

Managing Credit Risk in Taxable Fixed Income Portfolios

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PNC Capital Advisors Taxable Fixed Income Team

EXECUTIVE SUMMARY

- Corporate bond issuance increased significantly since the financial crisis, exceeding \$1 trillion on a gross basis in each of the last six years.
- Benchmark index composition shifted materially: the concentration in corporate bonds rose and the contribution from BBB-rated issuers expanded. Risk is higher with longer-dated issuance increasing overall duration against low yields and narrow spreads.
- We believe a disciplined portfolio construction process that is predicated on the assessment and management of credit risk protects our clients' capital and provides for attractive risk-adjusted returns. Our approach utilizes:
 - A fundamental, team-based Credit research process that ensures consistent positioning of client portfolios.
 - An enhanced issuer exposure and sector limit framework based upon contribution to duration.

In the post-financial crisis world, fixed-income markets both domestically and internationally have become more challenging to navigate and are increasingly interconnected. Central bank policies are exerting significant pressure on valuations across numerous asset classes and are distorting risk-reward opportunities. Recently, the efficacy of non-traditional policies such as quantitative easing and negative interest rates is being questioned. However, it is likely that current regimes will persist for an extended period.

In many ways these effects are most pronounced in global bond markets:

- Pervasive negative yields: 17.5% of the Bloomberg Barclays Global Aggregate yields less than zero.
- Increased interest-rate sensitivity in domestic credit: The duration of the Bloomberg Barclays credit index is still near all-time highs.
- Asymmetric risk-reward: The spread (or additional yield) per unit of duration is below long-term averages, while the absolute yield per unit of duration is near all-time lows.

PNC Capital Advisor's Taxable Fixed Income team remains committed to our top-down process, which emphasizes sector rotation. We believe our focus on generating attractive risk-adjusted returns for our clients is of particular importance in periods like today.

Through a series of two Insights papers, we will address not only the fundamental tenets of our process, but also the evolution of our approach given the changes and challenges facing fixed-income investors. Our sector allocation and portfolio construction framework is discussed in detail in [Optimizing Risk-Return Outcomes in Core Fixed Income](#).

Our initial focus will be the credit sector as we explore market dynamics and our process in four steps:

- 1 Credit Selection: Fundamentals (F), Valuations (V) and Tactics (T)
- 2 Introduction to Credit and Index Composition
- 3 Defining Risk Through Contribution to Duration (CTD)
- 4 Managing Individual Issuer Concentrations

CREDIT SELECTION: FUNDAMENTALS, VALUATION, AND TACTICS

Our security selection process for credit (as well as the process for our structured products research team) is rooted in our fundamentals, valuation, and tactics (FVT) framework. It is the marriage of our fundamental overview of a credit, the relative value of an issuer's debt securities, and a consideration of market conditions. Our team-based approach is a distinguishing characteristic of our selection process: the analyst's fundamental assessments and recommendations are vetted by the credit team prior to initiating a position. This allows us to draw on the collective experience of each credit team member and ensure the broader team's macro and economic themes are reflected in sub-sector allocations across industry and quality.

The Fundamental analysis determines whether we are comfortable with the issuer and the industry in which they operate. The areas of focus for our research include:

- The company's operating model and its position in the industry (What is the competitive landscape?)
- The overall strength of the industry (What are the margin, growth, and cyclical characteristics?)
- Earnings, cash flow, and leverage profile (Are the cash flows stable and are they sufficient for debt service and capital investment?)
- The reputation of the company's management (How are the needs of equity and debt holders served?)
- Capital structure analysis (Are there sufficient assets at each level of the capital structure to honor claims?)

While we may like the overall fundamentals of a business, the pricing of an issuer's securities may not be attractive. Valuation analysis compares the risk premiums of an issuer's securities relative to others in its industry, as well as those outside its industry. Other factors we consider include: issue amount outstanding, bond premium (or discount) to par, trading volume in the issue (liquidity), and where the security is positioned in the capital structure.

