Local Government Fiscal Early Warning Surveys: Lessons From COVID-19

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Yang (2020) recently argued for enhanced evidence–based decision making during sudden and widespread economic shocks such as the COVID-19 pandemic, but he lamented the difficulty of acquiring such data in a timely manner. One strategy is to implement an early warning survey system. This article describes Colorado's experience with a survey the state administered to local government officials shortly after the governor's stay-at-home order. The state used the survey to inform its fiscal response policies. We describe the advantages and challenges of using surveys as a statewide, rapid information collection strategy as well as offer evidence that the survey yielded relatively accurate data about local fiscal impacts. We also provide an empirical analysis of the survey, employing the Heckman correction technique to account for selection bias, to illustrate how the survey responses can improve state decision making.

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As COVID-19 spread in the US, most state governors attempted to slow its progression by issuing stay-at-home orders and mandating retailers, theaters, restaurants, and bars close. Bringing economic activity to a halt unexpectedly stressed local governments' budgets with those relying more heavily on consumption–based taxes facing the most difficult challenges (Felix, 2020). States and the federal government responded by providing considerable financial aid, most notably the federal government through the Coronavirus Aid, Relief, and Economic Security (CARES) Act.[1] The aid has been criticized on multiple fronts for its lack of targeting the neediest jurisdictions (Gordon, 2020; Walczak, 2020).

Allocating aid inefficiently should be expected, however, during such events when credible information about local fiscal conditions is difficult to obtain in a timely manner. Yang (2020) recently discussed the challenges of making evidence–based policy decisions during COVID-19, and though his discussion focuses on public health policy, we think his points equally apply to fiscal policy as it relates to local governments. The economic impacts of COVID-19 have demonstrated that the existing systems most states use to identify and measure local fiscal stress are inadequate for sudden and widespread shocks to the tax base. Many states have so-called early warning fiscal systems that intend to provide state lawmakers information about local governments' fiscal health, but these systems operate too slowly to be of use during a pandemic or other sudden shocks. And, nor were they designed as an information gathering solution with such events in mind. This suggests that states should consider new strategies for quickly gathering credible information from local governments during these periods. This article describes and evaluates Colorado's experience with an early warning survey to local

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government officials as one such alternative strategy. We study Colorado because as far as we are aware it is the only state to have had an executive agency administer such a survey to inform its fiscal policy response. In an effort to improve the state's policy response to COVID-19, Colorado's Division of Local Government (DLG) in the Department of Local Affairs conducted an early warning survey in the first week of April 2020, the purpose of which was to learn more about the near future fiscal and budgetary impacts of COVID-19 on local governments.[2] Because surveys can be quickly disseminated and the results quickly evaluated, they provide a chance, if designed well and target the right people, to acquire policy–relevant information much faster than existing early warning systems (Levine et al., 2012). Seen from this perspective, surveys are complements to existing systems, not substitutes. But surveys are also not without their own challenges, and studying Colorado's experience may help to improve surveys as a policy tool during future sudden economic shocks.

The remainder of the paper is organized as follows. In the next section, we describe existing early fiscal warning systems to appropriately frame surveys as a complementary policy tool. We also provide some information about DLG's survey. The section thereafter discusses the advantages and challenges of early warning surveys as an evidence–gathering technique during COVID-19. We then provide an empirical analysis of DLG's survey as an illustration of the sort of credible and policy–relevant information that is obtainable. We then close with a summary.

Before continuing, we think it is worth emphasizing that while early warning surveys are a practitioner's tool, the crucial role for academics is to cast a critical light on the tool—in this case, to evaluate the merits of our arguments and to test if surveys lead to better outcomes than the next best alternative. This relationship between practitioner and academic is consistent with Yang's (2020) call for bringing topical experts in the public bureau and researchers together to address challenges like those posed by COVID-19, to build "institutionalized government capacity in searching, coproducing, using and evaluating appropriate evidence, as well as learning from the use of evidence in various situations" (p. 30).

Fiscal Early Warning Systems

State monitoring of local fiscal health is common in the US (Levine et al., 2012), and there is variation in the monitoring's extent (Honadle, 2003; Kloha et al., 2005). Some states take a more passive monitoring role; they collect fiscal indicators on a regular basis and issue reports. Otherwise, they lack the authority to take corrective action or provide assistance. Others grant state oversight agencies a more proactive role; they define the indicators that signal fiscal distress as well as the thresholds for determining when a jurisdiction is in distress, and they have legal authority to intervene. Monitoring systems with the first two characteristics are frequently known as early warning systems (Cahill & James, 1992; Kloha et al., 2005) whose modern genesis are fiscal emergencies in the 1970s (Rubin, 1998). As Justice and Scorsone (2012) emphasize, however, given the variety of monitoring systems in place in the US, "no one system can be expected to serve all audiences and needs" (p. 44).

