

Causes and Consequences of Fiscal Stress in Michigan Municipalities

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Introduction

In recent years, Michigan local governments have experienced significant and ongoing budgetary challenges. The underlying causes of this fiscal crisis are threefold. First, Michigan's economy, with its shrinking manufacturing base, has struggled and this is especially true since 2001. In 2000 Michigan's economy was performing well, as indicated by its 3.8 percent rate of unemployment. However, beginning in 2001 Michigan's economy began a long and steady decline. Unemployment jumped to 5.2 percent in 2001 and increased over the next seven years, reaching 12.9 percent by April 2009. Through 2006 Michigan's economic hardship was largely due to declines in manufacturing, in the context of a state that has historically relied on manufacturing as the primary component of its economic base. Since 2007, however, the challenges have been exacerbated by the

severe national recession.¹ Second, continuing structural deficits at the state level have led to reductions in revenue sharing to local units. Third, the combination of restrictive property tax limitations and a down housing market over the past two years has exacerbated fiscal conditions.

Our analysis identifies the primary causes of fiscal stress and examines its consequences for nearly all Michigan municipalities using data for fiscal 2005, 2006, and 2007.² To preview our complete analysis, we find that of the core expenditure categories, health and welfare spending has been most vulnerable (in those municipalities that offer such services). Public works and general government have also been cut in areas with increasing fiscal stress. Interestingly, we find that capital spending actually increases with fiscal stress, whereas noncapital spending is reduced. One possible explanation is that stressed communities are targeted by state and federal government for reinvestment.

Michigan may be a harbinger for what is to come in other parts of the nation.

This research may offer critical insights regarding the likely implications of the real estate crisis for communities in other parts of the nation that have, until very recently, enjoyed relative economic prosperity and limited fiscal distress. In several ways, Michigan may be a harbinger for what is to come in other parts of the nation. In the next section, we provide a brief summary of existing research that has focused on state and local government fiscal crises. We then present a particularly illuminating

¹The recent declarations of bankruptcy by Chrysler and General Motors illustrate the severe economic challenges, both nationwide and in Michigan.

²Fiscal 2008 data will be available soon and we plan to update this report once we have access to those data.

case study of Saginaw, Mich., a city that has experienced prolonged fiscal stress. Next, the framework used to guide the empirical analysis is presented. Both the case study and this framework inform the econometric analysis. That is followed by a presentation of our analysis, and the conclusion.

Literature Review

There is a substantial literature that attempts to measure and evaluate how local governments in the United States cope with fiscal stress. However, measuring abstract notions of “fiscal capacity” or “fiscal stress” in the context of subnational governments is a challenging task. Given that our objective is to develop an appropriate measure of fiscal stress and then evaluate how municipalities in Michigan have coped with the challenges, we restrict our literature review to articles that focus on the measurement of and responses to fiscal stress in subnational governments in the United States.

As noted in Chernick and Reschovsky (2007), there are numerous studies that attempt to address the difficult challenge associated with developing an accurate measure of local government fiscal conditions. Generally, we place those measures into two categories. The first is fiscal stress that has, in part, been determined by local government decisions. For example, poor fiscal management may lead to significant fiscal challenges (that is, substantial and ongoing debt or the use cash from restricted funds for general purposes). However, fiscally conservative local officials may well make the difficult decisions to cut expenditures to avoid fiscal irresponsibility. In that case, a local government, though it is in fact experiencing significant fiscal stress, may appear to be fiscally sound. A second approach is to define fiscal stress, not based on local official actions, but on the underlying economic circumstances causing the crisis. For example, rising healthcare insurance costs might be a driving factor, especially in combination with a flat or declining property tax base. Similarly, flat or declining state revenue sharing may also be a driver in determining underlying fiscal conditions. For the purposes of this study, we seek to measure fiscal stress by those underlying fiscal and economic conditions, not by the possible mismanagement of local government fiscal affairs.

A report published by the U.S. Advisory Commission on Intergovernmental Relations (1973) is one of the early studies that examined the fiscal health of cities. In particular, the report identified six indicators of fiscal stress:

- an imbalance in the operating fund;
- a consistent pattern of current expenditures exceeding current revenue over several years;
- an excess of current operating liabilities over current assets;

- short-term operating loans outstanding at the end of the fiscal year, or the borrowing of cash from restricted funds;
- a high and rising rate of property tax delinquency; and
- a substantial decrease in assessed values.

Other studies, including Dommel and Nathan (1978), the Congressional Budget Office (1978), U.S. Department of Treasury (1978), the Municipal Finance Officers Association (1978), the International City/County Management Association (Groves and Valente 1994), Brown (1993, 1996), and Kloha, Weisert, and Kleine (2005), later attempted to measure fiscal health using variations/modifications on this general theme. However, a drawback of that approach in the context of our study is that it combines both external forces with internal local government management decisions. For example, a local decision-maker, in the interest of maintaining fiscal responsibility, may decide to significantly cut spending to avoid fiscal imbalance and short-term operating loans. By measures such as those, that community may appear to be fiscally sound, even though it is experiencing fiscal distress. Those measures, though useful for many purposes, will not provide an effective measure of fiscal distress if one seeks to understand how local decision-makers have responded in terms of allocating increasingly limited resources to the various functional categories.

The recent work of Hendrick (2004) makes distinctions between three categories of fiscal health, which she characterizes as “slack,” “balance,” and “environmental” factors. Slack includes measures such as unreserved fund balances, capital expenditures as a percentage of total expenditures, and reliance on enterprise income, whereas balance is meant to capture expenditures and needs of a community relative to its revenue-generating capacity. Finally, environmental health measures the overall fiscal condition of the community. For our purposes, we need to focus on the external forces (balance and environmental health) that determine fiscal health, and we now turn our attention to that work.

Ladd and Yinger (1989) defined fiscal health in terms of the “need-capacity gap.” That approach attempts to measure fiscal stress by combining expenditure needs with revenue-raising capacity. Generally, expenditure need is defined as the spending required to provide an average level of public services, whereas revenue-raising capacity is defined as the revenue that could be raised at the average tax rate for all local governments. Reschovsky (1993), Sjoquist (1996), Chernick and Reschovsky (2007), and others have used similar frameworks to assess fiscal health. We use that general approach to assess fiscal health in our study, and we extend that body of research by examining the relationship between that externally driven measure of fiscal health and changes in the various

municipal spending categories: general government, public safety, public works, health and welfare, community and economic development, recreation and culture, other expenditures, and capital and noncapital expenditures. We now turn to a review of the fiscal history of Saginaw, a city that has been in intense fiscal crises for many of years.

Saginaw's Experience

Saginaw exemplifies the challenges and struggles of many Michigan manufacturing-based municipalities. The city's population, which peaked in the 1950s at over 100,000, has declined to just under 60,000 by 2009; an exodus of nearly 40 percent of the population. That exodus has been driven by the aging and decline of the automobile and related industries and a continuing and sustained rise in lawlessness and lack of public safety. The city government has struggled to respond to those challenges and proactively stem the decline. This case study is designed to highlight the changes in public finance and service delivery from the period of the late 1970s through the first decade of the 2000s. This examination will provide some guidance for developing hypotheses about the types of changes to financing and public services that other struggling Michigan cities have used to stabilize themselves.

