity care (Bazzoli 2016). Blavin (2017) also found that hospital profit margins increased the most at small, for-profit, and non-federal government

hospitals, and hospitals located in nonmetropolitan areas because of the ACA. Thus, the literature has largely found that safety-net hospitals have been the least likely to benefit from the ACA Medicaid expansions.

This paper is most similar to Bazzoli (2016) and Blavin et al. (2017) because it asks how increased Medicaid enrollment affected hospital financial performance in safety-net hospitals relative to non-safety-net hospitals. It uses data on the universe of acute care hospitals with emergency departments in CA, FL, and TX from 2005-2016. The empirical strategy compares hospitals within states over time to show how increased Medicaid demand for hospital care affected the number of hospital visits by payer type, total revenues by payer type, and total operating profits. The results show that increased Medicaid demand at safety-net hospitals crowded out demand from the uninsured and private pay patients, so there was no net increase in total patient demand at safety-net hospitals. As a result, operating profits in safety-net hospitals did not increase relative to non-safety-net hospitals. The results are most consistent with Blavin's study because both findings suggest that certain types of hospitals, whether it be safety-net hospitals or ones that treated the most uninsured prior to the ACA, did not experience better financial performance relative to their counterparts.

3 Data and Methods

This paper asks whether hospital finances were affected by the woodwork effect and the ACA Medicaid expansion in 2014. I use hospital financial data from all acute care hospitals in California, Florida, and Texas to estimate a dynamic difference-in-differences (DD) instrumental variables model using the share of total patient demand coming from Medicaid patients in the pre-ACA period (2005 - 2008) as the instrument. The "treated group" includes hospitals with higher shares of Medicaid visits in the pre-ACA period (i.e., safety-net hospitals), and the "control group" includes hospitals with lower shares of Medicaid visits. I use the increase in Medicaid demand for hospital care that resulted from California's 2014 Medicaid expansion and Florida's woodwork effect that started in 2009 to estimate the relationship between Medicaid hospital visits and hospital operating profits, total revenue, and revenues and visits by patients with different types of insurance.

3.1 Data and Sample Statistics

The data for this study included hospital financial data from California, Florida, and Texas from 2005 to 2016. The Office of Statewide Health Planning and Development (OSHD) in California provides desk-audited, quarterly financial and utilization data collected from all licensed hospitals. This data contains facility-level data on service capacity, revenues and expenses by payer, and

utilization by payer. In addition, I used ED data by facility that includes patient demographic information, treatment information, and expected source of payment.

The Florida Agency for Healthcare Administration (AHCA) collects detailed hospital level financial reports that all hospitals are required to file. These financial reports contain statements of patient care revenues and deductions by payer for inpatient and outpatient services, patient care services expenses, balance sheet information, and operating costs. The Agency has 90 days to conduct an initial review of the report and reports are deemed acceptable when all corrections are made.

The Texas Department of State Health Services (DSHS), along with the American Hospital Association (AHA) and the Texas Hospital Association (THA) combined an annual survey into a single questionnaire that all licensed hospitals in Texas are required to submit under state laws (Health and Safety Code, Chapters 104 and 311) within 60 days of receipt of the survey form. Verification sheets are sent out that allow hospitals 30 days to review and make any changes before the data is considered final. This survey includes extensive financial and utilization data by facility. It includes revenue by payer, admissions by payer, and ER visits by Medicare and Medicaid.

All acute care hospitals with emergency departments were selected as part of the study sample. Hospital visits include inpatient, outpatient, and ED visits. Visits are then categorized by payer which include Medicaid, Medicare, private, and self-pay. Private pay usually means the patient has employer-sponsored health insurance. Self-pay means the patient is uninsured. Total revenue includes net patient revenue, other operating revenue and non-operating revenue. Total revenues are also partitioned by payer and it is important to note that total revenues represent total charges for services, not the total net revenues which the hospitals are paid. Total operating profits measures the profitability of hospitals and is defined as net patient revenue plus other operating revenue minus total expenses.

Table 1 shows finance and discharge variables for hospitals in all three states from 2005 to 2008. California hospitals had the highest percentage of Medicaid visits (22%), compared to FL hospitals with 19%, and TX hospitals with 13%. As expected, this contrast was also reflected through Medicaid revenue: California hospitals had the highest Medicaid revenues of \$128.75 million and Texas hospitals had the lowest Medicaid revenues of \$44.98 million. California hospitals also had the highest number of Medicaid visits with 37,000 while Florida hospitals had the lowest with 9,000; however, Florida hospitals treat fewer patients overall compared to hospitals in California and Texas. Hospitals in all states maintained operating profits between \$1-2 million and total net revenue between \$100-200 million.

