Staff Paper

**Proposed Alterations to the Local Government
Fiscal Stress Indicator System for the
State of Michigan**

by

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Abstract

Monitoring the fiscal stress levels of local governments at the state level is a critical strategy for predicting and preventing fiscal crises. The State of Michigan currently monitors the fiscal stress levels of its local governments using a set of indicators created in 2002. These indicators, however, are not capturing all types of fiscal stress and are not being utilized to their fullest. In this report, we outline proposed changes to the current system, calculate the proposed indicators, and then compare them to the current system.

The new fiscal stress indicator system proposed here builds upon the current system in five ways. First, it better captures different types of fiscal stress that are being missed in the current system, including those caused by transfers of money from one fund to another and unfunded long term liabilities. Second, it utilizes a mixture of scoring methods that help to determine both relative stress and absolute stress. Third, it measures both current stress levels and changes in stress levels in order to predict future stress in localities that are currently healthy and those that are worsening. Fourth, it captures the magnitude of stress within each indicator rather than assigning a point of either zero or one based on a single threshold. And fifth, it differentiates between different types of fiscal stress which allows it to be better linked with possible solutions based on the specific type of fiscal stress faced by each locality.

Two key points are proposed in this paper. First, fiscal stress involves not only financial distress, but service level distress. If a locality is not providing an adequate level of services to its citizens, it is in stress. A city that has balanced books but a high level of unemployment or crime is not a healthy city. Second, not all types of fiscal stress will be solved through the use of short term strategies such as emergency financial managers and emergency loans. Some stress is chronic and requires solutions that are more structural in nature. Short term solutions may work well in situations where the stress is short term and perhaps internally controlled. They may not be successful, however, in situations where stress is chronic and external in nature. The new indicator system helps to distinguish between these different types of fiscal stress.

However, fiscal stress indicator systems do not work in isolation. Results must be analyzed and acted upon and indicators must be published in a timely manner. Cities that fall within the distressed range should be further examined and solutions should be sought. The new system will facilitate this action by helping the state to not only acknowledge and predict fiscal stress, but to better link it with strategies that are suited for the specific type of fiscal stress in each locality. This will help the state to not only alleviate fiscal stress, but to prevent it before it occurs.

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Introduction

       Local governments in the state of Michigan and throughout the country are facing unprecedented levels of fiscal stress. An important strategy for preventing and ameliorating this stress is monitoring it at the state level. The State of Michigan currently monitors the fiscal stress levels of its local governments using a set of indicators created in 2002. These indicators, however, do not capture all types of fiscal stress and are not being utilized to their fullest. In this report, we outline proposed changes to the current fiscal stress indicator system, calculate these new indicators, and then compare them to the current system.

       This new system updates the old one in five main ways. First, the new system proposed here better captures fiscal stress that is missed in the current system by measuring indicators at both the general fund level and at the total fund level.[2] In addition, unfunded liabilities including long term liabilities related to retiree health care costs and other post-employment benefits are accounted for, which are a serious cause of concern for many local governments.

       Second, this new system clusters localities into similarly sized population groups which are better suited for comparison, and then uses a mixture of scoring methods to capture both absolute and relative fiscal stress levels: some of the scores are based upon industry wide benchmarks and others are based upon rankings within each group. Clustering ensures that small cities in the Upper Peninsula are not compared to cities such as Detroit or Lansing that have very different levels of demand for services and economies of scale for service provision. Scoring based on relative rankings helps to remove macro shocks from the analysis; in 2007, for instance, all units lost housing value but in this system only the ones that lost a large amount relative to the other units would receive a point.

       Third, the trajectory of stress within each locality is better captured in this new system. This is measured through use of a mixture of indicators that measure current stress levels with indicators that measure changes in stress levels in order to determine whether a locality is becoming more or less fiscally healthy over time. This will help to predict stress in some localities that are currently fiscally healthy and to emphasize fiscal stress in those that are worsening. Rather than measuring indicator levels in previous years as the current system does, this new system measures the change in fiscal stress levels in some indicators in order to better predict stress.

       Fourth, the new system proposed captures the intensity of stress within each indicator by giving scores that range from 0 to 1.0 based on increments within this range. This is in contrast to the current system that gives only a score of 0 or 1.0 and does not capture the level of stress within each indicator. Assigning scores of fractions

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[2] Indicators measured at the total fund level do not include component unit funds in them. These funds are legally separate from the local government and therefore are not an accurate representation of the fiscal health of the unit.

of a point within each indicator will help to draw an important distinction between those localities that are only slightly beyond the stress range for a certain indicator and those that are well beyond the stress threshold. For instance, under the old system a city that has had a population loss of one person would receive the same score as a city that lost 100,000 people. Under the new scoring system, the unit that lost one person might receive a 0.25 and the city that lost 100,000 people might receive a 1.0, depending upon its ranking within its group.

Finally, this new system helps to link different types of fiscal stress with possible solutions. Not all types of stress are the same. This new system differentiates between short term and long term stress, as well as internal stress and external stress.

In sum, the main changes in this proposed fiscal stress indicator system improve upon the previous indicators in five main ways:

1) They better capture different types of fiscal stress that are being missed in the current system, including those caused by transfers of money from one fund to another and unfunded liabilities for retiree healthcare and other post-employment benefits.
2) They include a mix of scoring methods, some of which are based on benchmarks and others of which are based upon rankings with other similarly sized cities.
3) They measure both current stress levels and changes in stress levels in order to predict future stress.
4) They measure the scale of fiscal stress within each indicator through use of scores that range from 0.25 to1.0, thus capturing the magnitude of stress.
5) They differentiate between different types of fiscal stress which allows them to be better linked with possible solutions.

The rest of the report is laid out as follows. First, we give a brief introduction to fiscal stress and its measurement. Second, we review the current fiscal stress indicator system for the State of Michigan. Third, we outline proposed alterations to the current system. And finally, we compare the new system to the old one in order to determine whether the new system better captures fiscal stress. Appendix B provides an extended literature review of fiscal stress indicator measurement methods.

Fiscal Stress

Many local governments in Michigan are facing fiscal stress levels that are impeding their ability to provide basic services to their communities. However, measuring this fiscal stress is not as simple as looking at one bottom line number or ratio. There are many ways in which a local government can undergo stress, some of which are not easily detected through standard accounting measures. For instance, some funds within a local government such as the general fund may appear to be healthy and sustainable while other funds may be quickly losing money or having money transferred out of them at unsustainable rates. In some other units, current

revenues and expenditures may be balanced while long term liabilities are growing faster than their ability to pay them. A fiscal stress indicator system must capture and differentiate between each of these possible types of fiscal stress.

The first step to measuring fiscal stress is defining it. In this analysis, we begin by first defining fiscal health using a generally agreed upon definition and then defining fiscal stress as a deficiency in any of these measures. Fiscal health, therefore, is defined as a government's ability to maintain solvency in four measures: cash solvency, budgetary solvency, long run solvency, and service level solvency. These are defined as follows:

- **Cash solvency** refers to a local government's liquidity and effective cash management, as well as its ability to pay current liabilities.
- **Budgetary solvency** refers to the ability of the government to generate sufficient revenues to fund its current or desired service levels.
- **Long run solvency** refers to the impact of existing long term obligations on future resources.
- **Service level solvency** refers to the ability of the government to provide and sustain a service level that citizens require and desire.[3]

Fiscal stress, therefore, is defined as a deficiency in any of these measures and does not only include short term, immediate stress, but also long term and service level insolvency. A fiscal stress indicator system should measure each of these types of solvency in order to adequately predict and prevent fiscal crises. In the next section, we outline the current fiscal stress indicator system to show which types of solvency the current system measures and in which types it is deficient.

As mentioned previously, we believe that it is important to measure not only cash and budgetary stress, but also long run and service level solvency. If a city is not providing an adequate level of services to its citizens or if it is not meeting long term obligations, it is not a healthy city. It is interesting to note, for instance, that most of the municipal bond literature and research is done from the perspective of the bond holders rather than the citizens of the municipality in question. The health of a city should not be analyzed solely from the perspective of the bond holders, but from the perspective of the citizens who are not receiving adequate services from their government.

Current Michigan Fiscal Stress Indicator System

The current fiscal stress indicator system for the State of Michigan is based upon an analysis commissioned in 2002 by the Michigan Department of Treasury. The Treasury department commissioned the Institute for Public Policy and Social Research at Michigan State University to evaluate the local government fiscal stress indicators

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[3] Groves et al., 2003

included in state law at that time.[4] The Institute completed an analysis and proposed a fiscal stress indicators system which was implemented beginning in 2006.[5]

Under this system, each local unit's score is calculated and then posted to the Department of Treasury's web site under the appropriate year. The scores are grouped by level of distress as follows:

Figure 1: Scoring for Current Fiscal Stress Indicator System

Fiscal Stress Score	Level of Distress	State Response
0-4	Fiscally Neutral	No state action needed
5-7	Fiscal Watch	Unit is placed under fiscal watch for the current and following year
8-10	Fiscal Stress	Unit is notified of its high score and is placed on a watch list for the current year and following year, and receives consideration for review

Kleine et al. based this fiscal indicator system on four groups of variables that compose models thought to cause fiscal distress as follows:

- **Population and job market shifts** which focuses on the dynamics of a government unit's tax base. If the tax base decreases, this can lead to budgetary problems and fiscal distress.
- **Governmental growth** which measures fiscal distress caused by a public sector too large for its tax base
- **Interest group demands** which captures overspending as a result of vulnerability of mayor and other local elected officials to special interest groups
- **Poor management** which refers to poor accounting methods, inaccurate estimation procedures, poor budgeting practices and/or inept managers for fiscal crisis

The authors use the following criteria for constructing their indicator system:

- Theoretical validity
- Ability to predict fiscal distress before it occurs
- Ability to capture concepts relevant to the State's interest
- Availability of the data

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[4] Kleine, Kloha, Weissert, 2002
[5] Michigan Department of Treasury

- Uniformity of data collection
- Frequency of data collected
- Ability to discern the progressing levels of distress
- Parsimony
- Resistance to manipulation or "gaming"
- Inclusion of a measure of hope for those in distress and forgiveness for those that are doing well
- The minimization of both type I and type II errors[6]

The current system consists of indicators in nine categories: 1) population growth, 2) real taxable valuation growth, 3) large real taxable value decrease, 4) general fund expenditures as a percent of taxable valuation, 5) general fund operating deficits, 6) prior general fund operating deficits, 7) size of general fund balance, 8) fund deficits in current or previous years, and 9) general long-term debt as a percent of taxable value. The indicators make up a 10-point scale which can be seen in figure two below.