As in most states, Michigan requires local units to have a balanced budget. A balanced budget implies that all forms of incoming resources are equal to outgoing or uses of resources. Resource use may include current and capital expenditures as well as transfers to other funds. Incoming resources includes taxes, fees, other forms of income as well as transfers into a fund from other funds, and any emergency stabilization or rainy day funds used. For Saginaw, the choices for balancing the budget over time are to increase revenue, use one-time resources such as fund transfers and rainy day funds, or reduce expenditures. In this section, we discuss the trends and use of all those strategies in Saginaw.

Revenue

In 1979 the city's general fund revenue in real 2005 dollars was \$61.71 million and had fallen to \$31.05 million in 2007.³ However, in 2005 the city passed for the first time a public safety extra voted millage, which generates approximately \$3.6 million to supplement the general fund. Thus, true total general fund available resources are \$34.65 million. Despite that new millage, real general fund revenue has fallen by nearly 50 percent over the period. While that reduction roughly matches the decline in the city's population, the land area over which services must be provided has not changed.

³All dollar figures are expressed in real terms (2005 dollars) unless otherwise stated.

One important aspect of Saginaw's financial resources is a unique property tax cap that was implemented in 1979. That cap limits the city property tax revenue to the 1979 levels. Any potential revenue growth resulting from growth in the tax base is forgone because the millage rate must be rolled back to maintain the 1979 property tax revenue levels. In 1979 the city collected over \$10.3 million from property taxes but by 2007 that revenue had been cut by nearly two-thirds. The imposition of that city-specific tax limitation severely constrained revenue, and has led to a major shift from the property tax to a reliance on the city income tax. (See Table 1.)

Table 1.
Saginaw Revenue and Spending in
Real 2005 Dollars (in millions of dollars)

Category	Fiscal 1979	Fiscal 1995	Fiscal 2007
Income Tax	\$20.23	\$16.87	\$12.71
Property Tax	\$10.31	\$5.18	\$3.76
Stated Shared Revenue	\$10.88	\$12.05	\$9.26
Total Revenue	\$61.71	\$41.32	\$31.05
Police	\$14.36	\$15.33	\$11.43
Fire	\$8.07	\$9.91	\$8.98
Total Expenditures	\$58.12	\$41.16	\$30.23
Population	77,508	69,512	62,422

As a result, the revenue structure has changed dramatically over the past few decades (see Table 2, next page). Today, the city income tax and state revenue sharing are the dominant sources of funding for the city general fund, followed in distant third by the property tax. Saginaw is one of 22 cities in Michigan that rely on a city income tax. City income tax collections equaled \$17.65 million in 2000 and have since dropped dramatically over the past nine years. By 2007 the income tax revenue had declined to just \$12.71 million. For comparison, income tax collections in 1979 were \$20.23 million. Thus, in real terms income tax collections in 2007 were about \$7.52 million lower than they were in 1979.

State shared revenue is another major source of funding to the city general fund. In 2000 revenue sharing accounted for over \$14.62 million, but has since decreased. In 2007 state revenue sharing was down to \$9.26 million, a drop of over 36 percent. Those cuts are largely the result of the state budget problems and budget reductions. That mirrors the experience of many other local governments across the state. From a longer-term perspective, the city

Table 2.
Saginaw per Capita Revenue and Spending

Category	Fiscal 1979	Fiscal 1995	Fiscal 2007
Income Tax	\$261.01	\$242.72	\$203.65
Property Tax	\$133.02	\$74.49	\$60.29
Stated Shared Revenue	\$179.04	\$173.29	\$148.40
Total Revenue	\$796.21	\$594.37	\$497.42
Police	\$185.32	\$220.47	\$183.10
Fire	\$104.09	\$142.51	\$143.90
Total Expenditures	\$749.89	\$592.14	\$484.23
Population	77,508	69,512	62,422

collected state shared revenue of \$13.88 million in 1979; revenue sharing is considerably less today than it was in 1979.

The property tax is the third-most important source of revenue in the city. For the general fund, property tax revenue is limited to collections of about \$3.8 million and have declined dramatically since the 1970s. As stated earlier, an extra voted millage was passed in 2005 for police and fire operations. That millage, which required the city to maintain a certain level of effort regarding police and fire staffing, is set to sunset in 2011 and must be renewed by the voters. The extra voted millage has allowed the city to avoid further cuts in the public safety departments.

Other revenue sources for the general fund include licenses and permit fees, penalties, sales of assets, indirect costs (overhead charges), and interest income. Generally, those sources of funding have been declining in real terms over the years. For example, those revenue sources accounted for approximately \$10.42 million in 1979, but had fallen to \$5.18 million by 2007.

Expenditures and Services

The Saginaw analysis primarily covers the general fund services such as police, fire, code compliance and finance, and general government. In 1979 Saginaw spent \$58.12 million (in 2005 dollars), and by 2007 general fund expenditures had decreased to \$30.23 million. For 2007 the bulk of spending falls under the category of public safety (\$20.41 million). As previously highlighted, an additional \$3.6 million of public safety spending occurs via special revenue funds and in particular the public safety extra voted millage. The rest of general spending was accounted for in general government, administrative services, and public works. Also, the bulk of public works spending on infrastructure, particularly the road system, occurs in special revenue funds dedicated to local and major street funds. Those funds are constrained by receipts from the state gas tax. A likely

result of the ongoing fiscal stress within the city is the inability of the general fund to provide additional resources to the local or major street funds and the inability of city leaders to provide resources through an extra voted millage, for example.

Saginaw spent \$14.36 million (in 2005 dollars) on police operations in 1979. In 2007 the city spent \$15.03 million, including funding from the millage. Thus, the police department in the city has, to some extent at least, maintained its funding levels in real terms; however, police staffing has declined. In 1997 there were 154 full-time equivalent (FTE) sworn officers in the Saginaw police department and 99 FTE in 2007. In 2007 police employees accounted for one-quarter of all city employees and about one-quarter of the city's general fund budget. That represents a reduction of over 55 FTE positions over 10 years, but the losses were concentrated during the 1999 to 2005 period — coinciding with the ongoing major state recession that began in 2000. Despite the continuing challenges, police expenditures over that period have held steady in real terms. The fact that police expenditures were constant while staffing fell indicates that either the remaining staff were working significant overtime or nonwage benefits and salaries increased substantially over the period. The different stories regarding staffing and the financial figures indicate that addressing fiscal stress is often complex. Although it is clear that the budget has not increased in real terms, which may be beneficial in terms of managing short-term fiscal conditions, reductions in staffing diminishes response time and capacity of the police personnel that remain. Minor crimes are often not responded to at all, or are responded to only after a significant delay.

A property tax limitation has led to a major shift from the property tax to a reliance on the city income tax.

The Saginaw Fire Department is another major component of the general fund budget. In 1979 the total fire budget was \$8.07 million and was \$8.98 million in 2007. In terms of staffing, the city fire department was at 100 FTE in the early 1990s and maintained that level until the early 2000s. Since the early 2000s, staffing has been reduced to 64 FTE. The city's fire department accounts for about 15 percent of the general fund budget. The mix of services provided has changed: The number of fires has fallen, but the number of ambulance runs has increased.