3.2 Methods

To estimate the effects of increased Medicaid enrollment on hospital visits, revenues, and operating profits, I estimate a dynamic difference-in-differences (DD) instrumental variables model, where I first create a variable for each hospital that measures the share of hospital visits made by Medicaid patients before 2009. Then I interact that “treatment” variable with year dummy variables from 2009-2016. For ease of interpretation, I refer to hospitals with high shares of Medicaid visits as “safety-net” hospitals and hospitals with lower shares of Medicaid visits as “non-safety-net” hospitals. The first stage model uses a DD estimator in which the safety-net hospitals are the “treated group” and the non-safety-net hospitals are the “control group.” The hypothesis is that safety-net hospitals received relatively more Medicaid visits in the post-ACA period relative to non-safety-net hospitals. The estimation strategy controls for year and hospital fixed effects as well as hospital-specific linear time trends. Standard errors are clustered at the hospital-level. The first stage model for estimation is,

$$(1) \quad \#Medicaid_Visits_{it} = \gamma_t + \delta_i + \Omega t' \delta_i + \sum_{j=2009}^{2016} \beta_j (\%Medicaid_i * Post_{jt}) + u_{it}$$

where the number of Medicaid visits in hospital i in year t is the outcome variable. γ_t and δ_i are year and hospital fixed effects, respectively. $\Omega t' \delta_i$ represents hospital specific linear time trends. $\%Medicaid_i$ is the share of visits by Medicaid patients and it is multiplied by 10 for a more realistic interpretation of the coefficients. β_j is the incremental change in Medicaid visits in post-period year j that compares hospitals with 10% higher shares of Medicaid visits (“safety-net”) in the pre-period to hospitals with lower shares (“non-safety-net”). When I estimate the model separately by state, $Post_{jt}$ are indicator variables for j years 2009 to 2016 (when “treatment” is in effect). When I combine the states and re-estimate the model, the value of $Post_{jt}$ equals 0 for all years in Texas because I find no evidence of a differential woodwork effect across hospitals in Texas. Similarly, $Post_{jt}$ equals 0 until 2014 in California because there is no differential woodwork effect across hospitals in California until the Medicaid expansion in 2014. Both sets of results appear in [Table 2](#).

Next, I use the same DD model to estimate the reduced form effects of increased Medicaid enrollment on other hospital discharge variables and financial outcomes:

$$(2) \quad Y_{it} = \gamma_t + \delta_i + \Omega t' \delta_i + \sum_{j=2009}^{2016} \beta_j (\%Medicaid_i * Post_{tj}) + u_{it}$$

where Y_{it} represents total hospital visits, Medicaid visits, Medicare visits, other visits (total visits excluding Medicare and Medicaid), operating profits, total revenue, Medicaid revenue, self-pay "revenue", private revenue, and Medicare revenue.

Finally, I use the predicted Medicaid demand in each hospital from 2005-2016 from the first stage model to plug into the second stage model to estimate how an additional Medicaid visit affects hospital finances. Thus, the IV model is identified from the variation that comes from comparing safety-net hospitals to non-safety-net hospitals before and after the ACA. The second stage is defined as follows,

$$(3) \quad Y_{it} = \gamma_t + \delta_i + \Omega_t' \delta_i + \beta_1 \#Medicaid_Visits_{it} + u_{it}$$

where Y_{it} includes operating revenue, total revenue, total net revenue, revenue by payer, and visits by payer. Standard errors are clustered at the hospital-level. I use the “ivreg 2sls” command in Stata to estimate the dynamic DD instrumental variables model.

4 Results

California, Florida, and Texas had varying degrees of woodwork effects and differ when it comes to the ACA Medicaid expansion in 2014. Florida did not expand Medicaid eligibility under the ACA, but it experienced the largest woodwork effect of all the states that did not expand eligibility (Ryan 2014). Texas did not expand Medicaid but experienced a small woodwork effect. California expanded Medicaid in 2014 under the ACA, and also had a small woodwork effect. [Graph 1](#) shows how the woodwork effect and Medicaid expansion affected the demand for hospital care. [Graph 1](#) shows the average number of Medicaid visits per hospital by state over time. There is a slight increase from 2008 and 2009 in all three states, where the number of Medicaid visits per hospital reached over 10,000 in Florida, 20,000 in Texas, and 40,000 in California. There is a much larger increase in California starting in 2013 with around 42,000 Medicaid visits per hospital, which increased to over 70,000 by 2016. The increase in Medicaid hospital visits is largely explained by the ACA Medicaid expansion in California.