Figure 2: Current Michigan Fiscal Indicators System

No.	Indicator	Calculation	Scoring System	Type of Solvency Measured	Weaknesses
#1	Population Growth	Current Population - Population in 2000	If population change is < 0, unit receives a 1.0. If population change is ≥ 0, then unit receives a 0.	Long run	No sense of scale. May duplicate other measures and not provide new information. Measurement change based on population in 2000 rather than previous year.
#2	Real taxable value (TV) growth	Current TV - TV from two years past	If change in two year TV was < 0, unit receives a 1.0. If two year TV was ≥ 0, unit receives a 0.	Long run	No sense of scale.
#3	Large Real Taxable value decrease	Current TV - TV from two years past	If change in two year TV was < one standard deviation, unit receives a 1.0. If change in two year TV was ≥ one standard deviation, unit receives a 0.	Long run	Standard deviations based on 2002 data.
#4	General fund Expenditures as a percent of taxable value	General Fund Expenditures/ Taxable Value	If ratio is > one standard deviation, unit receives a 1.0. If ratio is ≤ one standard deviation, unit receives a 0. (note:	Service	Standard deviations based on 2002 data. Only measures General Fund. Not clear that a low score is

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[6] A type I error occurs when a locality is falsely coded as fiscally stressed when it is in fact fiscally healthy. A type II error is when a locality is defined as fiscally healthy when it is in fact stressed.

			standard deviations different for townships and cities for this indicator only).		necessarily good – could indicate that the government is not providing an adequate level of services.
#5	General fund operating deficit ratio	(General Fund Expenditures - General Fund Revenues)/ General Fund Revenues	If ratio is >1%, unit receives a 1.0. If ratio is <1%, unit receives a 0.	Budget	Only measures general fund.
#6	Prior general fund operating deficit ratios	(General Fund Expenditures - General Fund Revenues)/ General Fund Revenues all measured in previous year, and two years past	For each year that ratio is >1%, unit receives a 1.0. For each year that ratio is <1%, unit receives a 0.	Budget	Only measures general fund.
#7	General fund balance ratio	General Fund Balance/ General Fund Revenues	If ratio is < half a standard deviation, unit receives a 1.0. If ratio is ≥ 0, then unit receives a 0.	Budget	Standard deviations based on 2002 data. Only measures General Fund.
#8	Fund deficits in current or previous year	Fund (general, special, capital, and debt service funds) Deficit in Current and Previous Year	If a unit had a negative fund balance in any of these funds in the current or prior year, it receives a 1.0. If it did not, it receives a 0.	Budget	No sense of scale or number of funds that have negative deficits.
#9	General long-term debt as a percent of Taxable value	General Long-Term Debt/ TV	If ratio is > one standard deviation, unit receives a 1.0. If ratio is ≤ one standard deviation, unit receives a 0.	Long run	Only measures general fund.

Deficiencies in the Current System

In this indicator system, there are no measures of cash solvency, four measures of budgetary solvency, four measures of long run solvency, and one measure of service level solvency. Service level solvency is the most difficult level to measure due to lack of data. However, cash level solvency is relatively simple to measure and should be added into this system.

Second, the current indicator system only measure stress at the general fund level and fails to account for unfunded long term liabilities. Stress should be measured at different fund levels in order to capture fund transfers and stress in funds that are not the general fund. In addition, unfunded long term liabilities should be accounted for because they are a serious cause of stress for many local governments.

Third, the current indicator system assigns scores based on standard errors from 2002 data which are inadequate for capturing current stress levels. It also lacks a mixture of rankings and industry benchmarks which help to capture relative and absolute stress.

Fourth, the current system lacks a sense of scale within each indicator. For instance, a unit that lost one person in population receives the same score as one that lost 100,000.

Finally, the current system does not differentiate between different types of stress such as short term or long term stress, or internally caused versus Environmental Stressors. This makes it difficult to link up possible solutions based upon the type and cause of stress.

In the next section, we outline the proposed changes to the current system which build upon these deficiencies but retain the beneficial qualities of the current system.

Proposed Michigan Fiscal Stress Indicator System

As previously mentioned, the fiscal stress indicator system proposed here updates the current system in the following ways:

1) It better captures different types of fiscal stress in different governmental funds, including those caused by unfunded liabilities for retiree healthcare and other post-employment benefits.
2) It includes a mix of scoring methods, some of which are based on benchmarks and others of which are based on rankings with other similarly sized cities.
3) It measures both current stress levels and changes in stress levels in order to predict future stress.
4) It measures the scale of fiscal stress within each indicator through use of scores that include 0, 0.25, 0.5 and 1.0, thus capturing the magnitude of stress.
5) It differentiates between different types of fiscal stress which allows them to be better linked with possible solutions.

Each of the new indicators is listed below by the type of solvency that it measures. The indicators are then summarized in Figure 3.

Cash solvency

Cash solvency measures a local government's liquidity and effective cash management, as well as its ability to pay current liabilities. In the new system, we measure cash solvency with the following indicators:

1) Cash Ratio (CR) = Cash and Certificates / Current Liabilities

- Level at which indicator is measured: General fund level
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.

2) Debt Service Ratio (DSR) = Annual Debt Service / Total Revenues
- Level at which indicator is measured: Total fund level – component units
- Scoring method: absolute score based on industry wide benchmark
  - Those localities with a debt service ratio exceeding 20% receive a 1.0, those with a debt service ratio between 15% and 20% receive a 0.5, those with a debt service ratio between 10% and 15% receive a 0.25, and those with a debt service ratio below 10% receive a zero.
    - This is based upon bond rating agency data in which debt service on net direct debt exceeding 20% of operating revenues is considered a warning signal. A ratio of 10% or less is considered acceptable.

Budgetary solvency

Budgetary solvency refers to the ability of a government to generate sufficient revenues to fund its current or desired service levels. Budgetary solvency is measured as follows:

3) & 4) Operating Deficit Ratio (ODR) = (Total Expenditures – Total Revenues) / Total Revenues
- Levels at which indicator is measured: 3) general fund and 4) total fund level – component units
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the highest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the lowest 25% of localities within each group are given a score of 0.

5) & 6) Change in the Operating Deficit Ratio (CODR) = DEF in previous year – DEF in current year
- Levels at which indicator is measured: 5) general fund and 6) total fund level – component units
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the highest 25% of scores within each group are

given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the lowest 25% of localities within each group are given a score of 0.

7) Percent Taxable Value Growth (TVG) = (Current TV – TV from previous year) / TV from previous year
   - Level at which indicator is measured: total fund level
   - Scoring method: relative ranking
     - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.
       - NOTE: we use absolute taxable value not adjusted for inflation because it does not matter in this relative scoring regime whether all TV's are adjusted for inflation or none are.

8) Taxable Value Per Capita (TVPC)= Current TV/ Total Population
   - Level at which indicator is measured: total fund level
   - Scoring method: relative ranking
     - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.
   NOTE: Although it is less than ideal to use population estimates, we find this indicator to be helpful even if it is just an estimate because it tells us a lot about the relative tax base for the locality.

9) Revenue Sharing Ratio (RSR) = (state revenue sharing + federal revenue sharing + other general state aid grants)/SEV
   - Level at which indicator is measured: total fund level – component units
   - Scoring method: relative ranking
     - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.
       - NOTE: This ratio measures the external stress caused by a lack of revenue sharing from other levels of government. It is measured in relation to SEV in order for this indicator to measure only environmental stressors and not something that is controllable by the local government. For instance, if it were measured as the revenue sharing divided by total revenue, this could be impacted by the local government's

11

revenue policies. By measuring it in relation to SEV it is purely a measure of external stress.

Long run solvency

Long run solvency refers to the impact of existing long term obligations on future resources. Note the addition of two indicators measuring the amount of unfunded long term liabilities. This is a major source of stress for some local governments in Michigan. We would have also liked to have a measure of unemployment as an indicator for long run solvency, but this data is not available yearly at the city level.

We chose not to use an indicator for change in population because yearly population estimates are generally inaccurate and we feel that taxable value growth is a more accurate indicator of fiscal health. In addition, even though population growth is thought to positively influence financial condition, larger populations may also demand greater public spending which can lead to deteriorating financial conditions if additional revenues are not generated proportionally to fund the increased service demand.[7] Therefore, it is unclear whether population growth alone is necessarily correlated with fiscal health.

Regarding UAAL including OPEB and pension costs, we would like to create an indicator that measures short term UAAL costs, but most cities do not have short term indicators in their financial statements. Some cities include data on the UAAL funded ratio and UAAL as a percent of covered payroll. However, not enough cities have this information for us to be able to use it at the current time. We suggest adding this to the F-65 requirements.

We would have liked to have used an indicator for unemployment rate in order to measure the external environmental stress on each locality. However, to our knowledge no data source exists that has locality level unemployment data. The Bureau of Labor Statistics has unemployment rates for all cities greater than 25,000 in population, but not for smaller cities. If this data becomes available in the future, it would be a beneficial indicator to add to this system.

Therefore, long run solvency is measured by the following indicators:

10) & 11) Unrestricted Fund Balance Ratio (UFB) = Unrestricted fund balance / Total Revenues = (Designated Fund Balance + Undesignated Fund Balance)/Total Revenues
- Levels at which indicator is measured: 8) general fund and 9) total fund level – component units
- Scoring method: absolute score based on industry wide benchmark
    - Those localities with a UFB less than 0 receive a 1.0, those with a UFB between 0 and 5% receive a 0.5, those with a UFB between

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[7] Wang et. al, 2007

5% and 10% receive a 0.25, and those with a UFB above 10% receive a zero.[8]

12) & 13) Change in Unrestricted Fund Balance Ratio (CUFB) = UFB for current year – UFB from previous year
- Levels at which indicator is measured: 10) general fund and 11) total fund level – component units
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.

14) Long-Term Debt Ratio (LTD) = Long Term Debt / Total Revenue
- Level at which indicator is measured: total fund level – component units
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.

