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A New Way to Set Issuer Limits in Corporate Credit Portfolios

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AT A GLANCE

- *Credit ratings are not always a reliable indicator of credit risk*
- *Credit spreads have been shown to predict spread volatility across credit classes*
- *Credit spreads can be used in place of credit ratings to determine maximum individual issuer limits*
- *This approach to position sizing can help improve the efficiency of portfolio management and protect portfolio performance in the event of a corporate blow-up*

Fixed income portfolio managers constantly grapple with the problem of setting appropriate issuer limits in corporate credit portfolios. However, in spite of its fundamental importance in portfolio management, most approaches to setting issuer limits are surprisingly crude. More often than not, limits are based simply on credit ratings, with a maximum exposure defined for each rating class: for example, AAA: 5%, AA: 4%, A: 2%, BBB: 1%. But credit ratings can be inaccurate, and can also be slow to reflect changes in credit quality. The most obvious examples include the AAA ratings of Enron prior to 2001, WorldCom before 2007, and most European sovereigns prior to 2010.

In this article, we describe an alternative approach to setting upper limits to the exposure to single issuers that is based on issuer spreads. It is rooted in the widely observed fact that many measures of spread risk, such as spread volatility and the distribution of spread changes, are proportional to absolute spread levels.

BACKGROUND: A SUMMARY OF SPREAD BEHAVIOR

It was shown as far back as 1999 that the volatility of US investment-grade corporate bond spreads is proportional to the spreads' absolute level. In the years since, this observation has been shown to hold in Europe as well as the US, and across industries, rating classes and maturities.

A useful rule of thumb emerges from these studies: over long horizons, the annualised volatility of a corporate bond spread is approximately 30% of its current level. For example, if a spread is 200 basis points (bps), its spread volatility will be about 60 bps per year. If the spread tightens to 100 bps, its spread volatility falls to about 30 bps per year, while if it widens to 400 bps, its spread volatility doubles to about 120 bps per year.

This observation has important implications for investors, and has in the past been used as an input in fixed income risk management software and analytic tools, and also as a measure to identify bonds that are expensive or cheap relative to their true probability of default.

DON'T FORGET TAIL RISK

But looking at spread volatility alone is not enough, in our view. We also need to take into account tail risk when setting issuer limits in credit portfolios – and credit tails can be very long.

With this in mind, we examined spread behaviour in two very different corporate bond indices: the Barclays US Corporate Index, which consists of US corporate bonds (looking at data from May 1993 to July 2013); and the JP Morgan CEMBI Index, which is made up of dollar-denominated emerging market corporate bonds (data from December 2001 to July 2013).

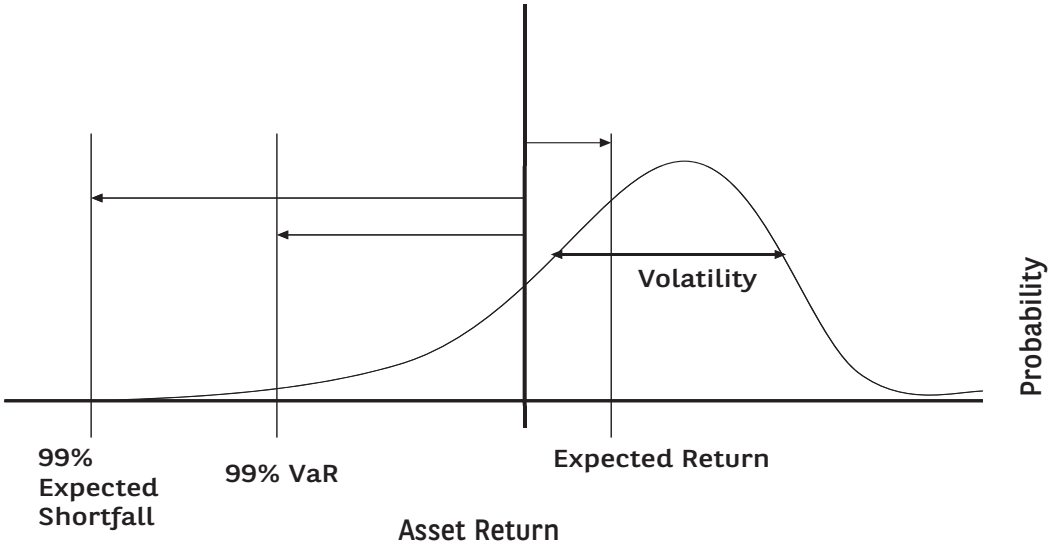
Our aim was to analyse tail risk in credit portfolios. We calculated the following for each index:

