Buy and Hold (on Tight):
The Recent Muni Bond Rollercoaster and What It Means for Cities

by

Tracy Gordon

Brookings Institution

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Introduction

Despite its reputation, the municipal bond market has been anything but "staid," "boring," and "wonky" lately (Shira, 2011). After downgrading U.S. long-term debt, Standard and Poor's (S&P) downgraded thousands of state and local issuances backed by U.S. Treasuries and other federal guarantees. Together with Moody's, S&P further indicated that it would review the ratings of several states and localities to assess their vulnerability to federal spending cuts and fluctuations in credit markets and the broader economy (Moody's Investor Service, 2011; Standard and Poor's, 2011a).

Nevertheless, stock market volatility has investors flocking in droves to munis and U.S. Treasuries, sending yields to historic lows (Figure 1). This flight to quality contrasts with only a few months ago when investors were fleeing muni bond mutual funds, withdrawing $47 billion from October 2009 to April 2010, or about half of the funds they had invested in since early 2009 (Albano, 2011). That exodus may have been a response to so-called headline risks, including warnings from financial analyst Meredith Whitney of "hundreds of billions of dollars" in municipal defaults (Kroft, 2011).

Although these predictions have not come to pass, uncertainty remains. In particular, state and local governments are still climbing out of a revenue hole created by the Great Recession (Dadayan, 2011). Looking ahead, they face unfunded pension and retiree health care liabilities variously estimated at $1 to $3 trillion (Novy-Marx and Rauh, 2011 and forthcoming; Pew Center on the States, 2011). Faced with its own fiscal challenges, the federal government will be seeking cuts to discretionary spending, roughly one-third of which tends to flow to states and localities, and potentially making long-term changes to the joint federal-state Medicaid program and U.S. tax code.

This policy brief assesses recent developments in muni bond markets and implications for local government borrowers. After a primer on muni debt, it evaluates predictions about municipal default and bankruptcy as well as changes to federal tax treatment and regulation of muni bonds. It also explores more fundamental shifts in muni markets. The brief concludes with guidelines for local decision makers regardless of how these issues are ultimately resolved.

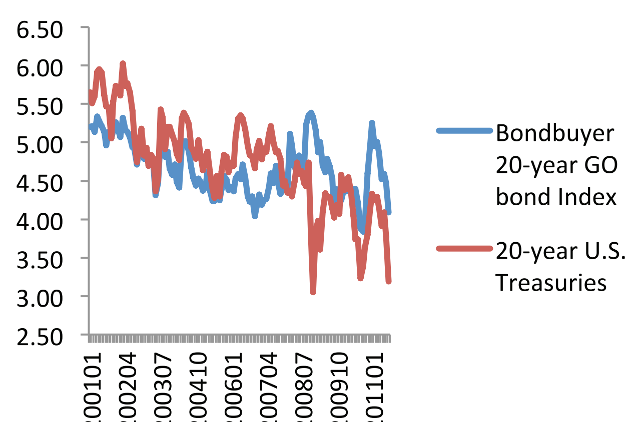
How Muni Bonds Work

States and localities undertake three-quarters of U.S. public spending on infrastructure such as roads, highways, bridges, and water distribution and treatment facilities. They are solely responsible for building most educational facilities (U.S. Congressional Budget Office, 2010). Because these

FIGURE 1

STATE AND LOCAL GOVERNMENT BONDS VS U.S. TREASURIES

END OF PERIOD YIELDS



Source: *Bond Buyer*, Federal Reserve Board investments are expensive and long lived, they generally require access to capital markets.

State and local governments can and sometimes do fund infrastructure from current revenues. However, borrowing allows them to overcome potentially exorbitant costs of raising taxes in a single year to finance a large project. Matching the duration of financing to the life of an asset also spreads costs more efficiently and equitably across multiple generations of users.

State and local governments borrow mainly by issuing bonds. Bonds entitle holders to a repayment of principal at a defined date or maturity. Investors also receive a stream of interest payments known as coupon payments. In addition to new issuances, investors can purchase bonds on secondary markets. A bond's yield is the interest rate that equates its market price to all future cash flows. Prices and yields are inversely related (i.e., when prices are high, yields are low).

In general, the most secure type of muni bond is a general obligation (GO) bond backed by an issuer's "full faith and credit," including its power to tax. Because of their guaranteed status, GO bonds typically require voter approval and are subject to limits on total debt outstanding. Bonds secured by future legislative appropriations or anticipated project revenues do not typically require voter approval. In addition to new borrowing, state and local governments may issue bonds to refinance or "refund" existing debt.

