The Research Bureau

Worcester's Bond Rating and the Recession: What's the City's Credit Score?

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EXECUTIVE SUMMARY

Over the past few months, turmoil in the municipal bond market has saddled many state and local governments with increased borrowing costs. Investor demand for municipal bonds had been strong through most of the current recession, but due to a combination of factors, including intensifying concern about the underlying fiscal condition of state and local governments, this trend seems to have come to an end.

The Research Bureau undertook this report to understand the implications of this development for Worcester, as well the nature of municipal bonds and municipal bond ratings in general. How have Worcester's bond rating and borrowing costs been affected by the recession? What factors do credit ratings agencies look at when evaluating municipal debt? Some of the report's main findings include:

- Worcester's bond rating is stable, investment grade, and Worcester has a demonstrated record of access to market.
- While Worcester's situation is stable, over 70% of Massachusetts communities that are rated by Moody's have a higher rating than Worcester.
- Like most other municipalities, Worcester's bond rating has not been downgraded since the onset of the current recession. Worcester's bond rating was recently affirmed as A1/AA-/A- by Moody's, Fitch's and Standard & Poor's, respectively. Less than 10% of Massachusetts municipalities have had their bond rating downgraded since 2007.
- Like many other municipalities across the nation, Worcester's borrowing costs declined during the recession. The decline has been most dramatic on the City's short-term debt and has been due to broader market trends, not because of any changes in Worcester's bond rating.
- Throughout most of the past two years, there has been strong investor demand for municipal bonds. More recently, however, yields on major bond indices have begun to climb and issuing entities have faced higher borrowing costs. Worcester's borrowing costs are likely to increase as well. Reasons cited for this recent turmoil in the municipal bond market include the extension of the Bush income tax cuts (reducing demand for tax-exempt municipal bonds) and an increased concern among investors about state and local governments' bleak near-term revenue outlook, their large unfunded pension and retiree health care liabilities, inflexible labor contracts, and the unreliability of elected bodies at the state and local level to address these issues.
- Credit ratings agencies issue bond ratings based on their analysis of a variety of fiscal and economic factors. Some of the more important factors include measures of local property wealth and income, a community's unemployment rate, and its dependence on state aid.

I. THE SIGNIFICANCE OF BOND RATINGS

Governments at all levels finance their capital needs by selling bonds to private-sector investors. In Worcester, many of what are considered core municipal services, such as fixing streets and sidewalks and maintaining school facilities, are too costly to be financed by annual operational expenditures. To provide these services, Worcester borrows money in the form of notes (debt maturing in a year or less) and bonds, purchased by individual and institutional investors.

In order for Worcester to access credit through the municipal bond market, its debt must be rated by an independent, third party credit rating agency. Credit rating agencies issue bond ratings based on their opinion about a municipality's fiscal health, thereby giving potential bond purchasers an indication of the likelihood of timely repayment of principal and interest. Although Worcester makes available exhaustive information about the City's finances whenever it issues notes or bonds, most investors will be inclined to base their investment decisions primarily on the ratings agencies' opinion, viewing it as an efficient and reliable way to gauge risk.[1]

Table 1 gives the ratings scales for Moody's and S&P (the two largest ratings agencies), with Worcester's current rating highlighted in **bold**.

Table 1: Moody's and Standard & Poor's Bond Rating Scales

Moody's	Standard & Poor's
Aaa	AAA
Aa1	AA+
Aa2	AA
Aa3	AA-
A1	A+
A2	A
A3	**A-**
Baa1	BBB+
Baa2	BBB+
Baa3	BBB-

Worcester's rating from Moody's appears stronger than its rating from S&P's due to the "recalibration" of its municipal rating scale that Moody's enacted in April 2010. According to Moody's, this placed municipal debt on the same "global rating scale" as all other varieties of rated debt, such as that of corporations and asset-backed securities.[2] This was done in response to longstanding criticism that the ratings agencies rated municipal bonds too low. In other words, Moody's gave almost every municipality's credit rating, including Worcester's, a "facelift" this past spring.[3] Prior to Moody's recalibration,[4] Worcester's rating from Moody's was "A3," the same "low A" that Standard & Poor's still assigns to it.[5]

Before Moody's recalibration, the last time Worcester's bond rating changed significantly was when Moody's upgraded it in 2002, in that case due to substantive improvements in the City's fiscal position (**Table 2).**

Table 2: Worcester's Bond Rating 1986-2010

Year	Moody's	S&P's
1986-2001	Baa1	Unrated
2002-09	A3	A-
2010	A1	A-

Source: Massachusetts Department of Revenue (DOR)

Like an individual's credit score, a bond rating has a direct impact on the cost of borrowing. The safer a municipality is, the less interest it will have to offer to investors to persuade them to lend it money. The money saved from having a high bond rating can be substantial.

How much does a community stand to save from improvements in its bond rating? What is the relation between borrowing costs and bond ratings? The answer to these questions depends significantly on market trends at any given time. If, for instance, there happens to be a glut of highly-rated municipal bonds at a certain time, then the gap between what an AAA-rated municipality pays and a BBB-rated issuer pays may compress.

Table 3, based on information compiled by the research firm Delphis Hanover (accessed through the *Wall Street Journal*'s "Market Data Center"), gives an estimate of the spread on borrowing costs between differently-rated issuers for December 2010.

Table 3: Average Spreads Between Differently-Rated Municipal Bond Issuers, December 2010

Aaa vs. Aa	Aa vs. A	Aaa vs. A	A vs. Baa
-0.31%	-0.66%	-0.98%	-0.79%

Source: Delphis Hanover

Thus, an AAA-rated issuer could expect to pay a full 1% less in interest on its debt than the A-rated Worcester. On $10 million of long-term debt, this would mean $100,000 less in annual debt service.

II. INVESTING IN MUNICIPAL BONDS

Worcester does not sell its bonds directly to investors. Each issuance is underwritten by a securities firm that Worcester either selects on an auction basis, or selects outright and then negotiates the price of an offering. The auction (or negotiation) determines what interest rate Worcester will be required to pay to its bondholders. The underwriter purchases the bonds in bulk and either holds them or sells them to other investors.

From the point of view of the prospective investor, "municipal bonds"[6] have two main attractions. The first, and most important one, is that

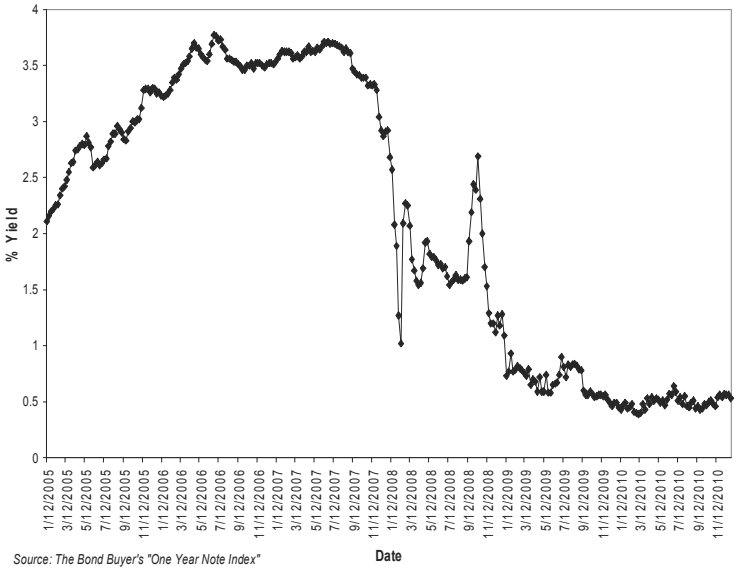
they are tax-exempt: the interest earned by bondholders of most municipal bonds[7] is exempt from Federal income tax and often also from state income tax, personal and corporate.[8] As a result, municipal bonds offer lower interest payments and are especially attractive to investors in high income-tax brackets. (The more an investor pays in taxes, the greater the value of the tax exemption.) The second main attraction of municipal bonds is their safety. Historically, cases of default for municipal bonds in America are extremely rare, especially for general obligation bonds backed by the "full faith and credit" of the issuing municipality.[9]

III. THE MUNICIPAL BOND MARKET

In addition to bond ratings, broad trends in the municipal bond market significantly influence Worcester's borrowing costs.[10] Just as with all other types of investments (stocks, Treasury bonds, corporate bonds, etc.), investor demand for a municipality's debt depends on many factors that are only indirectly related to its underlying fiscal condition. Until recently, municipal bonds were a fairly attractive investment during the current recession. Some commonly-cited causes for this include the "flight to safety," from which the Federal government and blue-chip American corporations have also benefited in their debt issuances; concerns over future Federal income tax increases for high earners; and the introduction of the taxable Build America Bonds program, which decreased the overall supply of tax-exempt bonds (this program ended in 2010). This has been good news for municipalities: strong investor demand for their debt has meant lower borrowing costs.