- The spread return (the percentage change in spread over a month) of each issuer in the index in each month
- The volatility of the spread returns over the periods analysed
- The range of monthly spread returns for all issuers in the indices trimmed at two percentiles: first the 1st and 99th, and then the 5th and 95th

Expected shortfall

The expected shortfall is a useful way to determine credit tail risk. In simple terms, the expected shortfall at the 1st / 99th level is the average spread return in a given month for the best 1% and worst 1% of issuers.

In our study we examined both tails (the best and worst cases) as our findings are applicable both to long-short portfolios and to long-only portfolios. The right tail (when spreads increase the most) is negative for a long portfolio, while the left tail (when spreads decrease the most) is negative for a short portfolio.



Source: BNP Paribas Investment Partners

The expected shortfall of monthly spread returns and spread changes at the same percentiles (1st/99th and 5th/95th). Our main findings were as follows.

- Despite the two indices differing widely in their construction and in the types of bonds they contain, the monthly spread returns of their constituents exhibit very similar patterns of behaviour. This suggests that our findings are applicable across credit types.
- Over the entire period, the volatility of spread returns for both indices is around 12% per month. When the sample is trimmed by 1% on each side, this figure falls to 10%, and when it is trimmed by 5%, it falls to 7%.
- The corresponding one-month expected shortfall levels at the 99% and 95% confidence limits (that is, the average spread return in the best and worst 1% and 5% of cases) are 45% and 26% respectively.

Table 1: Summary of monthly issuer spread return statistics: JP Morgan CEMBI index, December 2001 – July 2013 and Barclays US Corporate Index, May 1993 – July 2013

Parameter	Conditioning	Morgan CEMBI index: average	Barclays US Corporate Index: average
Mean monthly spread return	Including all observations	1.2%	1.3%
	Excluding largest and smallest 1% of observations	1.2%	1.3%
	Excluding largest and smallest 5% of observations	1.2%	1.3%
Monthly volatility (standard deviation) of spread returns	Including all observations	12.1%	11.3%
	Excluding largest and smallest 1% of observations	10.9%	8.5%
	Excluding largest and smallest 5% of observations	7.8%	6.1%
Monthly standardised range of spread returns	Including all observations	7.9 standard deviations	14.4 standard deviations
	Excluding largest and smallest 1% of observations	6.3 standard deviations	7.3 standard deviations
	Excluding largest and smallest 5% of observations	4.6 standard deviations	4.9 standard deviations
Monthly expected shortfall of spread returns	99% expected shortfall	43.6%	46.8%
	95% expected shortfall	27.7%	25.6%

Source: BNP Paribas Investment Partners, April 2014

These figures clearly show the long-tailed nature of corporate bond spreads in both indices: trimming only a small percentage of observations (the top and bottom 1% or 5%) on both sides of the distribution leads to a significant drop in the volatility and the range of spread returns, but has essentially no impact on the mean. If spread changes and returns were normally distributed, trimming 1% and 5% of the observations at each end of the distribution would reduce the estimated volatility only by 1.5% and 11.5% respectively, and not the 10–40% that we observe.