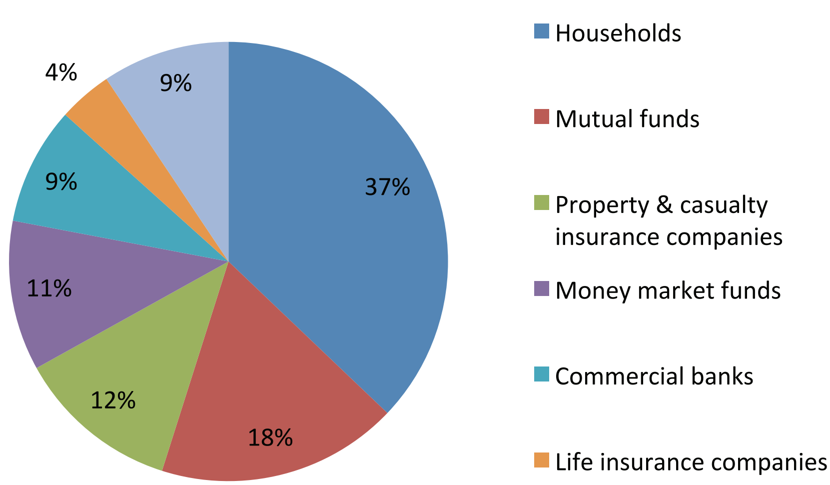
As of the last quarter of 2010, there was $2.95 trillion in muni debt outstanding. Most muni debt (94 percent) was long term, or of a maturity beyond one year (U.S. Federal Reserve, 2011). Short-term debt is generally used for smoothing cash flows within a given year.[2] The majority (60 percent) of muni debt is issued by local governments—cities, townships, counties, school districts, and special districts (U.S. Census Bureau, 2010). Domestic households are the largest category of investors, followed by mutual funds, exchange-traded funds, and money market mutual funds—which are also comprised of household investors (Figure 2).

Muni debt outstanding represents about 20 percent of U.S. gross domestic product and 133 percent of total state and local revenues. These debt levels may appear high, but they are not historically anomalous (Figure 3). Similarly, interest payments represent a modest, although rising, share of own-source revenues (Figure 4).[3]

A distinguishing feature of muni debt is its tax-exempt status. Muni bond holders do not owe federal income taxes on interest payments, except for a limited number of

FIGURE 2

HOLDERS OF U.S. MUNICIPAL DEBT



Source: Federal Reserve Board.

Notes: * "Other" category includes holders of less than 3 percent of total: closed-end funds, foreign investors, brokers and dealers, nonfinancial corporate businesses, nonfarm noncorporate businesses, government-sponsored enterprises, savings institutions, exchange-traded funds, state and local government general funds, and state and local government retirement funds.

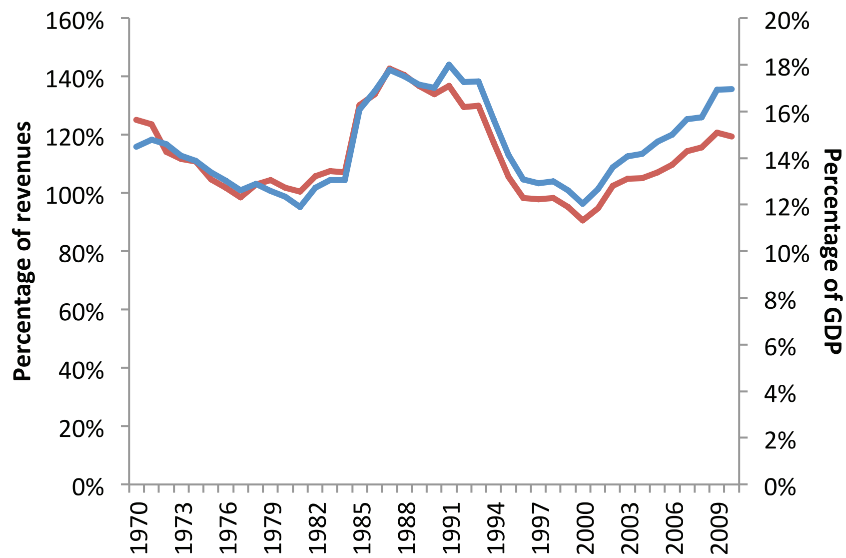
[2] In some cases, borrowers have used short-term debt to cover ongoing deficits. This can lead to problems when investors demand higher prices to rollover the debt, as in New York City in the 1970s, Philadelphia in the 1980s and the state of California in the 2000s.

[3] These comparisons refer to explicit debt only and not implicit obligations such as unfunded public pensions or retiree health care obligations.

[4] Note that yields may reflect other differences such as issuer creditworthiness, interest payments time profile, and secondary market liquidity (e.g., Ang et al., 2011).

