

Safety of Investment Grade Bonds

Examining Credit Ratings and Default Rates of Municipal and Corporate Bonds

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Executive Summary

With a few alarmists calling for a massive increase in municipal bond defaults and many investors still stinging from the Lehman Bros. bond defaults, should investors be worrying about their bonds? High quality municipal and corporate bonds have long been considered “safe” asset classes. Volatility in the stock market is enough to keep many investors up at night and now many may be losing sleep over their bonds too. This paper takes an historical look at the risks and relative safety of high quality municipal and corporate bonds. We will show that although investors need to carefully analyze their bond investments, they can still rely on high rated investment grade bonds to deliver predictable income and relative stability in their portfolios.

*Asset Dedication is affiliated with BondDesk Group LLC, owner of BondDesk Trading LLC, a leading fixed-income electronic trading platform, and one of the largest market destinations for trading odd-lot fixed income securities in the U.S.

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Introduction

The incidence of default for high quality municipal and corporate bonds is generally very low. 99.97% of all Aaa and Aa rated municipal bonds and 98.96% similarly rated corporate bonds have generated coupon payments and redemptions as promised over the past 40 years without a single missed or even late payment.

There are, however, rare periods when default rates see a significant spike. Following economic crises like the Great Depression, bond issuers have experienced much higher. The bond markets now have much greater transparency and there are modern safeguards to help protect investors from widespread defaults.

With yields at historic lows, investors seeking slightly higher yield may be willing to accept the slightly higher risk of municipal or corporate bonds. In this paper, we examine default and recovery data and revisit the historical record to uncover the risks associated with high quality municipal and corporate bonds. The credit rating agencies Moody's, Standard and Poors (S&P) and Fitch have evaluated default rates and recovery and provide insight into the impact that economic shocks have on bonds of various quality ratings.

We find a significant difference in the safety of municipal bonds compared to corporate bonds. Although municipal bonds are generally much safer than corporate bonds, they are not without risk. Furthermore, they have had isolated periods with much higher than average default rates.

We will show that credit quality is the most important decision for bond investors looking to benefit from the tax advantage of municipal bonds or relative higher yields on corporate bonds. Bonds with higher credit quality tend to be stronger financially and have more room to slide before becoming distressed. They also tend to recover quicker in the event of default.

Since bonds are thought of as a safe asset class, investors expect their bond investments to provide stability to their overall portfolio. For investors using an income-matching strategy, they also expect bonds to deliver predictable income. In fact, the mathematical precision of an income-matching strategy hinges on bond issuers making their coupon and principal payments on time. Bond investors, especially those looking for income, must evaluate the risks that default can have on their portfolio, whether using municipal or corporate bonds.

Bond Default

Bonds, whether issued by a corporation or a government entity, represent legal obligations to pay the investor coupon interest and return the face value of the bond at maturity. A bond is said to be in default if either the principal or interest payments are not paid when due. Default, however, does not necessarily mean the investor loses the entire investment. Complete loss is actually a rare event as even bonds in default usually have some sort of salvage value. Default simply means that the exact conditions for payments have not been met as originally promised.

Not all bonds are subject to default risk. Treasury bonds (Treasuries), are considered be essentially free from default risk because the federal government is can always print more money to pay investors. FDIC insured certificates of deposit (CDs) are “backed by the full faith and credit of the United States government.”¹ US Agency bonds (agencies) have a similar implied backing of the government.

Typically, investors approach their decision to use municipal bonds differently than corporate bonds. Municipal bonds are used in taxable accounts if they provide superior after-tax income as compared to Treasuries and other safe investments like CDs and agencies. This is primarily a tax-planning decision. Corporate bonds, on the other hand, are selected simply for their higher relative returns.

Municipal and Corporate Bond Default Rates

Historically, defaults on investment grade bonds are rare for both municipal and corporate bonds. Table 1 shows the default rates of municipal bonds compared to corporate bonds over the same time period, 1970-2009. As can be seen, no Aaa municipal bonds and only 0.5% of Aaa corporate bonds defaulted with 10 years. Examining Table 1 reveals that portfolios consisting of Aaa and Aa bonds have a very low probability of default.

