# The Effectiveness of Medicaid Administrative Spending on Reducing the Hospital Administrative Burden

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# 1 Introduction

The burden of Healthcare Administration on the United States economy has been well documented. Expenditures from hospitals alone accounted for 5.63% of GDP in 2010, and 25.32% of those costs are administrative (Himmelstein et al., 2014). It is also clear from existing literature that a large portion of these administrative activities go towards billing insurance companies. Billing Insurance Related (BIR) costs represented an estimated $471 billion system wide in 2012, of which hospitals accounted for $74 billion (Jiwani et al., 2014). The reason for the great deal of resources directed at the BIR activities is partially due to the response from insurers to a potential problem of physician moral hazard.

Because the medical professionals know a great deal more about the services they are providing, they have the opportunity to provide services that may not be necessary. The Fee-for-service payment scheme used by many insurers in the United States, including large public payers Medicaid and Medicare, provides potential incentives to abuse this information gap. There are incentives to provide unnecessary services as providers are paid for each service provided, thus they are able to increase revenue by billing more services. There is some evidence to support this supply induced demand in U.S. hospitals (Takaku and Yamaoka, 2019) as well as mental health services (Douven et al., 2015) and general practice services (Van Dijk et al., 2013) in the Netherlands, and hospitals in South Korea (Jung and Park, 2021). In response to concern towards this moral hazard problem, insurers have moved toward more scrutinous claim processing and increased monitoring of recipient's utilization to ensure that the services billed are indeed medically necessary. The result is a complex and difficult billing process which creates a great deal of administrative work for providers and insurers alike.

The process of medical billing in Fee-For- Service uses code combinations from over 10,000 medical procedures (CPT Codes), 69,000 medical diagnosis (ICD 10 Dx Codes), and over 250,000 drug codes (NDC codes). The payer then will utilize this information to determine the individual coverage, medical necessity, and payment of the services indicated on a claim according to their own policies. These coverages will vary payor to payor, and in the case of Medicaid, will vary state to state. Often the coverage rules for these code combinations will also be updated year to year, and codes will be added to and removed from the national coding books. The complexity of the tasks involved with creating and reviewing these claims by providers requires a great deal of resources, and is often subject to limitations with cost effective technology. In addition to this coding, there are a variety of other kinds of monitoring efforts including utilization review, which is an exchange of medical documentation reviewed by insurers for medical necessity, credentialing processes to verify provider information, and claim audits. Maintaining sufficient claim processing information systems and retaining medically educated personnel to run all of these complex tasks also requires a great deal of resources on behalf of the insurers.

Between the complexity of these billing processes, the varying payer require-

ments, and the systems and rules in place for the purpose of monitoring there becomes a need for a great deal of communication between healthcare administrators and their payers to clarify requirements and settle disputed claims. This requires that providers shift administrative resources toward tasks that produce little to no benefit for the provider or patients outside of simply getting reimbursed for services already rendered. These costs meet the traditional definition of a transaction cost, as noted by J. Kahn et al. (2010). Depending on the difficulty and volume of these tasks, hospitals are forced into a trade-off between paying for additional administrative resources or simply absorbing the costs of the services.

The relationship of Medicaid and this administrative burden is equally nuanced. Among health care providers, Medicaid generally has a reputation for being the most difficult payer to work with. This combined with relatively low reimbursement rates leads a large deficit between the cost of serving Medicaid patients and the revenue received from the program. Our data shows that this net deficit on the US hospital system is between $30 and $35 billion annually between 2015 and 2019. Medicaid, however, also reduces the cost burden of uncompensated care. The administrative work associated with the collection of medical bills left to patient liability is also a burden on healthcare providers, and a large portion of those costs also go unpaid, especially in states with very little Medicaid coverage. Our data shows that this burden of uncompensated care is between $ 13.4 and $ 20.9 billion per year between 2015 - 2019. Although discussed more at depth in the next section, it is unclear from the existing literature which of these effects has a greater impact on the administrative and unpaid cost burden of hospitals.

Medicaid administrative spending may have an important role in this cost burden on hospitals through both potential direct and indirect effects. The direct effect is that states with higher administrative spending may have more efficient processes to handle the billing complexity described above, and more efficient processes used by the payer also reduces the administrative burden of hospitals. The indirect effect is that it's possible that state's with higher levels of Medicaid administrative spending may also have more Medicaid enrollment. These effects will also be discussed in more detail in the next section.

This paper seeks to provide some clarity on this important question by analyzing the effect of level of administrative spending by the state's Medicaid program on the levels observed in cost categories closely related to BIR activities as well as the level of unpaid Medicaid costs.

## 2 Literature Review

Although the issue of Billing Insurance Related costs has not gone entirely unnoticed by the existing literature, there is certainly a limited amount on which to draw from. As mentioned above, there are existing estimates for the levels of BIR costs at Hospitals, but these estimates are primarily based on micro-cost data only from California (J. G. Kahn et al., 2005). These estimates have been

used in a number of related studies including extrapolations of those estimates to the national level (Jiwani et al., 2014). The age of these estimates are somewhat problematic as they reflect an administrative burden prior to a great deal of technological advancement in healthcare administration, as well as the Affordable Care Act and related Medicaid expansion. A nationwide review has likely not been conducted specifically for BIR costs due to data limitations, which are discussed in more detail in the next section. Previous studies have observed variations in total administrative costs using micro data for Florida hospitals across several hospital characteristics including rural/metropolitan hospitals, ownership type, and bed size (McKay et al., 2008). There has also been several studies that compare Hospital Administrative costs in the US with other countries, (Himmelstein et al., 2014, Himmelstein et al., 2020), finding that US costs far outpace other countries in terms of percentage of hospital expenditure.

In a review of billing complexity for a large national sample of US physician practices, Gottlieb et al. (2018) introduced a measure of "challenged revenue" which measures the amount of the physician's fee that was never paid or was lost in administrative costs during the billing process. They found that this made up 21% of revenue for Medicaid Fee for Service recipients and 13% for Medicaid managed care. The former number is nearly triple that of Medicare Fee for Service and of Private payers. The number of payer interactions per Medicaid claim was also much higher than that of Medicare and Private payers. They also found that the Medicaid Fee for Service claim denial rate is 17.8% higher than Medicare Fee for Service. Bradbury (2015) also found that billing complexity and reimbursement issues were a key limiting factor in physician offices accepting Medicaid patients. There is not comparable research for U.S. Hospitals, but the high levels of unpaid costs observed in our data suggest that these problems likely also carry over to hospital billing.

Medicaid Administrative spending has also received limited study from the existing literature. Balio (2020) provides a comprehensive review of the state trends of Medicaid administrative spending as well as the effect of the Medicaid expansion. Among the statistically significant correlates with per-enrollee administrative spending was the Federal Match Assistance Program (FMAP) which matches amounts spent on Medicaid claims at varying percentages across states. This was negatively coorelated suggesting that higher FMAP indicates lower levels of administrative spending. On this relationship they comment, "FMAP is calculated based on the average income in the state where those with lower average incomes have higher match rates. This finding that higher match rates are associated with lower administrative spending as a percent of total spending may reflect greater health needs of the population and therefore greater medical spending for these states," (Balio, 2020). It is also possible that these results may indicate that there are higher reimbursement rates in states with higher FMAP, which may lead to less unpaid Medicaid costs for providers. There isn't existing literature that has explored this possible relationship so the state's FMAP percentage will be included in our models.

In a related study, they also found no significant results from a difference-in-difference approach on the effect of ACA's Medicaid expansion on state's

per enrollee administrative spending (Balio et al., 2021). This is also in line with the general results found from a similar method in Balio (2020), but in this study differences were observed in the per-enrollee spending in states with large expansions versus small expansions where states with smaller expansions had increases in administrative spending and states with large expansions had reductions in spending. These results make it ambiguous whether or not expansion is a relevant control. Because FMAP was also increased in expansion states as a part of the ACA, a dummy variable for expansion status was not included in the model.

