



Understanding Risk in the Municipal Bond Market

Jeffrey D. Slater, CFA

MuniCrest Investment Management Company, LLC

February 15th, 2011

Executive Summary

The municipal bond market has recently come under attack in both the financial and popular press as a high risk asset class ripe for widespread defaults and material capital losses by investors. We disagree with these broad generalizations, note that they are being made by those with little, if any, experience in the asset class, and will make the case that the current dislocation in the market actually presents educated investors with a unique opportunity to enter the asset class at cheap valuations. We define four key risk characteristics inherent in municipal bonds and address whether current interest rate levels adequately compensate investors for these risks. We conclude that the asset class is oversold, current interest rate levels more than compensate investors for the credit risks they incur, and that interest rate risk management will be the primary driver of returns in 2011 and beyond.

Credit Risk

Credit risk is the risk that a bond issuer will be unable to make principal and interest payments in a timely manner. The market prices credit risk by attaching a yield premium to each bond issue based on the perceived probability that the issuer will make its debt service payments. Those bond issues deemed to have a lower probability of missing a debt service payment will have a very small yield premium above and beyond the risk-free rate, while issues perceived to be more at risk will have a higher yield premium over the risk-free rate. The difference between the yield on a bond with a credit risk premium and the risk-free rate is defined as a "quality spread." In the municipal bond market, the accepted measure for the risk-free rate is the triple-A scale published by Municipal Market Data everyday at 3 P.M. (the MMD scale). While the MMD scale is far from perfect, it represents an average of where the universe of triple-A paper may have traded on that particular day and is accepted by the marketplace as the benchmark scale. Portfolio managers and traders track quality spreads relative to the MMD scale very closely and use historical averages as a gauge for whether current spreads adequately compensate an investor for incurring credit risk. When we think about credit risk, we think of it in two ways: Default Risk and Downgrade Risk. Default Risk is the risk that an investor will not receive interest and principal back from the issuer. Downgrade Risk is the risk that the credit rating of a bond issue will decrease, leading market participants to demand an increased quality spread for buying the bond.



Let us address default risk first. Historically, the municipal bond market has been perceived as a very safe asset class. Defaults have been extremely rare, and the entire universe of municipal bonds has a lower default rate than the universe of triple-A rated corporate bonds (see Figure 1). When they do occur, they are concentrated in the housing and health-care sector, and generally happen to bonds that never had an investment grade credit rating from one of the nationally recognized credit rating agencies. These are bonds that were perceived as very risky (High Yield), from the get go. The default rate for bonds that originally came to market with investment grade ratings is near zero. Since 1970, there have been only four defaults at the county and local level. Monetary losses by investors have been miniscule. Note that when municipal bonds go into default, the recovery rate, or percentage of original investment returned to investors, averages 66% of par versus 42% for corporate bonds. We know that past results do not guarantee future performance, and that credit risk can change very rapidly, as we only need look as far back as 2008 and see what happened with Bear Stearns, Lehman Brothers, etc. We feel that default risk remains extremely low.

Figure 1				
Cumulative Historic Default Rates	Moody's Muni	Moody's Corp	S&P Muni	S&P Corp
Aaa/AAA	0.0%	0.5%	0.0%	0.6%
Aa/AA	0.1%	0.5%	0.0%	1.5%
A/A	0.0%	1.3%	0.2%	2.9%
Baa/BBB	0.1%	4.6%	0.3%	10.3%
Ba/BB	2.7%	19.1%	1.7%	29.9%
B/B	11.9%	43.3%	8.5%	53.7%
Caa-C/CCC-C	16.6%	69.2%	44.8%	69.2%
Investment Grade	0.1%	2.1%	0.2%	4.1%
Non-Invest Grade	4.3%	31.4%	7.4%	42.4%
All	0.10%	9.70%	0.29%	12.98%