Table 1.
Average Cumulative Bond Default Rates at Various Years, 1970-2009²

	RATING	1	2	3	4	5	6	7	8	9	10		
Municipal Bonds	Aaa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	Investment Grade	
	Aa	0.00%	0.00%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.03%	0.03%		
	A	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.03%		
	Corporate Bonds	Baa	0.01%	0.02%	0.04%	0.06%	0.08%	0.10%	0.11%	0.13%	0.14%	0.16%	Investment Grade
		Ba	0.22%	0.71%	1.06%	1.33%	1.57%	1.91%	2.27%	2.52%	2.71%	2.80%	
		B	3.65%	6.00%	7.88%	9.91%	11.73%	12.40%	12.40%	12.40%	12.40%	12.40%	
Corporate Bonds		Caa-C	7.07%	8.97%	11.03%	11.60%	11.60%	11.60%	11.60%	11.60%	11.60%	11.60%	Investment Grade
		Aaa	0.00%	0.01%	0.01%	0.04%	0.11%	0.17%	0.25%	0.32%	0.41%	0.50%	
		Aa	0.02%	0.06%	0.09%	0.16%	0.23%	0.31%	0.38%	0.45%	0.49%	0.54%	
	Corporate Bonds	A	0.05%	0.17%	0.34%	0.52%	0.72%	0.94%	1.18%	1.46%	1.76%	2.05%	Investment Grade
		Baa	0.18%	0.49%	0.91%	1.40%	1.93%	2.47%	3.00%	3.53%	4.15%	4.85%	
		Ba	1.17%	3.19%	5.58%	8.12%	10.40%	12.49%	14.32%	16.15%	18.03%	19.96%	
Corporate Bonds		B	4.55%	10.43%	16.19%	21.26%	25.90%	30.30%	34.47%	38.11%	41.42%	44.38%	Investment Grade
		Caa-C	17.72%	29.38%	38.68%	46.09%	52.29%	56.62%	59.77%	63.56%	67.42%	71.38%	

¹ www.fdic.gov

In comparing the riskiness of municipal and corporate bonds, at least in terms of expected default, municipal bonds can be considered much safer than equally rated corporate bonds. According to the rating agency Moody's, there have been only 54 defaults by municipal bond issuers since 1970. Research firm Robini Global Economics estimates the size of the U.S. municipal bond market to be \$2.7 trillion. On the other hand, there were 191 defaults by corporate bond issuers in 2009 alone. According to Fitch, the size of the US corporate bond market is about \$4 trillion.

Default and Recovery

On the rare occasions when defaults do occur, it is important to note how much investors may lose. Over time, bond issuers, municipal or corporate, may face times of financial distress and are forced to default on their obligations. Default can range from as simple as making a single late coupon payment, to renegotiating principal repayment to declaring bankruptcy.

That means investors do not usually lose all of their money. Table 2 compares average recovery rates for municipal and corporate bonds. The contrast between the bond types is clear. In the event of a default, corporate bond investors can expect to recover a little more than half of what municipal bond investors could recover. Full recovery, where issuers simply get caught up on coupon payments and continue to make payments on time, occurs for about 20 percent of municipal defaults and 11 percent of corporate defaults.

Table 2.
Average Bond Default Recovery

	30-Days post default	Ultimate Recovery
Municipal Bonds³	59.9%	67.0%
Corporate Bonds⁴	31.0%	41.0%

³ Moody's U.S. Municipal Bond Defaults and Recoveries, 1970-2009

⁴ Moody's Corporate Default and Recovery Rates, 1920-2009

Municipal Bonds

There are more than 60,000 issuers of tax-exempt municipal bonds, including state and local governments, plus various non-profit organizations such as hospitals and universities. These issuers range from the large and well known, such as the state of California, to small school districts in rural areas. A 2004 study by the SEC found that about 74 percent of municipal bond issues are for \$1 million or less.⁵

Municipal bonds can generally be categorized as either general obligation (GO) or revenue bonds. GO bonds are backed by the taxing power of the issuing government and generally viewed as the safest of municipal bonds, along with revenue bonds that are backed by the ratepayers of public water and sewer utilities. Other revenue bonds, backed by less essential projects, are less secure.

Tax-free Income

The primary advantage of municipal bonds is tax-free income. Especially for investors in high tax brackets, their after-tax yield can be much higher than Treasuries, CDs or agencies. Interest from most types of municipal bonds is exempt from federal income tax. Most states do not tax interest payments on municipal bonds issued in their state. Alaska, Florida, Indiana, Nevada, South Dakota, Texas, Washington State and Wyoming do not tax their residents on interest from other states' bonds either.

