Too small to fail: The role of Medicaid in mitigating pandemic-related fiscal strain on local governments

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Abstract
Local governments across the United States have had a prominent role in financing the pandemic response during the ongoing COVID-19 outbreak and economic recession. Yet, such governments are increasingly facing budgetary strain as sources of tax revenue evaporate. If the financial burden on such governments can be eased, they may better address those aspects of pandemic response to which they are uniquely suited, such as coordinating resources and re-allocating space within their communities. This paper investigates the role of Medicaid, traditionally the default insurer of the unemployed, as a stabilizing force on local government budgets. Using panel data from county governments during the Great Recession (2006–2012), we estimate the effect of state Medicaid generosity on public finances. We find that Medicaid mitigates the effect of unemployment shocks on county government expenditures, specifically safety-net programs and debt. We apply these point estimates to extrapolate predictions based on contemporary state Medicaid generosity and local unemployment rates. In this way, we show that Medicaid continues to mitigate the financial strain on local government during the COVID-19 pandemic.

Applications For Practice
• Local governments contribute heavily to hospital, health, and welfare services in the United States, and are an important implementor of pandemic policies.
• As the pandemic spreads, local governments incur additional expenditures in a time of depressed revenue.
• Often, the debate around Medicaid financing is framed around federal and state government budgets. However,
local governments support the safety-net for indigent residents by assuming a substantial role in the finance and delivery of health care and will likely benefit from this relief.

- Our findings indicate higher Medicaid generosity reduces the downstream economic strain on local governments emanating from labor market shocks.
- State and federal policy may establish grants to aid local governments during the pandemic, such as in the CARES Act of 2020. However, we establish that the Medicaid program is itself a channel by which state and federal governments can support local governments.

INTRODUCTION

Public health policy during the COVID-19 pandemic has overall sought to encourage people to work from home if possible, stop working if not, and take care of their health (Holpuch, 2020). With more than half of Americans receiving insurance through an employer, rising unemployment due to policy guidance for COVID-19 highlights the Medicaid program as a social safety-net that complements this policy goal. During recessions, Medicaid is difficult for state governments to properly budget for, as they must reconcile increased expenditures with diminished revenues. State policymakers faced with economic downturns may overlook fiscal externalities that accrue outside the state budget. Meanwhile, local governments are supporting the same public as they did pre-recession, with an increasingly limited ability to run deficits (Epple & Spatt, 1986; Kioko & Zhang, 2019). Relieving fiscal stress on local governments is crucial to the country's decentralized response to pandemics: "on the ground" local policies to contain COVID-19 are extremely expensive for local governments, as they range from cancelling large revenue-generating public events to financing testing centers and isolation shelters. Indeed, across the United States (U.S.), local governments are projecting budget shortfalls with limited ability to rapidly adjust to the financial stress without major adjustments to their budgets (Simon & Sullivan, 2020).

In this study, we use the Great Recession to draw inferences about the effects of Medicaid generosity in the presence of rising local unemployment. Medicaid acts as a safety-net insurer, which can stabilize local government finances during periods of high unemployment. This dynamic is particularly true in the post-Medicaid expansion period because more adults can qualify for the program based on income alone (see Figure 1). We present three aspects of local government financing: Expenditures by function, revenues by source, and debt by term length. After confirming our fiscal externality hypothesis that Medicaid generosity yielded intergovernmental savings for local governments during the Great Recession, we then apply these estimates to current Medicaid generosity and recent unemployment shocks driven by the COVID-19 pandemic. Our results demonstrate considerable geographic heterogeneity driven by state policy and local unemployment during the pandemic. They further provide state-specific representations of the current local government savings from state generosity in Medicaid.

Previous work has considered the long-term effects of Medicaid generosity on household finances (Allen et al., 2017), state finances (Cross-Call, 2018), and federal tax receipts (Wherry et al., 2018). Related work has focused on predicting program design as a function of state financial strain.

1Further examples of different local government-financed programs in response to the current pandemic can be found in Cohen and Madowitz (Cohen & Madowitz, 2020) and Perez and Ross (2020).
This paper, however, is the first to consider the fiscal externalities the Medicaid program provides to local governments. Because local governments are critical in pandemic management, the existence of such externalities is an important finding in its own right. To identify the key parameter of interest, we leverage geographic discontinuities in state policy by using adjacent-county pairs along state borders. To our knowledge, our study is the first application in the Medicaid-related literature. Our policy estimates and recent estimates of unemployment rates raise the profile of the Medicaid program as an existing channel through which state and federal policies can provide financial relief to local governments. Medicaid functions alongside other policy measures such as the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020 that establish direct grants to local governments.

The remainder of this paper proceeds as follows. The section “Background on local government and health care in pandemics and recessions” gives background on local government involvement in both pandemics and the broader health-care system. The section “Data and variables” discusses the data used in this paper and how the variables represent key concepts. The section “Empirical approach” details the empirical approach to identifying key parameters during the Great Recession and the subsequent estimates for the COVID predictions. The section “Results” presents the findings, followed by their Discussion and Conclusions.

BACKGROUND ON LOCAL GOVERNMENT AND HEALTH CARE IN PANDEMICS AND RECESSIONS

In addition to administering federal and state programs, local governments participate directly in the health-care sector both as third party payers and as patient-care providers. For instance, more than 800 local governments representing 100 million American residents reported expenditures on hospitals in recent years. Collectively, they outspt state governments by a
ratio of $3:$2 on hospitals (Perez et al., 2019). Apart from hospitals, local governments spend $90 billion a year in support of public health services, a 1:1 match with state spending. In welfare programs like TANF and EITC, local governments assist to varying degrees with registration through community outreach. They further offer a highly diverse range of direct welfare programs of their own, at a smaller scale than the state and federal government. For example, even the township governments common in the Midwest have direct cash assistance programs for household financial emergencies. Such programs exist to quickly cover bills for cars, phones, rent, and so on, and are targeted toward low-income individuals unlikely to qualify for other forms of public assistance (see Schott & Cho, 2011).