Generally speaking, there are two types of municipal bonds we invest in for our clients, general obligation bonds (GOs) and essential service revenue bonds (ESRBs). We have no housing bonds in our portfolios and only a modest exposure to the health care sector. GOs are backed by the full faith and credit of the municipality, including the ability of levy a special property tax should all other sources of revenue fall short. No other type of security pledge equals this in any other fixed income market. If the property owner fails to pay the tax, they lose their house, but it never gets that far in the municipal bond market. Municipalities have a broad range of revenue raising tools at their disposal. They can raise income taxes, sales taxes, and user fees. Take the example of the State of Illinois, recent press reports infer that they are on the brink of bankruptcy, that they need a Federal bailout, and that bread lines are already forming on the Southside of Chicago. Nothing could be farther from the truth. The state's debt burden as a percentage of GSP is 3.8%. What Illinois needs is strong leadership and political courage. After



years of ignoring their structural budget deficit (they spend more than they take in), they finally agreed to raise their income tax rate from 3% to 5%. With a vote of the legislature, and the stroke of the governor's pen, state income tax revenues are slated to increase by up to 67%. Note that the new tax rate is far lower than California and New York income tax rates, and will not force people from the state looking for a lesser tax burden. Municipalities have revenue raising tools that corporations do not have. Illinois will continue to exist as a state. Chicago is a hub of commerce in the Mid-West. Wealth levels are high and their debt burden is well within reason. In other words, their underlying credit fundamentals are sound. They simply need the courage to make the tough adjustments and deal with the effects of a horrible recession. On a broader level, all state revenues will increase as the economy recovers. The Nelson A. Rockefeller Institute of Government at the State University of New York at Albany publishes a State Revenue Report on a quarterly basis. It is a valuable resource for credit analysts and every quarter in 2010 showed revenue growth for the states. While there is still plenty of ground to be made up from the 2008 recession, the numbers are encouraging.

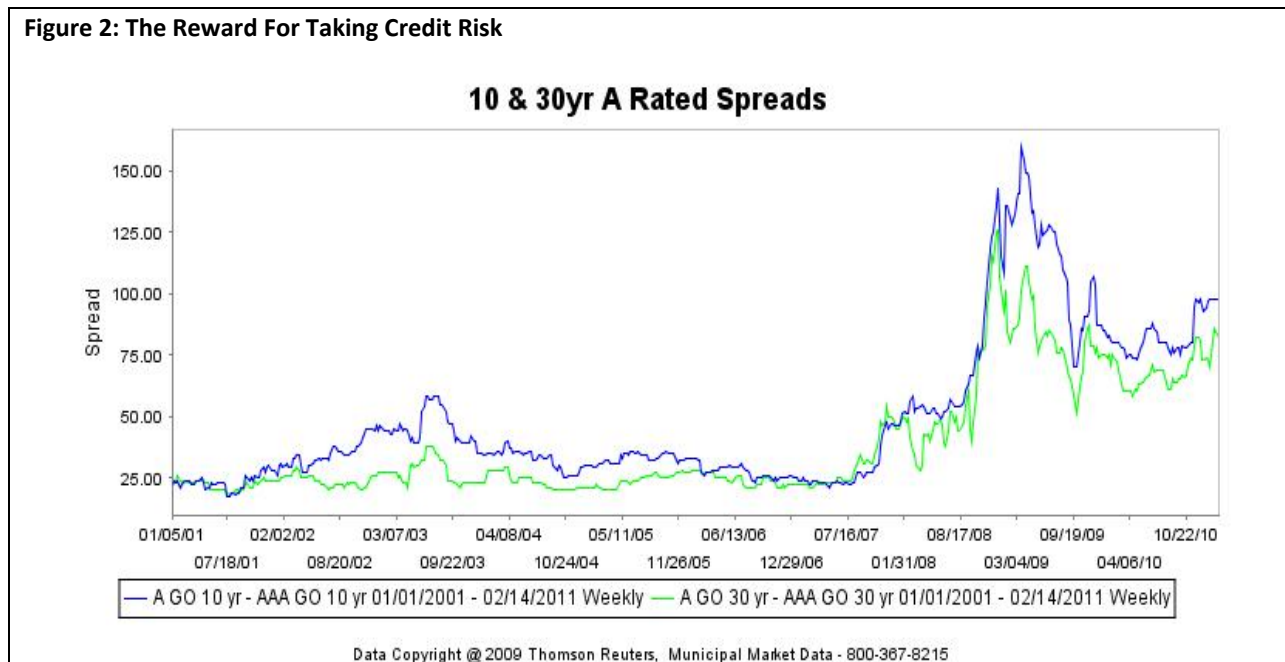
The expense side of the ledger also shows some flexibility, as much is being made of unfunded pension liabilities at the state and local level. One study puts the unfunded pension liability on the state and local level at \$3 Trillion dollars. Municipalities have been underfunding their pensions programs for years hoping for a rallying stock market. After a decade of flat returns, the numbers are starting to look ominous. We agree that there are reforms that municipalities must take, the situation is not as bad as it seems. These hard times will force municipalities to make tough choices, but let's look at that \$3 Trillion number. The first problem with the number is that the analysis discounts the future liability at the risk-free rate, and not at the historical returns of the plan assets. Plan assets are invested in stocks, high yield bonds and other alternative investments. Over time, these asset classes have returns far in excess of the risk-free rate. Discounting future pension liabilities at more practical historical rates of return on stocks reduces the \$3 trillion unfunded liability to \$700 billion, still a problematic number, but not insurmountable.