Currently, municipal bonds are yielding roughly the same as Treasuries on a before-tax basis, making municipal bonds particularly attractive. On a taxable equivalent basis, municipal bonds have a considerable advantage. For example, if a 10 year Aaa rated municipal bond has a nominal yield of 3.65% and the investor's marginal tax rate is 35%, the investor's taxable equivalent yield would be 5.62% (see callout for the calculation).⁶

Taxable Equivalent Yield Calculation

$$R(te) = \frac{R(tf)}{(1-t)}$$

R(te) = taxable equivalent yield to the investor
 R(tf) = tax-free yield (municipal bond yield to maturity)
 t = investor's marginal tax rate

$$5.62\% = \frac{3.65\%}{(1-.35)}$$

On an after-tax basis, municipal bonds present a substantial yield advantage over Treasuries. Given that, over the long term, 10-year municipal bonds usually yield only 83% of Treasuries on a before-tax basis.⁷ Even if the yield is discounted by the average default rate, municipal bonds are still superior given the low incidence of defaults since 1970. It would require a period of higher defaults to dramatically reduce this advantage.

⁵ SEC Report on Transactions in Municipal Securities, 2004

⁶ Price quote from February 16, 2011

⁷ Source: BondDesk Group January 31, 2011

Rating Changes Over Time

A bond's credit rating is not fixed. Over time, many bonds are upgraded or downgraded based on changes in the issuer's financial condition or that of the underlying insurer for insured bonds. Table 3 shows how municipal bonds rated by Standard & Poor's as have transitioned to other ratings over time. In this relatively short historical period, investment grade bonds have never moved from high ratings to default, though bonds that are below investment grade have.

Table 3.

Average 5-year Municipal Bond Rating/Default Transition Rates, 1986-2009⁸

Rating	AAA	AA	A	BBB	BB	B	CCC/C	Default	Not Rated	
AAA	91%	4%	0%	0%	0%	0%	0%	0%	5%	Investment Grade
AA	3%	68%	3%	0%	0%	0%	0%	0%	26%	
A	0%	7%	55%	3%	0%	0%	0%	0%	35%	
BBB	0%	1%	9%	49%	2%	1%	0%	0%	39%	
BB	0%	0%	2%	18%	29%	4%	1%	1%	43%	Not Investment Grade
B	0%	0%	2%	10%	5%	18%	3%	6%	57%	
CCC/C	0%	0%	0%	11%	1%	5%	23%	30%	29%	

The Impact of Depressions on Defaults

Although there is an absence of significant default events in recent history, looking further back in history reveals periods where default rates on municipal bonds have been sizable. In his authoritative analysis, "The Postwar Quality of State and Local Debt," George Hempel identified that, as far back as the 1830's, periods following severe economic crises have shown drastically higher default rates. In particular, the Long Depression (1873-1879) and the Great Depression (1929-1933) preceded periods of significantly higher defaults as shown in Table 4.⁹

Table 4.

Default and Complete Loss During Economic Depressions

	Default as a Percent of Total Outstanding Debt	Complete Loss as a Percent of Total Outstanding Debt
1873-1879 The Long Depression	24.5%	15.0%
1929-1937 The Great Depression	15.4%	0.5%

⁸ Standard and Poors U.S. Municipal Rating Transitions and Defaults, 1986-2009

⁹ The Postwar Quality of State and Local Debt; Hempel; 1971

Comparing the Current Economic Crisis to the Great Depression

In assessing the chances of a spike in defaults, a central part of the analysis is to determine whether the crisis of 2008 was significant enough of an economic event to substantially impair issuers' ability to pay on their obligations. Table 5 compares economic factors in the first three years of the Great Depression (1929-1931) and the three years following the crisis of 2008 (2008-2010). But for the steep correction in housing prices in 2008, it is clear that to this point in time the Great Depression was a much more severe economic event. However, since many municipalities rely on property taxes, the correction in housing could provide enough pressure on revenues to tip municipalities into default if budgets are not managed prudently.

Table 5.
Comparing The Great Depression and The Current Economic Crisis

	1929	1930	1931	2008	2009	2010
S&P 500 Total Return	-10.5%	-27.9%	-43.4%	-36.5%	27.5%	15.1%
Unemployment¹⁰	3.1%	8.7%	16.1%	5.8%	9.3%	9.6%
Housing Prices¹¹	-2.1%	-4.3%	-8.2%	-18.3%	-2.4%	-0.4%
Change in GDP¹²	6.4%	-12.0%	-16.1%	2.6%	-1.3%	2.6%

Risks to Consider

There are many Wall Street analysts, Meredith Whitney being one of the most vocal, who are warning about the potential for a significant increase in municipal bond defaults. They warn that if municipal bond issuers fail to address key problems, then investors could face a period of defaults similar to the Great or Long Depressions. The issues below help shape Whitney and other's concerns.