LOCAL GOVERNMENTS DURING PANDEMICS

As the pandemic spreads, local governments incur additional expenditures in a time of depressed revenue. Though far from exhaustive, we list below several key examples of local government’s function during a public health crisis and economic recession.

First, as mentioned above, local governments contribute heavily to hospitals, and the demand for that financing will likely increase. Local governments in many cases will be charged with extending hospital capacity to treat and test for coronavirus in ways that meet local needs. For instance, Denver residents can receive drive-thru testing (Hawkins, 2020); Lawrence, Massachusetts increased hospital capacity by moving beds to temporarily closed school buildings (Kirk, 2020). King County, Washington spent $4 million to house infected people who cannot be quarantined or are experiencing homelessness (Buch, 2020), while the county’s large employers and tourist attractions are losing their regular traffic, a source of revenue (Amihere et al., 2020). Local fire departments and governments run emergency transportation services, own hazmat suits, and have standing infectious disease protocols (Stone & Sholtis, 2020). The number of people told to self-quarantine and monitor their condition from home is expected to increase as hospital capacity reaches its limits. As this happens, fire departments and emergency medical technicians (EMTs) will increasingly be COVID-19 first-responders.

Local governments are directly charged with stopping the spread of communicable diseases. The local government’s role as an event regulator is a large part of this charge. The CDC has made it clear that local events are a local decision; therefore, local governments can establish “soft quarantines,” wherein public spaces are closed and events are cancelled. Such actions require the local government to balance public safety against revenue-generating events they depend on, from events like a St. Patrick’s Day parade to sporting events (Mather, 2020).

Finally, local governments have an administrative role in curbing COVID-19. Within their communities, they must communicate risk-mitigation strategies to the public, warn of scams peddling false cures (Taliaferro, 2020), coordinate the delivery and pickup of reduced-price meals usually distributed in school, oversee deep cleaning and sanitation of public spaces, and collaborate with other local governments to share data and strategies. These activities often require additional staff, at a time when staffing itself is diminished by the virus. Within containment areas, local governments are charged with coordinating the efforts of the National Guard, as in New Rochelle, New Jersey. In this capacity, they provide an overview of existing infrastructure as partners in COVID-19 response, recovery, and mitigation.

Local governments are limited in their ability to run deficits and face borrowing penalties when attempting to increase spending outside of a regular schedule of budget hearings.

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2Authors’ analysis of the 2017 State and Local Government data.

3For example, at the beginning of 2021, Los Angeles EMTs were directed to selectively transport patients to hospitals and conserve the use of oxygen based on perceived patient survival probability. This directive resulted from an overwhelmed hospital system, operating close to capacity (Diaz, 2021).
Though such policies promote citizen transparency and local democracy, in times of emergency, these policies can prevent local governments from re-purposing monies.

**Medicaid and local governments**

The Medicaid program ostensibly functions as a safety-net program on two levels. First, it provides care for medically needy groups for extended periods of time. For example, each additional year of childhood Medicaid eligibility increases federal tax revenue by $247 for women and $127 for men through age 28 (Brown et al., 2015). Second, Medicaid is an insurer of last resort during times of economic downturn. As unemployment rises, the loss of employer-sponsored health insurance does not correspond to a rise in the uninsured rate in states where Medicaid eligibility is generous (Benitez et al., 2020).

Often, the debate around Medicaid financing is framed around federal and state government budgets. However, local governments support the safety-net for indigent residents by assuming a substantial role in the finance and delivery of health care. Local governments provide services through nursing homes and behavioral health authorities, but they are most dominant in the hospital market, operating 17% of community hospitals (American Hospital Association, 2020; Chase et al., 2018). Health-care workers are the second largest group of local government employees (Perez et al., 2019). In addition to owning local hospitals, local governments also support private hospitals through grants and direct transfers to guarantee community access.

In supporting lower-income households, local governments may benefit from reduced demands for their own safety-net services, saving them program costs for welfare programs or public-supported health services. In acting as an income support, it is also possible that Medicaid will support households in their ability to pay for taxable goods and services. That is, an *a priori* case can be made that local governments would benefit from state Medicaid generosity through both increased tax revenues as well as through reduced expenditures.

This study estimates the marginal return to community financial health at the local government level. We then extend the analysis to consider the returns to Medicaid investment during a time of global economic recession. In the context of the COVID-19 pandemic, these findings have important implications as states look to minimize the fiscal cost of the pandemic.

**DATA AND VARIABLES**

The analysis focuses on general-purpose county governments for three reasons. First, counties are the local governments which serve as administrative extensions of the state government. Not all citizens live on land that has been incorporated into municipalities, so state-mandated functions of local governments (e.g., welfare administration, voting, and certain forms of policing and criminal justice) are typically operationalized or regulated through the oversight of county governments. Lastly, subcounty governments like townships, cities, villages, and towns are not geographic units that have their own unemployment rates tracked regularly by the Bureau of Labor Statistics. Therefore, to look for fiscal externalities from a state program like Medicaid, county governments are the most promising form of general-purpose government to investigate, and they are also the smallest geographic unit with corresponding unemployment rate data. However, we note that only using county governments represents only a partial picture of local governments that may be affected, most notably municipalities and special districts that carry out health and/or hospital functions.