Municipalities need to address excesses in municipal union contracts. Changes need to be made to define contribution plans from defined benefit plans. In Camden, NJ, the Mayor was forced to layoff scores of police and firefighters in January. Facing a structural budget deficit, the city approached the union with a plan to cut pay and benefits, but the union refused and 15% lost their jobs. The union voted 300-1 against the concessions. This is a battle in a war that the unions can not win. Municipal leaders, such as Governor Christie in New Jersey, are finally having the courage to tell their constituents the truth: The buck can not be passed to the next administration any longer. The time to make tough decisions is now, and sacrifice must be shared. Few have sympathy for the municipal unions and their inability to face this new reality. We take the view that municipal leaders across the country will take the lead from Governor Christie, and have the courage to make the tough decisions. As the economy continues to recover from the recession, municipal finances will become strong again.



One more word on default risk, in the aggregate, debt service as a percentage of government expenditures averages less than 10%. Municipal debt outstanding to GDP is roughly 16%, or just slightly higher than the long term average of 14%, not onerous debt burdens. Clearly, any municipality looking to cut expenditures would lose access to the capital markets for an extended period of time should they fail to pay debt service, leading to a substantial increase in their cost of capital. Investors have long memories. Those memories become longer when they lose money on an investment. Any municipality that tried to short-change bond holders would be sorely mistaken if they thought they could sell bonds again in this market. We think that losing access to the markets is deterrent enough to focus on the other 90% of their budget when making cuts.

Figure 2: The Reward For Taking Credit Risk



Downgrade risk is the more pressing risk in today's market. Whenever the economy goes into recession, state and local revenues decrease, and budget deficits start to mount. The recent recession was more severe than most, putting unprecedented stress on municipalities. The rating agencies have acted accordingly and have downgraded those credits under the most stress. When the market anticipates a downgrade, the investors demand an increased spread to own the bond. An increase in spread equates to a decrease in price. The figure above shows the spread difference between single-A rated bonds and the benchmark MMD curve. Prior to the capital market implosion of 2008, spreads were very tight with little variation on a month-to-month basis. Spread experience post-2008 is the new normal. With the bond insurance industry on its last legs, there is a greater universe of single-A rated paper and a great perception of credit risk. Short-term movements in spreads have a material impact on price returns for a portfolio. We have already stated that we feel default risk in the investment grade universe is extremely low. Our main task in credit risk management then becomes to avoid



those credits that will face spread widening and favor those that will see spread tightening. Many times, the bonds with the best spread tightening prospects are those bonds that you are hearing the worst news about. In mid-January, a thirty year bond issued by California was yielding more than similar maturity bonds issued by both the Republic of Mexico and the Republic of Columbia (See Figure 3). Not only is the California bond exempt from Federal income taxes, but the wealth and economic indicators in California far exceed those of the aforementioned sovereign credits. Quite simply, California and most other municipal bonds are oversold.

Figure 3: Irrational Pessimism

January 15th, 2011 Market Activity	Rating	Bid-Side
California 6% of 2039	A1/A	6.10%
Mexico 6.05% of 2040	Baa1/BBB	5.75%
Columbia 6.125% of 2039	Ba1/BBB-	5.77%