1. Reliance on falling real estate values for tax revenues
2. Over-extended state and local budgets and lack of will to make needed cuts
3. Un-funded pension and health care liabilities
4. Lack of transparency in disclosure of financial condition of local issuers

Modern Safeguards

Despite the risks outlined above, there are a number of safeguards in the municipal bond market that reduce the likelihood of high default rates like investors experienced during the Long or Great Depressions. Improved regulation, transparency and oversight have brought more structure to the market. Bond insurance provides investors with an added layer of protection.

In 1975 the Municipal Securities Rulemaking Board (MSRB) was established by Congress as a self-regulatory organization to protect investors by improving the efficiency of the municipal

¹⁰ Bureau of Labor Statistics

¹¹ S&P Case-Shiller HPI home index

¹² www.usgovernmentspending.com/us_20th_century_chart.html

bond market. The MSRB's role, under the oversight of the Securities and Exchange Commission, includes developing rules to regulate underwriting, trading, and selling of municipal bonds. Most notably, SEC Rule 15c2-12 has led to much greater transparency with required filing of annual financial information and material event notices. This information is made public on the MSRB's Electronic Municipal Market Access (EMMA) website. The SEC continues to seek improved transparency so that investors can make more informed decisions about the financial health of the issuers.

The main credit rating agencies, Moody's, Standard and Poors and Fitch, started providing analysis prior to the Great depression, however their analyses were primarily available to large institutional investors like banks and insurance companies. Following the debt crisis of 1931, regulators and individual investors began to have broader access to ratings and analysis.

Although ratings tend to be more reactive than predictive, they provide benchmarking and analysis for investors to make decisions.¹³ Ratings show trends in financial condition as a bond's rating deteriorated and transitions from one rating to another (as seen in Table 3). It is important for investors to remember that bond ratings cannot detect fraud or predict extreme financial crisis, which often precipitate default. However, rating agencies bring increased scrutiny and transparency to bond markets. Under most normal market conditions, bond ratings can help investors see problems and take action in advance of a default, especially as ratings begin to fall below investment grade.

First introduced in 1971, bond insurance provides investors with a backstop if an issuer does default. Municipal bond insurance guarantees the payment of principal and interest on a bond if the issuer defaults and usually reduces interest costs, depending upon the issuer's underlying credit and market conditions. In addition to interest cost savings, higher bond rating associated with insurance also improves liquidity for insured bonds.

Bond insurers are in shakier financial condition as they have been in the past due to the recent financial crisis. Issuers are also less willing to pay premiums, reducing revenue as the threat of rising municipal defaults looms. Nevertheless, bond insurers can still provide some level of stability to the market.

Federal backing for municipal bonds?

Although the federal government does not have an official obligation to bail out troubled municipalities, Warren Buffett, whose Berkshire Hathaway owns both a significant holding of municipal bonds and municipal bond insurer Berkshire Hathaway Assurance, questions whether the federal government will allow a major default event. At the firm's 2010 annual shareholder meeting, Buffett said:

"It would be hard in the end for the federal government to turn away a state having extreme financial difficulty when they've gone to General Motors and other entities and saved them... I don't know how you would tell a state you're going to stiff-arm them with all the bailouts of corporations."

¹³ To err is human: rating agencies and the interwar foreign government debt crisis; 2010

Practical Deterrents to Default

In addition to the number of safeguards that help improve investors' ability to evaluate municipal bonds, from a practical perspective, defaulting on bonds would essentially lock the issuer out of the market. Since the bond market is the best source of financing for municipalities, defaulting simply does not make sense. For most issuers, the total debt service on their outstanding bonds is less than 10% of their budget. The legal fees and increased borrowing costs (assuming any credit is still available) associated with default is not cost effective. Even Orange County in California, which declared bankruptcy in 1994, never defaulted on its bonds.

Comparing Corporate and Municipal Bonds

A corporate bond is issued by a company to raise money in order to expand its business. Compared to municipal bonds, corporate bonds have a much higher risk of default. Unlike a municipality that can tax residents and is assumed to go on in perpetuity so long as there are residents, corporations have to repay debt from revenue and can simply go out of business when the debt load becomes too great.

