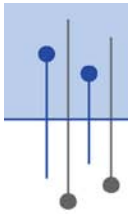
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Municipal Aid Evaluation and Reform

by Bo Zhao

Abstract

The distribution of unrestricted municipal aid has been a major policy concern in many states. Using Massachusetts as a case study, this paper examines the extent to which unrestricted municipal aid is responsive to the variation in the underlying fiscal health of municipalities. The paper uses a measure of "municipal gap"—based on local economic and social characteristics outside the direct control of local officials—to indicate the underlying fiscal health of cities and towns. The analysis finds large disparities in municipal gaps among Massachusetts cities and towns, and that those disparities have increased in recent years. However, unrestricted municipal aid has not been highly correlated with municipal gaps. This pattern is partly due to large ad hoc cuts in state aid over the past 20 years. This paper suggests that the state consider adopting a gap-based formula that provides more aid to communities facing larger municipal gaps. Policymakers should carefully readjust policy parameters in the formula over time to maintain the political feasibility of the approach. The gap-based framework and policy suggestions are potentially applicable to other states.

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I. Introduction

Unrestricted municipal aid is an important component of state aid, helping cities and towns provide vital public services. In fiscal year (FY) 2007, unrestricted municipal aid represented almost one-quarter of total state aid to cities and towns in the United States, second only to restricted education aid (Fisher and Prasad 2009). Nearly half of the U.S. states provide unrestricted municipal aid, and such aid accounts for more than 10 percent of local general revenue in 10 states.

The distribution of unrestricted municipal aid has been a contentious issue, prompting debates and reforms in many states. For example, New York, Minnesota, and Wisconsin implemented major overhauls of their municipal aid programs in the 2000s, but still contend with problems of inequity and budgetary instability (Office of the New York State Comptroller 2008; Minnesota House Research Department 2009; Wisconsin Department of Revenue 2009). Similarly, policymakers in Florida, Michigan, and Massachusetts have been exploring alternative formulas to distribute unrestricted municipal aid (Florida Fiscal Resource Committee 1999; Michigan Suburbs Alliance 2006; Ryan 2010).

This paper examines unrestricted municipal aid in Massachusetts as a case study. Unrestricted municipal aid represented 18.2 percent of total state aid to the 351 cities and towns in Massachusetts in FY 2007—somewhat lower than the national average of 24.5 percent. This aid source provided 6.2 percent of local general revenue in Massachusetts—close to the median percentage among all states providing unrestricted municipal aid (Fisher and Prasad 2009).

In Massachusetts, unrestricted municipal aid has a stated goal of helping equalize municipalities' ability to provide public services.[1] For example, the purpose of Lottery Aid—a major source of unrestricted municipal aid in Massachusetts—is to "provide general purpose financial assistance to municipalities on an equalizing basis" (Municipal Data Management and Technical Assistance Bureau 2003, p. 26). However, local officials have been concerned that

[1] State government may equalize municipalities' ability to provide public services to help ensure both equity and efficiency. Yinger (1986) states that it is not equitable for identical households or businesses in different communities to pay different amounts of taxes for the same level of local public services, or to receive different levels of local public services for the same taxes. Downes and Pogue (1994) suggest that disparities in the underlying local fiscal health may distort resource allocations, because households and businesses may move from their current communities to communities that are in better underlying fiscal health.

some aid programs are "archaic" and "arbitrary" (Schworm 2003). The governor echoed this sentiment in his FY 2011 state budget proposal, observing that unrestricted municipal aid "is no longer based on a current funding formula" (Massachusetts Office of the Governor 2010).

This paper explores these concerns of state and local officials and investigates the extent to which unrestricted municipal aid correlates with the underlying fiscal health of cities and towns. Underlying fiscal health is estimated using a measure of municipal fiscal gap based on local economic and social characteristics that are outside the direct control of local officials. The paper then explores alternative and politically feasible approaches to allocating state aid based on municipal gaps, to improve the distribution of aid.

This paper contributes to the research literature and the policy discussion in several ways. First, while examining the statewide aid pattern, the analysis highlights differences among the largest cities within the state. Concerns about aid inequity among these cities often surface in policy debates and the media (e.g., Urban Land Institute 2006; Ring 2010). However, inequity among the largest cities has not been well studied. Previous research has either examined aid distribution among large central cities nationwide (e.g., Dye and Hurley 1978; Pelissero 1984; Ladd and Yinger 1989) or emphasized that allocations tend to favor suburbs over central cities within a single state (e.g., Riew 1970; Bahl, Martinez-Vazquez, and Sjoquist 1992; Ali, Lerme, and Nakosteen 1993; Gyourko 1998; Chernick and Reschovsky 2001).

This paper's second contribution is that it uses new data to provide an updated measure of the underlying fiscal health of cities and towns in Massachusetts, and investigates changes in fiscal disparities over time. An earlier study by Bradbury and Zhao (2009) implies that Massachusetts cities and towns faced large fiscal disparities in FY 2000, given that the range between the municipal gap at the 95th percentile and the 5th percentile was 2.2 times the median gap.

Third, the paper evaluates the distribution of aid for the first time since the state consolidated its municipal aid programs in FY 2010. Fourth, using 10-year simulations, this paper shows how policymakers could readjust the new aid formula to achieve an economically desirable and politically feasible outcome over time. Finally, this paper suggests that the proposed analytical framework and policy recommendations may apply to other states beyond Massachusetts.

II. Measuring underlying municipal fiscal health

Municipalities may differ in their underlying fiscal health because some have more resources to finance public services, or can provide a given level of services at lower cost. Following Bradbury et al. (1984), Yinger (1988), Ladd, Reschovsky, and Yinger (1991), and Bradbury and Zhao (2009), this section measures underlying fiscal health by examining the gap between the underlying costs of providing local public services ("costs") and the ability to raise revenue locally to pay for those services ("capacity").

Differing from actual spending and actual revenue, measures of both costs and capacity are based on local economic and social characteristics that are outside the direct control of local officials. As such, they reflect a municipality's underlying fiscal health, not the spending or taxing behavior of local officials. A community with a larger gap between costs and capacity is thus considered to be in worse underlying fiscal health, and to have a greater need for state aid. This gap concept is the basis for the Minnesota Local Government Aid formula, the now-defunct Massachusetts Resolution Aid formula, and foundation formulas for education aid in most states (Zhao and Bradbury 2009).

2.1. Municipal costs

In the context of evaluating underlying municipal fiscal health, municipal costs are defined as spending that local governments must incur to provide a common set of municipal services of average quality. These services include police and fire protection; public works; general government, health, welfare, culture, and recreation services; and debt service, fixed costs, and other services supported by the general fund.[2]

The cost of providing these services depends on a given municipality's economic and social characteristics. Indeed, using a regression-based approach to data on Massachusetts cities and towns, Bradbury and Zhao (2009) find that after controlling for preference and demand, inefficiency, and institutional factors, four factors primarily determine per capita municipal costs: population density, poverty rate, unemployment rate, and jobs per capita.

[2]Following Bradbury and Zhao (2009), this paper excludes elementary and secondary education; services supported by enterprise funds rather than general funds; and services provided by other entities (such as regional transit authorities). This paper also removes water, sewer, and solid waste disposal services, because most municipalities provide them through enterprise funds. Some municipalities do not provide those services, so their inclusion could make the data inconsistent.

There are economic reasons why these factors affect municipal costs. Higher population density and poverty and unemployment rates tend to increase costs for fire protection, because housing that is closely packed and poorly maintained creates a greater fire hazard than housing that is widely spaced and well maintained. The costs of providing police protection also rise with poverty and unemployment rates, because low-income communities and those with higher unemployment rates tend to have higher crime rates. The number of jobs per capita serves as a proxy for cost pressures from employers and workers who commute into a municipality and consume municipal services, including roads and police and fire protection.