States have a financial interest in monitoring the fiscal health of its local governments (Modlin, 2010). Local governments' inability to pay their debt may require the states to absorb the outstanding obligations. Additionally, local government bankruptcies make it more expensive for jurisdictions to issue future debt, threatening the quantity and quality of public services and possibly requiring the state to increase intergovernmental aid. At the extreme, states may respond by taking control of local fiscal decision making (Nickels, 2016); though, state intervention may take other administrative forms (Coe, 2008). Moreover, to the extent states can determine which local governments need how much of what sort of assistance to remain in good health, state monitoring systems can improve resource allocations. Importantly, the

state's financial incentive to monitor local fiscal health is agnostic to the source distress; states have the same financial interest whether stress is caused by local officials' poor decision making or by an unanticipated shock to the local tax base. The state's response may vary by the source of distress, of course. Takeovers, for instance, may not be politically desirable if the cause of distress is due to a recession, natural disaster, or pandemic, since these are exogenous to fiscal management. Indeed, the entire notion of monitoring local governments to prevent fiscal stress caused by an unexpected event is prima facie nonsensical and speaks to the need for a different type of distress monitoring system for such causes.

The extent of COVID-19's economic reach suggests that existing fiscal distress monitoring systems are not equipped for these sorts of situations. One purpose, if not the central purpose, of a fiscal monitoring system is to identify local jurisdictions in need of assistance, and existing monitoring systems operate under an implicit assumption that the causes of distress are related to management, not exogenous environmental conditions such as natural disasters, terrorism, or the like (Kloha et al., 2005). Events such as these tend to be salient and localized, affecting a relatively small number of communities within a state or metro area. Thus, the location of the event itself provides enough information to allocate resources well; a fiscal alert system is unnecessary.

An additional complication with existing fiscal alert systems is the time lag between when economic destabilizing events occur, when the event registers in local governments' financial data, and when that data is received and processed for use by state officials. In New York, for instance, the auditor requires that local governments and school districts file their annual financial reports within six months of the end of the fiscal year, with the final fiscal distress metrics available three months later. The stay-at-home orders prompted by COVID-19 were, in most cases, statewide and the loss of economic activity sudden. In other words, states may want to provide assistance, but leaders may not know how much of what sort of assistance to provide to which communities when it is needed. The consequence, then, is inefficiently targeted aid.

Surveying finance officials is an alternative early warning strategy but one that potentially trades timeliness of information with precision of information. A similar tradeoff was the impetus for the creation of the American Community Survey, which provides information about communities more quickly and frequently than the decennial census long form (MacDonald, 2006). In theory, the rapid snapshots provided to state officials through surveys improve intergovernmental fiscal triage, thereby mitigating local fiscal stress compared to waiting for complete data from all local governments to be collected and analyzed (Leiser & Mills, 2019).

In early April 2020, about two weeks after the governor issued a stay-at-home order, DLG surveyed all local governments in Colorado (counties, municipalities, and special districts) with the assistance of the Colorado Municipal League (CML), Colorado Counties Inc. (CCI), and the Special District Association of Colorado (SDA), nonprofit organizations that lobby for the respective government types, among other activities. The purpose of the survey was to inform the state's COVID-19 policy response as it concerned the fiscal health of local governments. For example, DLG staff used the survey results to evaluate policy proposals such as extending sales tax return deadlines and the types of services the departments could provide for local governments. They also used the results to inform the design of federal aid disbursements through the Coronavirus Aid, Relief, and Economic Security (CARES) Act (Thayer, personal communication, July 8, 2020).

The survey is a widely used tool in the public administrator's toolbox (Eller et al., 2018; Folz, 1996), but its most popular use is to collect information about citizens' attitudes and preferences (Dalehite, 2008; Rivenbank & Ballard, 2012). The use of surveys as a strategy to gather evidence of local fiscal impacts during an economy destabilizing event is novel, offering

public administrators a new way to use an old tool. Such surveys are not without their limitations, though, and in the next section we provide additional insight on the advantages and challenges of DLG's survey.

Advantages and Challenges of Early Warning Surveys

In this section, we share some of the advantages and challenges learned from DLG's administration of its COVID-19 survey. With respect to advantages, we argue there are three: (a) the survey was relatively inexpensive with a relatively quick data and analysis turnaround time, (b) DLG asked both structured and open–ended questions, and (c) DLG obtained relatively accurate information because of who the survey targeted. With respect to challenges, we discuss three: (a) survey fatigue, (b) the need to ask policy relevant questions, and (c) the need to ask answerable questions.

Advantages

Inexpensive and Timely

DLG's survey was relatively inexpensive to implement and analyze. DLG staff estimated that the survey took 20 to 30 hours to complete and analyze (Thayer, personal communication, July 30, 2020). CML staff indicated an upper limit of 15 hours spent on the survey—SDA indicated it spent three hours, and CCI estimated it spent no more than eight hours on it. Based upon conversations with respective staff and publicly available records, we estimate the average hourly wage across the four organizations is $64.42, implying a total survey cost of $3,608. This is an upper limit since we assume the upper end of DLG's hourly effort, and the wage estimate is also biased upward since lower–wage earners probably comprise more of the hours spent than higher–wage earners.[3] While we do not have reliable information on costs to administer surveys to local governments for comparison, it is noteworthy that with a survey infrastructure now in place, DGL's average cost per survey declines, which is not true if surveys were contracted out. Because DLG's survey can be deployed during other economic shocks, using it becomes cheaper over time.