In the area of general government, which includes the city clerk, city council, city manager, human relations (employee services), and some other basic

services, spending has been constrained. After inflation adjustments, the fiscal services and general government departments have a total budget of \$4.01 million, compared with a budget of \$5.03 million in 1979. Much of that reduction occurred in the early 2000s. Since 1990 the biggest reduction came in the city manager's budget allocation, which was cut by \$171,049 (-39 percent).

Another major service area is called general services. Those services include civil engineering, street lighting, building and grounds, cemeteries, recreation, and rubbish collections. Those are generally covered under the city's Public Works Department. In 1979 total spending in that area was \$11.97 million. Of that amount, nearly \$2.21 million was spent on rubbish collection. In 1982 the rubbish collection was removed to a separate rubbish collection fund, which included a new millage. At that time, the new adjusted general services budget was \$8.4 million, but it has since declined to \$2.89 million in 2007. Expenditures in that category remained at around \$4 million, through the 1980s and 1990s until about 2002. Services affected by those cuts included public works, engineering, and the elimination of the nearly \$500,000 recreation budget by 2007. General services and public works have clearly suffered significant reductions since the 1970s.

The final category is the community services budget, which includes the civic center, inspections and zoning, planning and economic development, and some other miscellaneous categories. In 1978 the city spent just \$5.33 million in real terms on those services. Over time, large cuts were made to the planning and economic development line item. By 2007 the total allocation for these services (inspections and zoning, and planning and economic development) had dropped to \$1.25 million.

Revenue, Expenditures, and the Overall Budget

Fiscal stress in the city's general fund has been largely the result of reductions in state revenue sharing and the city income tax. In the 1990s those sources of revenue actually grew, with the economy at a 5 percent annual rate, well above the rate of inflation. Income tax revenue increased modestly from \$17.27 million in 1990 to \$17.65 million in 2000, just over 2 percent. During that period, state shared revenue grew from \$12.19 million to over \$14.6 million by 2000. That growth more than made up for stagnation in other revenue sources such as the property tax. Over that same period, total general fund expenditures grew from \$36.88 million in 1990 to over \$41.11 million. During that decade, the city was generally running a nominal surplus of \$1 million or more. The number of fire fighters generally remained in the 100 range and the number of police officers remained in the 150 range during the

decade. Further, the number of total employees remained at around 650. Despite the challenges in the 1990s, the city maintained relative fiscal health, but reduced its unreserved general fund balance from \$2.37 million in 1990 to just under \$300,000 by 2000. However, since 2000 the city has experienced significant fiscal challenges.

The expenditure categories that were most vulnerable were community development and public works.

Generally, the expenditure categories that were most vulnerable were community development and public works. The elimination of parks and recreation was one casualty of the fiscal strain facing the city. Another major cut, although the service is supported by the private sector, was the elimination of funding for the civic center. In the case of parks and recreation, it is unclear whether the private sector has been able to provide a viable substitute. Another major area of cuts has come to public services such as street lighting and road maintenance. From this point, other cuts are more difficult or more marginal in nature. Police and fire services have continued to be funded, but the adequate growth of those services has been constrained as evidenced by difficult working environments.

This detailed overview of the Saginaw experience provides a frame of reference for thinking about how other Michigan municipalities have and are responding to fiscal stress. Below, we present a more general framework for thinking about how to assess the degree of fiscal stress and examine how municipalities have responded.

Framework for Evaluating Fiscal Stress

The primary research objective is to evaluate the effects of ongoing local government fiscal challenges on public service delivery across Michigan. A critical component in the evaluation of how governments have responded to ongoing fiscal crises is developing an appropriate measure of fiscal stress. Although there are several possible indicators of fiscal stress, as highlighted earlier, for purposes of this study the fiscal stress indicator should not be a function of local government financial decisions. For example, one might be compelled to use deficits or reserves as a measure of fiscal stress. However, responsible local officials may make difficult decisions to cut expenditures to avoid fiscal irresponsibility. In that case, a local government, though it is experiencing fiscal stress, may appear to be fiscally sound. By that measure, it is indeed maintaining fiscal health, but it is doing so by cutting public services.

With that challenge in mind, we propose the following formulation of “fiscal stress,” in which we measure the wedge between the costs of providing government services and the actual revenue being generated. The approach we propose measures the fiscal gap by examining the differences in changing costs of provision and actual revenue growth. We generate for each municipality in each year a government cost index (GCI) and a government revenue index (GRI). The GCI is a weighted average of a measure of a government employee cost index (GECI) and a capital cost index (CCI) for each municipality in every year. GECI and CCI are taken from the Bureau of Labor Statistics (<http://data.bls.gov/cgi-bin/surveymost?ci>) and the Turner Building Cost Index (http://www.turnerconstruction.com/corporate/files_corporate/CI4q2007.pdf). The GRI is a weighted average index of revenue growth from the major sources of revenue for each municipality in every year (property tax, income tax, state government revenue sharing, federal government revenue sharing, and all other revenue). Fiscal Stress (FS) is therefore equal to GRI-GCI. All municipal government fiscal data are provided by the Michigan Department of Treasury.

The approach we propose measures the fiscal gap by examining the differences in changing costs of provision and actual revenue growth.

We acknowledge that the national cost indexes may not be entirely reflective of the actual costs faced by a particular local unit. We note, however, that the critical drivers in employee costs (health insurance) and capital costs are largely determined in national markets. Also, given that our interest is in using fiscal stress originating from external conditions (as opposed to internal decisions), these indexes are appropriate proxies for measuring the costs of government service provision. The approach taken here to measure fiscal stress is generally consistent with Reschovsky (2004).⁴

Revenue Restrictions in Michigan

Nearly all sources of revenue (or potential revenue) for municipal governments are restricted by state law. The most important revenue source for municipal governments, the property tax, is con-

⁴We acknowledge that other approaches are also valid, and some of those alternative approaches will be explored in future research.

strained by tax limitations.⁵ The nature of those limitations requires some explanation. In 1994 Proposal A was approved by voters, and that resulted in major changes in the property tax environment. First, a taxable value cap was imposed. The new cap limited the growth of the value of property for tax purposes to the lesser of the rate of inflation (as measured by the national Consumer Price Index) or 5 percent, regardless of the actual increase in state equalized value (SEV) of property.⁶ Thus, over time, the taxable value of a property could fall well below the SEV. However, Proposal A also specifies that the taxable value of a property is returned to the current market-based SEV when the property is sold.⁷ Proposal A also introduced a distinction between homestead property and nonhomestead property, with the homestead defined as the homeowner’s principal residence. For homestead property, Proposal A imposed a maximum on the statutory property tax millage rate⁸ that local school districts could use for public school operating expenses. That is known as the homestead exemption, because it does not apply to nonhomestead property. As a result of the homestead exemption, average statutory millage rates were reduced by about one-third.⁹ The state government then added a 6-mill state education tax and increased sales taxes and cigarette taxes to provide for the financing of elementary and secondary public education.¹⁰

Proposal A was not the first mechanism for restraining property tax revenue in Michigan. Before

⁵Those policies are discussed in detail in Feldman, Courant, and Drake (2003).

⁶The inflation rate has been lower than 5 percent throughout this entire period. Thus, the 5 percent limitation has not had any practical effect; the assessment growth cap has been determined by the inflation rate.

