A PREDICTIVE MODEL OF FISCAL DISTRESS IN LOCAL GOVERNMENTS

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ABSTRACT. This paper investigates the financial risk factors associated with fiscal distress in local governments. We hypothesize that fiscal distress is positively correlated with revenue concentration and debt usage, while negatively correlated with administrative costs and entity resources. The regression model results in a prediction of the likelihood of fiscal distress, which correctly classifies up to 91% of the sample as fiscally distressed or not. The model also allows for an analysis of the impact of a change in a risk factor on the likelihood of fiscal distress. A decrease in intergovernmental revenues as a percent of total revenues and an increase in administrative expenditures as a percent of total expenditures have the biggest influences on reducing the likelihood of fiscal distress.

INTRODUCTION

Local governments provide invaluable services to the citizenry, which include fire, police, water, sewer, parks, and recreation. Local governments also provide a wide array of public and social services, and contribute to the quality of community life. The citizenry count on local governments to respond in times of trouble and to help maintain the quality of life; however, local governments can do this only if they maintain their own fiscal health. Thus, a local government's ability to avoid fiscal distress directly affects its ability to sustain its current level of services (Honadle, Costa & Cigler, 2004).

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Fiscal distress has been a topic of concern for nearly half a century. Older, industrialized cities in the Northeast United States began to suffer from fiscal distress in the 1960s (Howell & Stamm, 1979), as the industrial revolution began to decline. Cities that relied on manufacturing and steel production found it difficult to attract new capital investments and began to increasingly rely on long-term debt financing to fund short-term operating expenditures (Howell & Stamm, 1979). Local government fiscal distress became a major news item in the mid-1970s, when New York City experienced a near fiscal collapse. The energy crisis and high inflation of the 1970s contributed to New York City's financial crisis, yet many analysts blamed New York's problems on poor management, budget deficits, and expensive social programs (Fuchs, 1992). In fact, other cities were experiencing fiscal distress at the time and managerial practices had little to do with it (ACIR, 1985a).

In 1985, the Advisory Commission on Intergovernmental Relations (ACIR) issued a report, stating that the causes of local government fiscal distress are usually beyond the control of the state or local government and can affect all types of communities, including urban and rural, small and large, and newer and older municipalities. ACIR found that local government fiscal distress is usually the result of a complex array of factors, which include but are not limited to the strength of the local economy, the resources and needs of the taxpayers, the support received by other governments, and the condition of the local government's infrastructure (ACIR, 1985b).

It is unrealistic for local governments to expect to receive protection under the federal bankruptcy laws (Watson, Handley & Hassett, 2005). Firstly, federal bankruptcy laws make local governments prove actual insolvency, not imminent risk of insolvency. Therefore, local governments almost never qualify for bankruptcy protection. Secondly, local governments provide essential community services. Therefore, creditors hesitate to force local governments to liquidate their assets in order to pay their debts (AICR, 1985a). Instead, local governments are forced to succumb to the workout plans of financial control boards and state oversight agencies (Lewis, 1994). However, even when the fiscal distress is resolved with the assistance of outside agencies, it jeopardizes the continuation of

essential government services. Accordingly, early warning signals of fiscal distress are of great value to stakeholders of local governments. This study develops a model for predicting and mitigating fiscal distress in local governments.

The Focus of this Study

Although several studies address the issue of fiscal distress in local governments, very few focus on the prediction of fiscal distress. The purpose of this paper is to develop a model based on financial risk factors that can be used to predict the likelihood of fiscal distress in local governments.   We focus on fiscal distress in local governments located in Pennsylvania. As in previous research, we distinguish between the condition of fiscal distress and causes of fiscal distress. The condition of fiscal distress is defined as a local government that experiences a significant and persistent imbalance between revenues and expenditures.   We operationalize the definition of fiscal distress as a local government that experiences three consecutive years of operating deficits (scaled by total revenues) with a cumulative three-year operating deficit of more than five percent. The causes of fiscal distress are proxied by risk factors or indicators of fiscal distress. We extend previous studies by using financial risk factors to develop a model to predict the likelihood of fiscal distress. Stakeholders of local governments will benefit from the results of this study by determining the likelihood of fiscal distress and the impact of the risk factors on this likelihood.

We examine several financial risk factors in an attempt to differentiate among local governments in varying states of fiscal condition. These risk factors include revenue concentration, administrative expenditures, debt usage and the resources of the local government.   We classify a local government as fiscally distressed if it experiences three consecutive years of operating deficits with a cumulative three-year operating deficit (scaled by total revenues) of more than five percent. Using logistic regression, we find that, holding the other variables constant, fiscally distressed local governments receive more intergovernmental revenues (as a percent of total revenues), have lower administrative expenditures (as a percent of total expenditures), have more debt, and experience less growth in revenues than local governments that are not fiscally distressed.

The regression model is used to predict fiscal distress. The model correctly classifies up to 91% of the local governments into their actual states (fiscally distressed or not). The regression analysis also allows decision makers to determine the impact of a change in a risk factor on the likelihood of fiscal distress. Decreases in intergovernmental revenues (relative to total revenues) and increases in administrative expenditures (relative to total expenditures) have the biggest influences on reducing the likelihood of fiscal distress. Our model provides a parsimonious and statistically reliable method of predicting fiscal distress. The systematic use of this model provides an efficient and effective way for stakeholders to monitor and mitigate fiscal distress in local governments.

The remainder of the paper is organized as follows: The next section describes the extant literature on fiscal distress in local governments, particularly in Pennsylvania. The section after next discusses the risk factors associated with fiscal distress and the related hypotheses. The results of testing the fiscal distress model are analyzed in the next to last section, and the last section summarizes the work of this paper.

PREVIOUS LITERATURE ON FISCAL DISTRESS IN LOCAL GOVERNMENTS

Overview of the Fiscal Distress Literature

Shortly after the spate of municipal emergencies in the late 1970s and early 1980s, academic and other researchers began to study the causes of fiscal distress. In November 1985, the ACIR issued a widely-recognized report on fiscal distress. In this report, the ACIR (1985b) purports that fiscal distress is caused by cyclical or structural forces. Cyclical forces are short-term conditions that usually correspond to business cycles. Structural forces are long-term changes in the economy that are beyond the control of state or local government. The ACIR added that fiscal distress is often the result of a complex array of economic conditions (such as changes in population growth rates, unemployment rates, and rates of new business development); socioeconomic conditions (including per capita income levels, poverty levels, and education levels); physical conditions (such as the condition of infrastructure assets); and financial factors (for example, dependence on intergovernmental revenue, debt financing, and tax revenues).

Previous research addresses the issue of measuring and assessing fiscal distress. Groves, Godsey and Shulman (1981) use a set of financial indicators to assess the fiscal condition of 24 cities. Their indicators include environmental factors such as changes in population growth, personal income levels, property values, unemployment rates, and business activity, as well as regional inflation rates. They also consider intergovernmental constraints (e.g., the extent of grants-in-aid, tax restrictions, and federal/state mandates), legislative policies and managerial practices. They develop a theoretical model, which captures all these external factors with several basic financial indicators, and they develop financial ratios for each factor. In the end, the model includes six broad categories--revenues, expenditures, earnings, debt structure, unfunded liabilities, and condition of capital plant –and approximately 30 related financial ratios. This model, developed by Groves and Valente (1994) and published by the International City/County Management Association, is a widely accepted fiscal monitoring tool for local governments.

There are other fiscal assessment tools, such as Brown's 10-point test to conduct a trend analysis (1993), Ammons' (1995) attempt to establish municipal benchmarks, and Kleine, Kloha and Weissert's (2003) 10-point scale for Michigan. There have been several other studies of fiscal distress in local governments (e.g., Brown, 1996; Campbell, 1990; Honadle, 1998; Stevens & LaPlante, 1987; Weinberg, 1984). Stevens and LaPlante (1987) suggest that studies of fiscal distress are best when limited to a specific group of relatively homogenous local governments.

There are weaknesses in the extant research. There is little consensus about what indicates fiscal distress or how to operationalize the concept (Bahl, 1984). The field lacks a theoretical framework of fiscal distress, especially for small, rural local governments (Stevens & LaPlante, 1987). There are very few studies that use sound statistical methods, reliable databases and parsimonious models of fiscal distress (Bahl, 1984). There is also a lack of consensus as to which indicators are relevant (Stevens & LaPlante, 1987). Researchers have been examining fiscal distress in local governments for more than thirty years, but few have developed a parsimonious set of indicators that are statistically reliable in

predicting fiscal distress and that can be applied across a wide variety of local governments. Our model addresses these weaknesses.