County government financial measures are extracted from the US Census Annual Survey of State and Local Government Finances (CSLG). In this dataset, a census of all local county governments (3031) is included in 2007 and 2012; the years in-between have a sample of counties, with larger population counties being sampled more often. This results in an
unbalanced panel over 2006–2012 in which about 30% of the counties are observed only during the two census years, about 46% are surveyed in every year of the data and another 22% are missing as many as 3 years. In total, this data provides 14,867 county-year observations.

The key outcome variables from the CSLG are county government expenditure, revenue, and debt. These variables are intended to capture the ways in which local governments can adapt to financial downturns. Figure 2 demonstrates expenditures by function to demonstrate that county governments spend about 25% of their budget on social safety-net functions. Safety-Net expenditures is a measure intended to capture the extent to which the local government contributes to the support of vulnerable populations and is fairly evenly distributed across health, hospital, and welfare services (Figure 2).

We disaggregate total local government revenue in several ways. First, intergovernmental transfers from state and federal governments to local governments are used as controls in the main specification; we do not want to interpret changes in these inflows to rises in local county economies. Local government revenue is then distinguished with regards to whether it is from property taxes or non-property taxes. In our data, nearly 50% of county governments’ own source revenues are derived from the property tax, with the other revenues coming from mixes of general sales taxes, income taxes, or selective sales taxes that depend very much on the state in which the county lies. Because the property tax is based on a periodically valued base that is used to determine the division of tax bills according to property wealth, it is typically less sensitive to economic cycles than taxes directly derived from market exchanges. In cases where the demand for safety-net spending increases during a recession and local governments opt not to raise taxes, the local government may issue debt to finance expenditures. We separately consider total debt and short-term debt, as the latter is often considered as a possible indicator of fiscal distress arising from unanticipated revenue shortfalls and is, therefore, seldom issued (Su & Hildreth, 2018).

To construct a measure of Medicaid generosity, we (1) draw a nationally representative random sample of adults in the 2007 Annual Social and Economic Supplement of the Current Population Survey, and (2) estimate the share of adults in the sample who would be eligible for Medicaid under each states’ 2007 guidelines. This simulated approach is standard of related studies using simulated Medicaid eligibility approaches to derive causal estimates of public health insurance expansions (Benitez et al., 2020; Garthwaite, 2012). This simulation produces a measure of generosity that is not endogenous to state and local factors that affect Medicaid program design (Currie & Gruber, 1996; Gruber & Simon, 2008).

Though it is plausible that states could roll back certain provisions of Medicaid coverage during times of fiscal stress (Rudowitz & Marks, 2008), research by Perez et al. (2018) suggests this did not occur during the most recent recession. States periodically make subtle changes to their Medicaid upper-income limits that can result in a larger (expansions) or smaller (contractions) share of the population being eligible for Medicaid participation; in this case, potential policy endogeneity would only become a concern if several states were to either raise or lower their Medicaid income limits in response to the recession. To avoid this issue, we categorize states based on their prerecession (2007) levels of generosity to avoid simultaneity bias in the results estimations. During the 2008 Recession, states rarely transitioned across the terciles of generosity, based on our data.

To extend our findings to the current economic crisis, we modify the measure of simulated Medicaid eligibility to account for changes in Medicaid programs since the Great Recession.

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4There is considerable variation across states on the implementation of the property tax, but the classical American property tax from which these systems derive determines an amount of money to be raised from property taxes. That amount is then divided by the stock of taxable property to obtain the rate, which is then applied to individuals to determine individual tax collections. By contrast, other tax instruments set a rate, then a flow of taxable exchanges occur that results in revenue from which the government can spend. See Mikesell (2018) for a more in-depth overview.

5Short-term debt in the CSLG is debt payable 1 year or less from its date of issue. Examples of debt included are bond anticipation notes, tax anticipation notes and warrants, bank loans, tax-exempt commercial paper, and interest-bearing short-term warrants and obligations.
FIGURE 2  County government expenditures by function (2012). (a) Expenditure function. (b) Safety-net expenditure subfunction. Note: Data source is the U.S. Census Bureau Annual Survey of State and Local Government Finances. Figure is constructed from the sum of all county governments in the United States by function.
The Affordable Care Act (ACA) simplified Medicaid eligibility by extending coverage to all low-income adults. A sample of nationally representative nondisabled adults aged between 19 and 64 years is constructed from the Current Population Survey (CPS). The first measures of simulated eligibility are based on the 2007 Annual Social and Economic Supplement (ASEC); the second wave of simulated eligibility is based on the 2019 CPS-ASEC.

**EMPIRICAL APPROACH**

**Estimates from the Great Recession**

The first stage of the analysis is to estimate the effect of state Medicaid generosity in 2007 (MGs, 2007) interacted with local unemployment rates (URit) on the outcomes of interest discussed under the section “Local governments during pandemics.” A straightforward approach to this question would be a two-way fixed effects model that uses county-government-level panel data from 2006 to 2012. The model for county government i in state s for year t would be specified as:

\[ y_{ist} = \beta_1 \text{MGs,2007} + \beta_2 \text{UR}_{it} + \beta_3 (\text{UR}_{it} \times \text{MGs,2007}) + \beta_4 X_{it} + \theta_i + \theta_s + \theta_t + \gamma_{it} + \text{ist}. \]  

(1)

This model estimates the effect of state Medicaid generosity guidelines on county government fiscal outcomes (yst) during and after the Great Recession, while controlling for observable covariates in the vector Xist with the parameter of interest represented in coefficient β3. In addition to year fixed effects (θt), the specification includes county government fixed effects (θi) that subsume both state fixed effects (θs) and state Medicaid generosity (MGs, 2007). Because local government fixed effects include state-level variations, this specification accounts for reimbursement differences set by the federal match rate, the share of Medicaid expenses reimbursed by the federal government to the state government, as well as state-level differences in service delivery.