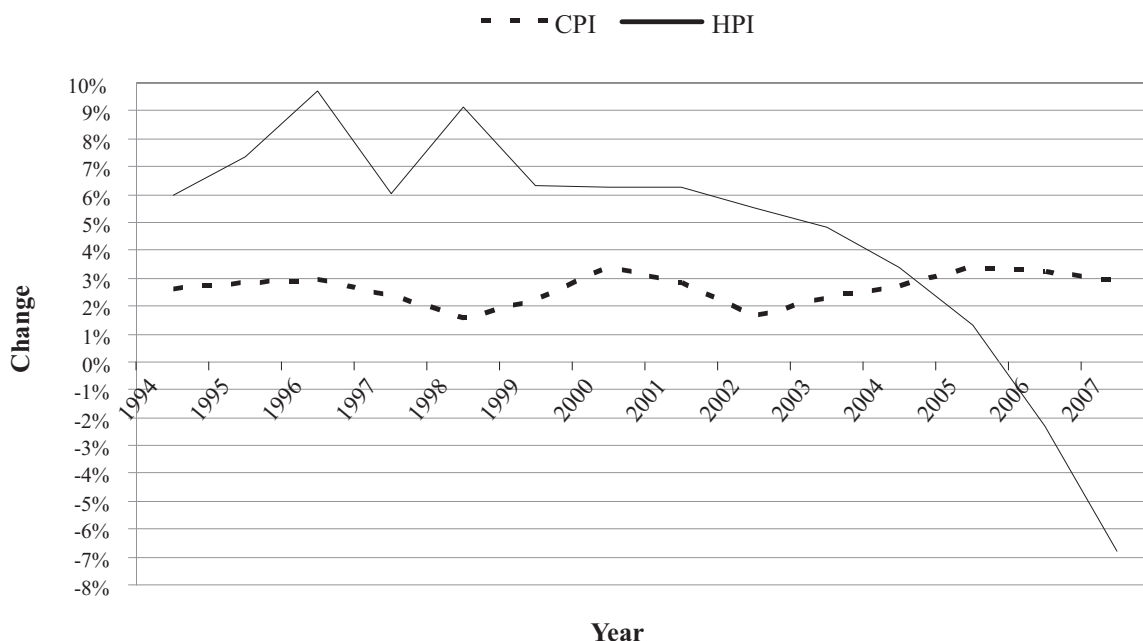
⁷That “pop up” also occurs in the case of a property transfer. For example, property ownership may be transferred from one family member to another, but the tax benefits cannot be transferred to the new owner.

⁸One mill is defined as \$1 per \$1,000 of taxable value.

⁹The homestead exemption effectively equalized the statutory property tax millage rates for local school operating expenses on homestead properties across the state. That reduced the disparities in overall statutory millage rates across jurisdictions, but it did not eliminate them. Substantial differences in overall millage rates remain, as a result of differences in millage rates between homestead and non-homestead properties, and as a result of differences in the millage rates for school capital expenditures, and for municipal governments, county governments, and special districts.

¹⁰Proposal A also put severe restrictions on the ability of local units to increase property taxes on their own. Thus, the financing of operating expenses for K-12 public education became highly centralized, whereas it had previously been highly decentralized. Also, the funding formulas pushed in the direction of more equal per-student funding for operating expenses, although considerable gaps remain between the highest- and lowest-spending districts. For discussion, see Arsen, et al. (2005).

Figure 1.
Consumer and Housing Price Indexes



Source: CPI from the Bureau of Labor Statistics and home price data from the Michigan Association of Realtors.

Proposal A, property tax revenue was limited by the “Headlee Amendment,” which was passed in 1978.¹¹ While Proposal A limits statutory millage rates and imposes a limit on the growth in taxable values, the Headlee Amendment puts a direct limitation on property tax revenue growth. The Headlee Amendment restricts property tax revenue growth to the rate of inflation (with an adjustment for new construction). Any jurisdiction with potential revenue increases exceeding the Headlee limit is required to reduce property tax rates, to bring revenue into line with the revenue growth restriction. That type of tax rate reduction is known as a “Headlee rollback.”¹² Before the introduction of the taxable value cap, rapidly rising property values resulted in many Headlee rollbacks. After Proposal A, however, rollbacks were greatly reduced in number and magnitude.

In addition to the restrictive property tax environment, other potential sources of revenue are also constrained. In Michigan, municipalities do not have the authority to levy a local option sales tax.

¹¹The Headlee Amendment is named for its author, Richard H. Headlee.

¹²Local residents can choose to exceed the Headlee limitation by referendum, but that has occurred rarely.

They are, with voter approval, allowed to levy a city income tax. However, to date only 22 cities have imposed an income tax. The ability to charge fees is also limited by state statute and court rulings; fees must not exceed the cost of service provision. A number of communities have, by referendums, approved “extra voted” millage for special purposes, but generally Michigan municipalities have few options for generating revenue, and have historically relied on the growth in taxable values to bolster property tax revenue. However, beginning in 2001 growth in property values stagnated, and then began to decline in 2006.

Figure 1 shows the rates of change of average property values in Michigan between 1994 and 2007. For comparison, Figure 1 also shows the rate of change of the national CPI, since the property tax assessment cap is based on the change of the CPI. To summarize, that institutional detail suggests that the property tax index will be relatively stable and flat over time and across jurisdictions, although beginning in 2006 many communities began to experience significant declines in the value of real estate. It is important to note that there is typically a delay between the time that property values change and the time those changes are reflected in assessments and incorporated into the tax rolls.

Once FS is generated for each municipality, we use it to examine the severity and sources of fiscal stress. For example, fiscal stress may be the result of cuts in state revenue sharing, or it may be driven by declining real estate markets and property tax revenue. Economic hardship and revenue sharing are not evenly distributed across the state, and our fiscal stress variable is designed to capture these differences.

Michigan municipalities have few options for generating revenue, and have historically relied on the growth in taxable values to bolster property tax revenue.

We now turn to our primary objective, which is to understand how municipalities have responded to ongoing fiscal stress. Because municipalities are restricted from increasing property taxes beyond that which the property tax limitations allow, the primary ways to deal with fiscal stress are to improve efficiencies in service provision and cut services.¹³ While we acknowledge that it is possible for municipal governments to improve efficiencies of public service delivery, difficult fiscal conditions have continued for several years and therefore we suspect that at this point in the prolonged fiscal crises, many communities are now experiencing significant reductions in public services.¹⁴ We examine the impact of the fiscal stress measure described earlier (FS_{it}) by regressing FS_{it} on various per capita expenditure (EXP_{jit}) categories:

$$EXP_{jit} = f(FS_{it}, X_{it})$$

where EXP_{jit} represents a vector of expenditure categories. We also include X_{it} , a limited array of demographic and economic control variables that we are able to collect at the municipal level to control for changes in demand for public services. Included in EXP_{jit} are the following expenditure categories: general government, public safety, public works, health and welfare, community and economic development, recreation and culture, and other expenditures.

We also examine the effect of FS_{it} on capital and noncapital expenditures.

¹³Municipal governments have limited authority to generate revenue from alternative sources. Twenty-two municipalities have an income tax. Municipalities may exceed property tax limitations by referendum.

¹⁴One dimension of "efficiency" is the potential elimination of public services that are not valued as highly by the public.