# 3 Data

There are two primary data sources that will be used in this paper, both from the Center for Medicaid and Medicare Services (CMS). U.S. hospitals are required to provide cost reports to CMS annually using the form CMS-2552-10. This form is broken up into several worksheets in which providers will give cost report details in a large number of categories. Unfortunately, isolating BIR costs from these reports is difficult as most of the pertinent BIR costs are reported together under a broad category "Administrative and General" and there are few other categories that are relevant to the BIR cost centers mentioned in previous studies (J. G. Kahn et al., 2005). These previous estimates also estimated that BIR costs accounted for between 6.6% and 10.8% of total revenue which accounts for a large portion of the total 20.6% of total revenue that was reported for Administrative costs in the same data-set. This indicates that likely a large portion of the variation in administrative costs can be attributed to variation in the BIR costs within that category, but the data will limit this paper from being able to provide clear causal evidence. It is also worth noting that the cost categories included in this paper will be more restrictive than those that have been used in the past to measure overall administrative costs. Several of the previous studies mentioned above measured administrative costs from Hospital cost reports using the cost assignment methodology from Woolhandler et al. (1993), which included things such as Nursing Administration and employee benefits. Previous estimates of BIR costs have used the estimated percentages from J. G. Kahn et al. (2005) and applied them to this broad administrative definition or to the level of overall revenue. Rather than rely on these estimates, we will only use the Hospital Cost Report categories that can be directly tied to high percentages of BIR activity, "Administrative and General" and "Medical Records and Library". This will yield estimates that are below the true level of administrative spending and perhaps also the true level of BIR costs, but this measure of administrative costs should vary more closely in relation to changes in BIR related burden. A comparison of the estimates from our selected categories with estimates using 8.5% of total revenue reported in the Hospital Cost reports is available in Figure 1 below.

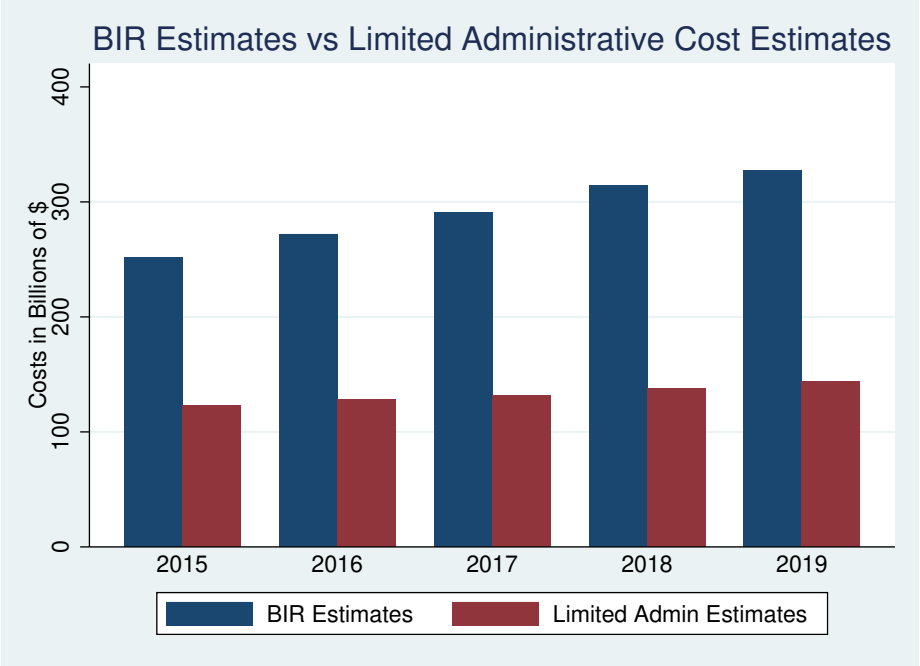


Figure 1: Comparison of Administrative Estimates by Fiscal Year

From the same cost reports, there is also data available on unpaid costs for Medicaid which reflects simply the difference between the amounts reported as Medicaid costs and Medicaid revenue. This amount is represented as a positive number if the hospital is losing money and negative if it is profiting on Medicaid patients, this scheme was chosen because in general Hospitals have a large cost deficit from servicing Medicaid patients. Figure 3 shows the total amounts for these costs per fiscal year and Figure 4 shows the average hospital costs by fiscal year. From the cost reports we will also use the reported level of Uncompensated Care. These are, by CMS definition, amounts that were patient liability, typically through cost share with an insurance or by lack of insurance, and were deemed uncollectable. Medicare reimburses for a portion of their unpaid cost share amounts, but those are not included in this uncompensated care reporting category. Medicaid patients do not have patient liability by law for Medicaid covered services, so there should be no overlapping amounts between the medicaid unpaid amount and the uncompensated care. Other categories from the cost reports that will be utilized for control variables include hospital control type, total hospital revenue, and zip-code. Medicaid "days" will also be used from this data. These are defined as a per hospital count of any single outpatient visit or individual inpatient day at the hospital. These will all be discussed in more detail in Methods section. Our dataset will utilize the cost reports for fiscal years 2015 through 2019. These years were selected to avoid potential issues created by the shock of the ACA Medicaid Expansion and from the COVID

pandemic on enrollment rates and overall Medicaid spending noted in Clemens et al. (2021). Speciality hospitals such as Cancer, Psychiatric, Rehabilitation, and Children's hospitals were not included in the sample as billing requirements, reimbursements rates, availability of outpatient and inpatient services and cost structure can vary across these other hospital types. This removes 7,251 observations, leaving 22,289 hospital level observations over the 5 year period or about 75% of the total hospital population.

The primary limitation with this data is that there appears to be a non-neglible number of observations with missing values in some key variables. For observations that reported zero amounts in both of the administrative categories noted above, but reported a value for "Administrative and General Salaries" that value was used. If directions for the CMS Cost Reports are followed correctly then this salary category should be a subcategory used in the calculation of "Administrative and General", and on average this subcategory represents almost 20% of the "Administrative and General" category. There were 906 observations where this replacement was made and there were 260 observations remaining that contained no value for either cost category, those observations were not dropped. A single observation was dropped for an Arizona hospital in 2015 that reported $30 Billion in Medicaid revenue which was three times the total medicaid claims expenditure reported through our Medicaid expenditure data source for fiscal year 2015. There are other instances of missing data from the cost reports are addressed in later sections, in total 697 observations were dropped. There are a great deal more values that have zero values which are unlikely including 98 observations that report Medicaid revenue, but no Medicaid costs. More importantly there are 1,899 observations that report no Medicaid days, but non-zero Medicaid revenue. This will limit the validity of the estimates adjusted for patient volume, and overall these missing and potentially incomplete cost reports are troublesome for the overall validity of the cost report data in this paper and will serve as a considerable limitation.

The other primary data source is CMS form 64 from the Medicaid Budget and Expenditure System (MBES). These forms are used by state Medicaid programs to report expenses of the Medical assistance program quarterly. The data set, available through the CMS website, summarizes this data by fiscal year, and includes the amounts matched by the Federal Government through the FMAP program. The federal government does provide matching for Administrative costs, but at a fixed rate of 50% for all states in the U.S. so the combined federal and state amounts will be used. Two categories of interest will be used from this data, the total amount of administrative spending and the combined spending spent specifically on MMIS through both contracted and non-contracted work. MMIS is the Medicaid Management Information System and is used by state governments for claim processing along with recipient eligibility and a number of other claim related functions. This may be a strong target for policy implications as this technology has a great impact on the ability of both Medicaid and hospital administrators to manage the billing process complexity. Finally we will also use total monthly enrollment data for Medicaid recipients to adjust these measures by the size of the program.

