Developing a Financial Condition

Indicator System for New York School Districts

Condition Report
Education Finance Research Consortium

William Duncombe
Bernard Jump
Center for Policy Research
Syracuse University
Syracuse, NY

Salwa Ammar
Ronald Wright
Department of Business Administration
Le Moyne College
Syracuse, NY

May 23, 2003

Developing a Financial Condition Indicator System for New York School Districts

Table of Contents

Developing a Financial Condition Indicator System for New York School Districts

Executive Summary

State governments are in midst of one of the most severe fiscal crises of the last half century. Many local governments are experiencing fiscal problems that are equally daunting. The magnitude of the fiscal challenges facing state and local governments highlights the importance of sound fiscal planning and access to key financial indicators. Without an early warning system that assesses financial condition, the extent of a government's financial problems might go undetected until they are so severe that draconian measures are required. As used in this report,

> *Financial condition of school districts is defined as the ability to finance adequate student performance over the long-run with reasonable tax burdens and without temporary disruptions of service. Adequate student performance implies students reaching the academic standards set by the New York State Board of Regents.*

The framework used for the financial condition indicator system (FCIS) developed in this study includes four components applicable to a school district: short-run financial condition; long-run financial condition; economic condition; and student performance. Short-run financial condition captures the ability of the district to pay its bills, and balance the budget without extraordinary measures. Long-run financial condition measures the capacity to finance adequate services over the long-run without onerous tax burdens and debt burdens. Economic condition is broken out as a separate category to reflect the importance that the local economy has on student needs, and on the capacity of the district to raise taxes. The fourth component, student performance, is included as a measure of service level adequacy.

The FCIS is designed to accomplish several important objectives. No single indicator or even a small set of indicators is likely to accurately identify school districts at risk of future financial crises. Thus, the FCIS incorporates 50 different measures to provide a comprehensive view of financial condition in New York school districts. Second, the FCIS is designed to be modular. One of the advantages of the FCIS is that it provides separate measures of each of the four components of financial condition as well as a number of subcomponents. Third, the FCIS was designed to reflect the judgment of financial experts in New York on what financial measures are important, and how these measures should be combined into overall assessments of financial condition.

In designing the FCIS to meet these objectives, the research team and advisory board confronted several challenges. Combining the 50 different measures becomes a challenge, because they are often measured in different units. Second, while it is desirable to tap the knowledge of experts in designing a complex evaluation system, the judgments of experts is often context dependent. In other words, how an expert evaluates

an indicator depends on context in which the judgment is being made. For example, financial experts might view low debt burdens favorably, but only if the government has made adequate capital investments.

To address these challenges we have employed a state-of-the-art evaluation tool—fuzzy rule-based systems (FRBS). To handle the many indicators and units of measures in the FCIS, FRBS converts all indicators into membership levels in three "fuzzy" sets (e.g., high, moderate, low). Drawing from fuzzy set theory in mathematics, a school district can be classified as being a member of a more than one set at the same time. For example, a district's fund balances could be classified as poor to some degree and fair to some degree. The use of fuzzy sets makes the evaluation results in a FRBS much less sensitive to small changes in measurement. The second key component of a FRBS is the use of "rule bases" to combine several measures into a composite measure of performance. Rule bases are a collection of rules about how these measures should be associated with different levels of performance. It is the use of rule bases that allows a FRBS to capture the contextual judgment of experts.

A key step in the FCIS development process involved selection by the New York State Education Department (SED) staff of a panel of experts to serve as an advisory board to our research team. The advisory board reviewed each stage of our work and offered valuable advice regarding both the framework and set of indicators for the FCIS, and the rule bases.

The results reported here should be viewed as tentative, because the system is still a prototype which requires additional field testing. Average results are presented for need/resource capacity categories, and generally fit expectations. The high need urban districts as defined by SED are in poor to fair financial condition on all the different dimensions. The financial condition of the Big 4 is particularly weak. On the other end of the spectrum, low need districts are in fair to good financial condition, due largely to strong economies and high student performance. The high need rural districts had short-run and long-run financial condition that was comparable to average need and low need districts. Despite relatively poor economic condition, many high need rural districts appear to have successfully managed finances at least up to 2001, the last year for which we have fiscal data.

The principal contribution of the FCIS is a detailed view of the components of financial condition in a district. This information could be used to identify districts facing potential short-run and long-run financial crises. To illustrate this potential, the financial condition of an anonymous district is analyzed using the results of the FCIS. The FCIS could be used to develop an early warning system that could help SED identify when a district is at risk of financial problems. SED, in conjunction with the New York State Association of School Business Officials (NYSASBO), New York State Council of State Superintendents (NYSCOSS), and New York State School Boards Association (NYSSBA), could use the FCIS as a training tool to assist districts in identifying and tracking key financial indicators. Individual districts could use the results of the FCIS to examine how their financial condition compares to districts of a similar size or

need/resource capacity category. An important feature of the FCIS is that it permits a user to peel back the layers that make up the system to see where a school district's financial condition is good and where it is in need of improvement. For example, districts at risk of a credit rating downgrade may be able to take action to correct the problems identified by the credit rating agencies.

Ultimately, the FCIS has the potential of providing a financial information system that can be used by school administrators, school boards, teachers, and concerned citizens. The system could generate user-friendly reports that explain why particular judgments were made about the district's financial condition and what actions could be taken to improve it.

Developing a Financial Condition Indicator System for New York School Districts

I. Introduction

Are most New York's school districts fiscally healthy, and what is their prognosis for the coming decade? How does the state identify school districts facing short-term and/or long-term financial problems? Do the financial problems that some New York school districts are experiencing suggest poor underlying fiscal health, poor financial decisions, or some combination of the two? Are school districts with inadequate student performance facing increased fiscal stress as the Regents' standards become fully implemented? The objective of this report is to describe a financial condition indicator system (FCIS) for school districts to help the New York State Education Department (SED) and other relevant state agencies begin to answer these questions.

Maintaining sound government financial condition is one of the pillars of the effective and efficient operation of government. Yet the financial condition of governments tends to be invisible to the public and most government managers until a financial emergency emerges. The near bankruptcy of New York City in the 1970s, for example, publicized the concept of a "structural deficit" and the improper use of debt to cover deficits. Similarly, the Orange County, California debacle less than a decade ago brought the arcane world of investing public funds to the attention of the general public.

The importance of being able to anticipate and plan for fiscal crises has been reinforced by the rapid increase in state budget gaps in the last several years. "When states developed their fiscal year 2003 budgets, they faced an aggregate budget gap of about $49.1 billion. They closed some of the gap with combinations of tax increases,

spending cuts, and the use of budget reserves, and other revenue sources." (Jenny, 2003, 5) An additional $25.7 billion gap opened up before the close of the 2003 fiscal year. States face an even larger gap for FY 2004, which has been estimated between $69 billion and $85 billion (NCSL, 2003). Thirty-three states estimate budget gaps in excess of 5 percent of spending, and 18 states face budget gaps exceeding 10 percent. Despite sizeable fund balances in FY 2000, states have rapidly exhausted these balances, and will have to make painful budget choices over the next several years.

By the time a financial emergency becomes visible, the financial problems of a government have often become so severe that draconian measures are required to maintain financial solvency: major employee layoffs and budget cuts, sharp increases in tax rates, a significant drop in the bond rating (raising interest costs), a state financial bailout (often with "strings attached"), and the use of financial gimmicks to make it to the next fiscal year. As summarized in a recent publication by the Office of the State Comptroller (2002),

> Sound fiscal health is imperative to the effective operation of municipalities in New York State. For this reason, local managers should periodically assess the financial condition of their local government. Timely financial condition analysis can provide managers with valuable information on the past, present and future state of their municipality's finances...By taking action to address weaknesses and strengthen fiscal health, local managers can better ensure that resources are available to fund the level and quality of services expected by local citizens. (p. 1)

The objectives of this report are threefold. First, a conceptual framework for organizing the different dimensions of a school district financial condition indicator system (FCIS) is presented, and the specific measures used in the FCIS for New York

school district's are discussed. In developing this framework, we will be building on similar efforts by other organizations and government financial management experts.[1] Second, the report provides an introduction to one methodology—fuzzy rule-based systems (FRBS)—for combining the disparate measures in the FCIS into an overall evaluation of financial condition. As discussed in depth later in the report, the FRBS methodology is particularly well suited for complex evaluations, where the "contextual judgment" of experts plays a crucial role.[2] The third objective is to report results of the FCIS developed for New York school districts. The FCIS should be viewed as a work in progress, or a prototype rather than a finished product.[3] Thus, the results of this system are suggestive of the findings that may emerge from a final FCIS developed for New York. Our goal is to propose a system that can serve several purposes, can be implemented with readily available data, and can draw on the knowledge of financial experts in the state.

The report is organized into five sections. After the introduction, we will provide a brief review of the literature on defining and measuring fiscal health and financial condition, which will serve as a foundation for the framework proposed in this report. We will then present in detail the financial condition indicator system proposed for New York school districts. After laying out the system, we will discuss the process and methodology used to develop a prototype system. The results of this system will then be

[1] In developing this framework, we are heavily indebted to the comprehensive treatment of this topic in Berne and Schramm (1986), Mead (2001), and Office of the State Comptroller (2002).
[2] By contextual judgment we are referring to evaluations of a particular phenomenon that varies depending on the context. For example, deficits are usually considered a detriment to fiscal health; however, temporary deficits may be appropriate when the school district has a large unreserved general fund balance and an intention to spend a portion of the fund balance.
[3] One of the changes required in the final system is to add New York City. Because New York City is such a unique case (over twenty times the size as the next largest school district), the system was developed and calibrated with more typical districts in mind.

summarized for need/resource capacity categories and regions in New York State. Financial condition results will be disaggregated into key components. We will conclude with a review of the key steps involved in designing a financial condition indicator system for New York school districts, and the potential benefits of this system as an information system for school district officials and the public.

II. Defining and Measuring Financial Condition

How does one go about measuring the financial condition of local governments, such as school districts? As stated by Mead (2001),

> The term "financial condition" means different things to different people. Some consider it to be a school district's financial standing at a given point in time. Some think it is a district's ability to make ends meet. Others look at it as a district's capacity to raise revenue. (p. 59)

Since financial condition is in the eye of the beholder, we begin this report by discussing some of the most common definitions of this term, and objectives in its measurement. The measurement of financial performance of governments typically varies on two dimensions—time frame and government discretion. First, measures can be designed to capture the possibility of a fiscal crisis in the next year, or to provide visibility on potential future fiscal crisis over the next several years. Second, measures can reflect underlying conditions outside government control (at least in the short run) or capture the effects of budgeting and other financial decisions of government. The term "fiscal health" typically refers to the underlying capacity of a school district to finance adequate student performance with a reasonable local tax rate. The concept of financial condition carries this definition a step farther by examining the results from the actual financial decisions made by a school district, such as debt and tax burdens, and fund balances.

Liquidity and Budget Deficits

Governments facing an immediate financial crisis often have liquidity problems, and/or a large budget deficit. The New York Comptroller (2002) as part of its Fiscal Awareness Strategy Team (FAST) system for municipal governments has developed

indicators of both "cash solvency" and "budgetary solvency." Cash solvency or liquidity is the ability of the government to pay its bills over the next fiscal year. Measures used to determine liquidity tend to be ratios involving current assets, especially cash, relative to operating expenditures or current liabilities.

Besides liquidity problems, a government can end the year with a budget gap that may require extraordinary measures to fill. Budget deficits can be an indication of a long-term structural deficit (expenditures growing faster than revenues), or a temporary problem (e.g., due to a natural disaster) that leads to unusually low revenues or high expenditures. One of the most commonly employed indicators of fiscal health is a measure of an operating deficit or general fund deficit (Bahl and Duncombe, 1991). A deficit combined with very low fund balances, particularly unreserved general fund balances, could indicate a pending budget crisis (Dearborn, 1988). While providing an incomplete picture of a government's finances, the general fund in most general-purpose governments is the main focus of budget deliberations. An analysis by Steven Gold (1986) of balances in the General Fund compared to all major funds for 1979 to 1983 found, "...that it is best to focus primary attention on the General Fund if one is concerned about changes in state fiscal conditions. General Fund balances fluctuate much more than balances in most other funds." (p. 596)

Underlying Fiscal Health

While surplus and balance measures can be valuable fiscal indicators, they can also disguise a government's underlying fiscal health. As discussed by Bahl (1984), an operating surplus,

> ...could mean a buoyant revenue system and truly indicate fiscal health. On the other hand, the excess could reflect no more than a temporary embarrassment of riches resulting from service cutbacks, reductions in capital expenditures and employment, deferred compensation, and so on. (p. 49)

In other words, information on budgetary surpluses or deficits does not necessarily tell us whether a jurisdiction has the financial capacity to provide an adequate level of public services in the future.[4]

For this reason there has been significant research on the "underlying" or "structural" fiscal health of a government. This research generally has divided the analysis of fiscal health or position into two parts; the fiscal capacity of the community and its expenditure needs.[5] Fiscal capacity measures attempt to estimate the potential revenue that a community could raise using average tax rates or burdens on its citizens. Expenditure needs indicate the level of expenditures required to provide a standard package of public services of average quality. As defined by Ladd and Yinger (1989), " 'standardized fiscal health' is the difference between the revenue-raising or fiscal capacity of a community and 'standardized expenditure need'." (p. 8)

Determining fiscal capacity is a standard part of developing state operating aid formulas for schools. Fiscal capacity measures for a school district typically reflect the underlying property wealth and/or taxable income in the district. Ladd and Yinger (1989) developed one of the most comprehensive measures of fiscal capacity, which is based on income augmented by an estimate of the share of taxes that are exported onto nonresidents.

---

[4]For a good discussion of the difference between "budgetary" fiscal distress and "structural" fiscal distress, see Bradbury (1984).

[5]For several good discussions of the theoretical basis of such measures, see Ladd and Yinger (1989); and Musgrave and Musgrave (1989), pp. 479-480.

Ideally, the second part of a fiscal health measure would be an estimate of the cost of producing an acceptable level of student performance. This measure should capture cost differences due to both higher resource prices (e.g., teachers' salaries), and the additional resources required in some districts to raise student performance to some area or statewide average level. Measurement of resource costs is gaining increasing attention at the national level (Chambers, 1997; Fowler and Monk, 2001), and there is a growing body of research using cost models to estimate comprehensive cost indices and the cost of adequate services (Duncombe and Yinger, 1999, Reschovsky and Imazeki, 1997).[6]

Once capacity and cost are both expressed as indices, then the measure of underlying fiscal health is simply the ratio of the capacity index over the cost index. Values greater than one would indicate above average fiscal health.

Ability to Repay Debt (Bond Ratings)

Another perspective on the fiscal health of state and local governments is that of the credit rating agencies. Credit ratings agencies focus on the ability of a government to repay its debt obligations. Such an assessment encompasses an evaluation of the present and projected future economic health of the jurisdiction, and the impact of past and present financial decisions (including financial management practices) of the government. Are government officials willing to make the hard decisions to balance the budget, and most importantly to avoid future financial emergencies? As discussed in one publication by Moody's Investors Service, "Credit analysis is the assessment of the

[6] Robert Refuse (1986) of the ACIR developed estimates of expenditure needs using workload measures. His measures of "representative expenditures" closely parallel the representative tax system developed by the ACIR. Essentially, he has collected information on the recipients of different public services and used this to construct workload indexes by service and state. He then divides the total national expenditures for each public service by the total workload, to develop a "unit-cost" measure. The final step is to multiply this average unit cost by the actual workloads in each state. The result is an estimate of the expenditures required to provide public services of average quality in each state.

relative strengths and weaknesses of those factors, which have a bearing on the likely repayment of debt obligations. Ultimately, the repayment of debt depends on both the borrower's ability and willingness to make repayment." (Moody's, 1989, 22).

The rating agencies themselves have been fairly vague about the key information that influences rating decisions. Fitch Ratings, Moody's Investors Service, and Standard & Poor's all indicate that economic, fiscal, debt, and administrative factors are considered, and they identify a core of ten to twenty variables that receive attention.[7] However, as indicated by Lovescek and Crowley (1996), "Rating agencies have never publicly revealed either what variables are, on average, the prime determinants of bond ratings, or the weight to assign each variable." (p. 486)

Four broad factors are often used in assessments of *economic health*: 1) economic growth relative to state and national trends; 2) average wealth and income of taxpayers; 3) changing composition of the population and structure of employment; and 4) the diversification of the economy and tax base (Moody's, 1999). *Debt ratios* are a major consideration in developing credit ratings since they indicate the level of a government's present debt burden. Two common debt ratios are outstanding debt divided by property values and debt service divided by revenue or expenditure.[8] The rating agencies also consider the speed of repayment of debt when evaluating debt burdens.

The most frequently cited *financial factors* in credit analyses are general fund balances. In particular, rating agencies emphasize the unreserved, general fund balance, since by definition it is not reserved for another purpose. Rainy day funds, which are

[7] Fitch (2000a), Moody's Investors Service (1999), and Standard & Poor's (2000).
[8] Typically, the debt measure used in the ratios is net debt, which is defined as debt that is supported by general taxes. Net debt is comprised of bonded debt minus any sinking funds to pay off the debt, and

specifically designed to support spending in financial emergencies, are less frequently cited. It is also important to know if the government has a structural deficit, since this is an indicator of future negative fund balances. "*Management* [emphasis added] has always been viewed as a crucial component of credit analysis …However, Fitch has come to the conclusion that management practices are even more important to predicting favorable credit performance than had been appreciated in the past. In future rating assignments, Fitch will place greater and more specific weight on management practices…" (Fitch, 2000b, p. 1) Management variables are less frequently cited by rating agencies, but property tax collection rates and accounting practices are mentioned occasionally in credit reports.

Combination Measures of Financial Condition

In contrast to conventional credit analysis, with its focus largely on a jurisdiction's capacity to service its debt, there have been some efforts to take a broader view of financial condition.

Berne and Schramm (1986) provide one of the most comprehensive reviews of the process of measuring financial condition. "Financial condition goes by many names—financial health, solvency, strength, stress—all of which can be defined as the probability that a government will meet its financial obligations to creditors, consumers, employees, taxpayers, suppliers, constituencies..." (p. 68) They develop a framework for measuring financial condition that compares expenditure pressures (from present service demands, and past commitments) to available resources (from either internal reserves or external revenues and grants). Short-term measures of liquidity, fund balances, and

---

without any self-supporting debt (generally revenue bonds). The rating agencies also look at the debt ratios for overlapping governments to determine the total debt burden faced by a community's residents.

budget surpluses/deficits are reflected in past expenditure commitments and available internal resources. Current expenditure pressures and available external resources include measures of the long-term fiscal health of the government and the impact of past financial decisions.

More recently, Mead (2001) has addressed school district financial condition analysis. He defines financial condition as "the ability of a school district to meet its obligations as they come due and to finance the services its constituency requires." (p. 59) Among the measures he suggests for use in assessing a school district's financial condition are liquidity, financial position, solvency, fiscal capacity, risk and exposure, and economic base. He does not, however, provide an analytical framework for combining the various financial condition measures.

The Office of the State Comptroller (2002) in New York has developed a financial condition measurement system for local governments in New York called the Fiscal Awareness Strategy Team (FAST) system. FAST incorporates the different time dimensions of financial condition from short-term measures of liquidity ("cash solvency") and budget problems ("budgetary solvency"), to management of long term assets and liabilities ("long run solvency,"), to cuts in essential services ("service level solvency"). (p. 2)

One of the unique aspects of FAST is the inclusion of measures of service level solvency as an indicator of the long-term effects of poor fiscal condition on "essential quality of life services." (p. 7) Measures of service quality or outcomes have not generally been part of financial condition indicator systems. With the emergence of standards and high stakes testing in education, student performance in districts may also

influence long-term financial condition. For example, the financial outlook for a district currently in adequate financial condition may appear much less favorable if student performance in the district is well below state standards. Continued poor student performance may lead to an exodus of families from the district, for example, with deleterious effects on the district's capacity to support even its current level of spending. Attempts to significantly improve student performance in this district may require sizeable increases in district spending, which may also jeopardize the long-run financial condition of the district.

III. Framework for Financial Condition Indicator System

No single indicator or even a small set of indicators is likely to accurately identify school districts at risk of future financial crises. The principal objective of this project is to build on the research discussed above by developing a broad-based system to measure the financial condition of school districts in New York. By financial condition we adopt the definition of the New York Office of the State Comptroller (2002).