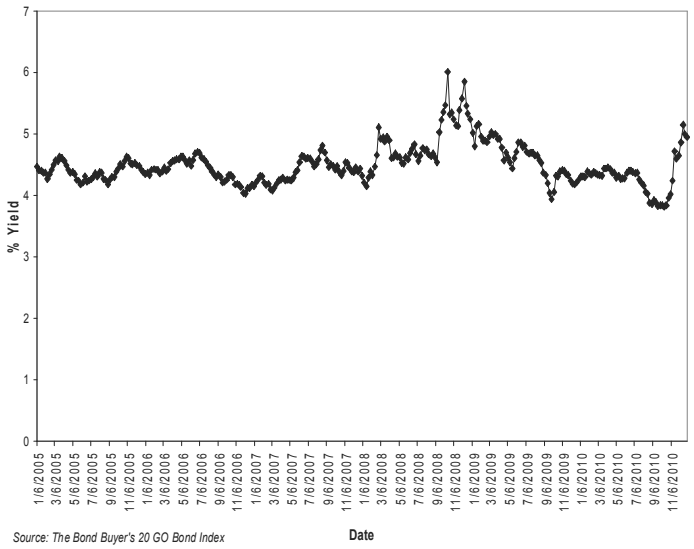
Drawing on data compiled by *The Bond Buyer*, a prominent public finance periodical, **Charts 1**[11] and **2**[12] show the effect that the recession has had on the cost of borrowing for municipalities nationwide.

Chart 1: Note (One-Year) Yields, 2005-2010



Source: The Bond Buyer's "One Year Note Index"

Chart 2: General Obligation Bond Yields, 2005-10



Source: The Bond Buyer's 20 GO Bond Index

As with the Dow Jones and S&P 500 averages for American stocks, these indices only depict general trends in the municipal bond market. The yields of particular issuances will differ. (See **Appendix 1** for more detailed information on Worcester's borrowing costs over the past five years.)

A brief comparison of **Charts 1** and **2** shows that the recession's effect has not been the same on short and long-term municipal issuances. The cost of short-term borrowing (**Chart 1**) has declined more or less continuously to the point where many municipalities have to pay less than .5% on it. The yields of long term debt (**Chart 2**) declined less drastically and in a less linear manner. Such difference is not uncommon. Since long-term municipal debt is partly an expression of investors' judgments on long-term trends such as future changes in interest rates or income-tax rates, yield rates for bonds are affected by factors that yield rates for notes are not.

Note also, in **Chart 2**, the rise in yields towards the end of 2010. Reasons cited for this include a temporary oversupply in issuance, concern about the expiration of the Build America Bonds program at the end of 2010, and the extension of the Bush income tax cuts (reducing demand for tax-exempt municipal bonds). It is also possible that some investors are coming to believe that municipal bonds are not as safe of an investment as they seemed to believe during the preceding months of the recession. Indeed, long prior to the recent market turmoil, several respected analysts and investors raised the question of a "muni-bond bubble," contending that municipal bonds did not deserve the generous treatment they were enjoying from the market. They pointed to warning signs such as the collapse of the "monoline" municipal bond insurers (which left many municipal bonds uninsured against default), the bleak near-term revenue outlook of state and local governments, their large unfunded pension and retiree health care liabilities, inflexible labor contracts, and the unreliability of elected bodies at the state and local level.[13]

Although the recession has made it difficult for many individuals and

businesses to access credit, it has become, until recently, if anything, cheaper and easier to access for state and local governments. If a municipality has managed to maintain its credit rating throughout the recession, as Worcester has, its borrowing costs in 2009 and 2010 should have been no higher than they were in 2005 or 2006, and were likely slightly less. As **Table 4** illustrates, Worcester's situation is representative, at least in Massachusetts. Relatively few cities and towns in the Commonwealth have had their debt downgraded since the beginning of the recession.[14]

Table 4: Downgrades of Massachusetts Municipalities During the Recession (2007-09)

	Moody's	Standard & Poor's
Downgrades	16	4
Upgrades	9	61
Left Unchanged	197	69
Total	222	134
% Downgraded	7.2%	3.0%

Source: DOR; 2010 was left out because in April of 2010 Moody's recalibrated its municipal rating scale

IV. THE CREDIT RATING AGENCIES

Moody's, Standard and Poor's, and Fitch's play a significant role in the world's financial markets by rating all varieties of debt, including corporate, sovereign (national), state and local, and asset-backed. They are private, for-profit companies paid by the debt-issuer for their analysis. However, they occupy a quasi-public status in the financial markets due to the fact that the requirements for their ratings are written into many financial laws and regulations. Often, the legal definition of an "investment grade" security is one that has been certified as such by one of the "Nationally Recognized Statistical Rating Organizations (NRSROs)."[15] For example, financial firms with stringent capital requirements such as insurance companies or money-market funds must own primarily securities that have been highly-rated by an NRSRO. Because of this, whenever any corporation or government wants to issue debt, it is essentially required by government regulators to pay Moody's et al. to rate it before they can access the market.[16]

The independence of the credit ratings agencies has long been questioned due to the fact that issuers, not investors, pay them for their analysis. In the wake of 2008's financial crisis, this criticism has intensified, since many of the asset-backed securities that precipitated the crisis were very highly rated, initially, by the credit ratings agencies. Because so many of these new securities were being packaged, rated, and issued during the recent boom, the profit margins of the ratings agencies soared before the collapse. As **Table 5** illustrates, at the height of the boom, Moody's structured finance ratings business constituted almost half of its

total revenues and brought it unprecedented revenue growth.

Table 5: Structured Finance Revenues; Moody's Investors Service (1998-2009)

Year	Total Corporate Revenues	Structured Finance Revenues as % of Total
2009	$304.9	25.0%
2008	$404.7	33.6%
2007	**$868.4**	**48.8%**
2006	**$886.7**	**46.8%**
2005	**$715.4**	**44.7%**
2004	$553.1	42.0%
2003	$460.6	40.6%
2002	$384.3	40.8%
2001	$273.8	35.7%
2000	$199.2	33.1%
1999	$172.4	30.6%
1998	$143.0	27.8%

Source: Moody's Investor's Service, Annual Reports

The credit ratings agencies were taking in large fees from financial firms to rate securities that proved in retrospect far too complex or simply too new to judge their risk adequately.

The Dodd-Frank Act, passed in July 2010, contained several provisions directed at the credit ratings agencies. In addition to requiring greater disclosure and subjecting them to potentially greater liability, the Act will remove specific references to the credit ratings agencies in Federal laws and regulations. The Act thus attempts to discourage investors from relying solely on Moody's et al. to define for them what an "investment grade" security is.

But these debates about the credit ratings agencies' role in the financial crisis and the "issuer pays" are less of a concern in the case of municipal issuers like Worcester. There is much less risk of bias in agency ratings of Worcester bonds than there was in the case of firms that were packaging billions of structured debt offerings annually during the boom. Worcester pays the three main NRSROs together a fairly modest sum of around $40,000 annually for their analyses (**Table 6**).