Based on our case study and discussions with local officials, we hypothesize that expenditures that are perceived to be nonessential, nonmandated, and provided to the most vulnerable or least empowered are most likely to be reduced in times of ongoing fiscal hardship. We estimate the following regressions:

$$\ln(\text{Exp}_{jit}) = \alpha FS_{it} + \beta'(\ln(X_{it})) + \tau_t + \varepsilon_{it}$$

where Exp_{jit} represents spending for expenditure category j in municipality i at time period t , FS_{it} is the measure of fiscal stress as defined earlier, and X_{it} is the vector of control variables that include the municipal population and taxable value.

We begin our examination by using a random effects estimation procedure with a correction of standard errors to allow for nonindependence of observations from the same state through clustering (Arellano 1987; Bertrand et al. 2004).

However, because some communities do not spend funds in some functional areas, we have a censoring issue in which the lower bound is truncated at a value of zero. Thus, the censored dependent variable could bias the coefficient estimates. We therefore estimate these regressions using a random effects Tobit procedure with bootstrapping to obtain robust standard errors.¹⁵ To examine the robustness of those core estimates, we also estimate corresponding series regressions using the two-way fixed effects estimation procedure.¹⁶ Using that approach, our results are robust to alternative estimation approaches.

Empirical Analysis

Before turning to the more formal econometric analysis, we offer a brief discussion of the data. Summary statistics are provided in tables 1-3 and include fiscal data for nearly all cities in Michigan for 2005, 2006, and 2007. The appendix (p. 691) contains detailed definitions and sources for all variables used in this analysis. For all summary statistics and analyses, we use an unbalanced panel; that is, we include all available information on municipalities even if data are unavailable for a particular community in a given year.¹⁷ Using a balanced panel, however, yields qualitatively similar results.¹⁸

¹⁵See Freeman and Peters (1984) for an overview of the bootstrapping technique.

¹⁶See Hsiao (1986) and Kennedy (1992) for excellent overviews of panel data estimation techniques.

¹⁷Our goal is to use all available information in our analysis.

¹⁸Of the 822 possible municipality-year observations, we include about 700 or 85 percent of the total in our analysis. Unfortunately, Detroit, Michigan's largest and perhaps most

(Footnote continued on next page.)

Table 3.
Summary Statistics Statewide Average Municipal Fiscal Variables
(standard deviation in parentheses)

Year	2005	2006	2007	% Δ 2005-2007
Number of Cities (out of 274)	250	255	239	
Basic Information				
Population	15,211.32 (25,676.60)	14,872.76 (25,374.66)	14,340.58 (25,768.53)	-6%
Fiscal Data in Per Capita Terms				
Property Value Data				
Taxable Value	\$29,342.14 (29,384.39)	\$30,001.78 (30,475.84)	\$31,360.46 (32,654.42)	7%
State Equalized Value	\$41,480.78 (44,049.45)	\$41,930.28 (46,099.79)	\$43,566.91 (49,479.67)	5%
Revenue				
Property Tax	\$492.28 (274.30)	532.47 (484.76)	\$510.70 (358.58)	4%
Income Tax (only 22 cities have an income tax-of these only 19, 16, and 13 reported fiscal data in \$189.40 \$183.64 \$189.31 0% 2005, 2006 and 2007, respectively)	\$189.40 (63.93)	\$183.64 (70.72)	\$189.31 (62.21)	0%
Revenue Sharing From State Government	\$116.88 (42.72)	\$112.98 (40.28)	\$105.80 (40.28)	-9%
Other Intergovernmental Revenue From State Government	\$91.70 (80.02)	\$55.78 (158.60)	\$05.10 (107.33)	4%
Intergovernmental Revenue From Federal Government	\$66.31 (221.71)	\$63.60 (167.13)	\$67.33 (239.73)	2%
Total Revenue	\$1,701.17 (882.30)	\$1,768.87 (1,142.60)	\$1,739.00 (1,109.08)	2%
Expenditures				
General Government	\$177.65 (99.64)	\$185.08 (141.43)	\$184.89 (114.68)	4%
Public Safety	\$263.32 (145.60)	\$272.97 (165.09)	\$274.53 (168.79)	4%
Public Works	\$564.63 (439.66)	\$628.46 (619.94)	\$621.71 (592.50)	10%
Health and Welfare	\$32.33 (275.95)	\$35.69 (267.14)	\$33.04 (274.02)	2%
Community and Economic Development	\$55.76 (119.52)	\$61.22 (99.30)	\$55.07 (82.03)	-1%
Recreation and Culture	\$84.90 (92.58)	\$82.60 (84.78)	\$83.11 (92.89)	-2%
All Other Expenditures	\$481.96 (389.44)	\$500.79 (497.99)	\$497.91 (460.04)	3%
Total Expenditures	\$1,716.17 (1,231.24)	\$1,766.80 (1,190.71)	\$1,750.27 (1,065.23)	2%

Consider Table 3, which reports summary statistics for the municipal government data. All economic

troubled city, is not included in the analysis. Detroit officials failed to submit the city's financial information to the Treasury in 2005, 2006, and 2007.

and fiscal data reported in Table 3 and elsewhere are expressed in real 2005 dollars. As we might expect, on average, population in Michigan municipalities fell by 6 percent between 2005 and 2007. Over that period, Michigan, as a whole, experienced net out-migration. Per capita taxable value and

Table 4.
Summary Statistics
Statewide Average Municipal Capital and Noncapital Expenditures
(standard deviation in parentheses)

Year	2005	2006	2007
Total Capital Outlay	\$2,885,988.05 (6,920,643.40)	\$3,360,578.90 (8,305,178.89)	\$3,153,804.19 (8,370,219.64)
Per Capita Capital Outlay	\$191.48 (258.21)	\$234.77 (284.27)	\$225.67 (331.21)
Total Noncapital	\$23,481,877.10 (45,940,818.58)	\$21,684,987.98 (36,426,728.33)	\$22,515,041.91 (46,734,350.90)
Per Capita Noncapital	\$1,524.68 (1,152.74)	\$1,546.14 (1,101.38)	\$1,534.12 (957.03)

state equalized value grew steadily over the period, although we expect declines in 2008 because of the real estate crisis.¹⁹

For this initial analysis, our goal is to evaluate overall fiscal conditions, and therefore all fiscal data include total revenue and spending as opposed to general fund revenue and expenditures. Both property and income taxation have grown modestly over the period, but state government revenue sharing has been in decline. That finding is not surprising because Michigan state government has been in fiscal crisis for several years, leading to forced cuts; revenue sharing has therefore been vulnerable. Intergovernmental revenue from federal sources is holding steady in real terms.²⁰ These variables will be used to develop the GRI. Taken together, flat or declining own-source revenue and flat or declining state government revenue sharing should generate a GRI that is growing much more slowly (even declining in some jurisdictions) than the GCI. We can then use the difference between the GRI and GCI to determine the degree to which critical expenditure categories have been affected by fiscal stress.

Also provided in Table 3 are the summary statistics for the major expenditure categories for municipal governments: general government, public safety, public works, health and welfare, community and economic development, recreation and culture, other expenditures, and total expenditures. With the exception of community and economic development and recreation and culture, every major spending category increased over the three-year period. Public works experienced the highest rate of growth,

whereas the other spending categories grew at a rate close the rate of growth in total expenditures. Note that the largest categories of spending were public works, public safety, and other expenditures.

