The Financial Indicators Associated with Reductions of Public Services by Pennsylvania Municipalities

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Abstract

This paper investigates the financial indicators associated with reductions of public services in Pennsylvania municipalities. We use logistic regression analysis to investigate whether or not certain symptoms of fiscal distress lead to reductions in public services. We hypothesize that fiscal distress is positively correlated with revenue risk and debt usage, and negatively correlated with organizational slack and entity resources. We develop and test a parsimonious model to predict the likelihood of significant reductions in public services by Pennsylvania municipalities. We find that 31.7 percent of the municipalities have reduced public services during the period 1998-2008, with second-class townships having the highest incidence of reductions during this period. The results also show that the most important predictor of a reduction in public services is a high level of capital expenditures relative to total revenues and bond proceeds in the year preceding the reduction.

Keywords: fiscal distress; public finance; logistic regression; public service expenditures

Data Availability: Data are available from public sources identified in this study.

I. Introduction

Municipalities provide important public services. They are the first responders when it comes to public safety, water, sewer, streets, parks, and recreation. They also improve the quality of our lives by providing a wide variety of social services. However, municipalities can provide these services only if they avoid fiscal distress. The fiscal condition of a municipality is important because it reflects the municipality's ability to provide public services (Honadle et al., 2004). A significant reduction in public services, such as police and fire protection, is often the consequence of fiscal distress. The objective of this research is to develop a model using symptoms of fiscal distress to predict whether or not municipalities will significantly reduce public services. We operationalize a significant reduction as an annual decrease in public service expenditures per capita of more than five-percent. We hypothesize that the likelihood of significant public service reductions is directly related to two symptoms of fiscal distress, revenue risk and debt usage, and indirectly related to two other symptoms, organizational slack and entity resources. We use logistic regression to develop a parsimonious and statistically reliable method of predicting significant public service reductions. The remainder of the paper is organized as follows. The next section discusses fiscal distress in Pennsylvania municipalities. We then develop the model and indicators associated with the reduction of public services and the related hypotheses. The empirical tests and results of the model are analyzed in next section. The last section concludes the paper.

II. Fiscal Distress in Pennsylvania Municipalities

Shortly after a spate of municipal financial emergencies in the Southwest region of Pennsylvania in the early 1980s, Pennsylvania became serious about understanding the remedies of fiscal distress. In 1984, the Allegheny League of Municipalities developed a fiscal monitoring system, consisting of 24 financial indicators to measure the financial condition of Pennsylvania's municipalities (DCED, 1999). Shortly afterwards, the Pennsylvania Department of Community and Economic Development (DCED) began collecting and archiving the data needed to implement the fiscal monitoring system. In 1986, Pennsylvania enacted the Fiscally Distressed Municipalities Act of 1987 (Act 47) and identified eleven criteria by which the DCED could declare a municipality as fiscally distressed.

Among the criteria were: (1) the municipality experienced a deficit of revenues over expenditures of at least one percent for three consecutive years; (2) the municipality's expenditures exceeded revenues for three consecutive years; (3) the municipality operated with a deficit of at least five-percent of total revenues for two consecutive years; (4) the municipality failed to make its budgeted payments to its pension fund during the current fiscal year; or (5) the municipality experienced a decrease in the level of services provided over the prior year (DCED, 2001). If a municipality meets any one of the criteria, the DCED can deem the municipality fiscally distressed and assist it in mitigating the fiscal distress. Since its enactment, the DCED has designated more than twenty municipalities fiscally distressed under Act 47. In 2005, the DCED implemented an Early Intervention Program to identify municipalities "at risk" of fiscal distress. Pursuant to Early Intervention Program, municipalities are required to file annual Surveys of Financial Condition to answer questions about their financial condition. The questions on the Survey of Financial Condition mirror Act 47 criteria. If a municipality answers "yes' to any question, the DCED can put the municipality on a "watch list" and assist it with strategies to avoid fiscal distress.

In 2007, approximately forty municipalities were designated "at risk" of fiscal distress. About half of those municipalities were located in the Southwest region of Pennsylvania; the other half were located in the Northeast region. By 2011, only five municipalities were designated "at risk" of fiscal distress; however, three of the cities on the early watch lists had become fiscally distressed under Act 47. Much of the fiscal distress experienced by Pennsylvania's municipalities is what the U.S. Advisory Commission on Intergovernmental Relations (ACIR) refers to as structural distress. Structural forces are long-term changes in the economy that are beyond the control of the state or municipality (AICR, 1985). Structural forces change the underlying tax and economic bases of the community, making it difficult for the involved municipalities to recover from these structural changes. In Pennsylvania, these structural forces were the out-migration of the steel industries in the Southwest and Northeast regions of the State in the early 1980s. Pennsylvania's municipalities have yet to recover from the fiscal distress caused by these changes.