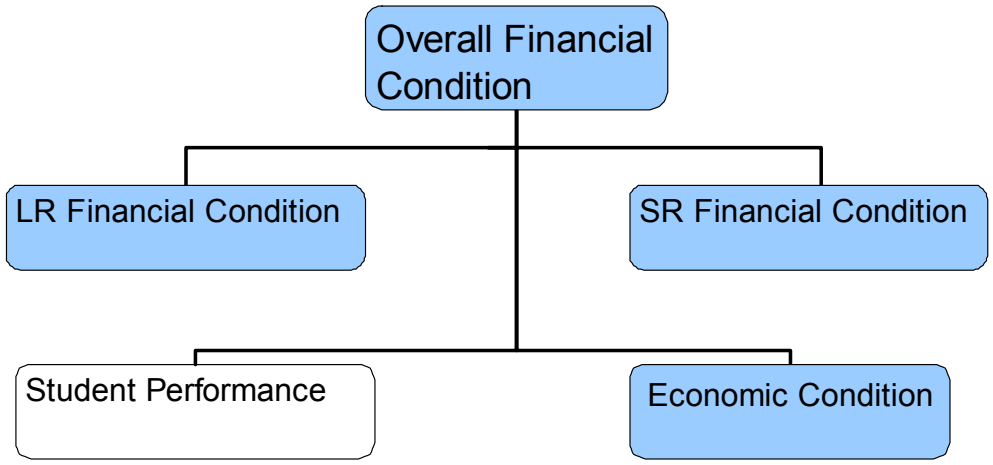
> Financial condition may be defined as a local government's ability to finance services on a continuing basis. This ability involves maintaining adequate service levels while surviving economic disruptions, being able to identify and adjust to long-term changes and anticipating future problems. (p. 1)

Building on this definition, ***financial condition of school districts is defined as the ability to finance adequate student performance over the long-run with reasonable tax burdens and without temporary disruptions of service***. Adequate student performance implies students reaching the academic standards set by the New York State Board of Regents.

The framework used for the financial condition indicator system developed in this study includes four components: short-run financial condition; long-run financial condition; economic condition; and student performance (Figure 1). Short-run financial condition captures the ability of the district to pay its bills, and balance the budget without extraordinary measures. Long-run financial condition measures the capacity to finance adequate services over the long-run without onerous tax burdens and debt burdens. Economic condition is broken out as a separate category to reflect the

importance that the local economy has on the capacity of the district to raise taxes, and the student needs affecting school performance. The fourth component—student performance—is not typically found in financial condition indicator systems. It is included to capture whether students are meeting state standards. A district with both good short-run and long-run financial condition, but with many students not meeting state academic standards, may face considerable long-run financial risks as it tries to bring its students up to standards.

Figure 1: Framework for Financial Condition Indicator System for New York School Districts



Note: Composite measures (rule bases) are shaded.

One of the advantages of the approach we propose in this report is that measures can be developed for each of these categories in addition to a measure of overall financial condition. For example, a measure of short-run financial condition can be used to identify school districts in immediate risk of a financial crisis. A measure of long-run financial performance emulates the characteristics considered by bond rating agencies, and could be used to help school districts predict their future bond rating. Districts at risk of credit rating downgrades might be able to take action to correct the problems that are

leading to the threat of a downgrade. The composite measure of economic condition developed in this report can be used by the State Education Department (SED) to classify districts on their economic strength, and can be used as a benchmark in examining the equity implications of school finance policies. Each of the shaded boxes in Figure 1 are composite measures, which combine a number of factors using the concept of a "rule base" discussed in section IV.

The following is a brief discussion of some of the indicators that have been included in the financial condition indicator system. In selecting these indicators the object was to find measures that are reliable, and are published on a regular basis in government documents.[9] In developing these indicators we have used the most recently available financial data on school districts, which tends to lag several years. Because fiscal year 2001 was the last year of financial data available, districts are still operating under pre-GASB 34 accounting rules. When GASB 34 is fully implemented, the FCIS should be modified to reflect some of the potentially valuable new information available in GASB 34 financial statements.[10]

---

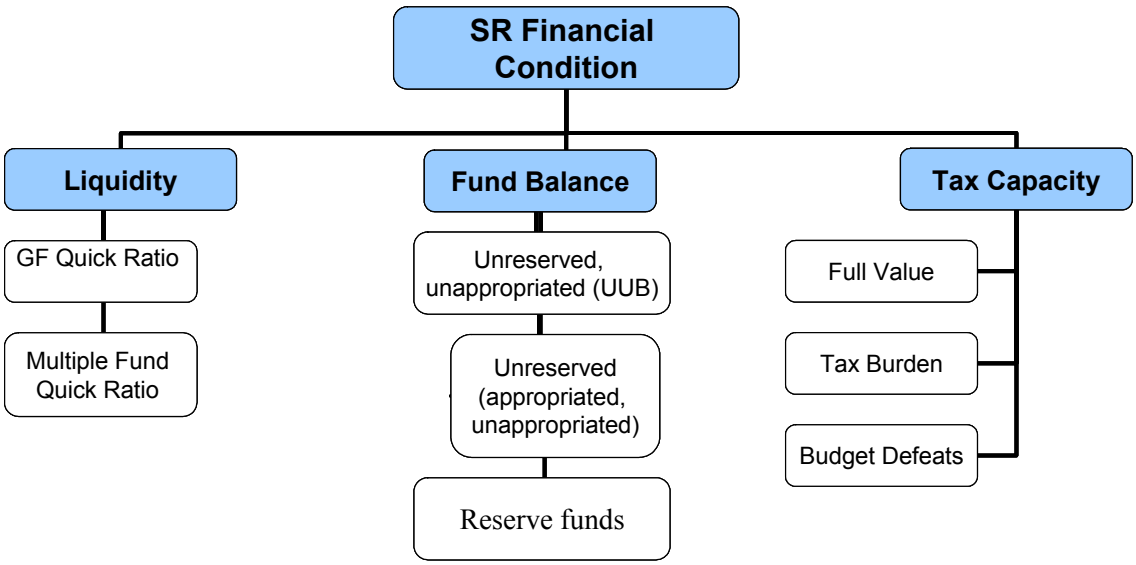
[9] One exception to the use of annual data was the decennial census, which was used for estimates of the population. While there are some inter-census estimates of population, they were not deemed reliable enough to be used in conjunction with the census population counts.

[10]The Government Accounting Standards Board (GASB) after over a decade of deliberation, passed in June of 1999 one of the most far reaching changes in government accounting and financial reporting—GASB 34. All districts are expected to adopt the new accounting standards no later than in fiscal year ending after June 15, 2004. The change is significant and it is complex. Some of the objectives of GASB 34 include: to make financial statements easier to read for public officials and the public; to provide visibility on the full government operation, including long-term commitments of government, and to provide information that can be used in cost analysis and assessing government efficiency. Some of the key changes associated with GASB 34 include: 1) management discussion and analysis section, which is meant to provide a user-friendly introduction and summary to the comprehensive annual financial report (CAFR); 2) government-wide financial reporting using an accrual basis of accounting. Even for "governmental funds," which are normally recorded using modified accrual accounting, the financial data is to be recast on accrual basis so that a picture of the financial position of the whole government can be determined; 3) government-wide financial reports will record for the first time long-term assets (equipment, land, building, other infrastructure), and liabilities (long-term debt); 4) expenses rather than expenditures will be calculated for the consolidated financial statements, which include consumption of capital assets (depreciation); and 5) new financial statements will be prepared—Statement of Net Assets, and Statement of Activities, which

Short-Run Financial Condition

The short-run measure of financial condition is designed to capture the ability of a district to finance present service levels without significant disruption even during economic downturns. Specifically, the measures used in the FCIS are organized into three components: liquidity, fund balances and tax capacity (Figure 2). Rule bases, which are a method for combining different measures are discussed in the next section.

Figure 2: Short-Run Financial Condition Framework



Note: Composite measures (rule bases) are shaded.

The financial information used in the financial condition indicator system generally is derived from unaudited annual financial statements submitted by school districts, commonly labeled as ST3 reports.[11] The information in the ST3 reports is summarized in two publications: *Special Report on Municipal Affairs* published by the

capture the accounting changes. For discussions of GASB 34 see Finkler (2001), Chapter 11; GASB (2000), and Association of School Business Officials International (2000).

[11] Districts are also required to submit audited financial statements to SED. While these reports are presumably more accurate, they are less detailed, and are not available in electronic form.

New York State Office of the Comptroller, and the *Fiscal Profile* published by SED. Summary numbers from these reports have also been used for some measures in the FCIS.

Liquidity: Liquidity measures are used to indicate the capacity of a district to meet cash flow obligations, i.e., to pay their bills during the present fiscal year. One standard measure of liquidity is the quick ratio, which is the ratio of very liquid assets, such as cash, to current liabilities. A common rule-of-thumb for the quick ratio is one; that is, liquid current assets should cover all current liabilities. For this system we use two versions of the quick ratio: the general fund quick ratio, and the quick ratio for the combination of the general fund, special aid fund and food service fund (Table 1). Included among general fund assets in our measure of the quick ratio are cash, short-term

Table 1. Short-Run Financial Condition Measures

Factors	Measure	Source
Liquidity:		
General fund quick ratio (assets including cash, receivables, ST investments divided by current liabilities)	2001 average (1998-2000)	ST3
Multiple funds quick ratio (general fund, special aid fund, food service fund)	2001	ST3
Fund balances as a percent of total expenditures: **(general fund, special aid fund, food service fund)**		
Unreserved, unappropriated fund balance (UUB)	average (1999-2001)	ST3
Unreserved fund balance (appropriated + unappropriated)	2001 trend from 1997-2001 (weights later years heavier)	ST3
Reserved fund balance	2001 or average (1999-2001)[1]	ST3
Tax capacity measures:		
Market property values per pupil in 2001	2001	NYComp
Property tax burden (property taxes/ property values)	2001 trend from 1998-2001	ST3/NYComp
Number of budget defeats in last five years	1997-2001	SED

Source: "ST3"=annual financial statements submitted by school districts, "SED"= NY State Education Department, "NYComp"=New York State Office of the State Comptroller.

[1]Minimum of the average from 1999 to 2001 or the values in 2001.

receivables and short-term investments. For the other two funds only cash is used to measure liquid assets. The special aid and food service funds are included, because they can include substantial assets and liabilities associated with instructional programs and auxiliary services.

Fund balances: To determine whether the government is likely to face a budget crisis in the current year or in the next fiscal year, we need to look at both levels and trends in fund balances. The total fund balance is defined simply as the difference between assets and liabilities. Some portion of the total fund balance can be reserved for other uses such as encumbrances, repairs, debt, and Worker's Compensation.[12] In general, we would not expect that reserve funds would be readily available to use to cope with a budget crisis. However, it is possible that districts use some reserves on a temporary basis. The remaining unreserved portion of the fund balance is divided between that portion which is appropriated for next year's budget, and the unappropriated fund balance. The rating agencies have used as a guideline a general fund balance (of which most is to be unreserved) of 5 percent to 10 percent in evaluating the credit-worthiness of governments (Fitch, 2000a, p. 6; Moody's, 1999, p. 6). However, the appropriate size of a fund balance will vary across governments based on a number of financial factors. The unreserved, unappropriated balance (UUB) is the portion of the fund balance, which is readily available for use for financial emergencies. New York school districts are restricted by state law to a level of UUB that is no more than 2 percent of the planned operating budget (§1318 of the Real Property Tax Law). If the balance

[12] The ST3 form in 2001 included 16 categories of reserves. For a summary of the different reserve funds available to school districts, and restrictions on their use, see information published on the SED website: http://www.emsc.nysed.gov/mgtserv/Reserve%20Funds.PDF

would otherwise exceed the 2 percent limit, districts can instead "appropriate" a portion of the unreserved balance (the UAB) to reduce property tax payments in the next year.

Our aim in developing the fund balance measures is to capture both the level and trend of the different components of the fund balance relative to total expenditures (which equals the sum of the general fund, special aid fund, and food service fund). The UUB is measured using a three-year average (1999-2001) to capture recent levels of reserves, but to avoid a measure overly sensitive to temporary fluctuations in fund balances. The total unreserved fund balance (UUB+UAB) is measured both in absolute terms in 2001, and as a trend from 1997-2001. To calculate the trend a weighted average of the annual rate of change is used with weights of 2 (1998), 3 (1999), 4 (2000), 5 (2001) with later years weighted heavier. This trend is a proxy for changes in the operating surplus (or deficit) over these years.[13] Finally, to account for the size of reserve funds, the minimum of the 2001 reserves or average from 1999-2001 is also included.

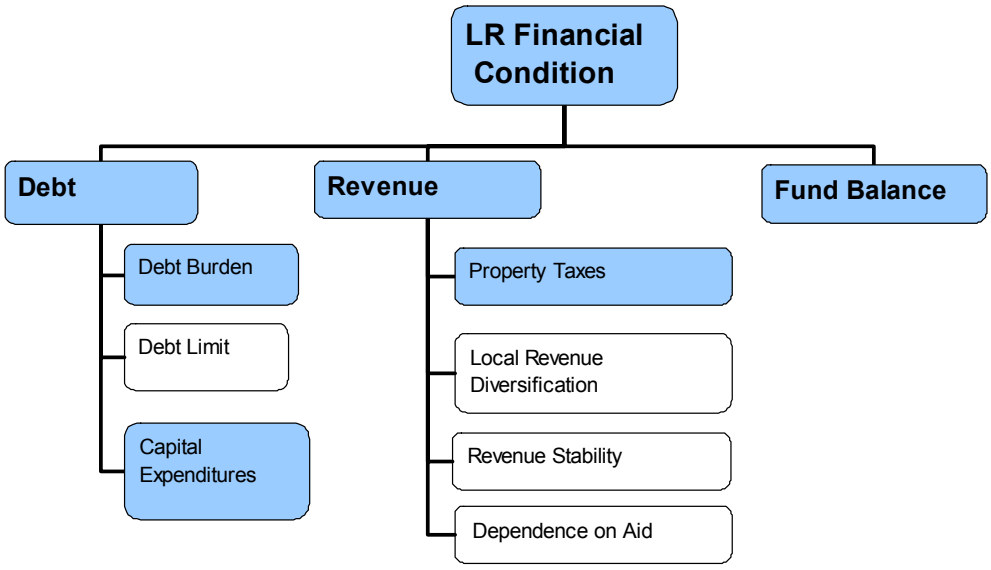
Tax capacity: Besides access to fund balances as a financial cushion against emergencies, the ability of a district to maintain service levels in the short-run depends on its tax capacity. Districts with significant property wealth per pupil, relatively low tax burdens, and a history of supporting budget referenda may be able to tax themselves out of a financial emergency. We have included measures of the market value of property wealth in 2001, property tax burdens in 2001 (and 3-year trend), and number of budget defeats in last five years.

[13] By definition, the total surplus or deficit in a year (total revenue – total expenditures) is equal to the change in the total fund balance. After examining fund balance changes in a number of districts, it appeared that they were often volatile due to temporary additions or deletions from the reserve funds. These changes do not appear to reflect the underlying structural surplus or deficit as well as changes in the unreserved fund balance.

Long-run Financial Condition

Evaluation of the long-run financial condition of government moves beyond measures of immediate financial condition to debt and financial measures reflecting the cumulative impact of financial decisions made by the government. Credit rating agencies have also focused on the long-run financial condition of a government as part of assessing the credit-worthiness of the government. All three agencies claim to use four broad categories of factors to determine ratings; economic, debt, financial and administrative (Fitch, 2000a; Moody's, 1999; Standard & Poor's, 2000). We include debt and financial factors under the long-run financial condition category, while economic condition measures are handled separately. Long-run financial condition is divided into three components: fund balances, debt and capital, and revenue (Figure 3). Fund balance measures are discussed under short-run financial condition.

Figure 3: Long-Run Financial Condition Framework



Note: Composite measures (rule bases) are shaded.

Debt: One of the most important long-term commitments that a school district can make is to invest in capital facilities financed with long-term debt. Typically, school districts will issue general obligation (GO) tax-exempt bonds backed by the full taxing power of the school district ("full faith and credit"). Because the key concern of credit-rating agencies is whether governments will pay off their debts on time, the relative magnitude of existing debt commitments is a key factor that is evaluated in determining a credit rating.

Table 2. Long-Run Financial Condition Measures

Factors	Measure	Source
Debt Measures:		
Debt Ratios:		
Long-term debt outstanding relative to property values	2001	NY Comp
Long-term debt multiplied by building aid ratio relative to property values	2001	NY Comp, SED
Adjusted debt service as percent of total expenditures	2001	NY Comp
Percent of debt paid off over 10 years	1992-2001	NY Comp
Debt limit: Percent of debt limit used	2001	NY Comp, SED
Capital spending per pupil adjusted for regional cost differences and inflation.	average (1999-2001)	NY Comp, SED
	average (1991-2001)	NY Comp, SED
Revenues:		
Property taxes:		
Tax burden:		
Property taxes relative to property values	2001	NY Comp
Property taxes relative to income	2000	NY Comp, SED
Property values per pupil	2001	NY Comp
Income (AGI) per pupil	2000	SED
Trend in tax burden relative to property values	1996-2001	NY Comp
Assessment ratio (assessed value/full value)	2001	NY Comp
Budget referendum defeats in last 5 years	1997-2001	SED
Local revenue diversification: property tax as percent of total local revenue	average (1999-2001)	NY Comp
Revenue stability: average variation around the regression line	1991-2001	NY Comp
Aid dependency: state aid and federal aid as percent of total revenue	average (1999-2001)	NY Comp

Source: "SED"= NY State Education Department, and "NYComp" = New York Office of the State Comptroller.

Long-term debt outstanding relative to the market value of taxable property within the school district is a common debt ratio considered in the credit rating process (Table 2).[14] Because New York provides generous Building Aid to support debt service on capital spending, we include another measure, which adjusts this debt ratio to reflect the local share of financing for capital facilities.[15] Another common debt ratio is total debt service as a percent of total spending, which is also adjusted by the Building Aid ratio. Finally, rating agencies look at the "payout rate," which is often defined as the percent of debt paid off in a ten-year period. Rating agencies use rough guidelines to define what might be considered debt burdens that are too high. Total debt outstanding as a percent of market value "above 6% trends toward high, with 10% a level above which affordability questions are raised." (Fitch, 2000a, 3) For school districts a debt service ratio "as high as 15% can still be considered in the average range. Concern over a high debt service level may be mitigated to the extent that amortization is faster than average." (Fitch, 2000a, 5) A payout rate of 50% (half of the debt is paid off in ten years) is typically considered an adequate rate.

The level of debt burdens has to be balanced against several factors. First, what is the level of capital spending in the district? If the district has high debt burdens but also

[14] The rating agencies emphasize the concept of net debt, which is debt that is supported by general taxes. Net debt is comprised of bonded debt minus any sinking funds to pay off the debt, and without any self-supporting debt (generally revenue bonds). The rating agencies also look at the debt ratios for overlapping governments to determine the total debt burden faced by a city's residents (Fitch, 2000a). The concept of net debt was the same as overall debt for school districts since all debt was back by the "full faith and credit" of the school district. It is not easy to calculate the overlapping debt for many school districts, because they cross town and county boundaries.