It is important to note that [Graph 1](#) merely represents the number of Medicaid visits, so [Graph 2](#) shows how the number of Medicaid visits compares to visits from patients with other types of insurance by plotting the share of total visits by Medicaid patients. In this graph, the woodwork effect is distinctly illustrated and confirms previous research findings (Ryan 2014). Texas did not experience much of a woodwork effect, which is shown by the rather flat line across the years. Florida experienced a large woodwork effect which is illustrated by the abrupt increase from 2008

to 2013; the percent of Medicaid visits per hospital increased from 19% in 2008 to 27% by 2013. There is a 1% increase in the share of Medicaid visits in California during this time frame as well, but it is meager compared to the 10% increase that occurs in CA from 2013 to 2016, which reflects the Medicaid eligibility expansion.

Did the increase in Medicaid enrollment lead to changes in hospital profitability? [Graph 3](#) shows how hospital profits evolved from 2005-2016 in CA, FL, and TX. Operating profits stayed relatively flat until 2008, at which point they started to increase and continued to increase for the remaining years. An average hospital in Florida generated close to \$1 million in operating profits before 2009 and reached over \$20 million by 2016. Average hospital profits in CA and TX follow similar trends and are similar in magnitude. It is interesting to point out that the years undergoing the largest increases: 2008 to 2009 and 2013 to 2014 correspond to the years the woodwork effect and the Medicaid expansion began. Thus, [Graph 3](#) suggests that increased Medicaid enrollment may have increased hospital profits; however, there could be other reasons why hospital profits increased. There were many other policy changes, and changes in hospital markets, in the years following the Great Recession. Therefore, I turn to the estimation strategy to identify the causal effect of increased Medicaid enrollment on hospital profits.

[Table 2](#) shows the first stage results from ([Equation 1](#)). First I estimate the results by state, and those results appear in the first four columns of [Table 2](#). Then I aggregate all three states and re-estimate the results and report the aggregated results in the fifth column of the table. In the first column, hospitals in Florida with 10% higher shares of Medicaid patients in the pre-period received 950 more Medicaid visits in 2009. I will refer to the hospitals that had 10% higher shares of Medicaid patients as safety-net hospitals going forward. The results show that safety-net hospitals in Florida received relatively more Medicaid demand each year, particularly from 2009 to 2010, than non-safety-net hospitals for all years, with the exception of 2016. In contrast, safety-net hospitals in Texas experienced insignificant decreases in Medicaid visits compared to non-safety-net hospitals in Texas. Due to the particularly large standard errors and insignificant results, there was not much of a differential woodwork effect across safety-net and non-safety-net hospitals in Texas. Although we do not see significant results in California in the third column, the sign of the coefficients is positive. Up until 2014, safety-net hospitals were receiving relatively less Medicaid demand. But they received 1,754 more Medicaid visits than non-safety-net hospitals in 2014 and it continued to increase onwards. The results in columns 3 suggest that there was no differential woodwork effect across safety-net and non-safety-net hospitals in CA from 2009-2013, but the Medicaid expansion had a larger effect on safety-net hospitals in CA than non-safety-net hospitals. Thus, column 4 shows results from re-estimating the model, but redefining the pre-period from 2005-2013. We now see large and significant results, where safety-net hospitals received about 5,000 more Medicaid visits compared to non-safety-net hospitals by 2016. Taking into account

context and the results that we observe by state, the pre-period was adjusted for Texas and California when the states were combined. All hospitals in Texas from 2005-2016 and all hospitals in California from 2005-2013 were treated as “control hospitals” (i.e., $\%Medicaid * Post = 0$ for all i in those states in those years). After making this change, I combine the data for these three states, re-estimate the first stage model, and see that safety-net hospitals had significantly more Medicaid visits compared to non-safety-net hospitals in the post-ACA period (column 5).

Table 3 shows the reduced form effects of increased Medicaid enrollment on hospital visits by patients with different types of insurance (i.e., payer). Safety-net hospitals received 2,191 fewer total visits in 2009 compared to non-safety-net hospitals and continued to receive fewer visits until 2013. It is not until 2014 that there is a net (insignificant) increase in total visits, which could indicate new demand induced by the individual mandate. Although there is an increase in Medicaid demand for safety-net hospitals relative to non-safety-net hospitals, it is offset by the significant decreases in other types of visits. Other visits is defined as all visits except Medicaid and Medicare. The results in Table 3 suggest that the increase in Medicaid visits at safety-net hospitals was accompanied by crowd-out of visits from patients who were uninsured or who had private insurance.¹

Table 4 shows the reduced form effects of increased Medicaid enrollment on hospital finances. There are no significant changes in operating profits and total revenue. Safety-net hospitals had insignificant decreases in total revenue relative to non-safety-net hospitals, except during 2016. This could be due to the fact that safety-net hospitals treated more Medicaid patients, who are not as profitable as other types of patients. As expected, these hospitals also received much more Medicaid revenue. In 2016, safety-net hospitals received \$26 million more in Medicaid revenue compared to non-safety-net hospitals. Meanwhile, both self-pay and private pay revenue decreased for safety-net hospitals, providing further evidence that Medicaid demand crowded out demand from uninsured and private pay patients.