Methodological Problems Identified in the Literature

We develop a model of fiscal distress in terms of the risk factors identified in the literature. We use these risk factors to develop a predictive model of fiscal distress. There are three methodological issues that surface in the literature on fiscal distress. The first issue is determining the existence of fiscal distress. There are many alternatives for defining the state of fiscal distress, but most revolve around the idea of significant financial problems that could lead to insolvency. The second issue is identifying the causes of fiscal distress. The causes of fiscal distress are typically proxied by risk factors. Risk factors are indicators of fiscal problems that are typically based on financial data. The third issue is the use of the risk factors as predictors of fiscal distress. Once fiscal distress is defined and the risk factors identified, then the local governments are classified into their predicted categories. Each of these three issues is discussed as they are addressed in the literature.

Fiscal distress is defined in various ways in the for-profit, nonprofit, and government sector literature. Most definitions describe what the entity experiences as a result of financial problems. In many of the early studies in the for-profit literature, fiscal distress is defined as a bankruptcy declaration (e.g., Beaver, 1966; Altman, 1968). Later research in the for-profit literature defined fiscal distress as a significant and persistent decline in stock returns or earnings (e.g., Gilson, 1989; Gilson, John & Lang, 1990; John, Lang & Netter, 1992). In the nonprofit literature, fiscal distress is defined as a significant decline in resources, such as revenues or net assets (Trussel, 2002; Trussel & Greenlee, 2004), or a persistent decline in program spending (Greenlee & Trussel, 2000).

In the government sector literature, there are also alternative definitions of fiscal distress. The U.S. Government Accountability Office (GAO) defines a fiscally distressed local government as one "in which residents bear substantially higher tax burdens in order to obtain levels of public services comparable to better-off communities" (GAO, 1990a). DeSanto et al. (1991, p. 7) define fiscal distress as "a

persistent shortfall in cash flows...resulting from an imbalance between revenues and expenditures for given service levels." Kloha, Weissert and Kleine (2005a, p. 314) define fiscal distress as "a failure to meet standards in the areas of operating position, debt, and community needs and resources over successive years." These definitions are difficult to operationalize. Raman (1982) identifies fiscally distressed entities using bond ratings from Moody's; specifically, local governments that were downgraded from an A rating are classified as fiscally distressed. As discussed in more detail in the next section, we define a fiscally distressed local government as one that experiences a significant and persistent imbalance between revenues and expenditures.

Many previous studies develop risk factors or indicators of fiscal distress in local governments. The Municipal Finance Officers Association (MFOA, 1978; now called the Government Finance Officers Association) suggests 29 indicators in five categories, including economic vitality, financial independence and flexibility, productivity, deferred recognition of costs, and financial management practices. The U.S. Congressional Budget Office (1978) discusses three indicators of distress: cumulative budget deficits, cash plus investments as a percent of general fund expenditures, and total debt to total revenue. Groves and Valente (1994) developed an indicator system with 36 quantifiable variables grouped into seven categories: revenue expenditure, operating position, debt, unfunded liability, capital plant, and community needs and resources. Raman (1982) defines four indicators of fiscal distress--long-term general obligation debt per capita, short-term debt to general revenues, net change in working capital to general obligation debt, and net change in cash from operations to general obligation debt. Recently, Kloha, Weissert and Kleine (2005a) described ten indicators of fiscal distress in local governments. The indicators include items such as population growth and real taxable value growth. Also recently, Watson, Handley and Hassett (2005) identify five factors associated with fiscal distress in local governments. The five factors are poor financial management, a declining population, structural changes in the economic base, natural or man-made disasters, and civic distrust. As discussed in Section 3, we derived the risk factors for our fiscal distress model primarily from Groves and Valente (1994). Our focus is on financial indicators of fiscal distress.

The risk factors utilized in some of these studies are summarized in Table 1. We utilized many of these variables in the present study, as noted in the last column of this table and discussed in the next section. The database that we use in this study does not allow us to compute some of these variables. Our goal is to have a parsimonious set of variables that can be used to predict fiscal distress; therefore, we want to maximize predictive power while minimizing the number of variables. Many of the other studies attempt to develop performance evaluation models, as opposed to fiscal distress prediction models.

Very few studies in the governmental sector used the risk factors as inputs into a predictive model of fiscal distress. Kloha, Weissert and Kleine (2005a) measure ten indicators of fiscal distress on a binary scale (the attribute is present or not) and rank a sample of governments according to a 10-point scale. Although they apply their rankings to a sample of local governments in Michigan, they do not test their model on a sample of distressed entities. Also, they do not test the statistical significance of the indicators in a two-state (distressed or not) multivariate model. Raman (1982) uses stepwise discriminant analysis on a sample of 12 local governments. In addition to his use of a small sample size, the author does not directly measure the cost of misclassification or the prior probability of fiscal distress.

We extend the previous research to address two research questions for local governments. First, are the risk factors different between the local governments that are fiscally distressed and those that are not fiscally distressed? Second, how do these risk factors affect the likelihood of fiscal distress in local governments? We also incorporate the cost of misclassification and the prior probability of fiscal distress into our predictive model. We focus our study of fiscal distress on local governments in Pennsylvania. The advantages of our approach are the parsimony, reliability, and predictive ability of our model compared to other approaches.

Fiscal Distress in Pennsylvania

We limit our study to Pennsylvania local governments because there is substantial support for limiting the scope of analyses of fiscal distress to a homogeneous set of local governments. Coe (1999),

TABLE 1
Risk Factors Used in Previous Studies

Study	Category	Measures	Related Variables in Present Study
ACIR (1973)	One year operations	Revenues - Expenditures	MARGIN*
	Continuous operations	Revenues – Expenditures over time	MARGIN*
	Working Capital	Current assets – Current liabilities	NA
	Short-term operating loan balance	Current debt	NA
	Property tax delinquency	Property taxes delinquent / Total Property taxes	NA
	Property Valuation	Assessed value of real property	DEBTREV**
Congressional Budget Office (1978)	Continuous operations	Revenues – Expenditures over time	MARGIN*
	Coverage of expenditures	Cash + Securities / Total Expenditures	NA
	Debt burden	Total Debt / Total Revenues	DEBTREV, DEBT
U.S. Department of Treasury (1978)	Population	Population	SIZE
	Per capital income	Net income / Population	MARGIN*
	Own source revenue	Total revenue – Revenue from federal and state government	IGR
	Per capital long-term debt	Long-term debt / Population	DEBT, DEBTREV
	Property valuation	Assessed value of real property	DEBTREV**
Brown (1993)	Per capita revenue	Revenue / Population	SIZE
	Own source revenue	(Total revenue – Revenue from federal and state government) / Total Revenues	IGR

TABLE 1 (Continued)

Study	Category	Measures	Related Variables in Present Study
	Other source revenue	Revenue from federal and state government / Total Revenue	IGR
	Operating expenditure ratio	Operating expenditures / Total expenditures	ADMIN
	Revenues to Expenditures	Total revenues / Total expenditures	MARGIN*
	Unreserved general fund ratio	Unreserved general fund balance / General fund revenues	NA
	Liability coverage	(Cash + securities) / Total Liabilities	NA
	Debt to Revenue ratio	Total Liabilities / Total Revenues	DEBTREV
	Per capita Long-term debt	LT debt / Population	DEBT, DEBTREV
	Debt service to revenues	Debt service / total Revenues	DEBT
Raman (1982)	LT Debt per capita	LT debt / Population	DEBT, DEBT REV
	ST Debt to Revenue	ST debt / Total Revenues	NA
	Working capital change to Debt	Change in working capital / Total Debt	NA
	Cash change to Debt	Change in cash / Debt	NA
Kloha, Weissert & Kleine (2005a)	Population growth	Year to year percentage change in population	SIZE
	Real taxable value growth	Year to year percentage change in assessed value of real property	DEBTREV**
	General expenditures to taxable value	General expenditures / Assessed value	DEBTREV**
	Operating margin	(Revenues – expenditures) / Revenues	MARGIN*

TABLE 1 (Continued)

Study	Category	Measures	Related Variables in Present Study
	General fund balance to revenues	General fund balance / Total revenues	NA
	Fund balance	Assets – liabilities	NA
	LT debt to taxable value	LT debt / taxable value	DEBT, DEBTREV
Groves, Godsey & Shulman (1981); Grove and Valente (1994)	Revenue	Per capita revenues, restricted revenues, inter-governmental revenues, property tax revenues, Uncollected property tax revenues	SIZE, GROWTH, TAXREV
	Expenditure	Per capita expenditures, employees per capita, fixed costs, and fringe benefits	ADMIN
	Operating position	Operating deficits, Enterprise losses, fund balances, and liquidity	MARGIN*
	Debt	Current liabilities, long-term debt, debt service	DEBT, DEBREV
	Unfunded liabilities	Unfunded pension liability, pension assets, and accumulated employee leave	NA
	Capital plant	Capital expenditures	NA
	Community needs and resources	Population change, median age, personal income per capita, Poverty households, property value, residential development, vacancy rates, employment base, business activity	SIZE, GROWTH

Notes: NA: Data is not readily available to compute these variables.