15) & 16) Unfunded Actuarial Accrued Liability Ratio (UAALR) = UAAL / Total Expenditures
- Level at which indicator is measured: total fund level but done for both 13) OPEB UAAL and 14) Pension UAAL Separately
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the highest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the lowest 25% of localities within each group are given a score of 0.

17) Long Term % Taxable Value Growth (LTTVG) = (Current TV – TV from 2005) / TV from 2005
- Level at which indicator is measured: total fund level – component units
- Scoring method: relative ranking
  - Localities are ranked within a group of similar localities and then the localities with the lowest 25% of scores within each group are given a 1.0, the next 25% are given a score of 0.5, the next 25% are given a score of 0.25, and the highest 25% of localities within each group are given a score of 0.

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[8] Washington State Paper

- NOTE: we use absolute taxable value not adjusted for inflation because it does not matter in this relative scoring regime whether all TV's are adjusted for inflation or none are.

Service Level solvency

Service level solvency refers to the ability of the government to provide and sustain a service level that citizens require and desire. Unfortunately at the moment there is no data available for measuring service level solvency. The indicator used in the current system to measure service level solvency, general fund expenditures as a percent of taxable value, is inadequate because it is unclear that a high level is necessarily an indicator of stress. A low level of expenditures could indicate that the government is not providing an adequate level of services to its community. Therefore both a high level and a low level of expenditures per taxable value could indicate fiscal stress.

We would like to use an indicator for service level solvency relating to crime protection. However, we do not recommend using crime rates as an indicator of service level solvency because high crime rates could indicate that the police are patrolling regularly and catching criminals, or it could indicate that the police are not preventing crime adequately and the number of crimes is increasing. Similarly, a low crime rate could mean that crime is still occurring but that the police are not catching the criminals. Therefore, neither a high or low crime rate is necessarily an indicator of service level solvency. Instead, we recommend that an indicator is created using the number of police per capita as a measure of service level solvency. The F65 data base does ask for this data. However, very few localities responded to this question. We recommend that this response be made mandatory and that a police per capita ratio be used in this indicator system in the future.

Groupings of Similarly Sized Localities

Localities are split into four groups, or quartiles, based on total population. This is done by first ranking the localities in order of population, and then splitting them into four equally sized groups. This ensures that small local governments are not compared directly to large governments such as those of Detroit and Lansing. Localities are also differentiated by type of government: city, township and county. This makes it such that cities are not compared to counties and townships which have very different taxing and expenditure structures.

Summary of the New System

A summary of the proposed indicators are can be found in figure 3 below.

Figure 3: Proposed Michigan Fiscal Indicators System

No.	Indicator	Calculation	Fund Level	Scoring System	Type of Solvency Measured
#1	Cash Ratio	Cash and Certificates / Current Liabilities	General fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Cash
#2	Debt Service Ratio	Annual Debt Service / Total Revenues	Total fund[9]	Benchmark: Larger than 20% receives a 1.0, between 15% and 20% receives a 0.5, between 10% and 15% receives a 0.25, and below 10% receives a 0	Cash
#3 & #4	Operating Deficit Ratio	(Total Expenditures - Total Revenues) / Total Revenues	General Fund Total fund	Within group: highest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the lowest 25% are given a 0	Budgetary
#5 & #6	Change in Operating Deficit Ratio	DEF in previous year – DEF in current year	General Fund Total fund	Within group: highest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the lowest 25% are given a 0	Budgetary
#7	% Taxable Value Growth	(Current TV – TV from previous year) / TV from previous year	Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Budgetary
#8	Taxable Value Per Capita	Current TV/ Total Population	Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Budgetary
#9	Revenue Sharing Ratio	Revenue Sharing/ SEV	Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Budgetary
#10 & #11	Unrestricted Fund Balance Ratio	(Designated Fund Balance + Undesignated Fund Balance) / Total Revenues	General Fund Total fund	Benchmark: Less than 0 receive a 1.0, between 0 and 5% receive a 0.5, between 5% and 10% receive a 0.25, and above 10% receive a 0	Long Run
#12 & #13	Change in Unrestricted Fund Balance Ratio	UFB from current year – UFB from previous year	General Fund Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Long Run
#14	Long Term Debt Ratio	Long Term Debt / Total Revenue	Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the	Long Run

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[9] All indicators measured at the total fund level have had the component units removed from the calculation

				highest 25% are given a 0	
#15 & #16	Unfunded Actuarial Accrued Liability Ratio	UAAL / Total Expenditures	Total fund but done for both OPEB UAAL and Pension UAAL Separately	Within group: highest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the lowest 25% are given a 0	Long Run
#17	Long Term % Taxable Value Growth	(Current TV – TV from 2005) / TV from 2005	Total fund	Within group: lowest 25% are given a 1.0, the next 25% are given a 0.5, the next 25% are given a 0.25, and the highest 25% are given a 0	Long Run

Type of Stress

These indicators can then be used to determine the type of stress in each locality by grouping them into indicators that designate either short term or chronic stress, and internal stressors or environmental stressors. Internal stressors refer to stress that the local government may have the ability to fix from within. Environmental stressors are those types of stress that are more external in nature and are not so easily dealt with from within. These groupings can be seen in figure 4 below.

Figure 4: Groupings of Indicators into Short term, Chronic, Internal Stressors, and Environmental Stressors

	Internal Stressors	Environmental Stressors
Short Term	CR DSR DEF UFB	TVPC RSR TVG
Chronic	CDEF CUFB LTD UAAL	TVPC LT TVG

Change Ratio: CDEF+CUFB+TVG+LTTVG/6

It is clear from figure 4 that this system is lacking in indicators that measure environmental stressors. These are the most difficult indicators to create based on data availability. We would like to have a measure for unemployment rates as another measure of chronic, environmental stress, but unemployment data is not available on a yearly basis at the city level. Similarly, a measure for per capita income and/or vacant parcel ratio would have been useful for measuring environmental stress, but these

numbers are not available on a yearly basis. We recommend, however, that this data be collected in the future for use in this indicator system.

Results for Fiscal Stress under the Proposed System for 2009

This section summarizes the results for this new system of fiscal stress indication for cities within Michigan for the year 2009. Data for these indicators was drawn from the new F65 web portal data. However, not all cities fully entered their fiscal data into this system, and some cities' data were clearly inaccurate. Therefore, these cities were dropped and not all cities are included in this analysis.

We use the following breakdown of fiscal stress as seen in figure 5 in order to rate the stress level of each city. This scoring system is a bit more conservative than the previous breakdown. We feel that this is appropriate because the current system seems to be underestimating the fiscal stress levels of many localities.

Figure 5: New Scoring System

Fiscal Stress Score	Level of Distress	State Response
Less than 5	Fiscally Neutral	No state action needed
5-8	Fiscal Watch	Unit is placed under fiscal watch for the current and following year
8 or greater	Fiscal Stress	Unit is notified of its high score and is placed on a watch list for the current year and following year, and receives consideration for review

The scores for each city based on population size can be seen in Appendix A. Cities that score seven or higher are rated at fiscally stressed. Cities whose scores are at least five but less than seven are considered to be under fiscal watch. And cities that score below a five are considered to be fiscally neutral.[10] Their scores under the current system are also in this appendix. Note that some cities are missing because their F65 data was incomplete. These include Detroit, Dowagiac, Ecourse, Fremont, Gaylord, Gobles, Hamtramck, Ionia, Royal Oak, Saugatuck, Stanton, Williamston, and Wyoming. In the next section we take a sample of cities and compare their current and new scores in order to see the changes more directly.

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[10] Detroit's data is not in the F65 Dataset

Comparison between the Current System and Proposed Systems for 2009

In order to more easily compare the two systems (the current one with the new one proposed here), in this section we look more closely at a few cities and their scores under each system. First we will look at Flint, then Saginaw.

Flint

The first city analyzed more fully is Flint, Michigan. Flint scored an 8 in the current fiscal stress indicator system for 2009 which just puts them in the range of fiscal stress as can be seen in figure 6 below.

Figure 6: Current Fiscal Stress Indicators for Flint, Michigan in 2009

<table>
<tr><td colspan="6" align="center">Michigan Department of Treasury</td></tr>
<tr><td colspan="2">Local Unit: FLINT</td><td align="center">City</td><td colspan="2">Municode: 25-2-040</td><td>Fiscal Score Year: 2009</td></tr>
<tr><td>Indicator</td><td>Description</td><td>Year</td><td colspan="2">Data</td><td>Points</td></tr>
<tr><td>#1
Population Growth</td><td>A Decrease in Population=1
Growth or No Change=0</td><td>2009
2000</td><td>Population:
Population:</td><td align="right">111475
124943</td><td>1</td></tr>
<tr><td>#2
Real Taxable
Value Decline</td><td>Current Taxable Value Deflated to Real Dollars
Decline in Real Taxable Value=1
Real Growth or No Change=0</td><td>2009

2007</td><td>Taxable Value:
Real Taxable Value:
Taxable Value:</td><td align="right">$1,452,228,463.00
$1,358,238,367.94
$1,634,137,820.00</td><td>1</td></tr>
<tr><td>#3
Large Real
Taxable Value Decline</td><td>Current Taxable Value Deflated to Real Dollars
Decline in Real Taxable Value >4%=1
Real Growth or No Change=0</td><td>2009

2007</td><td>Taxable Value:
Real Taxable Value:
Taxable Value:</td><td align="right">$1,452,228,463.00
$1,358,238,367.94
$1,634,137,820.00</td><td>1</td></tr>
<tr><td>#4
General Fund
Expenditures as a %
of Taxable Value</td><td>Cities & Villages >5%=1
Townships & Counties >1%=1
Below the Respective Standards=0</td><td>2009</td><td>General Fund Expenditures:
Taxable Value:</td><td align="right">$66,703,149.00
$1,452,228,463.00</td><td>0</td></tr>
<tr><td>#5
General Fund Operating
Deficit
For Current Year</td><td>General Fund Expenditures >1% of General
Fund Revenues=1
General Fund Expenditures <1% of General Fund
Revenues=0</td><td>2009</td><td>General Fund Revenues:
General Fund Expenditures:</td><td align="right">$63,937,302.00
$66,703,149.00</td><td>1</td></tr>
<tr><td>#6
Prior Year General Fund
Operating Deficit</td><td>General Fund Expenditures >1% of General
Fund Revenues=1(for each year applicable)
General Fund Expenditures <1% of General
Fund Revenues=0 (for each year applicable)</td><td>2008