Tactics focus on market conditions and how we implement our strategies. The emphasis of this step is to get the best execution for our clients and that relies heavily on the insights and experience of our corporate bond traders. We consider technical factors such as new-issue supply, market sentiment, and liquidity. We prefer to be buyers when the market is better offered and sellers when the market is richly valued.

The FVT process highlights the steps we undertake to evaluate and invest, at the security level, in a corporate bond issuer. However, this process does not illustrate either how we determine the amount to invest in an issuer or how we assess the riskiness of a position. **We believe a disciplined portfolio construction process that is predicated on the assessment and management of credit risk has the potential to protect our clients' capital and may provide for attractive risk-adjusted returns.** The rest of this paper will lay out the framework for how we allocate and manage risk in the credit market.

INDEX COMPOSITION

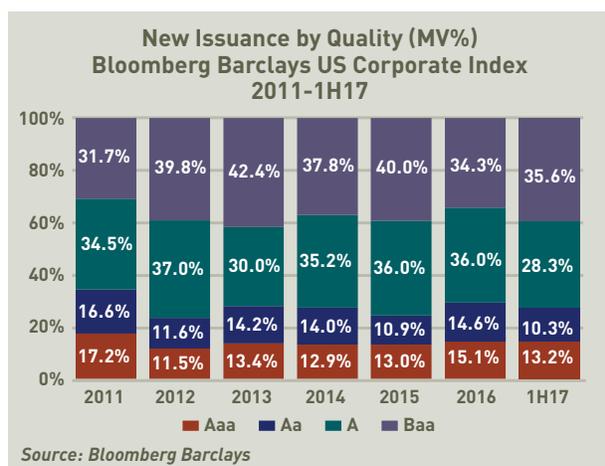
Our portfolio construction process begins with a thorough understanding of the characteristics and risk attributes of the benchmarks for our clients' mandates. The optimal risk-reward profile results from portfolio structure and security selection decisions that may deviate from the benchmark. This can be

measured by our active risk or tracking error. Benchmarks represent a significant portion of the investable universe and define the baseline risk-return characteristics expected by our clients.

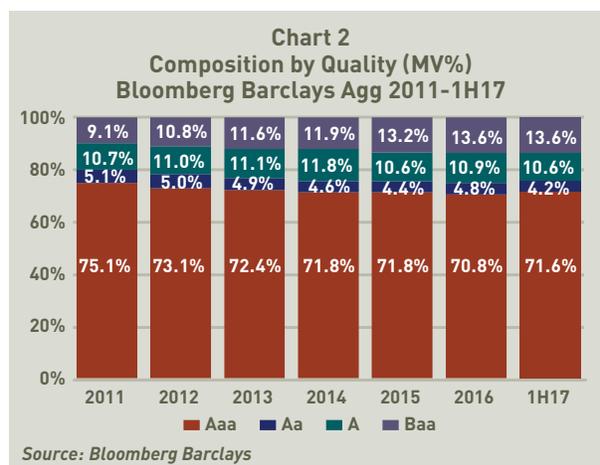
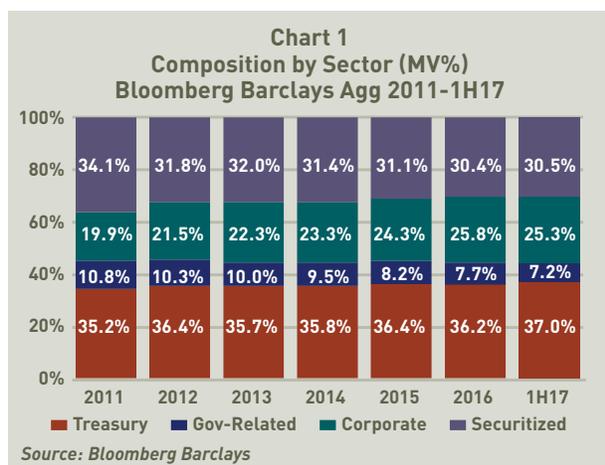
Both Bloomberg Barclays and Merrill indices include corporate as well as non-corporate credit securities¹. While the index construction rules for credit securities vary slightly between Barclays and Merrill Lynch, they have some common elements:

- They must have a fixed coupon (no floating rate) and be U.S. dollar denominated
- They must be investment-grade rated: Baa3/BBB- or higher
- Any issue must have at least \$300 million outstanding

Corporate bond issuance has increased significantly since the financial crisis, exceeding \$1 trillion on a gross basis in each of the last six years. As shown below, issuance from BBB-rated issuers has averaged approximately 37% of the total.