Interest Rate Risk

We spent a great deal of time talking about credit risk. However, interest rate risk is the main risk investors take when they buy bonds. When interest rates move, bond prices move. Bond yields consist of two main components: A real return and an expected inflation premium. Currently, the ten year Treasury is yielding 3.60%. Assuming a historically average real rate of return of 2.5%, the market expects inflation to average 1.10% in the future. In order for rates to increase, the market has to either demand a higher real rate of return, or expect inflation to rise. In 2009 and 2010, rates fell because inflation was non-existent, and some investors actually were pricing in price deflation. Stronger economic data in later half of 2010 spooked investors, and increased focus was placed on the inflation premium in bond yields, sending yields higher. In the municipal market, yields move based on a number of factors. The primary factor are changes in benchmark Treasury rates. The secondary determinant of interest rates is simply the forces of supply and demand within the market. In the tax-exempt municipal universe, supply has been depressed due to the Build America Bond program, which siphoned supply to the taxable bond market. That program expired at the end of 2010 leading many to believe that traditional tax-exempt supply would increase in 2011. We disagree with this assessment and feel that because the BAB program was set to expire, some of 2011S issuance was brought forward in 2010. We agree with the analysts at Barclay's Capital that forecast a new decrease of tax exempt supply in 2011. Lower supply should lead to higher bond prices and lower yields, all else being equal.

When talking about interest rates, we need to be clear about what rates we are talking about. Investors hear that the Federal Reserve controls interest rates, but that isn't really true. The Fed controls two key rates: the federal funds rate, or the rate that banks charge each other for overnight loans; and the discount rate, or the rate the Fed itself charges the banks for overnight loans. Overnight borrowing rates are only one small component of the yield curve.



The yield curve is the graphic description of interest rates across the maturity spectrum. When the yield curve is steep, longer rates are higher than shorter rates. Currently, the yield curve is extremely steep in both the taxable and municipal bond market. Investors are rewarded for extending maturities. As they extend maturities they take more interest rate risk. The key measure of a bond or portfolio's interest rate risk is duration. Duration is used to approximate the percentage price change in a bond given a change in interest rate:

$$\Delta\text{Price} = \Delta\text{Rates} \times (-\text{Duration})$$

If a bond has a duration of 7 and rates decrease .50%, the change in price of the bond will be approximately 3.5%. That is what we call simple bond math. A challenge for portfolio manager is determining what the duration of a portfolio should be, when to extend duration to take more risk, and when to shorten duration. When interest rates move, they do not always move at the same magnitude across the curve. Given that the curve is currently steep, we would expect rates in shorter maturities to rise more than rates in the longer maturities. Returns this year will be driven chiefly by changes to the steepness, or shape, of the yield curve. The markets will eventually start to price in a tightening scenario by the Federal Reserve. When that happens, all fixed income curves will flatten, and the optimal maturity structure will be a barbell. A barbell structure means that both short and long maturities are favored at the expense of intermediate maturities. The key challenge in the coming months will be when to sell the intermediate part of the curve and build the barbell.

An additional component of interest rate risk is convexity management. For the purpose of this report, we will use the practical definition of convexity. Convexity is a measure of how sensitive a portfolio's duration is to changes in rates. More clearly, a positively convex portfolio has a stable duration when rates change, while a negatively convex portfolio has a volatile duration when rates change. The municipal market is by definition a negative convex market, as most bonds are issued with at-the-money ten year par calls. The challenge for portfolio managers is to structure positively convex portfolios and then rebalance when rates change. Given the level of volatility in the past few months, it will be a challenge to stay positively convex. We value positive convexity greatly, and always make sure that our portfolios are more convex than the market.

Tax Risk

The municipal bond market is a distinct asset class for one reason only: the income tax preference. Generally speaking, interest received from a municipal bond is exempt from taxation on the federal level, and tax preferences exist at the state level as well. When tax rates are expected to rise, the value of these tax preferences increases. Likewise, falling tax rates have the opposite effect. Analysts are constantly watching tax policy to see if there will be any material changes to the code that will impact demand. Last year's Build America Bond (BAB) program had an impact on the market. While not a change to a tax rate or tax preference, the program changed the way the federal government views their subsidy to state and local



governments. In the simplest terms, the income tax preference for municipal bonds is an indirect interest cost subsidy for state and local governments. Because the preference exists, municipalities have lower borrowing costs. Without it, the municipal asset class would simply be a sector of the corporate bond market. The BAB program was a game changer. The federal government decided to directly subsidize a municipality's interest expense by having them sell taxable bonds and pay 35% of the interest expense. The rationale being that by incenting them to sell in the taxable marketplace, they would be exposed to a larger group of buyers, and thus their after-tax interest expense would be lower. The program was conceived in late 2008 when the capital markets were frozen. An initial selling point for the program was that it gave municipality's access to the capital markets that they otherwise would not have. The program was not reauthorized at the end of 2010, but proposals remain on the table to revive it in some form, perhaps with a reduced subsidy. The bottom line on tax risk is that the code can change. Even small changes to the code can have material impact on supply, demand and valuation.