[15] The Building Aid program is a matching grant, where the Building Aid ratio is the state share of financing. The Building Aid ratio included Reorganization Building Aid for those reorganizing districts. To calculate the adjusted debt, the debt outstanding in 1982 was first multiplied by one minus the Building Aid ratio. For each year after this the new debt issued was multiplied by one minus the Building Aid ratio. For debt retired in a year, we generally assumed that the building aid ratio was the average of building aid ratios from 1982 until that year. The final calculation of debt outstanding was the sum of 80 percent multiplied by the adjusted debt outstanding , and 20 percent multiplied by the actual debt outstanding.

has a high rate of capital spending, this is considered a much more favorable picture than a district that has high debt burdens but relatively low capital spending. Likewise, low debt burdens may not be viewed as positives if they indicate that the district has been deferring capital spending, where necessary capital spending has been deferred. It is quite possible that the district will have to significantly increase capital spending and debt burdens in the future. To measure capital spending we first adjusted per pupil capital spending for inflation by dividing it by the consumer price index for urban consumers (CPI-U). To account for cost differences across New York (especially between upstate and downstate), inflation-adjusted capital spending per pupil was then divided by a regional construction cost index developed by SED. To capture both recent spending levels and long-term spending we included a 3-year average and an 11-year average as indicators. New York school districts are constrained by law on the level of long-term debt they can issue. Debt limits can serve as a constraint for districts trying to make capital investments. Because the debt limit varies by type of district, the percent of the debt limit used was calculated differently depending on the class of the district.[16]

Revenue: Besides measures of debt, another set of factors which can affect long-run financial condition are related to revenue (Table 2). Property taxes remain the major source of revenue for most school districts, and property tax burdens are often a source of political conflict and equity concerns. In calculating property tax burdens, we compare

[16] For suburbs and rural districts, we divided the adjusted total debt outstanding by the debt limit. These districts are able to deduct building aid from the total debt used to calculate the limit. State aid is assumed to be directly related to the aid ratio for a district. For small city districts, which are not able to deduct aid from total debt in calculating the limit, we divided total debt outstanding by the debt limit. For the Big 4 cities data on school district debt limits is not available, because all debt is issued by the city government as a whole., and the debt limit applies to all city services. To approximate the percent of the debt limit used in these large cities the five year average of full property values is multiplied by 6%. (The total debt limit for all city debt is 9% of the 5-year average of property values, and we assumed that two-thirds of the total debt issued by a city was used for public schools.)

property taxes to either the full market value of property or to adjusted gross income (AGI). Property values are the primary local tax base, but ultimately all taxes on residents have to be paid out of their income. Property tax burdens should be considered in the context of the underlying fiscal capacity of the district. For two districts with the same property tax burdens, the district with the greater wealth or income will generally have greater capacity to raise taxes. In addition to the current level of property tax burdens, we also look at the five year trend in tax burdens.[17] Factors that may be related to the ability of the district to raise taxes in the future include the district's history in successfully passing budget referenda, and how well administered the property tax is. Poorly administered property taxes are likely to result in significant horizontal inequity within the district as similar houses are assessed at different rates. To measure property tax administration we include the ratio of the assessed value over market value of property, commonly called the assessment ratio.

Other revenue measures included in long-run financial condition are revenue diversification and stability. In general, we might expect that a school district that was less reliant on property taxes for local revenue would have more revenue choices in deciding how to balance the budget. Access to a local sales tax, for example would generally provide a district with a faster growing, but less stable sources of revenue. While diversification of local revenue sources might be viewed as a positive factor, heavy dependence on state aid could make a district vulnerable to large decreases in state aid. During economic downturns aid dependent districts may be faced with large losses of state revenue, and potentially large budget cuts or property tax increases. To calculate

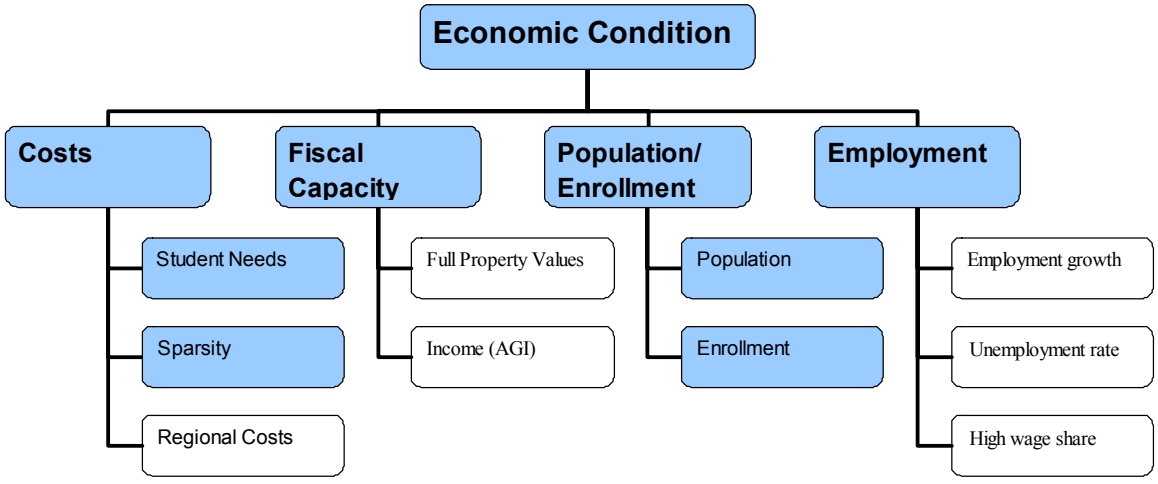
[17] The latest year of data at the time the system was developed was 2001 for full value and 2000 for income.

revenue stability we first estimate a simple trend line for total revenue per pupil from 1991 to 2001. The ratio of the standard error of estimate (average variation around the trend line) is divided by the district average to measure revenue stability. For example, assume that revenue in a district varied on average by $500 per pupil around the trend line for district revenue, and that average district revenue per pupil from 1991 to 2001 was $5000. Thus, district revenue would vary by 10% ($500/$5,000) on average around the trend line.

Economic Condition

Even a district with strong financial management may have difficulty providing adequate services at reasonable tax rates if the district experiences significant declines in its tax base or increases in student needs and other cost factors. We account for four broad categories of economic measures in this system: 1) costs; 2) fiscal capacity; 3) population and enrollment; and 4) employment (Figure 4).

Figure 4: Long-Run Financial Condition Framework



Note: Composite measures (rule bases) are shaded.

Table 3. Economic Condition Measures

Factors	Measure	Source
Cost Factors:		
Student needs:		
Share of K6 students getting free lunch	average (1999-2001)	SED
Share of K12 students classified as limited English proficient	average (1999-2001)	SED
Share of K12 students classified as high cost special needs	average (1999-2001)	SED
Regional cost index	1998	SED
Sparsity:		
Pupils per squre mile	2001	SED
Districts with population below 500 students	2001	SED
Fiscal capacity:		
Income (AGI) per pupil	2000	SED
	trend (1995-2000)	
Market value of property per pupil	2001	SED
	trend (1996-2001)	
Population/Enrollment:		
Population growth	1990-2000	Census
Pupils per capita	2000	Census/SED
	trend (1990-2000)	
Enrollment:		
Growth	1991-2001	SED
	1996-2001	SED
Stability: average variation around the regression line	1991-2001 and 1996-2001	SED
Employment (county-level):		
Employment growth rate	1996-2000	NYDOL
	2000-2002	NYDOL
Unemployment rates	average (2000-2002)	NYDOL
High wage employment share (manufacturing, TPU, FIRE)	average (1998-2000)	NYDOL

Source: "Census"=U.S. Bureau of Census, "SED"= NY State Education Department, "NYDOL"=New York Dept. of Labor.

Cost: Factors outside a district's control that can raise the cost of providing services include resource prices, the proportion of a district's children living in poverty or requiring special services, and the sparsity of the district (Duncombe, 2002). Students living in households in poverty or where English is not the primary language often face greater difficulty achieving in school. Student poverty was measured by the share of K6 students receiving free lunch as part of the National School Lunch Program administered by the U.S. Department of Agriculture. To qualify for the program a student's family

must have an income below 130 percent of the federal poverty line. To control for possible volatility in this measure we use a 3-year average for K6 students (Table 3). The percent of K12 students classified as having limited English proficiency (LEP) is used as the measure of students with language needs. Finally, we included high cost special needs children as a percent of all students to reflect the potential additional costs that these children may represent for a school district.[18]

Other cost factors affecting school districts include the cost of doing business and effects of small scale. Certain parts of the state have to pay more to hire teachers and other staff, and to construct new facilities. SED has calculated a regional cost index based on relative salaries in 1998 of 77 different private sector service occupations, which could be viewed as alternative occupations for teachers. A relative salary index is calculated for 10 labor market areas in New York (SED, 2000). Research on costs of education has determined that small school districts face higher costs per pupil to reach the same student performance standard (Andrews, Duncombe and Yinger, 2002). To capture the cost effects of sparsity, we include a measure of pupil density (pupils per square mile) and enrollment.

Fiscal capacity: The ability of a district to raise taxes, commonly called fiscal capacity, is directly related to the size of the tax base available to a district. Given that the property tax is the principal local revenue source, market value of property per pupil is the most direct measure of the base. We measure the level of property wealth in 2001, and the trend in property values in the last five years. Ultimately, all taxes falling on

[18] Students classified as "high cost," are defined as students whose special education costs "the lesser of: 1) $10,000, or 2) four times the 1998-99 approved operating expense per pupil without limits." (State Aid Unit, 2000)

local residents have to be paid out of income. Thus, property wealthy but income poor residents (such as some elder households) may be hesitant to support property tax increases despite their property wealth. To capture the income of residents we used the level of adjusted gross income (AGI) per pupil in 2000 (last year available) and the five-year trend.

Other economic measures: While measures of costs and fiscal capacity represent the immediate impact of the economy on the district, changes in other economic measures may be useful in forecasting the future direction of the economy (Table 3). For example, population and enrollment growth rates are often used in projecting enrollment in the future. Decreases over an extended period of time in enrollment may indicate a long-term pattern of decline in the size of the district. While both costs and revenues will decline, the declines in costs are likely to be slower, because of the difficulty of proportionally reducing administrative costs and facility costs. However, the use of save-harmless provisions for distribution of state aid should slow the decline in revenue. If enrollment declines are accompanied by increases in the enrollment/population ratio and in the percent of high need students, the district may be faced with a structural deficit in the future. Enrollment instability can create difficulty with fiscal planning and personnel planning, and may lead to increases in costs.

The most common indicators of economic activity used in economic base studies are changes in the growth rate and composition of employment (Bahl and Duncombe, 1991). Ideally, employment estimates would be at the school district level, given the residency based nature of educational services. Unfortunately, with the exception of the decennial census, the county is the lowest geographic level of reporting for employment.

We have included several county employment measures in the analysis to provide a picture of the broader county economy, however, the employment picture within the county could vary substantially. Overall employment estimates have been included for the economic expansion of the late 1990s (1996-2000), and the recent decline (2000-2002), and average unemployment rates for the last three years (2000-2002). To capture the structure of the economy, we have included the share of employment (average for 1998-2000) in high wage employment sectors—manufacturing, transportation and public utilities (TPU), and finance, insurance, and real estate (FIRE).

Service Level Adequacy

While measures of service levels and outcomes are not typically part of a financial condition indicator system, the bottom line in evaluating government performance is the quality and quantity of government services provided. A focus on performance is particularly appropriate in education, because many states have developed academic standards. New York has had a long history of measuring student performance through its Regents Exams, and has in place a school report card system, as well as a program for identifying and assisting low performing schools. In addition, New York is putting in place a student and school accountability system, System for Accountability for Student Success (SASS), to comply with the accountability provisions of the No Child Left Behind Act (NCLB). The measures used in the SASS system are the basis for the student performance measures used in the FCIS system.

Newly developed examinations in mathematics and English language arts are required of all 4th and 8th grade students. The results of these examinations are reported in the *New York State School Report Cards* for each school and district. To aggregate

results to the school level, SED has divided test results into 4 levels and reports the counts (and percent) of students reaching a given level. To measure adequacy, we use an approach similar to what SED has developed as part of SASS. The percentage of student reaching given levels is first identified (0 to 100 scale), and then a weighted average of these percents is calculated. Students reaching only level 1 are given no weight, students reaching level 2 are counted once, and those reaching levels 3 or 4 are weighted twice. Accountability scores can range from zero (all level 1 students) to 200 (all level 3 and 4 students).

With relatively few exceptions (severe disabilities), all students have to pass a series of Regents Exams to receive a regular high school diploma. We used the percent of students reaching a specified score on the Math and English Regents for 1999 and 2000 to calculate the student performance measure. The percent of student receiving a score between 55 and 64 are given a weight of one, and the percent of students with scores of 65 or higher are given a weight of two. These results will also range between zero and 200. To combine the results of the six different exams (4^{th} Math and ELA, 8^{th} Math and ELA, and Regents Math and English) we used a simple average.[19]

[19] Another step in the process was to impute missing observations for some exams in some districts. Test data were unavailable for several reasons: 1) central high school districts do not have 4^{th} grade results; 2) K-6 districts do not have 8^{th} grade and Regents Examination results; 3) K-8 districts do not have Regents Examination results, and 4) some other districts (usually K12) were missing various test scores either because the district was too small (to keep results confidential) or the district did not administer the test. For districts with missing test scores, we used the performance measure for the exams that were available.

IV. Process for Developing Financial Condition Indicator System

> Financial condition analysis is not a regimented, strictly-defined science. There are a least two reasons why it may be considered more of an individualistic art form. First, people measure financial condition in many different ways. Second, financial condition ultimately boils down to a subjective decision by the analyst, so that two people looking at the same financial information can come to different conclusions about a school district's condition...If not a weakness, though, this inherent flexibility can be a *threat* to the credibility and reliability of the conclusions that an analyst draws from his analysis. (Mead, 2001, p. 60)

The previous paragraph summarizes some of the key aspects of the process of selecting and aggregating financial condition measures that make development of reliable indicator systems difficult. First, a system must consider a wide range of factors, and types of data ranging from numeric to categorical. Second, the conclusions that an analyst may draw about the impact of a particular factor on financial condition depend on the context. For example, absent other information, an operating deficit would be viewed negatively. However, if the district already has very large unreserved fund balances, then running a temporary deficit might be considered an appropriate financial management decision. Third, evaluation of complex situations such as financial conditions, involves multiple layers and multiple stages of analysis, and it is difficult to maintain consistency among analysts. "Financial condition analysis is an iterative process, like peeling away the layers of an onion." (Mead, 2001, p. 60) The order in which an analyst considers various factors can influence the conclusions that they draw (i.e., the conclusions are path dependent).

Developing performance evaluations generally involves three stages: 1) determining the criteria to be used in the performance evaluation; 2) developing measures of these criteria; and 3) aggregating the individual measures into an overall measure of performance. The simplest types of evaluations select just a few measures and use simple weighting schemes to combine them. For more complex phenomena, such as financial condition, a few measures are rarely adequate to capture all the important dimensions that should be considered.

However, the larger the set of factors used in the evaluations, the more difficult steps 2) and 3) become. How can measures expressed in different units be combined? The typical approach is to re-express all measures in a common ordinal scale that can be combined. Unfortunately, using ordinal data with these additive methods produces performance measures that are sensitive to relatively small changes in measurement.[20] In addition, most aggregation methods use a fixed procedure to combine different measures, such as a weighted average, which cannot adjust to the context of the evaluation. In other words, each measure is treated the same way regardless of the context in which the measure occurs. For example, operating deficits are treated as a negative indicator regardless of whether the school district has substantial fund balances or not. Many practitioners and theorists believe that performance evaluation should be a context and environment dependent problem, thus any fixed set of rules will miss important contingent relationships between variables (Chen, 1990).

[20] Recently, generalized analytical approaches have emerged, such as data envelopment analysis (DEA), that can handle multiple inputs, and outputs expressed in different units. DEA, however, has difficulty with variables that are ordinal or categorical in nature. DEA involves the construction of production frontiers using non-parametric linear programming techniques. Under most circumstances DEA requires that inputs and outputs are cardinal measures. See for example, Thanassoulis, (1999).

Components of a Fuzzy Rule-Based System (FRBS) of Evaluation

In this section of the report we describe the methodology we use to develop a financial condition indicator system--fuzzy rule-based systems (FRBS). We will briefly introduce the main steps in developing a FRBS, and the type of output that can be produced by this system. Fuzzy rule-based systems are specifically designed to handle the challenges of complex evaluation systems, to tap the knowledge and judgments of experts in the field, and apply these judgments in a consistent fashion. The FRBS methodology has successfully been applied to evaluate financial management and financial condition of cities (Ammar, et al., 2001a, 2001b, 2001c), state financial management, (Ammar, et al., 2000a), and low performing schools (Ammar, et al, 2000b).

Developing a FRBS involves three stages: 1)Decomposition--the decomposition of the evaluation object into important components, 2) Fuzzy-sets--the construction of robust ordinal measures of these components, and 3) Rule Bases--the use of formal rules to combine inputs into overall performance measures that can reflect the contextually dependent judgment of experts. The following is a description of these three stages in the context of evaluating financial condition.[21]

Decomposition: The first step in the process is to decompose the general evaluation problem into smaller groups of evaluations that lead to an overall rating. The key components of financial condition analysis—short-run financial condition, long-run financial condition, economic condition, and service level adequacy--are used to form the first level of decomposition. These components are further decomposed into sub-elements for evaluation (see Figures 1-4 earlier in report). Under a FRBS, evaluation is a bottom up process. For example, each of the sub-elements of short-run financial

condition is first evaluated to produce measures of liquidity, fund balances, and tax capacities. Then the output for these three sub-categories is combined into an overall measure of short-run financial condition. A part of decomposing a problem is identifying the key tradeoffs between factors, and identifying important contextual measures that should be included in the analysis. For example, the impact of high property tax burdens on the long-run financial condition of a district may depend on the underlying property wealth and income of district residents. The decomposition stage is the first place where the judgments of experts should be utilized to assist in developing the framework.

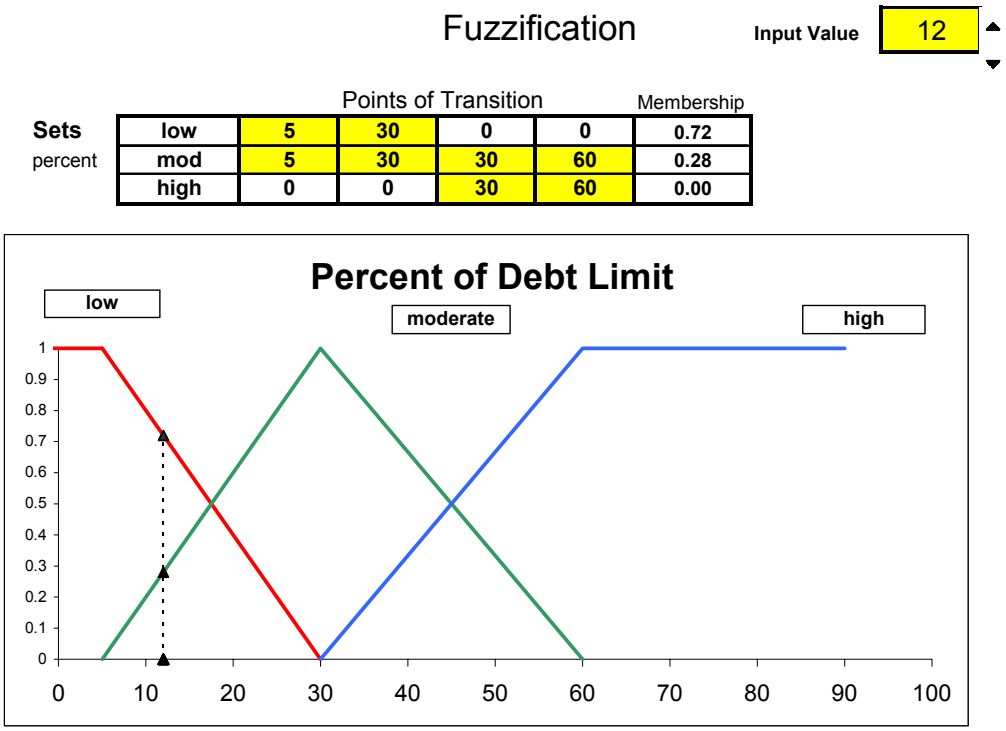
Input Fuzzification: The second step in developing a FRBS is collecting data on inputs. The financial condition indicator system developed for New York school districts includes variables with many different units of measure. Traditionally, combining dissimilar measures involved converting all data into a common ordinal scale. However, ordinal scales are particularly sensitive to measurement error, because small changes in variable measurement can lead to large changes in classification. FRBS use fuzzy set theory to translate input measures into membership levels in ordinal categories (Dubois and Prade, 1988). Membership levels indicate the degree to which a particular observation, in this case a school district, falls in a set; membership levels can range between 0 and 1. Under fuzzy set theory, an element can belong to more than one set with different degrees of membership.