FIGURE 3

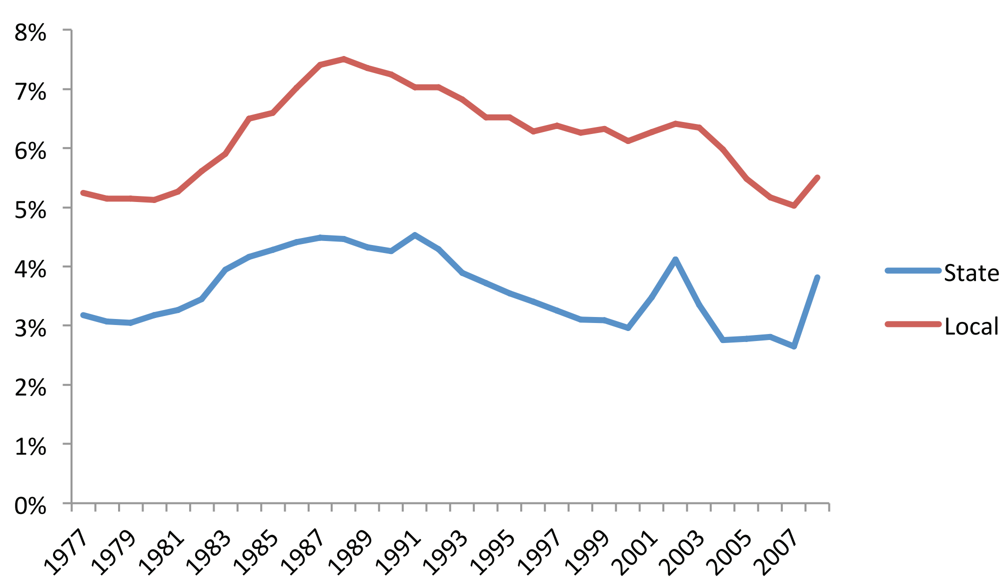
STATE AND LOCAL DEBT OUTSTANDING



Source: Federal Reserve Board, Bureau of Economic Analysis

FIGURE 4

STATE AND LOCAL GOVERNMENT DEBT SERVICE RATIOS



Source: Census of Governments, 2010

taxable bonds as discussed below. They also do not owe state and local income taxes, at least for bonds issued within their state of residence (Department of Revenue of Kentucky v. Davis, 553 U.S. 328, (2008)).

The federal tax exemption functions as a subsidy, allowing state and local governments to borrow more cheaply than they otherwise could. From the federal government's perspective, however, this subsidy is expensive, projected to cost $230 billion in foregone revenue between fiscal years 2012 and 2016 (U.S. Office of Management and Budget, 2011). It is also inefficient: High-bracket taxpayers receive a higher subsidy to purchase muni bonds.

Consider an example. In 2007, a high-grade taxable corporate bond yielded 5.6 percent. The yield for a comparable tax-exempt bond was 4.4 percent. Thus, taxpayers in the 21 percent tax bracket should be indifferent between the two types of bonds (because the gap in yields—1.2 percent—is about 21 percent of 5.6) (U.S. Congressional Budget Office and Joint Committee on Taxation, 2009). Anyone in a higher tax bracket receives an extra transfer with no corresponding benefit to state and local government.[4]

In light of this problem, proposals have long circulated to replace the federal tax exemption with a taxpayer credit or direct payment to issuers. Both alternatives would eliminate the unnecessary transfer to high-income tax payers (estimated at up to 20 percent of the subsidy) (see, e.g., citations in Zimmerman, 1991). They would also allow for more specific targeting of federal funds. For example, the federal government could set different subsidy rates for different types of infrastructure, as it has done under small-scale taxable bond programs (e.g., Qualified Zone Academy Bonds for educational facilities).

The American Recovery and Reinvestment Act of 2009 (ARRA) greatly expanded the use of taxable bonds. It authorized state and local issuers to sell taxable Build America Bonds (BABs) for infrastructure, thereby accessing nontraditional buyers such as foreigners and pension funds that do not benefit from a tax exemption because they do not owe U.S. income taxes.[5] Issuers could choose whether to make a tax credit available to buyers or take a direct federal subsidy at 35 percent of interest costs. Most chose to take the subsidy.

BABs were enormously popular, generating $181 billion in new taxable issuances and costing the federal government roughly $10 billion more than initially estimated (on a gross basis, not including new tax revenues generated from the bonds) (U.S. Congressional Budget Office, 2011; U.S. Treasury Department, 2011). This success may have also alleviated supply pressures in the tax exempt market, lowering overall borrowing costs for state and local governments.