III. The Development of the Model and Indicators

The objective of this research is to develop a model using symptoms of fiscal distress to predict whether or not municipalities will reduce public services. We first operationalize the key consequence of fiscal distress, and then we identify the symptoms of fiscal distress that could lead to public service reductions.

The Key Consequence of Fiscal Distress

The purpose of a municipality is to provide the public services required by the citizenry and to meet obligations as they become due (GASB, 1992). Citizens evaluate the financial condition of a municipality based on the extent to which it can deliver public services in an efficient, effective, and fair manner (Berne, 1992). The concept of financial condition also implies that municipalities can deliver public services both currently and in the future (Berne and Schramm, 1986). We derive our definition of fiscal distress from Section 201(11) of Act 47 and define the key consequence of fiscal distress as a significant reduction in public services. However, public services are outputs that cannot be easily measured (Berne, 1992). We use service efforts to proxy public service outputs and measure those efforts as public service expenditures per capita. We operationalize the construct of a significant reduction in public services as a reduction in annual expenditures of public services per capita by more than five-percent.

We define public service expenditures per capita (EXPCAP) as total operating expenses less administrative expenditures scaled by population. EXPCAP excludes capital expenditures, interest costs and administrative costs, so that we capture only expenditures on public services. The source of our data (the DCED), includes administrative costs not otherwise allocated to specific programs, such as public welfare. We use a five-percent cutoff to account for the significance or materiality of the reductions because minor reductions in public services are not always the result of fiscal distress. For example, the State of Michigan has been cutting the funds it shares with municipalities for the past decade (Lieb, 2010). It is only recently, after years of unmitigated fiscal distress, the municipalities in Michigan have responded by closing their parks and fire stations (Lieb, 2010). We test the robustness of this assumption in the next section.

The Symptoms of Fiscal Distress

The symptoms of fiscal distress are indicators that identify a municipality as vulnerable to significant public service reductions. The symptoms of fiscal distress are proxied by financial ratios or indicators. Financial ratios are indicators can be used to measure the financial condition of a municipality at a certain point in time or to evaluate the results of its operations over a period of time. As noted above, the Allegheny League of Municipalities created a fiscal monitoring system for Pennsylvania's municipalities, which consists of indicators to measure the financial condition of Pennsylvania's municipalities at a particular point in time and a trend analysis technique to measure changes in financial condition over time (DCED, 1999).

The system focuses on cash solvency (e.g., the relationship of current assets to current liabilities), budgetary solvency (e.g., the relationship of revenues to expenditures), long-term solvency (e.g., the extent of long-term debt usage) and service-level solvency (the ability of the municipality to maintain its current level of public services). The indicators identified by the Allegheny League of Municipalities are similar to those recommended by the Government Accounting Standards Board (Mead, 2001), the International County/City Management Association (Groves and Valente, 1994) and Standard & Poor's (2005) to assess the financial condition of municipalities. Trussel and Patrick (2009) provide a complete review of the indicators used to detect municipal fiscal distress. Using a combination of the financial indicators recommended by the Allegheny League of Municipalities and Trussel and Patrick (2009), we hypothesize that a significant reduction in public services is a function of four symptoms of fiscal distress. We use financial indicators to proxy the symptoms of fiscal distress and hypothesize that public service reductions are positively correlated with revenue risk and debt usage and negatively correlated with organizational slack and entity resources.

Revenue Risk

Municipalities receive revenue from a variety of sources, including taxes, grants, fees, fines and other municipalities. Municipalities that rely heavily on intergovernmental revenues relative to own-source revenues are more likely to experience fiscal distress (Reid, 1986). A municipality runs the risk of having to replace revenues with its own sources if the funds it receives from the federal, state or other municipalities diminish. This leads to our first hypothesis, stated in alternative form:

H_1: A high level of revenue risk is a symptom of fiscal distress that could lead to public service reductions.

We measure revenue risk (REVRISK) as the intergovernmental revenues received from federal, state or other municipal government sources to own-source revenues (Mead, 2001). Own-source revenues are revenues from current operations, taxes and miscellaneous revenues. This ratio measures the relationship between intergovernmental revenue and own-source revenues, and can be interpreted as the percent of own-source revenues that would have to be increased for every percentage decrease in intergovernmental revenue. For example, if the ratio of intergovernmental revenues to own-source revenues were 0.20, the municipality would have to increase its own-source revenues by two percent for every ten-percent decrease in intergovernmental revenue. The higher the REVRISK, the more the municipality would have to increase taxes, fees and such to offset decreases in intergovernmental revenue.

Organizational Slack

Organizational slack is a measure of an entity's resource utilization and level of discretionary spending (Hendrick, 2004). Municipalities with high levels of organizational slack usually have the resources needed to buffer against fiscal distress (Cyert and March, 1963). By contrast, municipalities with low organizational slack are more likely to experience fiscal distress because they have exhausted all their surplus resources to mitigate the distress before reducing public services (Hendrick ,2004). This leads to our second hypothesis in alternative form:

H_2: A low level of organizational slack is a symptom of fiscal distress that could lead to public service reductions.

