# Quantitative Fiscal Brief: New York State Fiscal Stress Data for City Governments

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## ARPA New York State Local Government Improvement Program Series

This study is part of a four part series about the efforts of the State of New York to improve local government efficiency.  The series includes reports on:

1. The New York State Fiscal Stress Monitoring System for Local Governments.
2. The Financial Restructuring Board for Local Governments *A New York State Entity*.
3. The New York State Local Government Real Property Tax Freeze.
4. The New York State Department of State Local Government Efficiency Program.

## Quantitative Fiscal Brief Studies

The *Quantitative Fiscal Brief* studies use inferential statistics such as regression analysis to study public management tools in the area of government finance.

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# Quantitative Fiscal Brief: New York State Fiscal Stress Data for City Governments

**Abstract**

This paper examines the data used by the Office of the New York State Comptroller (OSC) and by the New York Financial Restructuring Board (FRB) for Local Governments as they make financial stress determinations.  The FRB uses two variables to designate if a local government may have fiscal stress including a property tax rate variable, and a fund balance variable.  Regression analysis is used to study the variables for 53 city governments in New York State. The analysis shows that there is some statistical support to use a property tax rate variable and the fund balance variable by the FRB.  Both of the variables are statistically significant in the regression analysis.  The variables taken together only explain about 25 percent of the fiscal stress as determined by the OSC.  If the variables are considered on a stand-alone basis the fund balance ratio explains about 20 percent of the fiscal stress as computed by the OSC while the property tax rate variable explains only nine percent of the fiscal stress.

**Introduction**

The State of New York New York currently has a Fiscal Stress Monitoring System maintained by the Office of the New York State Comptroller (OSC).  The system uses a number of metrics to designate whether a local government is experiencing fiscal stress.  New York State also has a Financial Restructuring Board (FRB) which uses financial metrics to designate whether individual governments are subject to fiscal stress.  This study uses regression analysis to determine whether the two fiscal stress systems support each other.  Data for city governments are used in the regression analyses.

**Background**

The OSC developed a new Fiscal Stress Monitoring System for Local Governments during 2012.[1] The system uses data for nine variables to develop a fiscal stress score. Examples of the variables include fund balance ratios, operating deficit metrics, and cash and debt related variables (Martinez 2016). The system develops a fiscal stress score for the governments and those with scores greater than 45 percent are considered to have varying levels of fiscal stress. The more important variables in the system for city governments are related to fund balance, operating deficits, and cash levels.[2]

The FRB also makes a fiscal stress determination.[3] This system examines approximately 1,600 local government entities and examines two variables (Bronner 2015). The first variable examines the property tax rate for the locality.[4] This variable is computed by taking the property tax levy and dividing it by the full value of taxable real estate over a five year period. The key assumption used by the FRB is that the higher the tax rate the greater level of fiscal stress. Any local government with a tax rate exceeding 7.1674 percent is considered to have some fiscal stress.

It is important to consider how the tax rate variable is being used by the FRB. The FRB logic is that if a government has a high tax rate then it has less flexibility to raise taxes in the future. Another way to view the tax rate variable is that those localities with higher tax rates are funding current operations to a greater degree and are actually increasing fund balance. This would make the locality less subject to fiscal stress.

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[1] See Albany Research in Public Administration Report Number 2016-1, entitled *The New York State Fiscal Stress Monitoring System for Local Governments.* August 1, 2016. (www.albany.rpa.com)

[2] Ibid.

[3] See Albany Research in Public Administration Report Number 2016-2, entitled *The Financial Restructuring Board for Local Governments A New York State Entity.* September 1, 2016. (www.albany.rpa.com)

[4] This metric divides the current property tax levy by the full value of taxable real estate.

An important element to study in the regression analyses that follows is the sign of the coefficient of the property tax rate variable. The sign can either be positive (+) or negative (-). If the coefficient is negative that indicates that fiscal stress is <u>lower</u> for governments with higher tax rates than for other governments. That would indicate that local governments with higher tax rates are funding current operations to a greater degree than other governments and most likely have a higher fund balance than they would otherwise have. If the coefficient is positive this would illustrate that those governments with higher tax rates are more subject to having fiscal stress. This would confirm the logic being used by the FRB.