Table 6: Fees Paid by Worcester to Rating Agencies, 2005-10

Year	Agency	Fees	Annual Total
2005	Moody's	$12,750	
	S&P	$12,100	
	Fitch	$12,000	$36,850
2006	Moody's	$10,550	
	S&P	$16,000	
	Fitch	$10,000	$36,550
2007	Moody's	$13,450	
	S&P	$19,000	
	Fitch	$15,000	$47,450
2008	Moody's	$9,950	
	S&P	$17,000	
	Fitch	$12,000	$38,950
2009	Moody's	$11,300	
	S&P	$19,200	
	Fitch	$15,000	$45,500
2010	Moody's	$12,700	
	S&P	$15,300	
	Fitch	$15,000	$43,000

Source: City of Worcester

Moreover, municipal bonds are significantly less "exotic" than mortgage-backed securities. There is therefore arguably less of a danger that ratings agencies, which have been evaluating municipal bonds for decades, lack the capacity to assess their risk.

V. WORCESTER'S BOND RATING

Worcester's current bond rating is investment-grade, stable (not in imminent danger of downgrade), and squarely within the range of the other older industrial cities in the Commonwealth (**Table 7**).

Table 7: Bond Ratings of Older Industrial Cities in Massachusetts

Community	Moody's
Leominster	Aa2
Brockton	Aa3
Chicopee	Aa3
Fall River	A1
Fitchburg	A1
Haverhill	A1
Holyoke	A1
Lowell	A1
Lynn	A1
New Bedford	A1
Pittsfield	A1
Taunton	A1
Worcester	**A1**
Springfield	A2
Lawrence	Baa1

Source: DOR

According to the Massachusetts Department of Revenue, Moody's rates 247[17] municipalities in the Commonwealth. It assigns a rating higher than Worcester's to 179 communities, or 72.5%.[18] Thus, Worcester's borrowing costs are higher than over 70% of the other Massachusetts communities rated by Moody's.

What sort of municipalities are rated AAA? In Massachusetts, they tend to be small suburbs with a primarily residential tax base. As **Table 8** shows, Cambridge and Boston are the only AAA communities with populations above 85,000 and a residential tax base below 65% of its assessed value.

Table 8-AAA-rated Massachusetts Municipalities

Moody's (2010)			Standard & Poor's (2009)		
Municipality	% Residential Tax Base	Population	Municipality	% Residential Tax Base	Population
Acton	87.1	21,234	Acton	87.1	21,234
Bedford	76.9	13,814	Arlington	94.1	41,724
Belmont	94.1	23,675	Barnstable	88.5	46,297
Boston	64.5	645,169	Bedford	76.9	13,814
Brookline	90.6	56,410	Cambridge	61.4	108,780
Cambridge	61.4	108,780	Canton	76.0	22,382
Concord	90.6	17,580	Chatham	93.5	6,753
Dover	97.5	5,723	Dover	97.5	5,723
Hingham	86.6	23,270	Duxbury	96.3	14,362
Lexington	87.4	30,929	Hingham	86.6	23,270
Newton	89.7	84,600	Lincoln	96.3	8,653
Wayland	95.1	13,503	Marlblehead	95.1	19,962
Wellesley	88.4	27,412	Natick	76.2	32,338
Weston	96.3	11,954	Needham	87.3	29,037
Winchester	94.4	21,497	Norwell	84.6	10,336
			Sherborn	95.5	4,285
			Sudbury	92.9	17,714
			Wellesley	88.4	27,412
			Weston	96.3	11,954
			Westwood	86.6	14,330
			Winchester	94.4	21,497

Source: DOR

VI. WORCESTER'S BOND RATING AND THE CITY MANAGER'S FIVE-POINT FINANCIAL PLAN

Stabilizing Worcester's bond rating is a cornerstone of the City Manager's "Five-Point Financial Plan," adopted by the City Council in November, 2006 (**Table 9**).

Table 9: Worcester's Five-Point Financial Plan
Five-year forecasting and long-term planning of City finances and projects
Strengthening of reserves, including creation of Bond Rating Stabilization Fund
Quarterly financial reporting
$18 million cap on tax levy-backed borrowing (briefly lowered to $15 million in FY10, restored to $18 million in FY11)
Capital Improvement Plan to achieve debt service stability in budget

The plan calls for the creation of a Bond Rating Stabilization Fund made up of deposits from debt service reimbursements Worcester receives from the Massachusetts School Building Authority and a new policy that places 50% of any net Free Cash (year-end surpluses) generated by the City in any given year into this fund. These two actions are designed to increase the amount of City reserves available to address economic and budgetary fluctuations that the City may face over the long term. The Plan also calls for creating a North High Capital Improvement Fund that will be used to finance the construction of a new high school without increasing Worcester's property taxes to finance this $72 million project. The positive impact of this plan on the City's long-term financial stability has been regularly cited by all three ratings agencies in their credit reports for Worcester.[19]

VII. MOODY'S METHODOLOGY

A bond rating cannot be reduced to a mathematical formula. Moody's[20] rates 3,300 local governments that differ in a variety of ways, and endeavors to appreciate these differences while still rating them all on the same scale. Moody's issues its credit rating based on four general categories that are given different weights (**Table 10**).

Table 10: Weightings of Moody's Rating Factors	
Factor	**Weighting**
Economic Strength	40%
Financial Strength	30%
Management and Governance	20%
Debt Profile	10%
Source: "General Obligation Bonds Issued by U.S. Local Goverments," Moody's Investors Service	

Local economic conditions are the primary source of bondholder security. Since a general obligation bond is one that is secured by a local government's pledge to levy property taxes sufficient

to pay debt service, Moody's gives most weight to the property tax base and the condition of the local economy. To assess them, Moody's looks at figures such as a community's overall valuation (size, growth trends and valuation per-capita), personal and family income averages, tax base diversity, and unemployment rate. Moody's also analyzes the reasons for the numbers. Are increases in the overall valuation due to appreciations in existing properties or new development? Is the tax base's overall valuation artificially low due to large tax-exempt institutions that may support the local economy in other ways? Is the community primarily residential or commercial?

Only slightly less important to Moody's are the actual finances of the municipality: the size of its reserves, its independence from high fixed costs and state aid. In general, what Moody's wants to see is maximum flexibility in a community's ability to withstand negative pressure from changes in the local economy.

Moody's bond ratings also factor in the strength of municipal management and governance. Assessing the strength of 3,300 different municipal administrations would seem to be much more difficult than, say, comparing their unemployment rates, but there are certain things that Moody's believes demonstrate a basic level of managerial competence. How accurate has the management team been in its budgetary forecasting? Does it have long term plans in place for both its operational and capital budgets? Does it adhere to them?

In Moody's official statements on its ratings methodology, a few overriding principles stand out. The first is the need for historical analysis. "General obligation credit ratings do not generally move up in boom times and fall in recessions."[21] Moody's analyzes a community's *fundamental* creditworthiness, which requires examining more than one year of financial and economic data. The second is flexibility. A creditworthy community is one that is flexible enough to meet its obligations even when faced with an unexpected crisis. The third is the need for qualitative analysis to supplement quantitative measures.

VIII. FACTORS THAT CONTRIBUTE TO A COMMUNITY'S BOND RATING

The remainder of this report will attempt to explain how Moody's analyzes Worcester and other municipalities by looking at a few select quantitative factors that Moody's singles out as especially important. The intention is less to compare Worcester with other communities in each category, than to determine the general importance of each factor. In

each case, we will calculate the correlation coefficient between the Moody's rating and the indicator to see how closely related they are. (The correlation coefficient between two variables is a common method of statistical analysis, as explained in **Appendix 2**.) Thirty-three Massachusetts communities will be surveyed with respect to six different factors: unemployment, wealth, recent growth, level of reserves, dependence on state aid, and retirement benefit obligations. Moody's lists many other factors that it examines when conducting its analysis, but these are among the most important.[22] Each of the communities has been assigned a numerical bond rating: "10" for "AAA," "9" for "Aa1," and so forth, down to "3" for Baa1, the lowest rating for any community in this set. The correlation coefficient between this number and each given indicator will then be calculated. This will allow us to express how closely correlated a bond rating is to unemployment, reserves, per-capita income, etc.