    * MARGIN, revenues less expenditures to revenues, is used to determine the fiscal distress status (dependent variable); therefore, we do not use MARGIN as an independent variable.

    **The assessed valuation of real estate is highly correlated with DEBTREV; therefore, we do not include this as a separate variable.

Groves, Godsey and Shulman (1981) and Stevens and LaPlante (1987) find studies limited to a single state or similar form of government most effective because they reduce variability among the governments. Local governments in different states operate under different laws, accounting practices, and economic conditions. These differences affect fiscal health. In Pennsylvania, similar type governments are required to use the same chart of accountants, the same accounting practices and the same set of laws. They operate under relatively similar economic conditions and levels of state government oversight. These factors support a single-state analysis.

Pennsylvania began to tackle the problem of local government fiscal distress in 1984, when the University of Pittsburgh began to develop strategies for mitigating fiscal distress (fiscal distress was first experienced by local governments in the Pittsburgh area). These efforts were continued by the Pennsylvania General Assembly when it established a taskforce to study the problems associated with fiscal distress. The findings of the taskforce resulted in the Financially Distressed Municipalities Act of 1987 (Act 47), which established criteria to define a local government as fiscally distressed and procedures to follow when it occurs. According to Act 47, a local government is distressed if it meets any one of eleven criteria, which include: 1) deficits for a 3-year period; 2) deficits for 2-years that equal 5% or more of total revenues; 3) failing to meet any required pension obligation; 4) missing a payroll for 30-days; 5) defaulting on a bond; and so on. A wide variety of stakeholders can petition the State government to designate a local government as distressed; however, most often it is the local government itself that requests the designation because the Act 47 designation enables the local government to receive special funding in the form of low-interest loans and grants.

More recently, Pennsylvania State government has increased its role in the oversight of local government fiscal health. In addition to designating local governments as fiscally distressed under Act 47, it now identifies local governments that are "at risk" (Kloha, Weissert & Kleine, 2005b). Pennsylvania makes this determination based on a survey that local governments are required to submit annually to the State government. The survey asks local governments to self-report the answers to the eleven criteria in Act 47; however, the State

government does not use this information to deem the local governments distressed. Instead, it uses the information to designate the local governments as "at risk" of fiscal distress. Local governments deemed "at risk" of fiscal distress receive special support from the State government to help them avoid actual distress.

Pennsylvania has an elaborate system that can be used by stakeholders to monitor fiscal distress, but the system uses more than a dozen indicators, relies largely upon self-reported qualitative data and has never been tested for statistical reliability. Our model relies upon objective, quantitative data and is tested for statistical reliability and parsimony.

MODEL DEVELOPMENT AND THE RISK FACTORS

In order to address the research questions, we consider a model to classify local governments as fiscally distressed or not fiscally distressed. There are two issues at hand—determining the existence of fiscal distress and defining the causes of fiscal distress. The first issue is determining whether or not an entity is experiencing the condition of fiscal distress. The second issue addresses the causes of fiscal distress and the underlying reasons that an entity is experiencing the condition of fiscal distress. In this section we provide our definition of the existence of fiscal distress and develop the risk factors or indicators used to proxy the causes of fiscal distress.

The Existence of Fiscal Distress

We classify local governments into two states of financial condition--fiscally distressed or not fiscally distressed. As stated in the previous section, there are several definitions of fiscal distress in the government sector. Drawing on these definitions, we define a fiscally distressed local government as one that experiences a significant and persistent imbalance between revenues and expenditures. We operationalize this definition using two of Pennsylvania's quantitative criteria. First, a local government must have three consecutive years of operating deficits (scaled by total revenues). Second, a local government must have experienced a cumulative operating deficit of more than five percent during this

three-year period. Operating deficits occur when expenses exceed revenues. If a local government meets both of these criteria, then it is considered to be fiscally distressed. In the first measure, we use operating deficits, scaled by total revenues, as a measure of the imbalance between revenues and expenditures. Operating deficits necessarily result in a decrease in organizational resources, since net assets must be reduced in times of deficits to meet operating needs. Declining cash flows from operations is an alternative measure of the imbalance, but they are not available on the database. We use three consecutive years of operating deficits to account for the persistence of the imbalance, since a one-year decline may be a temporary financial problem. Finally, following Pennsylvania guidelines, we use a five percent cutoff to account for the significance or materiality in the reduction of resources. Immaterial reductions are not likely to cause fiscal distress. Tests of robustness of this definition are included later in this paper.

The Risk Factors of Fiscal Distress

We use variables similar to those developed in previous studies to address the risk factors related to fiscal distress in local governments. The indicators of fiscal distress developed by Groves and Valente (1994) are widely used by states to evaluate local governments (Kloha, Weissert & Kleine, 2005a, 2005b). Their system is published by the International City/County Management Association (ICMA) and has 36 quantifiable variables grouped into seven categories –operating position, revenues, expenditures, debt, unfunded liability, capital plant, and community needs and resources. Accordingly, we draw upon the indicators developed by Groves and Valente for our study.

Several of the Groves and Valente (1994) indicators are not available on the Pennsylvania database and thus are not used in this study. For example, the balances in equity and total assets are not reported by Pennsylvania local governments and are therefore not available for our tests. As a result, we could not measure any variables in the unfunded liability and capital plant categories. We use proxy measures in four categories that are similar to the ICMA system (Groves & Valente, 1994); however, due to the likelihood of a high correlation among the many variables in each category and the lack of data available to compute many of the variables, we limit our

risk factors to measures in the following the five categories: revenue concentration, administrative expenditures, debt usage, and entity resources. Our goal is to develop a parsimonious set of variables with relatively high predictive ability.

Revenue Concentration

Local governments receive funds from a variety of sources, including taxes, grants, fees and fines. Local governments with few sources of revenues are more likely to be vulnerable to financial problems because they cannot rely on alternatives sources. The GAO (1990a, 1990b, 1991) reports a decline in traditional services provided by local governments when they cannot replace tax revenues lost due to population declines. We examine changes in population (see entity resources below); however, we also examine revenue concentration, as local governments must have the ability to draw upon alternative revenue sources when less reliable revenue streams disappear, if they are to avoid fiscal distress. Heavy reliance on intergovernmental revenues (IGR) can result in fiscal distress, if those funding streams dry up (Reid, 1986). We have two proxies for revenue concentration. First, we compute the reliance on tax revenues (TAXREV) as total tax revenue to total revenues (Groves & Valente, 1994). Second, we compute the reliance on IGR as revenues from the federal and state government as a percent of total revenues (Brown, 1993; U.S. Department of Treasury, 1978). This leads to the following hypothesis:

H_2: Ceteris paribus, there is a positive association between revenue concentration and fiscal distress.

Administrative Expenditures

Administrative expenditures include expenditures that are not allocated to particular programmatic functions of the local government such as public safety, public works, parks, and recreation. Administrative expenditures include all general purpose expenditures made from the General Fund. These expenditures include such items as office salaries, office supplies, office rent, utilities and maintenance. Administrative expenditures do not include debt service costs or costs incurred to support programmatic functions, entitlement programs, and social services. Brown (1993)

posits that local governments that spend more on administrative costs, relative to total expenditures, are less prone to fiscal distress because administrative costs are more discretionary than programmatic and debt service costs, which are non-discretionary. Programmatic and debt service costs are mandatory and can put a strain on the local government, causing fiscal distress. Moreover, state and federal governments are increasingly imposing funded and unfunded mandates upon local governments.