The BABs program also generated a political backlash. Critics charged that the subsidy was overly generous and delayed needed fiscal adjustments at the state and local level. They pointed to high BAB issuances in states with severe budget challenges such as California, New York, Illinois (e.g., Malanga, 2010). However, these states also tend to dominate bond issuances generally.

Another concern was that underwriters were capturing too much benefit from BABs through higher fees, although it is unclear how much these fees reflected costs of developing a new product. Indeed, fees declined over time, presumably as the federal government clarified BAB guidelines and market participants grew familiar with the program (U.S. Treasury, 2011). In any event, although President Obama proposed extending BABs at a lower subsidy rate (28 percent), the program expired as scheduled on December 31, 2010.

What's Been Happening Lately

Are municipalities going bankrupt or defaulting on their bond payments?

As noted earlier, predictions of widespread municipal bankruptcies and defaults have not come to pass. Despite high-profile cases of municipal fiscal distress in Harrisburg, PA and Jefferson County, AL, Central Falls, RI, is the only city to have declared bankruptcy since Vallejo, CA in 2008. Since the Great Depression, just over 600 municipalities have declared bankruptcy and most of these were special districts and utilities rather than general-purpose governments such as cities or counties (Spiotto, 2010, pp. 97, 100).

One reason for the limited number of bankruptcies is state law. Federal law did not permit Chapter 9 municipal bankruptcy until after the Great Depression, and even then it did so only with state approval. Today, only sixteen states authorize municipal bankruptcy, ten authorize it on a conditional or limited basis, two prohibit it, and the rest are silent on the matter.[6]

Another barrier to bankruptcy is the threshold to qualify. Federal bankruptcy law specifies that a municipality be insolvent—or unable to pay debts as they come due—in order to file for bankruptcy. This is a higher standard than corporations must meet and a difficult test for any entity with taxing power.

Also, unlike in a corporate bankruptcy, judges cannot force a municipality to liquidate or direct it to raise taxes or cut spending to pay its debts. Bankruptcy is therefore a long and uncertain process. For example, Vallejo, CA is just now emerging from bankruptcy more than three years after its initial filing. Issuers themselves have a strong interest in avoiding this process and maintaining access to credit markets.

Defaults, defined as missed principal or interest payments, are also exceedingly rare. For example, Moody's reports 54 defaults from 1970 to 2009. Overall, the default rate for investment-grade muni bonds during this period was 0.03 percent, compared to just under 1 percent for corporate bonds.

[5] Interestingly, the Federal Flow of Funds Report for the last quarter of 2010 did not detect an increase in foreign muni investors over the course of the BABs program. However, there have been criticisms of these data (e.g., Neumann, 2011).

[6] The 16 states are Alabama, Arizona, Arkansas, California, Florida, Idaho, Kentucky, Minnesota, Missouri, Montana, Nebraska, New York, Oklahoma, South Carolina, Texas, and Washington (Spiotto, 2010. p. 93).

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When defaults occurred, muni investors also recovered more of their money ($59.91 for every $100 of principal, compared to $37.50 in the corporate sector) (Moody's Investor Service, 2010).[7] Thus far in 2011, 24 issuers have defaulted on $746 million, compared to 89 issuers defaulting on $3.2 billion in 2009 and 218 on $8.2 billion in 2010 (Riggs, 2011).

Like bankruptcies, defaults have generally been concentrated among special-purpose issuers. These include "industrial development bonds" or "public debt for private purposes" such as hospitals and housing projects. Particularly vulnerable after the recent housing crash have been "dirt bonds" issued by local governments on behalf of private housing developers and secured by anticipated tax payments from future homebuyers (Whelan, 2011).

In evaluating default risk, it can be helpful to delineate, as the Fitch rating agency does, three broad classes of muni debt:

1. **GO bonds and revenue bonds issued by public enterprises that provide essential services with little market competition (e.g., public colleges and universities; single-family housing; public power distribution; and water, sewer, and gas utilities; the second encompasses public power generation and waste disposal)**
2. **Bonds issued by or on behalf of entities that provide essential services but face limited competition or fluctuations in consumer demand (e.g., hospitals, private higher education, stadiums, airports, seaports, parking facilities, and toll roads with established traffic patterns)**
3. **Bonds issued by or on behalf of entities with volatile revenues that compete directly with the private sector (e.g., industrial development bonds, local multifamily housing, nursing homes and continuing care retirement communities, toll roads and other transportation facilities without established traffic patterns, tobacco securitizations, and tribal gaming bonds)**

Whereas the first category defaults half as often as AAA corporate bonds, the latter two categories perform very similarly to comparable corporate bonds (Fitch Ratings, 2007).

What will happen to the federal tax exemption and other preferences for muni debt?