Figure 5 provides an example of fuzzy sets for "percent of debt limit used." The first step in developing fuzzy sets is to identify the number of ordinal categories or sets that a district could be assigned to. Generally three categories (e.g., high, moderate, low) are adequate to capture variation in performance across governments. The second step in

[21] For more details on the process of developing a FRBS, see Ammar, et al., (2000a, and 2001a).

the process is to decide on transition points between different sets. For example, at what level of debt limit use should a district be classified as fully in the low set, or at what maximum level should it be classified as fully in the high set? By fully in a set, we mean that this district would be classified as having a membership level of one in the specified set, and membership levels of zero in the other sets. In this case we have selected 5 percent of debt limit used as the transition point to the low set, and 60 percent as a transition point to the high set (Figure 5). Thirty percent is the peak of the moderate set

Figure 5: Fuzzy Sets for Percent Debt Limit Used



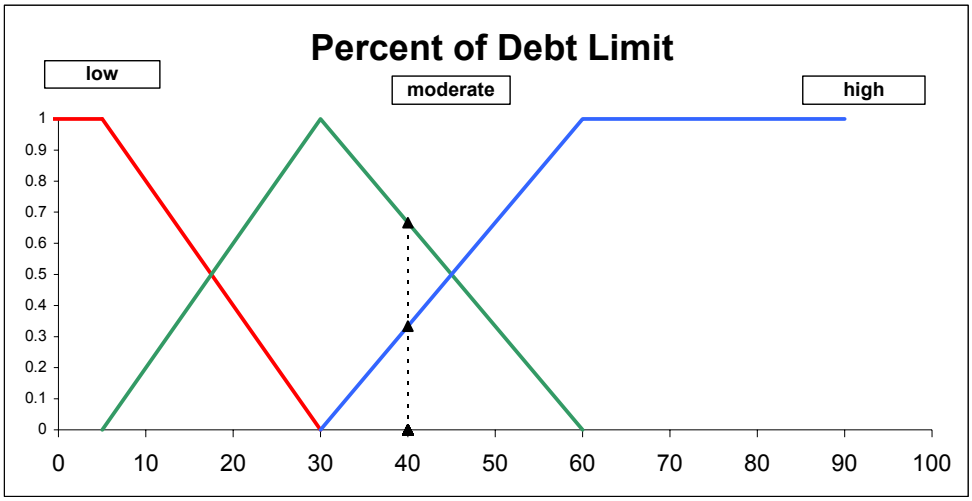
and also the point where districts transition from being partially low to partially high. Selecting transition points is a second stage where expert judgment can guide system development.

Using the fuzzy sets identified by the transition points, it is now possible to rescale the input measure into membership levels in fuzzy sets.[22] For a district with 12 percent of debt limit used, draw a vertical line above 12 on Figure 5. The intersection of this line with the fuzzy sets for low (0.72) and moderate (0.28) are the fuzzy set membership levels for this district (and 0 in the high set). This district is primarily in the low set, but would be classified as also partially moderate. For a district with 40 percent of its debt limit used (Figure 6) it was classified as primarily moderate (0.67) but with some membership in the high set (0.33).

Figure 6: Fuzzy Sets for Percent Debt Limit Used

Fuzzification Input Value 40

Sets percent		Points of Transition				Membership
	low	5	30	0	0	0.00
	mod	5	30	30	60	0.67
	high	0	0	30	60	0.33



The debt limit variable for each district is reclassified into membership levels in the low, moderate high sets. Small changes in the data lead to only small changes in

[22] Other shapes besides a triangle can be used for fuzzy sets. Triangular fuzzy sets are the most common,

membership levels in these sets, rather than either no change or large jumps between ordinal categories. Thus, the use of fuzzy sets allows measures used in an evaluation to be rescaled into a common metric while preserving most of the information from the original data.

Rule Bases: Once all the raw data have been rescaled into fuzzy sets, the next step in developing a performance measure is to combine the measures of the individual inputs into composite measures of financial condition. FRBS accomplishes this process using what are called "rule bases." A rule base is a set of rules about what represents different levels of performance. The rules should reflect the judgment of experts about the relative importance of the various components in the context of performance on the other components. For example, in evaluating debt burdens in a district, it is important to consider the level of capital investment that a district has been making. Generally, low debt burdens would be considered a positive long-term financial indicator. However, if low debt burdens exist, because a district has consistently deferred investments in school facilities, the debt burdens may indicate a pending facility crisis in the district. Thus, debt burdens should be considered in the context of capital spending.

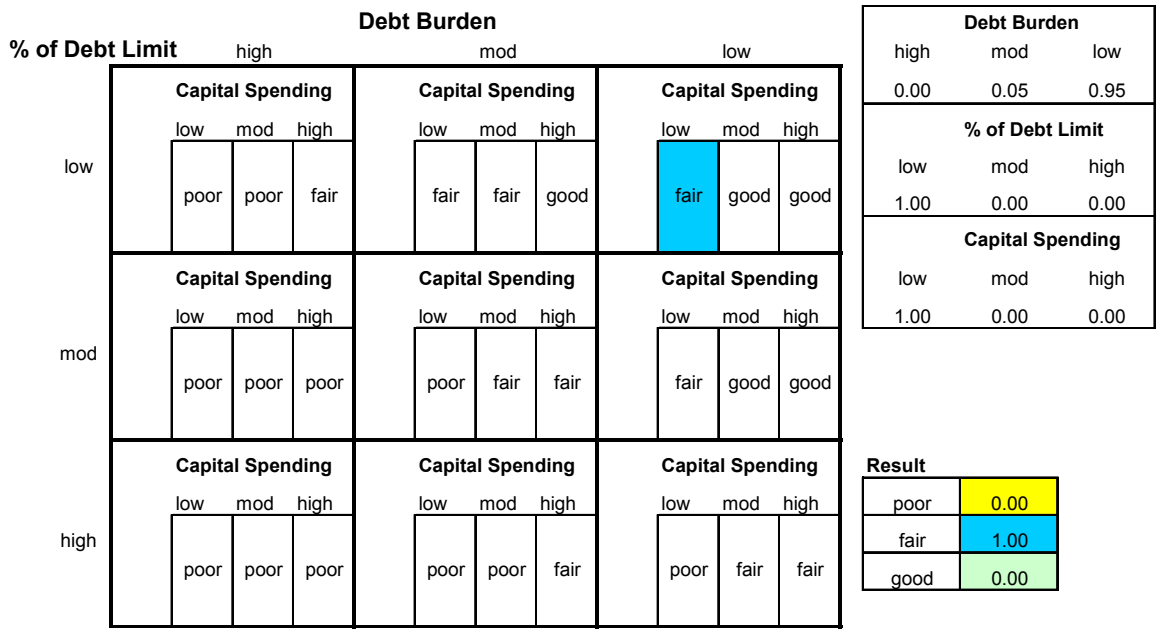
The biggest challenge in designing a rule base is extracting from experts a complete set of rules that include all possible evaluation scenarios. One way to simplify this task is to have them develop rules for only a few performance levels, such as poor (p), fair (f), and good (g). To illustrate, the three components of the debt position of a school district—debt burdens, capital spending, and debt limit--can be combined using a rule base into an overall measure for debt position. In order to extract a complete rule base, a matrix representation is used. With three levels of performance and three

---

because they allow a simple proportional transition across sets.

components of debt position, there are a total of $3^3 = 27$ possible combinations (Figure 7).

Figure 7: Rule Base for Debt Position of District



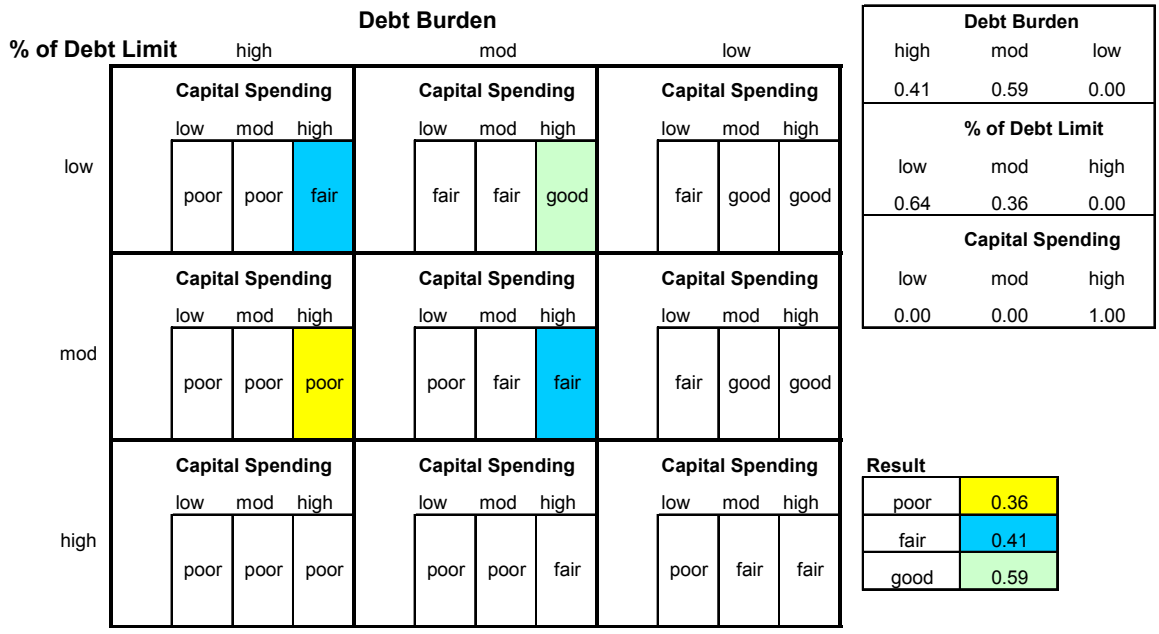
Each cell in the matrix corresponds to a rule for economic performance. For the hypothetical district in Figure 7 it falls into only one cell. The rule associated with this district then can be expressed as:

> IF debt burdens are **low** AND
> % of debt limit used is **low** AND
> capital spending is **low** THEN
> the debt position of the district is **fair**.

The more typical situation is when several rules in the matrix apply to a district. In Figure 8, this district has high to moderate debt burdens, low to moderate use of its debt limit, and high capital spending. The district falls into four different cells in the matrix and, thus, four different rules apply to its debt position. Two of these rules

indicate that the district has fair debt, one rule is associated with poor debt position, and one is associated with a good debt position. The final measure of debt position for this district has elements that are good, fair, and poor to different degrees.

Figure 8: Rule Base for Debt Position of District



Output Measures: The final stage of the process is the conversion of the input measures and rules into output measures. Using the "extension principle" in fuzzy set theory, membership levels in different output sets are assigned to each unit.[23] For example, for the one highlighted rule for this district that assigns a "good" rating, the rules and their memberships are;

> IF debt burdens are **moderate** AND
> % of debt limit used is **low** AND
> capital spending is **high** THEN
> the debt position of the district is **good**.

[23] For a detailed explanation of this process see Dubois, and Prade (1988). For a simple illustration, see Ammar, et al. (2001a).

The extension rule assigns the minimum membership of the three input sets to the output set. Intuitively, the level of membership defines a cutoff for degree of belonging to a performance category. To be conservative in selecting a membership level, we want a level that applies to all the inputs. Using the same process a membership level of 0.36 is assigned to the one rule classified as "poor". There are two rules that assign a rating of "fair" to this district's debt burden. Another element of the extension principal is that when more than one rule applies to an output category, the rule with the highest membership dominates.

This process is replicated for each district for each rule base. The result is that for each rule base fuzzy output measures are developed that indicate membership levels in the different performance categories. The output of one rule base can be used as the input to another rule base farther up the hierarchy. Most districts have membership in two sets, but a few have membership in all three.[24] One of the real strengths of FRBS is that it provides a more detailed measure of output. In addition, a FRBS can be used to determine which factors are driving the output measure for a particular unit. The results of this type of analysis could be provided to individual school districts to assist in their fiscal planning. It could also be used by SED and other state government organizations to identify districts facing possible short-term fiscal crises or long-term financial problems. Assistance could then be targeted to districts with the greatest needs.

Development Process

The development of a FRBS is an iterative process that strategically draws on the advice of experts. The system is generally too complex to be presented initially in its entirety to experts for their review and revision. Instead, experts are presented different

parts of the system and asked to react to these. Based on their comments, revisions are made to the system, and they are asked to review a new part of the system. In this section, we provide a brief introduction to the development process for the FCIS. The goal is to illustrate how experts were used to create this system, and how they can continue to be used to refine the system in the future.

Selecting an Advisory Board: SED appointed an Advisory Board to serve as a panel of experts to design the system. To select members several criteria were used. First, some members of the advisory board had to be directly involved in assembling and monitoring financial information on local governments. These members came from the Office of Audit Services in SED, and the Office of the State Comptroller. Second, members were selected who had expertise in district financial management, as a school business official, as a representative of the New York Association of School Business Officials (ASBO), or as a CPA who has audited district financial information. Finally, members were selected to represent school district administrators, or school board members.[25]

The advisory process took place through a series of meetings between the research team and the Advisory Board. The research team would spend part of the meeting presenting some part of the financial condition indicator system to the Advisory Board, and then ask for questions, comments, and recommended changes. Based on the Advisory Board comments, changes would be made to the system, and the revised system would be presented to the Advisory Board at the next meeting.

---

[24] When a district has membership in three sets, the membership levels do not have to add up to one.
[25] A full list of Advisory Board members is available in Appendix A.

Developing a framework: The first task in developing any evaluation system is to select the types of factors to be included in the system, to decide how these factors are related to each other, and to develop specific measures for each factor. In developing the framework used in the financial condition indicator system described here, we drew heavily from the previous research on financial condition and fiscal health discussed in section II. The Advisory Board was presented a first draft of this system in the first meeting. Based on Advisory Board recommendations a number of different measures were tried before a final set was selected.

Determining fuzzy sets: As second part of the development process was to rescale all the raw data into several fuzzy sets. As discussed previously, the key steps in this process are to select the number of sets and to determine the transition points between sets. Three sets are usually adequate to capture the important variation in the measure.

Transition points can be selected either on the basis of the distribution of the actual data, or to reflect good practice or state policy. In general, the transition points for the low and high sets should be set far out in the tails of the distribution, typically the 5^{th} percentile for low and 95^{th} percentile for high. Because all districts below (above) the 5^{th} (95^{th}) percentile will be classified as fully in the low (high) set, relatively few districts should be placed in these categories. However, for some measures, there may be no choice regarding the number of districts in these categories because benchmarks may already exist, or state law or regulation set limits.

A good example is setting transition points for fund balance measures. The rule of thumb often used by credit rating agencies and government finance professionals for

an adequate level of unreserved fund balances is at least 5 percent of expenditures (Fitch, 2000).[26] In New York's case, however, districts are limited by state law to unreserved, unappropriated fund balances (UUB) of no more than 2 percent of the planned operating budget (Table 4). The Advisory Board felt that a district should not be penalized for following state law, so the high transition point was set at 2 percent. However, for the other measures of the fund balance the transition points were set at or close to the 5th and 95th percentile levels. Appendix B provides the full set of transition points used to convert the raw data into fuzzy sets.

Table 4. Transition Points for Fund Balance Measures

Fund Balance[1]	Measure	Low	Moderate	High
Unreserved, undesignated fund balance (UUB)	Average 1999-2001	0.0	1.5	2.0
Unreserved fund balance	2001	1.0	5.5	13.0
	Trend 1997-2001[2]	-2.0	0.0	1.5
Reserved fund balance	Average[3] 1999-2001	0.0	3.6	10.0

[1]As a percent of total expenditures in the general fund, special aid fund, and food service fund.

[2]Weighted trend which has higher weight on later years.

[3]Minimum of the average from 1999 to 2001 or the values in 2001.

Setting rules in the rule bases: The third part of the process is to determine the set of rules to be used to combine the different measures into overall measures of performance. As discussed previously, the principal tool used in the combination process is a "rules base," which is a collection of rules indicating what outcome category will be assigned to each combination of input measures. Examining Figures 1 through 4 i(in

[26] An alternative mechanism, not available to New York school districts, is to create a "budget stabilization fund" (BSF), which is specifically designed to assist governments stabilize their budgets during economic

section III) indicates that there are 24 different rule bases as part of the financial condition indicator system. See Appendix C for a complete set of rule bases.

Most of the rule bases are similar to Figure 9 and have 81 different rules to be set. Needless to say, determining all the rules to go in these 24 rules bases would overwhelm any panel of experts. To effectively utilize the Advisory Board in the rule setting process, we took several steps. First, we asked the advisory board (or extracted from their discussion) the broad principles they would use when evaluating different types of information. For example, for the overall measure of financial condition rules matrix (Figure 9), how much weight would they put on short-run versus long-run financial condition and how is this dependent on the economic conditions of the district? When should student performance levels modify the assessment based purely on financial condition and economic condition? These broad principles or "macro rules" set guidelines that help guide the construction of the rule matrix. Some of the macro rules guiding the development of the overall financial condition rule matrix include:

- SR and LR financial condition are generally given the highest weight. If a district is classified as poor in SR or LR financial condition, the best it can do is a fair overall financial condition. If the economy is in poor condition, a district can be classified as good only if all other indicators are good.
- Student performance only modifies the evaluation in a few cases.
- If SR and LR financial condition are poor, then a district is classified as being in poor overall financial condition unless the economy and student performance are good.
- If SR and LR financial condition are good then overall condition is poor unless economy is poor, and performance is not good.
- If the economy is poor and LR condition is poor then overall condition is poor unless the SR condition is good and performance is at least moderate.

---

downturns. The recommended level for a BSF is also 5 percent of expenditures (Hou, 2002).

Figure 9. Rule Base for Overall Measure of Financial Condition

short term

long term		poor			fair				good			
		performance			**performance**				**performance**			
	economic	low	mod	high	**economic**	low	mod	high	**economic**	low	mod	high
poor	poor	p	p	p	poor	p	p	p	poor	p	f	f
	fair	p	p	p	fair	p	f	f	fair	p	f	f
	good	p	p	f	good	p	f	f	good	f	f	f
		performance			**performance**				**performance**			
	economic	low	mod	high	**economic**	low	mod	high	**economic**	low	mod	high
fair	poor	p	p	p	poor	p	f	f	poor	f	f	f
	fair	p	p	f	fair	f	f	f	fair	f	f	g
	good	p	f	f	good	f	f	f	good	f	g	g
		performance			**performance**				**performance**			
	economic	low	mod	high	**economic**	low	mod	high	**economic**	low	mod	high
good	poor	p	f	f	poor	f	f	f	poor	f	f	g
	fair	p	f	f	fair	f	f	g	fair	g	g	g
	good	f	f	f	good	f	g	g	good	g	g	g

Another way to calibrate the system is to compare system results to districts for which experts already have substantial knowledge of their financial condition. The Advisory Board was asked to provide names of districts that they were familiar with and felt had particularly strong or weak financial performance. Their evaluation of these districts may have come from general impressions about the district, information about financial difficulties the district may have been having, or from their own analysis of the financial health of the district. After the initial rule bases were determined, the first set of results was produced. The Advisory Board was then presented the results for the set of districts they had identified as weak and strong.

Table 5.Overall Evaluation for Districts Identified by SED as Experiencing Fiscal Stress

	overall		
	poor	fair	good
District W1	1.00	0.00	0.00
District W2	1.00	0.00	0.00
District W3	1.00	0.00	0.00
District W4	1.00	0.00	0.00
District W5	1.00	0.00	0.00
District W6	1.00	0.00	0.00
District W7	1.00	0.00	0.00
District W8	0.99	0.01	0.00
District W9	0.99	0.01	0.00
District W10	0.91	0.09	0.00
District W11	0.85	0.15	0.00
District W12	0.85	0.15	0.00
District W13	0.76	0.24	0.00
District W14	0.63	0.37	0.00
District W15	0.62	0.38	0.00
District W16	0.56	0.44	0.00
District W17	0.73	0.27	0.13
District W18	0.28	0.72	0.10
District W19	0.14	0.66	0.34
District W20	0.09	0.62	0.38

Table 5 presents the results for twenty districts that the Advisory Board identified as in weak financial condition. For the first seven districts, the financial condition indicator system classified these districts as fully in the poor category. For seventeen out of the twenty districts, they were primarily classified in the poor category, which matches the initial predictions of the Advisory Board. However, the overall financial performance of the last three districts (W18-W20) is primarily fair, and two of the three had some elements that are classified as good.

For these three districts we identified for the Advisory Board which measures and rules seem to account for their classification. A number of the measures and rule bases were examined, which provided an opportunity for the Advisory Board to reexamine the measures and the rule bases. As a result a series of modifications were made to the system to better match the results the Advisory Board expected. This type of revision of

evaluation system in response to results is a common part of all complex and potentially controversial evaluations. The difference in this case is that whatever modifications are made to the system are applied to all districts. A similar process was applied for districts classified in strong financial condition (Table 6).