In addition, DLG's survey and analysis had a relatively quick data turnaround time. The survey was open for a week (April 3 through April 10), and DLG's report published ten days later (April 20). By comparison, Denver's 2018 National Citizen Survey (NCS) began on October 29, 2018 with the report published January 18, 2019. Yet, a simple comparison of survey dates can mislead given differences in the survey itself, such as the number of targeted respondents and the number of questions asked. In this case, NCS asked almost twice as many questions and reached 66% more respondents than DLG, but the NCS survey window from start to results publication was ten times greater. Notwithstanding other differences, it is important to point out that DLG designed and administered their survey in-house, whereas Denver contracted out, explaining some of the differences in survey data turnaround time (Folz, 1996).

Qualitative and Quantitative Responses

Surveys provide an opportunity to systematically obtain both quantitative and qualitative information about local conditions at the same time. Likert scales and multiple choice are question design choices yielding quantitative data that, while ready for lawmaker consumption more quickly, nonetheless limit the sort of information local officials may otherwise want to provide. Open–ended questions, on the other hand, provide the chance to voluntarily report useful information to state lawmakers, adding a richness to the survey that is not available using questions with canned response choices (Groeneveld et al., 2015).

DLG's survey contained two open–ended questions (questions 21 and 22 in Table A1 in the Appendix). These illustrate the value added to open–ended questions in early warning surveys. Question 21 asks about efforts to seek reimbursement from the federal government and state. Of the 348 jurisdictions answering the question, 10% disclosed that they were unsure what financial aid is available and from whom. This identifies a role for DLG as a purveyor of information; not all state aid to local governments needs to be financial. Question 22 asks officials to disclose any information they feel state and federal lawmakers should know. Below is a selection of these responses that further highlight the nuance available with open–ended questions:

- "One of our biggest expenditures of about $1 million is due to unbudgeted technology purchases to have essential employees work from home. FEMA does not allow for this to be reimbursed. Would like the ability to have a funding stream to reimburse for this, at least partially."
- "Our economy fell off a cliff, we need help!"
- "Some attorneys won't allow remote meetings still. We need legislation that clearly allows this."
- "The age group we employ between the ages of 16–23 are left out of federal help."
- "Concerned about next year and the property tax delinquency rate increase due to high unemployment today."

These sample comments reflect the varied nature of officials' concerns that cannot be fully captured by surveys with pre–determined answers or warmth–like Likert scales. Many respondents expressed concerns that federal funds from the CARES Act, Federal Emergency Management Agency, and the U.S. Small Business Administration do not allow for reimbursement of expenses like emergency sick leave, technology expenses for moving to remote work, or expenses made by hospital special districts. These concerns show that DLG, the state's local government associations (such as CML), and state lawmakers could assist local governments by lobbying Congress for better targeted aid.

Relatively Accurate

A possible criticism of early warning surveys is that they elicit information at a point in time in which information may be unreliable because the pandemic's scope and longevity was more uncertain. But these circumstances are also what make polling professional experts on local budgetary conditions important (Yang, 2020). DLG targeted city and town managers and county and special district executives as survey respondents, enhancing the likelihood of acquiring relatively accurate information about COVID-19's short–term fiscal impact early during the pandemic.

We can bring data to bear on this, because CML conducted a follow up fiscal impact survey of municipalities in the first week of July 2020. Officials were asked to speculate about fiscal 2020 impacts. At the time of CML's survey, municipalities, which operate on a calendar fiscal year, had three full months of information about COVID-19's fiscal and budgetary impacts, compared to when officials had two weeks' worth of information at the time of DLG's survey. Thus, CML's follow up survey provides a yardstick to compare the accuracy of information provided previously to DLG. Table 1 shows aggregate responses by questions common to both surveys. Response rates between the two were different with about 30 fewer municipalities responding to CML's survey than DLG's; it is unclear if this explains differences in responses.

Nonetheless, comparing the results show relatively minor differences with the most noteworthy being that by July the volume of municipalities expecting general fund impacts between $100 and $1,000 per capita shrunk, and the two extremes (less than $100 per capita and greater than $1,000 per capita) increased. From the standpoint of evaluating the early warning survey as an accurate evidence–gathering strategy, this comparison should boost our confidence that polling the right local people yields credible insights for state policy making.

Table 1. Comparison of Municipality Responses

	DLG (April 2020) %	CML (July 2020) %
Response rate	47	37
Anticipating general fund (GF) shortfall	82	80
Average anticipated GF shortfall	21	17
Anticipating GF shortfall greater than $1,000 per capita	9	11
Anticipating GF shortfall between $100 and $1,000 per capita	62	53
Anticipating GF shortfall less than $100 per capita	29	36

Importantly, the usefulness of early warning surveys depends on having confidence they are providing accurate information. As the comparison of the DLG and CML surveys suggests, evaluating an early warning survey may require a second survey, administered after some time has passed but asking the same fiscal impact questions. If questions across the surveys are different, the second survey may still provide actionable information for state officials, but it would not be meaningful for evaluating the specific early warning survey administered. To the extent officials' understanding of fiscal impacts change with time, already administered early warning surveys take on a new role, namely, becoming a means to track changes in officials' understanding of fiscal challenges.