Based on Bradbury and Zhao's (2009) estimated coefficients, and the most recent data available at the time of analysis, municipal costs for FY 2007 are measured as: [3]

(per capita municipal costs) = 28.0 × (population density) + 19.8 × (poverty rate) + 81.0 × (unemployment rate) + 272 × (jobs per capita) + 570.2.

2.2. Municipal capacity

Municipal capacity is defined as the ability of local governments to raise revenues locally for non-school municipal purposes. A measure of municipal capacity includes the capacity from property taxes and other smaller local revenue sources, minus the capacity reserved for non-municipal services (for example, schools).

Using regression analysis of property taxes in Massachusetts cities and towns, Bradbury and Zhao (2009) show that a municipality's property tax capacity depends on its taxable property values and local residents' income. Based on the estimated coefficients from that study and updated data, property tax capacity for FY 2007 is measured as (in per capita terms): [4]

(property tax capacity) = 0.0142 × (taxable residential property value)$^{2/3}$ × (income)$^{1/3}$ + 0.0126 × (taxable nonresidential property value).

[3] Bradbury and Zhao (2009) estimate that the robust standard errors for coefficients of population density, poverty rate, unemployment rate, and jobs per capita are 5.6, 5.1, 30.5, and 58, respectively. Therefore, these coefficients are fairly precisely estimated.

[4] Bradbury and Zhao (2009) estimate the exponential powers of 2/3 and 1/3 from the regression, with their robust standard errors of 0.026 and 0.050, respectively.

Besides property taxes, other smaller local sources that contribute to municipal capacity include motor vehicle excises, local hotel/motel excises, and state payments in lieu of taxes for state-owned land. Of course, state law and service agreements require municipalities to reserve some portions of local revenue for non-municipal services. Thus the measure of municipal capacity needs to remove required local contributions for the foundation budget for public schools, county tax payments, and assessments for services provided by the state, regional transit authorities, and regional planning agencies. Required local contributions for schools are the largest component of required reductions from municipal capacity.

2.3. Municipal gap

Municipal gap reveals the relative underlying fiscal health of cities and towns. It is calculated as:

(municipal gap) = (municipal costs) – (municipal capacity).

According to the measure of municipal gap, there are large and growing fiscal disparities across Massachusetts cities and towns. The range between municipal gap at the 95th percentile and the 5th percentile was 2.7 times the median gap in FY 2007—higher than the ratio of 2.2 in FY 2000. The coefficient of variation and the relative mean deviation for the gap measure also rose 34 percent and 16 percent, respectively, from FY 2000 to FY 2007.[5]

The growing disparities in municipal gaps are driven partly by a recent policy change in the required local contribution for public schools.[6] The state overhauled the school aid system in FY 2007, and lowered the required local contribution of some high-capacity communities as a percent of the foundation budget.[7] These communities include 26 percent of Massachusetts

[5] This paper does not show a Gini coefficient for the gap measure, because 18 percent of communities had negative municipal gaps in FY 2007, and using those negative values in calculating the Gini coefficient would lead to overestimates of inequality (Hagerbaumer 1977; Pyatt, Chen, and Fei 1980).

[6] The Gini coefficient for the capacity measure increased 14 percent statewide from FY 2000 to FY 2007. A decomposition analysis by capacity source indicates that this increase is driven entirely by a growing contribution to the Gini coefficient from the required local contribution.

[7] The state had planned to cap the required local contribution of each community at 82.5 percent of its foundation budget by FY 2011, so that "the formula would fund a minimum of 17.5 percent of foundation through state aid, even for the wealthiest of communities" (Massachusetts Department of Education 2006, p. 3). However, because of the fiscal crisis, the state has decided to extend the phase-in period beyond FY 2011 (Massachusetts Department of Education 2011).

cities and towns, whose population-weighted average per capita property tax capacity was 59 percent higher than the statewide average in FY 2007. As a result of the policy change, the required local contribution of these communities declined a population-weighted average of 0.6 percent from FY 2006 to FY 2007, while required local contributions statewide rose 4 percent.

Overall, large and growing disparities in municipal gaps indicate that communities have different needs for state assistance to help them provide municipal services to their residents, businesses, and commuters. This measure of the municipal gap provides the basis for evaluating the distribution of municipal aid.

III. Evaluating unrestricted municipal aid

Before FY 2010, Massachusetts state government operated two separate programs to allocate unrestricted municipal aid: Additional Assistance and Lottery Aid.

3.1. Additional Assistance

As the Municipal Data Management and Technical Assistance Bureau showed (2003, p. 28), the aid that each city and town received from the Additional Assistance program in the 2000s "cannot be attributed to any one formula or factor, but rather are the combined legacy" of policy and political factors.

Introduced in the early 1980s, Additional Assistance was initially distributed as a residual aid source. That means the state first calculated each community's share of statewide School Aid and so-called Resolution Aid—each based on its own formula. The amount of Resolution Aid awarded to each community was determined by an equalizing formula (Municipal Data Management and Technical Assistance Bureau 2003). However, this formula suffered from political interference designed to benefit certain municipalities (Ladd and Kennedy 1985). Additional Assistance for each community was then defined as any amount remaining after School Aid was subtracted from Resolution Aid.

School Aid grew faster than Resolution Aid statewide in the 1980s. Crowded out by School Aid, Additional Assistance fell to zero in some communities. The state also cut funding for Additional Assistance significantly during the severe fiscal crisis in the early 1990s. In FY 1992, for example, statewide Additional Assistance declined 35 percent from the previous year. However, because the state implemented "a combination of a $27 per capita and a 13 percent

reduction in funding," individual communities experienced uneven percentage cuts (Municipal Data Management and Technical Assistance Bureau 2003, p. 28).

As a result, 66 communities received 100 percent reductions in their Additional Assistance, pushing the number of communities receiving no Additional Assistance up to 192—more than half the state's communities. Among the state's 10 largest cities, which are home to roughly a quarter of the state population, Springfield lost 84 percent of its Additional Assistance in FY 1992—the largest drop experienced by any of these cities—while Boston lost just 18 percent of its Additional Assistance.

Since FY 1992, each community's Additional Assistance has simply been funded at the previous year's nominal level, except in FY 2003, 2004, and 2009, when state government made across-the-board cuts of 15.2 percent, 6.2 percent, and 9.7 percent, respectively. After these cuts, statewide Additional Assistance was funded at $342 million in FY 2009.

3.2 Lottery Aid

Massachusetts established Lottery Aid in 1971 for the purpose of fiscal equalization. Municipalities receive Lottery Aid in proportion to their populations, and inverse to their equalized property valuation (EQV). EQV represents the state's estimate of the fair cash value of all taxable properties in a municipality. EQV can be considered a simple measure of municipal capacity. It can explain 86 percent of the variation in municipal capacity in FY 2009.

Like Additional Assistance, Lottery Aid suffered cuts during the past fiscal crises. For instance, the state cut Lottery Aid across the board in FY 2003, 2004, and 2009 by 9.4 percent, 6.2 percent, and 9.7 percent, respectively. In FY 2009, Lottery Aid totaled $844 million—about 2.5 times the size of Additional Assistance.

3.3. FY 2010 aid consolidation

The FY 2010 state budget merged Additional Assistance and Lottery Aid into one aid category called Unrestricted General Government Aid. Although Additional Assistance and Lottery Aid disappeared on paper, they are still the implicit components of Unrestricted General Government Aid. Besides the merge, the state also cut total funding for this unrestricted municipal aid by 21 percent in FY 2010 compared with the previous year. It made another across-the-board cut of 4 percent the following year.