Municipal bonds and corporate bonds have different ratings schemes. For example, an Aa rated general obligation municipal bond would be equivalent to a Aaa corporate bond in terms of likelihood of default. Moody's generally bases its municipal bond ratings on the fiscal strength of the municipality that issues the bonds. For corporate bonds, on the other hand, Moody's rating is based on risk of loss. Table 6 maps corporate bond ratings to municipal bonds.

Table 6.
Mapping Muni to Corporate Scale Ratings¹⁴

Muni Scale Ratings	Corporate scale equivalents, by sector				
	State GO	Local GO, State, Lease, Wtr/Swr	COPS; Special Tax; Public Higher Ed.; Airports	Hospitals and Universities	Start-up TIFs and Toll Roads, CCRC, Multifam
Aaa	Aaa	Aaa	Aaa	Aaa	Aaa
Aa	Aaa	Aaa	Aa-Aaa	Aa-Aaa	Aa
A	Aa-Aaa	Aa	A	A-Aa	A-Aa
Baa	Aa	A-Aa	A	A	Baa-A
Ba	A-Aa	A	Baa-A	Baa	Ba-Baa
B	Baa-A	Baa	Ba-Baa	B-Ba	B-Ba
Caa	Baa	Ba-Baa	B-Ba	Caa-B	Caa-B

Notes: Abbreviations represent bonds sold for specific funding purposes: GO = General Obligation, COPs = Certificate of Participation, TIFs = Tax Increment Financing, CCRC = Continuing Care Retirement Community

The speed with which corporate bonds transition to default depends on their original rating. They generally move to lower ratings before default actually occurs. Table 7 shows the time it has taken for corporate bonds deteriorate and transition to default.

Table 7.
Cumulative Default Among Global Corporate Bonds From Original Rating (1981-2008)¹⁵

Defaulting Within:	AAA	AA	A	BBB	BB	B	CCC/C	Total
One year				3	10	53	39	105
Three years			6	28	122	429	75	660
Five years		2	13	64	250	724	93	1146
Seven years	2	4	27	93	330	861	100	1417
Total	7	25	84	176	486	1048	107	1933

¹⁴ Moody's

¹⁵ Standard & Poor's Global Fixed Income Research and Standard & Poor's CreditPro®.

Credit Spread

Credit spread reflects the additional yield an investor requires to assume more credit risk in one bond type relative to one with less default risk. As of February, 2011, the spread between Aaa corporate bonds and government agency bonds was about 20 basis points (4.2% for corporate bonds versus 4.0% for agency bonds). This spread has narrowed dramatically since the spike in 2008, meaning the relative risk of corporate bonds has diminished. It is important to note that following 2008, only a small number of corporate issuers are still Aaa rated.

Recall that Table 1 listed cumulative default rates back to 1970. Table 8 shows cumulative default rates on corporate bonds at 1 to 10 years going back to 1920. It shows that about 1% of Aaa rated corporate bonds defaulted over a 10-year period. As shown in Table 2, the average expected recovery is 41%. Institutional investors may prefer corporate bonds because they hold a slight advantage over government agency bonds from a purely mathematical perspective. But individual investors may not view this slight yield advantage to be enough to compensate for the uncertainty and worry that the added risk of default, albeit small, entails.

Table 8.
Average Cumulative Corporate Bond Default Rates, 1920-2009¹⁶

RATING	1	2	3	4	5	6	7	8	9	10	
Aaa	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.4%	0.5%	0.7%	0.9%	Investment Grade
Aa	0.1%	0.2%	0.3%	0.5%	0.7%	1.0%	1.3%	1.6%	1.9%	2.2%	
A	0.1%	0.3%	0.6%	0.9%	1.3%	1.6%	2.0%	2.4%	2.9%	3.3%	
Baa	0.3%	0.8%	1.5%	2.3%	3.1%	4.0%	4.7%	5.5%	6.4%	7.2%	
Ba	1.4%	3.3%	5.5%	7.7%	9.9%	11.9%	13.8%	15.7%	17.4%	19.2%	Investment Grade
B	4.0%	9.0%	14.0%	18.5%	22.4%	25.9%	29.1%	31.9%	34.3%	36.4%	
Caa-C	14.3%	24.0%	31.4%	36.9%	41.2%	44.3%	46.7%	48.8%	50.9%	52.8%	

Surprise Defaults

Economic crisis or financial fraud can often lead to rapid deterioration and default on corporate bonds. Lehman Brothers is a perfect example. In 2007, the 150 year old financial firm had posted its 4th straight year of record earnings. By September 15th, 2008, Lehman still maintained an A credit rating, but was forced to file for bankruptcy. Despite the fact that the government had bailed out smaller and less diversified Bear Stearns, Lehman did not receive the backing it needed to remain liquid. An S&P special report on the Lehman collapse said, “the U.S. government may have needed a ‘moral hazard example,’ to demonstrate that it would not be willing to rescue floundering major financial institutions in all circumstances.”