In Pennsylvania, local governments are required to use a standardized chart of accounts and to post transactions in accordance with a set of rules established by the State government. The State government provides periodic training to local governments, so they keep their books in accordance with these established rules. The financial records of local governments are also audited annually for proper posting and classification. Accordingly, costs are presumed to be properly classified between administrative and programmatic expenditures. This leads to the following hypothesis:

H_3: Ceteris paribus, there is a negative association between administrative expenditures and fiscal distress.

Debt Usage

Solvency impacts a local government's ability to continue as a going concern. Local governments that rely heavily on debt financing are more susceptible to insolvency than governments that rely less on debt because local governments must meet their debt service requirements, even when faced with financial difficulties. Local governments experiencing fiscal distress are also less able to raise funds from the capital markets to finance their programs than other governments because they are less credit-worthy and pose a higher risk of default.

Pennsylvania imposes legal debt limits upon its local governments; however, the limits can be increased to enable the local governments to comply with federal and state mandates. The debt limits can also be increased to allow local governments to undertake a wide variety of capital improvements and programmatic services. Finally, Pennsylvania's debt laws do not limit debt borrowed in the form of a capital lease, although this is also a fixed cost and

can jeopardize the financial viability of a local government if not used prudently (Department of Community and Economic Development, 2001).

We have two proxies for debt usage or solvency. The first is total debt (DEBT). This ratio is measured as the natural log of total liabilities. The second is debt to revenue (DEBTREV). We use the measure suggested by the U.S. Congressional Budget Office (1978), which is the ratio of total liabilities to total revenues. Debt to revenue measures the number of years of revenue necessary to cover the debt. This leads to the following hypothesis:

H$_4$: Ceteris paribus, there is a positive association between debt usage and fiscal distress.

Entity Resources

The ICMA (Groves & Valente, 1994) and ACIR (1985b) suggest that evaluations of fiscal distress should include a category of predictor variables reflecting the resources and needs of the surrounding community. The balance between the needs and resources of the surrounding community is a key factor is assessing the risk of fiscal distress and this relationship is no more clearly revealed than through land use decisions. Pennsylvania has one of the highest growth rates in the nation when it comes to the development of open forests, woodlands, and farms. Pennsylvania is not growing in terms of new citizens; rather, its citizens are moving out of the older cities and boroughs and into the outlying, rural townships (Pennsylvania Economy League, 1999). This puts a strain on the infrastructures of the large, urban, local governments, which are left with underutilized and under-funded infrastructures through the loss of their tax-base and out-migration (Kelsey, 1998). Similarly, it puts a strain on the small, rural, local governments, which do not have the tax-base and infrastructure to support the sudden influx of residents occupying cost-intensive, single-family dwellings. The small, rural, outlying local governments will fair the worst in this imbalance, as they will be required to develop schools, roads and other public services with the most cost-intensive and least income-producing type property, single-family homes on residential lots (Kelsey, 1998).

We determine entity resources, in part, by trends in the size of the entity and its tax base. We measure size two ways. First we use the

natural log of total revenues (SIZE) as a measure of entity size. Second, we use revenue growth to capture the change or use of the tax base. We compute the year-to-year change in total revenues (GROWTH) as a measure of the change in the resources of the entity. We also consider the population of the local government as a measure of the size of the entity; however, the correlation between total revenues and population is extremely high (almost 90%) and inclusion of both variables would be harmful to our regression model. Also, population changes are available from the U.S. Census Bureau only every ten years, whereas, changes in total revenues are available annually. Thus, we omit population from our model and rely upon total revenues and changes in total revenues to proxy entity size and growth. This leads to our last hypothesis:

H_5: Ceteris paribus, there is a negative association between entity resources and fiscal distress.

In summary, we hypothesize that certain risk factors are related to fiscal distress. We predict that the likelihood of fiscal distress is directly related to a local government's revenue concentration and debt usage. We also hypothesize that the likelihood of fiscal distress is inversely related to a local government's administrative expenditures and entity resources. The variables are summarized in Table 2.[1]

RESULTS OF TESTING THE FISCAL DISTRESS MODEL

This study focuses on the risk factors and the prediction of fiscal distress in local governments. Certain risk factors are hypothesized to be related to fiscal distress and are described in the previous section. This section presents the empirical tests of the fiscal distress prediction model.

Sample Selection and Descriptive Statistics

We obtain a sample of 2,633 local governments in Pennsylvania from the Pennsylvania Department of Community and Economic Development. The data includes information for all Pennsylvania 67 counties, 56 cities, 962 boroughs, 91 first class townships, 1,457 second class townships, and 1 town. In Pennsylvania, local government designations (city, borough, township, etc.) reflect

TABLE 2
Risk Factors of Fiscal Distress and Their Expected Relation with Fiscal Distress

Indicator	Measure	Expected Relation with Fiscal Distress
Taxes to Revenues (TAXREV)	$\dfrac{\text{Tax Revenues}}{\text{Total Revenues}}$	+
Inter-governmental Revenues (IGR)	$\dfrac{\text{Revenues from Federal and State}}{\text{Total Revenues}}$	+
Administrative Cost Ratio (ADMIN)	$\dfrac{\text{Administrative Expenditures}}{\text{Total Expenditures}}$	-
Debt Level (DEBT)	ln (Total Liabilities)	+
Debt to Revenue (DEBTREV)	$\dfrac{\text{Total Liabilities}}{\text{Total Revenues}}$	+
Size (SIZE)	ln (Total Revenues)	-
Revenue Growth (GROWTH)	$\dfrac{\text{Total Revenues}_t - \text{Total Revenues}_{t-1}}{\text{Total Revenues}_{t-1}}$	-

population density and historic settlement patterns. In descending order, cities are the largest form of government, then boroughs, first class townships, and second class townships. First class townships are usually large, urban local governments clustered around cities; they serve established suburban populations. Second class townships are small, rural local governments in outlying areas. Second class townships are about three times larger than first class townships and they hold 93% of the Commonwealth's land area; however, they are much less densely populated than first class townships. This study focuses on municipal governments, so we exclude school districts from our sample.

The various forms of local governments in Pennsylvania each operate under their own sets of laws (e.g., there is a borough code, a first class township code, etc.); however, cities, boroughs, and townships are fairly homogeneous. They perform similar programmatic functions, have similar types of staff, use the same chart of accounts, and have access to similar types of resources. Counties, on the other hand, have unique structural, accounting and regulatory issues that make them less comparable to municipalities.

They also have broader boundaries and scope of services. Accordingly, we exclude counties from the study.

We merge the files for the years 1998-2005 to create cross-sectional longitudinal (panel) data. Pennsylvania local governments report on a calendar yearend and 2005 is the most recent year available on the database at the time of this study. To be included in the sample, the local governments must have all of the data available in the database to compute the independent variables. Thus, we excluded any local governments with missing data and all the outliers, which are local governments with independent variables in the extreme one-percentile. The final sample consists of 19,126 local government-years. The sample criteria are summarized in Table 3.

TABLE 3
Summary of the Sample Selection Procedures

	Local governments	
	Number	Percent
Total local government-years	20,199	100.0
Data not available for all variables	678	3.3
Outliers[a]	395	2.0
Final sample	19,126	94.7
Less: Government years not utilized[c]	7,582	37.5
Total included in two-state partition	11,544	57.1
Two state partition:		
Not fiscally distressed	10,519	91.1
Fiscally distressed[b]	1,025	8.9
Total	11,544	100.0

Notes:
[a] Outliers are defined as those local governments with any independent variables (from Table 2) in the extreme one percent.
[b] Fiscally distressed local governments represent the number of local governments that, during the sample period 1998-2006, experienced three consecutive years of operating deficits and a cumulative operating deficit of more than five percent across the same three-year period.
[c] Since three years of data are necessary to determine the fiscal status, these years are not included in the two state partition; however, they are used to compute the fiscal status.

As noted in the previous section, we define a local government as fiscally distressed if the entity has three consecutive years of operating deficits with a three-year cumulative operating deficit (scaled by total revenues) of more than five percent. We need three consecutive years of data to define fiscal distress; therefore, local governments could not be defined as financially distressed in 1998 or 1999. This eliminates 7,582 local government-years from consideration as financially distressed or not, leaving 11,544 for such designation. Of these, there are 1,025 local government-years (8.9% of the total) that are classified as fiscally distressed using our definition. Local governments are considered to become fiscally distressed in the first of the three years that they had operating deficits. Thus, we measure the risk factors for these fiscally distressed local governments in the first of the three years that the organization had operating deficits. For example, if a local government has operating deficits in 2000, 2001 and 2002 that cumulate to more than five percent, then it is considered to be fiscally distressed in 2000. The remaining 10,579 government-years (91.1% of the total) are classified as not fiscally distressed.