Table 6.Overall Evaluation for Districts Indentified by Advisory Board as Strong

	overall		
	poor	**fair**	**good**
District S1	0.35	0.61	0.39
District S2	0.28	0.72	0.15
District S3	0.39	0.61	0.18
District S4	0.28	0.35	0.65
District S5	0.37	0.63	0.27
District S6	0.16	0.84	0.06
District S7	0.00	0.98	0.02
District S8	0.49	0.51	0.31
District S9	0.00	1.00	0.00
District S10	0.35	0.44	0.56
District S11	0.33	0.67	0.17
District S12	0.16	0.46	0.54
District S13	0.21	0.77	0.23
District S14	0.11	0.59	0.41
District S15	0.00	0.67	0.33
District S16	0.18	0.23	0.77
District S17	0.00	0.63	0.37
District S18	0.00	0.60	0.40
District S19	0.00	0.59	0.41
District S20	0.06	0.33	0.67
District S21	0.05	0.49	0.51
District S22	0.41	0.44	0.56
District S23	0.11	0.21	0.79
District S24	0.01	0.46	0.54
District S25	0.00	0.36	0.64
District S26	0.31	0.42	0.58
District S27	0.07	0.11	0.89
District S28	0.20	0.29	0.71
District S29	0.00	0.30	0.70
District S30	0.19	0.28	0.72
District S31	0.11	0.73	0.27
District S32	0.00	0.30	0.70

V. Financial Condition Results for New York School Districts

Using the framework presented in section III, and the fuzzy rule-base methodology discussed in section IV, we developed estimates of financial condition of New York school districts. Besides estimating the overall financial condition of school districts, we also estimated their short-run financial condition, long-run financial condition, and economic condition. One of the strengths of FCIS is that it provides information on the multiple dimensions of financial condition. An assessment of short-run financial condition can be used to identify districts with immediate financial problems that could affect budgets over the next several years. Our evaluation of districts' long-run financial condition provides visibility on districts that may face financial problems in the next decade. The economic condition measure is a composite of measures that will affect both a district's cost of providing services and ability to raise revenue.

In this section, we will present a summary of the results from the FCIS for New York school districts. Results for individual districts are not presented in the report because the system should be viewed as a prototype and work-in-progress rather than a finished product. We believe it is important to do additional field testing and to solicit feedback from school business officials and other district administrators on the measures and rules used to develop the system before we present our findings for individual school districts. It is possible that we will make refinements to the system that improve its predictive accuracy.[27] The results are organized into three subsections: 1) overall results;

[27] There are several other cautions with using the present results. First the latest year of data available at the time the dataset was put together was 2000-01. The recent declines in the economy and accompanying impacts on school districts are not reflected in the results. Second, New York City was excluded in the

2) results by need/resource capacity category; and 3) a detailed example for a specific (but anonymous) district.

Table 7. Summary of Financial Condition Measures (membership levels)

Financial Condition Indicator Components	Average		
	Good Set	Fair Set	Poor set
Overall condition	0.26	0.55	0.26
SR condition	0.34	0.49	0.20
Fund balance	0.32	0.47	0.22
Liquidity	0.39	0.54	0.07
Tax capacity	0.28	0.50	0.25
LR condition	0.28	0.51	0.31
Debt	0.28	0.58	0.23
Revenue	0.26	0.53	0.30
Economic condition	0.31	0.46	0.31
Student performance	0.15	0.80	0.05
	Districts around Median Overall Condition[1]		
Overall condition	0.23	0.77	0.19
SR condition	0.34	0.65	0.02
Fund balance	0.33	0.61	0.06
Liquidity	0.37	0.59	0.04
Tax capacity	0.17	0.60	0.25
LR condition	0.33	0.63	0.23
Debt	0.28	0.65	0.22
Revenue	0.23	0.60	0.24
Economic condition	0.18	0.46	0.51
Student performance	0.01	0.99	0.00
	Districts around 75th Percentile Overall Condition[1]		
Overall condition	0.38	0.62	0.03
SR condition	0.43	0.57	0.00
Fund balance	0.38	0.60	0.04
Liquidity	0.33	0.65	0.02
Tax capacity	0.47	0.45	0.09
LR condition	0.39	0.60	0.10
Debt	0.23	0.77	0.07
Revenue	0.38	0.44	0.29
Economic condition	0.58	0.35	0.12
Student performance	0.34	0.61	0.05
	Districts around 25th Percentile Overall Condition[1]		
Overall condition	0.08	0.61	0.39
SR condition	0.20	0.64	0.22
Fund balance	0.13	0.64	0.23
Liquidity	0.49	0.44	0.06
Tax capacity	0.10	0.55	0.36
LR condition	0.11	0.52	0.48
Debt	0.23	0.58	0.38
Revenue	0.08	0.61	0.33
Economic condition	0.14	0.53	0.43
Student performance	0.00	0.97	0.03

[1]Average of ten districts closest to this location.

development of the FCIS, because its financial structure and fiscal situation is different than other districts in the state.

Overall results

The results from a fuzzy rule-based system are typically membership levels in three different sets—poor, fair, and good. Table 7 reports average membership levels for several financial condition measures. In general, the average membership levels in the good set and poor set are approximately the same. Exceptions to this are cases where the transition points are not selected based on the distribution of the data, but based on other criteria, such as legal limits and industry benchmarks. The first panel of Table 7 generally fits this pattern. Exceptions include fund balance, liquidity, and student performance. Transition points for fund balance and liquidity were generally selected based on industry benchmarks. Particularly with regard to liquidity, most districts were above minimum recommended coverage levels which resulted in a low membership in the poor set. For student performance, we selected transition points for the good and poor sets so that only a relatively few districts were classified as fully good or fully poor. The reason that student performance is included in the FCIS is to influence the financial condition measure only when a district has unusually high or low student performance.

The other panels of Table 7 present average membership levels for the ten districts that are closest to the district with the median, 25^{th} percentile, and 75^{th} percentile for overall financial condition. Districts around the median overall financial condition have primarily fair financial condition. Student performance is almost exclusively classified in the fair category. Comparing across the four components of financial condition, these districts have fair to good short-run financial condition due to relatively strong fund balances and liquidity. Offsetting the good short-run financial condition is fair to poor economic condition for these districts. Thus, the typical district offsets poor

economic condition with relatively good management of fund balances and liquidity. For districts around the 75th percentile of overall performance, their financial condition is primarily fair (0.60) to good (0.40). The major exception is revenue where districts have significant membership in the poor set due to high property tax rates. Districts around the 25th percentile of overall financial performance are primarily fair to poor, with the exception of liquidity and debt, where districts had substantial membership levels in the good set.

Table 8 confirms that the different components of financial condition are not necessarily strongly related to each other. Overall financial performance is most highly correlated with short-run and long-run financial condition. The relationship between overall financial condition and student performance is the weakest. Short-run financial condition and long-run financial condition are highly related to each other, because of the existence of fund balances and tax burdens in both measures. As expected, there is a strong relationship between student performance and the economic condition of a school district. The economic condition measure is driven primarily by fiscal capacity and cost factors. By contrast, student performance and economic measures are almost completely unrelated to both short-run and long-run financial performance. Thus, district short-run and long-run financial condition is not "determined" primarily by the economic condition of the district. A number of districts are able to maintain strong fund balances, reasonable tax and debt burdens despite the relatively poor economic condition of the district.

Table 8. Correlations Between Financial Condition Measures (membership levels)

Financial Condition Indicator Components	SR Condition	LR Condition	Economic Condition	Student Performance
Good Set				
Overall condition	0.78	0.81	0.32	0.27
SR condition		0.76	0.05	0.05
LR condition			0.04	0.09
Economic condition				0.56
Poor Set				
Overall condition	0.85	0.80	0.32	0.30
SR condition		0.69	0.09	0.14
LR condition			0.13	0.13
Economic condition				0.20

To examine this issue further, we examined the correlation between various condition measures and two measures of fiscal capacity—full market property values per pupil and income per pupil (Table 9). As expected, property values and income are relatively strongly related to tax capacity, revenue condition, and economic condition. This is particularly true for income, where many of the correlations exceeded 0.50. While property values can include substantial nonresident property, income is calculated entirely based on the income of district residents, which also explains the high correlation of student performance and income. The correlations of the fiscal capacity measures with the fund balance, liquidity, and debt measures are weak.

Table 9. Correlations Between Financial Condition Measures (membership levels) and Measures of Fiscal Capacity

Financial Condition	Full Property Value Per Pupil		Income (AGI) Per Pupil	
Indicator Components	Good Set	Poor Set	Good Set	Poor Set
Overall condition	0.36	-0.19	0.32	-0.28
SR condition	0.21	-0.13	0.09	-0.15
Fund balance	0.16	-0.09	0.00	-0.04
Liquidity	0.07	-0.07	-0.04	-0.07
Tax capacity	0.41	-0.20	0.55	-0.29
LR condition	0.27	-0.17	0.14	-0.20
Debt	0.19	-0.12	-0.01	-0.12
Revenue	0.33	-0.16	0.60	-0.24
Economic condition	0.26	-0.25	0.57	-0.50
Student performance	0.22	-0.06	0.56	-0.08

Results for need/resource capacity categories:

Data from individual districts can be aggregated into different categories to examine different patterns across the state. In this report, we will present the results by the need/resource capacity (N/RC) categories developed by SED (2001). The categories are developed by taking an index of child poverty (based on the share of K6 free and reduced price lunch students) and the combined wealth ratio (CWR), which is a measure of fiscal capacity using both income and property wealth. (See Appendix D for a more detailed definition of these categories.)

Figure 10 presents the results for the measure of overall financial condition by need/resource capacity category. Specifically, the average membership levels in the good, fair, and poor sets are presented for each category. Districts with relatively high membership levels in the good (poor) set indicate that the district has strong (weak) overall financial condition. Not surprisingly, the Big 4 cities (Buffalo, Rochester, Syracuse, and Yonkers) are primarily classified in poor financial condition (membership level in poor set of 0.83) with some elements of fair financial condition (0.17 in fair set). On the other end of the spectrum, the low need districts (principally high wealth suburban districts) are primarily classified as having fair (0.56) to good (0.40) financial condition. Other high need urban/suburban districts, while in better financial condition than the large cities, are still primarily classified as poor (0.57) to fair (0.40). High need rural districts' financial condition is primarily fair (0.57) with some elements that are classified as poor (0.29) and good (0.22). The financial condition of average need districts appears to be similar, on average, to that of high need rural districts, despite the former's stronger fiscal capacity and lower student needs.

Figure 10. Comparison of Overall Financial Condition by Need/Resource Capacity Categories

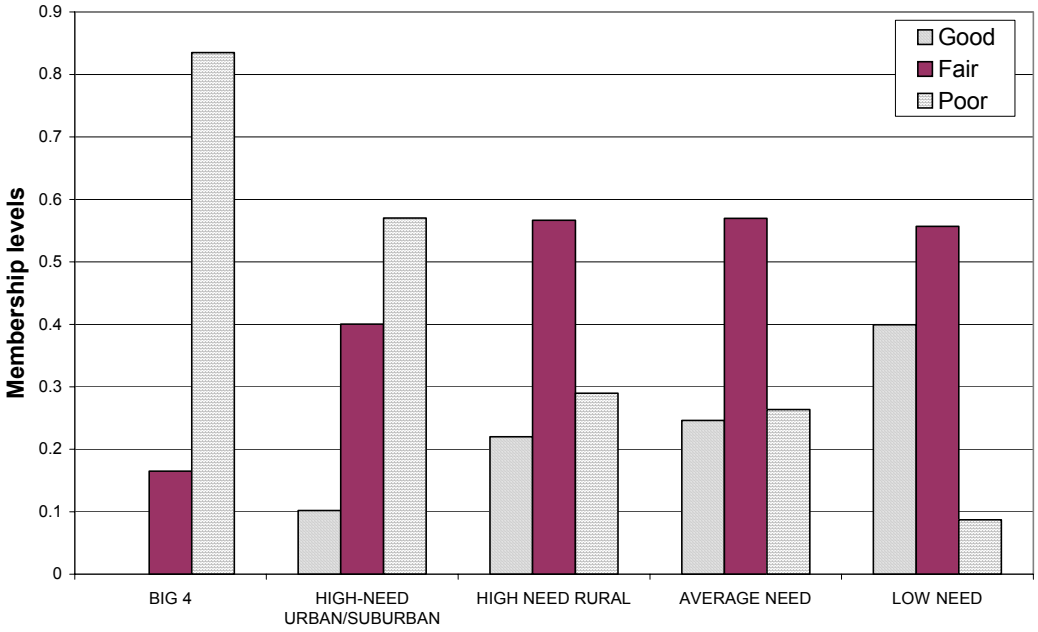
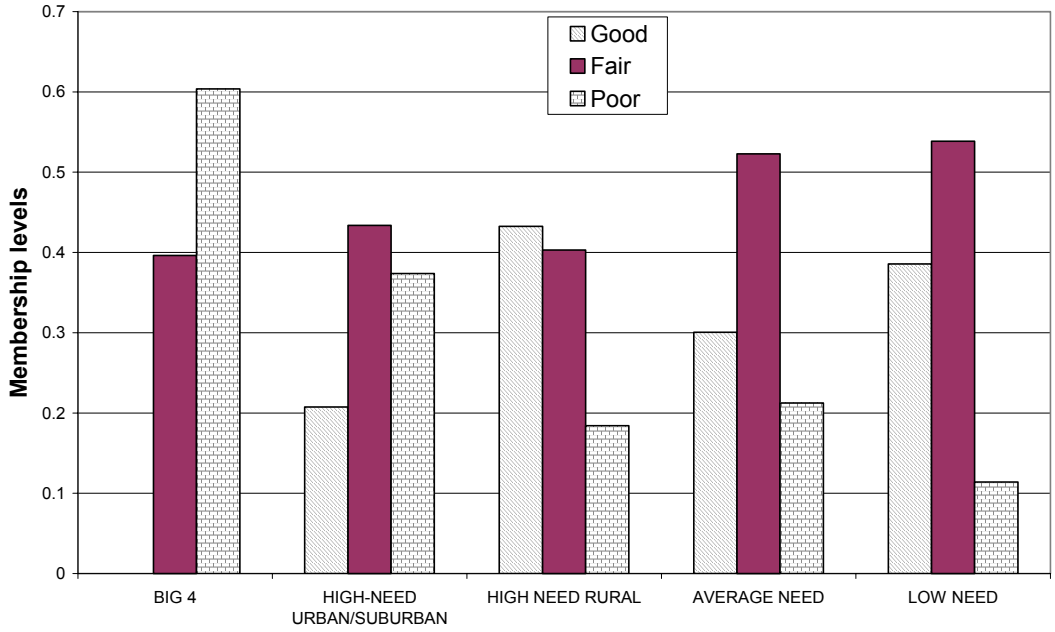


Figure 11 contains measures of short-run financial condition for the same categories included in Figure 10. For the most part, the results are as one would expect. The high need urban districts have poor to fair short-run financial condition and the low need districts have fair-to-good financial condition. But an unexpected result is that the high need rural districts actually have stronger short-run financial condition than the average need districts. In fact, the average membership level in the good set was higher in high need rural districts (0.43) than in the low need districts (0.39). The results for the rural districts are not driven by a few very successful districts. The high need rural districts have lower membership levels in the poor set (0.18) than the average need districts (0.21).

Figure 11. Comparison of Short-Run Financial Condition by Need/Resource Capacity Categories



To get behind the short-run results Table 10 presents the membership levels for the three different components of short-run financial condition. The poor performance of the Big 4 is due primarily to very low fund balances, and to a lesser extent poor liquidity and tax capacity.[28] High need urban/suburan districts are evaluated as both poor and fair on all three short-run measures. The relatively strong short-run financial condition of the high need rural districts is due to stronger fund balances and liquidity, on average, than in average need and low need districts. The tax capacity of high need rural districts, on the other hand, is primarily poor to fair.

[28] The fair tax capacity for the Big 4 is due entirely to the strong tax capacity for Yonkers. The tax capacity for the Big 3 is primarily poor (0.76) and to a lesser extent fair (0.24).

Table 10. Components of Short Run Financial Condition
(average membership levels in each set)[1]

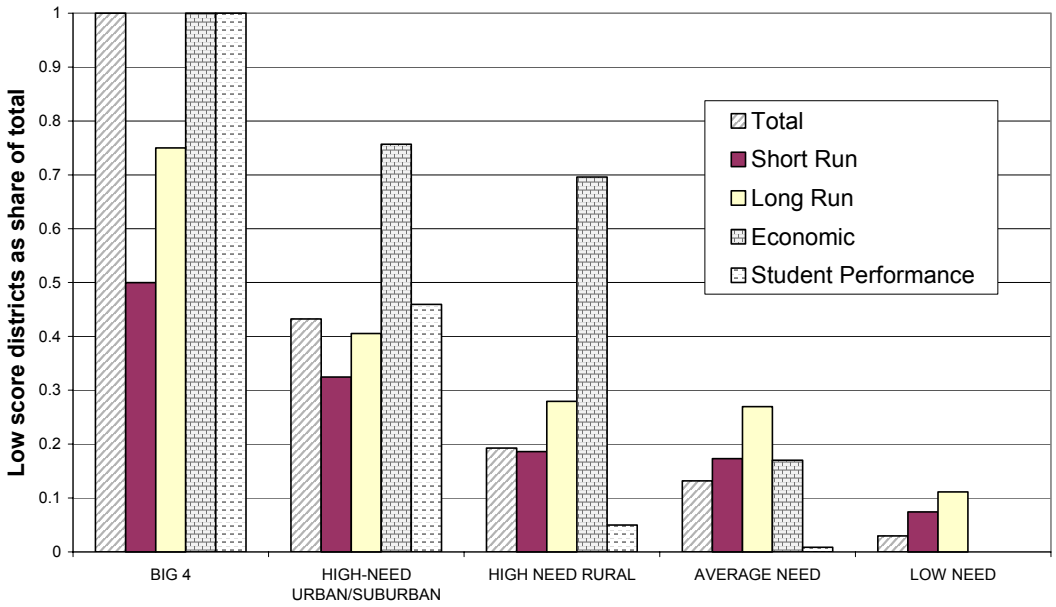
Need/Resource Category	Overall Shortrun	Fund Balance	Liquidity	Tax Capacity
POOR SET	0.34	0.22	0.07	0.25
BIG 4	0.60	0.80	0.21	0.29
HIGH-NEED URBAN/SUBURBAN	0.37	0.39	0.12	0.49
HIGH NEED RURAL	0.18	0.19	0.06	0.31
AVERAGE NEED	0.21	0.23	0.06	0.27
LOW NEED	0.11	0.19	0.06	0.07
FAIR SET	0.49	0.48	0.54	0.50
BIG 4	0.40	0.20	0.79	0.41
HIGH-NEED URBAN/SUBURBAN	0.43	0.38	0.66	0.43
HIGH NEED RURAL	0.40	0.38	0.41	0.55
AVERAGE NEED	0.52	0.50	0.56	0.57
LOW NEED	0.54	0.55	0.61	0.27
GOOD SET	0.20	0.32	0.39	0.28
BIG 4	0.00	0.00	0.00	0.30
HIGH-NEED URBAN/SUBURBAN	0.21	0.24	0.22	0.11
HIGH NEED RURAL	0.43	0.44	0.52	0.17
AVERAGE NEED	0.30	0.28	0.37	0.19
LOW NEED	0.39	0.30	0.33	0.67

1 All numbers are membership levels in a given set. The higher the membership level in the poor set, the worse the short-run financial condition of the district. The higher the membership level in the good set, the better the short-run financial condition of the district.

Several caveats should be made in interpreting the short-run results. First, because the latest year of financial data available when the system was developed was 2000-01, the results probably do not reflect the more difficult fiscal environment of the last several years. Particularly for low-wealth rural districts, the high fund balances of 2000 could easily be exhausted. Second, average results may not reveal the extent to which some districts are in poor short-run financial health even in categories with overall strong performance for the entire group. Figure 12 indicates the share of districts with poor financial condition by need/resource capacity category and component of financial condition. For the high need rural group, the share of districts with poor overall financial condition is higher than in the average need group due primarily to a higher percentage (70 percent) in poor economic condition. Despite fair to good average short-run financial

condition in the high need rural group, 20 percent of the districts are in poor short-run financial condition.