# 4 Methods

We will use several hospital level control variables in our models, the first and potentially most important will be uncompensated care. Inclusion of the level of uncompensated care controls for a few different effects, hospitals with higher levels of uncompensated care, holding size constant, will typically have a higher portion of low income and uninsured patients. The level of uncompensated care has also been shown to be negatively correlated with the share of Medicaid patients (Dranove et al., 2016) (DeLeire et al., 2014). In addition, a higher level of uncompensated care also creates an increased administrative burden of collection from patients. These administrative activities are targeted at patients and are not considered BIR activities but have some overlapping resources and effect a hospitals decision to pay for administrative resources for BIR activity or allowing claims to go unpaid. This means that uncompensated care is expected to be positively correlated with both administrative costs and negatively coorelated with Medicaid unpaid costs through Medicaid patient share.

Next we will also include a categorical variable for revenue size, one for each 20th percentile. Figure 2 below was calculated by adjusting the level of administrative spending and unpaid costs by the level of reported Medicaid and Medicare days using the 2019 cost report. There appears to be significantly decreasing costs per visit with increasing scale.

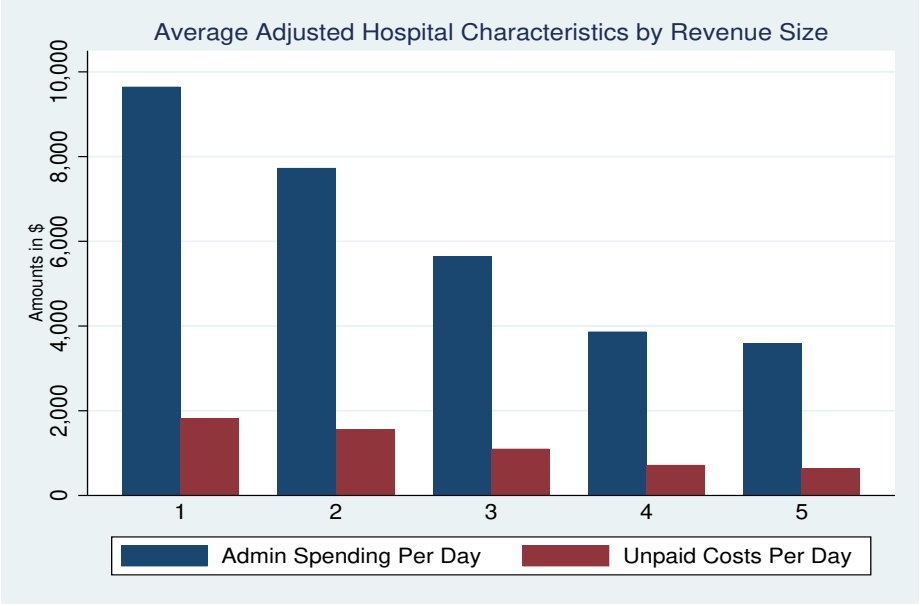


Figure 2: Average Adjusted Hospital Characteristics by Revenue Size in 2019

In total there were 474 observations (less than 1% of the sample) that had a zero value for total revenue, these are most likely errors and were dropped from the dataset. A dummy variable will also be included to indicate if the Hospital is in a rural or urban county. This data is based off Rural Urban Commuting Area codes from the 2010 USDA designation, where Urban is defined as any zip-code with a "Metropolitan Area" designation. There were 220 observations that contained a zip code that was not given a RUCA code in the 2010 Census, those observations were also dropped. The final control variable will be one for type of hospital control: non-profit, government-owned, or private owned. The non-profit will be the ommitted reference group as the majority of hospitals are non-profit. These controls are in line with the key co-variates with administrative costs in McKay et al. (2008).

The only state level control that will be utilized is the FMAP percentage for the reasons previously discussed. The data for FMAP percentages were provided by the Kaiser Family Foundation website. There were some other potentially relevant demographic co-variates with Medicaid Administrative spending that were mentioned in Balio (2020), but the additional hospital level controls should cover many of these demographic effects. Dummy variables by fiscal year will also be included with omitted reference group being 2015. State fixed effects will not be necessary as the Medicaid administrative spending and FMAP percentage are observed at the state level and does not vary at the state level within the same year, so state effects will be omitted avoid multi-collinearity issues.

The first two models will be an OLS regression of the following form:

$$A_{ijt} = \beta_0 + \beta_1 M_{jt} + \beta_2 U_{ijt} + \beta_3 C_{ijt} + \epsilon_{it}$$

Where $A_{ijt}$ is the level of hospital administrative costs for hospital $i$, in state $j$, and fiscal year $t$. The term $M_{jt}$ will be the level of Medicaid administrative spending in state $j$ and fiscal year $t$. The model will be run twice, once with the total level of administrative spending and once with the level of administrative spending specifically on MMIS. Finally $C_{ijt}$ represents the vector of state and hospital level controls that have been previously discussed.

The next two models will be similar OLS regressions of the form:

$$U_{ijt} = \beta_0 + \beta_1 M_{jt} + \beta_2 U_{ijt} + \beta_3 C_{ijt} + \epsilon_{it}$$

Where the only significant change from above is that dependent variable is now the level of Unpaid Medicaid costs for hospital $i$, in state $j$, and fiscal year $t$. Again this will be run both for the level of total administrative spending and spending specifically on MMIS.

The above models will be then be repeated using the log of each variable of interest, both types of Medicaid administrative spending, both dependent variables, and uncompensated care. This is done as it produces a more qualified interpretation. All of our models will use robust standard errors, because our explanatory variables are at the state level. This is because there are states with relatively low numbers of Medicaid enrollees, either because they are a small

state or a state that has not expanded Medicaid program. Those states are likely to have less variation in outcomes than a large state or an expansion state. These differences in variation mean that there is likely heteroskedasicity in the data, which makes the robust standard errors necessary. The previous literature also used per enrollee Medicaid Administrative costs, so the same regressons will be run using per enrollee spending. The data for Medicaid enrollment is monthly, and will be averaged over the corresponding year.

The issue with the per-enrollee adjustment method for this study is that it does not isolate hospital utilization by Medicaid recipients. Even with a high number of recipients, if there is little hospital utilization, then it those resources may be going toward administrative tasks unrelated to hospitals. Data for the amount of Medicaid days will be used to account for this utilization by adjusting the variables hospital unpaid costs, uncompensated care, and administrative costs by the hospital's level of medicaid days. The Medicaid administrative spending will then be adjusted by the total number of medicaid days in that state and fiscal year. This, however, will create a separate issue. There 2095 observations that have no recorded Medicaid days, this again in spite of the fact that 1,899 of those observations are reporting positive Medicaid revenue which leads us to conclude that most of these missing observations are due to the fact that the cost reports were not correctly filled out. Because this is about 9% of the sample, these adjusted models will run again using the two-step Heckman model.

Our targeted first stage sample selection equation has the following form:

$$Z_i = R_i + O_i + M_i + u_i$$

Where $Z_i$ is the latent selection variable in this case representing a combined outcome of either in-completion of the cost report form or no actual Medicaid days. There are several key explanatory variables that will be used in the estimation of the selection model. The first is revenue size, $R_i$. Table 3 shows that there appears to be a disproportionate amount of hospitals in the first 20 percentile range that do not report medicaid days. This is likely due to these hospitals either being more likely to not see any Medicaid patients or being more likely to incorrectly complete the cost report due to administrative scale issues previously discussed. The next explanatory variable, $O_i$, will be a dummy to measure if they have zero amounts for other key variables including total administrative spending (after salaries category adjustment), medicare days, uncompensated care, and reimbursable Medicare bad debt. This variable will be a proxy to estimate the likelihood that the zero days is due to incompletion of the cost report. The final explanatory variable, $M_i$ is a dummy indicating if the hospital also reported zero medicaid revenue and zero medicaid costs which would represent the likelihood that this value is missing because they did not see any medicaid patients. Tables 4 and 5 show the frequency of these dummies with those hospitals that have reported zero Medicaid days.