Liquidity Risk

All other risk characteristics aside, at the end of the day, the price of anything is determined by the forces of supply and demand. This is true for oil, wheat, and also bonds. In the municipal bond market, liquidity plays a huge role in valuation. Liquidity is defined as the ability to buy and sell bonds in an efficient and timely manner. It is based on the premise that for every seller, there needs to be a buyer. When there is a mismatch, the market becomes illiquid and prices need to adjust either higher or lower in order for transactions to occur. When there are more buyers than sellers, bond prices move higher and the market place is not really all that concerned as everyone's bond are appreciating in value. The problem occurs when there are more sellers than buyers. In this instance, bond prices have to fall to entice more buyers into the market. Since the fall of 2008, municipal market liquidity has been an issue. Prior to late 2008, there was a distinct group of players who ensured the market was liquid on a daily basis including the individual investor, mutual fund investor, insurance company, arbitrage investor, or Wall Street broker-dealer. When one of these groups took a break, it seemed another was there to take their place. The buyer of last resort was always the broker-dealer community. They would step-in and support the market if prices fell. 2008 changed everything. The arbitrage investor, who funded billions in tender option bond programs, exited the market en masse after the auction rate market dried up. With no ability to sell synthetic money market instruments, there was no need to buy long bonds and derivative them. Their exit from the market cheapened municipal bonds versus Treasuries. While the diminished role of the arbitrage investor had a material impact on liquidity, the primary hit to liquidity came from the broker-dealers. The banking crisis killed Lehman Brothers and Bear Stearns, two major players in the municipal bond market, and forced additional consolidation in the dealer community. Wall Street capital became a premium asset. Banks cleaned up their balance sheets and made tough decisions about where to commit capital. The end result was that the fewer firms that remained in business committed less capital to their municipal bond trading desks. In today's market, when sellers outnumber buyers, Wall Street is no longer there to support the market.



We have seen huge swings in liquidity the past 24 months. These swings lead to magnified moves in interest rates. Understanding that decreased liquidity is the new normal, we find that there are tremendous buying opportunities when liquidity dries up and great selling opportunities when the markets feel good. It is always better to be a buyer when everyone else is selling.

Conclusions

The argument against municipal bonds seems to center around the fact that the recession left many municipalities with budget deficits, and Federal aid to the states will be reduced due to the Federal government's own budget woes. This broad brush analysis ignores the fact that municipalities have many tools at their disposal to raise revenue, and have flexibility, no matter how unpopular, to also address expenditures in a material way. Further, those talking about bankruptcy and default seem to forget that such a maneuver would punish the municipality into perpetuity with regards to their ability to access the capital markets. We, therefore think that the market has priced in too much credit risk, and that quality spreads have widened too much. There is value in single-A rated credits, in bonds issued by fallen angels such as Illinois and California, and in most investment grade credits. We would recommend that for those investors with a long term investment horizon view this as a time to buy municipal credit. Regarding interest rate risk, we feel that the general trend in interest rates is to higher rates, given the improving economy and increased inflation expectations. However, as rates have risen rapidly over the past few months, we would view a further sell-off as a short-term buying opportunity for long duration assets. On a long term basis, we are recommending a neutral-to-short duration position and a barbelled maturity structure. Regarding tax risk, we feel that the general trend is towards high rates, especially on the state level, and this favors municipal bonds. Finally, liquidity will continue to be a challenge as long as the broker-dealer community stands on the sidelines. We think this is the new-normal, and would view periods of illiquidity as buying opportunities. Those with a long term investment horizon, a solid base in fundamental credit analysis, and the courage to go against popular opinion will be rewarded on relative basis versus Treasuries and corporate bonds. We will look back on the first quarter of 2011 as a great buying opportunity for municipal bonds. Remember, two years ago this March, there were record outflows from equity mutual funds. Anyone who sold in March of 2009 and hid in the bunker missed a 100% rally in the S&P 500.

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