1: Unemployment Rate

The most basic measure of economic health for any community is its unemployment rate.

Key Quote: "Unemployment rates, adjusted for any seasonal fluctuation, are perhaps the most current measure of an area's economic health. Equally important are the unemployment trends over a period of time, which illustrate a municipality's demonstrated ability to withstand changes in national or regional economic fortunes and may provide an indication of future employment performance."

Findings:

In order to estimate the correlation between Moody's bond ratings and the unemployment rate, we compared average annual unemployment rates between 2005-9. The Pearson's-*r* correlation coefficient our analysis returned was -0.8305. This indicates a fairly strong *negative* correlation, which means that, generally speaking, the higher a community's unemployment rate it, the lower its bond rating tends to be (**Chart 3** and **Table 11**).

Chart 3: Unemployment Rate and Moody's Bond Rating of Select Massachusetts Municipalities

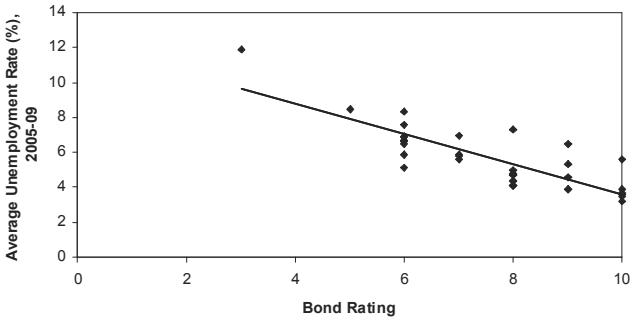


Table 11: Unemployment Rates and Bond Ratings		
Community	Moody's Bond Rating	Average Unemployment Rate, 2005-9
Brookline	Aaa	3.2
Wellesley	Aaa	3.5
Cambridge	Aaa	3.6
Newton	Aaa	3.7
Concord	Aaa	3.9
Natick	Aa1	3.9
Somerville	Aa2	4.1
Westborough	Aa2	4.1
Framingham	Aa2	4.4
Waltham	Aa1	4.6
Marlborough	Aa2	4.7
Chelmsford	Aa2	4.8
Nantucket	Aa2	5.0
Medford	A1	5.1
Danvers	Aa1	5.3
Boston	Aaa	5.6
Quincy	Aa3	5.6
Salem	Aa3	5.8
Pittsfield	A1	5.9
Weymouth	Aa3	5.9
Haverhill	A1	6.5
Plymouth	Aa1	6.5
Worcester	A1	6.6
Revere	A1	6.7
Taunton	A1	6.7
Attleboro	A1	6.9
Lynn	A1	6.9
Chicopee	Aa3	7.0
Leominster	Aa2	7.3
Lowell	A1	7.6
Fitchburg	A1	8.3
Springfield	A2	8.5
Lawrence	Baa1	11.9
Source: DOR		

2: Wealth

A local economy can also be evaluated in terms of its wealth. To measure wealth, Moody's looks at per capita income of the local population, and "full value per capita," the community's total taxable property valuation divided by its population. In Massachusetts, this is known as the "Equalized Valuation" (EQV).

Key Quote: "A community that has higher wealth levels may have relative flexibility to increase property tax rates in order to meet financial needs. Likewise, a wealthier community has greater spending power to…provide the demand necessary to support growth in the commercial and service sectors…."

Findings:

Since both the per capita income and average EQV measures rely on population estimates (which don't change on an annual basis), it is more difficult to track them as a trend over time. Thus, for these indicators, we looked only at the most recent figures available (2008).

The correlation between EQV and the bond rating was 0.8389 and between per capita income and bond rating was 0.6725. (PCI and average EQV themselves yielded a correlation coefficient of 0.9133.) Hence, there is a strong correlation between high taxable property values and bond rating, even

stronger than between bond rating and income level.

Chart 4: Per Capita Income and Moody's Bond Rating of Select Massachusetts Municipalities

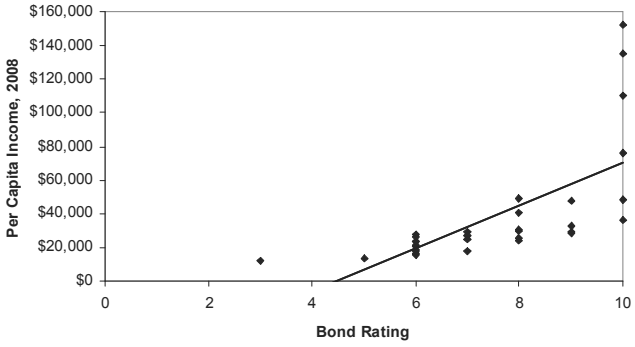


Chart 5: EQV Per Capita and Moody's Bond Rating of Select Massachusetts Municipalities

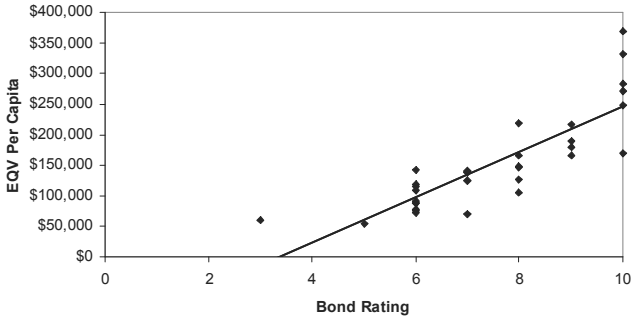


Table 12: Bond Ratings and Measures of Wealth

Community	Moody's Bond Rating	2007 Income Per Capita	2008 EQV Per Capita
Boston	Aaa	$36,114	$170,621
Brookline	Aaa	$76,186	$283,510
Cambridge	Aaa	$48,560	$247,399
Concord	Aaa	$134,773	$330,972
Newton	Aaa	$110,040	$270,534
Wellesley	Aaa	$152,308	$368,138
Danvers	Aa1	$32,540	$179,610
Plymouth	Aa1	$28,708	$190,075
Waltham	Aa1	$29,231	$164,919
Chelmsford	Aa2	$40,375	$165,753
Framingham	Aa2	$30,662	$147,142
Leominster	Aa2	$24,066	$105,685
Marlborough	Aa2	$30,068	$148,391
Somerville	Aa2	$25,849	$127,042
Westborough	Aa2	$49,027	$217,742
Chicopee	Aa3	$18,115	$70,762
Quincy	Aa3	$27,073	$140,220
Salem	Aa3	$24,972	$125,268
Weymouth	Aa3	$28,825	$138,702
Attleboro	A1	$26,538	$116,089
Fitchburg	A1	$16,016	$73,151
Haverhill	A1	$23,671	$109,348
Lowell	A1	$17,948	$79,008
Lynn	A1	$20,762	$87,558
Medford	A1	$27,668	$143,163
Natick	Aa1	$47,967	$216,700
Pittsfield	A1	$23,658	$88,457
Revere	A1	$15,393	$92,545
Taunton	A1	$21,177	$118,835
Worcester	A1	$18,336	$75,726
Springfield	A2	$13,156	$54,525
Lawrence	Baa1	$12,423	$59,535

Source: DOR

3: Recent Growth

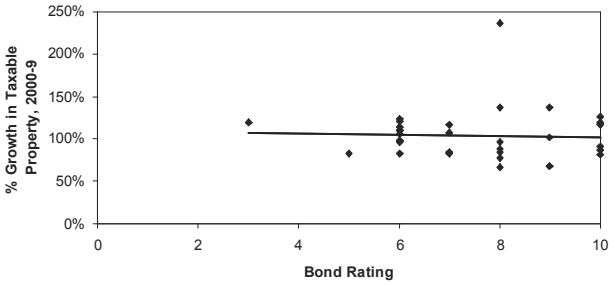
Has a community been growing recently, stagnant or in decline? Recent trends in the tax base are important indicators of the future economic outlook.