Since this is the two step method, we will estimate:

$$P(z_i* > 0) = \Phi(\gamma w_i)$$

where $w_i$ is a vector of the explanatory variables mentioned above. This will be used to calculate the estimation term $\hat{\lambda_i}$:

$$\hat{\lambda_i} = \phi(\hat{\gamma})/\Phi(\hat{\gamma} w_i)$$

And following Heckman's methodology, this selection term will be included in the same regression equation that has been used previously:

$$U_{ijt} = \beta_0 + \beta_1 M_{jt} + \beta_2 U_{ijt} + \beta_3 C_{ijt} + \hat{\lambda_i} + \epsilon_{it}$$

$$A_{ijt} = \beta_0 + \beta_1 M_{jt} + \beta_2 U_{ijt} + \beta_3 C_{ijt} + \hat{\lambda_i} + \epsilon_{it}$$

# 5 Results

The fully controlled OLS regression using total Medicaid spending and the level of hospital administrative spending with no adjustments was not statistically significant, but was significant for unpaid Medicaid costs. The results for the latter suggest as an additional dollar in Medicaid administrative spending would increase hospital level administrative spending by less a cent. Full results for the unadjusted total Medicaid administration are in Table 6. In the unadjusted models, MMIS spending had greater magnitude of negative returns, that a 1 dollar increase in spending in this area would lead to an increase of 4 cent increase in administrative costs and a one cent increase in unpaid Medicaid costs. Both results are statistically significant, full results in Table 7. Ultimately, the magnitude these results are difficult to interpret due to the different levels of spending between the state government and and individual hospitals.

The log adjusted equations will rectify this issue by putting the results into the context of percentage changes. The log-adjusted hospital administration coefficient was statistically significant at the 99% level, and was negatively correlated. This suggests that a 1% increase in Medicaid administrative spending would decrease hospital administrative costs by .05%. According to these results, if total state administrative spending increased about $293 million in 2019 then the total administrative costs for hospitals nationwide would decrease by $72 million. The results also show MMIS spending as statistically significant and negatively correlated as a 1% increase in spending on this technology reduces administrative spending at the hospital level by .016%. This suggests far more effective returns, however, since the average state in 2019 would need to spend $184,000 to reduce the average hospital administrative costs by $33,000. If total state spending on MMIS increased by 1%, $9.4 million in 2019, then our model predicts that the total administrative costs for Hospitals would decrease by $23.1 million. The full results for administrative spending can be found in Table 8.

Despite the clear returns indicated above toward administrative spending, the returns to unpaid Medicaid costs were positive meaning more administrative spending would increase unpaid costs and by a non-negligible magnitude. Continuing the 2019 examples, a 1% increase for all state's total medicaid administrative spending, $293 million, would increase Hospital unpaid costs by .189% which would be $65.9 million in total unpaid Medicaid costs for U.S. hospitals. The coefficient for spending specifically on MMIS was also significant and positive. The same $9.4 million spent on MMIS from the last example would also increase unpaid costs by $5.8 million. Full results for Unpaid costs can be found in Table 9.

When adjusted per enrollee, however, the signs on the coefficients flip and indicate that increased administrative spending per enrollee increases total hospital administrative costs by .26% and decreases total unpaid Medicaid costs by .158%. These results suggest that the previous effects were primarily a result of the overall size of the Medicaid program, as the program gets larger and thus has more Medicaid administrative costs then administrative costs decrease and unpaid costs increase. The adjusted model predicts, however, that as a Medicaid program becomes more administratively intensive relative to its size, then hospital administrative costs will increase and unpaid costs will decrease. The results of the per-enrollee adjusted model can be found in Table 10.

Finally, the adjustment for hospital utilization appears to result in coefficients to be positive for both unpaid costs and administrative costs. Once both scale of the program and utilization of hospital services are taken into account, then the impact of increases in the state programs administrative spending will result in increases in both unpaid costs and administrative costs. This result is difficult to understand. It's possible that the benefits observed in reducing unpaid costs from increased per-enrollee spending comes from states where there is relatively lower levels of utilization among its enrollees. States and hospitals likely are making administrative decisions based on expectations for the future levels of utilization, and when they over-estimate the administrative need, the surplus of resources can are used to solve unpaid claim problems. Since neither Medicaid or the Hospitals have much control over utilization, this effect could also be due to randomness. This model may be improved by using the lag of patient days, since past utilization would better reflect the information they are using to make their decisions. It also may be better utilized as a separate control variable rather than as an adjustment on the dependent and independent variable because of the randomness that can be associated with it.

It's also worth noting that the Heckman selection term was statistically significant here, so there was some selection bias in OLS. The coefficients on the Medicaid spending variables suggest that this may be a slight downward bias on both estimates for both outcomes, but does not appear to be of great magnitude. Full results for the utilization adjusted administrative spending model can be found in Table 11 and the unpaid costs model can be found in Table 12.

# 6 Conclusions

Our results provide evidence of the trade off between increasing Administrative costs allowing the costs to go unpaid that faces U.S. hospitals and that Medicaid programs a similarly difficult policy trade-off. The flipping of signs from the unadjusted models to the model adjusted per enrollee is particularly interesting and could have several possible explanations.

The first model's results indicated that Hospitals in states that have Medicaid programs that are large in administrative scale are likely to have greater levels of unpaid costs. Likely this is at least partially through the effect of simply having more Medicaid patients at their facilities, but it is more difficult to understand why hospitals in these states would also have reduced administrative costs if patient volume was the driving factor. Previous studies have suggested that there is a benefit of larger Medicaid programs to Hospital uncompensated care, but since we are controlling for that effect in these models, that cannot be the source. What these results may suggest is that as the scale of the Medicaid program's administration increases, hospitals are more likely to substitute toward increasing unpaid costs rather than increasing resources toward billing insurance related activities. This would make sense if the productivity of those administrative resources was less efficient in states with large scale Medicaid administration who might have more complex billing systems and processes. As more resources are then directed at administration holding the scale of the overall program constant, hospitals begin to substitute back towards increasing administrative resources over letting the costs go unpaid, potentially because this increased spending begins to make BIR activities more productive.

Another possible explanation is that there is an omitted variable bias in these results: the complexity of a states billing requirements and monitoring efforts. It is possible that states with more stringent and difficult requirements increases both the level of spending required by the state to administer the program as well as the cost impact on hospitals as they need to keep up with the requirements. The complexity of these requirements would also have a very relevant impact on the productivity of the administrative resources. Although difficult to do in practice, a future version of this model could benefit by controlling for the level of difficulty in the state's billing processes.

From our results, it also appears that spending on specifically on MMIS technology is far more cost effective than increasing overall spending in the unadjusted model. On a per-enrollee basis, however, both effects were positive. Ultimately, this again may be an issue of reverse causality with the omission of billing complexity. Since more complex billing processes also would require a great deal more resources directed to implementation and maintenance of a billing system that could handle them. It is also possible that these results indicate that there are some crowding-out effects as states potentially have a fixed amount of spending to direct toward Medicaid administration and by increasing resources used on MMIS then other resources valuable to hospital's BIR tasks are subsequently reduced.

Ultimately, the implications of this analysis for the policy maker is mixed.

The results do suggest that if the intended goal of a program is decrease the amount unpaid costs and increase administrative resources at hospitals, then the key would to be to increase the productivity of those administrative resources by either reducing the complexity of billing requirements or increasing administrative spending. It does appear that perhaps in the absence of crowding out effects that increases in administrative spending should be directed towards spending on technology, as there is greater cost effectiveness from those services.

Perhaps the key result from this paper is that it shows that the level of these costs are of concerning magnitude. Directing $150 billion a year towards something that can be considered transaction cost could be a major source of waste in the healthcare industry. Considering that the estimates in this paper are expected to be under-estimates for the actual level of BIR activities and including an additional $ 30 billion a year in unpaid Medicaid costs adds to the case that this problem should likely receive more attention from researchers and policy makers. Much of the previous literature and the past policy discussion has primarily revolved around reducing the level of uncompensated care. This was a primary goal of the ACA which has since received credit for achieving advances in reducing the unpaid cost burden. This analysis shows that uncompensated care is a relatively small amount of waste compared to BIR costs and unpaid Medicaid costs. This difference in magnitude could be attributed to the fact that the data used in this paper is post-ACA, but if the gains made in uncompensated care came at the price of increased cost deficits from serving more Medicaid patients, then the efficacy of these reductions in uncompensated care should be reconsidered. Future research in review of the effectiveness of the ACA would benefit from also considering the impact on these other sources of waste, especially with respect to the Medicaid expansion.