In Table 4 we report summary statistics for capital spending and noncapital spending. For any given municipality, capital spending can vary greatly from year to year as demonstrated by the relatively high standard deviations. We are interested in getting access to the 2008 capital spending data because that is a particularly challenging year, and it may be that long-planned capital projects were delayed or canceled.²¹ Over the 2005-2007 period, the average total expenditures on capital outlay grew from \$2.89 million to \$3.15 million, or about 9 percent in real terms. However, cities spent an average of 16 percent more in 2006 than in 2005, but 6 percent less in 2007 than in 2006. In per capita terms, capital outlay expenditures grew 23 percent from 2005 to 2006 and fell 4 percent from 2006 to 2007. Over that period, the city of Sandusky spent the most per capita on capital outlay at approximately \$2,260 per person.

Noncapital expenditures account for approximately 88 percent of all municipal expenditures, and exhibited a very different growth pattern over the 2005-2007 period than did capital outlay. The total average noncapital expenditures dropped 8 percent from 2005 to 2006, but grew by 4 percent between 2006 and 2007. In per capita terms, however, noncapital expenditures grew 1 percent from 2005 to 2006 and shrank 1 percent from 2006 to 2007. The city of Mackinac Island spent the most in noncapital per capita expenditures at \$10,071 in 2006 and \$10,322 in 2007.

Table 5 provides a summary of the average and standard deviations of all the indexes used in this

¹⁹Michigan has a taxable value cap in place. Thus, the rate of change in taxable value is different than the state equalized value. State equalized value is a better overall measure of property value growth, and taxable value is better overall measure of tax base growth.

²⁰Federal revenue sharing for 2004 appears to be incorrect here. That may be because of changes in the form that occurred beginning in 2005 as previously discussed.

²¹For example, Saginaw has experienced fiscal stress for a number of years and has continually reduced road maintenance spending. In fact, officials had considered returning some city streets back to gravel.

Table 5.
Summary Statistics
Statewide Average Municipal Service Cost and Revenue Growth Indexes
(standard deviation in parentheses)

Variable	2005	2006	2007
Share of expenditures from employees costs (a)	0.896 (0.118)	0.877 (0.115)	0.896 (0.117)
Share of expenditures from capital costs (b)	0.104 (0.118)	0.123 (0.115)	0.113 (0.120)
Government service cost index (GCI)	100.000 -	104.786 (0.759)	118.020 (0.147)
Government employee cost index (GECI)	100.000 -	103.974 -	117.881 -
Capital cost index (CCI)	100.000 -	110.600 -	119.107 -
Property tax index (PTI)	100.000 -	100.088 (0.648)	100.093 (0.137)
Share of revenue from property tax (c)	0.320 (0.130)	0.329 (0.294)	0.331 (0.149)
Income tax index (ITI)	100.000 -	100.103 (0.205)	100.124 (0.247)
Share of revenue from income tax (d)	0.007 (0.033)	0.008 (0.032)	0.007 (0.034)
State revenue sharing index (SRSI)	100.000 -	99.876 (2.649)	100.964 (6.281)
Share of revenue from state revenue sharing (e)	0.063 (0.061)	0.031 (0.046)	0.062 (0.047)
Federal revenue sharing index (FRSI)	100.000 -	101.080 (4.675)	101.491 (8.553)
Share of revenue from federal revenue sharing (f)	0.037 (0.118)	0.033 (0.081)	0.048 (0.217)
Other revenue index (ORI)	100.000 -	100.325 (2.008)	100.361 (2.232)
Share of revenue from other revenue (g)	0.521 (0.176)	0.536 (0.155)	0.524 (0.182)
Government revenue index (GRI)	100.000 -	100.097 (0.430)	100.100 (0.396)
Fiscal stress (FS)	100.000 -	104.692 (0.865)	117.921 (0.366)

report. A critical factor of increasing statewide fiscal stress was the sharp increase in the GCI, which grew 18 percent over the over the 2005-2007 period. As previously discussed, the GCI is the weighted average of the CCI and GECI, each of which grew at exceptional rates (19 percent and 18 percent, respectively). Statewide, the shares of total expenditures from capital costs (b) and employee costs (a) changed little over the period.²²

As the major government cost factors grew substantially, on average the GRI grew only 0.1 percent, remaining nearly flat over the period. The components of the GRI, which include revenue growth indexes for the property tax, income tax, state revenue sharing, federal revenue sharing, and other revenue, were all anemic. Recall that these indexes

²²Also, the share of total revenue from property taxes appears to be relatively low at around 33 percent. That is

because we are using total revenue and not just general fund revenue. Total revenue included fees for water and sewer services, and so forth.

(Footnote continued in next column.)

Table 6. Municipal Expenditure Random Effects Regression Results (z-statistics in parentheses)

Independent Variable	Dependent Variable									
	General Gov't	Public Safety	Public Works	Health & Welfare ^a	Economic Development ^a	Parks and Recreation ^a	Other	Capital ^a	Non-capital	
Fiscal Stress	-0.07* (-1.796)	-0.05* (-1.877)	-0.19** (-2.137)	-2.17** (-2.077)	-0.26 (-0.770)	-0.09 (-0.876)	-0.08 (-0.960)	0.52** (2.225)	-0.26*** (-6.645)	
Ln(Population)	0.55563*** (9.776)	0.67*** (9.651)	0.88*** (5.385)	2.72 (1.142)	2.28*** (4.206)	0.48** (2.087)	0.67*** (6.477)	0.43 (1.260)	0.73*** (15.03)	
Ln(Taxable Value)	0.350*** (6.902)	0.51*** (8.627)	0.14 (1.026)	0.10 (0.0473)	-0.12 (-0.250)	0.76*** (3.183)	0.41*** (4.278)	0.69** (2.500)	0.30*** (7.049)	
Adjusted R ² (within)	0.031	0.013	0.038				0.017		0.265	
Log Likelihood				-867.68	-1728.25	-1198.35		-1757.04		
Number of Observations	701	698	701	695	698	702	700	702	702	
Left-Censored Observations				504	116	13		45		

Notes: All regressions include time effects.

^aThese coefficients are generated from a random effects Tobit estimation with bootstrapping.

* Indicates significance at the 90 percent confidence level for a two-tailed test.

** Indicates significance at the 95 percent confidence level for a two-tailed test.

*** Indicates significance at the 99 percent confidence level for a two-tailed test.

are generated from the nominal, not inflation-adjusted data. The only index that grew by more than 1 percent was federal government revenue sharing, which increased a modest 1.5 percent over the 2005-2007 period. Not a single revenue source managed to keep up with the rate of inflation as measured by the CPI. The shares of total revenue attributed to each revenue source were relatively unchanged over the period.

The fiscal stress (FS) variable, which is calculated by subtracting GRI from GCI, provides a measure of which Michigan cities experienced the greatest stress. To illustrate, the cities of Mackinac Island and Fennville have consistently low levels of fiscal stress over the entire period. However, numerous cities experienced severe fiscal stress. For example, South Lyon experienced the greatest level of fiscal stress, and Portland and Standish were not far behind. South Lyon, a city of approximately 11,000 in Oakland County (in the Detroit metropolitan area), saw revenue decline in real terms by 6.2 percent from 2005 to 2006. While the city experienced a property tax revenue increase of 4.7 percent and an increase in intergovernmental revenue from federal sources, revenue sharing from the state government dropped significantly. As a result, the city responded by decreasing expenditures in all functional categories, and was able to maintain revenue in excess of expenditures in the 2006 fiscal year.