MGs, 2007 is our key policy variable to determine states’ generosity with respect to Medicaid eligibility guidelines. As discussed under the section “Local governments during pandemics,” our approach affixes the generosity of each states’ guidelines to their 2007 distributional position; this ensures the term itself is not influenced by fluctuations in local economic conditions during the Recession, which would be the case if we used actual Medicaid enrollment. Within states, county and time variation comes from county unemployment rates, allowing β3 to be estimated while including county government fixed effects.

To understand the effect of Medicaid generosity in high unemployment areas, we do not wish to overcontrol the regression with related covariates like household income. We limit controls to state and federal transfers because these inflows are likely to be correlated with state Medicaid generosity as federal countercyclical policy targets high unemployment areas and states reduce transfers to local governments to balance their own budgets.

The primary concern of a two-way fixed effects model to an unbiased estimate of β3 would include time-varying, unobservable factors (γit) that are correlated with the unemployment and Medicaid generosity interaction. Regional variations in the thickness of local labor markets or the local price of inputs to government production could contribute to this bias. To diminish this concern, we adopt the cross-state contiguous border pair difference (BPD) approach used elsewhere in the literature (Brunner et al., 2020; Dubé et al., 2010; Holmes, 1998; Huang, 2008; Mikesell & Ross, 2017; Rohlin & Ross, 2016), though to our knowledge this is the first application in a Medicaid study.

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6 Appendix Table A1 substantiates this concern of omitted variables, as several of the signs are counterintuitive even if statistically significant. For instance, the two-way fixed effects estimates suggest Medicaid generosity increases bankruptcy in high unemployment areas while reducing property tax revenues. The most plausible explanation for this is time-varying omitted variables.
In this approach, we employ only those counties which are along state borders, rearrange the data into contiguous pairs across state borders, and seek to explain the cross-border differences in outcomes as a function of the cross-border differences in the independent variables.\footnote{This approach omits states without neighboring states: Alaska and Hawaii.} If these county pairs are good matches in that their local time varying unobservables are identical, an unbiased estimate of \( \beta_3 \) can result from estimating on the border pair difference. To illustrate, define a county government \( j \) in state \( k \) that is the result of the same data-generating process as for \( i \) in Equation (1). After dropping redundant terms that are subsumed by county fixed effects, differencing the data generating process of \( j \) from \( i \) can be written as:

\[ y_{it} - y_{jt} = \beta_2 (UR_{it} - UR_{it}) + \beta_3 (UR_{it} \times MG_{k,2007}) - (UR_{jt} \times MG_{k,2007}) + \beta_4 (X_{it} - X_{jt}) + (\theta_{it} - \theta_{jt}) + (\gamma_{it} - \gamma_{jt}) + (ist - jkt). \]

The key identification assumption is that local unobservables are constant where they are separated by state boundaries such that \( \theta_{it} = \theta_{jt} \). If \( \theta_{it} = \theta_{jt} \) then this differenced specification eliminates the time-varying unobserved variable that is the source of bias in Equation (1) and we recover an unbiased estimate of \( \beta_3 \). Indexing the difference between cross-state county pairs \( i \) and \( j \) as observation \( p \) in state pair \( q \), the two-way fixed effect border pair differences is written as:

\[ y_{pqt} = \beta_2 UR_{it} + \beta_3 UR_{it} \times MG_{q,2007} + \beta_4 X_{it} + \theta_p + \theta_t + iqt. \]

The outcomes of interest measuring financial status are at the county (\( i \))-year (\( t \)) level: Total expenditures, social welfare expenditures, total property tax revenues, total debt, and short-term debt. The coefficient of interest is \( \beta_3 \). Unemployment levels are indicative of the county-level economic impact of the recession and has been shown to mirror changes in Medicaid enrollment during this time. As discussed in the previous section, if Medicaid provides fiscal benefits to local governments, then it would manifest as positive effects on revenues and negative for debt and expenditures.

Table 1 provides the summary statistics for the relevant data for the full sample of counties, the counties that are adjacent to the state border (see Figure B1), and finally the mean difference in levels after performing the border differencing of cross-border pairs. On the basis if the summary statistics, the means and standard deviations are very similar between the full dataset and the sample of border counties, suggesting this subsample is representative of the full population, which is good for the external validity when inferring implications for the full sample from the border pair regressions.\footnote{As already mentioned, in years not ending in ‘2 or ‘7, the Census oversamples high population counties. To appear in the border-differenced pair, a county and a cross-state adjacent county must appear in the same year. Of the possible border pairs, 28% appear in every year, 48% appear only in the Census years, and 24% appear in four or five of the seven possible years.} Similarly, in the cross-border pairs the mean difference in levels is regularly quite small for county level measures.

### Projecting impact from COVID-19 unemployment

The second stage of our analysis is to use estimates from the first stage to generate predicted values in the current setting of the COVID-19 pandemic. We generate these projections according to the following calculation:

\[ \hat{y_i} = \hat{\beta}_3 UR_{i,\text{Apr}2020} \times MG_{s,2019}, \]

The coefficient \( \hat{\beta}_3 \) is the estimate of \( \beta_3 \) from the specification in Equation (2). \( UR_{i,\text{Apr}2020} \) is the county’s unemployment rate in April 2020. Medicaid generosity (\( MG_{s,2019} \)) is based on the
eligibility rules in 2019, as applied to a random sample of adults from the 2018 ACS, the most recent year for which that level can be calculated.