Key Quote: "Moody's analysis of economic growth incorporates a review of historical trends, including average annual increases in assessed and full valuation and building permit activity over time, to provide an indication of future economic performance. We review at least five years of historical assessed and full valuations (primarily valuation of real estate and personal property), paying close attention to growth patterns during periods of national or regional economic downturn."

Findings:

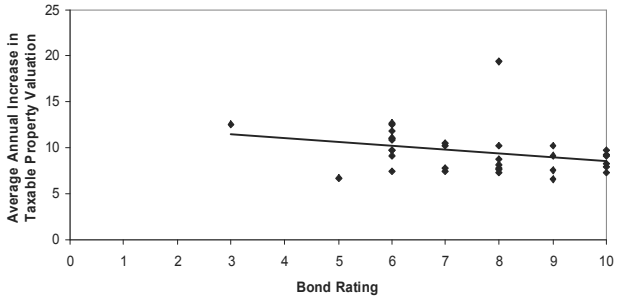
The figure that was used for recent growth was the percentage difference between each community's EQV (again, its taxable property) between 2000 and 2009. The correlation between this particular way of measuring local economic growth and the Moody's rating was quite weak: -0.0399, or close to 0. Thus growth, measured as cumulative increase in valuation over a decade, was not correlated with bond rating among the communities in this sample. As **Chart 6** shows, most of the communities are grouped around the 100% growth line, whether they have high ratings (10/AAA) or low ratings (5/A2).

Chart 6: Growth in Taxable Property, 2000-09, and Moody's Bond Rating of Select Massachusetts Municipalities



The correlation between bond rating and average annual growth in taxable property valuation between 2000-9 was somewhat stronger: -0.2985 (**Chart 7**).

Chart 7: Average Annual Increase in Taxable Property Valuation, 2000-09, and Moody's Bond Rating of Select Massachusetts Municipalities



As **Chart 7** shows, most communities surveyed seem to have experienced around 10% average annual growth, regardless of the strength of their bond rating. The correlation between bond rating and average annual growth had a higher correlation than between bond rating and cumulative growth, but was still quite weak. Some low-rated communities during the past decade experienced fairly significant property valuation increases (Lowell and

Lawrence), and some highly-rated communities experienced more modest growth (Danvers and Concord) (**Table 13**). A more precise analysis would determine to what extent the growth in these various communities was due simply to appreciation of existing properties, and what was due to actual new growth.

Table 13: Growth in Property Valuation and Bond Rating

Community	Moody's Bond Rating	Average Annual Change, 2000-9 (%) (Taxable)	Total Growth in EQV, 2000-2010
Boston	Aaa	9.7	126.1%
Brookline	Aaa	9.1	116.9%
Cambridge	Aaa	9.3	120.0%
Concord	Aaa	8.3	81.8%
Newton	Aaa	7.3	87.1%
Wellesley	Aaa	7.9	90.5%
Danvers	Aa1	7.6	68.5%
Natick	Aa1	9.1	101.6%
Plymouth	Aa1	10.2	137.1%
Waltham	Aa1	6.6	68.6%
Chelmsford	Aa2	7.7	83.7%
Framingham	Aa2	7.8	66.4%
Leominster	Aa2	8.8	97.1%
Marlborough	Aa2	8.2	88.5%
Nantucket	Aa2	19.4	236.5%
Somerville	Aa2	10.2	136.6%
Westborough	Aa2	7.3	77.2%
Chicopee	Aa3	7.4	84.0%
Quincy	Aa3	10.3	117.1%
Salem	Aa3	7.8	82.9%
Weymouth	Aa3	10.5	107.4%
Attleboro	A1	11.8	124%
Fitchburg	A1	9.7	109.7%
Haverhill	A1	11.0	109.4%
Lowell	A1	12.6	121.6%
Lynn	A1	9.7	97.9%
Medford	A1	10.9	97.3%
Pittsfield	A1	7.4	83.1%
Revere	A1	12.7	106.2%
Taunton	A1	11.1	113.6%
Worcester	A1	9.2	96.9%
Springfield	A2	6.7	82.3%
Lawrence	Baa1	12.6	119.6%

Source: DOR

4: Reserves

Just as with a family or a corporation, the stronger a community's level of reserves is, the better able it is to make good on its obligations. Reserves provide independence and the ability to meet crises. The General Fund is the chief operating fund of a municipality. General Fund expenditures cover the core municipal services of public safety, public education, and public works; most personnel costs (salaries and benefits); and debt service payments. In addition to funding these regular operational expenses, municipalities also set some revenues aside as reserves: this amount is known as the General Fund Balance. For accounting purposes, the General Fund Balance includes reserved or designated portions, which have been set aside for specific purposes, and an unreserved or undesignated portion, which is available for any expenditure necessary. The total fund balance is the combination of the two.

The General Fund Balance can be a source of supplemental funding during an economic downturn, or can be used to cover unexpected revenue shortfalls or unanticipated expenditures. Worcester drew down $7 million of its reserves between FY05 and FY06 to pay for higher-than-anticipated costs for snow removal, police overtime, and employee retirement and health benefits. In FY09, Worcester's unreserved general fund balance

dropped from $11.9 million (2.2% of total GF revenues) to $6.1 million (1.2%). This was due to mid-year cuts in state aid and to higher snow removal costs.

A community's level of reserves is often expressed as the ratio of the General Fund Balance to General Fund Revenues (the size of the budget). This allows ratings agencies and others to compare the reserve levels of communities of different sizes.

Key Quote: "One financial statistic that is key to evaluating financial strength is the General Fund balance as a percent of revenues. This ratio provides a measure of the financial reserves potentially available to fund unforeseen contingencies as well as likely future liabilities."

Findings:
The correlation between the unreserved fund balance and bond rating among the communities surveyed was moderate: 0.5513. The correlation between the total fund balance and bond rating was also moderate: 0.5921.

Chart 8: Unreserved Fund Balance and Moody's Bond Rating of Select Massachusetts Municipalities

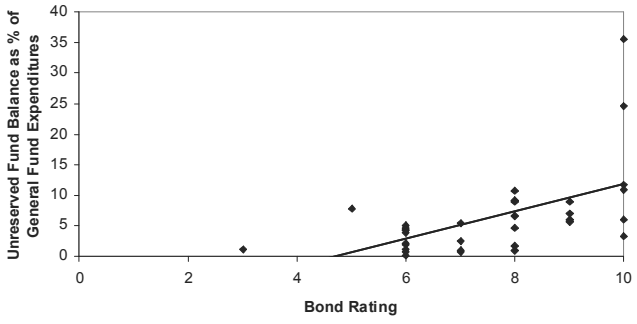


Chart 9: Total Fund Balance and Moody's Bond Rating of Select Massachusetts Municipalities