A SPREAD-BASED APPROACH TO ISSUER LIMITS

Based on our findings, we propose limiting the allocation to any single issuer in a credit portfolio such that when its spread return tightens or widens by the 1st or 99th percentile expected shortfall – a good approximation of what is likely to occur in the event of a credit blow-up – the impact on portfolio performance is not disproportionately large relative to the portfolio's annual return target.

This principle is broadly applicable – it is as valid for a long-only portfolio measured against a benchmark (in which case it is the relative allocation to an issuer that must be constrained) as it is for an absolute return vehicle (in which case it is the absolute allocation to an issuer that must be constrained).

While there is no universal definition of what constitutes a large loss for a portfolio, our suggestion is that the threshold be set at 10% of its annual excess return target. This is not so large that a portfolio becomes unsalvageable in the event of such a loss, and not so small that it limits a portfolio manager's ability to express his or her views.

Table 1 shows that the 1st and 99th percentile expected shortfalls correspond to proportional spread increases and falls of somewhat over 40% for both of the indices we analysed. For convenience, we have settled on 40% as a uniform measure of expected shortfall across all credit indices at a 99% confidence level. The return of a bond to a 40% change in its spread is easily computed, and after a series of straightforward steps we come up with the following formula to determine the maximum weight in any issuer:

Maximum single-issuer weight (%) = 500 / spread (bp) x target excess return (%)

In practice, this formula works well, provided that it is not applied to bonds that are deeply distressed, and we have used it to good effect in a wide range of portfolios that invest in both developed and emerging markets.

Two loose ends need tying up. First, as spreads rise and fall, our limit moves. This could induce unwarranted trading, so our solution is to grandfather positions – that is, once we have put a position on, we do not have to reduce it if the spread expands, and can only take it up as far as the initial limit if it tightens. We do make pragmatic exceptions in the event of significant spread moves or rating changes, such as a transition between investment grade and high yield.

Second, at low spreads, the maximum exposure according to our formula increases markedly, but a stricter limit to any single issuer is still necessary: bonds involve default risk as well as market risk, and can drop sharply in value in the event of an attempted leveraged buyout. So for investment-grade portfolios, which typically target a tracking error of around 1%, we suggest a limit of 1% for issuers rated BBB / Baa2 or lower, and 5% for all other issuers regardless of their rating or spread.

The much lower limit for issuers near the boundary between investment grade and high yield is because when issuers get downgraded and cross this boundary, their bonds fall out of many indices, and forced selling by investors with ratings constraints can easily depress the price of a bond by 5% and render it far less liquid. The maximum exposure to any single issuer in an investment-grade portfolio is the tighter of our spread-based limit and this ratings-based auxiliary limit.

Risk- and return-based limits are generally more pertinent to high yield investors than ratings, so we suggest that the auxiliary limit be twice the target annual excess return, as at this level a 40% change in spread should only have a limited impact on overall portfolio performance. This can be shown to be equivalent to a lower bound of 250bp on spreads. The maximum exposure for our high-yield portfolios is the tighter of our spread-based limit and this excess-return-based limit.

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In focus: divergences between spreads and ratings

The failure of credit rating agencies to realise the risk involved with companies such as WorldCom and Enron is well known, but there are lots of other less extreme examples of credit spreads – which essentially represent the market's view of risk – not corresponding to credit ratings.

The table below shows the distribution of current spreads in the JP Morgan CEMBI Broad Diversified Index split by Moody's ratings.

Spread (bp)	Aa	A	Baa	Ba	B	Caa
Tenth percentile	64	83	124	284	336	695
Mean	139	128	185	448	654	1767
Ninetieth percentile	200	184	229	679	916	3913

We can see from the table that the mean spread of A-rated bonds is lower than for Aa-rated issues. And there is substantial overlap of spread across ratings: a bond trading at 600bp could be a poor Ba, an average B or a good Caa.