Table 5 summarizes the previous results using the two-stage least squares estimation framework. Additional visits by Medicaid patients did not affect hospital financial outcomes such as operating profits, total revenues, or total net revenues, where total net revenues convert hospital charges to the amount of revenue that hospitals actually receive for treating patients. An additional Medicaid visit increased Medicaid revenue (i.e., charges) by \$3,310, decreased self-pay revenue by \$647, decreased private pay revenue by \$1,195, and decreased Medicare revenue by \$985. An additional Medicaid visit decreased other visits by about 0.6-persons, so the crowd-out rate was about 60%. Overall, the increase in Medicaid demand in CA, FL, and TX did not improve hospital

¹I cannot separate visits by uninsured vs. private pay patients because the Texas hospital financial data does not report that information for emergency department and outpatient visits. I can, however, separate total revenues from self-pay patients vs. private pay patients in all states, so I present those results in Table 4.

profitability, possibly because Medicaid demand crowded out demand from other types of patients at safety-net hospitals.

Although increased Medicaid demand did not affect hospital operating profits, [Graph 4](#) shows that operating profits increased in both non-safety-net and safety-net hospitals, starting in 2008. I separated hospitals based on their shares of total visits by Medicaid patients in the pre-ACA period (2005-2008), where the shares equal the number of Medicaid visits divided by the number of total visits. Safety-net hospitals include hospitals in the top quartile of the percentage of Medicaid visits, while non-safety-net hospitals include hospitals below the top quartile for the percentage of Medicaid visits. From 2005-2008, safety-net hospitals had negative operating profits, and non-safety-net hospitals earned about \$4 million in operating profits. By 2015, safety-net hospitals were generating over \$10 million in operating profits, while non-safety-net hospitals were earning close to \$20 million. Thus, the difference in hospital profits between the two groups remained constant, yet all hospitals became more profitable.

There are two explanations for why profits increased at both types of hospitals. The first is that safety-net hospital profits increased because they received less uncompensated care as patients switched to Medicaid, while non-safety-net hospital profits increased because the hospitals received more demand from patients with private coverage. However, the second explanation is that the increases in Medicaid enrollment had no effect on hospital profits, and that hospital profits started to increase in 2008 for reasons that were unrelated to changes in Medicaid policy. These hypotheses could be investigated using hospital discharge data.

5 Discussion

This paper asks how increases in Medicaid enrollment affect demand for hospital care and hospital finances, and it compares safety-net to non-safety-net hospitals from the pre-ACA period (2005-2008) to the post-ACA period (2009-2014). Theoretically, as Medicaid enrollment increases, hospital profits could increase if uncompensated care decreases. However, hospital profits could decrease if Medicaid reimburses below marginal cost. This paper shows that safety-net hospitals, which experienced greater Medicaid demand for hospital services as a result of the ACA's woodwork effects and Medicaid expansions, did not experience greater profitability compared to non-safety-net hospitals.

There is also significant evidence that Medicaid demand at safety-net hospitals crowded out demand from uninsured and private-pay patients. Future research could explore whether safety-net hospitals were capacity-constrained, and how they triaged patients as demand for hospital care from Medicaid patients increased. The influx of Medicaid patients could have caused safety-net hospitals to relocate other types of patients, such as private pay patients, to other hospitals

because of limited space and resources. Safety-net hospitals may have benefited from treating fewer uninsured patients, while at the same time, non-safety-net hospitals may have benefited from treating more private pay patients who got deferred from safety-net hospitals. Future research could explore these compositional changes in patient visits across different types of hospitals by using hospital discharge data.

Future Medicaid eligibility expansions would likely result in greater crowd-out of private pay patients at safety-net hospitals because expansions would affect people at higher points in the income distribution. Additional Medicaid eligibility expansions could further reduce uncompensated care, but also entice people with private insurance to switch to Medicaid, which has less cost-sharing. It is not clear whether such expansions would benefit hospitals financially. Perhaps if additional Medicaid expansions were coupled with higher hospital reimbursement rates for Medicaid patients, then crowd-out of private pay patients would not negatively affect hospitals' financial performance.