3.4. Evaluating municipal aid before and after the FY 2010 consolidation

Additional Assistance was scattered and only weakly correlated with municipal gaps across all 351 cities and towns in FY 2009 (Figure 1 and Table 1).[8] A simple linear regression of Additional Assistance on municipal gap shows a positive but rather small effect of municipal gap in determining Additional Assistance.[9] In fact, municipal gaps can explain only 5 percent of the variation in Additional Assistance. If the regression is restricted to the 159 communities receiving Additional Assistance, the explanatory power of municipal gaps drops to less than 3 percent. What's more, Additional Assistance is negatively correlated with the municipal gap among the 10 largest cities. Overall, the distribution of Additional Assistance appears largely ad hoc, and does not have a significant equalizing effect.

Lottery Aid has been more effective than Additional Assistance in equalizing municipal gaps, because the Lottery Aid formula distributes aid inversely to taxable property values, which are a major source of municipal capacity. Figure 2 shows that communities with higher municipal gaps often receive more Lottery Aid than communities with smaller municipal gaps. A regression of Lottery Aid on municipal gap shows a positive and significant effect of municipal gap when considering all municipalities, or only the 10 largest cities.

While the adjusted R-squared is much higher in the regression of Lottery Aid than in the regression of Additional Assistance, more than half the variation in Lottery Aid still cannot be explained by municipal gaps. The main reason is that the Lottery Aid formula does not take into account cost differentials across municipalities, and therefore does not compensate communities facing higher costs.

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[8] Because of limitations in the data, the following sections assume that municipal gaps after FY 2007 are the same as those in FY 2007. This assumption should not change the results qualitatively, because the factors underlying the gap measure are mostly slow-moving. When the value of the underlying factors changes, communities often move in the same direction, so the relative position of one community's municipal gap does not change significantly over a short period. However, because some high-capacity communities have continued to receive favorable treatment regarding their required local contributions to schools since FY 2007, this paper may overestimate the municipal gaps of those communities (Massachusetts Department of Education 2007, 2008, 2009, 2010, and 2011).

[9] Gap squared is added to capture potential nonlinearity in an alternative specification for Additional Assistance, Lottery Aid, and combined aid. This quadratic term is statistically significant, but economically very small. The regression graph shows almost no curvature within the boundary of municipal gaps in the data.

For instance, Boston has both high costs and a per capita EQV that is slightly above the statewide average. Under the Lottery Aid formula, Boston receives per capita Lottery Aid 22 percent lower than if Lottery Aid were distributed simply on a per capita basis—even though Boston's per capita municipal gap is in the top 10 percent of the gap distribution.

Combined unrestricted municipal aid (the sum of Lottery Aid and Additional Assistance) has delivered mixed results in equalizing municipal gaps. Statewide, unrestricted municipal aid was positively correlated with municipal gaps in FY 2009 (Figure 3, top graph).[10] This is mostly due to the equalizing patterns of Lottery Aid. However, municipal gaps explain less than half the variation in combined unrestricted municipal aid. If we consider only the 10 largest cities, municipal gaps have no significant relationship with municipal aid. The adjusted R-squared turns negative. The results show that the Additional Assistance component distorts the distribution of unrestricted municipal aid, especially among the largest cities.

The consolidation and cuts in unrestricted municipal aid in FY 2010 and FY 2011 have not improved its distribution. In the lower graph of Figure 3, the slope of the regression line declines because of the aid cuts. The adjusted R-squared in the regression of unrestricted municipal aid on municipal gap for FY 2011 is almost the same as that for FY 2009—indicating that municipal gaps still do not explain the majority of the variation in unrestricted municipal aid.[11]

Similarly, municipal gaps continue to have no explanatory power for the aid distribution within the 10 largest cities in FY 2011. Overall, the inequity persists after the FY 2010 consolidation, suggesting that municipal aid needs further reform.

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[10] Including restricted state non-school aid and federal grants has virtually no impact on the relationship between municipal aid and municipal gap. Massachusetts cities and towns receive restricted state funding for local and regional public libraries, as well as some revenues from the federal government (for example, Community Development Block Grants). However, these kinds of aid are too small to affect the overall distribution of aid. For example, the total amount of restricted state non-school aid and federal grants equaled less than 5 percent of Combined Unrestricted Municipal Aid in FY 2007.

[11] Owing to limitations in the data, this analysis assumes that municipal gaps remained unchanged between FY 2009 and FY 2011. However, as footnote 8 explains, some high-capacity communities have seen a smaller increase in their required local contributions for public schools than low-capacity communities during this period. As a result, these high-capacity communities are likely to have smaller municipal gaps in FY 2011 than in FY 2009. The regression line therefore could be flatter than it appears in the lower graph of Figure 3, and the adjusted R-squared for FY 2011 could actually be lower than for FY 2009.

IV. Reforming unrestricted municipal aid

Policymakers could consider alternative approaches to aid based on municipal gaps to allocate more funds to communities in worse underlying fiscal health. Because the gap measure uses local economic and social characteristics that are outside the direct control of local officials, gap-based approaches to state aid are not likely to create incentives for local officials to change their behavior to exploit the aid system.

4.1. Using a gap-based formula to distribute all unrestricted municipal aid

Policymakers could use a gap-based formula to distribute all unrestricted municipal aid. In a gap-based framework, policymakers usually need to set three policy parameters to determine the distribution of aid: the aid pool, the portion of the aid pool to be distributed as minimum aid, and the baseline gap (Bradbury et al. 1984; Zhao and Bradbury 2009). The aid pool determines how many dollars of aid the formula will distribute. If policymakers are aiming solely to redistribute existing aid, the aid pool equals total existing unrestricted municipal aid, which is $899 million in FY 2011.

The state could reserve a portion of the aid pool for minimum aid, distributed equally among all municipalities on a per capita basis. The state would allocate the remaining balance as equalizing aid based on municipal gaps. Establishing minimum aid would ensure that every city and town receives at least some municipal aid, regardless of the size of its municipal gap.

While introducing minimum aid would interfere with the equalization goal, it would help gain broader political support for the new aid formula.[12] Holding everything else equal, setting higher minimum aid would lower the amount available for equalizing aid. Setting lower minimum aid, in contrast, would mean that higher-gap communities could receive higher aid payments.

The baseline gap is set as a threshold for the per capita municipal gap. Communities with a municipal gap smaller than the baseline gap would receive only minimum aid. Communities with a gap above the baseline could be eligible to receive equalizing aid. Among

[12] Bluestone, Clayton-Matthews, and Soule (2006) suggest that virtually all communities in Massachusetts have recently faced fiscal stress—another argument for minimum aid.

communities receiving equalizing aid, municipal aid (equalizing aid and minimum aid combined) would fill the same fraction of their gaps above the baseline.[13]

To make the baseline gap more meaningful in practice, policymakers could link it to a specified percentile of the population-weighted gap distribution. Holding everything else equal, setting a lower baseline gap would allow more cities and towns to receive equalizing aid, but the amount of equalizing aid per city or town would be lower. Setting a higher baseline gap would target equalizing aid to communities with the largest gaps, but more cities and towns would receive only minimum aid.

The impact of the gap-based formula on the distribution of aid would depend on how policymakers set the policy parameters. To demonstrate this, Figure 4 displays two scenarios of simulated aid. Under the first scenario, only 5 percent of the statewide aid pool is dedicated to minimum aid, and the baseline gap is set at the 20th percentile of the population-weighted gap distribution.

Under the second scenario, minimum aid takes up 20 percent of the aid pool, and the baseline gap is set at the 5th percentile of the population-weighted gap distribution. The slope of the lines in Figure 4 represents the fraction of municipal gaps above the baseline gap filled by municipal aid. The slope is steeper under the first scenario because more equalizing aid is targeted to a smaller number of high-gap communities.

Communities with different gaps fare differently under these two scenarios. Large-gap communities (at the far right of the figure) receive much more aid under the first scenario than under the second scenario. Communities with low or medium gaps (less than $700 per capita) receive more aid under the second scenario, in contrast, because equalizing aid is shared more broadly, and the higher minimum aid benefits communities with smaller gaps.