2007</td><td>General Fund Revenues:
General Fund Expenditures:
General Fund Revenues:
General Fund Expenditures:</td><td align="right">$66,823,137.00
$79,475,612.00
$69,212,013.00
$70,908,742.00</td><td>1

1</td></tr>
<tr><td>#7
Size of General Fund
Balance</td><td>General Fund Balance <13% of General Fund
Revenues=1
General Fund Balance >13% of General Fund
Revenues=0</td><td>2009</td><td>General Fund Revenues:
General Fund Balance:</td><td align="right">$63,937,302.00
($10,113,744.00)</td><td>1</td></tr>
<tr><td>#8
Major Fund Deficits in
Current or Prior Year</td><td>A Deficit in One or More Major Fund in One or
Both Years=1
No Major Fund Deficits=0</td><td>2009
2008</td><td>Major Fund Deficit(s):
Major Fund Deficit(s):</td><td align="right">($10,113,744.00)
($6,869,370.00)</td><td>1</td></tr>
<tr><td>#9
General Long-Term Debt
as a % of Taxable Value</td><td>General Long-Term Debt > 6% of Taxable Value=1
General Long-Term Debt < 6% of Taxable Value=0</td><td>2009</td><td>General Long-Term Debt:
Taxable Value:</td><td align="right">$52,578,259.00
$1,452,228,463.00</td><td>0</td></tr>
<tr><td colspan="4"></td><td align="right">TOTAL SCORE</td><td>8</td></tr>
</table>

Flint scored a zero on the old system for #4, general fund expenditure as a % of Taxable Value. If this had been done at the total fund level, it would have scored a 1.0 indicating that perhaps the general fund is healthy but there is stress in some other funds.

In fact, Flint has been borrowing money from its water/sewer fund to cover general operating costs which would not show up in the current indicators since they

only look at the general fund. To account for this in our new system, we measure many of the indicators at both the general fund level and at the total fund level (minus component units which are legally separate entities from the local government and do not majorly affect their fiscal health level).

A problem arises in the case of Flint because both the sewer fund and the hospital account are in the enterprise units fund. This is problematic because we would like to measure the health of the sewer fund since the city is drawing from that fund, but we would not like to include the fiscal health of the hospital since those revenues are not usable by the city. We chose to measure the cash ratio at the general fund level to exclude both of these funds, but we measure many of the other indicators at both levels. Because our analysis cannot fully capture illegal fund transfers, we suggest that the state ramp up monitoring of such transfers so that local units cannot hide stress in this way. In addition, because entities such as hospitals are generally listed in the component units fund for most local governments and not in the enterprise funds, we chose to keep enterprise funds in the total fund analyses even though in the case of Flint it does not work out perfectly. On average, it will be a more accurate representation of the fiscal health of the unit.

Taking these points into consideration, our new system scored Flint at a 10 which indicates that it is facing a severe level of fiscal stress. Results from the new system can be seen in figure 7 below.

Figure 7: Proposed Fiscal Stress Indicators for Flint, Michigan, 2009

Local Unit: FLINT   **City**   **Fiscal Score Year: 2009**

Indicator	Description	Fund Level	Data	Points
#1 Cash Ratio	(Cash and Certificates / Current Liabilities) Scored based on ranking	Total fund	Ratio: 0.020	1.0
#2 Debt Service Ratio	(Annual Debt Service / Total Revenues) Larger than 20% receives a 1.0, between 15% and 20% receives a 0.5, between 10% and 15% receives a 0.25, and below 10% receives a 0	Total fund	Ratio: 0.005	0
#3 & #4 Operating Deficit Ratio	((Total Expenditures - Total Revenues) / Total Revenues) Scored based on ranking	General Fund	Ratio: 0.049	1.0
		Total fund	Ratio: .0245	0.5
#5 & #6 Change in Operating Deficit Ratio	((DEF in previous year – DEF in current year) / DEF in previous year) Scored based on ranking	General Fund	Chang in Ratio: -0.001	0.25
		Total fund	Change in Ratio: -0.019	0.0

#7 % Taxable Value Growth	((Current TV – TV from previous year) / TV from previous year) Scored based on ranking	Total fund	Growth: -0.085	1.0
#8 Taxable Value Per Capita	Current TV/ Current Population	Total Fund	Ratio: $13,027.39	1.0
#9 Revenue Sharing Ratio	Revenue Sharing/ SEV	Total Fund	Ratio: 2.87e^7	1.0
#10 & #11 Unrestricted Fund Balance Ratio	((Designated Fund Balance + Undesignated Fund Balance) / Total Revenues) Less than zero receives a 1.0, between 0 and 5% receive a 0.5, between 5% and 10% receive a 0.25, and above 10% receive a 0	General Fund	Ratio: -0.151	0.25
		Total fund	Ratio: .180	0
#12 & #13 Change in Unrestricted Fund Balance Ratio	((UFB from current year – UFB from previous year) / UFB from previous year) Scored based on ranking	General Fund	Change in Ratio: -0.046	1.0
		Total fund	Change in Ratio: -0.026	0.5
#14 Long Term Debt Ratio	(Long Term Debt / Total Revenue) Scored based on ranking	Total fund	Ratio: .167	0.25
#15 & #16 Unfunded Actuarial Accrued Liability Ratio	(UAAL / Total Expenditures) Scored based on ranking	OPEB UAAL	Ratio: 1.439	1.0
		Pension UAAL	Ratio: .001	0.25
#17 Long Term % Taxable Value Growth	(Current TV – TV from 2005) / TV from 2005 Scored based on ranking	Total fund	Growth: 0.119	1.0

TOTAL SCORE: **10.0**

This new system can help us to understand more about what type of fiscal stress Flint is facing. Figure 8 below shows Flint's scores for each type of stress in the stress matrix. These scores are then added up and turned in to a ratio for each cell within the matrix in order to determine which types of stress the city is facing.

Figure 8: Indicator Groupings for Flint, Michigan

	Internal Stressors	**Environmental Stressors**
Short Term	CR: 1.0 DSR: 0 DEF: 1.0, 0.5 UFB:.25, 0 **Sum/Total: 2.75/6=46%**	TVG: 1.0 RSR: 1.0 TVPC: 1.0 **Sum/Total: 3/3=100%**
Chronic	CDEF: 0.25,0 CUFB: 1.0, 0.5 LTD: 0.25 UAAL: 1.0, 0.25 **Sum/Total: 3.25/7=46%**	LT TVG: 1.0 TVPC: 1.0 **Sum/Total: 2/2=100%**

Change Ratio: 63% -- Declining health

Based upon the above matrix, it appears that Flint is facing a large amount of environmental stressors, both in the short and long term. However, the city is also facing a significant amount of internal stress as well. Note that Flint's change indicators ratio is 3.75/6= 63%[11] which would indicate the Flint's overall fiscal health is declining.

Saginaw

The second city that we will analyze in detail is Saginaw, Michigan. Saginaw scored a 4 in the current fiscal stress indicator system for 2009 which places them in the range of fiscally neutral. The breakdown can be seen in figure 9 below.

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[11] The change indicators ratio is calculated by summing up all of the scores for ratios that indicate change and then dividing this by the total possible score: CDEF (both at general and total fund levels), CUFB (both at general and total fund levels), TVG, and LT TVG

Figure 9: Current Fiscal Stress Indicators for Saginaw, Michigan for 2009

	Michigan Department of Treasury				
Local Unit: ALBEE		**Township**		**Municode:** 73-1-010	**Fiscal Score Year: 2009**
Indicator	**Description**	**Year**	**Data**		**Points**
#1 Population Growth	A Decrease in Population=1 Growth or No Change=0	2009 2000	Population: Population:	2214 2338	1
#2 Real Taxable Value Decline	Current Taxable Value Deflated to Real Dollars Decline in Real Taxable Value=1 Real Growth or No Change=0	2009 2007	Taxable Value: Real Taxable Value: Taxable Value:	$58,313,554.00 $54,539,425.74 $55,685,984.00	1
#3 Large Real Taxable Value Decline	Current Taxable Value Deflated to Real Dollars Decline in Real Taxable Value >4%=1 Real Growth or No Change=0	2009 2007	Taxable Value: Real Taxable Value: Taxable Value:	$58,313,554.00 $54,539,425.74 $55,685,984.00	0
#4 General Fund Expenditures as a % of Taxable Value	Cities & Villages >5%=1 Townships & Counties >1%=1 Below the Respective Standards=0	2009	General Fund Expenditures: Taxable Value:	$384,390.00 $58,313,554.00	0
#5 General Fund Operating Deficit For Current Year	General Fund Expenditures >1% of General Fund Revenues=1 General Fund Expenditures <1% of General Fund Revenues=0	2009	General Fund Revenues: General Fund Expenditures:	$384,500.00 $384,390.00	0
#6 Prior Year General Fund Operating Deficit	General Fund Expenditures >1% of General Fund Revenues=1(for each year applicable) General Fund Expenditures <1% of General Fund Revenues=0 (for each year applicable)	2008 2007	General Fund Revenues: General Fund Expenditures: General Fund Revenues: General Fund Expenditures:	$313,645.00 $364,177.00 $292,464.00 $392,748.00	1 1
#7 Size of General Fund Balance	General Fund Balance <13% of General Fund Revenues=1 General Fund Balance>13% of General Fund Revenues=0	2009	General Fund Revenues: General Fund Balance:	$384,500.00 $96,764.00	0
#8 Major Fund Deficits in Current or Prior Year	A Deficit in One or More Major Fund in One or Both Years=1 No Major Fund Deficits=0	2009 2008	Major Fund Deficit(s): Major Fund Deficit(s):	$0.00 $0.00	0
#9 General Long-Term Debt as a % of Taxable Value	General Long-Term Debt > 6% of Taxable Value=1 General Long-Term Debt < 6% of Taxable Value=0	2009	General Long-Term Debt: Taxable Value:	$431,817.00 $58,313,554.00	0
				TOTAL SCORE	**4**

Saginaw scored a zero on the following indicators: #3 large real taxable value decline, #4 General Fund Expenditures as a % of Taxable Value, #5 General Fund Operating Deficit for Current Year, #7 Size of General Fund Balance, #8 Major Fund Deficits in Current or Prior Year, and #9 General Long-Term Debt as a % of Taxable Value.