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7 Tables

Table 1: **Summary Statistics**

Pre-period (2005 - 2008)	CA	FL	TX
# Hospitals	328	199	383
%Medicaid Visits	0.22	0.19	0.13
Operating Profits (in millions)	\$1.92	\$1.57	\$1.54
Total Revenue (in millions)	\$613	\$572	\$117
Total Net Revenue (in millions)	\$160	\$145	\$119
Medicaid Revenue (in millions)	\$129	\$71	\$45
Medicare Revenue (in millions)	\$237	\$264	\$121
Self-Pay Revenue (in millions)	\$24	\$43	\$34
Private-Pay Revenue (in millions)	\$201	\$156	\$115
Total Expenses (in millions)	\$164	\$83	\$109
Total Visits (in thousands)	166	49	113
Medicaid Visits (in thousands)	37	9	14
Medicare Visits (in thousands)	42	12	21
Other Visits (in thousands)	88	27	84

Source: California OSHD, Florida AHCA, Texas DSHS hospital financial data

Table 2: The Effects of the ACA on Medicaid Visits in Safety-Net vs. Non-Safety-Net Hospitals

	(1) #Medicaid Visits Florida	(2) #Medicaid Visits Texas	(3) #Medicaid Visits California	(4) #Medicaid Visits California	(5) #Medicaid Visits All
%Medicaid*2009	950.33*** (267.21)	-366.44 (1272.57)	584.42 (565.62)		1605.66*** (351.48)
%Medicaid*2010	1463.98** (512.00)	1958.39 (2375.10)	-47.55 (671.93)		2543.02*** (436.37)
%Medicaid*2011	1849.56** (698.97)	-1142.13 (3738.72)	-865.87 (1043.07)		3629.89*** (502.49)
%Medicaid*2012	2395.73** (889.29)	-3171.99 (5218.71)	-1683.18 (1838.22)		5038.15*** (625.60)
%Medicaid*2013	2398.75* (982.53)	-3826.48 (4839.90)	-2001.39 (2082.35)		6186.40*** (646.79)
%Medicaid*2014	2618.83* (1165.48)	-4067.85 (7205.98)	1754.88 (2389.80)	3452.69** (1074.32)	5233.60*** (862.09)
%Medicaid*2015	2659.75* (1275.09)	-3824.92 (7626.04)	3468.67 (2702.45)	5418.03*** (1420.45)	7432.23*** (1056.59)
%Medicaid*2016	2556.49 (1362.03)	-4732.49 (6333.97)	3296.86 (2894.32)	5496.28*** (1557.98)	8068.49*** (1203.65)
N	2,339	3,633	3,785	3785	9757
Adjusted R ²	0.983	0.899	0.964	0.963	0.943

Notes: The first four columns present results comparing safety-net and non-safety-net hospitals using (Equation 1) by state while the fifth column presents results when the states are combined. Results are estimated using California, Florida, and Texas hospital financial data from 2005 to 2016. The outcome variable is the number of Medicaid visits. The independent variables are the percent of Medicaid visits before 2009 interacted with year dummy-variables from 2009 to 2016. Each regression controls for year and hospital fixed effects, along with hospital specific-linear time trends. Standard errors are clustered at the hospital level and appear in parentheses. Due to the expansion in California in 2014 and no differential woodwork effect across hospitals in CA, Column 4 presents results defining the pre-period before 2014 in CA, rather than before 2009.

Table 3: **The Effects of the ACA on Hospital Visits in Safety-Net vs. Non-Safety-Net Hospitals**

	(1) Total Visits	(2) Medicaid Visits	(3) Medicare Visits	(4) Other Visits
%Medicaid*2009	-2191* (854)	1606*** (351)	148 (259)	-3945*** (721)
%Medicaid*2010	-2420* (947)	2543*** (436)	-219 (244)	-4744*** (780)
%Medicaid*2011	-1609 (889)	3630*** (502)	10 (270)	-5249*** (811)
%Medicaid*2012	-380 (1009)	5038*** (626)	201 (297)	-5619*** (972)
%Medicaid*2013	1585 (925)	6186*** (647)	31 (260)	-4632*** (993)
%Medicaid*2014	3398* (1543)	5234*** (862)	39 (374)	-1875 (1511)
%Medicaid*2015	2998 (2079)	7432*** (1057)	-382 (533)	-4052* (2039)
%Medicaid*2016	4068 (2523)	8068*** (1204)	-409 (617)	-3591 (2524)
N	9,757	9,757	9,757	9,757
Adjusted R ²	0.971	0.943	0.957	0.954

Notes: Each column presents results comparing safety-net and non-safety-net hospitals using (Equation 2) when state data are combined. Results are estimated using California, Florida, and Texas hospital financial data from 2005 to 2016. The outcome variables include total visits, Medicaid visits, Medicare visits, and Other Visits (total visits excluding Medicaid and Medicare). The independent variables are the percent of Medicaid visits before 2009 interacted with year dummy-variables from 2009 to 2016. Each regression controls for year and hospital fixed effects, along with hospital specific-linear time trends. Standard errors are clustered at the hospital level and appear in parentheses.