We use two measures to proxy organizational slack. Our first measure is administrative costs per capita (ADMIN). Administrative expenditures pay for support functions such as office salaries, office supplies, office rent and the like. Tuckman and Chang (1991) posit that administrative costs relative to total expenditures provide organizational slack because they are discretionary. Municipalities facing fiscal distress will reduce administrative expenditures to mitigate distress before reducing public services. We measure ADMIN as administrative expenditures scaled by the population of the municipality. We include only administrative costs not otherwise allocated to specific programs, such as public safety. The second measure of organizational slack is capital expenditures relative to total revenues and bond proceeds (CAPREV). A municipality in fiscal distress will reduce capital expenditures before reducing public services (GAO, 1990). CAPREV measures organizational slack, as well as acts as a proxy for the condition of the municipality's physical infrastructure, where low organizational slack suggests low capital expenditures and a deteriorating physical infrastructure. We measure CAPREV as capital expenditures scaled by total revenues plus debt proceeds. This ratio measures the percentage of total revenues and bond proceeds spent on capital expenditures. We include bond proceeds with total revenues, since most bond issues are for capital projects.

Debt Usage

The use of debt can make a municipality susceptible to fiscal distress. Municipalities that rely too heavily on debt financing can become distressed because they must meet their fixed, debt service costs, even in times of financial difficulty (Mead, 2001). The overuse of debt can result in fiscal distress. Our third hypothesis follows:

H_3: Extensive debt usage is a symptom of fiscal distress that could lead to public service reductions.

We have two measures of debt usage. First, we use debt per capita (DEBTCAP), measured as total liabilities divided by total population. Second, we use debt scaled by revenue (DEBTREV). The U.S. Congressional Budget Office (1978) uses DEBTREV to measure the number of years of revenues needed to repay debt.

Entity Resources

Groves and Valente (1994) and ACIR (1985) suggest that the balance between the needs and resources of the local community is a key symptom of fiscal distress. We measure this relationship with total revenues, which is highly correlated with population. Municipalities experiencing drops in population (and thus total revenues) must support underutilized infrastructures whereas municipalities experiencing population growth must provide public services without the needed infrastructure (Kelsey, 1998). Municipalities experiencing out-migration fare worse in this imbalance, as they strive to maintain decaying infrastructures with fading resources (Kelsey, 1998). Our last directional hypothesis is:

H_4: A low level of entity resources is a symptom of fiscal distress that could lead to public service reductions. We measure entity resources as the natural log of total revenues (SIZE).

In summary, we expect the likelihood of public service reductions to be directly associated with revenue risk and debt usage and inversely associated with organizational slack and entity resources. The variables are summarized in Table 1.

Insert Table (1) about here

IV. The Empirical Tests and Results of the Model

This study focuses on the indicators related to reductions of public services in Pennsylvania municipalities. The indicators are hypothesized to be related to fiscal distress, which can lead to public service reduction are described in the previous section. This section discusses the empirical tests and results of the fiscal distress model.

Sample Selection

We obtain a sample of municipalities in Pennsylvania from the database of financial information maintained by the DCED for all Pennsylvania cities, boroughs, townships, and towns. During the period covered by our study (1998 to 2008) Pennsylvania had approximately 2,562 municipalities, excluding its 67 counties. We merge the files for the years 1998-2008 to get a multi-year window into the fiscal health of Pennsylvania's municipalities. We control for the municipality's designation as a city, township of the first class, township of the second class and borough. A municipality's designation or type reflects its population density and the historical circumstances surrounding its designation. Cities are the largest form of municipal government and have the highest population densities. Cities are the oldest form of municipality and they serve established populations. Townships of the first class are also large and urban, and they usually border cities. Boroughs usually have high population densities, but they do not necessarily border cities. Boroughs can be located in rural areas. Townships of the second class are usually rural. They serve outlying areas such as low-density residential areas, farmlands, forests, and mining areas. We classify Pennsylvania's single town (Bloomsburg) a borough. We control for possible differences in the designations of the municipalities by stratifying the municipalities by type. Aside from these differences, we believe cities, boroughs and townships are fairly homogeneous. They perform similar functions, have similar types of staff, and have access to similar types of resources.