Figure 12. Share of Districts with Poor Financial Condition by Component and Need/ Resource Capacity Category



Note: Districts with membership levels in the poor set of at least 0.50.

Turning to long-run financial condition, the patterns generally fit the need/resource capacity categories (Figure 13). The high need urban districts have fair to poor long-run financial condition, with the Big 4 primarily classified as poor (0.62). Low need districts are classified as having good to fair financial condition. As with short-run financial condition, the high need rural districts have stronger long-run financial performance than average need districts and have, on average, higher membership levels in the high set than low need districts have. The strong long-run financial condition of the high need rural districts is due to fair to good ratings of these districts in both fund balances and debt (Table 11). High need rural districts may have substantially invested in facility renovation as a result of generous Building Aid available to these districts. On

the other hand, the revenue condition of high need districts in general, including high need rural districts, is poor to fair.

Figure 13. Comparison of Long Run Financial Condition by Need/Resource Capacity Category

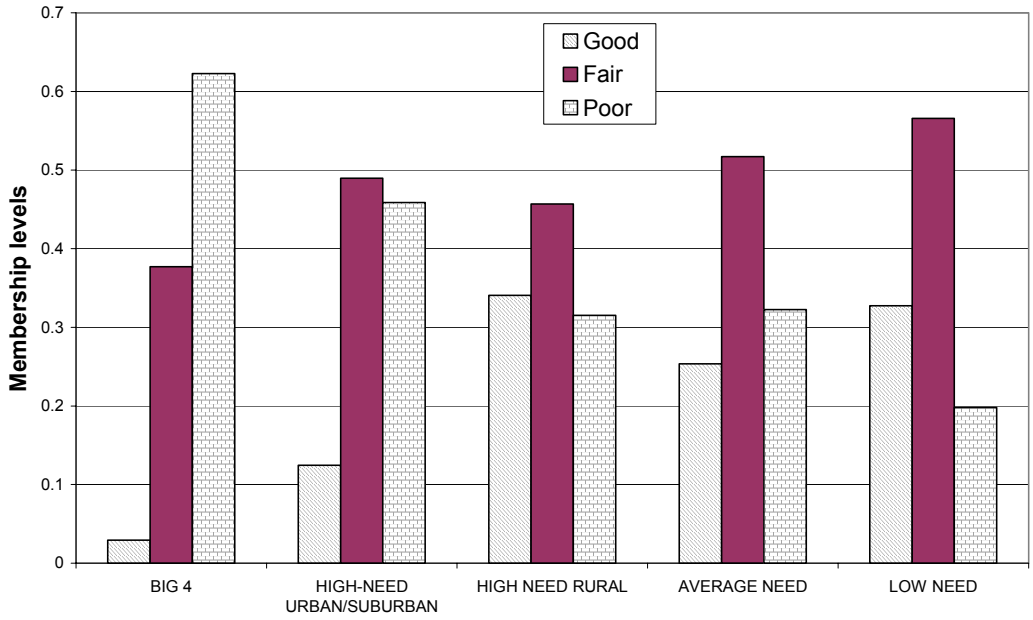


Table 11. Components of Long Run Financial Condition

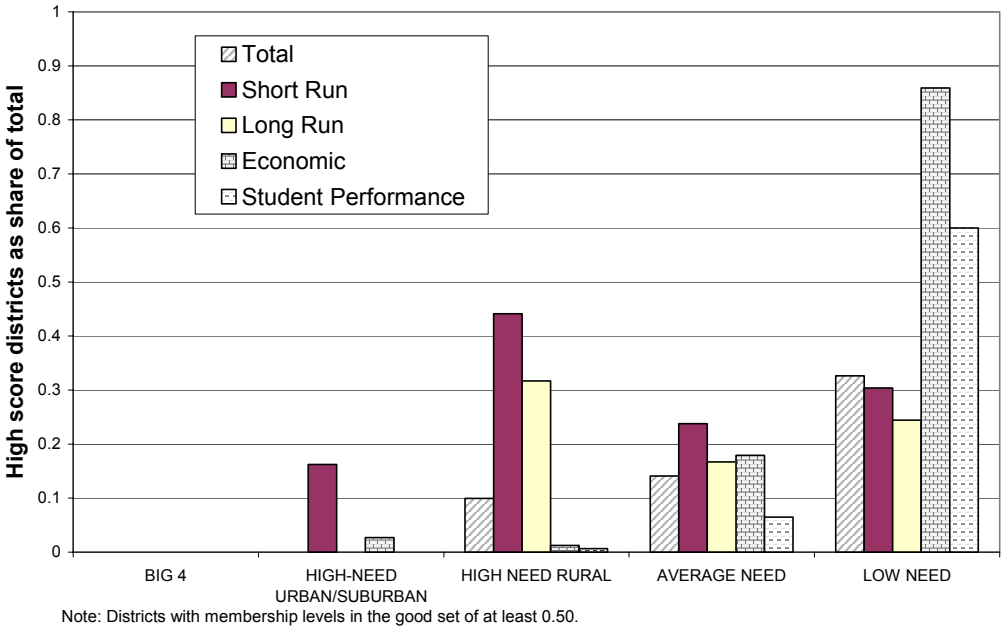
(average membership levels in each set)[1]

Need/Resource Category	Overall Longrun	Debt	Revenue	Fund Balance
POOR SET	0.28	0.23	0.30	0.22
BIG 4	0.62	0.38	0.28	0.80
HIGH-NEED URBAN/SUBURBAN	0.46	0.33	0.48	0.39
HIGH NEED RURAL	0.32	0.26	0.28	0.19
AVERAGE NEED	0.32	0.23	0.32	0.23
LOW NEED	0.20	0.14	0.19	0.19
POOR SET	0.51	0.59	0.53	0.48
BIG 4	0.38	0.62	0.45	0.20
HIGH-NEED URBAN/SUBURBAN	0.49	0.55	0.45	0.38
HIGH NEED RURAL	0.46	0.49	0.61	0.38
AVERAGE NEED	0.52	0.59	0.56	0.50
LOW NEED	0.57	0.70	0.39	0.55
POOR SET	0.31	0.28	0.26	0.32
BIG 4	0.03	0.03	0.39	0.00
HIGH-NEED URBAN/SUBURBAN	0.12	0.17	0.14	0.24
HIGH NEED RURAL	0.34	0.37	0.17	0.44
AVERAGE NEED	0.25	0.27	0.21	0.28
LOW NEED	0.33	0.21	0.50	0.30

1 All numbers are membership levels in a given set. The higher the membership level in the poor set, the worse the long-run financial condition of the district. The higher the membership level in the good set, the better the long-run financial condition of the district.

Despite the relatively strong long-run financial condition of high need rural districts in general, a significant percent (27 percent) are in poor long-run financial condition (Figure 12). Three of the four of the Big 4 are classified as in poor long-run financial condition, as are 40 percent of other high need urban districts. None of the Big 4 are in strong overall financial condition or have strong condition on any of the components of financial condition (Figure 14). Only one-third of low need districts are classified among districts with good overall financial condition despite very strong economies and good student performance levels. In fact, a higher share of high need rural districts are classified as having good short-run and long-run financial condition than average need and low need districts, despite generally worse economic conditions. These financial condition results suggest that many high need rural districts, despite low resources, were able to successfully manage their finances at least up to 2001.

Figure 14. Share of Districts with Good Financial Condition by Component and Need/ Resource Capacity Category



Note: Districts with membership levels in the good set of at least 0.50.

The results for economic condition are consistent with the validity of the need/resource capacity categories (Figure 15 and Table 12). The Big 4 are in generally poor economic condition, due primarily to high student needs (only Yonkers has regional costs well above average), and low fiscal capacity (except Yonkers). The other high need districts are also in poor to fair economic condition. For high need urban/suburan districts the poor rating is primarily due to high costs (principally high student needs) and poor fiscal capacity. High need rural districts have low fiscal capacity, high student needs, and generally poor local economies. Average need districts are evaluated as having primarily fair economic condition with elements that are poor and good. Not surprisingly, low need districts are ranked in the good category for all components of economic condition, except population and enrollment growth.

Figure 15. Comparison of Economic Condition by Need/Resource Capacity Categories

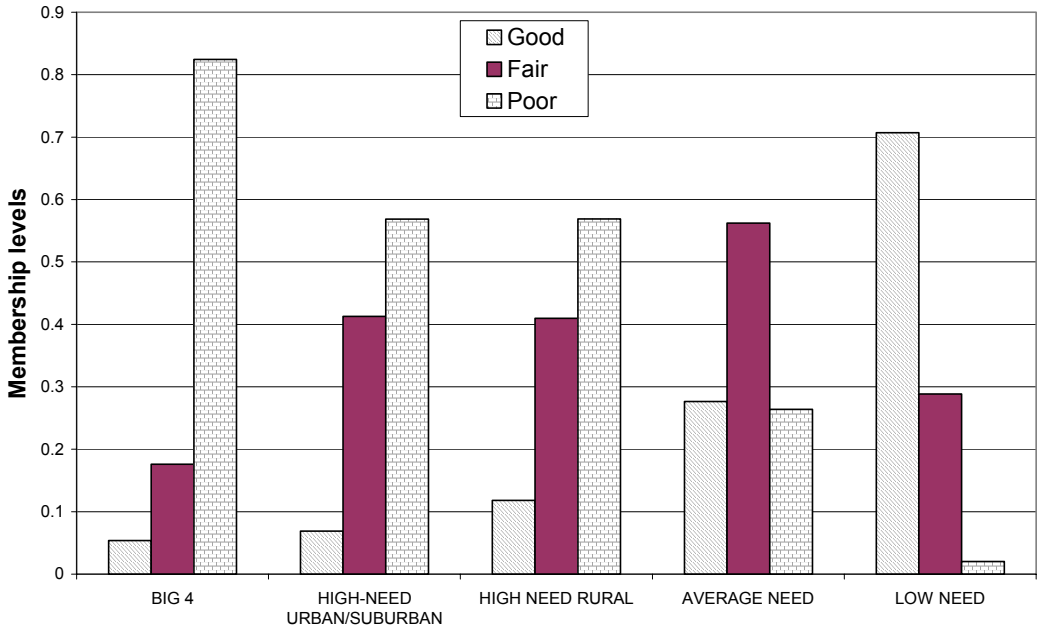


Table 12. Components of Economic Condition
(average membership levels in each set)[1]

Need/Resource Category	Overall Economic	Cost Factors	Fiscal Capacity	Population/ Enrollment	Employment
POOR SET	0.31	0.30	0.29	0.32	0.19
BIG 4	0.82	0.81	0.83	0.24	0.07
HIGH-NEED URBAN/SUBURBAN	0.57	0.69	0.55	0.35	0.20
HIGH NEED RURAL	0.57	0.44	0.52	0.55	0.39
AVERAGE NEED	0.26	0.25	0.26	0.31	0.17
LOW NEED	0.02	0.13	0.02	0.09	0.00
FAIR SET	0.46	0.44	0.47	0.52	0.46
BIG 4	0.18	0.19	0.17	0.58	0.74
HIGH-NEED URBAN/SUBURBAN	0.41	0.28	0.43	0.50	0.39
HIGH NEED RURAL	0.41	0.51	0.42	0.41	0.48
AVERAGE NEED	0.56	0.48	0.59	0.53	0.51
LOW NEED	0.29	0.31	0.23	0.59	0.32
GOOD SET	0.31	0.35	0.27	0.23	0.38
BIG 4	0.05	0.00	0.05	0.18	0.19
HIGH-NEED URBAN/SUBURBAN	0.07	0.07	0.05	0.23	0.42
HIGH NEED RURAL	0.12	0.17	0.09	0.10	0.18
AVERAGE NEED	0.28	0.37	0.19	0.24	0.35
LOW NEED	0.71	0.60	0.76	0.36	0.68

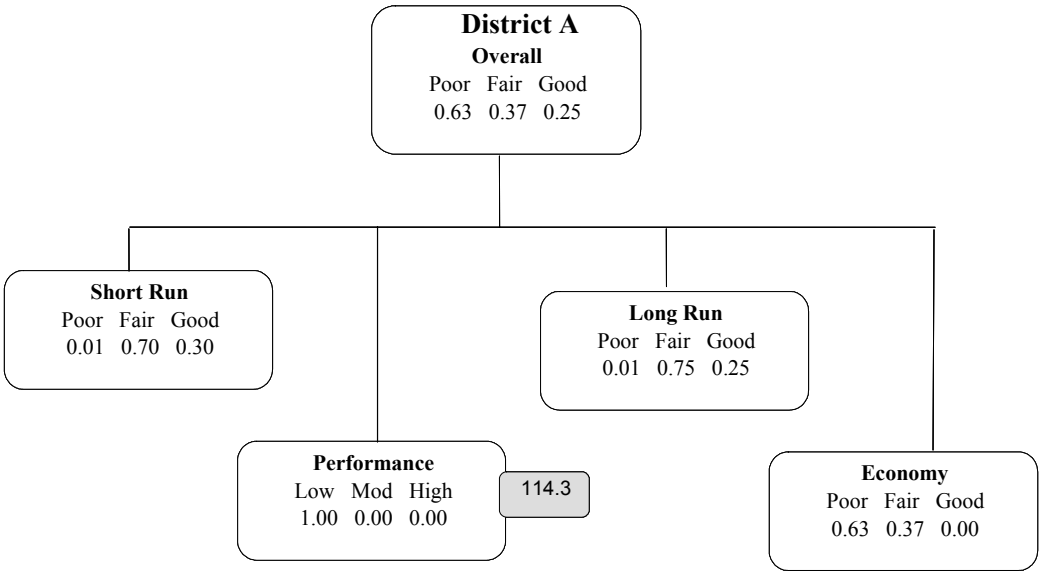
1 All numbers are membership levels in a given set. The higher the membership level in the poor set, the worse the economic condition of the district is. The higher the membership level in the good set, the better the economic condition of the district.

Example of Decomposing Financial Condition Using the FCIS

While the aggregate results for the FCIS can help to identify patterns that may be useful in targeting technical assistance, the principal benefit of the FCIS is that it provides a detailed view of the components of financial condition in a district. SED could use the results to identify districts facing potential short-run and long-run financial crises. The FCIS could be used to develop an early warning system that could help SED and individual districts identify when they are at risk of financial problems. SED, in conjunction with the New York State Association of School Business Officials (NYSASBO), New York State Council of State Superintendents (NYSCOSS), and New York State School Boards Association (NYSSBA), could use the FCIS as a training tool to assist districts in identifying and tracking key financial indicators. Individual districts could use the results of the FCIS for comparisons with districts of a similar size, or need/resource capacity category. They would be able to observe where their financial condition is good, and where it is in need of improvement. To illustrate this potential, the

financial condition of an anonymous district will be analyzed using the results of the FCIS.

Figure 16. Overall Financial Condition Assessment for District Example



District A has overall financial condition that is principally poor, but with elements that are fair and good. Under traditional evaluation systems, this district would have been placed in only one category, probably poor, which would have missed some of the financial strengths of the district. In terms of both short-run and long-run financial condition, District A rates primarily fair to good. The poor rating comes from low student performance and primarily poor economic condition. To highlight this point, we have included the overall rule base with the major applicable cells for District A highlighted. The one highlighted cell with a poor ('p') classification is of particular importance, because it applies most closely to the membership levels of this district. Under this rule, if a district is in poor economic condition, has low student performance, and the short-run and long-run financial condition is fair, the district is classified as poor.

If elements of short-run and long-run financial condition are classified as good, then the district will be classified as good to some degree if the economy is fair, even if student performance is poor.

Figure 17. Overall Rule Base for District A

short term

long term		poor			fair				good			
		performance			performance				performance			
	economic	low	mod	high	low	mod	high		low	mod	high	
poor	poor	p	p	p	p	p	p		p	f	f	
	fair	p	p	p	p	f	f		p	f	f	
	good	p	p	p	p	f	f		f	f	f	
	economic	low	mod	high	low	mod	high		low	mod	high	
fair	poor	p	p	p	p	f	f		f	f	f	
	fair	p	p	p	f	f	f		f	f	f	
	good	p	f	f	f	f	f		f	g	g	
	economic	low	mod	high	low	mod	high		low	mod	high	
good	poor	p	f	f	f	f	f		f	f	f	
	fair	p	f	f	f	g	g		g	g	g	
	good	p	f	f	f	g	g		g	g	g	

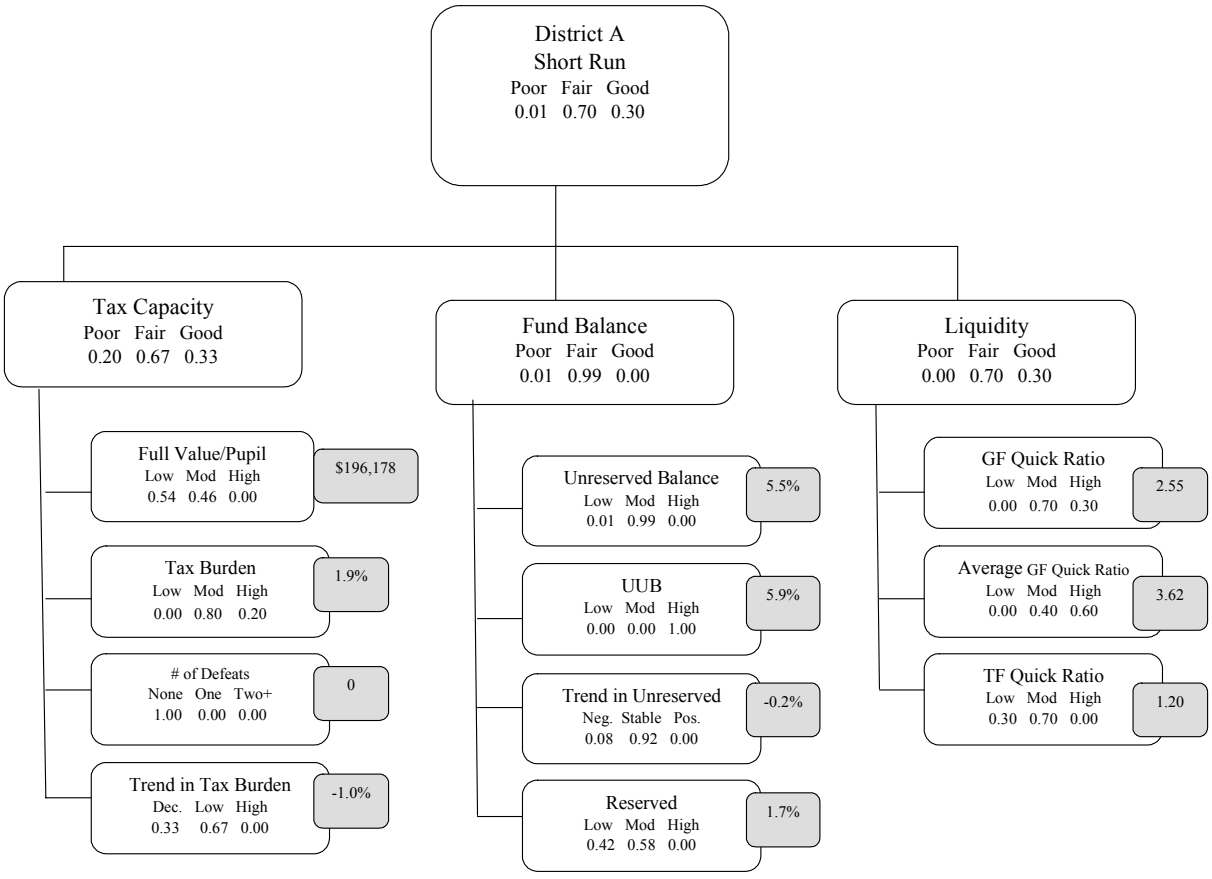
Result	
poor	0.63
fair	0.37
good	0.25

Figure 18 provides a detailed view of short-run financial condition for this district. Short-run financial condition of the district is primarily fair to good, but within this classification there is a fair amount of variation. Looking first at fund balances, the district is classified as almost fully in the fair category. The unreserved fund balance in 2001 was 5.5%, which was classified as fair, and this balance has decreased only slightly (-0.2%) over the last several years, which was evaluated as fair. The unreserved, unappropriated fund balance (UUB) was 5.9%, which was classified as high, especially considering legal restrictions of 2%.[29] The liquidity position of the district is fair to good,

[29] Careful readers may wonder how the UUB can exceed the unreserved fund balance since the UUB is a subset. This implies that the unreserved, appropriated fund balance (UAB) is negative, which does not make sense because the UAB is supposed to represent planned use of the fund balance to lower taxes in the next year. It is possible that this could be a measurement error, or could represent poor fiscal planning.