The recently appointed Congressional Joint Select Committee on Deficit Reduction has the authority to propose major tax reforms, although it may be politically unlikely to do so. Nevertheless, tax expenditures including the preferential treatment of muni bonds will likely continue to be a target for federal policymakers seeking to address the U.S. deficit. Two previous federal deficit commissions proposed substantial changes to the tax exemption for muni debt, while Senators Wyden and Coates suggested replacing it with a tax credit modeled on BABs (Bipartisan Policy Center, 2010; National Commission on Fiscal Responsibility and Reform, 2010).

The federal government has restricted the tax exemption for municipal debt before.[8] In particular, the Tax Reform Act of 1986 limited the use of private activity bonds including industrial development bonds. Concerns about reported abuses had circulated for nearly 20 years. Then, as perhaps now, the federal deficit prompted action. Still, as the above example indicates, overhauls of the federal tax code take time.

Another source of pressure is regulatory. Although municipal issuers are subject to Internal Revenue Service reporting requirements and Securities and Exchange Commission antifraud rules, they do not have to file regular financial reports like corporate issuers. The Tower Amendment to the Securities Act of 1933 specifically prohibits the Securities and Exchange Commission (SEC) from "directly or indirectly" regulating muni issuers.

The SEC does regulate muni brokers and dealers, preventing them from underwriting offerings over $1 million unless issuers agree to file annual financial statements and notices of material events with the Municipal Securities Rulemaking Board (MSRB) (Rule 15c2-12). However, market participants cite problems with the quality and timeliness of these reports. For example, DPC DATA Inc., reports that of 17,000 bond issuances it examined, more than 56 percent filed no financial statements between 2005 and 2009 (Dugan, 2011).

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 did not repeal the Tower Amendment, although it did tighten regulation of municipal financial advisors (Pub.L. 111-203, H.R. 4173). The SEC had scheduled field hearings on further bolstering disclosure but canceled them due to budget cuts. A report is forthcoming later this year. In the meantime, industry groups, including the Government Finance Officers Association (GFOA) and National Association of Bond Lawyers (NABL), are developing their own voluntary disclosure guidelines.

Has the muni bond market entered a new era?

Beyond market fluctuations and federal policy changes, some observers have suggested that the muni bond market is transforming on its own. By this argument, there is a long-standing disconnect between issuers, who would like to sell long-term maturities to finance capital needs, and buyers, who are reluctant to tie up their money. Banks traditionally filled this gap, but the Tax Reform Act of 1986 made munis less attractive to this sector by limiting their deductibility.

More recently, financial innovations such as auction rate securities (ARS) and variable rate debt obligations (VRDOs) helped fill the void by essentially repackaging long-term debt as short-term securities. ARS operated like adjustable-rate mortgages, except that rates reset at periodic—weekly or even daily—auctions. If the auction failed, rates would reset according to a predetermined formula, often at much higher interest rates. VRDOs functioned similarly, except that investors had an option to sell or "put" debt back to issuers at

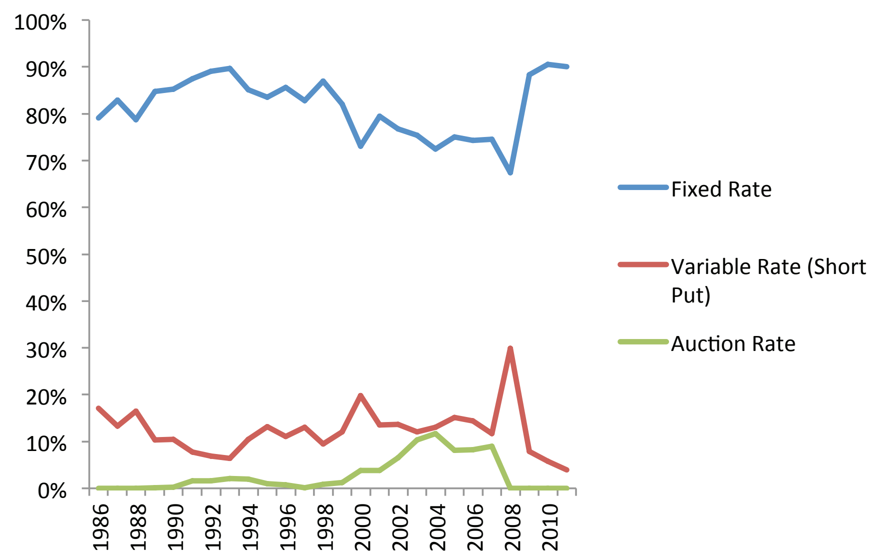
[7] These are monetary rather than technical defaults triggered by refinancing or violations of bond covenants.
[8] Although it dates to the inception of a federal income tax, the U.S. Supreme Court has ruled that exemption is grounded in statute and therefore may be revoked at any time (South Carolina v. Baker, 485 U.S. 505 (1988)).

specified dates. Issuers would acquire liquidity to repurchase debt through bank letters of credit or standby bond purchase agreements.