Concomitantly, issuance of agency mortgage-backed securities has been relatively stable while the Federal Reserve's quantitative easing program and on-going reinvestment of principal and interest has absorbed over one-third of the market. These factors have impacted benchmark indices and the investable universe significantly. Charts 1 and 2 below illustrate the evolution of the Bloomberg Barclays Aggregate since 2011. Notably, corporate credit has increased at the expense of the securitized (mortgages and asset-backed) sector. Assets rated Baa have also increased at the expense of Aaa-rated assets.



This shift occurred as issuers became more comfortable with increased leverage. Certain industries have transitioned from being primarily high-quality A or Aa issuers to a lower-quality, A to Baa profile, particularly in pharmaceuticals and technology. After the financial crisis of 2008, rating agencies changed their rating methodologies for financial institutions, which led to lower credit ratings for most banks, both domestic and global.

The declining quality of benchmark credit securities is an opportunity to emphasize the rigor of our research process. Utilizing both internal and external resources, our team of experienced credit research analysts utilize our FVT framework to evaluate each issuers' comparative creditworthiness and risk profile independently. Our team must also consider each issuer's credit ratings when evaluating relative risk.

Assessments from nationally recognized statistical rating organizations (NRSRO) set a baseline evaluation of an issuer’s creditworthiness and comparative risks. Downgrade and forward default probabilities increase as issuers migrate toward the Baa3 lower bound of investment grade, and they increase in a nonlinear fashion². We have found that NRSRO issuer ratings provide a useful means to stratify risk in the corporate bond sector. We believe the combination of this stratified credit assessment with our team-based, independent credit research create an effective process for managing credit risk.

HOW WE DEFINE RISK: CONTRIBUTION TO DURATION (CTD) EXPLAINED

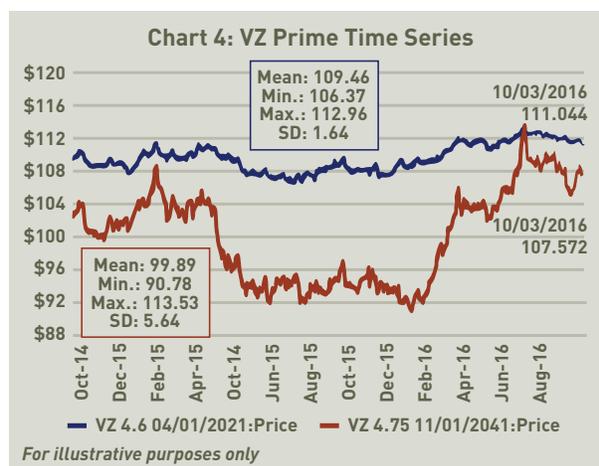
While a bond portfolio consists of securities with market-value weights that sum to 100%, the collection of securities also have duration weights that sum to the portfolio’s total duration. Duration weights are measured in units of contribution to duration (CTD). CTD is calculated by multiplying an issuer’s market-value weight by the duration of the individual bond. This can be illustrated with a simple two bond portfolio:

Security	Mkt Value (%)	Duration	CTD
VZ 4.6 4/1/2021	50.0%	4.1	2.0
VZ 4.75 11/1/2041	50.0%	14.7	7.4
	100.0%		9.4

For illustrative purposes only

This portfolio consists of two Verizon bonds maturing in 2021 and 2041. While the securities have the same market value weights, the longer duration security contributes significantly more CTD to the portfolio duration. These relationships are critical to portfolio management because bonds with longer maturities (and hence duration) have different risk characteristics than shorter-duration bonds.