Table 4: The Effects of the ACA on Hospital Finances in Safety-Net vs. Non-Safety-Net Hospitals

	(1) Operating Profits	(2) Total Revenue	(3) Medicaid Revenue	(4) Self-Pay "Revenue"	(5) Private Revenue	(6) Medicare Revenue
%Medicaid*2009	-\$1.683 (0.880)	-\$5.423 (4.151)	\$6.426*** (1.357)	\$0.027 (1.026)	-\$1.707 (1.460)	-\$2.675 (2.037)
%Medicaid*2010	-\$1.975** (0.748)	-\$9.120 (4.816)	\$11.580*** (1.758)	-\$1.462 (1.026)	-\$3.817* (1.762)	-\$5.235* (2.163)
%Medicaid*2011	-\$0.396 (0.871)	-\$8.810 (6.673)	\$15.607*** (2.565)	-\$1.472 (1.465)	-\$5.967** (1.953)	-\$4.689 (2.839)
%Medicaid*2012	-\$1.241 (0.822)	-\$6.917 (5.913)	\$21.734*** (3.004)	-\$2.743** (0.996)	-\$8.321*** (2.014)	-\$4.750* (2.241)
%Medicaid*2013	-\$0.960 (0.856)	-\$8.398 (6.028)	\$24.714*** (3.421)	-\$2.750** (1.010)	-\$10.744*** (2.068)	-\$4.329* (1.991)
%Medicaid*2014	\$0.424 (0.942)	-\$2.762 (3.056)	\$17.332*** (2.456)	-\$3.647*** (0.902)	-\$3.446* (1.693)	-\$1.825 (1.773)
%Medicaid*2015	\$1.582 (1.432)	-\$2.875 (4.375)	\$20.656*** (3.207)	-\$4.898*** (1.139)	-\$7.772** (2.463)	-\$6.885** (2.350)
%Medicaid*2016	\$2.183 (1.407)	\$5.278 (5.918)	\$26.087*** (4.265)	-\$5.971*** (1.443)	-\$8.908** (3.297)	-\$10.088** (3.229)
N	9,757	9,757	9,757	9,757	9,757	9,757
Adjusted R ²	0.866	0.992	0.973	0.948	0.976	0.987

Notes: Each column presents results comparing safety-net and non-safety-net hospitals using (Equation 2) when state data are combined. Results are estimated using California, Florida, and Texas hospital financial data from 2005 to 2016. The outcome variables include operating profits, total revenue, Medicaid revenue, self-pay "revenue", private revenue, and Medicare revenue. The independent variables are the percent of Medicaid visits before 2009 interacted with year dummy-variables from 2009 to 2016. Each regression controls for year and hospital fixed effects, along with hospital specific-linear time trends. Standard errors are clustered at the hospital level and appear in parentheses.

Table 5: The Effects of Increased Medicaid Demand on Hospital Visits & Finances

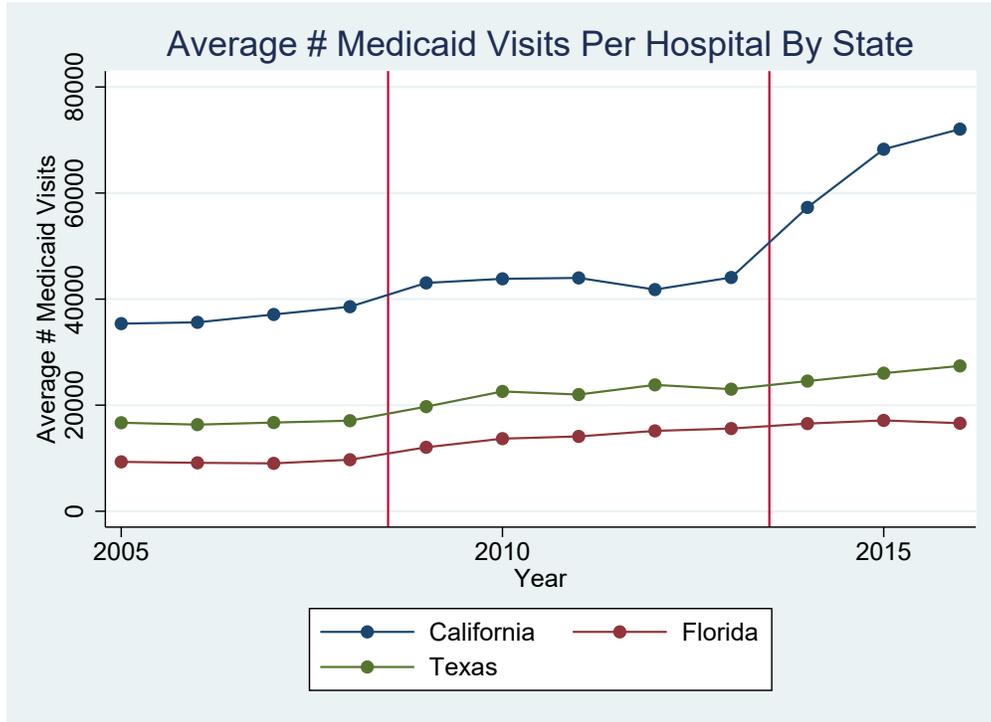
2SLS Estimates	(1) Operating Profit	(2) Total Revenue	(3) Total Net Revenue	(4) Total Expenses
#Medicaid Visits	\$126 (145)	-\$307 (565)	\$187 (193)	\$86 (169)