Summary statistics for the sample of local governments partitioned by status (fiscally distressed and not) are included in Table 4, Panel A. We hypothesize that the likelihood of fiscal distress is a function of the risk factors summarized in Table 2. We test the differences in the means between the two groups for each of these independent variables. Since we utilize panel data, we adjust the covariance structure using the first order autoregressive relationship to account for the correlation in the repeated measures. Based on the F-statistic in the analysis of variance (ANOVA) adjusted for repeated measures, the results indicate that all of the risk factors are significantly different (at the 0.05 level) between the two groups, except for IGR and DEBT; however, IGR is marginally significant at the 0.10 level. All of the risk factors have the hypothesized signs. Table 4, Panel B, shows the Pearson correlations for the risk factors. The highest correlation among the independent variables is 0.461 between IGR and SIZE. Thus, multicollinearity does not appear to present a problem with the regressions.

TABLE 4
Descriptive Statistics and Tests of Significance of Differences
between Fiscally Distressed and Not Fiscally Distressed Local
Governments in Pennsylvania

Panel A: Descriptive Statistics				
Variable	State	Mean	*F*-statistic	*p*-value
TAXREV	Not Distressed	0.459	9.777	0.002
	Distressed	0.468		
IGR	Not Distressed	0.204	2.929	0.087
	Distressed	0.208		
ADMIN	Not Distressed	0.167	9.406	0.002
	Distressed	0.160		
DEBT	Not Distressed	6.332	0.450	0.502
	Distressed	6.423		
DEBTREV	Not Distressed	0.996	4.135	0.042
	Distressed	1.384		
SIZE	Not Distressed	13.296	32.423	<0.001
	Distressed	13.254		
GROWTH	Not Distressed	0.064	32.889	<0.001
	Distressed	0.023		

Panel B: Correlations						
	TAXREV	IGR	ADMIN	DEBT LEVEL	DEBTREV	SIZE
IGR	0.168					
ADMIN	-0.170	0.091				
DEBTLEVEL	0.065	0.105	0.072			
DEBTREV	-0.011	-0.119	-0.026	-0.260		
SIZE	0.062	0.461	0.285	-0.423	0.073	
GROWTH	0.165	0.003	-0.014	0.051	-0.004	-0.153

Note: All variables are defined in Table 2.

Multivariate Model

We use cross-sectional time-series (panel data) analysis to test our model of fiscal distress. 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 local government *i*, which is related to the observed variable, *Status$_i$*, through the relation:

>*Status$_i$* = 0 if the organization is not fiscally distressed,

>*Status$_i$* = 1 if the organization is fiscally distressed.

The model includes all of the independent variables from Table 1. The predicted probability of the *kth* status for local government *i*, *P(Status$_{ik}$)* is calculated as:

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

Where:

$$Z_i = \alpha + \beta_1 \overset{+}{TAXREV} + \beta_2 \overset{+}{IGR} + \beta_3 \overset{-}{ADMIN} + \beta_4 \overset{+}{DEBT} + \beta_5 \overset{+}{DEBTREV} +$$

$$\beta_6 \overset{-}{SIZE} + \beta_7 \overset{-}{GROWTH}$$

We use a random sample of approximately one-half of the local governments to develop the model (the estimation sample) and the other half to test the model (the holdout sample). The results of the logistic regression model (adjusted for autocorrelation) are included in Table 5. Risk factors IGR, ADMIN, DEBT, and GROWTH are significantly related to the probability of distress (at the 0.05 level) with the predicted signs. The other three risk factors, TAXREV, DEBTREV and SIZE are not statistically significant in the multivariate model.

The results of the regression analysis also allow one to address the impact of a change in a risk factor on the likelihood of fiscal distress. In Table 5, *Exp(B)* is the odds ratio, which is the change in the odds of the event (fiscal distress) occurring for a one-unit change in the risk factor. The last column in Table 5 represents the impact on the predicted likelihood of fiscal distress due to a 0.10 increase in the value of the risk factor. The impact is computed as *Exp(b)$^{0.10}$* - 1. The risk factors IGR and ADMIN have the biggest influences on the likelihood of fiscal distress. An increase in IGR of 0.10 will increase the predicted likelihood of fiscal distress by 0.166 while an increase in ADMIN of 0.10 will decrease the likelihood by 0.150. Based on the

TABLE 5
The Logistic Regression Results of the Relation among the Risk
Factors and Fiscal Distress

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

$$Z_i = \alpha + \beta_1 \overset{+}{TAXREV} + \beta_2 \overset{+}{IGR} + \beta_3 \overset{-}{ADMIN} + \beta_4 \overset{+}{DEBT} + \beta_5 \overset{+}{DEBTREV}$$

$$+ \beta_6 \overset{-}{SIZE} + \beta_7 \overset{-}{GROWTH}$$

Variable	Coefficient	S.E.	p-value	Exp(B)	Impact
Constant	-3.338	0.782	0.000		
TAXREV	-0.208	0.349	0.550	0.812	-0.021
IGR	1.536	0.438	0.000	4.644	0.166
ADMIN	-1.628	0.728	0.025	0.196	-0.150
DEBT	0.031	0.010	0.002	1.031	0.003
DEBTREV	-0.001	0.007	0.852	0.999	0.000
SIZE	0.062	0.051	0.225	1.064	0.006
GROWTH	-0.994	0.180	0.000	0.370	-0.095

Note: See Table 2 for a description of the independent variables. The latent dependent variable equals 0 if the local government is not fiscally distressed and 1 if the local government is fiscally distressed. The last column represents the impact on the predicted likelihood of fiscal distress due to a 0.10 increase in the value of the covariate. The impact is computed as $Exp(B)^{0.10}$ - 1.

risk factors in this model, local governments attempting to reduce the likelihood of fiscal distress will have the greatest impact by decreasing the amount of intergovernmental revenues (relative to total revenues) or by increasing administrative expenditures (relative to total expenditures). Also, an increase in total revenues of 10% over the previous period (GROWTH) will decrease the risk of fiscal distress by 0.095. Changes in the other risk factors do not have nearly the same impact on the likelihood of fiscal distress.

Predicting Fiscal Distress

We use the results of the logistic regression analysis to test the predictive ability of the fiscal distress model. The observed logistic regression equation (from Table 5) for entity *i* at time *t* is:

$$P(i,t) = 1/(1+e^{-Zi})$$

Where:

$$Z_1 = -3.338 - 0.208TAXREV + 1.536IGR - 1.628ADMIN + 0.031DEBT - 0.001\ DEBTREV + 0.062SIZE - 0.994GROWTH$$

The predicted dependent variable, *P(i,t):* the probability of fiscal distress for local government *i,* is computed using the actual risk factors for each municipality in the estimation sample. The resulting probabilities are used to classify governments as fiscally distressed or not. Jones (1987) suggests adjusting the cutoff probability for classifying as fiscally distressed or not fiscally distressed in two ways. Following the suggestion of Jones, we first incorporate the prior probability of fiscal distress and then include the expected cost of misclassification.

Using logit, the proportion of fiscally distressed local governments in the sample must be the same as the proportion in the population to account for the prior probability of fiscal distress. If the proportion is not the same, then the constant must be adjusted (Maddala, 1991). This is more of a problem when a paired sample method is used, which is not the case here. Since we do not know the proportion of fiscally distressed entities in the population of all local governments, we assume that the proportion of local governments in Pennsylvania is an unbiased estimator of the proportion in the population of all local governments. Since 8.9% of the local governments in the sample are fiscally distressed, we assume that the prior probability of fiscal distress is 0.089.

The ratios of the cost of Type I errors (incorrectly classifying fiscally distressed governments as not fiscally distressed –a false negative) to Type II errors (incorrectly classifying governments that are not fiscally distressed as fiscally distressed–a false positive) also must be determined. The particular cost function is difficult to ascertain and will depend on the user of the information. For example, a creditor wants to minimize loan losses (and thus Type I errors); however, he or she will suffer an opportunity cost (Type II

error) if credit is granted to another borrower at a lower rate. In most cases, the cost of a Type II error is likely to be much smaller than a type I error. Thus, we incorporate several relative cost ratios (and cutoff probabilities) into our analysis. Specifically, we include the relative costs of Type I to Type II errors of 1:1, 10:1, 20:1, 30:1, 40:1, 60:1, and 100:1 (Beneish, 1999; Trussel, 2002).