We use the files for 1998-2008 to create cross-sectional longitudinal (panel) data and to create our model. We exclude any municipality with missing data. We need two consecutive years of data to determine the municipality's financial status as distressed. This is determined by the municipality's change in public service expenditures per capita. To be included in the sample, the municipality must have the data needed to compute the indicators for at least two consecutive years. We exclude 12.2 percent of the municipality-years due to the lack of data for consecutive years. We also scan the data for outliers. SIZE is the natural log of total revenues with a lower bound of zero and no upper bound. We find no outliers with this indicator based on a variety of techniques, including an examination of data in each percentile. The dependent variable, which is based on public expenditures per capita (EXPCAP), and the remaining five indicators, have lower bounds of zero with no upper bound. Using percentiles for these variables, we find that those above the 99th percentile appear to be outliers due to their extreme distance from the 99th percentile and are thus truncated. Winsorizing the data at the 99th percentile (results not shown) does not alter the result significantly. We exclude four-percent of the municipality-years as having outliers. The final sample consists of 23,758 local municipality-years from 1998-2008, which includes nearly 84 percent of all municipalities for the years 1998-2008. The sample selection criteria are summarized in Panel A of Table 2.

As noted above, we stratify the sample by the type of municipality to account for possible variations across the sample due to differences in population and define a significant reduction in public services as a reduction in public service expenditures per capita of more than five-percent in any given year. Panel B of Table 2 shows the estimation sample classified by the percentage of public service reductions by status and type. Using our definition, 7,549 municipality-years or 31.7 percent of the total are classified as having significant public service reductions. Second-class townships experienced the greatest percentage of significant public service reductions per capita (33.1 percent) during this period, while cities experienced the least (22.7 percent).

Insert Table (2) about here

Descriptive Statistics

Table 3 shows descriptive statistics for the municipalities by type. Specifically, Table 3 shows the data by mean, standard deviation, minimum, maximum and quartile for each indicator and by each type of municipality. The percentiles represent the cut off point for each percentile. The last column in Table 3 shows the probability of public service reductions for each type of municipality. As explained in the next section, the probability of public service reductions is the likelihood that a municipality will reduce its expenditures for public services by more than five-percent in a given year. Municipalities with higher probabilities have higher risks of future public service reductions. The probabilities by type seem to have two groups—boroughs and second class townships on one hand and cities and first class townships on the other. On average, boroughs (mean = 0.314) and second class townships (mean = 0.324) have the highest risk of reducing public services, while cities (mean = 0.278) and first class townships (mean = 0.276) have the lowest risk. Also, the percentiles are very similar for these two groups. Boroughs and second class townships have similar patterns, while cities and first class townships are similar. The actual incidence of public service reductions (from Table 2) supports these groupings, too.

Insert Table (3) about here

Table 3 also shows the statistics for each risk factor for each type of municipality. This table allows one to see how the values of the indicators and the probability of public service reductions differ for municipalities of different type. This is helpful in benchmarking an individual municipality against its peer group. For example, a borough can compute each variable and see where it falls in line with other boroughs. Cities and first class townships are larger on average than boroughs and second class townships. Cities and first class townships also carry more debt than boroughs and second class townships, both on a per capita basis and relative to total revenues.

Table 4 show the descriptive statistics for the municipalities partitioned by status (whether or not they had public service reductions) and type. We test the differences in the means between the status groups for each of the indicators for each type. Again, boroughs and second class townships seem to align, while cities and first class townships have similar patterns. For example, all the variables except DEBTCAP are significantly different (at less than the 0.05 level) between those that reduced their public services and those that did not for boroughs and second class townships. However, the signs for boroughs and second class townships are not as expected for ADMIN, CAPREV and DEBTREV. For the cities, only REVRISK is significantly different between the two statuses. For the first class townships, only REVRISK, ADMIN and CAPREV are significant; however, ADMIN and CAPREV have unexpected signs. Of course, these are univariate tests that do not simultaneously control for the other factors.

Table 5, Panel A shows the Pearson correlations for the indicators. The highest correlation between pairs of indicators is 0.842 for DEBTCAP and DEBTREV, which may cause a problem with multicollinearity the model. For this reason, we omit DEBTREV from our multivariate model below.

Insert Table (4) about here

The Multivariate Model of Public Service Reductions

The statistics above are presented for each individual variable (univariate). In order to develop a predictive model, we need to consider all of the variables simultaneously (multivariate). We use cross-sectional time-series (panel data) analysis to test our model of public service reductions. Since the dependent variable is categorical, the significance of the multivariate model is addressed using logistic regression analysis and adjusted for autocorrelation. Using this method, the underlying latent dependent variable is the probability of fiscal distress for municipality *i*, which is related to the observed variable, $Status_i$, through the relation:

$Status_i = 0$ if the municipality did not reduce public services; and
$Status_i = 1$ if the municipality reduced public services.