In reality, Saginaw appears to be managed well and under short term, internal fiscal health. However, the externally and in the long run, the city's fiscal health is in jeopardy. For instance, Saginaw's Unfunded Actuarial Accrued Liability (UAAL), which is the difference between the actuarial accrued liability and the actuarial value of assets accumulated to finance that obligation[12], is $67,879,660 and its UAAL as a percentage of covered payroll is 958%. These are both unsustainable long term obligations that the city should be funding more fully in the present.

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[12] GASB definition

These issues are better captured in our new fiscal stress system, which is summarized in figure 10.

Figure 10: Proposed Fiscal Stress Indicators for Saginaw, Michigan

Local Unit: SAGINAW   **City**   **Fiscal Score Year: 2009**

Indicator	Description	Fund Level	Data	Points
#1 Cash Ratio	(Cash and Certificates / Current Liabilities) Scored based on ranking	General fund	Ratio: 0.333	1.0
#2 Debt Service Ratio	(Annual Debt Service / Total Revenues) Larger than 20% receives a 1.0, between 15% and 20% receives a 0.5, between 10% and 15% receives a 0.25, and below 10% receives a 0	Total fund	Ratio: 0.042	0
#3 & #4 Operating Deficit Ratio	((Total Expenditures - Total Revenues) / Total Revenues) Scored based on ranking	General Fund	Ratio: -0.003	0.25
		Total fund	Ratio: 0.022	0.5
#5 & #6 Change in Operating Deficit Ratio	(DEF in previous year – DEF in current year) Scored based on ranking	General Fund	Chang in Ratio: -0.028	0
		Total fund	Change in Ratio: -0.027	0
#7 % Taxable Value Growth	((Current TV – TV from previous year) / TV from previous year) Scored based on ranking	Total fund	Growth: 0.020	0
#8 Taxable Value Per Capita	Current TV/ Current Population	Total Fund	Ratio: $12,411	1.0
#9 Revenue Sharing Ratio	Revenue Sharing/ SEV	Total Fund	Ratio: 1.04e^7	1.0
#10 & #11 Unrestricted Fund Balance Ratio	((Designated Fund Balance + Undesignated Fund Balance) / Total Revenues) Less than zero receives a 1.0, between 0 and 5% receive a 0.5, between 5% and 10% receive a 0.25, and above 10% receive a 0	General Fund	Ratio: 0.044	0.25
		Total fund	Ratio: 0.351	0
#12 & #13 Change in Unrestricted Fund Balance Ratio	((UFB from current year – UFB from previous year) / UFB from previous year) Scored based on ranking	General Fund	Change in Ratio: -0.004	0.5
		Total fund	Change in Ratio: 0.049	0.25

City

23

#14 Long Term Debt Ratio	(Long Term Debt / Total Revenue) Scored based on ranking	Total fund	Ratio: 0.566	1.0
#15 & #16 Unfunded Actuarial Accrued Liability Ratio	(UAAL / Total Expenditures) Scored based on ranking	OPEB UAAL	Ratio: 2.487	1.0
		Pension UAAL	Ratio: 1.188	1.0
#17 Long Term % Taxable Value Growth	(Current TV – TV from 2005) / TV from 2005 Scored based on ranking	Total fund	Growth: 0.169	0.5

TOTAL SCORE: **8.25**

Under this new system, Saginaw received an overall score of 8.25 which places them in the fiscal stress range. Saginaw has a low level of internal, short term stress, indicating that it may be being managed well in the short run. However, in the long run Saginaw is highly stressed both internally and externally.

Figure 11: Indicator Groupings for Saginaw, Michigan

	Internal Stressors	Environmental Stressors
Short Term	CR: 1.0 DSR: 0 DEF: 0.25,0.5 UFB:.25, 0 **Sum/Total: 2/6=33%**	TVG: 0 RSR: 1.0 TVPC: 1.0 **Sum/Total: 2/3=67%**
Chronic	CDEF: 0,0 CUFB:0.5, 0.25 LTD:1.0 UAAL: 1.0, 1.0 **Sum/Total: 4.75/7=68%**	LT TVG: 0.5 TVPC: 1.0 **Sum/Total: 1.5/2=75%**

Change Ratio: 21% -- Improving health

Note that Saginaw's change indicators ratio is 1.25/6= 21%[13] which would indicate the Saginaw's overall fiscal health is improving. Saginaw is mainly undergoing long term, externally caused stress.

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[13] The change indicators ratio is calculated by summing up all of the scores for ratios that indicate change and then dividing this by the total possible score: CDEF, CUFB, TVG, and LT TVG

Conclusion

The new indicator system proposed here better measures the fiscal health of Michigan's local governments. It expands upon the current system by better capturing different types of fiscal stress at all levels of government, using a mix of scoring methods, measuring both current stress levels and changes in stress levels, measuring the scale of fiscal stress within each indicator through use of scores that range from 0.25 to1.0, and differentiating between varying types of fiscal stress. This new system will help the state to not only recognize which units are stressed, but to predict this stress before it occurs. It will also help the state to better link policy solutions with the specific type of stress that each unit faces.

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Appendix A: New Fiscal Stress Indicator Scores, 2009

City	Population Quartile	New Fiscal Indicator Score	New Fiscal Stress Rating	Current Fiscal Indicator Score	Current Fiscal Stress Rating
JACKSON	4	10.5	Fiscal Stress	9	Fiscal Stress
FLINT	4	10	Fiscal Stress	8	Fiscal Stress
LANSING	4	9.75	Fiscal Stress	4	Fiscally Neutral
ADRIAN	4	9.25	Fiscal Stress	6	Fiscal Watch
HAZEL PARK	4	9	Fiscal Stress	7	Fiscal Watch
PONTIAC	4	8.5	Fiscal Stress	6	Fiscal Watch
BERKLEY	4	8.5	Fiscal Stress	4	Fiscally Neutral
TAYLOR	4	8.5	Fiscal Stress	4	Fiscally Neutral
KALAMAZOO	4	8.25	Fiscal Stress	6	Fiscal Watch
SAGINAW	4	8.25	Fiscal Stress	4	Fiscally Neutral
EAST LANSING	4	8.25	Fiscal Stress	2	Fiscally Neutral
FRASER	4	8	Fiscal Stress	4	Fiscally Neutral
TRENTON	4	8	Fiscal Stress	4	Fiscally Neutral
MUSKEGON	4	7.5	Fiscal Stress	4	Fiscally Neutral
AUBURN HILLS	4	7.5	Fiscal Stress	3	Fiscally Neutral
BAY CITY	4	7.5	Fiscal Stress	3	Fiscally Neutral
DEARBORN HEIGHTS	4	7.5	Fiscal Stress	3	Fiscally Neutral
NORTON SHORES	4	7.5	Fiscal Stress	2	Fiscally Neutral
ANN ARBOR	4	7.25	Fiscal Stress	3	Fiscally Neutral
WARREN	4	7	Fiscal Stress	4	Fiscally Neutral
WESTLAND	4	7	Fiscal Stress	4	Fiscally Neutral
WYANDOTTE	4	7	Fiscal Stress	4	Fiscally Neutral
GRAND RAPIDS	4	6.75	Fiscal Watch	4	Fiscally Neutral
GRANDVILLE	4	6.75	Fiscal Watch	4	Fiscally Neutral
ALLEN PARK	4	6.75	Fiscal Watch	3	Fiscally Neutral
DEARBORN	4	6.75	Fiscal Watch	3	Fiscally Neutral
INKSTER	4	6.75	Fiscal Watch	3	Fiscally Neutral
MADISON HEIGHTS	4	6.75	Fiscal Watch	3	Fiscally Neutral
MOUNT PLEASANT	4	6.75	Fiscal Watch	2	Fiscally Neutral
NOVI	4	6.5	Fiscal Watch	5	Fiscal Watch
BURTON	4	6.5	Fiscal Watch	3	Fiscally Neutral
FERNDALE	4	6.5	Fiscal Watch	3	Fiscally Neutral
OAK PARK	4	6.5	Fiscal Watch	3	Fiscally Neutral
PORT HURON	4	6.5	Fiscal Watch	3	Fiscally Neutral

BATTLE CREEK	4	6.5	Fiscal Watch	2	Fiscally Neutral
MIDLAND	4	6.25	Fiscal Watch	6	Fiscal Watch
SOUTHGATE	4	6.25	Fiscal Watch	5	Fiscal Watch
ST. CLAIR SHORES	4	6.25	Fiscal Watch	3	Fiscally Neutral
MT. CLEMENS	4	6	Fiscal Watch	4	Fiscally Neutral
GROSSE POINTE WOODS	4	6	Fiscal Watch	3	Fiscally Neutral
WAYNE	4	5.75	Fiscal Watch	5	Fiscal Watch
EASTPOINTE	4	5.75	Fiscal Watch	3	Fiscally Neutral
MONROE	4	5.75	Fiscal Watch	3	Fiscally Neutral
ROMULUS	4	5.75	Fiscal Watch	3	Fiscally Neutral
TROY	4	5.5	Fiscal Watch	6	Fiscal Watch
BIRMINGHAM	4	5.5	Fiscal Watch	3	Fiscally Neutral
LINCOLN PARK	4	5.25	Fiscal Watch	5	Fiscal Watch
SOUTHFIELD	4	5.25	Fiscal Watch	5	Fiscal Watch
OWOSSO	4	5.25	Fiscal Watch	4	Fiscally Neutral
ROSEVILLE	4	5.25	Fiscal Watch	3	Fiscally Neutral
STERLING HEIGHTS	4	5.25	Fiscal Watch	2	Fiscally Neutral
WALKER	4	5.25	Fiscal Watch	1	Fiscally Neutral
FARMINGTON HILLS	4	4.75	Fiscally Neutral	4	Fiscally Neutral
MARQUETTE	4	4.25	Fiscally Neutral	0	Fiscally Neutral
YPSILANTI	4	4	Fiscally Neutral	4	Fiscally Neutral
GARDEN CITY	4	3.75	Fiscally Neutral	3	Fiscally Neutral
TRAVERSE CITY	4	3.75	Fiscally Neutral	1	Fiscally Neutral
PORTAGE	4	3.5	Fiscally Neutral	1	Fiscally Neutral
LIVONIA	4	3.25	Fiscally Neutral	5	Fiscal Watch
ROCHESTER HILLS	4	3.25	Fiscally Neutral	2	Fiscally Neutral
HOLLAND	4	2.75	Fiscally Neutral	6	Fiscal Watch
MEMPHIS	4	2.5	Fiscally Neutral	3	Fiscally Neutral
KENTWOOD	4	2	Fiscally Neutral	4	Fiscally Neutral
HIGHLAND PARK	3	11.5	Fiscal Stress	7	Fiscal Watch
GROSSE POINTE PARK	3	10	Fiscal Stress	4	Fiscally Neutral
MUSKEGON HEIGHTS	3	9.75	Fiscal Stress	n/a	
BELDING	3	9.5	Fiscal Stress	3	Fiscally Neutral
FLUSHING	3	9.25	Fiscal Stress	5	Fiscal Watch
HARPER WOODS	3	9	Fiscal Stress	6	Fiscal Watch
RIVER ROUGE	3	9	Fiscal Stress	6	Fiscal Watch
GRAND LEDGE	3	9	Fiscal Stress	3	Fiscally Neutral
CENTER LINE	3	8.75	Fiscal Stress	4	Fiscally Neutral
RIVERVIEW	3	8.5	Fiscal Stress	7	Fiscal Watch