In 2007 Standish, with a population of 2,017, ranked very high by the fiscal stress measure. Since 2005 Standish lost 6.5 percent of their property tax revenue despite an 11.7 percent growth in taxable value.²³ Additional factors that contributed to stress were significant declines in intergovernmental revenue from the state (47.7 percent) and other revenue (27.3 percent). In fact, only intergovernmental revenue from the federal government increased over the 2005 to 2007 period, but by only about \$40,000. In response to the significant drop in revenue, Standish decreased expenditures significantly, especially capital expenditures. Expenditures in parks and recreation were also cut to one-eighth of 2005 levels, while every other major category saw some increase. Notably, expenditures on community and economic development and public safety increased substantially. Over that entire period, expenditures were always greater than revenue: In 2007, expenditures were nearly \$1 million greater than the \$2.69

million collected in revenue. These illustrations provide some indication of the range of experiences of Michigan municipalities over this period. By the measure of fiscal stress that we use, all municipalities experienced some fiscal stress over the period, but clearly some experienced more than others.

Responses to Fiscal Stress

To examine how municipalities across the state have responded to varying degrees of fiscal stress, we present a formal econometric analysis. As outlined earlier, the empirical strategy is to create a measure of fiscal stress that is largely driven by external forces (as opposed to internal management decisions). That measure is then included as an explanatory variable in our regressions to explain the variation in the functional municipal spending categories.²⁴

Consider the random effects estimates that are presented in Table 6. The explanatory power as measured by the adjusted R^2 generated from the within-municipality variation is low. We note, that the overall adjusted R^2 ranges between 0.50 and 0.85 (not reported) across the set of regressions. That is, while our regressions capture much of the cross-municipality variation in spending, they do not capture much of the within municipality variation year over year. Nevertheless, results indicate that many of the coefficient estimates are, for the most part, statistically significant. The two control variables are positive and significant in nearly all regressions, indicating that increases (decreases) in both population and taxable value lead to increases in most functional spending categories. Further, both capital and noncapital spending are positively correlated with population and taxable value. These results are largely driven by the cross-sectional variation in the dependent variables; municipalities with more people and higher taxable values have higher spending.

The coefficient on the fiscal stress variable is negative in all functional spending categories, as expected. However, the magnitude of the coefficients across spending categories differs greatly. A one point divergence between the costs of providing GCI and GRI results in a given percentage point reduction in spending. Consider spending in the general government category. Keep in mind that, on average, fiscal stress increased by 17 points over the period of analysis. Here, a 10-point increase in fiscal

²³The loss in property tax revenue may be the result of the expiration of either a special assessment or a nonrenewal of extra voted millage. A special assessment can be levied for a variety of purposes without voter approval. Residents may, by referendum, also choose to increase the millage for special purposes for a specified period. However, when the period expires, that revenue evaporates unless voters, by referendum, choose to extend the millage for another period.

²⁴In the econometric analysis, we include time indicator variables to control for changes in statewide overall stress. To control for changes in the demand for public services and to isolate the fiscal stress effect, we include population and taxable value as additional explanatory variables. In some regressions, we incorporate municipal fixed effects to further isolate the fiscal stress effect.

stress results in a 0.7 percent reduction in real spending in this category. We interpret that to be fairly unresponsive, though the coefficient is statistically significant. Fiscal stress is also statistically significant in the public safety regression, but again spending is relatively unresponsive. Responsiveness of public works spending to fiscal stress is roughly three times larger than general government and public safety, indicating that a 10-point increase in fiscal stress results in a 1.9 percent reduction in real public works spending. Health and welfare spending, however, is even more responsive to fiscal stress. A 10-point increase in fiscal stress results in a 21.7 percent reduction in health and welfare spending. Note that roughly a third of all municipalities offered those services over the period of analysis. Though the coefficients on fiscal stress are negative in the economic development, parks and recreation, and other categories, they do not meet typical standards of statistical significance.

In the last two columns, we report estimates for capital and noncapital spending. Here, we see that capital spending is positively associated with fiscal stress. That result was somewhat unexpected, but we offer a possible explanation. State and federal investment funds often targeted areas experiencing economic hardship. It may be that these communities received relatively more aid aimed to bolster capital investment.²⁵ Noncapital spending is negatively affected by fiscal stress. Overall, a 10-point increase in fiscal stress reduces overall noncapital spending by 2.6 percent and increases capital outlay by 5.2 percent.

Public works and especially health and welfare spending appear to be most vulnerable to fiscal stress.

These estimates reveal some consistent patterns in the ways that municipal officials in Michigan have responded to fiscal stress. In particular, we note that while general government, public safety, parks and recreation, and other spending are shown to be reduced in the midst of fiscal stress, these categories are not very responsive. Public works and especially health and welfare spending (in those communities that have health and welfare spending) appear to be most vulnerable to fiscal stress.²⁶ That pattern is consistent with the idea that municipal officials cut spending in areas that can be

²⁵In this context, it is also possible that local officials work harder to identify grant funding in periods of fiscal stress.

²⁶Economic development also exhibits a relatively higher responsiveness to fiscal stress, but the coefficient is not statistically significant.

delayed or put off (public works) or categories that are not a core municipal function (health and welfare).²⁷ Public works spending for municipalities includes maintenance of roads and streets, sanitation/landfill/solid waste, water and/or sewer systems, and other public works enterprise activities. It is not surprising that municipal officials might put off important but perhaps less urgent maintenance activities. Health and welfare includes spending for the functions of health departments, boards and clinics, alcoholism and substance abuse, hospitals, medical examiner, mental health, emergency services (ambulance), child-care activities and human services, human services and medical care facilities, area agency on aging, and veterans programs. While those programs are essential for a specific portion of the constituency, one can argue that they are not targeted at the broader population and are therefore more expendable. The research presented here suggests that municipal officials treat that spending as less essential.²⁸

We also explored the robustness of our results to alternative estimation techniques, the inclusion of state fixed effects, and the exclusion of control variables. We find the core results presented in Table 6 are robust.²⁹

Conclusion

In this report we presented detailed data on municipal public finances over the 2005-2007 period. Using that information, we developed an indicator of fiscal stress and identified some of the underlying

²⁷In Michigan, county governments are charged by state government with the provision of health and welfare services.

²⁸It may also be that municipal officials view the programs as redundant, given that counties have the primary responsibility for that function. They may also seek to push that programming to the county level as they seek to balance their budgets.

²⁹To examine the robustness of our findings and to evaluate the degree to which censoring could bias our results, we estimate an analogous set of regressions except they are estimated using the two-way fixed effects estimation procedure that includes controls for both municipal and time effects. The coefficients on the fiscal stress variable are reasonably consistent with the random effects estimates presented in Table 5. There are, however, several important differences that should be highlighted. First, the coefficient on fiscal stress in the other expenditures regression is now statistically significant, whereas fiscal stress on capital spending is no longer significant. With the exception of health and welfare, the magnitudes of the coefficients on fiscal stress are similar. In the health and welfare regression, the coefficient on fiscal stress, while still substantially larger in absolute magnitude than the other functional areas, is about a third of the size of the coefficient estimated using the random effects Tobit procedure presented in Table 6. Our interpretation is that failure to correct for censoring results in a substantial downward bias in the coefficient estimate on the fiscal stress variable.

causes of stress across nearly all municipalities in Michigan. While we find that all communities appear to have experienced fiscal crises, those communities whose tax revenue has been most stagnant or were in actual decline experienced relatively more stress. We then used these data to examine empirically how communities across the state have responded to fiscal crises brought on by external forces. Consistent with our initial notions, we find that while real spending was cut in several categories, public works and health and welfare were the most vulnerable. It appears that municipalities have put off important maintenance for roads, building, and the like. Although those delays may be an effective short-run strategy, they may result more extensive costs in the long run. Also, expenditures in health and welfare were found to be most responsive to fiscal stress, perhaps because those programs are not perceived to be of value to the broader community.