Challenges

Survey Fatigue

DLG administered its survey at the same time other organizations did. Between mid-March and early April, organizations such as the International City/County Management Association, the National League of Cities, and the Government Finance Officers Association surveyed their constituents, which included Colorado local jurisdictions. Surveying officials during a pandemic when their attention is and should be directed elsewhere is demanding enough, but being one survey among a sea of surveys increases the chances of poor survey response (Ho, 2007).[4] Sinickas (2007) offers three recommendations to lessen survey fatigue. First, surveys should be coordinated to reduce overlap. DLG administered its survey in conjunction with CML, CCI, and SDA in an effort to avoid redundancies with each organization proposing questions. Collaborating with these organizations also may have helped legitimize the survey, signaling to local officials they are not wasting their time responding. Collaborating with national organizations, on the other hand, is more difficult to manage and, as discussed shortly in more detail, may yield less insightful policy–relevant information. Second, surveys should be short, asking the fewest questions necessary to get the information needed. On this criterion, the DLG survey could have been better designed, perhaps multiple shorter surveys (notwithstanding survey fatigue) focusing on specific policy areas (e.g., tax policy, budgetary coping mechanisms, and business relief) rather than a 22–question survey covering all policy areas. Third, administrators should show that survey results are important for respondents. Empirical evidence demonstrates that survey response quality and response rate increase as respondents know more about the purpose of the survey (Smyth et al., 2009). CML helped to demonstrate the survey's importance by introducing it to municipal officials.[5]

Asking the Right Questions

For surveys to be useful, they must ask respondents the right questions (Guerra, 2003) whose answers provide actionable intelligence about local conditions to aid policy design. But asking the right questions involves balancing conflicting survey design goals. For example, survey design collaboration may help boost response rates and provide state lawmakers richer

information about local conditions, but collaboration can result in asking more questions (increasing survey fatigue) and asking questions that may not be relevant to all collaborators. Moreover, asking policy–relevant questions is presumably more difficult in states where local governments tend to have greater fiscal autonomy, where states devolve greater responsibility to local authorities. In such instances, local government fiscal structures and budgetary options are more likely to vary, increasing the likelihood the policy–relevant questions applicable to one community are not applicable to others.

Asking the right questions typically entails a chicken and egg problem—we do not know the right questions to ask until we understand the fiscal challenges communities face, but we do not know the challenges they face until asked. An open–ended survey question, then, presents an opportunity for respondents to provide information they believe to be important but about which state officials may not have the knowledge to ask.[6] By way of example, Question 7 in DLG's survey asked officials to identify all the revenue streams they are concerned about being impacted by COVID-19. While most identified the property tax as cause for concern, more useful for policy design is knowing what about the property tax is cause for concern. DLG's Question 22 allowed officials to disclose additional details, and 15% of responding communities stated that deferred payments and delinquencies are concerning, rather than decreasing property values. This additional detail suggests statewide strategies for boosting local personal income (such as circuit breakers that reimburse jurisdictions for revenue losses) may be more helpful than efforts to support local property markets.

Asking Answerable Questions

Related to asking the right questions, it is equally important to ask answerable questions. Phrasing questions unambiguously and avoiding nonspeculative questions reduces the likelihood of nonresponse (Ornstein, 2013). Asking answerable questions is particularly challenging when answers are expected to be prospective, however (Alwin, 2007). For instance, DLG's Question 9 asked respondents to identify if officials expect general fund reductions with four response options possible: (a) the official does not anticipate a reduction, (b) does anticipate a result, (c) the jurisdiction does not have a general fund, or (d) unknown. The follow up question, Question 9a, asked those expecting a reduction to report the magnitude of anticipated reduction in percentage terms. Though we provided evidence that officials' forecasts were accurate, 23 jurisdictions (about 10% of those answering) in DLG's survey failed to speculate about the size of the reduction despite indicating they expected it. It is unlikely this nonresponse is due to ambiguous wording, instead reflecting a reluctance to speculate.

Asking respondents to speculate is an unavoidable aspect of early warning surveys, but steps can be taken to improve the quality of speculation, aside from targeting informed officials. Response accuracy is a function of time; as time passes, officials gain better insight about the pandemic's effects. It stands to reason, then, that the window of time the survey is available is crucial. The longer the window is open, the more likely responses will be credible. On the other hand, if the window is too long, it threatens the timeliness of the survey results, and if too short, response accuracy is threatened. Existing scholarship does not provide insight on the optimal survey window for response accuracy; however, DLG allowed officials multiple opportunities to respond. If officials gain pertinent knowledge after responding to the survey, they have additional chances to update their speculations. Providing multiple opportunities to respond strikes us as a reasonable survey design strategy to enhance the quality of information gleaned.