Of course, redistribution creates winners and losers when compared with the existing aid allocation. Under the first and second scenarios, 66 percent and 58 percent, respectively, of communities receive less aid than they actually received in FY 2011. While 3 of the 10 largest

[13] If minimum aid per capita already fills a larger fraction of a community's municipal gap above the baseline gap, the community would receive only minimum aid without equalizing aid, even though its gap is larger than the baseline. That is often the case for communities with gap measures slightly larger than the baseline gap.

cities are "losers" under the first scenario, all of them lose some of their actual FY 2011 aid under the second scenario.

For some communities, these shifts are substantial. For example, under the first scenario, Cambridge loses 96 percent of its actual FY 2011 aid—the biggest loss among the 10 largest cities.

4.2. Using a gap-based aid formula with a hold-harmless provision

Redistributing existing aid is politically difficult, and thus may not be viable in practice. As the simulations above show, some communities, including a few large cities, would experience substantial losses if municipal aid were redistributed. Such losses could disrupt budgets in these communities and strain their finances.

Based on such concerns, a report from a group of mayors and civic leaders known as the Municipal Finance Task Force recommended that reform of the aid formula protect existing aid—that is, hold it harmless—"but use additional funding as a base to broaden non-school aid" (2005, p. xv). In other words, each community should retain the aid dollars it received in the previous year, while state government should use a new formula to allocate any additional aid.[14] The hold-harmless provision is common in other aid categories (e.g., education aid) and other states.

State government could consider adopting a gap-based formula to distribute new aid while holding each community's existing aid harmless. The combined existing and new aid that each community receives each year would then be considered existing aid the following year. To use such a formula, policymakers would need to add new funds to the aid pool, determine the portion of new funds dedicated to minimum new aid, and set the baseline gap each year.

Zhao and Bradbury (2009) propose that while holding existing aid harmless, the state treat existing aid as equivalent to new aid, and use the sum of the two to fill a fraction of a community's gap above the baseline gap.[15] This hold-harmless approach would target new

[14] Besides revenue growth from existing state taxes and lottery sales, tax revenues from the proposed gambling industry are a potential source of added state funding for local aid (Levenson 2010).

[15] Zhao and Bradbury (2009) show that other hold-harmless approaches are not fair, because they give less weight to existing aid than to new aid in filling the gap, and hence effectively treat communities receiving larger amounts of existing aid more favorably than communities receiving less or no existing aid.

aid—mostly equalizing aid—to large-gap communities that receive a low level of existing aid, and thus help correct inequity in the existing aid distribution.

While holding existing aid fully harmless may be politically attractive, it slows down the transition of the aid distribution from non-gap-based to gap-based. To speed up the process, policymakers could consider holding harmless some fraction of existing aid, rather than 100 percent. They would treat the reminder of existing aid the same as new aid (Zhao and Bradbury 2009).

With full or partial hold harmless, policymakers could consider readjusting policy parameters over time to expand the number of communities receiving equalizing aid—to maintain the political feasibility of the gap-based aid approach. Without such a readjustment, the same communities would likely receive equalizing aid year after year, which many other communities would perceive as unfair, even though they would receive additional minimum aid each year. That perception could drive cities and towns to withdraw their support for the new aid formula.

While any adjustment of the aid formula could involve all policy parameters, changing the baseline gap over time is particularly important and effective in creating a path to a politically feasible and gap-based aid distribution. As the state adds new funds to the aid pool each year, it could gradually lower the baseline gap. Doing so would mean that more communities—including many with medium-sized gaps—could receive equalizing aid and increasingly benefit from the new aid approach.

During this readjustment process, the state would need to ensure that higher-gap communities receive a larger increase in per capita aid dollars than lower-gap communities. This criterion requires municipal aid to fill a growing fraction of the municipal gap above the baseline from year to year.[16]

To meet both goals, policymakers need to readjust the baseline gap by taking into account the growth rate of the aid pool. If the aid pool grows faster and the state has more new funds to distribute, policymakers could lower the baseline gap more aggressively each year, to

[16] The mathematical proof of the criterion is as follows. For a community receiving equalizing aid, per capita aid in year 1 is expressed as $aid_1 = r_1 \times (gap - baseline\ gap_1)$, and per capita aid in year 2 is $aid_2 = r_2 \times (gap - baseline\ gap_2)$, where the community's per capita municipal gap is assumed constant for simplicity. Then, $\frac{\partial(aid_2 - aid_1)}{\partial(gap)} = r_2 - r_1$ and it is greater than zero if $r_2 > r_1$.

share equalizing aid among more communities. However, if the growth rate of the aid pool is more modest, policymakers should lower the baseline gap in smaller increments, to avoid a decline in the fraction of the gap above the baseline filled by aid.

To show how such a gap-based formula would work in the long run, this section simulates the distribution of unrestricted municipal aid over a 10-year period from FY 2012 to FY 2021 under three scenarios. Existing aid is held fully harmless each year under the first two scenarios, but only 90 percent harmless under the third scenario.

Under the first scenario, the aid pool grows 3.9 percent annually. At that speed, statewide unrestricted municipal aid would return to the nominal FY 2008 level—the pre-recession peak—at the end of 10 years. The second and third scenarios assume that the aid pool grows only 1 percent per year. Under the scenarios, 10 percent of new aid, or new aid plus the portion of existing aid that is not held harmless (third scenario), is reserved for minimum aid each year.

Under all scenarios, the baseline gap starts at the 20th percentile of the population-weighted gap distribution in the first year. After that, the baseline gap decreases one-half of a percentile per year under the first scenario, and one-quarter of a percentile per year under the second and third scenarios.

The simulations show that a growing share of communities and populations receive equalizing aid over time under all three scenarios (Table 2). For example, under the first scenario, 14 percent of communities receive equalizing aid in Year 1. That allows new aid to have an immediate equalizing impact on communities that have relatively large gaps but currently receive relatively small amounts of municipal aid. The share of communities receiving equalizing aid then steadily rises to 33 percent in Year 5 and to 50 percent in Year 10. The share of statewide population receiving equalizing aid is even higher: 64 percent by Year 10. That is mostly because large cities are more likely to have larger municipal gaps and therefore to benefit from equalizing aid.

The overall distribution of municipal aid becomes more correlated with municipal gaps during the simulation period. Municipal aid receipts (existing and new aid combined) are directly proportional to the municipal gaps among communities receiving equalizing aid, and therefore form the straight, upward-sloping lines in Figure 5. As the aid receipts of more

communities lie on the line, municipal gaps gain more power in explaining the variation in municipal aid. For instance, the adjusted R-squared of the regression of municipal aid on municipal gap increases from 0.44 in Year 0 to 0.56 in Year 10 under the first scenario (Table 2).

The slope of the straight lines also grows steeper, indicating that municipal aid fills a greater fraction of the municipal gap above the baseline gap over time. Under the first scenario, municipal aid fills 34 percent of the municipal gap above the baseline in Year 10, compared with only 20 percent in Year 1 (Table 2).

Under the full hold-harmless approach, the transition to a gap-based distribution occurs more slowly with a lower growth rate of the aid pool. Under the second scenario, municipal aid explains 52 percent of the variation in municipal aid in Year 10—8 percentage points higher than in Year 0. The percentage of communities and statewide population receiving equalizing aid and the slope of the straight lines also increase during this time period. However, the improvements are much smaller than those under the first scenario, owing to the slower growth of the aid pool. In fact, changes over the 10-year period under the second scenario are even less pronounced than in the first 5 years under the first scenario.