The model includes all of the independent variables from Table 1. The predicted probability of the k^{th} status for municipality *i*, $P(Status_{ik})$ is calculated as:

$$P(Status_{ik}) = \frac{1}{1+e^{-Z}} \quad (1)$$

where

$$Z_i = \alpha + \beta_1 \overset{+}{REVRISK} + \beta_2 \overset{-}{ADMIN} + \beta_3 \overset{-}{CAPREV} + \beta_4 \overset{+}{DEBTCAP} + \beta_5 \overset{-}{SIZE} + \beta_6 \overset{?}{TYPE}$$

We use the sample described in Table 2 to develop the model. The results of the logistic regression model (adjusted for autocorrelation) are included in Panel B of Table 5. Overall, the model is significant at the 0.01 level, according to the chi-square statistic. All of the indicators except DEBTCAP are significantly related to the probability of public service reductions (at the 0.05 level). The two organizational slack indicators, ADMIN and CAPREV, do not have the anticipated negative signs. The model seems to fit the data well, except for the unexpected signs on ADMIN and CAPREV. We expected municipalities reducing public services to have lower administrative costs and capital expenditures. In this study, however, we find that reductions in public services are associated with higher administrative costs per capita and higher capital outlays relative to total revenues and bond proceeds. These municipalities seem to be cutting their public services, but not their administrative costs or capital projects.

Municipalities that reduce public services, but continue to have high administrative costs may do so for a variety of reasons. First, most municipalities are reluctant to lay-off or reduce the hours of office workers, or to implement hiring freezes. Maher et al. (2011) find that municipalities experiencing fiscal distress will try to avoid laying-off workers, reducing hours, and implementing hiring freezes, if possible. Also, municipalities may not be motivated to reduce administrative expenditures. Hendrick (2004) finds municipalities staffed with professional managers to be more fiscally conservative and more motivated to reduce administrative costs. Professional managers also possess better training in government financial management. Most of Pennsylvania's municipalities are second class townships. These small, rural, municipalities tend to be staffed by part-time, non-professionals, which may not be motivated or trained to seek the benefits of cutting administrative costs (Patrick, 2007).

There are several reasons why a municipality might reduce expenditures for public services while moving forward on capital projects. First, capital projects are usually planned and financed over a several year period and paid for with bond proceeds, not annual tax revenues. Once a long-term capital project is started it could be difficult for a municipality to cancel the contracts and bond issues related to the project. Also, municipalities prepare long-term capital budgets to plan the financing of capital projects and short-term operating budgets to plan the financing of public services (Vogt, 2004). Ideally, the two budgets are integrated, but this may not always be the case, since the source of these revenue streams is separate. Finally, municipalities may proceed with planned capital outlays while reducing public services because they need the improvements and equipment financed with capital funds (Vogt, 2004).

Insert Table (5) about here

The regression analysis allows users to measure the impact of a change in the indicators on the likelihood of public service reductions. Panel B of Table 5 shows *Exp(B)* or the odds ratio, which is the change in the odds of public service reductions given a one-unit change in the indicator. For the TYPE indicator, the second class township is the reference category. The last column measures the impact on the likelihood of public service reductions for municipalities that belong to a type other than a second class township. For example, the likelihood of a reduction in public services by a city is 29.5 (1.00 - .705) percent less than a second class township. Since a one-unit change in a ratio is not realistic, the last column in Table 5 shows the impact on the likelihood of public service reductions due to a 0.10 increase in the continuous variables (the indicators other than TYPE). The impact is computed as $Exp(b)^{0.10} - 1$. Our model shows that the most influential indicator of public service reductions is capital expenditures relative to total revenues and bond proceeds (CAPREV). A decrease in CAPREV by 0.10 will decrease the risk of public service reductions by 0.139, just as an increase in CAPREV of 0.10 will increase the risk of public service reductions by 0.139.

Robustness Tests

We test our model for robustness by reconsidering several of the assumptions we made in developing the model. We defined a municipality as having public service reductions if it reduced public service expenditures per capital by more than five-percent in a given year. We reevaluate this definition using time periods of two and three-years for the reductions. We also test the definition by using any decline in public services (i.e., any reduction greater than zero-percent) and declines of more than ten-percent rather than five-percent. The model is not significant when we use public reductions without at least a five-percent level. With this exception, there are no changes to the tenor of the results.

We also assumed different prior probabilities of public service reductions. In developing the model, we assumed the prior percentage of public service reductions was equal to the percentage of distressed municipalities in the estimation sample. The prior percentage of public service reductions was 31.8 because 31.8 percent of the municipalities in the sample were reducing public service. We tested the sensitivity of the model to other prior percentages of public service reductions, including 0.20 and 0.40 in all years and these assumptions do not alter the results significantly.

V. Conclusion

This study develops a model to predict public service reductions in Pennsylvania municipalities. Our model finds that municipalities that reduce public services receive more intergovernmental revenues as a percent of own-source revenues, spend more on capital expenditures relative to total liabilities and bond proceeds, have higher administrative costs per capita, and are smaller than municipalities that do not reduce public services. In testing our model we find capital expenditures relative to total revenues and bond proceeds positively associated with public service reductions. This finding is inconsistent with our expectation that municipalities experiencing fiscal distress will defer routine maintenance and capital projects, thereby lowering their capital expenditures. In this study, the Pennsylvania municipalities that are experiencing public service reductions tend to have high capital expenditures. We find the most influential indicator of public service reductions to be high capital expenditures relative to total revenues and bond proceeds. A reduction of capital expenditures (scaled by total revenues and bond proceeds) by 0.10 will reduce the likelihood of public service reductions by 0.139. Our study extends the literature on fiscal distress and public service reductions two ways. First, we predict the key consequence of fiscal distress, public service reductions, rather than the existence of fiscal distress. Predicting the existence of fiscal distress is problematic due to the difficulties in defining this state of financial condition. Second, we use logistic regression analysis (adjusted for autocorrelation) to predict public service reductions. This approach can be used to predict the likelihood of public service reductions and to develop strategies to avoid such reductions before they happen.