There are a number of examples of our current holdings for which our spread-based approach produces different weights to a ratings-based limit:

- Gazprombank 7.875% 2018s is trading at 711bp while rated Baa3/BBB- (it is trading wide, so our spread-based limit is stricter)
- Pacific Rubiales Energy 5.375% 2019s is trading at 265bp while rated Ba2/BB+ (it is trading tight, so we can invest more in this bond than a ratings-based approach would allow)
- Electricidade de Caracas 8.5% 2018s trading at 1722bp while rated B- (trading wide; our limit is stricter).

Source: Barclays POINT, end of March 2014

THE BENEFITS OF A SPREAD-BASED APPROACH TO CREDIT POSITION SIZING

We have been using this methodology to size our credit positions across a wide range of portfolios for nearly three years, and have achieved a sensible level of diversification – neither concentrating too much in a small number of positions, nor creating an unmanageably large number of lines.

An important benefit of this approach is that it is adaptable. Investors can modify our formula to suit their particular requirements, and the technique can be easily extended to produce industry, sector and country limits by substituting the issuer spread in our formula with the weighted-average spread of the holdings in the industry, sector or country.

The idea behind our technique is twofold. First, it enables more efficient portfolio management by allowing us to invest more in bonds with a low chance of suffering a major credit event than a ratings-based limit might allow – and less in bonds with a higher chance of blowing up than a rating might suggest. Second, it minimises the impact on our portfolios were any of our holdings to blow up. Blow-ups, of course, are rare events, but when they do occur they can have a severe impact on a portfolio's performance. So while it is difficult to show the benefits of this on our portfolio in terms of increased return or reduced volatility, we remain mindful of the fact that over the long run, blow-ups do occur, and it wise to prepare for them in advance.

A full article on this subject matter appears in the *Journal of Investment Management.* Please click below to read it:
http://institutional.bnpparibas-ip.com/wp-content/uploads/2014/05/p0443.pdf

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BIOGRAPHIES

Thomas Philips, PhD, Global Head of Investment Risk, BNP Paribas Investment Partners – Institutional Business Line

Thomas Philips is the Global Head of Investment Risk for the institutional business line of BNP Paribas Investment Partners. In this role he manages the investment risk of the equity and fixed income businesses, including FFTW, the fixed income partner of BNP Paribas Investment Partners. He was appointed to this position in September 2013 and his based in New York.

Prior to his current position, Tom was the Head of Risk and Performance Control for FFTW for four years and before that he was the Senior Risk Manager for its sister firm, Malbec Partners, which was focused on hedge funds. Tom joined Malbec in 2008 from OTA Asset Management, where he was Head of Investment Strategy and Risk Control. Prior to working at OTA, he was the Chief Investment Officer at Paradigm Asset Management and a Managing Director at Rogers, Casey and Associates. He started his career in Finance at the IBM Retirement Fund. Tom has 22 years of investment experience.

Tom has an MS Degree and PhD in electrical and computer engineering from the University of Massachusetts as well as a BS Degree in electrical engineering from Benares Hindu University in India. He won the first Bernstein/Fabozzi/Jacobs-Levy Prize for his article "Why Do Valuation Ratios Forecast Long-Run Equity Returns" and the Graham and Dodd Scroll award for "Saving Social Security: A Better Approach", which he co-authored with Arun Muralidhar.

Miikka Taurén, PhD, Senior Risk Manager

Miikka works in the Investment Risk and Analytics group at FFTW, where he monitors and manages market risk. He joined FFTW's London office in 2011.

Prior to joining FFTW, Miikka was a Vice President at JPMorgan Chase, where he served as the European Head of Market Risk for Flow Credit Products. Prior to JPMorgan, Miikka spent 5 years at Credit Suisse as the Global Head of Market Risk for Credit Products, and was a Fixed Income Credit Strategist at Citigroup. Miikka began his financial career as a Risk Analyst at Deutsche Bank. He has 21 years of investment experience.

Miikka has a PhD in Finance from Indiana University and an M.Sc. in Finance from the Helsinki School of Economics and Business Administration.

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