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# 7 Appendix

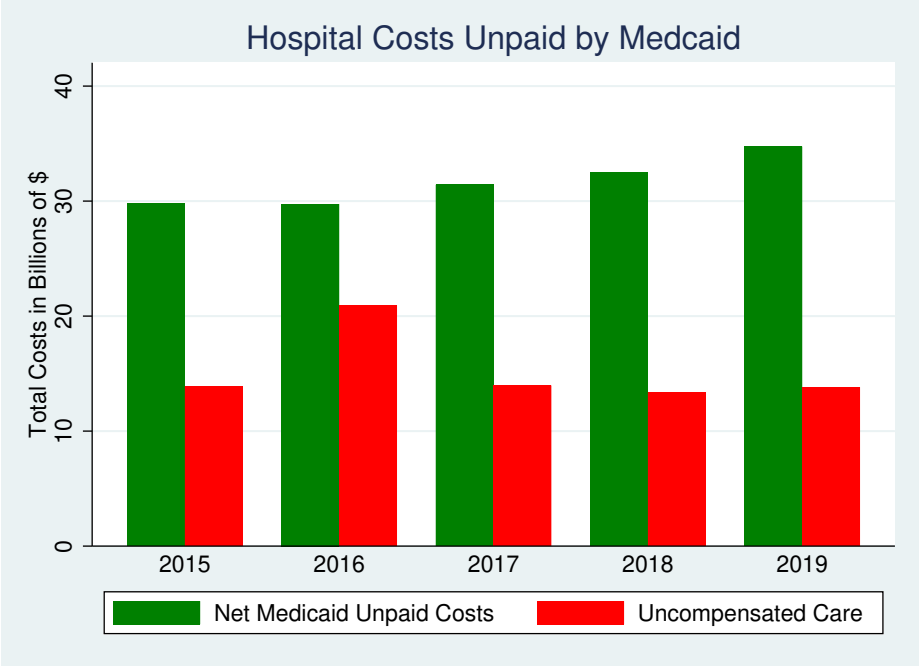


Figure 3: Total Hospital Unpaid Costs by Fiscal Year

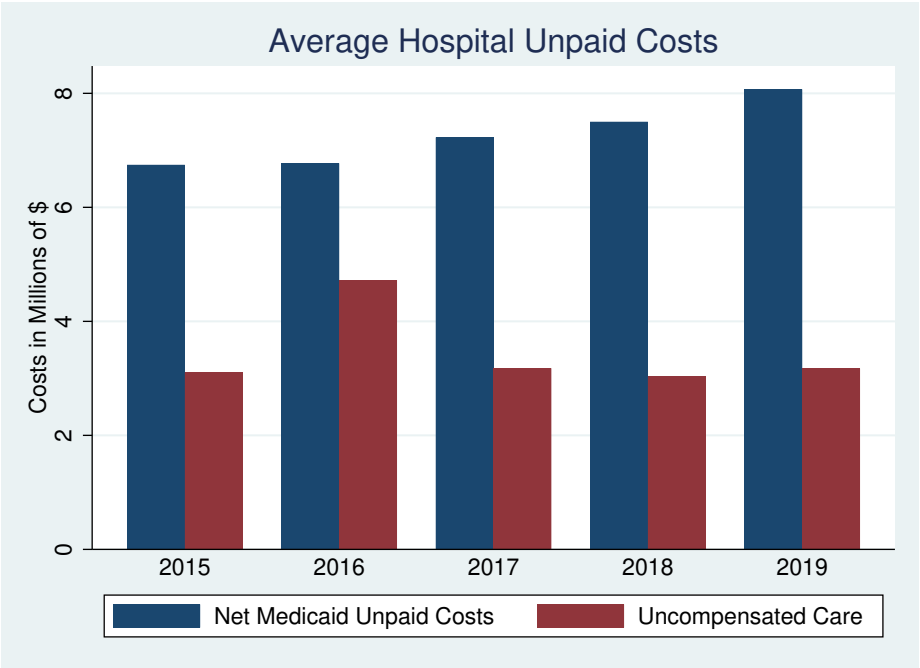


Figure 4: Average Hospital Unpaid Costs by Fiscal year

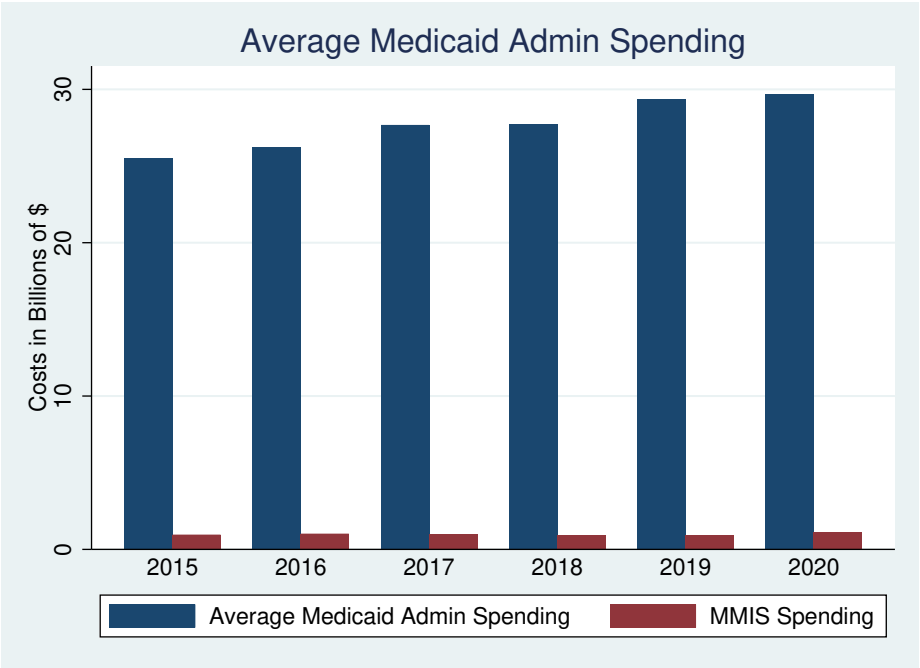


Figure 5: Medicaid Administrative Spending

Table 1: Summary of Hospital Characteristics by Fiscal Year

| | Mean | Total | SD | Min | Max | N |
|---|---|---|---|---|---|---|
| 2015 | | | | | | |
| Total Admin Costs (millions) | 27.54 | 123,138.73 | 46.80 | -0.00 | 666.45 | 4,472 |
| Net Unpaid Costs (millions) | 6.66 | 29,763.04 | 23.56 | -142.27 | 409.81 | 4,472 |
| Medicaid Days (hundreds) | 24.79 | 110,858.16 | 55.33 | 0.00 | 833.38 | 4,472 |
| Uncompensated Care (millions) | 3.11 | 13,904.32 | 6.28 | -0.30 | 185.44 | 4,472 |
| 2016 | | | | | | |
| Total Admin Costs (millions) | 28.85 | 128,364.77 | 49.73 | -0.00 | 752.01 | 4,449 |
| Net Unpaid Costs (millions) | 6.69 | 29,741.83 | 35.66 | -1,567.03 | 509.87 | 4,449 |
| Medicaid Days (hundreds) | 23.13 | 102,908.40 | 54.31 | 0.00 | 860.68 | 4,449 |
| Uncompensated Care (millions) | 4.71 | 20,946.65 | 100.58 | -0.50 | 6,696.99 | 4,449 |
| 2017 | | | | | | |
| Total Admin Costs (millions) | 29.89 | 131,663.93 | 52.46 | 0.00 | 799.52 | 4,405 |
| Net Unpaid Costs (millions) | 7.13 | 31,422.24 | 27.16 | -592.18 | 427.10 | 4,405 |
| medicaiddays2 | 22.56 | 99,385.61 | 54.46 | 0.00 | 841.56 | 4,405 |
| CMSuncompensatedcare2 | 3.17 | 13,969.32 | 6.53 | -0.03 | 130.97 | 4,405 |
| 2018 | | | | | | |
| Total Admin Costs (millions) | 31.24 | 137,502.11 | 55.53 | 0.00 | 766.41 | 4,402 |
| Net Unpaid Costs (millions) | 7.37 | 32,458.08 | 29.24 | -879.70 | 448.81 | 4,402 |
| medicaiddays2 | 21.36 | 94,016.85 | 53.81 | 0.00 | 854.76 | 4,402 |
| CMSuncompensatedcare2 | 3.04 | 13,389.70 | 5.97 | -0.11 | 124.09 | 4,402 |
| 2019 | | | | | | |
| Total Admin Costs (millions) | 33.06 | 144,174.83 | 60.37 | 0.00 | 850.46 | 4,361 |
| Net Unpaid Costs (millions) | 7.97 | 34,742.55 | 35.45 | -897.67 | 641.72 | 4,361 |
| medicaiddays2 | 21.33 | 93,029.03 | 53.13 | 0.00 | 890.35 | 4,361 |
| CMSuncompensatedcare2 | 3.17 | 13,826.20 | 6.58 | 0.00 | 196.59 | 4,361 |
| Total | | | | | | |
| Total Admin Costs (millions) | 30.10 | 664,844.37 | 53.18 | -0.00 | 850.46 | 22,089 |
| Net Unpaid Costs (millions) | 7.16 | 158,127.73 | 30.57 | -1,567.03 | 641.72 | 22,089 |
| Medicaid Days (hundreds) | 22.64 | 500,198.05 | 54.23 | 0.00 | 890.35 | 22,089 |
| Uncompensated Care (millions) | 3.44 | 76,036.19 | 45.49 | -0.50 | 6,696.99 | 22,089 |

Table 2: Summary of State Characteristics

| | Mean | Total | SD | Min | Max | N |
|---|---|---|---|---|---|---|
| 2015 | | | | | | |
| Total Admin Spending (millions) | 500.09 | 25,504.83 | 813.70 | 33.46 | 5,630.96 | 51 |
| MMIS Spending (millions) | 18.91 | 964.27 | 29.36 | 0.57 | 179.62 | 51 |
| Total Hospital Medicaid Days (Thousands) | 217.37 | 11,085.82 | 250.71 | 12.05 | 1,440.80 | 51 |
| 2016 | | | | | | |
| Total Admin Spending (millions) | 514.25 | 26,226.55 | 804.42 | 43.07 | 5,519.67 | 51 |
| MMIS Spending (millions) | 20.15 | 1,027.58 | 23.27 | 0.39 | 114.99 | 51 |
| Total Hospital Medicaid Days (Thousands) | 201.78 | 10,290.84 | 226.37 | 10.84 | 1,277.19 | 51 |
| 2017 | | | | | | |
| Total Admin Spending (millions) | 542.76 | 27,680.65 | 867.24 | 51.57 | 5,929.73 | 51 |
| MMIS Spending (millions) | 19.39 | 989.08 | 21.15 | 0.00 | 101.61 | 51 |
| Total Hospital Medicaid Days (Thousands) | 194.87 | 9,938.56 | 211.34 | 9.28 | 1,159.39 | 51 |