CLAWSON	3	8.5	Fiscal Stress	3	Fiscally Neutral
NEW BALTIMORE	3	8.5	Fiscal Stress	3	Fiscally Neutral
WIXOM	3	8.25	Fiscal Stress	2	Fiscally Neutral
FARMINGTON	3	8	Fiscal Stress	5	Fiscal Watch
BRIGHTON	3	8	Fiscal Stress	2	Fiscally Neutral
SOUTH LYON	3	7.75	Fiscal Stress	3	Fiscally Neutral
HASTINGS	3	7.75	Fiscal Stress	1	Fiscally Neutral
NORTHVILLE	3	7.25	Fiscal Stress	3	Fiscally Neutral
SALINE	3	7.25	Fiscal Stress	2	Fiscally Neutral
MELVINDALE	3	7	Fiscal Stress	5	Fiscal Watch
ST. LOUIS	3	7	Fiscal Stress	4	Fiscally Neutral
BENTON HARBOR	3	6.75	Fiscal Watch	7	Fiscal Watch
BIG RAPIDS	3	6.75	Fiscal Watch	3	Fiscally Neutral
GRAND BLANC	3	6.75	Fiscal Watch	3	Fiscally Neutral
MARYSVILLE	3	6.75	Fiscal Watch	3	Fiscally Neutral
PETOSKEY	3	6.75	Fiscal Watch	3	Fiscally Neutral
ESCANABA	3	6.75	Fiscal Watch	2	Fiscally Neutral
ISHPEMING	3	6.75	Fiscal Watch	2	Fiscally Neutral
NILES	3	6.5	Fiscal Watch	3	Fiscally Neutral
EAST GRAND RAPIDS	3	6.5	Fiscal Watch	2	Fiscally Neutral
LUDINGTON	3	6.25	Fiscal Watch	2	Fiscally Neutral
WALLED LAKE	3	6	Fiscal Watch	2	Fiscally Neutral
HUDSONVILLE	3	5.5	Fiscal Watch	3	Fiscally Neutral
MILAN	3	5.5	Fiscal Watch	3	Fiscally Neutral
SAULT STE. MARIE	3	5.5	Fiscal Watch	3	Fiscally Neutral
ST. CLAIR	3	5.5	Fiscal Watch	3	Fiscally Neutral
ST. JOHNS	3	5.5	Fiscal Watch	3	Fiscally Neutral
FENTON	3	5.5	Fiscal Watch	2	Fiscally Neutral
ROCHESTER	3	5.5	Fiscal Watch	2	Fiscally Neutral
COLDWATER	3	5.25	Fiscal Watch	5	Fiscal Watch
ALMA	3	5.25	Fiscal Watch	3	Fiscally Neutral
GROSSE POINTE FARMS	3	5.25	Fiscal Watch	3	Fiscally Neutral
HILLSDALE	3	5.25	Fiscal Watch	3	Fiscally Neutral
MARSHALL	3	5	Fiscal Watch	4	Fiscally Neutral
ALBION	3	5	Fiscal Watch	3	Fiscally Neutral
WOODHAVEN	3	5	Fiscal Watch	3	Fiscally Neutral
CHARLOTTE	3	5	Fiscal Watch	0	Fiscally Neutral
FLAT ROCK	3	4.75	Fiscally Neutral	3	Fiscally Neutral
TECUMSEH	3	4.75	Fiscally Neutral	3	Fiscally Neutral
HUNTINGTON WOODS	3	4.5	Fiscally Neutral	4	Fiscally Neutral

ALPENA	3	4.5	Fiscally Neutral	2	Fiscally Neutral
GRAND HAVEN	3	4.5	Fiscally Neutral	2	Fiscally Neutral
CADILLAC	3	4.5	Fiscally Neutral	1	Fiscally Neutral
GREENVILLE	3	4.25	Fiscally Neutral	5	Fiscal Watch
HOUGHTON	3	4.25	Fiscally Neutral	2	Fiscally Neutral
PLYMOUTH	3	4	Fiscally Neutral	3	Fiscally Neutral
STURGIS	3	4	Fiscally Neutral	3	Fiscally Neutral
MANISTEE	3	4	Fiscally Neutral	2	Fiscally Neutral
HOWELL	3	3.75	Fiscally Neutral	2	Fiscally Neutral
THREE RIVERS	3	3.75	Fiscally Neutral	1	Fiscally Neutral
IRON MOUNTAIN	3	3.5	Fiscally Neutral	3	Fiscally Neutral
MASON	3	3.5	Fiscally Neutral	1	Fiscally Neutral
MENOMINEE	3	3.25	Fiscally Neutral	1	Fiscally Neutral
ST. JOSEPH	3	2.25	Fiscally Neutral	1	Fiscally Neutral
LAPEER	3	1.75	Fiscally Neutral	2	Fiscally Neutral
DURAND	2	9.5	Fiscal Stress	3	Fiscally Neutral
BAD AXE	2	9	Fiscal Stress	2	Fiscally Neutral
NEGAUNEE	2	8.75	Fiscal Stress	3	Fiscally Neutral
IRONWOOD	2	8.75	Fiscal Stress	1	Fiscally Neutral
GLADSTONE	2	8.5	Fiscal Stress	7	Fiscal Watch
GROSSE POINTE	2	8.5	Fiscal Stress	3	Fiscally Neutral
LINDEN	2	8.5	Fiscal Stress	2	Fiscally Neutral
BELLEVILLE	2	8.25	Fiscal Stress	7	Fiscal Watch
NORWAY	2	8.25	Fiscal Stress	4	Fiscally Neutral
KEEGO HARBOR	2	7.75	Fiscal Stress	3	Fiscally Neutral
HANCOCK	2	7.5	Fiscal Stress	4	Fiscally Neutral
MANISTIQUE	2	7.5	Fiscal Stress	4	Fiscally Neutral
ITHACA	2	7.5	Fiscal Stress	2	Fiscally Neutral
RICHMOND	2	7.5	Fiscal Stress	2	Fiscally Neutral
MARINE CITY	2	7.25	Fiscal Stress	6	Fiscal Watch
EATON RAPIDS	2	7.25	Fiscal Stress	5	Fiscal Watch
DAVISON	2	7	Fiscal Stress	6	Fiscal Watch
PLEASANT RIDGE	2	7	Fiscal Stress	6	Fiscal Watch
CLIO	2	7	Fiscal Stress	4	Fiscally Neutral
CORUNNA	2	7	Fiscal Stress	3	Fiscally Neutral
OTSEGO	2	6.75	Fiscal Watch	5	Fiscal Watch
SANDUSKY	2	6.75	Fiscal Watch	4	Fiscally Neutral
BLOOMFIELD HILLS	2	6.75	Fiscal Watch	3	Fiscally Neutral
GLADWIN	2	6.75	Fiscal Watch	3	Fiscally Neutral
ALLEGAN	2	6.75	Fiscal Watch	2	Fiscally Neutral

LOWELL	2	6.75	Fiscal Watch	2	Fiscally Neutral
ESSEXVILLE	2	6.5	Fiscal Watch	3	Fiscally Neutral
MOUNT MORRIS	2	6.5	Fiscal Watch	3	Fiscally Neutral
COOPERSVILLE	2	6.5	Fiscal Watch	2	Fiscally Neutral
ALGONAC	2	6	Fiscal Watch	4	Fiscally Neutral
ROCKWOOD	2	6	Fiscal Watch	3	Fiscally Neutral
CLARE	2	6	Fiscal Watch	1	Fiscally Neutral
IRON RIVER	2	6	Fiscal Watch	0	Fiscally Neutral
SPRINGFIELD	2	5.75	Fiscal Watch	5	Fiscal Watch
CHARLEVOIX	2	5.75	Fiscal Watch	3	Fiscally Neutral
GIBRALTAR	2	5.75	Fiscal Watch	3	Fiscally Neutral
PORTLAND	2	5.75	Fiscal Watch	3	Fiscally Neutral
SWARTZ CREEK	2	5.75	Fiscal Watch	3	Fiscally Neutral
CEDAR SPRINGS	2	5.75	Fiscal Watch	1	Fiscally Neutral
KINGSFORD	2	5.75	Fiscal Watch	1	Fiscally Neutral
CROSWELL	2	5.5	Fiscal Watch	6	Fiscal Watch
IMLAY CITY	2	5.5	Fiscal Watch	3	Fiscally Neutral
CHELSEA	2	5.25	Fiscal Watch	2	Fiscally Neutral
HARTFORD	2	5	Fiscal Watch	2	Fiscally Neutral
ROGERS CITY	2	4.75	Fiscally Neutral	5	Fiscal Watch
BUCHANAN	2	4.75	Fiscally Neutral	2	Fiscally Neutral
DEWITT	2	4.75	Fiscally Neutral	2	Fiscally Neutral
VASSAR	2	4.5	Fiscally Neutral	4	Fiscally Neutral
CHEBOYGAN	2	4.5	Fiscally Neutral	2	Fiscally Neutral
FRANKENMUTH	2	4.5	Fiscally Neutral	2	Fiscally Neutral
PLAINWELL	2	4.25	Fiscally Neutral	4	Fiscally Neutral
NEW BUFFALO	2	4.25	Fiscally Neutral	0	Fiscally Neutral
LATHRUP VILLAGE	2	4	Fiscally Neutral	3	Fiscally Neutral
UTICA	2	4	Fiscally Neutral	3	Fiscally Neutral
WAYLAND	2	4	Fiscally Neutral	2	Fiscally Neutral
FERRYSBURG	2	3.75	Fiscally Neutral	4	Fiscally Neutral
ROOSEVELT PARK	2	3.75	Fiscally Neutral	4	Fiscally Neutral
BRIDGMAN	2	3.75	Fiscally Neutral	3	Fiscally Neutral
NORTH MUSKEGON	2	3.75	Fiscally Neutral	3	Fiscally Neutral
SOUTH HAVEN	2	3.75	Fiscally Neutral	3	Fiscally Neutral
ROCKFORD	2	3.75	Fiscally Neutral	2	Fiscally Neutral
WHITEHALL	2	3.75	Fiscally Neutral	1	Fiscally Neutral
ZEELAND	2	3.25	Fiscally Neutral	3	Fiscally Neutral
BOYNE CITY	2	3.25	Fiscally Neutral	2	Fiscally Neutral
EAST TAWAS	2	3	Fiscally Neutral	1	Fiscally Neutral