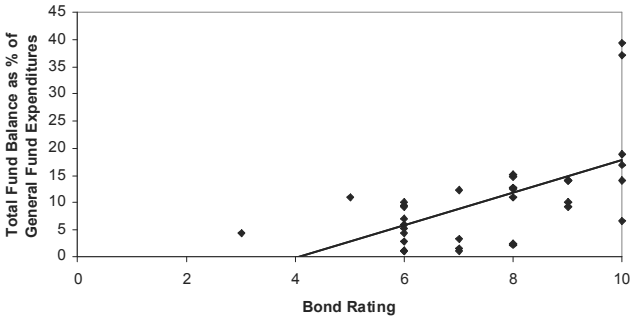


Table 14: Bond Ratings and Reserves

Community	Moody's Bond Rating	Unreserved Fund Balance (%)	Total General Fund Balance (%)
Attleboro	A1	4.2	4.3
Boston	Aaa	24.5	37.0
Brookline	Aaa	6.0	17.0
Cambridge	Aaa	35.5	39.3
Chelmsford	Aa2	1.7	2.4
Chicopee	Aa3	5.4	12.2
Concord	Aaa	11.7	18.8
Danvers	Aa1	6.1	10.2
Fitchburg	A1	4.2	6.0
Framingham	Aa2	0.9	2.3
Haverhill	A1	4.6	9.3
Lawrence	Baa1	1.1	4.3
Leominster	Aa2	9.0	12.7
Lowell	A1	0.2	2.9
Lynn	A1	4.0	5.3
Marlborough	Aa2	9.2	12.5
Medford	A1	0.7	1.1
Nantucket	Aa2	10.8	14.8
Natick	Aa1	5.6	9.3
Newton	Aaa	3.4	6.5
Pittsfield	A1	5.1	7.1
Plymouth	Aa1	7.0	14.0
Quincy	Aa3	1.0	1.5
Revere	A1	1.9	9.5
Salem	Aa3	0.7	1.0
Somerville	Aa2	6.7	15.1
Springfield	A2	7.9	10.9
Taunton	A1	2.2	10.2
Waltham	Aa1	9.0	14.0
Wellesley	Aaa	11.0	14.0
Westborough	Aa2	4.7	10.9
Weymouth	Aa3	2.5	3.2
Worcester	A1	1.2	1.2

5: Fiscal Independence

Moody's prizes "operating flexibility," and one measure of this is the degree of a local government's dependence on external, state revenues. The less reliant on state revenues a municipality is, the less exposed it is to whatever fiscal crises the state may endure. Additionally, in Massachusetts, fiscal independence for municipalities means a greater reliance on property-tax revenues, which are less volatile than state income and sales-tax revenues. As **Table 7** above indicated, many of the AAA-rated communities in Massachusetts are wealthy suburban communities whose high property values allow them to be more independent of state aid cuts.

Key Quote: "The extent to which government financial managers can exert local control over operating performance is a significant determinant of an entity's ability to maintain a satisfactory distance from fiscal distress. Local governments face inevitable budgetary pressures which may be managed from either the revenue or expenditure side. To the extent an issuer has flexibility to control both revenues and expenditures, financial flexibility will be maximized…. local governments that rely on local source revenues for the majority of their operating revenues generally have greater control over their financial condition than those entities that are heavily dependent on outside sources such as state aid or other intergovernmental revenues which are prone to reduction during times of state fiscal stress."

Findings:

The correlation between state aid and bond rating among the communities surveyed is strongly negative: -0.7753. The lower the dependence on outside sources of revenue, the higher a municipality's bond rating.

Table 15: Bond Rating and Dependence on State Aid

Community	Moody's Bond Rating	% Budget State Aid (Average, 2005-9)
Attleboro	A1	35.2
Boston	Aaa	25.9
Brookline	Aaa	9.1
Cambridge	Aaa	9.3
Chelmsford	Aa2	15.5
Chicopee	Aa3	40.7
Concord	Aaa	5.9
Danvers	Aa1	10.6
Fitchburg	A1	47.5
Framingham	Aa2	13.0
Haverhill	A1	33.7
Lawrence	Baa1	68.1
Leominster	Aa2	41.8
Lowell	A1	55.1
Lynn	A1	58.9
Marlborough	Aa2	14.5
Medford	A1	21.9
Nantucket	Aa2	1.5
Natick	Aa1	10.9
Newton	Aaa	7.5
Pittsfield	A1	37.1
Plymouth	Aa1	16.3
Quincy	Aa3	15.7
Revere	A1	34.1
Salem	Aa3	23.2
Somerville	Aa2	29.5
Springfield	A2	58.3
Taunton	A1	36.0
Waltham	Aa1	10.3
Wellesley	Aaa	6.2
Westborough	Aa2	10.1
Weymouth	Aa3	23.5
Worcester	A1	45.9

Source: DOR

Chart 10: Dependence on State Aid and Moody's Bond Rating of Select Massachusetts Municipalities

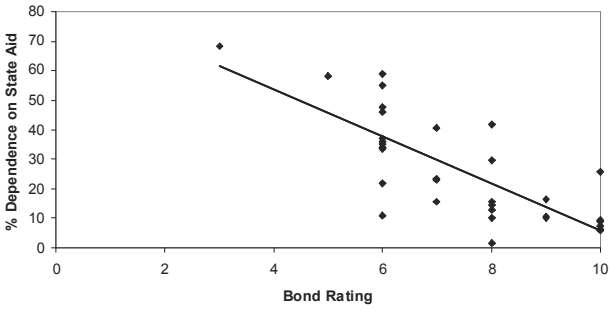
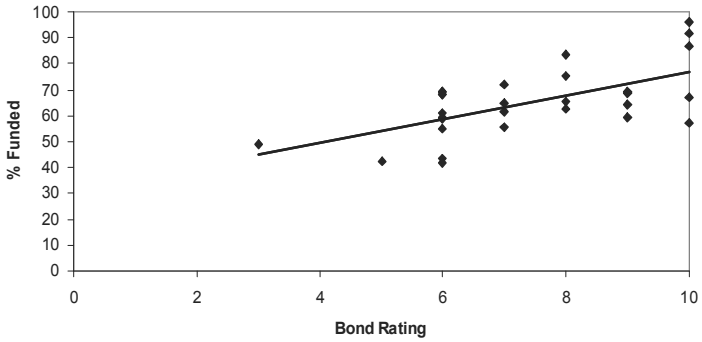


Chart 11: Pension System Funding and Moody's Bond Rating of Select Massachusetts Municipalities



6: Pension and Retiree Health Care Obligations

Many observers who hold a bleak outlook on state and local government finances in the U.S. place central importance on the enormous long-term obligations for pension and retiree health care that have accrued.

Key Quote:

"Moody's analysis of a municipality's debt profile includes an assessment of the degree to which other non-debt long term commitments, such as pension obligations and other post-employment benefits (OPEB), primarily retiree health benefits, impact the entity's long term flexibility."

Findings:

A pension system's solvency is measured by its funded ratio: its total assets on hand divided by its total obligations. The correlation between the bond rating and the funded ratio for pension obligations was about as strong as with the level of reserves: 0.6252.

Table 16: Bond Rating and Pension System Funding

Community	Moody's Bond Rating	Funded Ratio (%)
Boston	Aaa	67.6
Brookline	Aaa	67.3
Cambridge	Aaa	92.0
Concord	Aaa	96.0
Newton	Aaa	56.9
Wellesley	Aaa	86.7
Danvers	Aa1	59.4
Natick	Aa1	69.2
Plymouth	Aa1	68.7
Waltham	Aa1	64.4
Framingham	Aa2	75.3
Leominster	Aa2	83.5
Marlborough	Aa2	62.9
Somerville	Aa2	65.5
Chicopee	Aa3	61.7
Quincy	Aa3	65.0
Salem	Aa3	55.7
Weymouth	Aa3	71.9
Attleboro	A1	69.3
Fitchburg	A1	54.8
Haverhill	A1	60.8
Lowell	A1	58.8
Lynn	A1	41.9
Medford	A1	69.1
Pittsfield	A1	43.2
Revere	A1	59.4
Taunton	A1	68.1
Worcester	A1	68.0
Springfield	A2	42.4
Lawrence	Baa1	48.9

Source: CAFRs and PERAC 2009 Annual Report; Chelmsford, Nantucket, and Westborough have been left out because they are part of county retirement systems

The same calculation has not been made to determine the correlation between bond ratings and retiree health care obligations, since none of the communities surveyed have made a significant impact in funding these obligations. The funded ratio for most of them is 0%. (Boston and Wellesley have set aside some funds for this purpose, but a very small amount.)

Table 17 summarizes the results from this section, ranking all the factors in descending order of the strength of their correlation with the bond rating.