Using a partial hold-harmless approach can boost the ability of the new gap-based formula to improve the aid distribution, especially when the state does not add much new aid. The number of communities on the line in Year 10 under the third scenario with partial hold harmless is more than twice the number under the second scenario with full hold harmless. However, because only 90 percent of existing aid is held harmless each year, some communities lose aid during the simulation period because they do not receive enough new aid to cover the loss of existing aid. For example, 80 percent of communities receive less aid in Year 1 than in Year 0, with a population-weighted average 8 percent decrease in aid.

Overall, partial hold harmless is a compromise between redistribution and full hold harmless. Because it causes some communities to lose aid, the new gap-based formula with partial hold harmless may encounter significant political resistance.

It should be noted that the aid distribution among the 10 largest cities improves significantly under the gap-based approach. Before the new formula is applied, there is no significant relationship between municipal aid and the municipal gap in these cities. By Year 10,

9 cities, 6 cities, and 9 cities would receive equalizing aid under the first, second, and third scenarios, respectively, putting them on the upward-sloping lines.

Even with hold harmless, minimum new aid, and a shrinking baseline gap, municipalities that receive particularly high existing aid may challenge the political feasibility of the gap-based approach. These cities and towns may have to stay in the minimum aid group for a long period while policymakers use new aid to correct inequity in the existing aid distribution. For instance, Boston would receive only minimum new aid during the first 8 years under the first scenario, and during the entire 10 years under the second scenario. This could prompt Boston and similar municipalities to withhold support for reforming municipal aid formulas.[17]

V. Conclusion

This paper provides an updated analysis of underlying municipal fiscal health, using a measure of municipal gap and recent data for Massachusetts cities and towns. The analysis shows that large disparities in municipal gaps exist among cities and towns, and that the disparities have grown in recent years.

Created for the purpose of fiscal equalization, unrestricted municipal aid is not highly correlated with municipal gaps in Massachusetts. In fact, municipal gaps cannot explain the majority of the variation in municipal aid. This partly reflects large ad hoc aid cuts over the past 20 years. The consolidation of municipal aid programs in FY 2010 has not improved the aid distribution—that consolidation has simply perpetuated the existing inequity.

This paper suggests that the state consider adopting a gap-based formula to improve the distribution of aid. To avoid disrupting local budgets and build broad political support, policymakers could consider holding existing aid harmless, and using the gap-based formula to distribute new aid. This paper recommends that policymakers consciously and carefully readjust policy parameters over time, to expand the group of communities receiving equalizing aid. This would help maintain the political feasibility of the gap-based approach.

Despite fiscal difficulties, policymakers may find that now is a good time to reform unrestricted municipal aid. The economic downturn forced the state to cut municipal aid 31.6

[17] See Zhao and Bradbury (2009) for strategies to address this issue.

percent from FY 2008 to FY 2011. Because the aid pool held harmless is smaller, the state would need fewer new funds to significantly affect the distribution of municipal aid. By focusing on reform now, policymakers could agree on the overall approach to distributing municipal aid before the economic recovery makes more revenues available for municipal aid.

The proposed gap-based framework and its policy implications may be applicable to other states. Researchers can use a similar model to develop a measure of the municipal gap in other states, while taking into account state-specific institutions such as local-option taxation and the division of service responsibilities between state and local governments. Researchers can then use this gap measure to develop a new formula to improve the aid distribution in those states. Fisher and Prasad (2009) find that many states still rely on ad hoc approaches to allocating unrestricted municipal aid, and that almost no states include cost measures in their distribution formulas. This leaves ample room for improving the distribution of state aid to increase fiscal equalization.

Table 1. Regression Results: Aid Distributions on Municipal Gaps (per capita)

Dependent variable/sample	Estimated coefficients		Adjusted R^2	Number of observations
	Municipal gap	Constant		
FY 2009 Additional Assistance:				
All municipalities	0.0228	37.1	0.0505	351
	(0.0052)	(4.95)		
Municipalities receiving Additional Assistance	0.0230	55.4	0.0283	159
	(0.0097)	(9.35)		
10 largest cities	-0.176	323	0.2909	10
	(0.0812)	(94.3)		
FY 2009 Lottery Aid:				
All municipalities	0.0584	90.3	0.4544	351
	(0.0034)	(3.28)		
10 largest cities	0.189	-48.1	0.6621	10
	(0.0437)	(50.8)		
FY 2009 Combined Unrestricted Municipal Aid:				
All municipalities	0.0813	127	0.4423	351
	(0.0049)	(4.68)		
10 largest cities	0.0128	274	-0.1118	10
	(0.0415)	(48.2)		
FY 2011 Unrestricted Municipal Aid:				
All municipalities	0.0613	96.8	0.4417	351
	(0.0037)	(3.53)		
10 largest cities	0.00963	207	-0.1118	10
	(0.0312)	(36.3)		

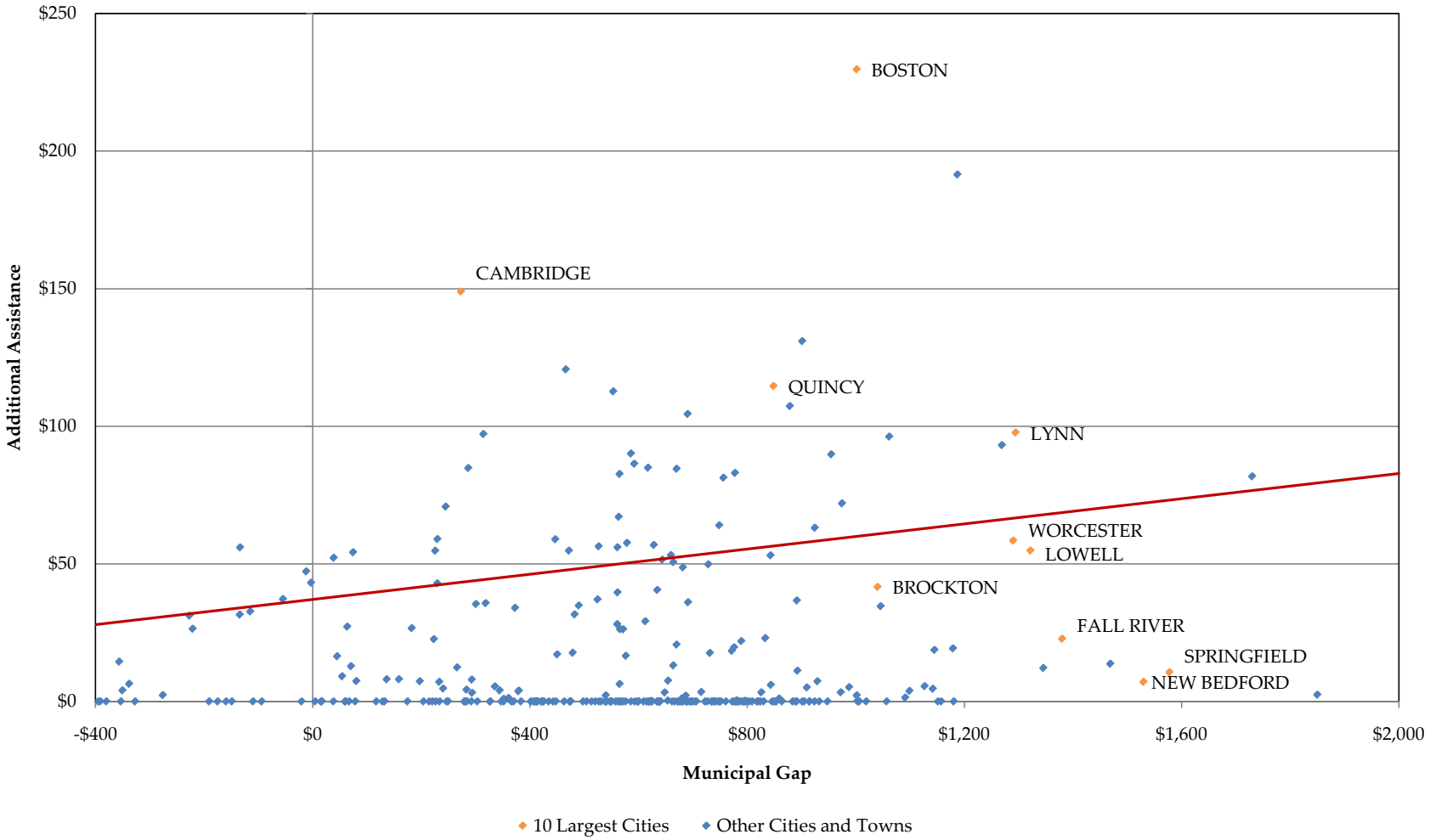
Note: Numbers in parentheses are standard errors. Regressions are weighted by population.