Determinant Analysis of Expected Revenue Loss

In this section, we offer an empirical analysis of DLG's survey to illustrate the sort of policy–

relevant information they can provide lawmakers. The insight we offer is that by surveying all local governments in a state, state officials can improve their policy making decisions even if only a fraction of local governments return the survey. This is made possible by states already having collected considerable financial information about local governments, which can then be used to model the bias that arises from selective survey response. For the forgoing analysis, we focus on questions eliciting information on jurisdictions' expected revenue loss during the remainder of fiscal year 2020.[7] Specifically, officials were asked to report the amount of predicted losses from revenue streams they are most concerned about as well as losses to the general fund. (Questions 8 and 9 in Table A1 in the Appendix.) The separate questions are necessary because many special districts do not have general funds.

At the time of the survey, Colorado boasted 4,099 local governments: 272 municipalities, 62 counties, and the balance special districts including schools.[8] Of these, 482 leaders provided their perspectives on COVID-19's forecasted impacts: 76% of cities, 82% of counties, 36% of towns, and 8% of special districts.[9] While the 482 responses amount to a 12% response rate, this rate is skewed downward due to the abundance of special districts in the state. Nearly every county and about half of the municipalities responded, and since these entities provide many more public services and have more revenue streams than special districts, the survey responses help paint a credible statewide picture of local officials' concerns early in the pandemic. Of the reporting jurisdictions, 261 stated they expected their revenue to be affected by COVID-19, but only 238 provided an estimate of the anticipated revenue loss.[10] Table 2 details the predicted revenue losses by jurisdiction type. We disaggregate cities and towns due to differences in the sizes of the populations they serve. Table A2 in the Appendix details differences in mean characteristics between responding and nonresponding jurisdictions.

Across all jurisdictions, officials expected nearly $900 million in revenue losses, and more than half of this is from cities. When expressed relative to budgeted expenditures for the year, however, towns and special districts report larger expected losses. Whereas the statewide average is 5.7%, expected losses for towns and special districts are 10.6% and 8.7% of budgeted expenditures, respectively. This finding is notable since towns and special districts tend to have fewer resources, implying COVID-19's impact may hit the poorest jurisdictions the hardest. This conclusion is supported by the second part of Table 2, which breaks the expected revenue losses down by fiscal year 2020 budget quantile. The predicted revenue loss burden decreases as wealth increases.

A third way to consider the data is by ruralness. COVID-19 did not strike rural America in force until well after it had spread within and across urban centers (Bosman et al., 2020). Thus, early during the pandemic, rural local officials may not have perceived a fiscal threat, and therefore they may have been less likely to report negative revenue impacts. The third part of Table 2 provides limited evidence to this effect. While the average percentages are greater for rural than nonrural in the table, the differences are not statistically different from zero for all jurisdiction types reporting.

The conclusions drawn from the data in Table 2 may be limited, since they reflect the opinions of only the officials that responded to the survey. Policies designed only with the feedback from some local governments may be inefficient. For instance, if only local governments with the time and resources to complete the survey do so, then the policies derived from the survey reflect the needs of these jurisdictions, not the needs of the jurisdictions with fewer resources.

We explore the descriptive data in more depth with a determinants analysis to identify which local characteristics are the best predictors of perceived revenue loss. A useful feature of state–level surveys to local governments is that the population of jurisdictions is known, and data for them are likely collected by various state agencies. This suggests that nonresponse can be modeled, and selection bias can be corrected, and we use the Heckman correction method to do so. The purpose of the analysis is not to replace a more thorough evaluation using more

Table 2. Expected Revenue Loss by Jurisdiction Type and Size

	N	Predicted Loss	FY20 Budget	% Share
Jurisdiction Type				
Cities	52	$540.1	$9,112.0	5.9
Counties	40	$155.0	$4,408.0	3.5
Towns	56	$98.1	$928.6	10.6
Special Districts	90	$100.4	$1,064.1	9.4
Budget Quantile				
$0.01–$0.4	19	$0.9	$3.3	26.9
$0.5–$1.9	40	$6.1	$46.2	13.1
$2.1–$6.9	47	$17.7	$212.0	8.4
$6.9–$24.0	55	$65.4	$802.4	8.2
$24.4–$3,718.1	77	$704.4	$13,912.0	5.1
Ruralness				
Cities	52	$540.1	$9,112.0	5.9
Nonrural	37	$511.6	$8,645.9	5.9
Rural	15	$28.5	$466.0	6.1
Counties				
Nonrural	15	$125.2	$3,653.6	3.4
Rural	25	$29.8	$754.4	4.0
Towns				
Nonrural	30	$56.9	$564.0	10.1
Rural	26	$41.1	$364.6	11.3
Special Districts				
Nonrural	68	$89.7	$964.4	9.3
Rural	22	$10.7	$99.8	10.7

complete data, and nor are causal claims offered. Instead, the goal is more simply to provide greater insight on the conclusions drawn from Table 2 using available data; to simulate the sort of analysis that could be accomplished by state officials in a short period of time.