Table 17: Correlations Between Bond Ratings and Select Economic and Fiscal Factors

	Correlation with Bond Rating (Pearson's-*r* correlation coefficienct)
EQV Per Capita	0.8389
Unemployment Rate	-0.8305
Dependence on State Aid	-0.7753
Per Capita Income	0.6725
Pension System Funding	0.6252
Total Fund Balance	0.5921
Unreserved Fund Balance	0.5513
Average Annual Increase in Taxable Property Valuation	-0.2985
Growth in Taxable Property Valuation	-0.0399

The foregoing list of factors affecting the city's bond rating is not exhaustive. There are many other factors that Moody's looks at when analyzing municipal debt (**Table 18**).

Table 18: Other Economic, Fiscal and Managerial Factors Considered by Moody's

Local economy's dependence on the regional, state and national economies
Office and retail vacancy rates
Housing market data
Building permit activity
Tax base concentration
Population trends
Poverty trends
Fixed costs as a % of total budget
Reliance on one-time revenues for recurring expenditures
Management's accuracy in forecasting revenues and expenditures
Fund Balance Policies
Multiyear fiscal plans
Multiyear capital improvement plans
Timeliness of annual budget adoption
Overall debt burden
Source: "General Obligation Bonds Issued by U.S. Local Governments"

Furthermore, to reemphasize, Moody's does not look at any of these in isolation, and always supplements its quantitative findings with qualitative analysis. However, the above six factors constitute some of the most important

economic and fiscal indicators that can easily be expressed in a quantitative manner, and can thus be correlated quantitatively with the bond rating.

CONCLUSION: WORCESTER'S BOND RATING AND THE RECESSION

Worcester, like most other municipalities throughout the Commonwealth, has so far made it through the current recession with its bond rating intact. As the ratings agencies themselves have recognized, this has partly to do with the City's management competence. Through policies such as devising and adhering to the City Manager's Five-Point Financial Plan, Worcester's bond rating is likely to remain stable.

A municipality's bond rating is determined by a mix of several factors, some of which it has some control over, others which it may exercise some indirect control over, and some which it has no control over at all. Worcester has no control over trends in the $2.4 trillion municipal bond market. The fact that yields have begun to rise, for all issuers, strongly suggests that Worcester will soon have to pay more to borrow money than it did over the past two years. Worcester has indirect control over economic factors such as the unemployment rate, wealth levels, and property values, insofar as it can influence them through policies such as zoning and taxes. But the impact of such efforts is likely to be uncertain, since economic growth is so strongly determined by broader national and international economic trends as well as the effect of state and federal policies. Worcester has the most direct influence over fiscal factors such as reserve levels and pension system funding. If the City desires to do as much as it can to strengthen its bond rating in the short-term, it should continue to focus on local fiscal matters.

APPENDIX 1: WORCESTER'S BORROWING COSTS 2005-2010

Worcester's Market Access: General Obligation Bond Offerings, 2005-2010						
Date	**Principal**	**No. of Bidders**	**Winning Bidder**	**True Interest Cost (including premium)**	**Cost of Borrowing (Total Net Interest Cost)**	**Maturity (Years)**
Jul-05	$43,230,000	1 (Negotiated)	UBS	4.87%	$22,059,863	15
Jul-05	$26,970,000	1 (Negotiated)	UBS	4.87%	$13,182,587	14
Sep-05	$64,575,000	6	Merrill Lynch	3.91%	$23,596,829	20
Sep-05	$1,830,000	1	BB&T	5.18%	$839,973	17
Oct-06	$46,770,000	7	CitiGroup	4.09%	$16,836,335	20
May-07	$4,750,000	1 (Negotiated)	RBC Capital	5.41%	$1,814,958	12
Oct-07	$39,097,000	5	Citigroup	3.92%	$12,196,115	20
Sep-08	$41,290,000	2	Robert W. Baird & Co.	4.45%	$15,052,268	20
Sep-08	$1,670,000	1	CitiGroup	3.19%	$175,249	4
Aug-09	$2,345,000	1 (Negotiated)	Fidelity	2.12%	$188,742	7
Oct-09	$38,075,000	6	Wachovia	4.26%	$18,225,804	28
Oct-10	$32,654,500	3	CitiGroup	3.55%	$11,019,476	24
Oct-10	$5,050,000	1	Roosevelt & Cross	6.37%	$4,769,938	24
Source: City of Worcester's Treasurer's Office						

Worcester's Market Access: Note Offerings, 2005-2010							
Date	**Sum (Principal in millions)**	**No. of Qualified Bidders**	**Winning Bidder**	**Net Interest Cost**	**Net Cost of Borrowing**	**Matures**	**Annual Net Interest (Net Cost of Borrowing/ Principal)**
Nov-05	$13,700,000	8	Sovereign	3.21%	$439,222	Nov-06	
Jun-05	$16,395,000	1 (Negotiated)	Eastern Bank	2.80%	$459,060	Sep-05	
Mar-05	$10,685,000	4	Sovereign	2.48%	$264,785	Sep-05	
Mar-05	$1,050,000	2	Fleet	3.67%	$38,489	Sep-05	
2005	**$41,830,000**				**$1,201,556**		**2.87%**
Nov-06	$21,420,000	6	Wachovia	3.59%	$769,406	Nov-07	
Apr-06	$12,515,000	12	Banc of America	3.66%	$458,575	Nov-06	
Jun-06	$8,105,000	5	First Albany	3.66%	$296,440	Nov-06	
Nov-06	$7,500,000	3	First Southwest	3.76%	$282,336	Nov-08	
Feb-06	$12,450,000	6	Mellon	3.30%	$411,348	Nov-06	
2006	**$61,990,000**				**$2,218,105**		**3.58%**
Dec-07	$14,715,000	5	Eastern Bank	3.08%	$452,633	Sep-06	
Apr-07	$1,000,000	5	Eastern Bank	5.43%	$54,300	Jan-08	
Jun-07	$1,000,000	3	First Southwest	5.69%	$56,895	Jan-08	
Jun-07	$8,467,000	4	Commerce Capital	3.78%	$319,953	Nov-07	
Sep-07	$13,763,000	4	Eastern Bank	3.52%	$484,019	Sep-08	
Dec-07	$1,150,000	2	First Southwest	4.49%	$51,612	Sep-08	
Apr-07	$9,210,000	6	Banc of America	3.64%	$335,401	Nov-07	
2007	**$49,305,000**				**$1,754,813**		**3.56%**
Sep-08	$9,900,000	1	Janney Montgomery	2.73%	$270,042	Nov-09	
Sep-08	$1,000,000	2	Janney Montgomery	4.05%	$40,493	Nov-09	
Jun-08	$5,245,000	1	Eastern Bank	1.97%	$103,536	Sep-08	
Mar-08	$6,417,000	4	Eastern Bank	1.96%	$125,645	Sep-08	
Jan-08	$1,450,000	1 (Negotiated)	UniBank	5.25%	$76,125	Jul-09	
2008	**$24,012,000**				**$615,841**		**2.56%**
Nov-09	$3,650,000	3	Oppenheimer	1.56%	$57,050	Nov-10	
Nov-09	$24,300,000	8	Morgan Stanley	0.60%	$144,828	Nov-10	
Jan-09	$8,805,000	4	Banc of America	0.85%	$74,693	Nov-09	
Jun-09	$11,405,000	3	Jeffries & Co.	0.80%	$91,012	Nov-09	
2009	**$48,160,000**				**$367,582**		**0.76%**
Jun-10	$7,059,500	4	Eastern Bank	0.74%	$52,381	Nov-10	
Feb-10	$7,690,000	6	TD Securities	0.57%	$43,449	Nov-10	
Jul-10	$1,000,000	4	TD Bank	2.15%	$21,500	Jul-10	
Jul-10	$150,000	3	Eastern Bank	1.40%	$2,100	Jul-11	
Sep-10	$11,396,000	4	Oppenheimer	0.96%	$109,402	Nov-10	
Nov-10	$3,220,595	2	Eastern Bank	1.74%	$56,038	Jun-12	
2010	**$30,516,095**				**$119,430**		**0.39%**