CRYSTAL FALLS	1	10.75	Fiscal Stress	7	Fiscal Watch
STANDISH	1	10.25	Fiscal Stress	8	Fiscal Stress
PETERSBURG	1	9	Fiscal Stress	4	Fiscally Neutral
WHITE CLOUD	1	8.75	Fiscal Stress	6	Fiscal Watch
COLEMAN	1	8.75	Fiscal Stress	3	Fiscally Neutral
GALESBURG	1	8	Fiscal Stress	3	Fiscally Neutral
LAINGSBURG	1	8	Fiscal Stress	3	Fiscally Neutral
WAKEFIELD	1	7.75	Fiscal Stress	5	Fiscal Watch
GAASTRA	1	7.75	Fiscal Stress	4	Fiscally Neutral
MANTON	1	7.75	Fiscal Stress	4	Fiscally Neutral
PARCHMENT	1	7.75	Fiscal Stress	4	Fiscally Neutral
BRONSON	1	7.75	Fiscal Stress	3	Fiscally Neutral
ONAWAY	1	7.5	Fiscal Stress	n/a	
STEPHENSON	1	7.5	Fiscal Stress	5	Fiscal Watch
BANGOR	1	7.5	Fiscal Stress	3	Fiscally Neutral
SCOTTVILLE	1	7.25	Fiscal Stress	7	Fiscal Watch
MARLETTE	1	7.25	Fiscal Stress	4	Fiscally Neutral
REED CITY	1	7.25	Fiscal Stress	4	Fiscally Neutral
MUNISING	1	7	Fiscal Stress	5	Fiscal Watch
BROWN CITY	1	7	Fiscal Stress	3	Fiscally Neutral
SYLVAN LAKE	1	7	Fiscal Stress	3	Fiscally Neutral
ST. IGNACE	1	6.75	Fiscal Watch	8	Fiscal Stress
GRANT	1	6.75	Fiscal Watch	4	Fiscally Neutral
OMER	1	6.75	Fiscal Watch	3	Fiscally Neutral
READING	1	6.75	Fiscal Watch	3	Fiscally Neutral
BEAVERTON	1	6.75	Fiscal Watch	2	Fiscally Neutral
HART	1	6.75	Fiscal Watch	1	Fiscally Neutral
AUBURN	1	6.5	Fiscal Watch	2	Fiscally Neutral
EVART	1	6.5	Fiscal Watch	2	Fiscally Neutral
CLARKSTON	1	6.25	Fiscal Watch	4	Fiscally Neutral
YALE	1	6.25	Fiscal Watch	4	Fiscally Neutral
CASPIAN	1	6	Fiscal Watch	5	Fiscal Watch
GRAYLING	1	5.75	Fiscal Watch	4	Fiscally Neutral
NEWAYGO	1	5.75	Fiscal Watch	2	Fiscally Neutral
OLIVET	1	5.75	Fiscal Watch	0	Fiscally Neutral
LITCHFIELD	1	5.5	Fiscal Watch	4	Fiscally Neutral
ROSE CITY	1	5.5	Fiscal Watch	4	Fiscally Neutral
MONTROSE	1	5.5	Fiscal Watch	3	Fiscally Neutral
POTTERVILLE	1	5.5	Fiscal Watch	2	Fiscally Neutral
HUDSON	1	5.25	Fiscal Watch	4	Fiscally Neutral

MONTAGUE	1	5.25	Fiscal Watch	3	Fiscally Neutral
WATERVLIET	1	5.25	Fiscal Watch	3	Fiscally Neutral
BESSEMER	1	5.25	Fiscal Watch	1	Fiscally Neutral
WEST BRANCH	1	5	Fiscal Watch	3	Fiscally Neutral
ORCHARD LAKE VILLAGE	1	5	Fiscal Watch	2	Fiscally Neutral
PINCONNING	1	5	Fiscal Watch	2	Fiscally Neutral
LUNA PIER	1	5	Fiscal Watch	1	Fiscally Neutral
HARRISON	1	4.75	Fiscally Neutral	2	Fiscally Neutral
LESLIE	1	4.75	Fiscally Neutral	1	Fiscally Neutral
MACKINAC ISLAND	1	4.5	Fiscally Neutral	1	Fiscally Neutral
HARRISVILLE	1	4.25	Fiscally Neutral	n/a	
MORENCI	1	4.25	Fiscally Neutral	n/a	
EAST JORDAN	1	4.25	Fiscally Neutral	6	Fiscal Watch
FRANKFORT	1	4.25	Fiscally Neutral	2	Fiscally Neutral
AU GRES	1	4	Fiscally Neutral	3	Fiscally Neutral
PERRY	1	4	Fiscally Neutral	3	Fiscally Neutral
WHITTEMORE	1	4	Fiscally Neutral	2	Fiscally Neutral
ZILWAUKEE	1	3.75	Fiscally Neutral	4	Fiscally Neutral
LAKE CITY	1	3.75	Fiscally Neutral	3	Fiscally Neutral
MCBAIN	1	3.5	Fiscally Neutral	3	Fiscally Neutral
COLOMA	1	3.5	Fiscally Neutral	2	Fiscally Neutral
HARBOR BEACH	1	3.25	Fiscally Neutral	3	Fiscally Neutral
FENNVILLE	1	3.25	Fiscally Neutral	2	Fiscally Neutral
CARSON CITY	1	3.25	Fiscally Neutral	1	Fiscally Neutral
TAWAS CITY	1	3	Fiscally Neutral	3	Fiscally Neutral
HARBOR SPRINGS	1	2.75	Fiscally Neutral	1	Fiscally Neutral
DOUGLAS	1	2.25	Fiscally Neutral	1	Fiscally Neutral
LAKE ANGELUS	1	2	Fiscally Neutral	2	Fiscally Neutral

Appendix B: Extended Literature Review

A number of academic and policy papers have attempted to define and measure local government fiscal stress. The one on which the current Michigan fiscal stress indicatory system is based is Ken Brown's 1993 Ten point test. The test consists of the following indices: three revenue measures: 1) Total Revenues/ Population, 2) Total General Fund Revenues from own Sources/ Total General Fund Revenues, 3) General Fund Sources from other Funds/ Total General Fund Sources; one expenditure measure: 4) Operating Expenditures/ Total Expenditures; three operating position measures: 5) Total revenues/ Total Expenditures, 6) Unreserved General Fund Balance/ Total General Fund Revenues, 7) Total General Fund Cash and Investments/ Total General Fund Liabilities; and three debt measures: 8) Total General Fund Liabilities/ Total General Fund Revenues, 9) Direct Long-Term Debt/ Population, and 10) Debt Service/ Total Revenues.

Brown's test entails three steps: 1) calculating 10 key financial ratios based on data contained in the city's current annual financial report, 2) comparing these ratios to similar-sized cities, and 3) grading the city's financial condition based on the comparisons. For comparison, cities are broken into 1) between 50,000 and 100,000, 2) between 30,000 and 50,000, 3) between 15,000 and 30,000, and 4) under 15,000.

From this, a city determines in which quartile their ratio falls for their population subgroup and compiles a score based on these quartile rankings. These groupings, however, are arbitrarily chosen. Groupings based on population broken into quartiles better clusters the localities.

Ladd and Yinger (1989) also analyzed fiscal health amongst cities in the U.S. They argued that revenue collected is a poor measure of a city's capacity to raise revenues because this could be influenced by the need to raise more money to provide the same quality of services (inefficiency or lack of economies) or due to the citizens desire for high-quality services. Therefore, they use a measure of what a city could raise at a given tax burden on its residents.

Ladd and Yinger also argue that expenditure needs depend on the amount of money they must spend in order to achieve a given quality of public services. For example, cities with a harsh environment in which to provide police and fire services such as Newark NJ must spend much more to obtain a given level of police and fire protection than cities with a favorable environment.

In 2007, Wang et al. tested a measure of financial condition using government-wide information as required under the new financial reporting model set forth in GASB 34. The authors find that the use of general fund data can be rather biased in measuring financial condition for larger governments such as states, counties, or mid-size and large cities where the general fund accounts for a relatively smaller part of a government's financial transactions.

Wang et al. also argue that the use of socioeconomic factors is questionable because they may affect financial conditions, but they are not financial conditions. For instance, population growth is thought to positively influence financial condition. However, larger populations may also demand greater public spending which can lead to deteriorating financial conditions if additional revenues are not generated proportionally to fund the increased service demand.

Wang et al. therefore use the following indicators in their analysis: 1) cash ratio = (cash + cash equivalents + investments)/Current liabilities, 2) quick ratio = (cash + cash equivalents + investments + receivables)/current liabilities, 3) current ratio = current assets/current liabilities, 4) operating ratio = total revenues/total expenses, 5) surplus (deficit) per capita = total surpluses (deficits) / population, 6) net asset ratio = restricted and unrestricted net assets/total assets, 7) long term liability ratio = long-term (non-current) liabilities/ total assets, 8) long-term liability per capita = long-term (non-current) liabilities/ population, 9) tax per capita = total taxes/population, 10) revenue per capita = total revenues/population, and 11) expenses per capita = total expenses/population.