We are interested in estimating parameters to the following equation:

$$\ln\left(\frac{LOSS}{BUDGET}\right)_i = \beta_1\left(\frac{STREV}{TOTALREV}\right)_i + \beta_2 \ln(BUDGET)_i + \gamma R_i + \delta_j T_i + \varepsilon_i$$

where *LOSS* is the expected revenue loss for jurisdiction *i*, *BUDGET* is the jurisdiction's fiscal year 2020 budget; *STREV* is the sales tax revenue; *TOTALREV* is the total revenue; *R* is an indicator equal to one if a jurisdiction is rural using the definition proposed by Propheter (2019); *T* is a categorical variable denoting the type of jurisdiction—city, town, or county—with cities being the reference group; and *ε* is a disturbance. *BUDGET*, *R*, and *T* are motivated by the conclusions drawn from Table 2. The variable $\left(\frac{STREV}{TOTALREV}\right)$ measures each jurisdiction's reliance on sales tax. COVID-19 halted much of local jurisdictions' sales tax–generating economic activity, and subsequent policy discussions at the state level focused on the sales tax (Chuang, 2020). On the other hand, the U.S. Supreme Court's decision in the Wayfair case may have mitigated these losses, since sales tax for online shopping is collectible (Afonso, 2019). This variable tests if a jurisdiction's reliance on the sales tax predicts officials' expectations about revenue loss.

Table 3 reports the results from four models: ordinary least squares (Column 1), a Heckman correction without exclusion restrictions (Column 2), a Heckman correction with average household size as an exclusion restriction (Column 3), and a Heckman correction allowing

Table 3. Determinant Analysis of Expected Revenue Loss

	OLS (1)	Heckman w\o excl. restrictions (2)	Heckman w\ excl. restrictions (3)	Heckman w\ excl. restrictions (4)
Log sales tax reliance	.321	.326***	.340***	
	(.105)	(.093)	(.106)	
Log budget	.013	.019	.035	.150
	(.086)	(.109)	(.113)	(.143)
Rural	-.122	-.117	-.107	.221***
	(.294)	(.304)	(.297)	(.056)
County	-.210	-.199***	-.166***	-.785
	(.065)	(.038)	(.062)	(1.181)
Town	-.088	-.111	-.165	.649
	(.206)	(.142)	(.189)	(.722)
Observations	165	332	332	332

sales tax reliance to vary with ruralness (Column 4).[11] We choose to present all results for transparency, and there is consistency in signs across all models. Note that special districts are excluded from the analysis because complete budget information for them could not be collected.

From Table 2, we concluded that towns were the most likely to perceive a negative fiscal impact from COVID-19, but after introducing controls, this conclusion is not corroborated. In the preferred model (Column 3), counties on average report predicted revenue impacts $\left(e^{(-.166)} - 1\right) * 100 = 15\%$ less than cities, and there is no difference in expected impacts between cities and towns. This result is sensible, since cities and towns rely less on the property tax and more on the sales tax than do counties in Colorado (Propheter, 2019), and the property tax base is not affected by the economic effects of COVID-19 in the short run.[12]

The finding of most practical significance is that sales tax reliance positively predicts local officials' expectations of revenue loss. The point estimate in the preferred model (Column 3) indicates that each one percent increase in sales tax reliance is associated with a 0.34% increase in expected revenue loss. At the sample mean, this estimate implies that a jurisdiction that draws one percent more of its total revenue from the sales tax will report that 10.2% of its budgeted revenue are threatened by COVID-19's economic impacts compared to the 7.6% predicted loss for an otherwise similar jurisdiction less reliant on the sales tax. Moreover, the interaction model extension in Column 4 further reveals that the effect of sales tax reliance varies by ruralness, with rural jurisdictions more reliant on the sales tax, reporting 25% greater revenue loss impacts compared to nonrural jurisdictions similarly reliant on the sales tax.

Note that a naive ordinary least squares regression concludes that sales tax reliance is statistically unrelated to perceived impact. By extension, policy designs based only upon the opinions of the local officials that returned the survey may lead state officials to incorrectly conclude that sales tax reliance and ruralness are unimportant criteria for evaluating need. Instead, the more compelling Heckman models suggest that socially efficient state aid should be targeted towards more sales tax reliant and more rural communities.

Conclusion

COVID-19 presents unprecedented economic challenges for local governments, which puts unprecedented pressure on state officials to find ways to assist communities. The sudden and widespread impact of stay-at-home orders on local tax bases will persist into the foreseeable future, making recovery difficult to envision. States have a financial interest, and perhaps a

moral obligation, in supporting local government recovery; helping communities recover helps the state recover (Becket-Camarata, 2004). However, an enduring challenge for states during fiscal crises is determining which communities need how much of what sort of assistance (Coe, 2008).

In this paper, we argue that one promising strategy is an early warning survey—a survey administered to local governments with questions focused on obtaining actionable and policy–relevant information. We explore a survey with this focus in mind administered by Colorado's Division of Local Government in the Department of Local Affairs, the results of which were used to inform the state's fiscal policy response. Notably, owing to the well–known and stringent revenue and spending limitations in Colorado, the survey results in this study may not generalize outside of the state, but the function of the survey as an early warning system still generalizes. We believe early warning surveys as a rapid, evidence–gathering strategy are a promising practice during sudden and widespread economic shocks.