Given the recent real estate crisis, this research is especially timely; policymakers and public officials in Michigan and across the nation are concerned about the implications of the foreclosure and financial crises and accompanying decline in property tax revenue for local governments. Our research suggests that strategic decisions will be made. For Michigan, fiscal crisis has meant delays in important but less urgent infrastructure maintenance and cuts in programs that are perceived to serve a more limited portion of the constituency.

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Appendix Definitions of Variables (abbreviated variable name in parentheses)	
Property Tax Revenue (prope)	Property tax — total of all funds and accounts. Includes delinquent taxes, penalties, interest, and fees. (MDT)
Income Tax Revenue (inctaxe)	Income tax revenue — total of all funds and accounts. Includes income tax revenue from 22 Michigan cities that impose the tax. They are Albion, Battle Creek, Big Rapids, Detroit, Flint, Grand Rapids, Grayling, Hamtramck, Highland Park, Hudson, Ionia, Jackson, Lansing, Lapeer, Muskegon, Muskegon Heights, Pontiac, Port Huron, Portland, Saginaw, Springfield, and Walker. (MDT)
Intergovernmental Revenue From Federal Government (fedreve)	Intergovernmental revenue from federal government — total of all funds and accounts. Includes all revenue for the functions of general government, public safety, streets and highways, sanitation, health and/or hospitals, welfare, culture and recreation, housing and community development, water, electric, transit, and all other federal aid grants. (MDT)
State Revenue Sharing (revsharee)	State revenue sharing revenue — total of all funds and accounts. (MDT)
State Revenue (Statereve)	Revenue from state government — total of all funds and accounts excluding revenue from state revenue sharing. Includes all revenue for the functions of general government, payment in lieu of taxes, swamp land taxes, forest reserve, public safety, streets and highways (Act 51), streets and highways (non-Act 51), sanitation, health and/or hospitals, welfare, culture and recreation, housing and community development, water, electric, transit, and all other general or state aid grants. (MDT)
Other Revenue (otherreve)	Other revenue — total of all funds and accounts. Includes all tax revenue except property and income taxes, and revenue from licenses and permits, contributions from local units, charges for services, fines and forfeits, interest and rents, and any other miscellaneous revenue such as, but not limited to, sale of fixed assets or extraordinary/special items. (MDT)
Total Revenue (treve)	Total revenue for all funds and accounts. (MDT)
General Government Expenditures (ggovexpe)	General government expenditures — total of all funds and accounts. Includes all expenditures for the functions of the legislative and judicial bodies, chief executive, treasurer, assessing equalization, clerk, elections, finance and tax administration, building and grounds, and all other general government revenue. (MDT)
Public Safety Expenditures (safetexpe)	Public safety expenditures — total of all funds and accounts. Includes expenditures for the functions of police/sheriff, fire, combined public safety departments, emergency 911 dispatch activities, corrections/jails, building inspection and regulations activities, and all other public safety activities (MDT).
Public Works Expenditures (pworkexpe)	Public works expenditures — total of all funds and accounts. Includes all expenditures for the functions of public works and infrastructure (non-Act 51), road commission/street department (Act 51), sanitation/landfill/solid waste, water and/or sewer systems, electric utilities, airports, public transportation, water, and all other public works enterprise activities. (MDT)
Health and Welfare Expenditures (welfexpe)	Health and welfare expenditures — total of all funds and accounts. Includes expenditures for the functions of health departments, boards and clinics, alcoholism and substance abuse, hospitals, medical examiner, mental health, emergency services (ambulance), child-care activities/human services, human services and medical care facilities, area agency on aging, veteran's programs, and all other health and welfare expenditures. (MDT)
Community and Economic Development Expenditures (econexpe)	Community and economic development expenditures — total of all funds and accounts. Includes expenditures for the functions of redevelopment and public housing, community planning and zoning, economic development, and all other development activities. (MDT)
Recreation and Culture Expenditures (parkexpe)	Recreation and culture expenditures — total of all funds and accounts. Includes expenditures for the function of parks and recreation, libraries, and various cultural activities, fine arts, historical societies, museums, etc. (MDT)
Other Expenditures (otherexpe)	Other expenditures — total of all funds and accounts, excluding those for general government, public safety, public works, health and welfare, community/economic development, and recreation and culture. Includes expenditures for the function of fringes, benefits, FICA, insurances, etc., capital outlay, debt service, transfers (out), and extraordinary/special items. (MDT)
Total Expenditures (totalexpe)	Total expenditures for all funds and accounts and for all activities. (MDT)
Capital Expenditures (capital)	Capital outlay expenditures for land, equipment, buildings, and construction. Includes expenditures for the function of legislative, judicial, general government, police, fire, combined public safety, parking meters/off-street parking, corrections, other public safety, streets and highways, sanitation/solid waste, sewerage, water, electric utilities, airports, public transportation, hospital and hospital operations, welfare, housing and redevelopment, all other health and welfare, parks and recreation, library, other recreation and culture, and other functions. (MDT)

Appendix
Definitions of Variables
(abbreviated variable name in parentheses)
(continued)

Noncapital Expenditures (noncap)	Noncapital expenditures as calculated by subtracting capital expenditures from total expenditures. (MDT) $\text{totalexpe} - \text{capital} = \text{noncap}$
CPI	Consumer Price Index. (BLS)
GECI	Government employee cost index. (BLS)
CCI	Capital cost index. (TBC) (AC)
SEV	State equalized value on real and personal property (MDT) (AC)
TV	Taxable value on real and personal property (MDT) (AC)
Pop	Population (MDT) (AC)
a	Share of expenditures from employee costs (MDT) (AC)
b	Share of expenditures from capital costs (MDT) (AC)
GCI	Government service cost index (MDT) (AC)
GECI	Government employee cost index (MDT) (AC)
PTI	Property tax index (MDT) (AC)
c	Share of revenue from property tax (MDT) (AC)
ITI	Income tax index (MDT) (AC)
d	Share of revenue from income tax (MDT) (AC)
SRSI	State revenue sharing index (MDT) (AC)
e	Share of revenue from state revenue sharing (MDT) (AC)
FRSI	Federal revenue sharing index (MDT) (AC)
f	Share of revenue from federal revenue sharing (MDT) (AC)
ORI	Other revenue index (MDT) (AC)
g	Share of revenue from other revenue (MDT) (AC)
GRI	Government revenue index (MDT) (AC)
FS	Fiscal stress indicator (MDT) (AC)
<i>Sources:</i> Michigan Department of Treasury (MDT), author's calculations (AC), U.S. Bureau of Census (BC), U.S. Bureau of Labor Statistics (BLS), and Turner Building Cost Index (TBC).	

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