Enron and WorldCom stand as examples where fraud can veil financial distress. In these cases, the firms eventually imploded, but investors and rating agencies did not have much insight into the real financial state of the firms and therefore could not make informed decisions.

¹⁶ Moody's Investor Services, Corporate Bond Defaults and Recoveries, 1920-2009

These examples made headlines when they occurred and, like Orange County in the 1990's, warped the public's perspective on the safety of investment grade bonds. Rather than report on the 99% of Aaa bonds that have not defaulted in all the years since 1920, broadcasters and reports prefer to shout about the few that did.

Risk Premiums

In their groundbreaking work “Common risk factors in the returns on stocks and bonds,” Fama and French isolate the risk factors that explain the majority of a security’s return.¹⁷ Risk factors are premiums that investors are paid for taking on risk above risk free assets (i.e. Treasury bills). For corporate bonds, the most meaningful factors were term risk (the bond’s time to maturity) and default rate. Fama and French found three risk factors that proved to be significant. Simply investing in the stock market was the first factor. Style (value vs. growth) and size (small vs. large) also contribute to a security’s premium over T-bills.

The differences among the premium are noteworthy. As shown in Table 9, in terms of average monthly risk premiums, investors receive a large premium for choosing to invest in stocks as well as tilting to small cap and value. For corporate bonds, taking on risk, albeit much smaller, receives only a small premium.

Table 9.

Monthly Equity and Bond Risk Premiums	
Equity Premiums	
Market	0.43%
Size	0.46%
Style	0.40%
Bond Premiums	
Term	0.06%
Default	0.02%

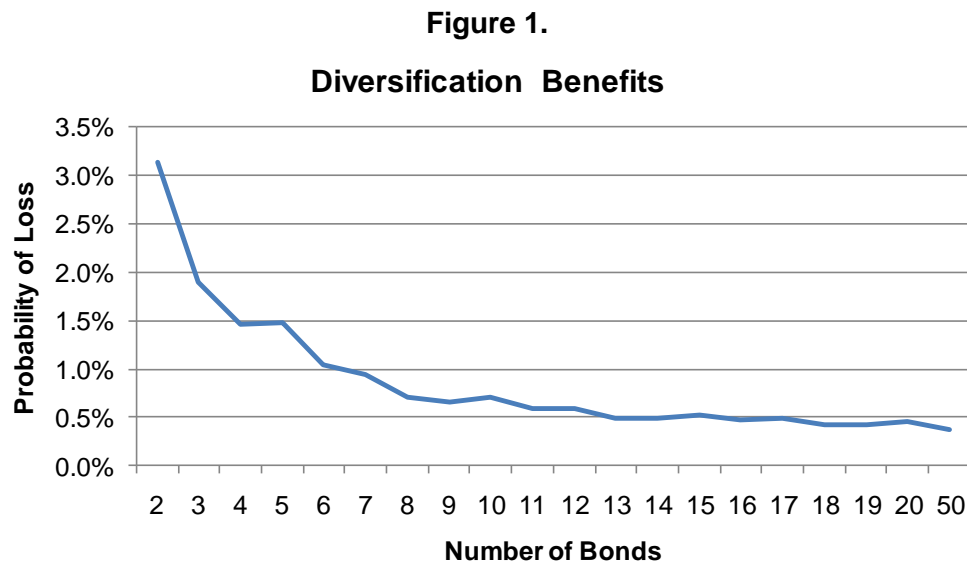
Investors who are not comfortable with the higher default rate on corporate bonds or the prospect of higher defaults on municipal bonds, can trade off some bonds risk for some equity risk. Given the much higher return premium for taking on incremental risk in their stock portfolios, investors could build a portfolio with the same risk return profile by substituting safer Treasury, CDs or agencies and making small increases in small cap and value tilts.

¹⁷ Common risk factors in the returns on stocks and bonds; Journal of Financial Economics; 1993.

Managing Risks

The risks associated with investing in high quality municipal and corporate bonds can be managed in a few simple ways that can greatly reduce an investor's exposure.