Charts 3 and 4 demonstrate this difference comparing these same two Verizon bonds. Chart 3 illustrates each bond’s option-adjusted spread to Treasuries over the last two years. While the 2041 maturity trades in a slightly wider range, the volatility is very comparable to the shorter maturity. Chart 4 highlights the price differences during the same period. The longer-duration 2041 maturity clearly displays greater volatility in price over the last two years. As a result, in our hypothetical, equally-weighted portfolio of two Verizon bonds, the bond maturing in 2041 would contribute more to the overall price volatility of the portfolio.



A key point to this analysis is that, from a credit risk perspective, the contribution to duration matters more to us than the market value weight of issuers in the index. As the spreads from higher CTD issuers change, they will have more relative impact on our portfolios than those with less CTD.³ The largest contributors to the duration of a portfolio or an index can often be quite different from the largest market value weights.

In Table 1, we see this most dramatically in the Barclays Aggregate Index, where the top five issuers by market value are almost entirely different than the top five issuers by contribution to duration. The long-dated capital structures of the telecoms Verizon and AT&T, as well as recent large issuances from Anheuser Busch Inbev and Microsoft bring these companies to the top of the index.

TABLE 1

Top Five Issuers by % Market Value								
Bloomberg Barclays Aggregate			Bloomberg Barclays Interm. Gov/Credit			Merrill Lynch 1-3yr Gov/Credit		
KFW	KFW	0.59%	KFW	KFW	1.07%	KFW	KFW	1.23%
JPM	JP Morgan	0.53%	EIB	European Inv Bank	0.85%	EIB	European Inv Bank	0.84%
BAC	Bank of America	0.47%	JPM	JP Morgan	0.80%	IBRD	World Bank	0.78%
GS	Goldman Sachs	0.47%	IBRD	World Bank	0.78%	IADB	Inter-American Dev Bank	0.48%
EIB	European Inv Bank	0.46%	BAC	Bank of America	0.67%	ASIA	Asian Dev Bank	0.47%

Top Five Issuers Contribution to Duration								
Bloomberg Barclays Aggregate			Bloomberg Barclays Interm. Gov/Credit			Merrill Lynch 1-3yr Gov/Credit		
VZ	Verizon	0.044	JPM	JP Morgan	0.038	KFW	KFW	0.022
T	AT&T Inc	0.040	KFW	KFW	0.032	EIB	European Inv Bank	0.017
MSFT	Microsoft	0.039	BAC	Bank of America	0.031	IBRD	World Bank	0.014
JPM	JP Morgan	0.033	MS	Morgan Stanley	0.031	IADB	Inter-American Dev Bank	0.009
WFC	Wells Fargo & Co	0.033	GS	Goldman Sachs	0.029	ASIA	Asian Dev Bank	0.009

MANAGING INDIVIDUAL ISSUER CONCENTRATIONS

So how do we apply these different concepts of risk into our issuer selection and portfolio construction process? We begin by basing our framework for credit issuer exposure on the concepts of CTD and ratings. Our issuer exposure management defines risk and limits in units of duration. Relative exposure limits use each issuer's CTD in the relevant benchmark plus a percentage of the overall portfolio's duration. We employ a reference matrix that is based on ratings and security duration in order to calculate each issuer's credit risk limits: Lower-rated, longer-duration securities have lower limits and, conversely, higher-rated, shorter-maturity securities have higher limits. Credit risk is inherently asymmetric and exposes portfolios to idiosyncratic risks that can be difficult to predict. For this reason, we utilize a market value limit overlay regardless of duration that is most restrictive for issuers rated Baa3.