| 2018 | | | | | | |
| Total Admin Spending (millions) | 543.42 | 27,714.49 | 844.01 | 48.49 | 5,737.88 | 51 |
| MMIS Spending (millions) | 18.29 | 933.00 | 20.77 | 0.24 | 102.08 | 51 |
| Total Hospital Medicaid Days (Thousands) | 184.35 | 9,401.69 | 186.99 | 10.22 | 891.01 | 51 |
| 2019 | | | | | | |
| Total Admin Spending (millions) | 575.86 | 29,368.81 | 912.30 | 50.34 | 6,243.26 | 51 |
| MMIS Spending (millions) | 18.35 | 935.91 | 17.82 | 0.00 | 90.11 | 51 |
| Total Hospital Medicaid Days (Thousands) | 182.41 | 9,302.90 | 191.95 | 9.64 | 972.89 | 51 |
| Total | | | | | | |
| Total Admin Spending (millions) | 535.28 | 136,495.33 | 842.93 | 33.46 | 6,243.26 | 255 |
| MMIS Spending (millions) | 19.02 | 4,849.85 | 22.63 | 0.00 | 179.62 | 255 |
| Total Hospital Medicaid Days (Thousands) | 196.16 | 50,019.81 | 213.43 | 9.28 | 1,440.80 | 255 |

Table 3: Frequency of Missing Medicaid Days by Revenue Size

| | (Revnue Size Percentile Ranking) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Not Missing Medicaid Days | 2937 | 4001 | 4171 | 4442 | 4443 | 19994 |
| Missing Medicaid Days | 1089 | 423 | 322 | 126 | 135 | 2095 |
| Total | 4026 | 4424 | 4493 | 4568 | 4578 | 22089 |

Table 4: Missing Other Medicaid Categories and Missing Medicaid Days

| | Not Missing Medicaid Days | Missing Medicaid Days | Total |
|---|---|---|---|
| Not Missing Other Medicaid Categories | 19789 | 1920 | 21709 |
| Missing Other Medicaid Categories | 205 | 175 | 380 |
| Total | 19994 | 2095 | 22089 |

Table 5: Missing Other Key Categories and Missing Medicaid Days

| | (1) | | |
|---|---|---|---|
| | Not Missing Medicaid Days | Missing Medicaid Days | Total |
| Not Missing Other Key Categories | 18277 | 1598 | 19875 |
| Missing Other Key Categories | 1717 | 497 | 2214 |
| Total | 19994 | 2095 | 22089 |

Table 6: Total Medicaid and Hospital Admin Spending

| | (1) | (2) | (3) |
|---|---|---|---|
| | Hospital Admin Costs | Hospital Admin Costs | Unpaid Medicaid Costs |
| Total Medicaid Admin | 0.000637** | -0.000281 | 0.00191*** |
| | (0.000273) | (0.000285) | (0.000318) |
| Uncompensated Care | 0.0377 | 0.0353 | 0.0229 |
| | (0.0372) | (0.0354) | (0.0227) |
| 2016.fiscalyear | 1224908.1 | 1232698.1 | -40086.6 |
| | (772576.8) | (769378.8) | (611089.5) |
| 2017.fiscalyear | 2205549.5*** | 2276950.6*** | 329977.7 |
| | (802809.7) | (799825.2) | (500854.2) |
| 2018.fiscalyear | 3614568.7*** | 3745962.0*** | 676616.1 |
| | (833108.0) | (830464.9) | (524604.1) |
| 2019.fiscalyear | 5403715.1*** | 5698366.3*** | 1232994.0** |
| | (889225.7) | (887130.2) | (598583.1) |
| 2.revenuesize | 3014404.4*** | 4960902.9*** | 2178100.3*** |
| | (82395.6) | (210537.4) | (215673.4) |
| 3.revenuesize | 10356975.5*** | 12769025.4*** | 4124065.1*** |
| | (191146.7) | (319972.1) | (313337.2) |
| 4.revenuesize | 28777562.7*** | 30025036.8*** | 9108220.0*** |
| | (347038.7) | (443576.3) | (543628.4) |
| 5.revenuesize | 90429434.5*** | 90905867.9*** | 21768533.1*** |
| | (1313477.2) | (1352431.7) | (867847.0) |
| urban | | 3822183.9*** | 1454676.0*** |
| | | (276217.4) | (237711.9) |
| for_profit | | -515144.9 | 1100093.1* |
| | | (719045.9) | (602867.5) |
| gov | | 8308388.4*** | 9563755.9*** |
| | | (928799.1) | (992891.6) |
| fmappercentage | | -29499874.4*** | -15332618.4*** |
| | | (3530702.6) | (2282718.8) |
| _cons | -528434.2 | 12876448.8*** | 2544119.7* |
| | (511480.9) | (2251135.8) | (1381733.0) |
| *N* | 22089 | 22089 | 22089 |
| r2 | 0.412 | 0.417 | 0.0966 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: MMIS Medicaid Spending and Hospital Admin Spending