Table 2. Simulation Outcomes Using a Gap-Based Formula

		Scenario 1			Scenario 2			Scenario 3		
	Year 0	Year 1	Year 5	Year 10	Year 1	Year 5	Year 10	Year 1	Year 5	Year 10
Percent of communities receving equalizing aid		14%	33%	50%	6%	17%	24%	25%	52%	62%
Percent of population receiving equalizing aid		21%	40%	64%	6%	24%	31%	32%	65%	74%
Fraction of municipal gap above the baseline filled by municipal aid among communities receiving equalizing aid		20%	28%	34%	17%	20%	23%	22%	27%	29%
Adjusted R-squared of the regression of municipal aid on municipal gap	0.44	0.49	0.54	0.56	0.46	0.50	0.52	0.52	0.54	0.55

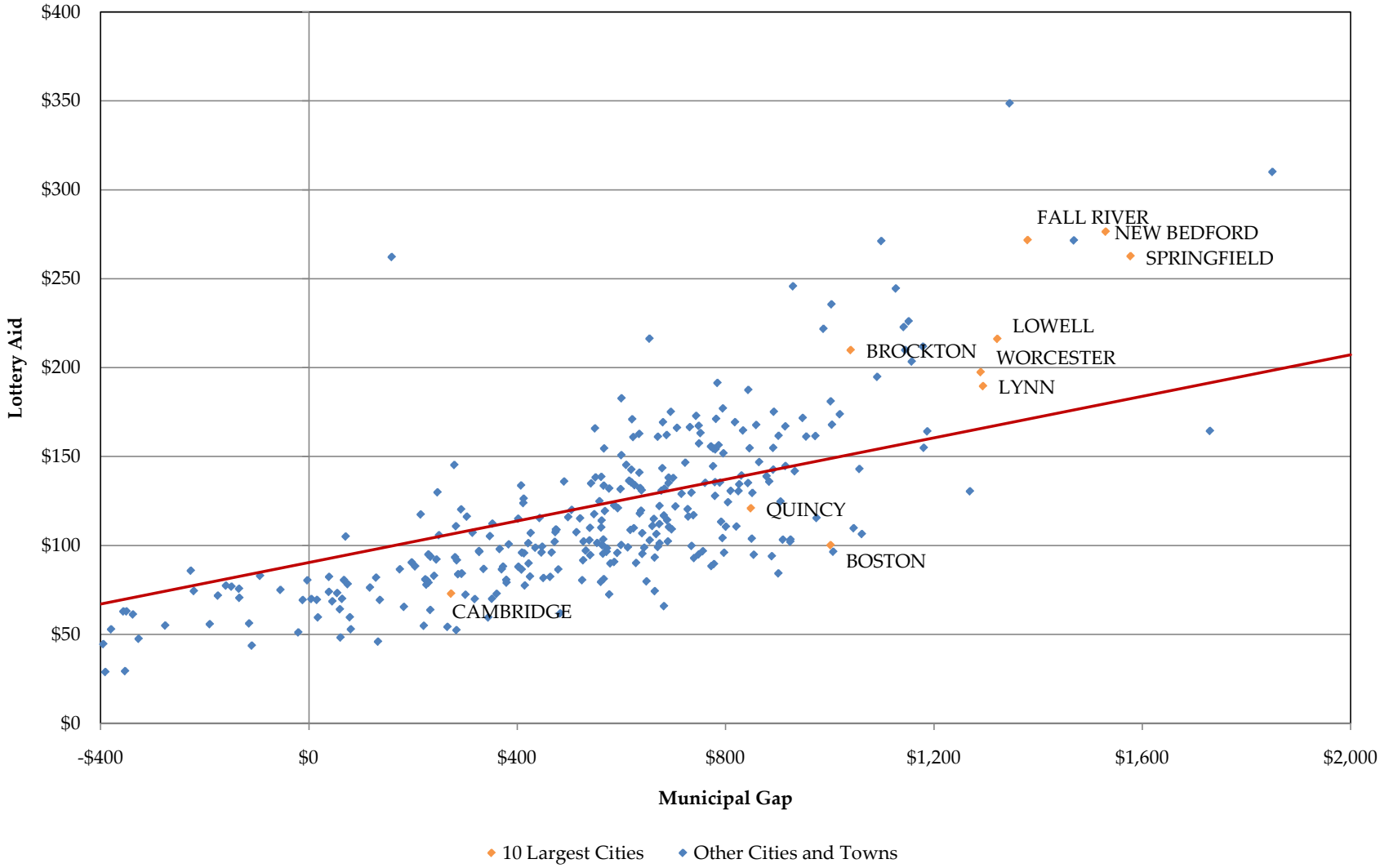
Note: Year 0 is actual FY 2011 aid distribution. All three scenarios assume that the baseline gap starts at the 20th percentile of the population-weighted gap distribution in Year 1. Scenario 1 assumes that the aid pool grows at 3.9 percent per year, and that the baseline gap decreases by one-half of one percentile per year. Scenario 2 assumes that the aid pool grows at 1 percent per year, and that the baseline gap decreases by one-quarter of one percentile per year. Both Scenarios 1 and 2 hold existing aid 100 percent harmless and reserve 10 percent of the statewide new aid for minimum new aid. Like Scenario 2, Scenario 3 also assumes that the aid pool grows at 1 percent per year, and that the baseline gap decreases by one-quarter of one percentile per year. However, Scenario 3 holds only 90 percent of existing aid harmless. Under this scenario, the state reserves 10 percent of the sum of the statewide new aid and the remaining existing aid that is not held harmless for minimum new aid.

Figure 1. Comparing Additional Assistance with the Municipal Gaps of Massachusetts Cities and Towns (FY 2009, per capita)