The results of using the logit model to classify local governments as fiscally distressed or not are included in Table 6, Panel A, for the estimation sample. The cutoff probabilities presented are those that minimize the expected costs of misclassification. Following Beneish (1999), the expected costs of misclassification (ECM) are computed as:

$ECM = P(FD)P_I C_I + [1 - P(FD)]P_{II}C_{II}$,
Where:
$P(FD)$ is the prior probability of fiscal distress;
P_I and P_{II} are the conditional probabilities of Type I and Type II errors, respectively; and
C_I and C_{II} are the costs of Type I and Type II errors, respectively.

TABLE 6
The Predictive Ability of the Fiscal Distress Model Including the Expected Costs of Misclassification and the Relative Costs of Type I Error to Type II Error

Panel A: Estimation Sample							
	Ratio of the Cost of Type I to Type II Errors						
	1:1	10:1	20:1	30:1	40:1	60:1	100:1
Cutoff	0.200	0.090	0.040	0.040	0.040	0.010	0.010
Type I Error	0.986	0.427	0.014	0.014	0.014	0.000	0.000
Type II Error	0.003	0.395	0.955	0.955	0.955	1.000	1.000
Overall Error	0.089	0.398	0.872	0.872	0.872	0.912	0.912
ECM Model	0.090	0.740	0.895	0.907	0.920	0.911	0.911
ECM Naïve	0.089	0.890	0.911	0.911	0.911	0.911	0.911
Relative Costs	1.014	0.832	0.982	0.996	1.010	1.000	1.000
Overall Correct	0.911	0.602	0.128	0.128	0.128	0.088	0.088

TABLE 6 (Continued)

Panel B: Holdout Sample							
Ratio of the Cost of Type I to Type II Errors							
	1:1	10:1	20:1	30:1	40:1	60:1	100:1
Cutoff	0.200	0.090	0.040	0.040	0.040	0.010	0.010
Type I Error	0.986	0.427	0.014	0.014	0.014	0.000	0.000
Type II Error	0.003	0.395	0.955	0.955	0.955	1.000	1.000
Overall Error	0.089	0.398	0.872	0.872	0.872	0.912	0.912
ECM Model	0.089	0.736	0.896	0.908	0.920	0.912	0.912
ECM Naïve	0.088	0.880	0.912	0.912	0.912	0.912	0.912
Relative Costs	1.014	0.837	0.982	0.995	1.009	1.000	1.000
Overall Correct	0.911	0.602	0.128	0.128	0.128	0.088	0.088

Note: The cutoff is the probability of fiscal distress that minimizes the expected cost of misclassification, ECM. ECM is computed as $ECM = P(FD)P_I C_I + [1 - P(FD)]P_{II}C_{II}$, where $P(FD)$ is the prior probability of fiscal distress (0.089), P_I and P_{II} are the conditional probabilities of Type I and Type II errors, respectively. C_I and C_{II} are the costs of Type I and Type II errors, respectively. The relative costs are the ECM Model divided by the ECM Naïve.

The validity of the model is tested on the holdout sample using the same cutoff probabilities from the estimation sample. Table 6, Panel B, includes the results for the holdout sample. The results indicate that the model can identify fiscally distressed local governments with 60% (at a cost ratio of 10:1) to 91% (at a cost ratio of 1:1) of the governments in the estimation sample correctly classified. However, when the cost ratio is above 10:1 the predictive ability diminishes dramatically due to the high levels of type II errors. In the holdout sample, the results are similar.

To test the usefulness of the model, we compare these results to a naïve strategy. This strategy classifies all local governments as fiscally distressed (not fiscally distressed) when the ratio of relative costs is greater than (less than or equal to) the prior probability of fiscal distress.[2] If all local governments are classified as fiscally distressed (not fiscally distressed), then the naïve strategy makes no Type I (Type II) errors. In this case, P_I (P_{II}) is zero, and P_{II} (P_I) is one. The expected cost of misclassification for the naïve strategy of

classifying all governments as not fiscally distressed (fiscally distressed) reduces to $0.911C_{II}$ ($0.089C_I$).

We also report the relative costs or the ratio of the ECM for our model to the ECM for the naïve strategy in both panels of Table 6. Relative costs below 1.0 indicate a cost-effective model. For both the estimation and holdout samples, our model has a lower ECM than the naïve strategy when the cost ratio is between 10:1 and 30:1 and has approximately the same ECM for other cost ratios. These results suggest that our fiscal distress model is cost-effective in relation to a naïve strategy for the middle ranges of the ratio of Type I and Type II errors.

Applying the Prediction Model

We use one of the local governments from the sample to illustrate the model. The model allows one to predict the status of the local government as fiscally distressed or not fiscally distressed. From the results of the logistic regression, the probability of the fiscal distress for local government *i* at time *t*, *P(i,t)* is:

$$P(i,t) = \frac{1}{1+e^{-zi}} \qquad (1)$$

Where:

Z_1 = -3.338 – 0.208*TAXREV* + 1.536*IGR* – 1.628*ADMIN* + 0.031*DEBT* – 0.001 *DEBTREV* + 0.062*SIZE* – 0.994*GROWTH*

Substituting the actual variables from the example entity (in parentheses), we obtain:

Z_1 = -3.338 – 0.208(0.67) + 1.536(0.151) – 1.628(0.24) + 0.031(0) – 0.001(0) + 0.062(12.41) – 0.994(0.08)

Z_i = -2.944

$P = 1 / (1+e^{-2.944})$

$P = 0.050.$

Table 6, Panel A, shows that the selected local government is predicted not to be fiscally distressed for cost ratios less than 20:1, since the actual probability (0.050) is less than the cutoff at those levels of the ratio of Type I to Type II errors. The entity's actual status is not fiscally distressed. Thus, the model correctly predicted the

fiscal status of this local government, assuming a cost ratio of 20:1 or less. For cost ratios above 20:1, the model did not correctly predict the status, which would be a Type II error.

Robustness Tests and Other Possible Risk Factors

We made several assumptions when developing and testing our model and test these assumptions for robustness now. For example, we defined a local government as fiscally distressed if the organization had three consecutive years of operating deficits that cumulated to an operating deficit of more than 5% across the three-year period. We reevaluate our model using time periods of one, two, four and five-years for the deficits in operating margin. We also test our model by using any decline in the operating margin (i.e., more than zero percent) and declines of more than 10% and 20% in the operating deficit. For most of these versions of the model, the tenor of our results does not change. However, using only one year of operating deficits with any of the materiality levels does change the results. The model is not significant in these cases.

We also assumed the prior probability of fiscal distress in developing our prediction model. For example, we assumed that the prior probability of fiscal distress was 0.089 because 8.9% of the local governments in the initial sample were fiscally distressed. We evaluated the sensitivity of the model to other assumptions of the prior probability of fiscal distress by using prior probabilities of 0.05 and 0.15. These assumptions did not alter the results significantly.

We also consider other risk factors for the model and test them for robustness. For example, there are four other risk factors that we considered but omitted from our model. The first factor that we believe could impact our model is the nature of the local government as either rural or urban. Studies suggest that urban and rural local governments face unique fiscal problems (Cigler, 1989; Reid, 1986; Shields, 2004). Economic development, personal income, unemployment, and other economic indicators often differ across urban and rural local governments. These differences are, in turn, associated with differences in industry growth and job markets (Shields, 2004). To address this potential difference, we code each government as urban or rural based on their population density. We adopt the definition of rural developed by the Center for Rural

Pennsylvania (2005), which is based on the U.S. Census Bureau's definition of urbanized areas. A local government is considered rural if the population density within the municipality is less than 274 persons per square mile or the local government's total population is less than 2,500 people. All other local governments are considered urban. This dummy variable is a proxy for the economic conditions found in urban versus rural local governments and the potential effect on fiscal condition.

The second factor we consider is the type local government. In Pennsylvania, local governments are created by the Commonwealth and assigned a classification based on the population within their borders. Local governments of differing types operate under different rules and regulations, with different types of governing bodies and with different opportunities and constraints (Honadle et al., 2004). Studies show patterns in fiscal distress across different types of local governments (Brookings, 2003, 2007). To control for type, we code local governments as cities, first class townships, second class townships, and boroughs. We code Pennsylvania's one town as a first class township. Thus, type of local government is a proxy for the legal and structural differences inherent in the different types of local governments.