2SLS Estimates	(5) Medicaid Revenue	(6) Medicare Revenue	(7) Self-Pay Revenue	(8) Private Revenue
#Medicaid Visits	\$3,310*** (348)	-\$985** (337)	-\$647*** (150)	-\$1,195*** (329)

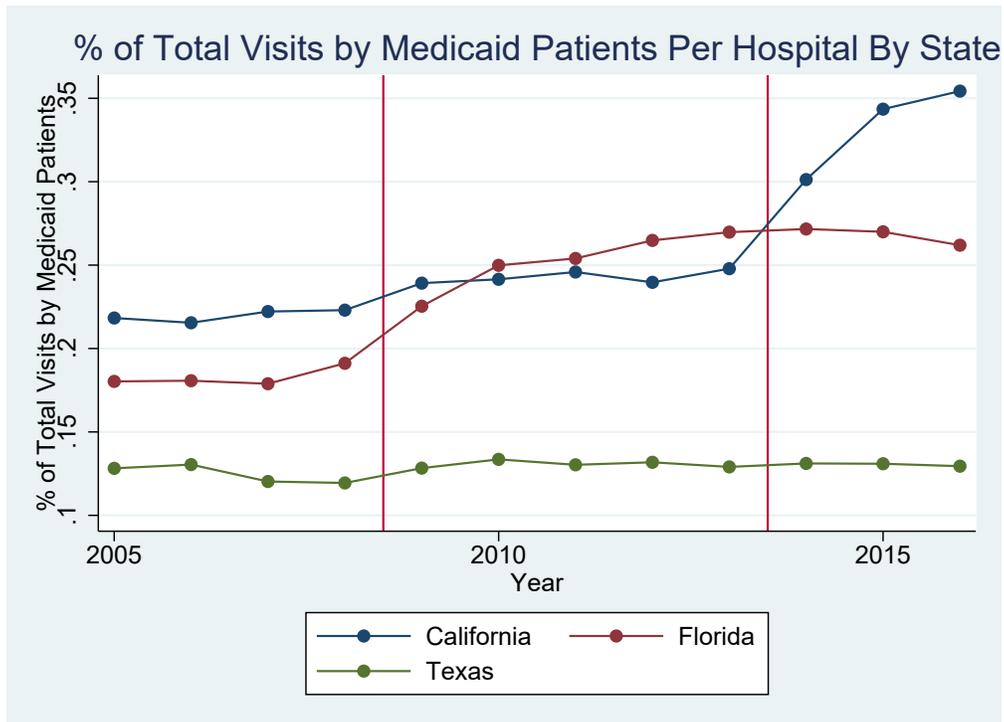
2SLS Estimates	(9) Total Visits	(10) Medicare Visits	(11) Other Visits
#Medicaid Visits	0.371 (0.220)	-0.031 (0.059)	-0.597** (0.206)

Notes: Each estimate is calculated using the 2SLS method described in (Equation 3), where the first stage equation is described in (Equation 1). Results are estimated using California, Florida, and Texas hospital financial data from 2005 to 2016. The outcome variables include operating profit, total revenue, total net revenue, total expenses, Medicaid revenue, Medicare revenue, self-Pay "revenue", private revenue, total visits, Medicare visits, and other visits (total visits excluding Medicaid and Medicare). The independent variable is number of Medicaid visits. Each regression controls for year and hospital fixed effects, along with hospital specific-linear time trends. Standard errors are clustered at the hospital level and appear in parentheses.