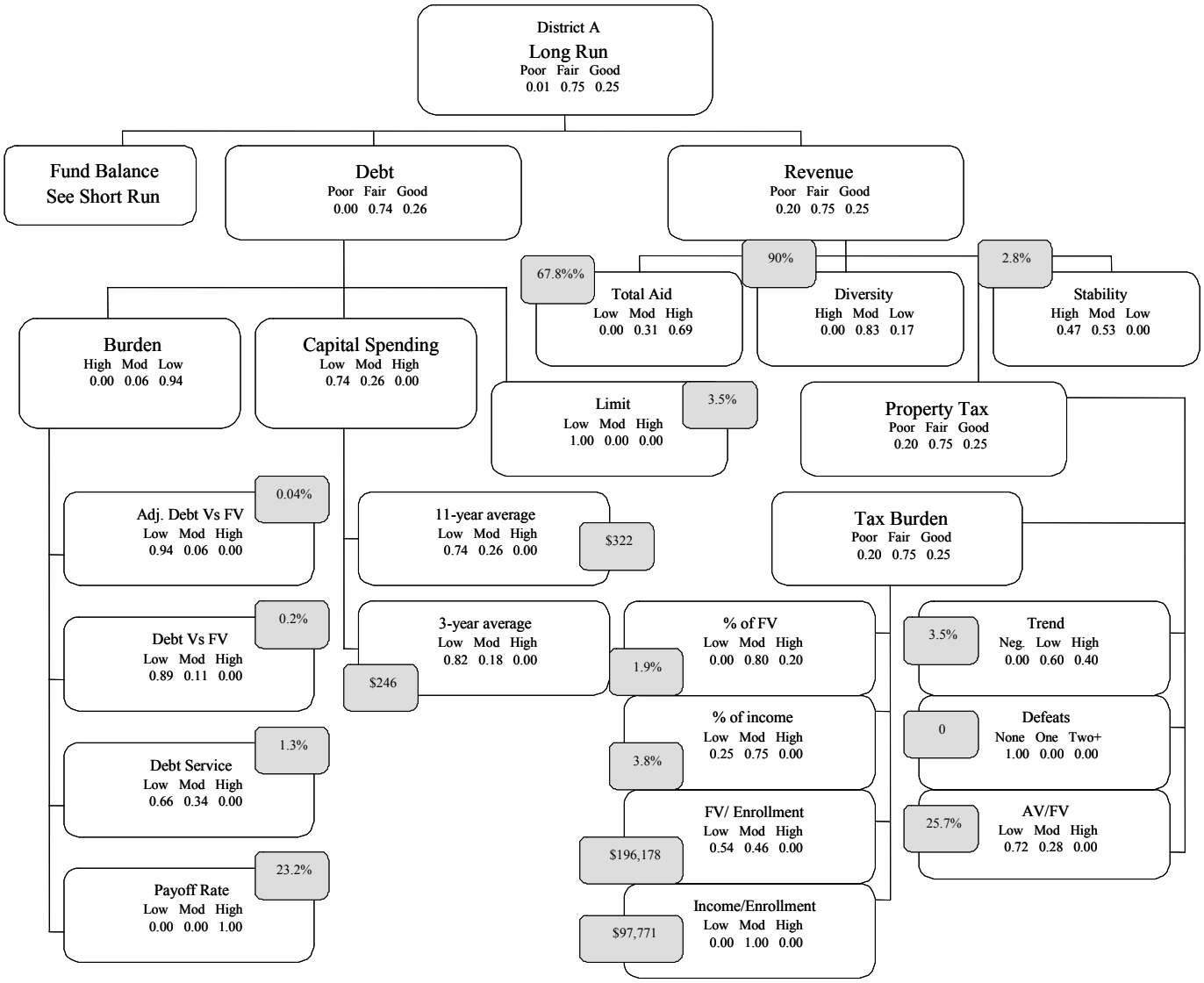
particularly for the general fund, although the liquidity coverage for the combination of the general fund, food service fund, and special aid fund is fair to low. The tax capacity of the district is a mixed story. Property values per pupil are low to fair, and the district has moderate to high tax burdens. However, the property tax burdens have been decreasing, and the district does not have a history of budget defeats. In general, this district seems to be in fairly good condition to weather short-run financial emergencies. *Areas of concern in the short-run might include moderately high tax burdens, relatively low quick ratio for the three funds, modest levels of unreserved balances and fairly low reserve funds.*

Figure 18. Short-Run Financial Condition Assessment for District Example



Either way, understanding district use of reserves and fund balances is an important topic for future research.

Figure 19. Long-Run Financial Condition Assessment for District Example



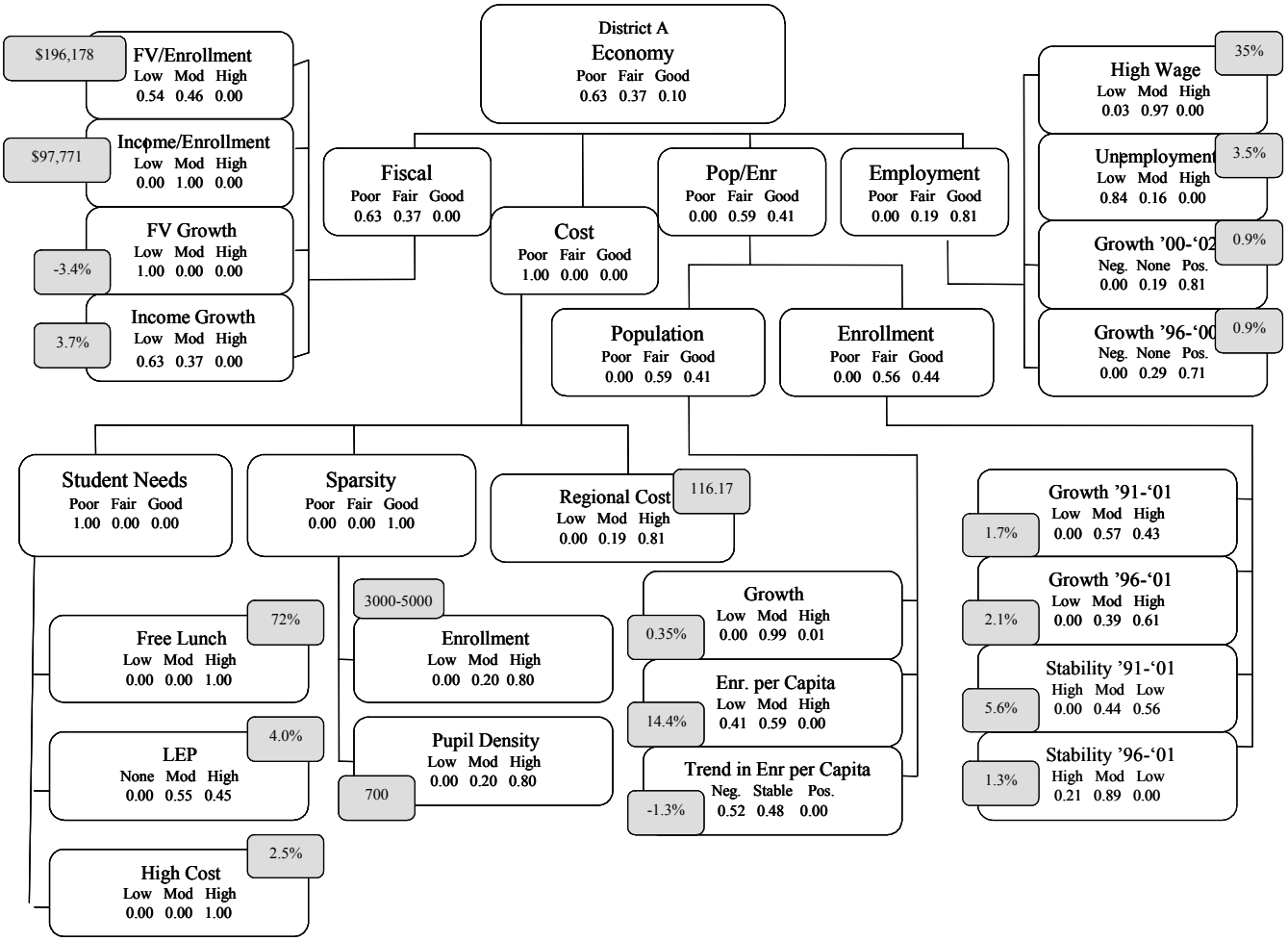
Turning to long-run financial condition, three broad categories are considered: debt and capital, revenue, and fund balances. The overall rating for this district is primarily fair (0.75), but with some good elements (0.25), and similar ratings exist for the three subcomponents. Focusing first on debt, the district has low debt burdens relative to property values and total spending in the district, and the district has used up little of its debt burden capacity. Focusing on debt burdens alone, this would be considered a

positive debt story. However, the district has also not invested heavily in capital, spending annually only $322 per pupil over the last decade, and even less in the last 3 years. Thus, the district may face serious facility problems in the future that could significantly increase debt burdens.

On the revenue side, the FCIS considers property taxes, total aid dependence, local revenue diversity and revenue stability. District A is a relatively low wealth district and has moderate to high aid dependence (aid is 68% of total revenue) , and moderate to low local revenue diversity (property taxes are 90% of local revenue). The dependence on property taxes probably accounts for fairly stable revenue, but this is tempered by dependence on state aid. Property tax burdens are moderate to high compared to property values, but moderate to low relative to resident income. Property tax burdens relative to property values are increasing at a moderate rate. The district has low to moderate property values per pupil, and moderate per pupil income. Regarding the receptivity of voters to tax increases, the district has not had a history of budget defeats. However, assessed property values are only a quarter of the estimated market value of property, which can lead to large disparities in assessment rates within the district. *In summary, areas of concern in the long-run might include low capital spending, relatively high property tax burdens that are rising, and possibly poor property tax administration.*

Economic condition has been broken out as a separate category, because it includes factors outside school district control that affect the financial environment the district operates in. Economic condition is broken into four broad areas: fiscal capacity, costs, population/enrollment, and employment (Figure 20).

Figure 20. Economic Condition Assessment for District Example



In evaluating the economic condition of a district, particular emphasis is put on the fiscal capacity of the district and its costs of providing an adequate education. In evaluating fiscal capacity, we look at both the level and trend for market property values per pupil and income (AGI) per pupil. Fiscal capacity of District A is evaluated as poor (0.63) to fair (0.37). Full value per pupil is low to moderate, and has fallen significantly from 1996 to 2001. Income per pupil is a moderate level ($97,800) and growing, although the growth rate (3.5% from 1995 to 2000) is generally low compared to other

districts in the state. Turning to costs, District A is classified fully in the poor category because of high student needs. The district has a very high percent of students receiving free lunch (72%) and high cost special needs students (2.5%), and moderate to high percent of limited English proficiency students (4%). Because this district is more urban in nature, higher costs associated with sparsity are not an issue. The district also has fairly high regional costs of doing business (16% above state average).

To examine the trends in the underlying economy measures of enrollment, population, and employment are included in the indicator system. Enrollment and population growth are evaluated as fair to good. The district experienced moderate growth in population in the 1990s (0.35% per year), and has moderate to low enrollment per capita, which is declining. Declining enrollment per capita generally indicates that the population is aging on average, as school age children represent a smaller share of the population. Enrollment grew at a moderate to high rate and enrollment remained fairly stable (around a trend line) during the 1990s. The employment picture also looks pretty good in the district with relatively strong employment growth (0.9% per year), a moderate share (35%) of high wage employment, and low unemployment rates from 2000 to 2002. *In summary, areas of concern about economic condition for this district are high student needs, and low property values that are declining.*

Appendix A. FCIS Advisory Board members

Steven Hancox, Assistant Deputy Comptroller for Municipal Affairs
Jack Dougherty, Chief Examiner (Performance Services and Risk Assessment)
John Clarkson, Assistant Comptroller
Office of the State Comptroller
Local Government Services and Economic Development
110 State Street
Albany, NY 12236-0001
Jclarkson@osc.state.ny.us
sjhancox@osc.state.ny.us
jdougherty@osc.state.ny.us
(518) 474-4037 (Hancox)
(518) 474-4227 (Dougherty)
(518) 474-4037 (Clarkson)

Charles Szuberla
Coordinator, Office of School Operations and Management Services
NYSED
Room 874 EBA
Albany, NY 12234
cszuberl@mail.nysed.gov
(518) 474-2238

Deborah Cunningham
State Aid Work Group Coordination and Cost-Effectiveness
NYSED
Room 874 EBA
Albany, NY 12234
dcunning@mail.nysed.gov
(518) 402-5286

Mr. George Perry, Executive Director
Mr. Steven VanHoesen, Deputy Director
NYS Association of School Business Officials
7 Elk Street
Albany, NY 12207
518 434-2281
Fax: 434-1303
asbomail@nysasbo.org
vanhoesens@nysasbo.org

Mr. Robert Loretan, Emeritus Director
Mr. Tom Rogers, Executive Director
Mr. Bob Lowry, Associate Director for Governmental Relations

New York State Council of School Superintendents
7 Elk Street
Albany, NY 12207-1002
518 449-1063
518 426-2229
tom@nyscoss.org
bob@nyscoss.org
boblowry@nyscoss.org

Mr. Dan Tworek
Director
Michael Abbott
Audit Manager
Office of Audit Services
Room 524 EB
New York State Education Department
Albany, New York 12234
dtworek@mail.nysed.gov
mabbott@mail.nysed.gov
518 473-4516

Mr. Tim Kremer
Mr. David Little
New York State School Boards Association
24 Century Hill Drive
Suite 200
Latham, NY 12110-2125
tim.kremer@nyssba.org
david.little@nyssba.org
karen.meier@nyssba.org
(518) 783-0200

Dr. Martin D. Handler
District Superintendent
Sullivan County BOCES
6 Wierk Avenue
Liberty, New York 12754
(845) 292-0082
FAX# (845) 292-0131
Donna Bright, Administrative Assistant
mhandler@scboces.org
dbright@scboces.org

Ms Marianne VanDuyne
R.S. Abrams and Company
1727 Veterans Highway

Islandia, NY 11749
Fax 631 234-4234
Mvanduyne@rsabrams.com
631-234-4444

Terry Schruers—OK 1-8-03
Assistant Superintendent for Business
New Hartford Central School District
33 Oxford Road
New Hartford, NY 13413
Tschruer@nhart.org
(315) 624-1287
fax 314 624-1265

Shane Higuera
Associate Superintendent
Management Services
Eastern Suffolk BOCES
201 Sunrise Highway
Patchogue, New York 11772
Telephone (631) 687-3014
Fax (631) 687-3238
Shiguera@sricboces.org

Appendix B. Transition Points Between Fuzzy Sets

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Tax Rate	Tax to Full Value Ratio (Burden)	Low/Mod/High	0.94%	1.78%	2.4%
	Tax to Income Ratio	Low/Mod/High	2.46%	4.23%	8.83%
	Income per Student	Low/Mod/High	$56,312	$96,826	$424,747
	Property Value per Student	Low/Mod/High	$135,055	$267,590	$900,000

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Property Taxes	Trend in Tax to Full Value Ratio	Neg./Low/High	-2.73%	1.78%	6.11%
	Number of Budget Defeats	0/1/2+	0	1	2
	Assessment to Full Value Ratio	Low/Mod/High	2.46%	84.94%	100%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Revenue	Tax as % of Local Revenue (Diversification)	Low/Mod/High	73.54%	88.81%	95.87%
	Revenue Variation (Stability)	High/Mod/Low	1.68%	3.82%	12.89%
	Aid as % of Total Revenue (Dependency)	Low/Mod/High	8.14%	50.58%	75.6%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Capital Expenditure	3-year Average per Student	Low/Mod/High	$143	$714	$3,870
	11-year Average per Student	Low/Mod/High	$195	$686	$1,809

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Debt Burden	Adj. Debt to Full Value Ratio	Low/Mod/High	0.00%	0.63%	2.4%
	Debt to Full Value Ratio	Low/Mod/High	0.00%	1.45%	7.94%
	Debt Service as % of Expenditure	Low/Mod/High	0.38%	3.06%	7.68%
	% of Debt Paid (Payoff Rate)	Low/Mod/High	3.54%	10%	20%
			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Debt	% of Debt Limit Used	Low/Mod/High	5%	30%	60%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Fund Balance	UUB as % of Expenditures	Low/Mod/High	0%	1.5%	2%
	Unreserved as % of Expenditures	Low/Mod/High	1%	5.5%	13%
	Trend in Total Unreserved	Neg./Stable/Pos.	-2%	0%	1.5%
	Reserved as % of Expenditures	Low/Mod/High	0%	3% to 6%	10%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Tax Capacity	Property Value per Student	Low/Mod/High	$135,055	$267,590	$900,000
	Tax to Full Value Ratio (Burden)	Low/Mod/High	0.94%	1.78%	2.4%
	Trend in Tax to Full Value Ratio	Neg./Low/High	-4.2%	0.6%	5.58%
	Number of Budget Defeats	0/1/2+	0	1	2

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Liquidity	Average GF Quick Ratio	Low/Mod/High	0.5	1.5	5
	GT Quick Ratio	Low/Mod/High	0.5	1.5	5
	TF Quick Ratio	Low/Mod/High	0.5	1.5	5

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Sparsity	Enrollment	Low/Mod/High	312	1,633	5,000
	Student Density	Low/Mod/High	3.8	32.8	889.2

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Student Needs	Free Lunch as % of Enrollment	Low/Mod/High	0.7%	21.19%	47.56%
	LEP as % of Enrollment	Low/Mod/High	0%	1%	7,78%
	High Cost as % of Enrollment	Low/Mod/High	0.11%	1.0%	2.47%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Costs Factors	Regional Cost Index	Low/Mod/High	80	100	120

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Enrollment	3-year Growth	Neg. /Low/High	-2.78%	0%	3.36%
	10-year Growth	Neg. /Low/High	-1.41%	0.58%	3.23%
	3-year Stability	High/Mod/Low	0.5%	1.39%	3.74%
	11-year Stability	High/Mod/Low	0.92%	2.21%	5.49%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Population	Growth	Low/Mod/High	-0.91%	0.33%	1.84%
	Enrollment per Capita	Low/Mod/High	10.3%	17.2%	21.8%
	Trend in Enrollment per Capita	Neg./Stable/Pos.	-2.46%	0%	1.56%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Employment	Growth Rate 00-02	Neg./Stable/Pos.	-1.01%	0%	1.17%
	Growth Rate 96-02	Neg./Stable/Pos.	-0.56%	0%	1.3%
	Unemployment Rate 00-02	Low/Mod/High	3.27%	4.57%	7.01%
	High Wage Rate 98-00	Low/Mod/High	29.28%	35.45%	45.71%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Fiscal Capacity	Property Value per Student	Low/Mod/High	$135,055	$267,590	$892,838
	Income per Student	Low/Mod/High	$56,312	$96,826	$303,908
	Income Growth Rate	Low/Mod/High	2.45%	5.76%	11.5%
	Property Value Growth Rate	Low/Mod/High	-1.76%	2.34%	6.35%

			Transition Points		
Rule Base	**Measure**	**Sets**	Lower	Middle	Upper
Overall	Performance Index	Low/Mod/High	125	140 to 170	180

Appendix C. Rule Bases

Overall Rule Base

short term

long term	poor			fair			good		
	performance			**performance**			**performance**		
	economic	low	mod	high	low	mod	high	low	mod	high
poor	poor	p	p	p	p	p	p	p	f	f
	fair	p	p	p	p	f	f	p	f	f
	good	p	p	f	p	f	f	f	f	f
fair	poor	p	p	p	p	f	f	f	f	f
	fair	p	p	f	f	f	f	f	f	g
	good	p	f	f	f	f	f	f	g	g
good	poor	p	f	f	f	f	f	f	f	g
	fair	p	f	f	f	f	g	g	g	g
	good	f	f	f	f	g	g	g	g	g

Short-Run Condition Rule Base

fund balance

tax capacity	poor			fair			good		
	liquidity			**liquidity**			**liquidity**		
	poor	fair	good	poor	fair	good	poor	fair	good
poor	p	p	p	p	f	f	f	f	g
fair	p	p	p	f	f	f	f	g	g
good	p	f	f	f	f	g	g	g	g