RESULTS

Table 2 presents the paper’s results of the first stage with the estimation of Equation (2) for our seven fiscal outcomes using the border pair differenced sample. Standard errors are clustered on each county appearing in the border pairs. The revenues, expenditures, and debt-dependent variables are expressed in tens of per capita dollars.9

| TABLE 1 | Summary statistics of county governments by sample |
|-------------------|-------------------|-------------------|
|                  | All counties | Border counties | Border-differenced pairs |
|                  | **Mean**   | **SD**  | **Mean** | **SD** | **Mean** | **SD** |
| Treatment variables |             |             |           |        |           |        |
| Medicaid Generosity (2007) | 8.86        | 7.99        | 8.62      | 7.62    | 1.59      | 9.36    |
| Unemployment rate  | 7.02        | 3.04        | 7.04      | 3.14    | 0.095    | 2.18    |
| Household-level outcomes (PC) |           |             |           |        |           |        |
| Personal bankruptcy rate | 0.011 | 0.0068 | 0.011 | 0.0067 | 0.00059 | 0.0063 |
| Local govt expenditures ($1000s/PC) |           |             |           |        |           |        |
| Total expenditures | 1.40        | 1.79        | 1.43      | 1.59    | 0.099    | 2.14    |
| Safety-net expenditures | 0.36 | 0.61  | 0.35      | 0.58    | 0.041    | 0.78    |
| Local govt revenues ($1000s/PC) |           |             |           |        |           |        |
| Total taxes | 0.53        | 1.17        | 0.53      | 1.17    | −0.0098  | 1.73    |
| Property taxes | 0.40        | 1.14        | 0.39      | 1.13    | −0.027   | 1.69    |
| Non-property taxes | 0.13 | 0.19  | 0.14      | 0.19    | 0.017    | 0.26    |
| Local govt debts ($1000s/PC) |           |             |           |        |           |        |
| Outstanding debt | 1.04        | 6.39        | 1.35      | 9.91    | −0.73    | 12.3    |
| Short-term debt | 0.0061      | 0.046       | 0.0068    | 0.048   | −0.00093 | 0.073   |
| Inter-govt transfers ($1000s/PC) |           |             |           |        |           |        |
| State revenue | 0.40        | 0.59        | 0.41      | 0.56    | 0.097    | 0.73    |
| Federal revenue | 0.056        | 0.19        | 0.059    | 0.18    | 0.0081   | 0.23    |
| Number of county governments | 14,867 | 5522 | 4750 |

Note: Medicaid Generosity is simulated by applying 2007 eligibility rules to a randomized sample of adults. Bankruptcy is rate per 10,000 people, whereas revenues, expenditures, debt, and intergovernmental revenue are measured in tens of per capita (PC) U.S. dollars. Years: 2006–2012. Columns (1)–(4) present the mean and standard deviation of the variable levels. Columns (5) and (6) present the means and standard deviations of the differenced variables.

9As a robustness check, we also estimated the model while excluding observations that included New York counties, where county governments implement the Medicaid program. The results were not easily distinguishable from those with the full sample and are not reported here. We appreciate an anonymous reviewer for suggesting this check.
TABLE 2  Regression results for county government finances using border-differenced pairs

|                                      | County expenditures | County revenue | County debt | Household |
|--------------------------------------|---------------------|----------------|-------------|-----------|
|                                      | (1) Total           | (2) Safety-net Programs | (3) Total | (4) Property | (5) Non-property | (6) Total outstanding | (7) Short-term | (8) Bankruptcy |
| Medicaid generosity × unemployment (Diff.) | −6.035*             | −6.566***       | 2.059       | 1.314     | 0.744        | −39.23**           | −0.560        | −0.156****    |
|                                       | (3.399)             | (2.405)         | (2.687)     | (2.551)   | (0.769)      | (15.82)            | (0.359)       | (0.0366)      |
| Unemployment rate (Diff.)            | 111.5               | 95.08*          | −120.5      | −66.47    | −54.01****   | −325.6             | −18.10        | 3.738****     |
|                                       | (97.96)             | (56.22)         | (81.40)     | (79.76)   | (14.89)      | (704.3)            | (11.76)       | (0.716)       |
| State Inter-governmental revenue (Diff.) | 1.706****          | 0.0701**        | 0.961****   | 0.946**** | 0.0150       | −0.130*            | −0.00651      | 0.000561****  |
|                                       | (0.364)             | (0.0292)        | (0.308)     | (0.306)   | (0.0118)     | (0.0751)           | (0.00413)     | (0.00137)     |
| Federal Inter-govemmental revenue (Diff.) | 0.371**            | −0.0548         | 0.00104     | 0.00594   | −0.00490     | −0.0962            | 0.00208       | −0.000227     |
|                                       | (0.155)             | (0.0377)        | (0.0460)    | (0.0459)  | (0.00720)    | (0.0700)           | (0.00137)     | (0.000484)    |
| County-year obs                      | 4745                | 4745            | 4745        | 4745      | 4745         | 4745               | 4745          | 4745          |
| $R^2$                                | 0.959               | 0.930           | 0.963       | 0.963     | 0.939        | 0.971              | 0.625         | 0.857         |

Note: Medicaid Generosity is simulated by applying 2007 eligibility rules to a randomized sample of adults. Revenue, expenditure, debt, and intergovernmental revenue are measured tens of 2019 dollars per capita. Bankruptcy is rate per 10,000 persons. Years: 2006–2012. Standard errors are clustered on both counties in each pair. All specifications include year and county-pair fixed effects. Standard errors in parentheses.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. 
In terms of total county government expenditures, the interaction between unemployment and Medicaid generosity is negative and statistically significant at the 0.05 threshold; however, the effect is driven by reduced expenditures on safety-net programs, which are significant at the 0.01 threshold. The point estimate suggests that a 1% expansion in the coverage of Medicaid reduces county government per capita expenditures on safety-net programs by $65 for each percentage point of unemployment they are experiencing; if both counties in the pair were experiencing a 5% unemployment rate, the side with the greater Medicaid generosity would save an estimated $325 per capita. This per capita expenditure is considerable, considering that the mean per capita expenditure level is $360 on safety-net programs, but consistent with local government safety nets targeting indigent persons who do not qualify for federal or state aid (Figure 3).