According to Wang et al., there is "little agreement on what dimensions and indicators definitively represent the concept of financial condition" and there is no general uniformity among the states to assess financial condition. They also question the reliability of financial condition studies that assess financial condition at the fund level rather than at the level of government-wide financial and operating data.

In 2007, Dollery et al. looked at fiscal sustainability in Australian local government. In this article, the authors point out that relative rather than absolute values of indicators serve to punish councils whose absolute values are satisfactory but nevertheless fall at the bottom end of a given scale

Dollery et al. discuss the South Australian Financial Sustainability review board (FSRB)'s financial indicators which are as follows: 1) net financial liabilities as a measure of the council's indebtedness to other sectors of the economy, 2) operating surplus or deficit as a measure of the intergenerational equity of the funding of the council's operations, 3) net outlays on the renewal or replacement of existing assets as a measure of the intergenerational equity of the funding of the council's infrastructure renewal or replacement activities, and 4) net borrowing or lending as a measure of the impact of the council's annual transactions – both operating and capital – upon the council's indebtedness to other sectors of the economy. Later, the Local government and shires associations of NSW did a similar study and suggested the following indicators: 1) Net Debt over total operating revenue, 2) net financial liabilities over non-financial assets plus holdings of externally restricted cash and securities, 3) net interest expense over total operating revenue, 4) operating surplus (deficit) over own source revenue, 5) net borrowing (lending) over annual capital expenditure on new or enhanced assets, 6) annual renewals deficiency over annual capital expenditure on

renewal or rehabilitation of existing assets, and 7) renewals backlog over non-financial assets.

Zafra-Gomez, et al. focus on benchmarking in their 2009 work. The authors stress the importance of benchmarking between municipalities with similar characteristics. They criticize current financial indicators in that the values measured by different authorities are not comparable as the services they provide differ significantly.

Zafra-Gomez et al. argue that analysts should group local authorities by social and economic factors influencing their provision of public services. They say that this will create a model that evaluates financial performance, detecting and minimizing the influence of the socioeconomic environment and, thus, maximizing the value of benchmarking.

In 2009, Sohl et al measure the Financial Position of Municipalities from the point of view of analyzing whether a city's revenue structure is fair and reasonable. They emphasize the difference between comparative financial position and comparative financial condition. Comparative financial position uses financial indicators to compare one unit of government or a group of jurisdictions against like-situated jurisdictions in order to establish that jurisdiction's relative position for each financial indicator. An analysis of comparative financial condition involves using financial indicators or indices to objectively measure the financial condition of a municipality and then benchmarking the municipality's position over time against an industry-wide standard or a standard accepted by the governing body. Sohl et al argue that if a financial indicator system only measures financial position, the entire cohort could have a poor financial condition but the city with the top ranking within the cohort would appear to be in good financial condition – absent any industry wide benchmark. This is why our proposed fiscal stress indicator system utilizes a mixture of financial position and financial condition indices.

Sohl et al also use the four measure of financial condition that are used in this paper: cash solvency, budgetary solvency, long run solvency, and service-level solvency. They argue for inclusion of a trend analysis in a fiscal stress indicator system because it provides valuable context to identify the direction of each indicator. In order to group localities into clusters, Sohl et al blend together six dimensions of socioeconomic and organization variables: community population, organizational size and scope of services, revenues and expenditures, service territory size, tax base/economic activity, and community characteristics. Specifically, they use estimated population, government full time equivalents, general fund revenues, general fund expenditures, five-year growth rate, square miles or geographic area, median household income, total revenues, total expenditures, median home value, fortune 500 headquarters within the city limits (y/n), bond rating, unemployment rate (civilian labor only), education - % of people with bachelor's degree or higher, property crime scores, hospital beds, union versus nonunion (y/n), poverty – all people, four-year college in city limits (Y/N), median age, airport w/daily svc (y/n), form of government –

mayor/administrator or council /manager (y/n, y=cm), top industry score (y/n), and geography – per census regions and divisions.

Sohl et al then combine the financial data with economic and demographic data to create a series of financial indicators that, when plotted over time, can be used to monitor changes in financial condition and alert the government to trends or future problems. They recommend that fiscal stress analysis of comparative financial position and financial condition be conducted in two separate and distinct phases: first a comparative financial position analysis should be undertaken in the following steps:

1) Determine the basis for comparison (form of government, geographical location, etc.)
2) Identify potential candidates and variables to support the comparison
3) Weight variables to select the cohort group
4) Analyze the cohort for reasonableness
5) Use a set of financial indicators to measure financial condition and measure each jurisdiction against the group mean, median, minimum, and maximum value for each indicator
6) Conduct additional interviews with municipal officials to explain outliers and anomalies and recalculate financial indicators and relative position when appropriate

And then a comparative financial condition analysis should be undertaken in the following steps:

1) Identify generally accepted benchmarks for agreed upon financial indicators/indices that measure financial conditions (i.e., healthy levels of fund balances, etc.).
2) Score the city's performance on each financial indicator/index
3) Compare the jurisdiction's score against the desired standard (benchmark) for each financial conditions indicator/index

International literature pertaining to national fiscal stress is also helpful when looking at local government fiscal stress. Belhocine et. al from the International Monetary Fund assessed fiscal stress amongst national governments in their 2010 paper "Assessing Fiscal Stress".

In this paper, Belhocine et. al Develop a fiscal stress index using an early warning system methodology. They use Hemming and Petrie's (2000) definition of fiscal stress as "a situation where a government is exposed to the possibility of failure to achieve its aggregate fiscal policy (or macro-fiscal) objective". They then create an index of fiscal stress based on a series of fiscal indicators compiled around four core themes: fiscal stance, fiscal sustainability, vulnerability, and demographic trends (Cheasty et al., 2010).

Belhocine et. al argue that fiscal crisis is typically triggered by economic, financial, or political shocks. Therefore, the risk of a crisis requires not only a sizeable underlying vulnerability but also a high likelihood that these shocks materialize. They define a fiscal crisis episode as extreme funding difficulties of the general government that arise as a result of debt build-up, contingent liability triggers, negative revenue shocks, or unaddressed demographic changes.

Belhocine et. al define four criteria for capturing such events: debt default or restructuring, implicit default, exceptional IMF financing, and market financing constraints. They then use threshold estimation: based on a univariate statistical approach, following the early warning system literature. This consists of defining thresholds for a variable that discriminates between predicted crisis periods and predicted non-crisis periods. If a variable is greater than its cut-off point, the model issues a signal of an upcoming fiscal distress episode. This can be done either through the minimization of total misclassified errors (TME) or the maximization of the signal-to-noise ratio (SNR). They find that the TME performs better. It is, unfortunately, not possible in our data set to undergo such an analysis because the only definitive definition of fiscal crisis at the local level is bankruptcy, and there have been no bankruptcies in Michigan within our data set, and very few overall.

Ward and Dadayan (2008) analyze state and local government fiscal sustainability by looking at the history of fiscal health. They find that historically, the single largest area of combined state and local government expenditures was public education, followed by highways and governmental administration. Currently, education is still the top expenditure area, but health and welfare – particularly Medicaid – has gained rapidly on the education subsector. Behn and Keating (2004) acknowledge this and recommend steps for both the states and the federal government, including the restructuring of Medicaid.

Political factors have also been shown to affect states' responses to fiscal stress. For example, Poterba (1994) finds that single-party control of the legislature and governorship is related to faster action on deficits than divided party control. Hedge funds have been major purchasers of tax-exempt debt in recent years, and the closing of many such funds might result in longer-lasting damage to the municipal bond market. Cost inflation for state and local government purchases and investments, as measured by the Bureau of Economic Analysis has been far higher than inflation in the overall economy or that related to federal expenditures (Dadayan and Ward 2008). Brinner et al. point to compensation increases for state and local government employees that have been substantially higher than those for workers in the private sector during the same period as a cause of local government fiscal stress.

Hendrick (2004) argues that fiscal health is a complex and multidimensional concept with varying time frames and that most of the early measures of fiscal stress were developed for larger, central cities rather than smaller, suburban municipalities. Hendrick defines fiscal health as the ability of a government to meet its financial and

service obligations which fall into two dimensions: properties of the government and properties of its environment. Under properties of the environment they include: revenue base, spending needs, and underlying economic, demographic, and political features that determine fiscal wealth and spending needs. Under properties of the government, they include: fiscal slack (a government's ability to buffer against environmental threats and uncertainty over a practical period of time), relativity of components (relative levels of revenue sources, spending functions, debt instruments, or other areas of financial activity), current operating conditions (ability to meet short term obligations), and future financial obligations (debt, pensions, unfunded liabilities). Hendrick also creates a third dimension which compares the first two, called balance or adaptation. This is a midterm measure of fiscal health that assesses how well a government's fiscal structure accommodates environmental conditions. This is a direct comparison of the other two dimensions meant to determine the balance or level of adaptations (for example, property taxes collected relative to property wealth). Hendrick only focuses on four of these sub dimensions: revenue wealth, spending needs, fiscal balance, and fiscal slack. Hendrick emphasizes that useful measures of fiscal health should distinguish between municipalities in different categories of fiscal health such as insolvency versus fiscally threatened.

Finally, the Government Accountability Office's "State and Local Governments' Fiscal Outlook" (March 2010 Update) provides some insights into the recent causes of local government fiscal stress that can be used when attempting to measure this stress. The GAO argues that increases in federal grants-in-aid (largely from the Recovery Act) alleviated some near-term pressure. However, the GAO predicts that the sector's long-term fiscal position will steadily decline through 2060 absent any policy changes, primarily due to rising health care costs. Specifically, state and local expenditure on Medicaid and the cost of health insurance for state and local retirees and employees which are expected to grow more than GDP. They estimate that operating deficits for the state and local sector will be about $39 billion for 2010 and $124 billion for 2011. They calculate that closing the fiscal gap in the state and local government sector would require action to be taken today and maintained for each and every year following equivalent to a 12.3% reduction in state and local government current expenditures (or a similar increase in revenues).