Furthermore, this paper highlighted the usefulness of surveys designed and administered by states. During the early part of the pandemic, nonprofit professional associations, such as the NLC and ICMA, designed and administered surveys for their respective local government constituencies. These surveys may not have been intended to inform state level policy responses to the pandemic, evidenced by the few number of questions and the relative simplicity of the information being asked. In contrast, DLG's survey asked over 20 questions specifically focused on gathering information to improve the state's fiscal policy response. While we argued this approach yielded actionable policy insights, how much more we can learn from state–specific surveys compared to nationally administered ones remains an open question.

However, like all promising practices, the merits of early warning surveys should withstand academic scrutiny, particularly as it relates to local government outcomes. For example, DLG used its survey to inform its CARES disbursement policy. An empirical question, then, is if the policies adopted resulted in different local government awards, and, further, how these communities differed in terms of their recovery trajectories. At the time of writing, data on the state's CARES disbursements are unavailable, a matter that remains for future research. Additionally, the battery of questions DLG asked the state's local governments may serve as a blueprint for developing fiscal measures more useful for evaluating fiscal health during periods of widespread economic shocks.

Notes

1. Data on how much state and federal aid local governments have received to date is incomplete. According to the National Conference of State Legislatures, at the time of writing, states have appropriated over $4 billion for COVID-19 relief, with much going to local public health. Under the CARES Act, local governments will receive over $29 billion while an unknown portion of the $110 billion to states will also go to local governments.
2. The survey was web–based and opened about a week after Governor Polis issued a stay-at-home order on March 26. The survey closed on April 10.
3. We could not obtain information on how long it took local government officials to complete the survey, a cost that is thus excluded from our survey administration estimate.
4. We have no information on how many Colorado local jurisdictions responded to other surveys, and therefore we cannot provide quantitative data supporting or rejecting survey fatigue in fact. Moreover, the volume of surveys that local officials across the country were asked to respond to early during the pandemic is staggering, increasing the demand for officials' attention during a period when they are least able to supply

it. This situation begs the question whether national, state, and local nonprofit organizations should collaborate on survey administration rather than compete for local officials' time. Appropriate ways to organize survey administration across nonprofits focused on policy responses at different levels of governments is not a topic within the scope of this paper, but we hope future scholarship can help shed light on this dynamic problem.

5. The survey's introduction of municipal officials stated, among other things, that the survey "information will be used in conversations with the Colorado congressional delegation, as well as state legislators, to demonstrate the need for direct funding to municipalities of all sizes."

6. Aldag et al. (2019) provides a useful alternative to this issue. They use a focus group of local officials to inform the design of a survey that would then be disseminated to local officials statewide. Focus groups could help improve early–warning survey design for future crises.

7. Since the purpose of this analysis is simply to illustrate the usefulness of rapid–response surveys, we forgo much of the analysis of the survey data that would otherwise be expected to be included in an academic paper. Instead, we will make any additional analysis available upon request. In addition, we direct those interested to the various websites maintained by the Department of Local Affairs that reports various fiscal and budgetary information for local governments in the state. Most of these data are available at https://cdola.colorado.gov/budgeting-and-finance.

8. The cities of Denver and Broomfield are consolidated city–counties. They are categorized as cities for this analysis.

9. A total of 501 surveys were returned to DLG, but 20 of these were submitted by consultant groups managing the affairs of multiple special districts. These are excluded from the analysis.

10. Though only 54% of jurisdictions responding reported expected revenue impacts, this is biased downward because of special districts. Of the reporting jurisdictions, the following percentages of each jurisdiction type reported expected losses: 98% of cities, 86% of counties, 84% of towns, and 33% of special districts.

11. Exclusion restrictions are necessary. While the inverse Mill's ratio derivable from the first stage probit is technically nonlinear, and thus uncorrelated with the second stage parameters, it is nonetheless nearly linear over much of its profile. Thus, without exclusion restrictions, there is doubt as to whether the inverse Mill's ratio is capturing the unobserved selection effect or simply a specification error due to collinearity (Wooldridge, 2010). Exclusion restrictions predict selection but not the outcome. We assume, based on the authors' conversation with local officials, that local officials facing greater political and bureaucratic pressures from residents were more likely to respond, to inform the state of their challenges. We assume that jurisdictions with larger households are more likely to impose such pressures on local officials, because larger households suggest greater density of families, and hence children. In the unreported first stage probit, mean household size positively predicts survey response at the 99 percent level. Full first stage results are available upon request but are omitted here to conserve space. While n+1 exclusion restrictions are desirable for each endogenous predictor, we could only theoretically justify one (average household size) with the data available.

12. The local property tax base for the purpose of calculating tax rates was set a year before COVID-19 appeared. In the longer run, stay-at-home orders could affect the property market, which eventually would be reflected in the local property tax base.

13. In Table 1, the data are for municipalities only. DLG's survey was administered the first week of April 2020 while CML's was administered the first week of July 2020. Percentages are based upon responding municipalities.

14. In Table 2, dollars are nominal and in millions. AV means assessed value. Following Propheter (2019), ruralness is defined based upon distance to a passenger airport.