VI. References

Advisory Commission on Intergovernmental Relations. (1985). *The states and distressed communities: The final report.* Washington, DC: Author.

Berne, R. (1992). *The relationships between financial reporting and the measurement of financial condition*. Norwalk, CT: Government Accounting Standards Board.

_____. and R. Schramm. (1986). *The financial analysis of governments*. Englewood Cliffs, NJ: Prentice Hall.

Cyert, R. M., and J. G. March. (1963). *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice Hall.

Department of Community and Economic Development. (1999). *Financial monitoring workbook.* Harrisburg, PA: Governor's Center for Local Government Services.

_____. (2001). *Municipalities financial recovery act*. Harrisburg, PA: Governor's Center for Local Government Services.

Government Accounting Standards Board. (1992). *Concepts statement no. 1 –Accounting and financial reporting for governmental units*. Norwalk, CT: Author.

General Accounting Office. (1990). *Distressed communities. Report HRD-91-14.* Washington, DC: Author.

Groves, S. and Valente, M. (1994). *Evaluating financial condition: A handbook for local government*. Washington, DC: International City/County Management Association.

Hendrick, R. (2004, April 15). *The role of slack in managing local government fiscal conditions*. Presented at the Annual Meeting of the Midwest Political Science Association, Chicago, IL.

Honadle, B., Costa, J., and Cigler, B. (2004). *Fiscal health for local governments*. San Diego, CA: Elsevier.

Kelsey, T. W. (1998). *The fiscal impacts of different land uses.* Extension Circular 410. State College, PA: The Pennsylvania State University.

Lieb, D. A. (2010, May 29). States passing budget cuts onto local governments. *The Huffington Post.* Retrieved October 9, 2010, from http://www.huffingtonpost.com.

Maher, C., S. Deller, and J. Kovari. (2011). *How stressed are Wisconsin cities and villages?* Staff Paper No. 557. Madison, WI: University of Wisconsin at Madison.

Mead, D. M. (2001). *An analyst's guide to government financial statements*. Norwalk, CT: Government Accounting Standards Board.

Patrick, P. A. (2007). The determinants of organizational innovativeness. (Doctoral dissertation, Penn State Harrisburg, 2007). *Dissertation Abstracts International*, 68, 5.

Reid, J. N. (1986). Building capacity in rural places. In B. W. Honadle & A. M. Howitt (Eds.), *Perspectives on management capacity building* (pp. 66-84). NY: State University of New York Press.

Standard & Poor's. (2005). *Public finance criteria*. New York: The McGraw Hill Companies.

Trussel, J. M. and Patrick, P. A. (2009). A predictive model of fiscal distress in local governments. *Journal of Public Budgeting, Accounting and Financial Management* 21 (4): 578-616.

Tuckman, H, and Chang, C. (1991). A methodology for measuring the financial distress of charitable nonprofit organizations. *Nonprofit and Voluntary Sector Quarterly*, 20, 445-460.

U.S. Congressional Budget Office. (1978). *City need and the responsiveness of federal grant programs.* Washington, DC: Author.

Vogt, A. J. (2004). *Capital budgeting and finance: A guide for local governments*. Washington, DC: International City/County Management Association.

TABLE 1: Symptoms of Fiscal Distress and Their Expected Relation with Public Service Reductions

Indicator	Measure[a]	Expected Relationship with Public Service Reductions
Revenue Risk (REVRISK)	Revenues from Other Governments / Own-source Revenues	+
Administrative Cost per Capita (ADMIN)	Administrative Expenditures / Population	-
Capital Outlays (CAPREV)	Capital Expenditures / Total Revenues + Bond Proceeds	-
Debt-per-Capita (DEBTCAP)	Total Liabilities / Population	+
Debt to Revenue (DEBTREV)	Total Liabilities / Total Revenues	+
Size (SIZE)	ln (Total Revenues)	-

Note: All variables are measured in the year before the public service reductions. The time subscripts are dropped for ease of presentation.