1. For investors who prefer corporate bonds, diversification reduces the risk a single bond by spreading security risk across several issues. But how many bonds are needed to effectively diversify a portfolio? A recent study by BondDesk Group revealed that as few as 10 bonds provide 97% of the diversification benefit of hundreds of bonds.¹⁸ Figure 1 highlights the effect of diversification on a portfolio of corporate bonds.



2. Selecting higher quality bonds can greatly reduce the probability of default. Aaa rated bonds, municipal or corporate, have a very low incident of default even in severe economic turmoil. Modern safeguards like improved transparency and insurance provide added protection against default
3. Although the risk of default in high quality municipal and corporate bonds is low, the risks still exist. For investors with low tolerance for ratings downgrades and the possibility of default, they can come close to eliminating default risks by investing in Treasury bonds, FDIC insured CDs and government agency bonds.

To maintain a similar risk/return profile, investors can substitute Treasury/CDs/agency bonds for municipal or corporate bonds and increase tilts within their equity portfolios to higher returning style and size factors (i.e. small cap and value). The slightly lower yield/expected return on the safer bonds would be offset by taking on slightly more equity risk.

¹⁸ BondDesk Group, "How Many Bonds?," 2010

Conclusion

Historical evidence is quite clear that investment grade bonds with Aaa ratings are very safe investments. If held to maturity, there is less than a 1% probability of default based on statistics back to 1920, which includes the Great Depression. Since 1970, the record has been even better. The only investments with lower expected default rates are Treasuries, CDs and agencies, which also offer investors lower yields.

As we have shown, high grade municipal and corporate bonds have a low incident of default, particularly over the last 40 years. Under most circumstances, investors can expect high grade municipal and corporate bonds to return slightly higher yields with low expected defaults. They are not, however, risk free. There have been isolated periods of higher defaults, some of which have caught analysts by surprise. Investors looking for predictable cash flows from their bond investments must carefully weigh the after tax-benefit of municipal bonds and return premium of corporate bonds against the safety of Treasuries, CDs and agencies.

Municipal bonds are generally thought of as the second safest bond class behind Treasuries, CDs and agencies. Since 1970, there have only been 54 cases of default among the more than 1,000,000 outstanding issues. Investors need to keep in mind that periods of more serious economic crisis like the Great Depression have led to significant spikes in default rates. Although largely untested, modern safeguards like stricter regulation by the MSRB and backing by bond insurers should help reduce the impact of severe economic meltdowns. Still, investors who are not comfortable trading off higher after-tax returns for the prospect of higher defaults in periods of economic crisis should invest in Treasuries, CDs or agencies.

Corporate bonds are riskier than municipal bonds with the same rating. They have historically experienced higher default rates and lower recovery rates. Currently the credit spread between corporate bonds and safer bonds is narrow, which means that the premium investors are paid to take on higher risk is low. Investors may be better compensated by sticking with CD's and agency bonds and taking on slightly higher tilts toward small cap, value or emerging market stocks where the payoff for taking risk is, on average, higher.

Appendix

Long Term Municipal Obligation Ratings

Long-Term Corporate Obligation Ratings

Equivalent Credit Ratings by Different Companies

Comparing Moody's and S&P Default Rates

Moody's Long Term Municipal Obligation Ratings

Municipal Long-Term Rating Definitions

1. **Aaa** Issuers or issues rated Aaa demonstrate the strongest creditworthiness relative to other US municipal or tax-exempt issuers or issues.
2. **Aa** Issuers or issues rated Aa demonstrate very strong creditworthiness relative to other US municipal or tax-exempt issuers or issues.
3. **A** Issuers or issues rated A present above-average creditworthiness relative to other US municipal or tax-exempt issuers or issues.
4. **Baa** Issuers or issues rated Baa represent average creditworthiness relative to other US municipal or tax exempt issuers or issues.
5. **Ba** Issuers or issues rated Ba demonstrate below-average creditworthiness relative to other US municipal or tax-exempt issuers or issues.
6. **B** Issuers or issues rated B demonstrate weak creditworthiness relative to other US municipal or tax exempt issuers or issues.
7. **Caa** Issuers or issues rated Caa demonstrate very weak creditworthiness relative to other US municipal or tax-exempt issuers or issues.
8. **Ca** Issuers or issues rated Ca demonstrate extremely weak creditworthiness relative to other US municipal or tax-exempt issuers or issues.
9. **C** Issuers or issues rated C demonstrate the weakest creditworthiness relative to other US municipal or tax-exempt issuers or issues.