Long-Run Condition Rule Base

fund balance

debt	poor			fair			good		
	revenue			**revenue**			**revenue**		
	poor	fair	good	poor	fair	good	poor	fair	good
poor	p	p	p	p	p	f	p	f	f
fair	p	p	f	f	f	f	f	g	g
good	p	f	f	f	f	g	f	g	g

Economic Condition Rule Base

fiscal

employment	poor				fair				good			
	pop/enr				**pop/enr**				**pop/enr**			
	costs	poor	fair	good	**costs**	poor	fair	good	**costs**	poor	fair	good
poor	poor	p	p	p	poor	p	p	f	poor	p	f	f
	fair	p	p	p	fair	p	f	f	fair	f	f	f
	good	p	p	p	good	f	f	f	good	f	g	g
	pop/enr				**pop/enr**				**pop/enr**			
	costs	poor	fair	good	**costs**	poor	fair	good	**costs**	poor	fair	good
fair	poor	p	p	p	poor	p	f	f	poor	f	f	f
	fair	p	p	f	fair	f	f	f	fair	f	f	g
	good	f	f	f	good	f	f	f	good	g	g	g
	pop/enr				**pop/enr**				**pop/enr**			
	costs	poor	fair	good	**costs**	poor	fair	good	**costs**	poor	fair	good
good	poor	p	p	p	poor	f	f	f	poor	f	f	g
	fair	f	f	f	fair	f	f	g	fair	g	g	g
	good	f	f	f	good	g	g	g	good	g	g	g

Liquidity Rule Base (short-run condition)

gf quick ratio

average	low			mod			high		
	tf quick ratio			**tf quick ratio**			**tf quick ratio**		
	low	mod	high	low	mod	high	low	mod	high
low	p	p	p	p	f	f	f	f	f
mod	p	p	f	f	f	f	f	f	g
high	p	f	f	f	f	g	f	g	g

Fund Balance Rule Base (short-run condition)

UUB + UAB

UUB	low				mod				high			
	trend				**trend**				**trend**			
	reserved	neg	stable	pos	**reserved**	neg	stable	pos	**reserved**	neg	stable	pos
low	low	p	p	p	low	p	p	f	low	f	f	g
	mod	p	p	p	mod	p	f	f	mod	f	f	g
	high	p	p	p	high	p	f	f	high	f	f	g
mod	low	p	p	p	low	p	f	f	low	f	g	g
	mod	p	p	f	mod	p	f	f	mod	f	g	g
	high	p	p	f	high	f	f	f	high	f	g	g
high	low	p	p	f	low	f	f	g	low	g	g	g
	mod	p	f	f	mod	f	f	g	mod	g	g	g
	high	p	f	f	high	f	g	g	high	g	g	g

Tax Capacity Rule Base (short-run condition)

full value

burden	low			mod			high		
	trend			**trend**			**trend**		
	defeats	dec	low	high	dec	low	high	dec	low	high
low	none	f	f	f	g	g	f	g	g	g
	one	f	f	f	g	f	f	g	g	g
	two+	p	p	p	f	f	f	g	g	g
	trend			**trend**			**trend**		
	defeats	dec	low	high	dec	low	high	dec	low	high
mod	none	f	f	p	g	f	f	g	g	g
	one	p	p	p	f	f	f	g	g	f
	two+	p	p	p	f	f	f	f	f	f
	trend			**trend**			**trend**		
	defeats	dec	low	high	dec	low	high	dec	low	high
high	none	p	p	p	f	f	p	f	f	f
	one	p	p	p	f	p	p	f	f	p
	two+	p	p	p	p	p	p	f	p	p

Debt Rule Base (long-run condition)

burden

limit	high			mod			low		
	capital			**capital**			**capital**		
	low	mod	high	low	mod	high	low	mod	high
low									
	p	p	f	f	f	g	f	g	g
	capital			**capital**					
	low	mod	high	low	mod	high	low	mod	high
mod									
	p	p	p	p	f	f	f	g	g
	capital			**capital**			**capital**		
	low	mod	high	low	mod	high	low	mod	high
high									
	p	p	p	p	p	f	p	f	f
							p		

Debt Burden Rule Base (debt)

adj vs FV

vs FV		low			mod			high		
		service			**service**			**service**		
	payoff rate	low	mod	high	low	mod	high	low	mod	high
low	low	g	g	f	f	f	p	f	f	p
	mod	g	g	f	f	f	f	f	f	p
	high	g	g	g	f	f	f	f	f	f
		service			**service**			**service**		
	payoff rate	low	mod	high	low	mod	high	low	mod	high
mod	low	g	g	f	f	f	p	p	p	p
	mod	g	g	f	f	f	p	f	f	p
	high	g	g	f	f	f	f	f	f	p
		service			**service**			**service**		
	payoff rate	low	mod	high	low	mod	high	low	mod	high
high	low	f	f	f	f	p	p	p	p	p
	mod	g	f	f	f	f	p	f	p	p
	high	g	f	f	f	f	f	f	f	p

Capital Expenditure Rule Base (debt)

11 yr ave

3 yr ave	low	mod	high
low	p	f	f
mod	p	f	g
high	f	g	g

Revenue Rule Base (long-run condition)

property tax

total aid		poor			fair			good		
		diversity			**diversity**			**diversity**		
	stability	high	mod	low	high	mod	low	high	mod	low
low	high	f	f	p	g	g	f	g	g	g
	mod	f	p	p	g	f	f	g	g	g
	low	p	p	p	f	f	f	g	g	g
		diversity			**diversity**			**diversity**		
	stability	high	mod	low	high	mod	low	high	mod	low
mod	high	f	p	p	f	f	f	g	g	g
	mod	p	p	p	f	f	f	g	g	g
	low	p	p	p	f	f	p	g	g	f
		diversity			**diversity**			**diversity**		
	stability	high	mod	low	high	mod	low	high	mod	low
high	high	p	p	p	f	f	p	g	g	f
	mod	p	p	p	f	f	p	g	g	f
	low	p	p	p	f	p	p	f	f	f

Property Tax Rule Base (revenue)

tax rate

trend		poor			fair			good		
		defeats			**defeats**			**defeats**		
	AV/FV	0	1	2+	0	1	2+	0	1	2+
neg	low	f	p	p	f	f	f	g	g	g
	mod	f	f	p	g	f	f	g	g	g
	high	f	f	f	g	f	f	g	g	g
		defeats			**defeats**			**defeats**		
	AV/FV	0	1	2+	0	1	2+	0	1	2+
low	low	p	p	p	f	f	p	g	g	f
	mod	p	p	p	f	f	f	g	g	g
	high	f	p	p	f	f	f	g	g	g
		defeats			**defeats**			**defeats**		
	AV/FV	0	1	2+	0	1	2+	0	1	2+
high	low	p	p	p	f	p	p	g	f	f
	mod	p	p	p	f	f	p	g	g	f
	high	p	p	p	f	f	p	g	g	f

Property Tax Rate Rule Base (property taxes)

vs FV

vs Income	low			mod			high		
	FV/enr			**FV/enr**			**FV/enr**		
	Inc/enr	low	mod	high	**Inc/enr**	low	mod	high	**Inc/enr**	low	mod	high
low	low	f	f	g	low	f	f	f	low	p	f	f
	mod	g	g	g	mod	f	g	g	mod	f	f	f
	high	g	g	g	high	g	g	g	high	f	f	f
	FV/enr			**FV/enr**			**FV/enr**		
	Inc/enr	low	mod	high	**Inc/enr**	low	mod	high	**Inc/enr**	low	mod	high
mod	low	f	f	f	low	f	f	f	low	p	p	p
	mod	f	f	f	mod	f	f	f	mod	p	p	p
	high	f	g	g	high	f	f	f	high	p	p	f
	FV/enr			**FV/enr**			**FV/enr**		
	Inc/enr	low	mod	high	**Inc/enr**	low	mod	high	**Inc/enr**	low	mod	high
high	low	p	f	f	low	p	p	p	low	p	p	p
	mod	f	f	f	mod	p	p	p	mod	p	p	p
	high	f	f	g	high	p	p	f	high	p	p	p

Cost Rule Base (economic condition)

student needs

sparsity	poor			fair			good		
	regional costs			**regional costs**			**regional costs**		
	low	mod	high	low	mod	high	low	mod	high
poor									
	p	p	p	f	p	p	f	f	p
	regional costs			**regional costs**			**regional costs**		
	low	mod	high	low	mod	high	low	mod	high
fair									
	f	p	p	f	f	f	g	g	f
	regional costs			**regional costs**			**regional costs**		
	low	mod	high	low	mod	high	low	mod	high
good									
	f	p	p	g	f	f	g	g	g

Student Needs Rule Base (costs)

free lunch

LEP	low	mod	high
none	**High Cost** low mod high g g g	**High Cost** low mod high g f f	**High Cost** low mod high f p p
mod	**High Cost** low mod high g g f	**High Cost** low mod high f f p	**High Cost** low mod high p p p
high	**High Cost** low mod high f f p	**High Cost** low mod high f p p	**High Cost** low mod high p p p

Sparsity Rule Base (costs)

enrollment

pupil density	low	mod	high
low	p	f	f
mod	f	g	g
high	f	g	g

Fiscal Capacity Rule Base (economic condition)

Full Property Value

Income		low			mod			high			
		FV growth			**FV growth**			**FV growth**			
	Inc growth	low	mod	high	low	mod	high	low	mod	high	
low	low	p	p	p	p	p	f	p	f	f	
	mod	p	p	p	p	f	f	f	f	f	
	high	p	p	f	p	f	f	f	f	f	
	FV growth				**FV growth**			**FV growth**			
	Inc growth	low	mod	high	low	mod	high	low	mod	high	
mod	low	p	f	f	p	f	f	f	g	g	
	mod	p	f	f	f	f	f	f	g	g	
	high	f	f	f	f	f	g	g	g	g	
	FV growth				**FV growth**			**FV growth**			
	Inc growth	low	mod	high	low	mod	high	low	mod	high	
high	low	p	f	f	f	g	g	g	g	g	
	mod	f	f	f	f	g	g	g	g	g	
	high	f	f	f	f	g	g	g	g	g	

Population/Enrollment Rule Base (economic condition)

population

enrollment	poor	fair	good
poor	p	f	f
fair	p	f	g
good	f	f	g

Population Rule Base (population/enrollment)

growth

enr/capita	low			mod			high		
	trend			**trend**			**trend**		
	neg	stable	pos	neg	stable	pos	neg	stable	pos
low	f	f	f	g	g	f	g	g	g
mod	f	p	p	f	f	p	g	g	f
high	p	p	p	f	p	p	f	f	p

Enrollment Rule Base (population/enrollment)

91-01 growth

96-01 growth	neg			low			high		
	91 stability			**91 stability**			**91 stability**		
	96 stability	high	mod	low	high	mod	low	high	mod	low
neg	high	p	p	p	f	p	p	f	f	f
	mod	p	p	p	f	p	p	f	f	p
	low	p	p	p	p	p	p	f	p	p
low	high	f	f	p	g	f	f	g	g	f
	mod	f	p	p	f	f	f	g	g	f
	low	p	p	p	f	f	f	f	f	f
pos	high	f	f	f	g	g	g	g	g	g
	mod	f	p	p	g	g	f	g	g	g
	low	f	p	p	f	f	f	g	g	f

Employment Rule Base (economic condition)

high wage

unemploy	low				mod				high			
		00 growth				**00 growth**				**00 growth**		
	96 growth	neg	none	pos	**96 growth**	neg	none	pos	**96 growth**	neg	none	pos
low	neg	f	f	f	neg	f	f	g	neg	f	g	g
	none	f	f	f	none	f	f	g	none	g	g	g
	pos	f	f	g	pos	f	g	g	pos	g	g	g
		00 growth				**00 growth**				**00 growth**		
	96 growth	neg	none	pos	**96 growth**	neg	none	pos	**96 growth**	neg	none	pos
mod	neg	p	p	f	neg	f	f	f	neg	f	f	f
	none	p	f	f	none	f	f	g	none	f	f	g
	pos	f	f	f	pos	f	g	g	pos	f	g	g
		00 growth				**00 growth**				**00 growth**		
	96 growth	neg	none	pos	**96 growth**	neg	none	pos	**96 growth**	neg	none	pos
high	neg	p	p	p	neg	p	p	p	neg	p	p	f
	none	p	p	p	none	p	p	f	none	p	f	f
	pos	p	p	f	pos	p	f	f	pos	f	f	f

Appendix D. Need/ Resource Capacity Categories

"The need/resource capacity index, a measure of a district's ability to meet the needs of its students with local resources, is the ratio of the estimated poverty percentage (expressed in standard score form) to the Combined Wealth Ratio (expressed in standard score form). A district with both estimated poverty and Combined Wealth Ratio equal to the State average would have a need/resource capacity index of 1.0. Need/Resource Capacity (N/RC) categories are determined from this index…" using the definitions in the table below." (SED, 2001, Appendix B)

- **"Estimated Poverty Percentage:** A weighted average of the 1998-99 and 1999-2000 kindergarten through grade 6 free-and-reduced-price-lunch percentage. (An average was used to mitigate errors in each measure.) The result is a measure that approximates the percentage of children eligible for free- or reduced-price lunches."
- **"Combined Wealth Ratio:** The ratio of district wealth per pupil to State average wealth per pupil, used for 1998-99 aid."

Need/Resource Capacity Category	Definition
High N/RC Districts	
New York City	New York City
Large City Districts	Buffalo, Rochester, Syracuse, Yonkers
Urban-Suburban	All districts at or above the 70th percentile (1.1855) which meet one of the following conditions: 1) more than 100 students per square mile; or 2) have an enrollment greater than 2,500 and more than 50 students per square mile.
Rural	All districts at or above the 70th percentile (1.1855) which meet one of two conditions: 1) fewer than 50 students per square mile; or 2) fewer than 100 students per square mile and an enrollment of less than 2,500.
Average N/RC Districts	All districts between the 20th (0.7693) and 70th (1.1855) percentile on the index.
Low N/RC Districts	All districts below the 20th percentile (0.7693) on the index.

References

Ammar, Salwa, Ronald Wright, and Sally Selden. 2000a. "Ranking State Financial Management: A Multilevel Fuzzy Rule-based System." *Decision Sciences*. 31: 449-481.

Ammar, Salwa, Robert Bifulco, William Duncombe, and Ronald Wright. 2000b. "Identifying Low-Performance Public Schools." *Studies in Educational Evaluation*. 26: 259-287.

Ammar, Salwa, William Duncombe, and Ronald Wright. 2001a. "Evaluating Capital Management: A New Approach." *Public Budgeting & Finance*. 21 (Winter): 47-69

Ammar, Salwa, William Duncombe, Yilin Hou, and Ronald Wright. 2001b. "Evaluating City Financial Management Using Fuzzy Rule-Based Systems." *Public Budgeting & Finance*. 21 (Winter): 70-90.

Ammar, Salwa, William Duncombe, Yilin Hou, Bernard Jump, and Ronald Wright. 2001c. "Using Fuzzy Rule-Based Systems to Evaluate Overall Financial Performance of Governments: An Enhancement of the Bond Rating Process." *Public Budgeting & Finance*. 21 (Winter): 91-110.

Association of School Business Officials. 2000. *GASB Statement No. 34 Implementation Recommendations for School Districts*. Reston, VA: ASBO International.

Bahl, Roy. 1984. *Financing State and Local Government in the 1980s*. New York: Oxford University Press.

Bahl, Roy and William Duncombe. 1991. *Economic Growth and Fiscal Planning: New York in the 1990s*. New Brunswick, NJ: Center for Urban Policy Research.

Berne, Robert, and Richard Schramm. 1986. *The Financial Analysis of Governments*. Englewood Cliffs, NJ: Prentice-Hall.

Bradbury, Katherine. 1984. "Urban Decline and Distress: An Update," *New England Economic Review*. (July/August): 39-55.

Chambers, Jay. 1997. *A Technical Report on the Measurement of Geographic and Inflationary Differences in Public School Costs*. Prepared for the National Center for Education Statistics, Washington, DC.

Chen, Huey-Tsyh. 1990. *Theory-Driven Evaluations*. Newbury Park, CA: Sage.

Dearborn, Philip. 1988. "Fiscal Conditions in Large American Cities, 1971-1984," in *Urban Change and Poverty* edited by M. McGeary, et al. Washington D.C.: National Academy Press, 1988.

Dubois, D. and H. Prade. 1988. *Possibility theory*. New York, NY: Plenum Press.

Duncombe, William and John Yinger. 1999. "Performance Standards and Educational Cost Indexes: You Can't Have One Without the Other." In H. Ladd, R. Chalk, and J. Hansen (eds.) *Equity and Adequacy in Education Finance: Issues and Perspectives*. Washington, DC: National Academy Press.

Finkler, Steven. 2001. *Financial Management for Public, Health, and Not-for-Profit Organizations*. Upper Saddle River, NJ: Prentice Hall.

Fitch Ratings. 2000a. "Local Government General Obligation Rating Guidelines," *Tax Supported Special Report*. (May 23): 1-11.

Fitch Ratings. 2000b. "Impact of Management Practices on Municipal Credit," *Special Report* (May 4), 1-6.

Fowler, William, and David Monk. 2001. *A Primer for Making Cost Adjustments in Education*. NCES 2001-323. Washington, DC: NCES.

Government Accounting Standards Board (GASB). 2000. *Guide to Implementation of GASB Statement 34 on Basic Financial Statements—and Management Discussion and Analysis—for State and Local Governments*. Norwalk, CT: GASB.

Gold, Stephen. 1986. "State Government Fund Balances, Financial Assets, and Measures of Budget Surplus," in *Federal-State-Local Fiscal Relations, Technical Papers*, Volume 2, Washington D.C.: U.S. Department of the Treasury, p. 596.

Hou, Yilin. 2002. *The Economics, Law and Politics of Sub-national Counter Cyclical Fiscal Policies: Evidence from American States 1979-1999*. doctoral dissertation. Syracuse, NY: Syracuse University.

Jenny, Nicholas. 2003. "2002 Tax and Budget Review and 2003 Budget Preview." *State Fiscal Brief*, No. 66. Albany: NY: Fiscal Studies Program, The Nelson A. Rockefeller Institute of Government.

Ladd, Helen, and John Yinger. 1989. *America's Ailing Cities: Fiscal Health and the Design of Urban Policy*. Baltimore: The Johns Hopkins University Press.

Loviscek, Anthony, and Frederick Crowley. 1996. "Municipal Bond Ratings and Municipal Debt Management," *Handbook of Debt Management*, ed. G. Miller. New York: Marcel Dekker, pp. 475-514.

Mead, Dean. 2001. “Assessing the Financial Condition of Public School Districts.” *Selected Papers in School Finance, 2000-01*. Washington, DC: National Center for Education Statistics.

Moody's Investors Service. 1989. *Moody's on Municipals*. New York: Moody's.

Moody's Investors Service. 1999. "The Determinants of Credit Quality," *Municipal Credit Research*. (November): 1-16

Musgrave, Richard and Peggy Musgrave. 1989. *Public Finance in Theory and Practice*, Fifth Edition. New York: McGraw-Hill Book Company, pp. 479-480.

National Conference of State Legislatures. 2003. *State Budget Deficits for Fiscal Year 2004 Are Huge and Growing*, January 23.

Office of the State Comptroller. 2002. “Financial Condition Analysis.” *Local Government Management Guide*. Albany, NY: author.

Rafuse, Robert. 1986. "A Representative-Expenditure Approach to the Measurement of the Cost of the Service Responsibilities of the States," in *Federal-State-Local Fiscal Relations: Technical Papers*, Volume 1, Washington D.C.: U.S. Department of the Treasury.

Reschovsky, A. and J. Imazeki. 1997. “The Development of School Finance Formulas to Guarantee the Provision of Adequate Education to Low-Income Students.” In W.J. Fowler, Jr., *Developments in School Finance*. Washington, DC: U.S. Department of Education, pp. 123-147.

Standard & Poor's. 2000. *Public Finance Criteria*. New York: Standard & Poor's.

State Education Department. 2001. “Improving the Formulas to Help Meet State Learning Standards: The Regents Proposal on State Aid to School Districts for School Year 2002-03.

Thanassoulis, E. 1999. “Data Envelopment Analysis and Its Use in Banking.” *Interfaces*. 29: 1-13.