Source: City of Worcester's Treasurer's Office

APPENDIX 2: CORRELATION COEFFICIENT

Correlations between sets of data drawn from empirical observations are often somewhere between a perfect correlation and random. Statistical analysis, in the form of the Pearson's-*r* correlation coefficient, is able to define how closely related two variables are. Beginning with two sets of empirical observations (educational attainment and lifetime earnings, political party affiliation and occupation, or, in this case, bond rating and unemployment,) the correlation coefficient expresses how much the two variables move or change together. The formula is as follows:

$$r = \frac{\sum \mathrm{XY} - ((\sum \mathrm{X})(\sum \mathrm{Y})/n)}{\sqrt{\sum X^2 - ((\sum X)^2 / n)}\sqrt{\sum Y^2 - ((\sum Y)^2 / n)}}$$

n=number of data pairs
X=Bond Rating (dependent variable)
Y=Unemployment, dependence on state aid, funded ratio, etc. (independent variable)

The equation asks, essentially, as unemployment rates go down, do bond ratings go up a proportionate amount? A positive correlation means that changes in one variable are accompanied by changes in the other variable in the same direction. A negative correlation means that the two variables change in opposite directions; larger values in one variable correlate with smaller values in the other. For any given data set, the formula yields a figure somewhere between 1 and -1. The closer the figure is to 1, the more strongly correlated the two data sets are. A value close to -1 also reveals a strong correlation, but negative, or inverse (e.g., as unemployment rate goes down, bond rating gets stronger, proportionately). The closer to zero the figure is, the more uncorrelated or unrelated the two variables are.

Two caveats are in order regarding this calculation. First, this calculation is based on a sample. The entire universe of municipal bond ratings was not analyzed in this report, but only a select group of issuers in Massachusetts. Second, a correlation between two variables, even a strong one, does not necessarily imply a causal relationship.

[1] The credit rating agencies emphasize that their ratings are not meant to be taken as recommendations to buy, hold or sell securities, but only estimates of future probabilities.
[2] "Recalibration of Moody's U.S. Municipal Ratings to its Global Ratings Scale," Moody's Investors Service, March 2010.
[3] Girard Miller, "A Facelift for Muni Bonds," *Governing*, April 15, 2010.
[4] Fitch's, the third largest ratings agency, also recalibrated its municipal ratings ("Recalibration of U.S. Public Finance Ratings," Fitch Ratings Special Report, March 25, 2010). Worcester's bond rating used to be expressed as "A3/A+/A-," now it's "A1/AA-/A-."
[5] Moody's recalibration also affected state ratings. Prior to April, 2010, Massachusetts' debt was rated Aa2/AA+/AA by Moody's, Fitch, and Standard & Poor's. It is now Aa1/AA/AA.
[6] In common parlance, "municipal bond" refers to a debt obligation issued not just by a municipality (a city or town), but by any other government entity, such as a state, county, school district or public authority. Debt issued by non-profit organizations such as hospitals and universities is also referred to as "municipal," because it is also typically tax-exempt.
[7] Exceptions include bonds for public-private real estate development projects, local sports facilities and unfunded pension liabilities. The IRS does not deem these types of bonds of sufficient benefit for the general public to merit exemption from federal taxation, although they may qualify for exemptions from state taxes. (Worcester issued $221 million in pension obligation bonds in 1999, at a rate of 6.3%.)
[8] Most states don't tax the income on bonds issued within their borders but do tax income from bonds issued in other states. The right of states to do this, and thereby give preferential treatment to their own bonds with their tax code, was recently upheld by the Supreme Court in *Kentucky v. Davis* (2008).
[9] A "general obligation" bond is one backed by a city or state's taxing power. Worcester also supports its borrowing for its sewer and water functions through fees, but these are still general obligation, not revenue bonds. True revenue bonds such as those issued by public authorities, are backed exclusively by a stream of revenues. For information on default rates, see "U.S. Municipal Ratings Transitions and Defaults, 1986-2009," Standard & Poor's, March 11, 2009; "U.S. Municipal Bond Defaults and Recoveries 1970-2009," January 2010, Moody's Investor's Service. On default rates prior to 1970, see George Hempel, *The Postwar Quality of State and Local Debt*, National Bureau of Economic Research, 1971.
[10] The size of the municipal bond market (the total amount of state and local debt outstanding) is about $2.4 trillion. This represents an almost 30% increase since 2005, when it stood at about $1.8 trillion ("Flow of Funds Accounts of the United States: Flows and Outstandings, Third Quarter 2010," Board of Governors of the Federal Reserve System, December 9, 2010, Table L.1). The figure for the municipal sector as a whole is $2.8 trillion, up from $2.2 trillion (*Ibid*., Table L.2).
[11] This index is based on estimated yields for theoretical new one-year note issues from 10 state and local issuers: California, Colorado, Idaho, Los Angeles County, Michigan, New Jersey, New York City, Pennsylvania, Texas, and Wisconsin.
[12] This index consists of 20 general obligation bonds that mature in 20 years. The average rating of the 20 bonds is "roughly equivalent" an Aa2 from Moody's and AA from Standard & Poor's.
[13] Nicole Gelinas, "Beware the Muni-Bond Bubble," *City Journal*, Spring 2010; Steven Malanga, "The Muni-Bond Debt Bomb," *City Journal*, Summer 2010; "Tragedy of the Commons: Launching Ratings on the Top 15 States," Meredith Whitney Advisory Group, September 28, 2010; Warren Buffett, "Annual Letter to Berkshire Hathaway Shareholders, 2008," and "Testimony to Financial Crisis Inquiry Commission," June 2, 2010.
[14] It should be noted that although the total amount of downgrades has been relatively low during the recession, the ratio of upgrades to downgrades has been lower than before the recession ("Municipal Bonds, the Road Ahead," UBS Wealth Management Research, March 2, 2010, p. 15).
[15] This is an SEC designation, created in 1975. Credit rating requirements had been written into government regulations prior to this time, but they became more significant when the SEC imposed more significant capital requirements for securities firms in the 1970s. In an attempt to prevent firms from seeking out inflated credit ratings for riskier securities, the SEC developed this designation to ensure that only established, well-respected firms were certifying their securities as "investment grade." ("Credit Ratings and the Financial Crisis," Preliminary Staff Report, Financial Crisis Inquiry Commission, p. 6.)
[16] Ratings by NRSROs are also written into many private contracts between borrowers and lenders and options contracts. Often, one party will be required to post greater collateral in the event of a credit downgrade ("Credit Ratings and the Financial Crisis," p. 8). This happened between the Massachusetts Turnpike Authority and UBS in 2009.
[17] The discrepancy between this figure and the 222 in **Table 4** is due to the fact that **Table 4** only accounted for communities rated by Moody's since 2007.
[18] Figures are as of October, 2010.
[19] Standard & Poor's lists something similar to a Five-Point Plan as one of its "Top 10 Characteristics of Highly Rated Credits in U.S. Public Finance." ("Top 10 Characteristics of Highly Rated Credits in U.S. Public Finance," Standard & Poor's, June 2008.)
[20] Although Worcester is rated by all three of the major credit ratings agencies, this report will focus primarily on Moody's for reasons of simplicity. All information in this section about Moody's methodology is based on "General Obligation Bonds Issued by U.S. Local Governments," Moody's Investors Service, October 2009.
[21] This and all following quotes in this section are drawn from "General Obligation Bonds Issued by U.S. Local Governments," Moody's Investors Service, October 2009.
[22] All information in this section is drawn from Massachusetts' Department of Revenue and the various communities' audited financial statements.

Mission Statement:
The Research Bureau serves the public interest of the Greater Worcester region by conducting independent, non-partisan research and analysis of public policy issues to promote informed public debate and decision-making.

The Research Bureau

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