For the revenue side of county government, though the point estimates are positive, there are no statistically significant effects on county government finances. The Medicaid generosity interaction does have a statistically significant effect on total debt through liabilities that had maturities due in more than 1 year. The point estimate suggests that a 1% increase in the coverage of Medicaid reduces per capita debt by $390 for each percentage point of unemployment. The finding on short-term debt, which matures in less than 1 year and is often associated with unanticipated revenue shortfalls, is not statistically significant. This suggests that

FIGURE 3 COVID-19 projections of community financial measures by quartile of unemployment. (a) Total debt: Point estimate. (b) Total estimate: Quartile. (c) Safety-net expenditures: Point estimate. (d) Safety-net Quartile. Note: Unemployment rate during the COVID-19 pandemic uses April 2020 data. Medicaid generosity is simulated by using 2019 eligibility rules to a randomized sample of adults. Projections control for intergovernmental transfers.
if local governments are experiencing high unemployment, they may be financing it partly with longer term liabilities and that Medicaid generosity attenuates this tendency.

Reducing the need to borrow and spend while having no effect on revenues does suggest that these governments retained a better fiscal position than those in low generosity states. Table A2 provides the results of a two-way cluster for each state in every pair—the most conservative clustering of standard errors we can perform—and demonstrates that though the standard errors do lower the thresholds, only the total debt finding falls below one of the conventional levels.

Recognizing that the results are derived from an unbalanced sample of county governments in the CSLF, we consider whether our results are somehow an artifact of the sample. To help validate the findings on this particular sample, we estimate the effect of our variable of interest on personal bankruptcy, a finding that has been discovered elsewhere in the Medicaid literature (Allen et al., 2017; Hu et al., 2018). If Medicaid generosity is influencing financial outcomes at the local government level, changes in household-level finances should mirror these effects. We are able to replicate the finding in both Tables 2 and A2 that Medicaid generosity in high unemployment counties appears to reduce personal bankruptcies. A 1% increase in unemployment is associated with four additional bankruptcies per 10,000 people, but the effects are smaller within states with more inclusive eligibility criteria (−0.173, statistically significant at the 0.001 threshold). This finding supports both the idea that Medicaid generosity provides financial support for households and that our sample produces results consistent with previous research. As a second falsification test, we perform the Monte Carlo border analysis described in Mikesell and Ross (2017), which uses the counties along the border and matches them with another randomly selected border county to replicate the analysis, which should approximate the results of the two-way fixed effect because the omitted variables will no longer be differenced away. The estimated treatment effects over 1000 trials are presented for our statistically significant outcomes and are plotted in the histogram in Figure B2, and in every case the border difference result is much further from the central tendency than the two-way fixed effect estimate.

In the second stage, in order to calculate the returns to increased Medicaid generosity we employ the estimates from Table 2 for the significant findings: Total outstanding debt and safety-net expenditures. Figure B4 plots out the predicted effects of the interaction using county unemployment rates from April 2020 and current Medicaid generosity. The point estimates in the left-hand side panel plot out the predicted effects for the counties across different ranges of Medicaid generosity, along with their 95% confidence intervals. The right-hand side panels of Figure B4 report the prediction lines according to the counties’ place in the unemployment quartile. This demonstrates that the realized returns to increased Medicaid generosity are disproportionately higher among areas in the top quartile of unemployment. For example, though generosity reduces total expenditures across all areas experiencing unemployment, the effects of increasing Medicaid eligibility to 30% of the random sample are three times larger between the median and 75th percentile, a pattern repeated in each of the subfigures throughout Figure B4. The counterfactual-predicted effects are large, and the absolute magnitudes are possibly unrealistic. This is not surprising in the sense that unemployment rates under COVID-19 are historically unprecedented, even in terms of the Great Recession (see Figure 1). Consequently, this is an out-of-sample forecast. The results in Table 2 demonstrate that unemployment has large direct effects on increasing expenditures and bankruptcies and that the interaction with Medicaid generosity only eases these pressures. Whether such marginal effects could be sustained to what would be implied by the magnitudes of COVID-19 employment remains to be seen.

10Personal bankruptcy data is from the Administrative Office of the US Courts.
There is substantial heterogeneity in terms of county-level unemployment shocks (Figure 4a). The projected insulating effects of Medicaid generosity correspond closely to this variation (Figure 4b–c). Louisiana, for example, stands out in the southern states because it has comparatively high Medicaid generosity, not because of its unemployment circumstances. Figures 5 and 6 present state-level summaries of insulating effects of Medicaid generosity that occur across a wide range of benefits in reduced safety-net expenditures and total debt, respectively. They consistently differ to such an extreme degree due to unemployment shocks (9.7% in Missouri and 22.7% in Michigan) and Medicaid eligibility (3.9% in Missouri and 18% in Michigan).

DISCUSSION

The findings indicate higher Medicaid generosity reduces the downstream economic strain on local governments emanating from labor market shocks. Local governments are supporting financially vulnerable households with their own programs during the pandemic and recession, despite their own revenues simultaneously decreasing. State and federal policy may establish grants to aid local governments during the pandemic, such as in the CARES Act of 2020. However, we establish that the Medicaid program is itself a channel by which state and federal governments can support local governments.