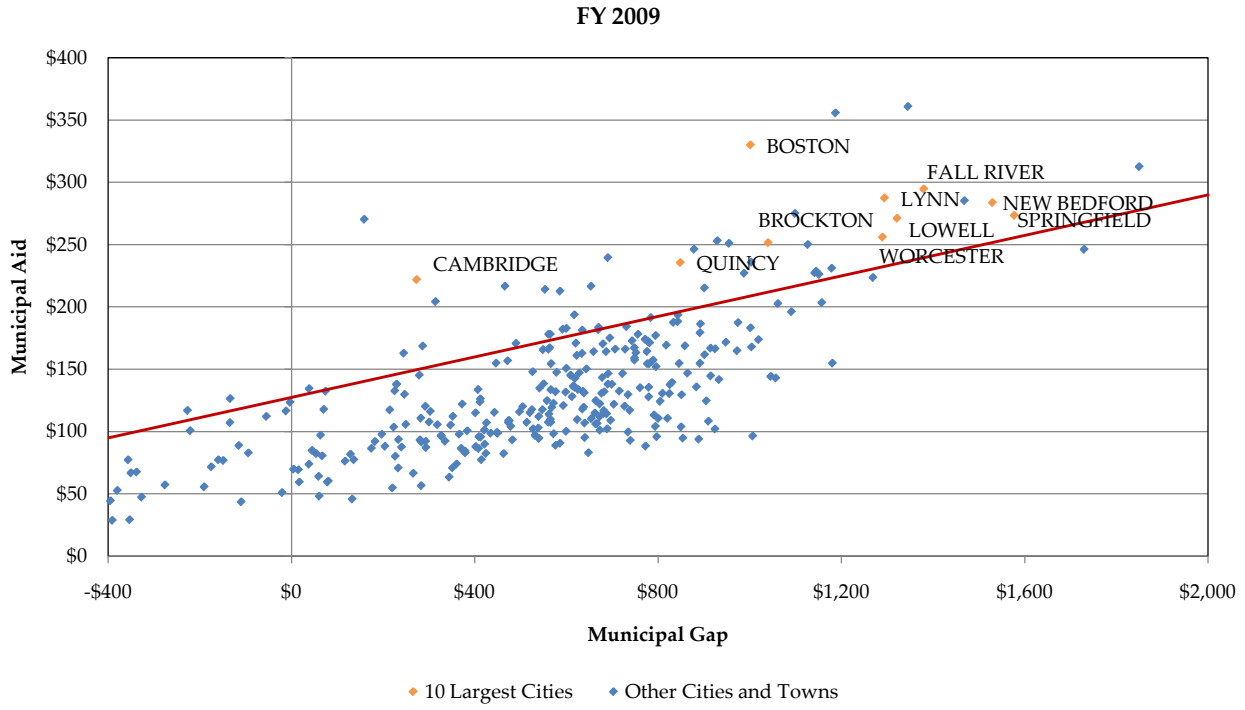
Note: To show the general pattern more clearly, 40 communities with a per capita gap of less than -$400 have been omitted. The red line is created from the population-weighted regression of Additional Assistance on municipal gap over all 351 cities and towns.

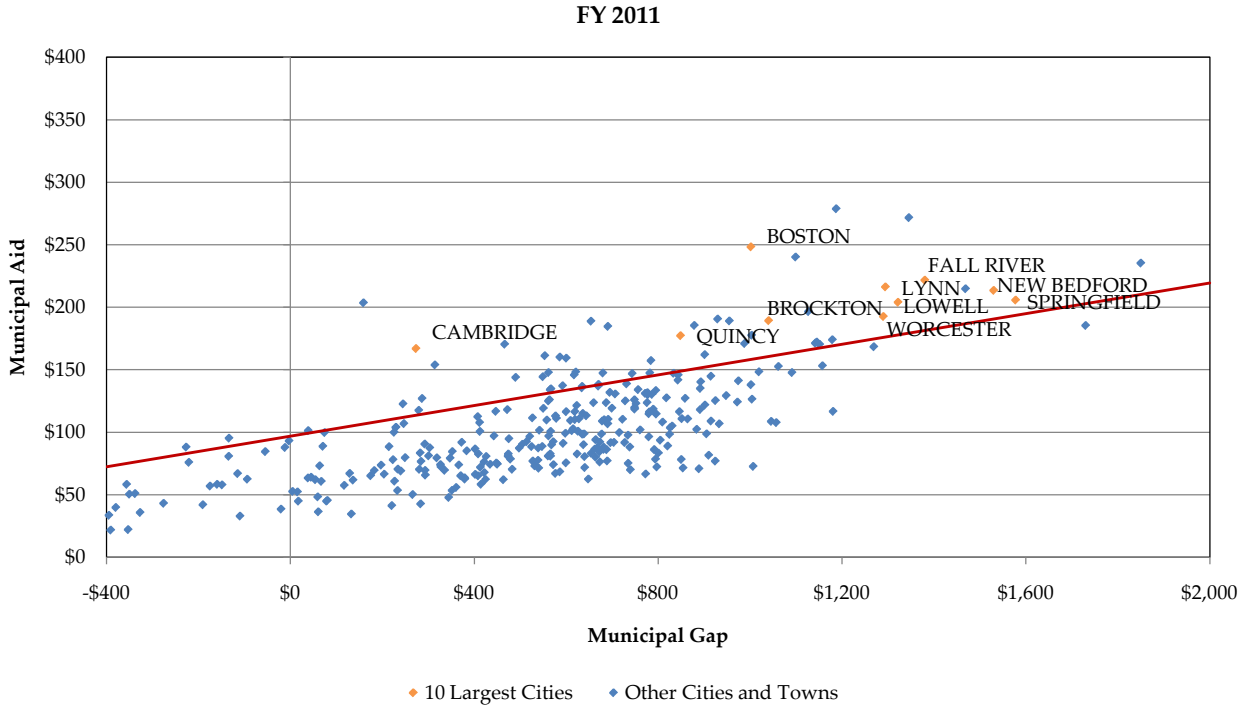
Figure 2. Comparing Lottery Aid with the Municipal Gaps of Massachusetts Cities and Towns (FY 2009, per capita)



Note: To show the general pattern more clearly, 40 communities with a per capita gap of less than -$400 have been omitted. The red line is created from the population-weighted regression of Lottery Aid on municipal gap over all 351 cities and towns.

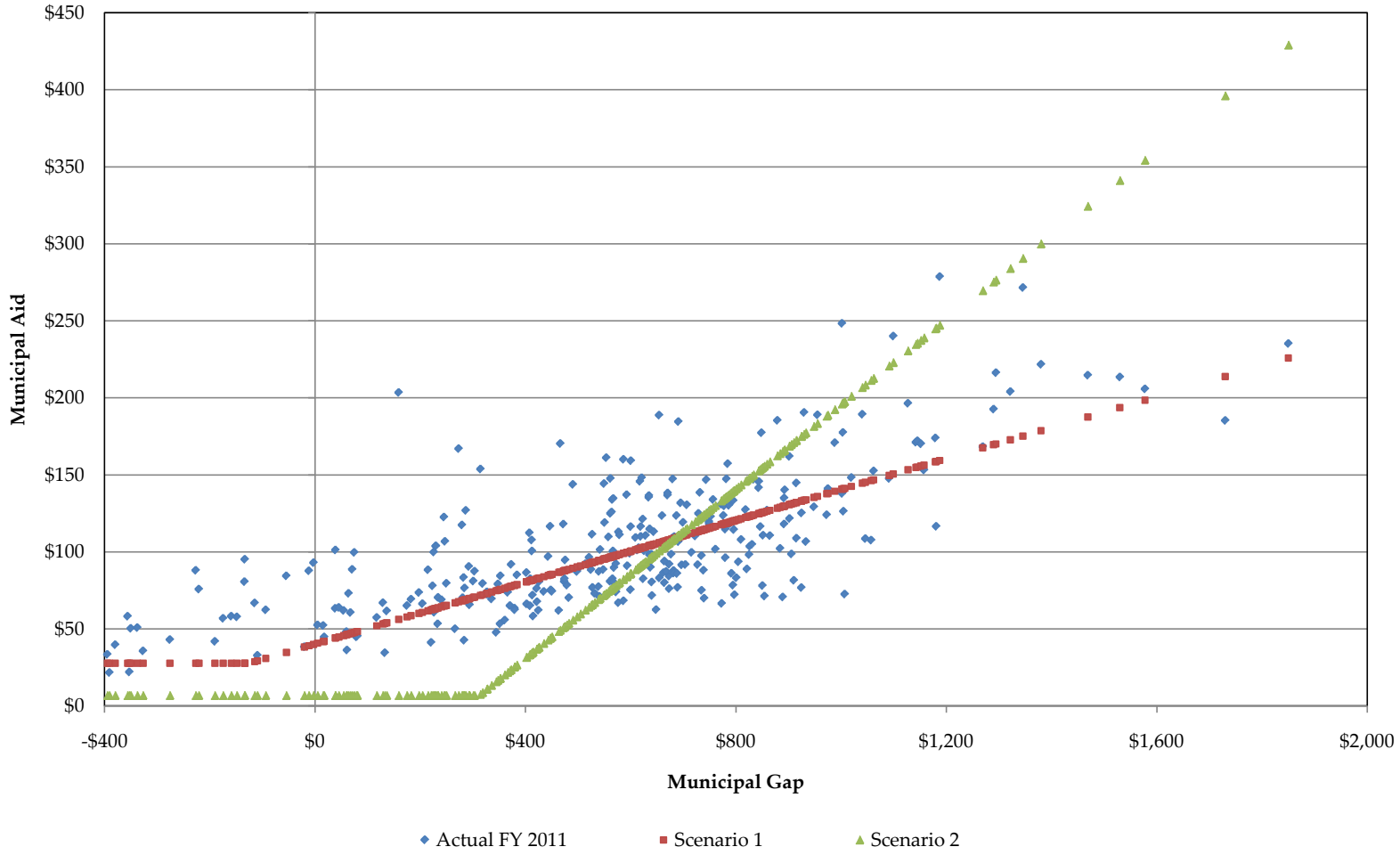
Figure 3. Comparing Combined Unrestricted Municipal Aid with Municipal Gaps (per capita)