The second variable used by the FRB measures fund balance to expenditures over a five year period. Governments with a fund balance to expenditure ratio below 5 percent are placed on a fiscal stress list. The logic behind the FRB assumption is that those governments with a lower fund balance have less assets in reserves or rainy day funds so they are more subject to having fiscal stress. It is also important to consider the coefficient computed for this variable. A positive coefficient would indicate that the higher the fund balance ratio the greater the amount of fiscal stress. A negative coefficient would indicate that the higher the fund balance, the lower the amount of fiscal stress. If a negative coefficient is computed, this would help to confirm the reasoning used by the FRB.

The analysis developed by the FRB indicates that if a local government fails either the property tax rate variable test, or the fund balance test, the locality can be determined to be placed on the fiscal stress list.[5] This means that in order for the FRB logic to be confirmed, the statistical tests must be passed for both variables.

**Regression Analysis for City Governments**

Appendix 1 contains the fiscal stress scores used by the OSC. The appendix also contains the property tax rate variable and the fund balance ratio used by the FRB.[6] A regression analysis can be used to determine if

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[5] Financial Restructuring Board for Local Governments, Resolution No. 2016-08, Approving the Determination of Automatically Fiscally Eligible Municipalities.

there is a statistical relationship between the OSC's fiscal stress scores, and the two variables considered by the FRB. [7] Three regression analyses are used below.  More detail on the three regression analysis is shown in Appendix 2.

**Regression #1:** The first regression analysis uses the OSC's fiscal stress score as the dependent variable and the FRB's tax rate variable as an independent variable.  The regression analysis shows that the property tax rate is a significant variable associated with fiscal stress for city governments.   The tax rate variable has a positive coefficient of 1.492.  This means that as the tax rate increases, the amount of fiscal stress also increases.  This supports the thinking used by the FRB.  The tax rate variable only explains, however, about 9 percent of the fiscal stress level for the city governments.  This means that on a stand-alone basis, the tax rate variable is not a good indicator of fiscal stress for the city governments.

**Regression #2**: The second regression analysis uses the OSC's fiscal stress score as the dependent variable and the FRB's fund balance ratio as an independent variable.  This equation specification is reasonable since governments with lower fund balances should have greater fiscal stress.  The results show that the fund balance ratio is a significant variable and that it explains about 20 percent of the fiscal stress score.  The following statistics were computed for the fund balance variable:

| | |
|---|---|
| Fund Balance Variable Significant: | Yes |
| Variable Coefficient | -.633 |
| Amount of Fiscal Stress Score Explained: | 20% |

Notice that the variable has a negative coefficient (-.633).  This means that the higher the fund balance, the lower the fiscal stress score. This regression analysis indicates that the fund balance ratio used by the FRB and

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[6] A small number of cities were not included in the regression analysis due to missing data either by the OSC or the FRB.

[7] A standard regression analysis using the formula Y = M(X) + b is used.  Y=the dependent variable represented by the fiscal stress score.  The term M(X) represents the independent variable effects such as the tax rate, or the fund balance variable.  The term b is a standard error term. (Berry and Feldman (1985), Lewis-Beck and Lewis-Beck (2016), Schroeder, Sjoquist, and Stephan (2017).

the fiscal stress score computed by OSC are in agreement.    The variable explains only a small amount (20 percent) of the fiscal stress score.  The fund balance variable is one of the metrics used by the OSC as it computes fiscal stress scores.  An Albany Research in Public Administration study from August 2016 found that the fund balance variable was responsible for about 59 of the fiscal stress scores for 12 cities that were defined as having fiscal stress by the OSC.[8]