| | (1) admintotal | (2) admintotal | (3) medicaidnet |
|---|---|---|---|
| MMISspend | 0.0386*** | 0.0387*** | 0.0962*** |
| | (0.0126) | (0.0126) | (0.00971) |
| CMSuncompensatedcare | 0.0374 | 0.0353 | 0.0222 |
| | (0.0370) | (0.0354) | (0.0222) |
| 2016.fiscalyear | 1388294.3* | 1383893.7* | 362821.1 |
| | (770285.1) | (767419.3) | (606936.5) |
| 2017.fiscalyear | 2427333.6*** | 2434725.4*** | 902375.3* |
| | (801253.0) | (798501.0) | (503121.6) |
| 2018.fiscalyear | 3986882.8*** | 4072225.4*** | 1655904.6*** |
| | (832722.7) | (830065.6) | (518652.5) |
| 2019.fiscalyear | 5753393.4*** | 5947477.3*** | 2220260.0*** |
| | (892287.2) | (889561.3) | (610651.5) |
| 2.revenuesize | 2933840.8*** | 4713210.4*** | 2213536.1*** |
| | (94475.6) | (211973.7) | (211866.9) |
| 3.revenuesize | 10329496.2*** | 12341265.5*** | 4227806.9*** |
| | (180334.0) | (316184.6) | (293585.1) |
| 4.revenuesize | 28791624.0*** | 29563210.3*** | 9133041.0*** |
| | (329834.9) | (441053.9) | (517083.9) |
| 5.revenuesize | 90634821.9*** | 90382680.8*** | 22171856.2*** |
| | (1288239.4) | (1332048.8) | (931527.3) |
| urban | | 3739115.3*** | 1914088.9*** |
| | | (267863.0) | (229128.8) |
| for_profit | | -519304.6 | 1021245.9* |
| | | (720145.6) | (602824.7) |
| gov | | 8239933.0*** | 10022933.3*** |
| | | (934799.3) | (988690.4) |
| fmappercentage | | -27486221.2*** | -28798846.4*** |
| | | (3483432.8) | (2680675.6) |
| _cons | -1080251.9* | 10711132.3*** | 9031312.7*** |
| | (552106.8) | (2160870.4) | (1523462.7) |
| $N$ | 22089 | 22089 | 22089 |
| r2 | 0.412 | 0.418 | 0.0987 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Log Medicaid Spending and Log Hospital Administrative Spending

| | (1) log(Hospital Admin) | (2) log(Hospital Admin) |
|---|---|---|
| log(Medicaid Admin) | -0.0517*** | |
| | (0.0117) | |
| log(MMIS Spending) | | -0.0168*** |
| | | (0.00446) |
| log(Uncompensated Care) | 0.114*** | 0.115*** |
| | (0.0121) | (0.0121) |
| 2016.fiscalyear | -0.00364 | -0.00429 |
| | (0.0384) | (0.0384) |
| 2017.fiscalyear | 0.0413 | 0.0335 |
| | (0.0376) | (0.0378) |
| 2018.fiscalyear | 0.0389 | 0.0332 |
| | (0.0404) | (0.0404) |
| 2019.fiscalyear | 0.0607 | 0.0497 |
| | (0.0412) | (0.0413) |
| 2.revenuesize | 0.808*** | 0.790*** |
| | (0.0389) | (0.0384) |
| 3.revenuesize | 1.572*** | 1.549*** |
| | (0.0410) | (0.0410) |
| 4.revenuesize | 2.334*** | 2.310*** |
| | (0.0505) | (0.0493) |
| 5.revenuesize | 3.143*** | 3.113*** |
| | (0.0610) | (0.0594) |
| urban | 0.0847*** | 0.0672** |
| | (0.0312) | (0.0309) |
| for_profit | -0.0371 | -0.0368 |
| | (0.0491) | (0.0491) |
| gov | 0.247*** | 0.235*** |
| | (0.0509) | (0.0506) |
| fmappercentage | -1.322*** | -1.077*** |
| | (0.187) | (0.168) |
| _cons | 14.58*** | 13.69*** |
| | (0.333) | (0.187) |
| $N$ | 22051 | 22051 |
| r2 | 0.287 | 0.287 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Log Medicaid Admin Spending and Log Net Unpaid Medicaid Costs

| | (1) log(Unpaid Costs) | (2) log(Unpaid Costs) |
|---|---|---|
| log(Medicaid Admin) | 0.154*** | |
| | (0.0204) | |
| log(MMIS Spending) | | 0.0576*** |
| | | (0.0113) |
| log(Uncompensated Care) | 0.517*** | 0.513*** |
| | (0.0252) | (0.0251) |
| 2016.fiscalyear | 0.0610 | 0.0627 |
| | (0.0471) | (0.0472) |
| 2017.fiscalyear | 0.114** | 0.137*** |
| | (0.0461) | (0.0460) |
| 2018.fiscalyear | 0.158*** | 0.178*** |
| | (0.0480) | (0.0479) |
| 2019.fiscalyear | 0.191*** | 0.224*** |
| | (0.0473) | (0.0471) |
| 2.revenuesize | 0.751*** | 0.800*** |
| | (0.0683) | (0.0666) |
| 3.revenuesize | 1.401*** | 1.468*** |
| | (0.0778) | (0.0760) |
| 4.revenuesize | 2.257*** | 2.323*** |
| | (0.0930) | (0.0905) |
| 5.revenuesize | 2.904*** | 2.989*** |
| | (0.107) | (0.104) |
| urban | -0.403*** | -0.350*** |
| | (0.0504) | (0.0510) |
| for_profit | -0.296*** | -0.297*** |
| | (0.0386) | (0.0388) |
| gov | -0.201*** | -0.171*** |
| | (0.0533) | (0.0533) |
| fmappercentage | -1.768*** | -2.484*** |
| | (0.216) | (0.201) |
| [1em] _cons | 4.025*** | 6.549*** |
| | (0.530) | (0.347) |
| $N$ | 18894 | 18894 |
| r2 | 0.416 | 0.415 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Log Medicaid Admin Spending per Enrollee and Log of Hospital Admin and Unpaid Costs