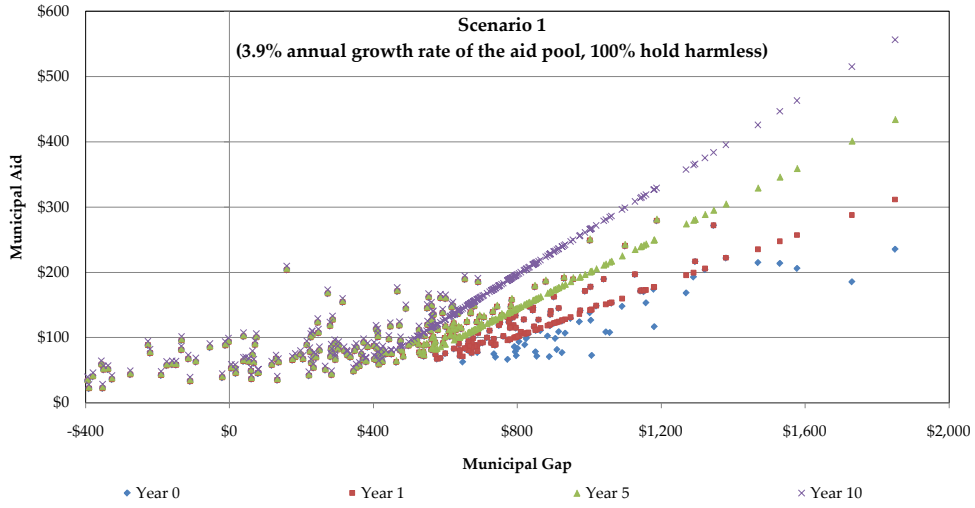
Note: To show the general pattern more clearly, 40 communities with a per capita gap of less than -$400 have been omitted. The red lines are created from the population-weighted regression of combined unrestricted municipal aid on municipal gap over all 351 cities and towns.

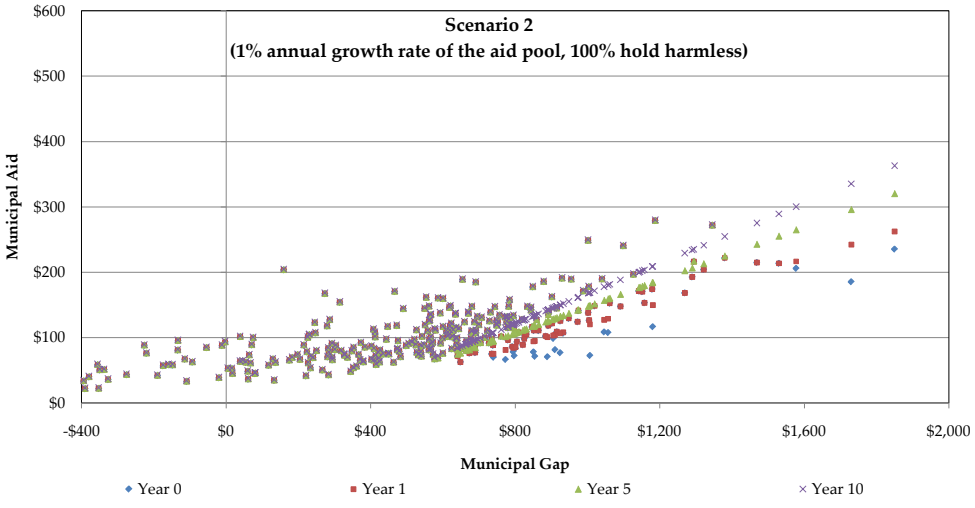
Figure 4. Using a Gap-Based Formula to Distribute All Unrestricted Municipal Aid (per capita, FY 2011)

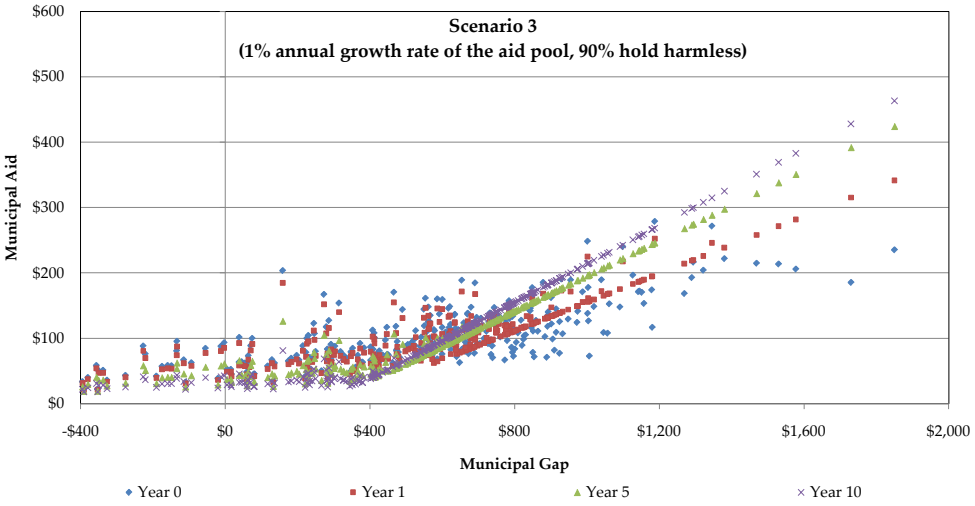


Note: In Scenario 1, minimum aid is set to be 5 percent of the statewide aid pool, and the baseline gap is set at the 20th percentile of the population-weighted gap distribution. In Scenario 2, minimum aid is set to be 20 percent of the statewide aid pool, and the baseline gap is set at the 5th percentile of the population-weighted gap distribution. The statewide aid pool in all scenarios is $899 million. To show the general pattern more clearly, 40 communities with a per capita municipal gap of less than -$400 have been omitted.

Figure 5. 10-Year Simulation Results Using a Gap-Based Formula (per capita)







Note: Year 0 is actual FY 2011 aid distribution. Existing aid is held fully harmless each year under the first two scenarios, but held only 90 percent harmless under the third scenario. Under the first scenario, the aid pool grows 3.9 percent annually, while under the second and third scenarios, the aid pool grows only 1 percent per year. Under the scenarios, 10 percent of new aid, or new aid plus the portion of existing aid that is not held harmless (third scenario) is reserved for minimum aid each year. Under all scenarios, the baseline gap starts at the 20th percentile of the population-weighted gap distribution in the first year. After that, the baseline gap decreases one-half of a percentile per year under the first scenario, versus one-quarter of a percentile per year under the second and third scenarios. To show the general pattern more clearly, 40 communities with per capita gaps of less than -$400 have been omitted.

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