Many ARS and some VRDOs carried insurance, making them susceptible to a technical default if bond insurers failed. That is precisely what happened at the start of the financial crisis, when it became clear that AAA-rated insurers such as Ambac and MBIA were exposed to "toxic" mortgage assets. Also in early 2008, buyers all but disappeared from ARS auctions. Some issuers had hedged against this risk, but

FIGURE 5

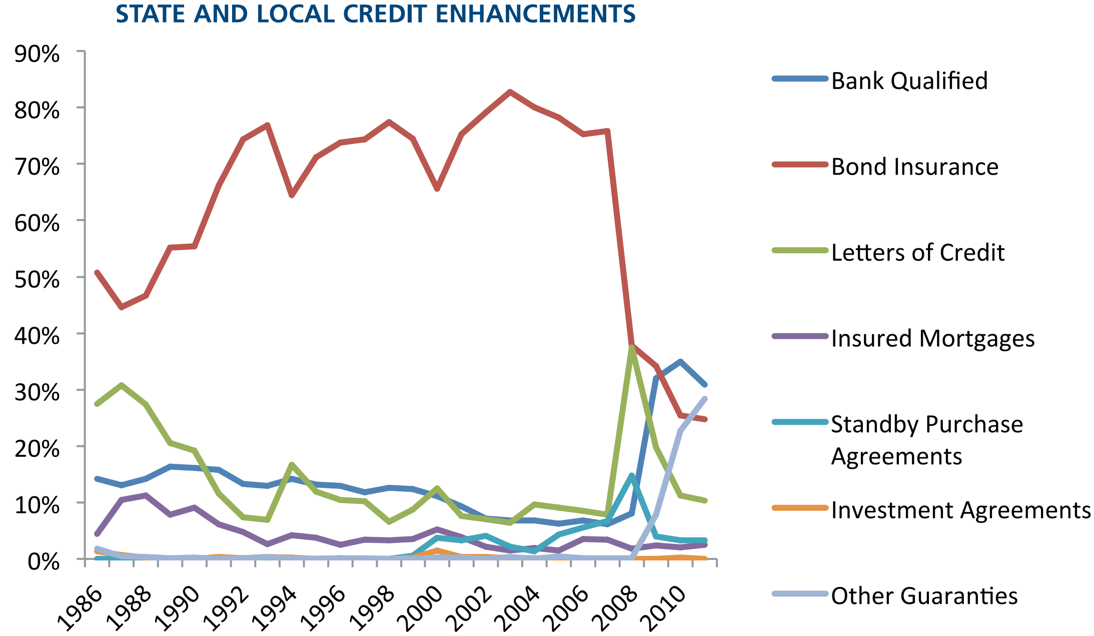
FIXED VS. VARIABLE RATE STATE AND LOCAL DEBT



Source: *Bond Buyer*, 2011

FIGURE 6

STATE AND LOCAL CREDIT ENHANCEMENTS



Source: *Bond Buyer*, 2011

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others were forced to repurchase ARS at punitively high rates or to issue new VRDOs and purchase new letters of credit instead (Figures 5 and 6).

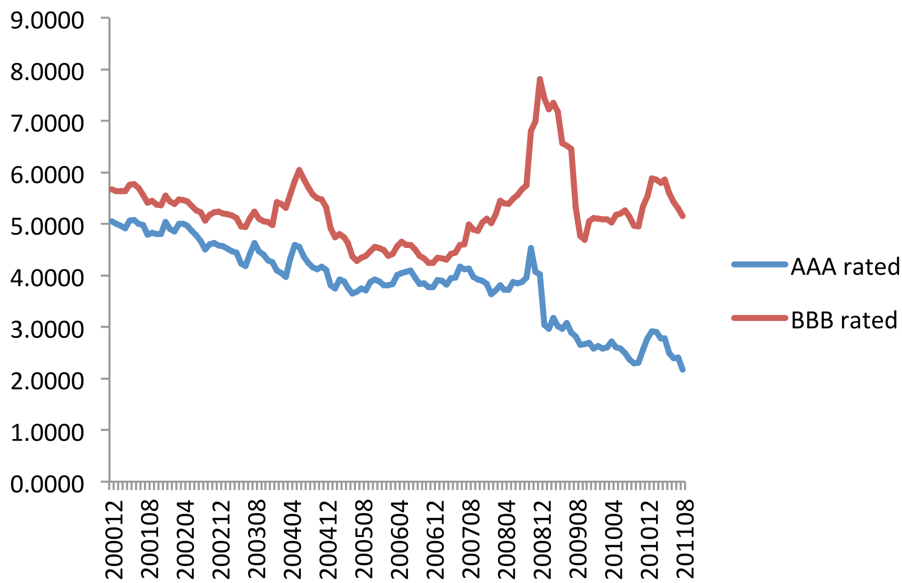
Starting in 2009, BABs helped prop up demand for long-term municipal securities. However, with the demise of the program and disappearance of financial products like ARS and VRDOs, spreads between 30-year munis and Treasuries have been widening recently. At the same time, market observers are asking what new financial products will next bridge the gap between muni buyers and sellers (Seymour, 2010).