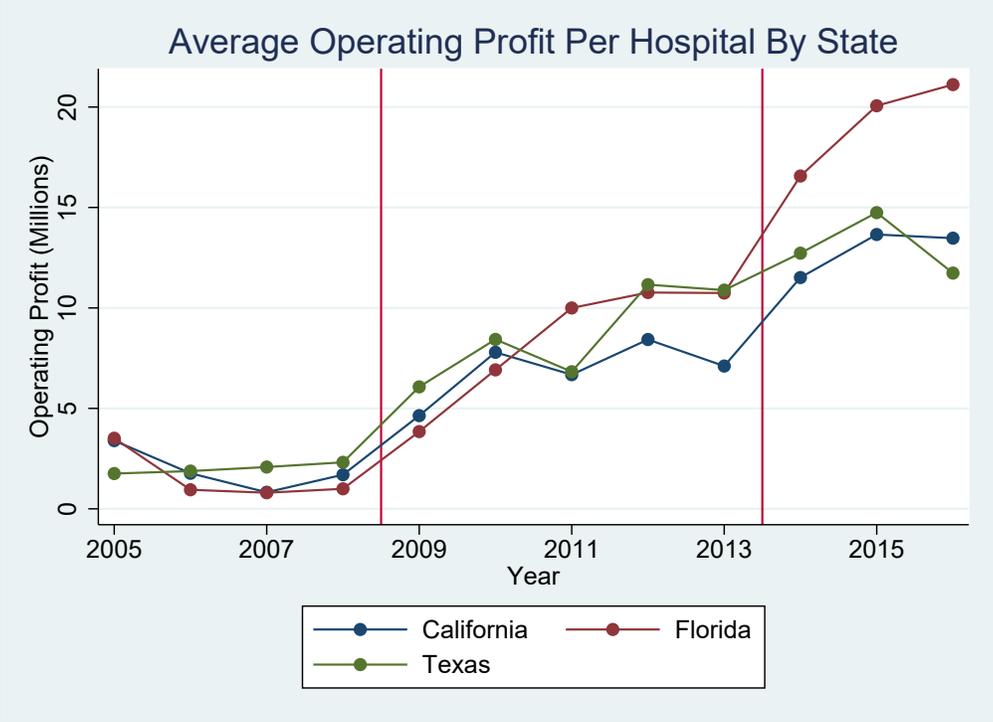
8 Figures



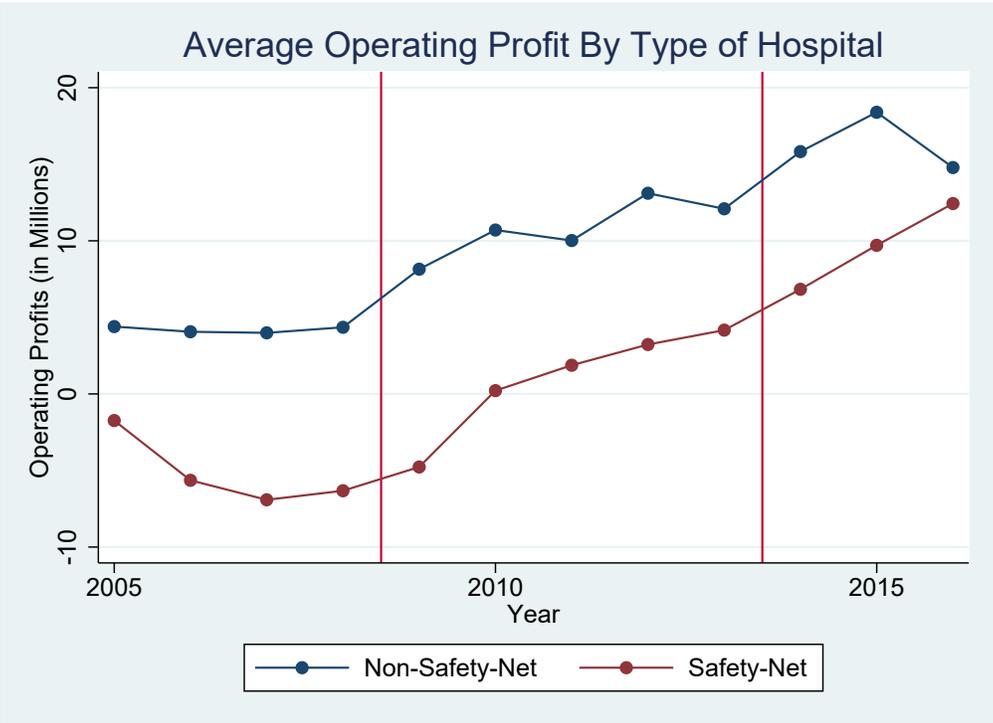
Source: California OSHD, Florida AHCA, Texas DSHS hospital financial data



Source: California OSHD, Florida AHCA, Texas DSHS hospital financial data



Source: California OSHD, Florida AHCA, Texas DSHS hospital financial data



Notes: Hospitals are separated based on their shares of total visits by Medicaid patients in the pre-ACA period (2005-2008), where the shares equal the number of Medicaid visits divided by the number of total visits. Safety-net hospitals include hospitals in the top quartile of the percentage of Medicaid visits, while non-safety-net hospitals include hospitals below the top quartile for the percentage of Medicaid visits