The first-stage results further an existing literature on the effects of Medicaid generosity on households during a recession. These studies find that recession unemployment increases Medicaid take-up, maintains health care access, and reduces the incidence of negative financial outcomes. Similar to that work, we observe reductions in personal bankruptcies in the sample of county governments. The analysis then shows that local governments benefit from Medicaid generosity through a reduction in safety-net expenditures and debt.
The differences between the Great Recession and the COVID-19 recession affect the interpretation of these results. First, the current unemployment shocks dwarf the Great Recession, which means the second stage results are predicting out of sample for states with the highest shocks. Second, the Great Recession was triggered by a subprime mortgage crisis, whereas the COVID-19 pandemic is a health crisis. Consequently, unemployment during the Great Recession affected household health care consumption primarily through the loss of employer-sponsored health insurance and affected local governments through the loss of property tax revenue. The COVID-19 pandemic, however, affects the demand for health care and introduces negative employment shocks. Further, local governments are at the forefront for financing and coordinating testing, contact tracing, and stages of economic reopenings. For these reasons, the

**FIGURE 5**  Saved local government safety-net expenditures during COVID-19 due to state Medicaid Generosity (2019 USD). Note: The figure presents the product of the coefficient from Table 2, April 2020 unemployment rates, and updated Medicaid generosity. Medicaid generosity is simulated by using 2019 eligibility rules to a randomized sample of adults from the 2018 ACS. Alaska and Hawaii are excluded as they have no neighboring US counties. Interactions are scaled by 10,000

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estimates presented are lower-bound projections on the return to Medicaid eligibility generosity.

The projections related to COVID-19-related labor market shocks indicate the potential relief Medicaid can provide to communities affected by unemployment. States deciding on Medicaid expansion should take these findings under consideration. For states that have not yet expanded Medicaid coverage, increasing eligibility under the ACA could be done with a federal match rate of 90%. Though directly benefiting low-income adults, a Medicaid expansion indirectly benefits the entire community, via local government.
CONCLUSION

The COVID-19 pandemic has imposed the most acute and prolonged shock to the economy this century. As areas reopen, they do so in a highly regional, uncoordinated way. Decisions on reopening are heavily determined at the local government level. As shutdowns impose a substantial economic cost, they are an expensive public safety measure for local governments. In this paper, we consider the extent to which the current pandemic’s effects on local government finances can be mitigated through the Medicaid program.

Our paper uses county governments from 2006 to 2012, as well as data from the Great Recession and its subsequent recovery, to estimate the interaction effect of state Medicaid generosity and local unemployment on a variety of fiscal indicators. Using a state border pair discontinuity design, we find evidence that local government expenditures were reduced through this interaction, primarily through reduced expenditures in safety-net functions (welfare, health, and hospitals). Specifically, we found that a 1% expansion in state Medicaid generosity reduced county safety-net expenditures by $65 per capita for every percentage point of unemployment. Though the effects on revenues were positive, none were statistically significant in any specification check. Lastly, we found evidence that a 1% increase in state Medicaid generosity reduced long-term debt issuances by around $390 per capita for every percentage point of unemployment, though the statistical significance of this finding was not robust to clustering choices. In summary, Medicaid generosity in high-unemployment areas reduces expenditures and the taking on of debt without affecting revenues, implying an improved fiscal condition for local governments. In the second stage of our analysis, we use April 2020 unemployment rates and 2019 Medicaid generosity to simulate the impact Medicaid has had on local government finances. Local impacts are heterogeneously spread across the state (see Figure 4), and state-specific impacts on these indicators is provided (Figures 5 and 6).

These findings directly inform states about the potential benefits of expanding state Medicaid programs under the Affordable Care Act (ACA). To date, 14 states have not extended eligibility to adults earning up to 138% of the federal poverty line under the ACA. Not expanding Medicaid under this provision means foregoing an enhanced match rate of 90% from the federal government, which is substantially higher than the average 55% federal match offered for other Medicaid beneficiaries. Our findings show that states increasing the generosity of Medicaid under the current recession would also generate savings for local governments.

It is important to note that the data upon which this study is based oversamples county governments which serve larger populations in five of the seven sample periods. Also, county governments are not the only local government type which may be impacted, as a plethora of municipalities and health-care special districts may also benefit from state Medicaid generosity. However, the most critical qualification of the study is in the external validity of using parameter estimates from the Great Recession to draw inferences to the COVID-19 recession. The key inference assumption is that Medicaid will provide similar effects on the chosen outcomes when the timing and magnitude of unemployment shocks vary linearly between the Great Recession and COVID-19 pandemic. As we demonstrated in Figure 1, the COVID-19 recession is of a much higher magnitude with a faster onset. Further, the take-up and use of Medicaid benefits are likely to be higher now as the impetus of the COVID-19 recession is a higher potential for hospital utilization.

The link between economic recovery and public health is, both in the short- and long-run, a balance between input quality and productivity. Federalism provides a political economy rationale for a regional, non-federally coordinated opening, but it does not provide guidance as to how to support local governments. For informed decision-making about the economic implications of COVID-19, local and state policymakers must consider the extent to which existing safety-net programs, like Medicaid, can mitigate economic effects of COVID-19.
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**SUPPORTING INFORMATION**

Additional Supporting Information may be found online in the supporting information tab for this article.

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APPENDIX A: ALTERNATIVE SPECIFICATION TABLES

See Tables A1 and A2.