This is most easily understood with an example. For a hypothetical portfolio that is benchmarked to the Bloomberg Barclays Aggregate (which has a duration of roughly five years), we can use our two Verizon bonds from earlier to illustrate the concept. Verizon's CTD in the Barclays Aggregate is 0.05 years and it has a Baa1 issuer rating. If our reference matrix for ratings allowed for a 2% relative CTD weight in Baa1 issuers, we can set our maximum CTD in Verizon as follows:

$$\text{Benchmark CTD} + (\text{portfolio duration} * \text{relative CTD weight}) = \text{Maximum CTD}$$

$$0.05 \text{ years} + (5.0 * 2\%) = 0.15 \text{ CTD}$$

With 0.15 CTD as our limit for Verizon exposure, we can translate that into market-value weights for the two Verizon bonds used in our earlier example. The math is simply maximum CTD calculated above divided by each bond's duration.

Bond	Duration	Max Mkt Value
VZ 4.75 11/1/2041	14.70	1.02%
VZ 4.6 4/1/2021	4.10	3.66%

For illustrative purposes only

CONCLUSIONS

The credit market has evolved considerably, growing in both size and contribution to the benchmarks, while at the same time declining in quality. It requires a rigorous process to both evaluate opportunities and manage risks. Our objective in this discussion was to illustrate our broad framework and emphasize the depth of the resources and the experience our team provides. Our risk management process utilizes the concepts discussed in this paper as the framework for monitoring and assessing the investment risk of our credit exposure. This provides insights as we calculate and attribute returns on both the sector and security level.

It is important to emphasize this is only one aspect of portfolio construction. We will address sector allocation and portfolio construction more broadly in a subsequent paper. Our strategy is set with a top-down approach through a firm understanding of monetary and fiscal policy, inflation expectations, and volatility. This market outlook drives our sector allocations as well as the subsector decisions within credit, broadly along both industry and quality classifications. This provides a foundation for ensuring a consistent, repeatable investment process that has the potential to provide attractive risk-adjusted returns for our clients.

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- 1 For the Bloomberg indices, the non-corporate issuers break down into four separate categories: sovereigns, supranationals, foreign agencies, and foreign local governments. Sovereigns are issuers of foreign sovereign debt, denominated in U.S. dollars. This does not include obligations of the U.S. Treasury. For example, sovereign issuers would include Mexico, Colombia, and the Philippines. Supranationals are multi-national institutions such as the World Bank and the European Investment Bank. Foreign Agencies would include country-specific institutions that are wholly owned and managed by sovereign nations, such as KfW (a German credit institution) and Pemex (the Mexico's state-owned oil company). Foreign local governments include taxable U.S. municipal issuers and Canadian providences.
- 2 Moody's Latest *Annual Default Study* analyzes more than 30 years of data on defaults and ratings transitions. Baa3 issuers have a 13.9% cumulative default rate over a 20-year period, nearly 40% higher than Baa2 issuers. Similarly, Baa3 issuers are more than three times as likely to transition to a high-yield rating, on average, than Baa2 issuers.
- 3 The fundamental relationship of credit spreads to bond prices is known as spread duration. The price sensitivity of a bond to a change in its credit spread is similar to interest-rate risk. When credit spreads increase (indicating more credit risk), bond prices fall, and when credit spreads fall, prices rise. Here, we are using the term duration to represent spread duration, and the term contribution to duration to represent contribution to spread duration.

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An investment in a fixed income security is subject to interest rate risk, which is the possibility that an investment's yield will decline due to falling interest rates and the potential for bond prices to fall as interest rates rise. High yielding, non-investment grade bonds present a greater risk of loss to principal and interest than investment grade securities. The value of debt securities may be affected by the ability of issuers to make principal and interest payments and even the possibility that the issuer will default completely. Obligations issued by some U.S. government agencies and instrumentalities are backed by the U.S. Treasury. Obligations issued by other agencies (such as the Federal National Mortgage Association, the Federal Home Loan Mortgage Association and the Federal Home Loan Bank) are backed solely by the ability of the agency to borrow from the U.S. Treasury or by the agency's own resources.

A credit rating is a current opinion of the creditworthiness of an obligor with respect to a financial obligation. It takes into consideration the creditworthiness of guarantors, insurers, or other forms of credit enhancement on the obligation and takes into account the currency in which the obligation is denominated. Bond ratings are subject to change.

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