**Regression #3:** The third regression analysis uses the OSC's fiscal stress score as the dependent variable and the FRB property tax variable and fund balance ratios as two separate independent variables.  This multiple regression analysis shows the effects of the two independent variables together on the fiscal stress score dependent variable.   The results show that both the tax rate and the fund balance ratios are significant and they explain about 25 percent of the fiscal stress scores computed by the OSC.  The tax rate variable coefficient in the multiple regression analysis is 1.11.  This means that the amount of fiscal stress increases as the tax rate variable increases.  The fund balance ratio coefficient is -.565.   This indicates that the amount of fiscal stress decreases as the fund balance level increases.   Some of the key statistical indicators for the model are listed below:

| | |
|---|---|
| Tax Rate Variable Significant: | Yes |
| Tax Rate Variable Coefficient | 1.11 |
| Fund Balance Ratio Significant: | Yes |
| Fund Balance Variable Coefficient | -0.565 |
| Amount of Fiscal Stress Score Explained: | 25% |
| Model Constant | 24.761 |

The multiple regression analysis shows that the FRB's use of a property tax variable and a fund balance ratio to determine fiscal stress has some statistical support because both variables are statistically significant and

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[8] See Albany Research in Public Administration Report Number 2016-1, entitled *The New York State Fiscal Stress Monitoring System for Local Governments.*  August 1, 2016. (www.albany.rpa.com)

the signs of the coefficients are reasonable.   The two variables only explain about 25 percent of the fiscal stress as computed by the OSC.[9]   This indicates that the use of these two variables as an indicator of fiscal stress will contain errors in many cases in a statistical sense.

**Summary and Conclusions**

This paper analyzed a number of fiscal stress indicators used by the OSC and the FRB to determine whether fiscal stress is occurring for city governments in New York State.  Regression analysis is used to study the fiscal stress scores computed by the OSC.  The analysis also analyzed two indicators of fiscal stress as used by the FRB.  The FRB uses a property tax rate variable and a fund balance ratio as indicators of fiscal stress. According to the FRB, if a locality fails a test associated with either variable, it can designate a locality as susceptible to fiscal stress.  The use of the property tax rate variable and the fund balance ratio is partially supported by the statistical analysis.  While both variables are statistically significant, they explain only about 25 percent of the fiscal stress scores.   A similar model computed for county governments in New York State found that the model explained about 36 percent of the fiscal stress scores.[10]

The FRB can designate a local government as having fiscal stress by using either the property tax rate variable of the fund balance variable or both.  For city governments it is problematic to use the property tax variable by itself since it only explains only 9 percent of the fiscal stress in the regression model.   The fund balance variable is important to fiscal stress since the OSC uses the metric as it computes fiscal stress.  In the statistical analysis the fund balance ratio explains about 20 percent of fiscal stress.

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[9] A similar analysis computed for county governments in New York State indicated that the model worked better since it explained about 36 percent of the fiscal stress score.  See Albany Research in Public Administration Report Number 2017-3, February 9, 2017.

[10] Albany Research in Public Administration Report Number 2017-3, *Quantitative Fiscal Brief:  New York State Fiscal Stress Data for County Governments.*  February 9, 2017. (www.albany.rpa.com)