**TABLE A1** Regression results for county government finances using two-way fixed effects estimates

|                      | County expenditures | County revenue | County debt | Household |
|----------------------|---------------------|----------------|-------------|-----------|
|                      | (1) Total           | (2) Safety-net programs | (3) Total | (4) Property | (5) Non-property | (6) Total outstanding | (7) Short-term | (8) Bankruptcy |
| Medicaid generosity × unemployment | -3.222 (2.978) | -1.296 (1.886) | 0.361 (1.765) | -0.106 (1.695) | 0.467 (1.072) | -7.398 (9.457) | -0.00218 (0.148) | 0.114 (0.0947) |
| Unemployment rate    | -157.6*** (74.82) | -44.04 (44.54) | -112.5*** (45.98) | -63.22 (44.40) | -49.25*** (22.64) | -113.6 (321.6) | -3.152 (2.723) | 6.183**** (1.444) |
| State revenue        | 1.182**** (0.282) | 0.0903** (0.0418) | 0.351 (0.275) | 0.339 (0.275) | 0.0119 (0.0203) | 0.216** (0.104) | 0.00187 (0.00284) | 0.000149 (0.000206) |
| Federal revenue      | 0.714**** (0.0834) | 0.0258 (0.0380) | 0.0688* (0.0405) | 0.0169 (0.0679) | 0.0520 (0.0389) | 0.142 (0.135) | -0.0000983 (0.00221) | -0.000191 (0.000179) |
| County-year obs      | 14,859 14,859 14,859 14,859 14,859 14,859 14,859 14859 |

Note: Analysis is done using the full sample of county levels, rather than the border-differenced pairs in the preferred specification (Table 2). Medicaid Generosity is simulated by applying 2007 eligibility rules to a randomized sample of adults. Revenue, expenditure, debt, and intergovernmental revenue are measured in tens of 2019 dollars per capita. Bankruptcy is rate per 10,000 persons. Years: 2006–2012. Standard errors are clustered at the state level. All specifications include year and county fixed effects. Standard errors in parentheses.

*p < 0.1; **p < 0.05; ****p < 0.001.
|                                      | County expenditures (1) | County revenue (3) | County debt (5) | Household (7) |
|--------------------------------------|--------------------------|--------------------|-----------------|--------------|
|                                      | Total                    | Safety-net programs| Total           | Non-property | Total outstanding | Short-term | Bankruptcy |
| Medicaid generosity × unemployment (Diff.) | -6.035 (3.721)          | -6.566* (3.569)   | 2.059 (4.377)   | 1.314 (4.136)| 0.744 (1.741)   | -39.23 (26.99)| -0.560 (0.746)| -0.156** (0.0510) |
| Unemployment rate (Diff.)            | 111.5 (150.0)            | 95.08 (76.04)      | -120.5 (117.4)  | -66.47 (102.8)| -54.01 (35.79)  | -325.6 (871.3)| -18.10 (12.02)| 3.738** (1.409) |
| State intergovernmental revenue (Diff.) | 1.706*** (0.559)        | 0.0701* (0.0385)  | 0.961** (0.473) | 0.946* (0.470)| 0.0150*** (0.00526)| -0.130 (0.110)| -0.00651 (0.00678)| 0.000561*** (0.000204) |
| Federal intergovernmental revenue (Diff.) | 0.371** (0.174)        | -0.0548 (0.0568)  | 0.00104 (0.0714)| 0.00594 (0.0694)| -0.00490 (0.00495)| -0.0962 (0.131)| 0.00208 (0.00203)| -0.000227 (0.000715) |
| County-year obs                      | 4745                     | 4745               | 4745            | 4745         | 4745             | 4745         | 4745           | 4745 |
| $R^2$                                | 0.959                    | 0.930              | 0.963           | 0.963        | 0.939            | 0.971        | 0.625          | 0.857 |

Note: Analysis is done using the border-differenced pairs as in the preferred specification (Table 2), but with higher level of clustering. Medicaid Generosity is simulated by applying 2007 eligibility rules to a randomized sample of adults. Revenue, expenditure, debt, and intergovernmental revenue are measured in tens of 2019 dollars per capita. Bankruptcy is rate per 10,000 persons. Years: 2006–2012. Standard errors are clustered for each state in the county pair. All specifications include year and county fixed effects. Standard errors in parentheses.

*p < 0.1; **p < 0.05; ***p < 0.01.
APPENDIX B: FIGURES OF PERSONAL BANKRUPTCY RATES

See Figures B1–B5.

FIGURE B1  Counties included in border-differenced pairs

FIGURE B2  Histograms of treatment effects from Monte Carlo border differencing of Random Pairs. Note: Based on 1000 trials using seed 42,000+ trial number. Reference lines indicate main results from border pair difference (BPD) estimation in Table 2 and the simple two-way fixed effects of all counties presented in Table A1 (OLS)
FIGURE B3  Geographic variation of COVID-19-related projections of personal bankruptcy. Note: Unemp × MG × β, where unemployment rate during the COVID-19 pandemic uses April 2020 data. Medicaid generosity (MG) is simulated by using 2019 eligibility rules to a randomized sample of adults. Projections control for intergovernmental transfers. β refers to the respective coefficient presented in Table 2.

FIGURE B4  COVID-19 projections of personal bankruptcy by quartile of unemployment. (a) Point estimate (b) Quartile of unemployment. Note: The figure presents the unemployment rate during the COVID-19 pandemic (left hand side) uses April 2020 data. Medicaid generosity is simulated by using 2019 eligibility rules to a randomized sample of adults. Projections control for intergovernmental transfers.
Avoided bankruptcies during COVID-19 due to State Medicaid Generosity. Note: The figure presents the product of the coefficient from Table 2, April 2020 unemployment rates, and updated Medicaid generosity. Medicaid Generosity is simulated by using 2019 eligibility rules to a randomized sample of adults from the 2018 Annual Census Survey. Alaska and Hawaii are excluded as they have no neighboring US counties. Interactions are scaled by 10,000.