Another question is what the loss of bond insurers will mean for muni markets. Previously, insurers would "wrap" their own sterling credit ratings around muni bonds for a fee. This arrangement was attractive to risk-averse household investors and to lower-rated municipalities as long as premiums were less than the higher interest payments they would otherwise pay.

Since the financial crisis, all but one bond major insurer has disappeared. Fewer than 5 percent of all new issuances now carry insurance, compared to 50 percent before the crisis (Ely, 2011). There is also some evidence of a widening yield spread between higher- and lower-rated issuers (Figure 7).

FIGURE 7

STATE AND LOCAL BOND EFFECTIVE YIELDS



Source: Bank of America Merrill Lynch, 2011

Conclusions and Recommendations

Recent events appear to belie the muni bond market's placid, "buy and hold" image. Although market watchers are currently focused on potential repercussions from S&P's U.S. credit downgrade, the tumult actually began in early 2008, when the financial crisis eliminated some types of securities, two large underwriters, and all but one major muni bond insurer.

Now, investors have returned to munis amid a general flight to quality. Nevertheless, uncertainty remains, and tax-exempt bond issuances this year are 50 percent below last year's level. More broadly, some commentators are asking whether muni debt has entered a "new normal" (Quigley, 2011).

In any crisis atmosphere, it can be helpful to take a step back. For example, it is worth recalling that muni issuances often exhibit annual volatility or start the year at depressed levels (Table 1).

Moreover, as discussions about modifying the federal tax treatment of muni bonds continue, it is worth bearing in mind that taxable bonds offer issuers some advantages. As a more efficient and equitable alternative to traditional tax-exempt bonds, they may be more politically sustainable. They also can provide needed access to long-term buyers, particularly after the demise of bond insurers and financial products like ARS and VRDOs.

On the other hand, taxable bonds carry some risks. In particular, subsidies may be uncertain if they are subject to the annual federal appropriations process. Subsidy rates will also likely reflect federal rather than local priorities, favoring some types of investment over others.

In light of these issues, as well as ongoing uncertainty about the course of federal spending and potential continued volatility in muni bond markets, borrowers would do well to reexamine their own debt management strategies. The financial crisis exposed problems with more speculative types of borrowing and investments. Similarly, S&P has said that it will pay particular attention to issuers that "maintain stronger credit characteristics in a stress scenario" (Standard and Poor's, 2011b).

As federal lawmakers consider enhanced disclosure requirements, issuers may want to consider participating in voluntary arrangements promulgated by GFOA or NABL. The MSRB's Electronic Municipal Market Access System (EMMA) for official statement releases provides a positive example in this regard. Despite automatic effects of a federal downgrade for some types of municipal securities, state and local credit ratings will ultimately depend on these governments' own economic and fiscal conditions.

TABLE 1

MONTHLY BOND ISSUANCES ($S)

		(2011 $'s)	
Year	**Jan-April**	**May-Dec**	**Total**
2010	135,113,066	308,662,000	443,775,065
2011	62,609,100	n/a	n/a
min	56,279,853 (1995)	126,573,956 (1987)	207,406,280 (1987)
average	103,529,675	239,714,475	343,244,150
max	152,058,706 (2007)	328,341,118 (2002)	467,093,853 (2005)

Notes: 2010 totals include taxable bonds. Inflation adjustment based on first two quarters of 2011.

Source, *Bond Buyer*, 2011.