15. In Table 3, the dependent variable is the natural log of the expected revenue loss divided by the jurisdiction's fiscal year 2020 budgeted expenditures. Standard errors are clustered at the metropolitan statistical area level. Column 1 contains coefficients using ordinary least squares on the returned survey data. Column 2 contains coefficients using a Heckman correction without the mean household size exclusion restriction. Column 3 contains coefficients using a Heckman correction with the exclusion restriction. Column 4 contains coefficients from the same Column 3 model with interaction terms added. The coefficients displayed are only for the respective variables interacted with log sales tax reliance. First stage profit results are omitted to conserve space but are available upon request.
16. In Table A2 (see Appendix), due to overlapping populations and the difficulty of compiling fiscal information for all special districts, they are omitted from this table.

Disclosure Statement

The author(s) declare that there are no conflicts of interest that relate to the research, authorship, or publication of this article.

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Appendix

Table A1. DLG Survey Questions

Questions	Response Type
1. What type of local government do you represent?	Categorical
2. What is the amount of your entity's total budgeted operating expenditures for 2020?	Categorical
3. How many months of operating expenditures does your organization have in reserves?	Discrete
4. Do you anticipate having to utilize these reserves to cover your operating budget?	Binary
5. Have you or will you adopt an emergency contingency ordinance/resolution to access reserves in response to anticipated reductions in revenue?	Binary
6. Do you anticipate having to access your TABOR emergency reserve for COVID-19 response expenditures?	Binary
7. What revenue types are you most concerned about a reduction in due to COVID-19 during the 2020 budget year?	Categorical
8. What is the estimated aggregate revenue decline of these revenue sources during the 2020 budget year?	Continuous
9. What overall General Fund revenue reduction are you anticipating in 2020?	Categorical
9a. Enter the percentage of General Fund reduction	Continuous
9b. Enter the $ amount of General Fund reduction	Continuous
10. Does your organization have sales & use tax?	Binary
11. What percentage of your 2020 General Fund revenue is comprised of sales/use tax?	Continuous
12. What % reduction in sales/use tax do you anticipate for 2020?	Continuous
13. What % reduction of sales/use tax revenue do you anticipate from the "restaurant" category for 2020?	Continuous
14. What % reduction of sales/use tax do you anticipate from the "lodging" category for 2020?	Continuous
15. What types of expenditures related to COVID-19 has your organization incurred, or you anticipate will incur, over the 2020 budget year? (Ex: staff overtime, staff sick/administrative leave, technology/equipment for remote work)	Categorical
16. At this time, what do you anticipate or forecast spending on your response and recovery from COVID-19?	Continuous
17. What budget strategies are you currently implementing to address revenue loss? Check all that apply: (Ex. Delay capital projects, delay equipment purchases, hiring freezes)	Categorical
18. What types of services have you reduced, or expect to reduce, for the 2020 budget year in response to COVID-19 expenditures and/or loss of revenue? (Ex: general government, public works, parks, and recreation)	Categorical
19. What, if any, methods are your organization considering to support local businesses? (Ex: relief fund for local business assistance, marketing support, waiving late fees/penalties)	Categorical
20. What, if any, methods are your organization considering to support residents who are suddenly out of work? (Ex: suspending utility shutoff, offering utility payment plans, utility late fees waived)	Categorical
21. What efforts are you undertaking in order to be potentially reimbursed for extra costs from federal or state funds?	Open–ended
22. What other financial information, if any, would you like to share with state and federal legislators to help them understand the impact your municipality is anticipating due to the coronavirus?	Open–ended

Journal of Public and Nonprofit Affairs

Table A2. Differences in Means between Responding and Nonresponding Jurisdictions

	Responding	Nonresponding	Difference
All jurisdictions			
Observations	179	153	
Sales tax reliance	0.333	0.278	-0.054**
	(0.017)	(0.017)	(0.024)
Population	48,408	12,656	-35,753***
	(10,006)	(5,460)	(11,400)
Budget per capita	3,861	7,558	3,697
	(328)	(2,883)	(2,902)
AV per capita	23,459	45,272	21,813
	(2,473)	(19,373)	(19,531)
Cities			
Observations	57	17	
Sales tax reliance	0.503	0.362	-0.141***
	(0.020)	(0.039)	(0.042)
Population	55,678	27,712	-27,966
	(16,215)	(11,097)	(19,649)
Budget per capita	3,708	28,553	24,844
	(412)	(23,365)	(23,368)
AV per capita	26,929	137,493	110,564
	(5,873)	(126,069)	(126,206)
Towns			
Observations	71	125	
Sales tax reliance	0.352	0.283	-0.068**
	(0.026)	(0.020)	(0.032)
Population	3,439	2,697	-743
	(898)	(839)	(1,303)
Budget per capita	5,336	5,182	-154
	(687)	(1,530)	(2,096)
AV per capita	21,215	34,638	13,423
	(3,557)	(16,528)	(22,118)
Counties			
Observations	51	11	
Sales tax reliance	0.116	0.094	-0.022
	(0.014)	(0.025)	(0.031)
Population	102,886	102,560	-326
	(28,348)	(70,314)	(69,111)
Budget per capita	1,979	2,115	136
	(288)	(458)	(658)
AV per capita	22,706	23,596	890
	(2,854)	(8,048)	(7,170)