Moody's Long-Term Corporate Obligation Ratings

Moody's long-term obligation ratings are opinions of the relative credit risk of fixed-income obligations with an original maturity of one year or more. They address the possibility that a financial obligation will not be honored as promised. Such ratings use Moody's Global Scale and reflect both the likelihood of default and any financial loss suffered in the event of default.

1. **Aaa** Obligations rated Aaa are judged to be of the highest quality, with minimal credit risk.
2. **Aa** Obligations rated Aa are judged to be of high quality and are subject to very low credit risk.
3. **A** Obligations rated A are considered upper-medium grade and are subject to low credit risk.
4. **Baa** Obligations rated Baa are subject to moderate credit risk. They are considered medium grade and as such may possess certain speculative characteristics.
5. **Ba** Obligations rated Ba are judged to have speculative elements and are subject to substantial credit risk.
6. **B** Obligations rated B are considered speculative and are subject to high credit risk.
7. **Caa** Obligations rated Caa are judged to be of poor standing and are subject to very high credit risk.
8. **Ca** Obligations rated Ca are highly speculative and are likely in, or very near, default, with some prospect of recovery of principal and interest.
9. **C** Obligations rated C are the lowest rated class of bonds and are typically in default, with little prospect for recovery of principal or interest.

Note: Moody's appends numerical modifiers 1, 2, and 3 to each generic rating classification from Aa through Caa. The modifier 1 indicates that the obligation ranks in the higher end of its generic rating category; the modifier 2 indicates a mid-range ranking; and the modifier 3 indicates a ranking in the lower end of that generic rating category.

Equivalent Credit Ratings by Different Companies

Fitch and Duff & Phelps are two other ratings companies, but records of their default rates are not readily available. All four have rating categories similar to Moody's as shown below

Credit Risk	Moody's*	Standard & Poor's*	Fitch IBCA**	Duff & Phelps**
INVESTMENT GRADE				
Highest quality	Aaa	AAA	AAA	AAA
High quality (very strong)	Aa	AA	AA	AA
Upper medium grade (strong)	A	A	A	A
Medium grade	Baa	BBB	BBB	BBB
NOT INVESTMENT GRADE				
Lower medium grade (somewhat speculative)	Ba	BB	BB	BB
Low grade (speculative)	B	B	B	B
Poor quality (may default)	Caa	CCC	CCC	CCC
Most speculative	Ca	CC	CC	CC
No interest being paid or bankruptcy petition filed	C	C	C	C
In default	C	D	D	D

* The ratings from Aa to Ca by Moody's may be modified by the addition of a 1, 2 or 3 to show relative standing within the category, with 1 the highest.

**The ratings from AA to CC by Standard & Poor's, Fitch IBCA and Duff & Phelps may be modified by the addition of a plus or minus sign to show relative standing within the category.

Source: The Bond Market Association

Comparing Moody's and S&P Default Rates

The other large credit rating company for which default rates are readily available is Standard and Poor's. Although its ratings are highly correlated with Moody's, they are generally considered to be slightly more lenient. A comparison of the default rates for each company reveals this to be true.

Cumulative Historic Default Rates, 1970-2006¹⁹

Ratings Categories	Muni		Corporate	
	Moody's	S&P	Moody's	S&P
Investment Grade				
Aaa/AAA	0.00%	0.00%	0.52%	0.60%
Aa/AA	0.06%	0.00%	0.52%	1.50%
A/A	0.03%	0.23%	1.29%	2.91%
Baa/BBB	0.13%	0.32%	4.64%	10.29%
Not Investment Grade				
Ba/BB	2.65%	1.74%	19.12%	29.93%
B/B	11.86%	8.48%	43.34%	53.72%
Caa-C/CCC-C	16.58%	44.81%	69.18%	69.19%
Investment Grade	0.07%	0.20%	2.09%	4.14%
Non-Investment Grade	4.29%	7.37%	31.37%	42.35%
All	0.10%	0.29%	9.70%	12.98%

¹⁹ http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_reports&docid=f:hr835.110

Disclosures

Projections, results and assumptions used herein reflect past performance of the referenced asset classes, exclusive of fees, expenses, and taxes. Past performance is no guarantee of future results. Total returns include reinvestment of dividends and capital gains. The investment return and principal value of an investment will fluctuate such that an investment, if and when redeemed, may be worth more or less than its original cost. Defaults on interest payments and/or principal may also occur. Investment results will vary depending on market conditions, length of planning horizon, inflation protection, and level of withdrawals. Investors should consider investment objectives, risks, and all fees, expenses and tax consequences of an investment before investing.

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