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | log(Hospital Admin) | Log(Unpaid) | log(Hospital Admin) | log(Unpaid) |
| log(Medicaid Admin) | 0.239*** | -0.268*** | | |
| | (0.0405) | (0.0471) | | |
| log(MMIS) | | | 0.0119 | 0.000686 |
| | | | (0.00828) | (0.0146) |
| log(Uncompensated) | 0.113*** | 0.518*** | 0.115*** | 0.511*** |
| | (0.0121) | (0.0251) | (0.0122) | (0.0253) |
| 2016.fiscalyear | -0.00549 | 0.0667 | -0.00548 | 0.0658 |
| | (0.0384) | (0.0472) | (0.0384) | (0.0473) |
| 2017.fiscalyear | 0.0271 | 0.138*** | 0.0375 | 0.132*** |
| | (0.0377) | (0.0462) | (0.0379) | (0.0462) |
| 2018.fiscalyear | 0.0200 | 0.188*** | 0.0363 | 0.171*** |
| | (0.0405) | (0.0481) | (0.0404) | (0.0480) |
| 2019.fiscalyear | 0.0264 | 0.244*** | 0.0471 | 0.223*** |
| | (0.0412) | (0.0477) | (0.0417) | (0.0471) |
| 2.revenuesize | 0.802*** | 0.799*** | 0.787*** | 0.825*** |
| | (0.0390) | (0.0668) | (0.0394) | (0.0672) |
| 3.revenuesize | 1.558*** | 1.476*** | 1.546*** | 1.514*** |
| | (0.0414) | (0.0756) | (0.0415) | (0.0760) |
| 4.revenuesize | 2.322*** | 2.329*** | 2.304*** | 2.362*** |
| | (0.0496) | (0.0906) | (0.0496) | (0.0914) |
| 5.revenuesize | 3.134*** | 2.979*** | 3.110*** | 3.030*** |
| | (0.0601) | (0.105) | (0.0603) | (0.106) |
| urban | 0.0867*** | -0.371*** | 0.0721** | -0.356*** |
| | (0.0308) | (0.0509) | (0.0317) | (0.0507) |
| for_profit | -0.0316 | -0.305*** | -0.0355 | -0.295*** |
| | (0.0492) | (0.0388) | (0.0494) | (0.0389) |
| gov | 0.252*** | -0.192*** | 0.244*** | -0.179*** |
| | (0.0507) | (0.0532) | (0.0512) | (0.0539) |
| fmappercentage | -0.593*** | -3.109*** | -1.098*** | -2.538*** |
| | (0.183) | (0.220) | (0.173) | (0.202) |
| [1em] _cons | 11.50*** | 9.656*** | 13.40*** | 7.527*** |
| | (0.367) | (0.474) | (0.176) | (0.308) |
| $N$ | 22051 | 18894 | 21896 | 18777 |
| r2 | 0.288 | 0.415 | 0.285 | 0.414 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Medicaid Admin Spending per Day and Hospital Administrative Spending per Day

| | (1) admintotal_adj | (2) admintotal_adj | (3) logadm_adj | (4) logadm_adj |
|---|---|---|---|---|
| main | | | | |
| stateadmin_adj | 19.59*** | 19.63*** | | |
| | (3.160) | (1.958) | | |
| uncomp_adj | 0.0865 | 0.0865*** | | |
| | (0.0867) | (0.00642) | | |
| logstate_adj | | | 0.368*** | 0.370*** |
| | | | (0.0102) | (0.0105) |
| loguncomp_adj | | | 0.693*** | 0.693*** |
| | | | (0.00639) | (0.00464) |
| 2016.fiscalyear | 15738.3 | 16497.0 | 0.00388 | 0.0100 |
| | (14585.0) | (13831.2) | (0.0196) | (0.0200) |
| 2017.fiscalyear | 10445.3 | 11797.3 | 0.0146 | 0.0233 |
| | (11861.1) | (13947.9) | (0.0197) | (0.0202) |
| 2018.fiscalyear | 33825.4** | 35204.4** | 0.0976*** | 0.107*** |
| | (13985.7) | (14087.9) | (0.0202) | (0.0204) |
| 2019.fiscalyear | 43858.3*** | 44923.6*** | 0.104*** | 0.113*** |
| | (13297.9) | (14190.4) | (0.0203) | (0.0205) |
| 2.revenuesize | -71050.6*** | -11917.5 | -0.214*** | -0.0630** |
| | (12276.3) | (26473.6) | (0.0239) | (0.0296) |
| 3.revenuesize | -132421.2*** | -64536.1** | -0.330*** | -0.157*** |
| | (14158.4) | (29414.6) | (0.0270) | (0.0324) |
| 4.revenuesize | -255123.2*** | -170075.6*** | -0.311*** | -0.0987*** |
| | (17717.2) | (35531.8) | (0.0305) | (0.0378) |
| 5.revenuesize | -317850.5*** | -233368.7*** | -0.216*** | -0.00575 |
| | (16579.6) | (35733.6) | (0.0332) | (0.0390) |
| urban | 110068.0*** | 109107.4*** | 0.130*** | 0.127*** |
| | (13989.6) | (11867.9) | (0.0189) | (0.0171) |
| for_profit | 28274.7*** | 27407.5** | -0.155*** | -0.160*** |
| | (9929.5) | (13774.4) | (0.0200) | (0.0200) |
| gov | -3345.3 | -4468.7 | -0.485*** | -0.491*** |
| | (10382.8) | (16564.7) | (0.0237) | (0.0240) |
| fmappercentage | -14023.4 | -3284.8 | -1.077*** | -1.006*** |
| | (53317.3) | (58055.4) | (0.0862) | (0.0876) |
| _cons | 147458.1*** | 41949.4 | 2.725*** | 2.405*** |
| | (35081.1) | (55682.6) | (0.107) | (0.116) |
| / | | | | |
| mills | | 222944.4*** | | 0.574*** |
| | | (80785.0) | | (0.0696) |
| $N$ | 19994 | 22089 | 19622 | 21954 |
| r2 | 0.0340 | | 0.653 | |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Medicaid Admin Spending per Day and Hospital Admin/Unpaid Costs per Day

| | (1) unpaid_adj | (2) unpaid_adj | (3) logunpaid_adj | (4) logunpaid_adj |
|---|---|---|---|---|
| main | | | | |
| stateadmin_adj | 6.260*** | 6.250*** | | |
| | (1.089) | (0.715) | | |
| uncomp_adj | 0.0192 | 0.0192*** | | |
| | (0.0189) | (0.00235) | | |
| 2016.fiscalyear | 3549.0 | 3372.4 | 0.0533* | 0.0510* |
| | (6575.9) | (5052.0) | (0.0286) | (0.0283) |
| 2017.fiscalyear | -2664.8 | -2979.6 | 0.0940*** | 0.0908*** |
| | (5177.8) | (5094.3) | (0.0284) | (0.0285) |
| 2018.fiscalyear | 1617.1 | 1296.1 | 0.154*** | 0.151*** |
| | (5473.5) | (5145.5) | (0.0291) | (0.0287) |
| 2019.fiscalyear | 2871.1 | 2623.1 | 0.198*** | 0.195*** |
| | (5523.8) | (5183.0) | (0.0292) | (0.0289) |
| 2.revenuesize | -13495.6* | -27261.6*** | -0.00428 | -0.0659 |
| | (7025.2) | (9670.7) | (0.0361) | (0.0444) |
| 3.revenuesize | -35068.6*** | -50871.9*** | -0.170*** | -0.251*** |
| | (8448.8) | (10747.5) | (0.0385) | (0.0523) |
| 4.revenuesize | -49428.5*** | -69227.2*** | -0.340*** | -0.456*** |
| | (10079.4) | (12985.6) | (0.0431) | (0.0684) |
| 5.revenuesize | -58722.1*** | -78389.1*** | -0.313*** | -0.432*** |
| | (10710.3) | (13059.2) | (0.0460) | (0.0713) |
| urban | 12782.2** | 13005.8*** | 0.134*** | 0.135*** |
| | (5547.3) | (4336.6) | (0.0257) | (0.0248) |
| for_profit | 6025.0* | 6226.9 | -0.159*** | -0.158*** |
| | (3177.9) | (5024.4) | (0.0255) | (0.0277) |
| gov | 408.4 | 669.9 | -0.355*** | -0.353*** |
| | (4079.4) | (6050.3) | (0.0334) | (0.0338) |
| fmappercentage | 6507.7 | 4007.8 | -2.287*** | -2.304*** |
| | (19282.5) | (21205.1) | (0.134) | (0.127) |
| logstate_adj | | | 0.492*** | 0.491*** |
| | | | (0.0150) | (0.0149) |
| loguncomp_adj | | | 0.590*** | 0.591*** |
| | | | (0.00834) | (0.00666) |
| _cons | 25616.0** | 50178.0** | 1.689*** | 1.910*** |
| | (12730.3) | (20355.3) | (0.158) | (0.190) |
| / | | | | |
| mills | | -51900.5* | | -0.330** |
| | | (29576.6) | | (0.160) |
| $N$ | 19994 | 22089 | 16777 | 22027 |
| r2 | 0.0131 | | 0.495 | |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$