The third factor that we consider is the region in which the local government is located. ACIR (1985b) suggests that long-term fiscal problems stem from structural changes in the economy. An example of this is the fiscal distress experienced by local governments in the Southwest region of Pennsylvania when the U.S. steel mills closed in the 1980s. Recent studies support the idea that fiscal health may be a regional issue (Center for Rural Pennsylvania, 2004, 2005). Thus, region serves as a proxy for the structural and long-term economic changes that are often responsible for a local government's fiscal health. Using the Center for Rural Pennsylvania's regional divisions, we divided the State into six regions based on relative location within the State—Southwest, South Central, Southeast, Northwest, Central, and Northeast Pennsylvania. We use this factor to isolate regions experiencing long-term fiscal distress due to structural changes.

Lastly, we consider the basis of accounting used by the local governments. Local governments in Pennsylvania submit annual financial reports to the State government; however, Pennsylvania

does not require compliance with generally accepted accounting principles. As a result, most local governments do not readily disclose their accounting methods. Accordingly, we use a proxy based on the size of the government. In 1999, the Government Accounting Standards Board issued *Statement No. 34* (GASB, 1999), requiring different accounting standards for governments of different sizes. A discussion of GASB *Statement No. 34* reporting requirements is beyond the scope of this analysis; however, *Statement No. 34* classifies governments with total annual revenues in excess of $100 million as Phase I governments, governments with total annual revenues between $10 and $100 million as Phase II governments, and governments with total revenue less than $10 million as Phase III governments, and imposed different reporting requirements on them based on their size and these phases.

All local governments covered by *Statement No. 34* are encouraged to prepare government-wide financial statements using the full accrual basis of accounting and fund financial statements using the modified accrual basis of accounting; however, Patrick (2007) finds that, in Pennsylvania, large, urban Phase I local governments tend to prepare government-wide financial statements using the full accrual basis of accounting, Phase II local governments tend to prepare fund financial statements using the modified accrual basis of accounting, and small, rural Phase III local governments prepare fund-based reports using the cash basis of accounting. Patrick's findings suggest that in Pennsylvania a local government's size is associated with its basis of accounting. Thus, we code the governments as Phase I, Phase II, and Phase III and use this to proxy the basis of accounting.

We add the aforementioned variables (e.g., nature, type, region, and phase) to the model individually and in combination and find them to be insignificant in all cases. The four control variables do not change the tenor of the results of the original model.

CONCLUSION

Local governments provide important public services. They provide the first level of response when it comes to public services such as safety, water, sewer, streets, parks, and recreation. Local governments also play a large role in the quality of community life by

providing a wide variety of public and social services; however, they can sustain these services only if they avoid fiscal distress. Fiscal distress threatens the ability of local governments to serve the citizenry and maintain essential public functions. Fiscal distress can also decrease the credit ratings of local governments and impair the reputation of the related state governments (Honadle, 2003).

State governments can monitor local governments to prevent fiscal distress, but they have few reliable and efficient ways to do so. Making the task even more difficult is the possibility that local government officials often fail to report their fiscal problems or heed the warning signs until it is too late (Honadle, 2003). Pennsylvania is more proactive than many states in monitoring the fiscal health of its local governments, in that it has a formal process to handle fiscal distress (Kloha, Weissert & Kleine, 2005b); however, most of Pennsylvania's oversight functions deal with fiscal distress after it is identified (Honadle, 2003). Pennsylvania recently implemented a preventive program, which deems local governments "at risk" of fiscal distress, but Pennsylvania has still not begun to predict fiscal distress. The reason for this weakness in Pennsylvania's system of preventing, detecting and mitigating fiscal distress could be that Pennsylvania lacks a reliable, quantitative method for determining the likelihood of fiscal distress. Pennsylvania officials currently must sift through more than eleven qualitative variables, requiring subjective, professional judgment, rather than objective, verifiable data.

In this study, we develop a parsimonious method that can predict fiscal distress with reasonable accuracy. Our model is parsimonious because it allows state governments to predict fiscal distress using a small number of indicators. It is reliable because it can predict fiscal distress with reasonable accuracy and cost-effectiveness within certain levels of the ratios of the cost of Type I to type II errors. While our model cannot identify the underlying causes of fiscal distress, it can determine the likelihood that a local government will experience fiscal distress based on a few key indicators.

Specifically, our model indicates that as IGR increases, so does the risk of fiscal distress. This supports our hypothesis that an over-reliance on IGR could result in fiscal distress, if those funding streams dry up and local governments are unable to find alternative funding

sources. This finding also supports the possibility that local governments experiencing fiscal distress seek out state and federal loans and grants to help alleviate that distress, causing their levels of IGR to be even higher. This is seen, to some extent, in Pennsylvania's Act 47 local governments, which are the beneficiaries of state subsidies, funding, and grants to help them overcome their fiscal distress.

Our model also shows that local governments experiencing higher revenue growth are less likely to develop fiscal distress. To the extent that revenue growth mirrors population growth (recall the previously discussed correlation between population and total revenues), this finding suggests that the Pennsylvania townships experiencing rapid growth are less vulnerable to fiscal distress than the boroughs and cities experiencing out-migration. Stated another way, it seems the townships racing to develop new infrastructures and public services are coping better with the population shifts, than the boroughs and cities left with the underutilized infrastructures. While this finding in itself does not refute widely-accepted theories of land use, which posit that suburban sprawl and single-family homes put a fiscal strain on local governments, it does suggest that Pennsylvania's abandoned urban areas pose a greater fiscal challenge than those areas hit by rapid growth and suburban sprawl. This finding may have important implications for local government land use management. Additional research is needed to analyze these relationships further.

Another interesting finding is that the risk of fiscal distress decreases as administrative expenditures increase. This finding supports our hypothesis that administrative costs are more cost-effective than programmatic and debt service costs. As stated previously, federal and state governments have been increasingly shifting funded and unfunded mandates, entitlement programs, and social services upon local governments without providing the requisite funding needed to cover these costs. Local governments are often required to provide these services, even when the programs are not supported by federal or state funding. These mandates place a burden on local governments, causing those with higher administrative costs (and thus lower programmatic costs) to be less prone to fiscal distress.

Finally, our model indicates that as the use of debt increases, so does the risk of fiscal distress. This finding is expected and supports our hypothesis that debt financing exposes local governments to greater risk of fiscal distress. While Pennsylvania does have laws limiting a local government's use of debt and formal procedures requiring State government approval for many forms of long-term debt, it appears as though local governments can comply with the State debt laws and still be at risk of fiscal distress. As previously noted, Pennsylvania's debt limit laws do not cover all types of long-term financing and the limits can be increased to enable local governments to meet a wide variety of purposes. Pennsylvania State government legally imposes debt limits on its local governments, but the basis for those limits is unclear, as they do not appear to be tied to any statistically determined proportion or amount. We suggest that in the absence of other indicators, State and local government administrators consider using the information contained in this study to set statewide debt limits.

Our study focuses only on local governments in Pennsylvania, limiting the ability to generalize to other types of governments and local governments in other states; however, further research on local governments in other states using this method could test the reliability and validity of our model. Our model does establish a set of risk factors associated with fiscal distress and a method to assess whether a local government may experience fiscal distress. The results of our model also provide important insights into the likelihood of fiscal distress and strategies for mitigating fiscal distress. This information is vital to state and local government officials interested in preventing, detecting, and mitigating fiscal distress.

NOTES

1. We did not adjust the variables for inflation. Adjusting for inflation, using the Consumer Price Index (CPI), does not change the tenor of the results.

2. This switch in strategy between classifying all organizations as not fiscally distressed to classifying all of them as fiscally distressed occurs at relative cost ratios of 11.23:1 (i.e., 1 / 0.089).

REFERENCES

Advisory Commission on Intergovernmental Relations (ACIR) (1985a). *Bankruptcies, Defaults, and Other Local Government Financial Emergencies.* Washington, DC: Author.

Advisory Commission on Intergovernmental Relations (ACIR) (1985b). *The States and Distressed Communities: The Final Report.* Washington, DC: Author.

Altman, E. (1968). "Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy." *Journal of Finance, 3*: 589-609.

Ammons, D. (1995). *Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards*. Thousand Oaks, CA: Sage Publications.

Bahl, R. (1984). *Financing State and Local Governments in the 1980s.* New York: Oxford University Press.