TABLE 2: Summary of the Sample Selection Procedures

Panel A: Sample Selection

	Municipalities Number	Percent
Total municipality-years[a]	28,358	100.00%
Less: Data not available for three consecutive years[b]	3,467	12.2%
Less: Outliers[c]	-1,133	4.0%
Final sample	23,758	83.8%

Panel B: Sample Partitioned by Public Service Reductions (PSR) Status and Type

	All Municipalities			
Type	No PSR	PSR[d]	Total	Pct. PSR
Borough	6084	2707	8791	30.8%
City	382	112	494	22.7%
First Class Township	636	223	859	26.0%
Second Class Township	9107	4507	13614	33.1%
Total	16,209	7,549	23,758	31.8%

[a]Total municipality-years represent the sum of the years of data available for municipalities between 1998 and 2008.

[b]If a municipality did not have all of the variables (from Table 1) available for two consecutive years, then those years were excluded. If the municipality did not have two consecutive years of public service expenditures per capita, then it is truncated.

[c]Outliers are defined as municipalities with public service expenditures per capita (EXPCAP) or any independent variable (except SIZE) in the extreme 99th percentile.

[d]Municipalities with public service reductions represent the number of municipalities that, during the sample period 1998-2008, reduced public service expenditures per capita by more than five-percent. The year of public service reductions is the year prior to the year of reductions (e.g., if a municipality reduces public services in 2001, we measure the symptoms in 2000).

TABLE 3: Descriptive Statistics for the Municipalities by Type

Type	Population	Total Revenue	REVRISK	ADMIN	CAPREV	DEBTCAP	DEBTREV	P(PSR)
Boroughs (N= 8,791)								
Mean	2,732	1,955,165	0.197	66.900	0.126	360.164	0.607	.314
Standard Deviation	3,794	3,929,769	0.242	46.340	0.080	973.643	2.348	.051
Minimum	19	1,205	0.000	0.000	0.000	0.000	0.000	.195
Maximum	38,923	69,565,886	2.500	337.230	0.405	18,490.000	57.672	.653
Percentiles* 25	553	170,083	0.075	36.633	0.066	0.000	0.000	.279
50	1,391	634,361	0.126	54.054	0.115	30.000	0.071	.307
75	3,415	2,104,656	0.218	82.719	0.174	328.000	0.511	.340
Cities (N= 494)								
Mean	36,578	56,726,222	0.206	74.897	0.158	917.889	0.878	.278
Standard Deviation	110,688	319,960,964	0.158	48.876	0.075	1,451.785	1.299	.035
Minimum	799	133,263	0.019	11.746	0.001	0.000	0.000	.201
Maximum	1,585,577	5,206,032,963	1.664	326.351	0.403	13,459.000	16.138	.429
Percentiles* 25	9,175	5,922,369	0.107	41.279	0.108	142.750	0.220	.255
50	14,502	10,317,278	0.164	59.419	0.155	496.000	0.609	.273
75	30,706	31,319,035	0.248	92.973	0.211	1,208.445	1.058	.296
First Class Twps (N=859)								
Mean	16,528	12,301,272	0.119	69.722	0.141	407.582	0.665	.276
Standard Deviation	14,715	13,315,106	0.134	49.423	0.083	706.790	2.585	.046
Minimum	351	87,615	0.010	0.000	0.000	0.000	0.000	.192
Maximum	81,821	88,815,959	2.184	328.729	0.401	12,591.000	57.100	.527
Percentiles* 25	5,006	3,753,116	0.067	39.034	0.079	98.000	0.181	.244
50	13,456	8,458,318	0.093	55.699	0.135	251.000	0.374	.267
75	22,611	15,976,635	0.126	85.526	0.196	481.000	0.687	.299
Second Class Twps (N=13,614)								
Mean	3,465	1,579,012	0.464	49.197	0.121	187.467	0.505	.324
Standard Deviation	4,818	3,996,802	0.387	39.076	0.078	912.769	3.196	.056
Minimum	34	5,596	0.000	0.000	0.000	0.000	0.000	.181
Maximum	58,434	159,029,491	2.495	340.784	0.405	18,668.000	56.700	.753
Percentiles* 25	1,010	230,824	0.193	25.863	0.063	0.000	0.000	.288
50	1,935	451,216	0.355	38.097	0.108	0.000	0.000	.315
75	3,947	1,129,894	0.618	57.887	0.165	52.000	0.172	.350

*Percentages represent the data ranked by quartiles. For example, the 50 percent quartile is the median. Half the municipalities have data values smaller than the median. The other half has data values larger than the median. Twenty-five percent of the municipalities have values smaller than the 25th percentile; 75 percent of the municipalities have values larger than the 25th percentile.