References

Albano, Christine (2011, February 25). "Muni Fund Rollercoaster Ride May Not Be Over," Bond Buyer.
Ang, Andrew, Vineer Bhansali, and Yuhang Xing (2011, February), "Decomposing municipal bond yields" (in progress).Cited in Lowering Borrowing Costs for States and Municipalities Through Common Muni, edited by Andrew Ang and Richard C. Green. Hamilton Project Discussion Paper. Washington, DC: Brookings Institution.
Dadayan, Lucy (2011, September 1). "Strong, Broad Growth in State Tax Revenues Continued in the Second Quarter of 2011." Data Alert, Rockefeller Institute of Government.
Dugan, Ianthe Elaine (2011, January 26). "Bondholders Left in the Dark," Wall Street Journal.
Ely, Todd (2011), "No Guarantees: The Decline of Municipal Bond Insurance." Working paper, Denver, CO: University of Colorado.
Fitch Ratings (2007, January 9). Default Risk and Recovery Rates on U.S. Municipal Bonds.
Kroft, Steve (2010, December 19). "State Budgets: Day of Reckoning," 60 Minutes, CBS News.
Malanga, Steven (2010, November 22). "The 'Build America' Debt Bomb." Wall Street Journal.
Moody's Investor Service, (2010, February) U.S. Municipal Bond Defaults and Recoveries, 1970 to 2009.
Moody's Investor Service (2011, July 19). Announcement: Moody's Places Ratings of Five of 15 AAA States on Review for Possible Downgrade Due to U.S. Sovereign Risk Vulnerability.
Neumann, Jeannette (2011, June 8). "Fed Dramatically Underestimating Size of Muni Market, Citi Says," Wall Street Journal.
Novy-Marx, Robert, and Joshua Rauh (forthcoming). "The Crisis in Local Government Pensions in the United States." In Growing Old: Paying for Retirement and Institutional Money Management after the Financial Crisis, edited by Robert Litan and Richard Herring. Washington, DC: Brookings Institution.
Novy-Marx, Robert, and Joshua Rauh (2011). "Policy Options for State Pension Systems and Their Impact on Plan Liabilities." Journal of Pension Economics and Finance 10(2): 173-94.
Ovide, Shira (2011, January 12). "The War of Words Over Muni Bonds." Wall Street Journal.
Pew Center on the States (2011). The Widening Gap: The Great Recession's Impact on State Pension and Retiree Health Care Costs, Washington, DC: Pew Center on the States.
Quigley, Joan (2011, May 6). "Mournful Muni Experts See End of an Era," Bond Buyer.
Riggs, Taylor (2011, August 3). "Bankruptcy Fears Are Hard to Eas,." Bond Buyer.
Seymour, Dan (2010, November 29). "BABs: The Last Pillar Standin,." Bond Buyer.
Spiotto, Jame, E. (2010, June). "Unfunded Pension Obligations: Is Chapter 9 the Ultimate Remedy? Is There a Better Resolution Mechanism? The Case for a Public Pension Funding Authority" presentation at the Federal Reserve Bank of Chicago: 97, 100.
Standard and Poor's. (2011a, August 11), Public Finance Rating Actions Following the Downgrade of the U.S.
Standard and Poor's. (2011b, August 8). State and Local Government Ratings Are Not Directly Constrained by That of the U.S. Sovereign.
Wallis, John Joseph, and Barry R. Weingast (2008). "Dysfunctional or Optimal Institutions: State Debt Limitations, the Structure of State and Local Governments, and the Finance of American Infrastructure. "In Fiscal Challenges: An Interdisciplinary Approach to Budget Policy, edited by Elizabeth Garrett, Elizabeth Graddy, and Howell Jacksos. Cambridge, England: Cambridge University Press.
Whelan, Robbie (2011, July 2). "Investments Muddy Dirt-Bond Holder,." Wall Street Journal.
U.S. Census Bureau, Governments Division (2010). 2008 Annual Surveys of State and Local Government Finances. Washington, DC: U.S. Census Bureau.
U.S. Congressional Budget Office. (2010, November). Public Spending on Transportation and Water Infrastructure, Washington, DC: U.S. Congressional Budget Office.
U.S. Congressional Budget Office. (2011, January 27). The Budget and Economic Outlook: Fiscal Years 2011 to 2021, Washington, DC: U.S. Congressional Budget Office.
U.S. Congressional Budget Office and Joint Committee on Taxation. (2009, October). Subsidizing Infrastructure Investment with Tax Exempt Bonds. Washington, DC: U.S. Congressional Budget Office and Joint Committee on Taxation.
U.S. Office of Management and Budget. (2011, February). Analytical Perspectives: Budget of the U.S. Government, Fiscal Year 2011, Washington, DC: U.S. Office of Management and Budget.
U.S. Federal Reserve. (2011, March 10). Flow of Funds Accounts of the United States. Washington, DC: U.S. Federal Reserve.
U.S. Treasury Department. (2011, May 16). Treasury Analysis of Build America Bond Issuance and Savings, Washington, DC: U.S. Treasury Department.
Zimmerman, Dennis (1991). The Private Use of Tax-Exempt Bonds: Controlling Public Subsidy of Private Activit, Washington, DC: Urban Institute Press.