Beaver, W. (1966). "Financial Ratios as Predictors of Failure." *Journal of Accounting Research* (Supplement): 71-111.

Beneish, M., (1999, September/October). "The Detection of Earnings Manipulation." *Financial Analysts Journal*, *55*: 24-41.

Brookings Institution (2003). *Back to Prosperity: A Competitive Agenda for Renewing Pennsylvania*. Washington, DC: Author.

Brookings Institution (2007). *Restoring Prosperity: The State Role in Revitalizing America's Older Industrial Cities*. Washington, DC: Author.

Brown, K. (1993). "The 10-Point Test of Financial Condition: Toward an Easy-to-Use Assessment Tool for Small Cities." *Government Finance Review, 9* (6): 21-27.

Brown, K. (1996). "Trends in Key Ratios Using the GFOA Financial Indicators Databases 1989-1993." *Government Finance Review, 12* (6): 30-35.

Campbell, H. (1990). "Comparative Fiscal Analysis for Counties." *Public Budgeting and Finance, 10* (2): 88-95.

Center for Rural Pennsylvania (2004). *Pockets of Rural Prosperity*. Harrisburg, PA: Author.

Center for Rural Pennsylvania (2005). *Persistent Poverty: An Issue for Some Pennsylvania Municipalities*. Harrisburg, PA: Author.

Cigler, B. (1989). *Meeting the Growing Challenges of Rural Local Governments*. Harrisburg, PA: Center for Rural Pennsylvania.

Coe, C. (1999). "Local Government Benchmarking: Lessons from Two Major Multi-Government Efforts." *Public Administration Review, 59* (2): 110-116.

Department of Community and Economic Development, Governor's Center for Local Government Services (2001). *Debt Management Handbook*. Harrisburg, PA: Author.

DeSanto, F, Emmett, R, Hall T, Horton, B, Seliga, R., Stoichess, T., Stoner, R., & Zurhellen, D. (1991). *Coping with Fiscal Distress in Pennsylvania's Local Governments: A Program Evaluation of Act 47: A Report to the Local Government Commission of the General Assembly of Pennsylvania*. State College, PA: The Pennsylvania State University.

Fuchs, E. (1992). *Mayors and Money: Fiscal Policy in New York and Chicago*. Chicago, IL: University of Chicago Press.

General Accounting Office (GAO) (1990a). *Distressed Communities: Public Services Declined in California as Budget Pressures Mounted* (GAO-HRD-90-95). Washington, DC: Author.

General Accounting Office (GAO) (1990b). *Distressed Communities: Public Services Declined in New Jersey Despite Targeted State Aid* (GAO-HRD-90-96). Washington, DC: Author.

General Accounting Office (GAO) (1991). *Distressed Communities: Capital Investments were Postponed in Texas as Local Economies Weakened* (GAO-HRD-91-14). Washington, DC: Author.

Government Accounting Standards Board (GASB) (1999). *Statement of Government Accounting Standards No. 34*. Stamford, CT: Author.

Gilson, S. (1989). "Management Turnover and Financial Distress." *Journal of Financial Economics, 25*: 241-262.

Gilson, S., John, K., & Lang, L. (1990). "Troubled Debt Restructurings: An Empirical Study of Private Reorganization of Firms in Default." *Journal of Financial Economics, 27*: 315-353.

Groves, S., Godsey, W., & Shulman, M. (1981). "Financial Indicators for Local Government." *Public Budgeting and Finance, 18* (2): 5-19.

Groves, S., & Valente, M. (1994). *Evaluating Financial Condition: A Handbook for Local Government*. Washington, DC: International City/County Management Association.

Greenlee, J., & Trussel, J. (2000). "Estimating the Financial Distress of Charitable Organizations." *Nonprofit Management and Leadership, 11*: 199-210.

Honadle, B. (1998). "Analyzing Rural Local Governments' Financial Condition: An Exploratory Application of Three Tools." *Public Budgeting and Finance, 18* (2): 69-88.

Honadle, B. (2003). "The States' Role in U.S. Local Government Financial Crises: A Theoretical Model and Results of a National Survey." *International Journal of Public Administration, 26* (13): 1431-72.

Honadle, B., Costa, J., & Cigler, B. (2004). *Fiscal Health for Local Governments: An Introduction to Concepts, Practical Analysis, and Strategies*. San Diego, CA: Elsevier.

Howell, J., & Stamm, C. (1979). *Urban Fiscal Stress: A Comparative Analysis of 66 Cities*. Lexington, MA: Lexington Books.

Jones, F. (1987). "Current Techniques in Bankruptcy Prediction." *Journal of Accounting Literature, 6*: 131-164.

John, K., Lang, L., & Netter, J. (1992). "Voluntary Restructuring of Large Firms in Response to Performance Decline." *Journal of Finance, 47*: 891-918.

Kelsey, T. W. (1998). *The Fiscal Impacts of Different Land Uses: The Pennsylvania Experience (Extension Circular 410).* State College,

PA: Department of Agricultural Economics and Rural Sociology. Cooperative Extension, The Pennsylvania State University.

Kleine, R., Kloha, P., & Weissert, C. (2003). "Monitoring Local Government Fiscal Health: Michigan's New 10-Point Scale of Fiscal Distress." *Government Finance Review, 19* (3): 18-23.

Kloha, P., Weissert, C., & Kleine, R. (2005a). "Developing and Testing a Composite Model to Predict Local Fiscal Distress." *Public Administration Review 65* (3): 313-323.

Kloha, P., Weissert, C., & Kleine, R. (2005b). "Someone to Watch over Me: State Monitoring of Local Fiscal Conditions." *American Review of Public Administration, 35* (3): 236-255.

Lewis, C., 1994. "Municipal Bankruptcy and the States: Authorization to File under Chapter 9." *Urban Affairs Quarterly 30* (1): 3-9.

Maddala, G. (1991). "Perspective on the use of Limited-Dependent and Qualitative Variables Models in Accounting Research." *Accounting Review, 66* (4): 788-807.

Municipal Finance Officers Association (MFOA) (1978). *Is Your City Heading for Financial Difficulty? A Guidebook for Small Cities and Other Governmental Units*. Chicago, IL: Author.

Patrick, P. (2007). *The Determinants of Organizational Innovativeness: The Adoption of GASB 34 in Pennsylvania Local Government*. (Doctoral Dissertation). Harrisburg, PA: The Pennsylvania State University.

Pennsylvania Economy League (1999). *Changing Patterns of Population and Wealth: As They Affect Land Use*. Harrisburg, PA: Capital Perspective.

Raman, K. (1982). "Alternative Accounting Measures as Predictors of Municipal Financial Distress." *Journal of Accounting, Auditing, and Finance, 6* (1): 44-50.

Reid, J. (1986). "Building Capacity in Rural Places: Local Views on Needs." In B. Honadle and A. Howitt (Eds.), *Perspectives on Management Capacity Building* (p. 66-83). New York: State University of New York Press.

Shields, M. (2004). *Rural Pennsylvania in the New Economy: Identifying the Causes of Growth and Developing New Opportunities.* Harrisburg, PA: Center for Rural Pennsylvania.

Stevens, J., & LaPlante, J. (1987). "Shaping State-Based Financial Policy in an Era of Change: A Policy and Research Perspective on City Size." *Policies Studies Review, 7*: 61-76.

Trussel, J. (2002). "Revisiting the Prediction of Financial Vulnerability." *Nonprofit Management and Leadership, 13*: 17-31.

Trussel, J., & Grenelee, J. (2004). "A Financial Rating System for Charitable Nonprofit Organizations." *Research in Governmental and Nonprofit Accounting, 11*: 105-127.

U.S. Congressional Budget Office (1978). *City Need and the Responsiveness of Federal Grant Programs.* Washington, DC: Author.

U.S. Department of the Treasury (1978). *Report on the Fiscal Impact of the Economic Stimulus Package on 48 Large Urban Governments.* Washington, DC: U.S. Government Printing Office.

Watson, D.J., Handley, D.M., & Hassett, W.L. (2005). "Financial Distress and Municipal Bankruptcy: The Case of Prichard, Alabama." *Journal of Public Budgeting, Accounting & Financial Management, 17* (2): 129-150.

Weinberg, M. (1984). "Budget Retrenchment in Small Cities: A Comparative Analysis of Wooster and Athens, Ohio." *Public Budgeting and Finance, 4*: 46-57.