TABLE 4: Descriptive Statistics and Tests of Significance of Differences between Municipalities with Public Service Reductions (PSR) and those without Public Service Reductions by Type

Type	Variable	STATUS	Mean	Std. Dev.	t	Sig.
Borough	REVRISK	NO PSR	0.177	0.207	-11.622	<0.001*
		PSR	0.241	0.302		
	ADMIN	NO PSR	64.832	43.347	-6.287	<0.001*
		PSR	71.548	52.157		
	CAPREV	NO PSR	0.122	0.075	-6.715	<0.001*
		PSR	0.134	0.090		
	DEBTCAP	NO PSR	367.773	1029.608	1.098	0.272
		PSR	343.064	834.198		
	DEBTREV	NO PSR	0.654	2.581	2.802	0.005*
		PSR	0.502	1.707		
	SIZE	NO PSR	13.315	1.702	4.886	<0.001*
		PSR	13.121	1.762		
City	REVRISK	NO PSR	0.199	0.126	-2.009	0.045**
		PSR	0.233	0.236		
	ADMIN	NO PSR	73.835	48.937	-0.891	0.373
		PSR	78.518	48.712		
	CAPREV	NO PSR	0.160	0.075	0.633	0.527
		PSR	0.155	0.078		
	DEBTCAP	NO PSR	917.245	1470.764	-0.018	0.985
		PSR	920.086	1391.501		
	DEBTREV	NO PSR	0.901	1.310	0.722	0.471
		PSR	0.800	1.263		
	SIZE	NO PSR	16.424	1.423	-0.420	0.675
		PSR	16.487	1.340		

*Significant at the 0.01 level
**Significant at the 0.05 level

TABLE 4 (Continued): Descriptive Statistics and Tests of Significance of Differences between Municipalities with Public Service Reductions (PSR) and those without Public Service Reductions by Type

Type	Variable	STATUS	Mean	Std. Dev.	T	Sig.
First Class Township	REVRISK	NO PSR	0.111	0.078	-3.043	0.002*
		PSR	0.142	0.225		
	ADMIN	NO PSR	65.226	42.616	-4.554	0.000*
		PSR	82.544	63.425		
	CAPREV	NO PSR	0.136	0.079	-3.358	0.001*
		PSR	0.157	0.092		
	DEBTCAP	NO PSR	402.165	775.881	-0.379	0.705
		PSR	423.032	456.581		
	DEBTREV	NO PSR	0.722	2.988	1.093	0.275
		PSR	0.502	0.505		
	SIZE	NO PSR	15.767	1.173	0.499	0.618
		PSR	15.720	1.281		
Second Class Township	REVRISK	NO PSR	0.449	0.373	-6.355	<0.001*
		PSR	0.494	0.412		
	ADMIN	NO PSR	47.225	35.626	-8.389	<0.001*
		PSR	53.181	44.994		
	CAPREV	NO PSR	0.119	0.074	-3.886	<0.000*
		PSR	0.124	0.085		
	DEBTCAP	NO PSR	194.665	958.547	1.308	0.191
		PSR	172.921	812.341		
	DEBTREV	NO PSR	0.544	3.364	2.039	0.041**
		PSR	0.425	2.825		
	SIZE	NO PSR	13.265	1.263	3.502	<0.001*
		PSR	13.184	1.294		

*Significant at the 0.01 level
**Significant at the 0.05 level

TABLE 5: Correlation and Regression Results of the Relationship among the Indicators and Public Service Reductions

Panel A: Correlations

INDICATOR	REVRISK	ADMIN	CAPREV	DEBTCAP	DEBTREV
ADMIN	-0.175**				
CAPREV	-0.103**	-0.051**			
DEBTCAP	-0.109**	0.146**	0.008		
DEBTREV	-0.033**	0.022**	0.001	0.842**	
SIZE	-0.409**	0.248**	0.104**	0.200**	0.046**

Note: All variables are defined in Table 1.
*Means for SIZE are tested and presented in natural log form of total revenues.
**Pearson correlation coefficient is significant at the 0.01 level (two-tailed).

Panel B: Regression Results

Indicator	B	S.E.	Wald	*p*-value	*Exp(B)*	Impact
Intercept	-.317	.1366	5.378	.020	.728	
REVRISK	.374	.0424	77.896	.000	1.454	0.038
ADMIN	.004	.0003	133.746	.000	1.004	0.000
CAPREV	1.301	.1645	62.503	.000	3.672	0.139
DEBTCAP	.000	.0000	1.400	.237	1.000	0.000
SIZE	-.068	.0097	48.804	.000	.934	-0.007
$TYPE_{(BOROUGH)}$	-.086	.0286	9.050	.003	.918	0.082
$TYPE_{(CITY)}$	-.350	.0909	14.838	.000	.705	0.295
$TYPE_{(FIRST\ CLASS)}$	-.161	.0752	4.611	.032	.851	0.149

Note: See Table 2 for a description of the indicators. The latent dependent variable equals 0 if the municipality did not reduce public services and 1 if the municipality reduced public services. The last column represents the impact on the predicted likelihood of public service reductions due to a 0.10 increase in the value of the continuous covariate. The impact is computed as $Exp(B)^{0.10}$-1. For TYPE, the last column represents the impact on the predicted likelihood due to belonging to that category as opposed to the reference category (a second class township). Overall, the Wald Chi-square for the model is 25.852, which is significant at less than the 0.001 level.