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# Appendix 1

## City Data for the Regression Analysis

| City | OSC Fiscal Stress Score | FRB Tax Rate Variable | FRB Fund Balance Ratio |
|---|---|---|---|
| Albany | 77.5 | 11.645 | 12.46 |
| Auburn | 11.3 | 11.879 | 22.31 |
| Batavia | 0 | 10.154 | 31.87 |
| Beacon | 1.70 | 8.21 | 28.48 |
| Binghamton | 17.5 | 22.945 | 19.02 |
| Buffalo | 9.60 | 11.211 | 38.39 |
| Canandaigua | 8.3 | 6.621 | 39.01 |
| Cohoes | 20.8 | 9.457 | 20.54 |
| Corning | 17.5 | 10.751 | 38.56 |
| Cortland | 25.4 | 15.102 | 17.49 |
| Dunkirk | 20.8 | 14.497 | 39.77 |
| Fulton | 64.2 | 17.01 | 5.45 |
| Geneva | 16.3 | 17.72 | 13.3 |
| Glen Cove | 53.8 | 7.598 | -5.24 |
| Glens Falls | 14.2 | 9.081 | 5.70 |
| Hornell | 5.0 | 11.358 | 20.63 |
| Hudson | 12.5 | 12.497 | 31.21 |
| Jamestown | 44.2 | 21.321 | 8.73 |
| Kingston | 15.8 | 9.878 | 14.01 |
| Lackawanna | 8.3 | 18.894 | 24.94 |
| Little Falls | 57.9 | 19.099 | 5.07 |
| Lockport | 43.3 | 14.519 | 6.82 |
| Long Beach | 33.8 | 5.888 | 1.62 |
| Mechanicville | 15.8 | 9.931 | 8.11 |
| Middletown | 5.0 | 11.913 | 21.15 |
| Mount Vernon | 20.8 | 10.872 | 11.67 |
| New Rochelle | 6.3 | 5.229 | 7.84 |
| Newburgh | 12.5 | 16.863 | 10.3 |
| Niagara Falls | 47.9 | 20.143 | 15.95 |
| North Tonawanda | 5.0 | 12.817 | 23.94 |
| Norwich | 45.8 | 12.764 | 13.23 |
| Ogdensburg | 46.7 | 16.47 | 30.65 |

**Source: OSC Fiscal Stress Scores from Fiscal Stress Monitoring System 2015 List dated September 22, 2016. Financial Restructuring Board Ratios from Resolution 2016-8.**

| City | OSC Fiscal Stress Score | FRB Tax Rate Variable | FRB Fund Balance Ratio |
|---|---|---|---|
| Olean | 6.7 | 14.27 | 27.8 |
| Oneida | 5.0 | 6.06 | 39.0 |
| Oneonta | 15.8 | 9.595 | 72.75 |
| Oswego | 0 | 10.293 | 14.62 |
| Peekskill | 21.3 | 8.254 | 22.51 |
| Plattsburg | 41.3 | 10.47 | 24.11 |
| Poughkeepsie | 62.5 | 9.909 | 16.23 |
| Rochester | 17.5 | 8.047 | 18.16 |
| Rome | 19.2 | 13.496 | 22.89 |
| Salamanca | 12.9 | 10.644 | 60.11 |
| Saratoga | 0 | 4.881 | 32.44 |
| Schenectady | 15.8 | 13.622 | 18.42 |
| Sherrill | 3.3 | 5.12 | 51.60 |
| Syracuse | 32.5 | 7.411 | 23.63 |
| Tonawanda | 26.3 | 16.36 | 21.93 |
| Troy | 40.0 | 10.47 | 21.24 |
| Utica | 40.0 | 15.46 | 3.84 |
| Watertown | 11.3 | 6.751 | 34.53 |
| Watervliet | 61.3 | 10.021 | 8.70 |
| White Plains | 7.9 | 5.993 | 18.36 |
| Yonkers | 51.7 | 5.703 | 6.87 |

# Appendix 2 Regression Analysis Detail

**Regression #1:** Fiscal Stress Score = Tax Rate Ratio Metric (N=53)

R-squared =     .09

Coefficient =    1.492

t-ratio =        2.510

Probability =   95%, p-value = .015

Constant =     8.102

Standard Error = .595

**Regression #2:** Fiscal Stress Score = Fund Balance Metric (N=53)

R-squared =     .203

Coefficient =    -0.633

t-ratio =        -3.771

Probability =    99%,   p-value = .000

Constant =     39.128

Standard Error = .168

**Regression #3:** Fiscal Stress Score = Fund Balance Metric + Tax Ratio Metric (N=53)

| | |
|---|---|
| R-squared = | .247 |
| Fund Balance Variable 2 Coefficient = | -.565 |
| t-ratio = | -3.391 |
| Probability = | 99%,  p-value = .000 |
| Standard Error = | .167 |
| Tax Rate Variable 5 Coefficient = | 1.11 |
| t-ratio = | 2.007 |
| Probability = | 99%,  p-value = .050 |
| Standard Error = | .553 |
| Constant = | 24.731 |