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Key Points

- The managed futures asset class is almost perfectly uncorrelated to various types of credit instruments over the long run, making it an excellent diversifier to a credit portfolio.
- Despite the fact that there are no liquid credit futures for managed futures programs to short, managed futures has historically demonstrated “crisis alpha” by performing well during the most severe credit drawdowns.
- The managed futures category has demonstrated positive convexity relative to credit instruments, having higher correlation and beta during up-periods and lower correlation/beta during down-periods for credit.

Introduction

Numerous articles and whitepapers discuss the ability of managed futures to act as a diversifier in normal times and as a crisis hedge during downtrends in equities.¹ In a prior research note, we determined that managed futures tend to outperform other asset classes during a rising interest rate environment.² In other words, not only is managed futures uncorrelated over the long term to both equities and interest rates (i.e., it is a good diversifier *per se*), but it has exhibited positive convexity to both asset classes, tending to be more highly correlated in up periods and less correlated or even negatively correlated in down periods for these traditional categories—even strongly negatively correlated when those asset classes are in a severe downtrend.

While the former characteristic (diversification) requires only that managed futures provide uncorrelated return streams, one plausible explanation for the latter phenomenon (“crisis alpha”) is that managed futures programs have at their disposal instruments (i.e., equity futures and fixed income futures) that allow them to short equities, short-term rates, or sovereign fixed income outright when those asset classes experience downtrends. However, there are no liquid futures contracts on credit instruments.³ That fact alone lends plausibility to the proposal that managed futures would be a good *diversifier* to a credit portfolio (since pure diversification requires non-correlation, which is highly probable given the lack of credit in a managed futures program⁴). However, given that managed futures cannot take outright short positions in credit-related instruments, is there any possibility for managed futures to offer credit “crisis alpha”?

This note will examine the empirical evidence for diversification and crisis alpha relative to three categories of credit instruments: Investment grade corporate bonds (IGs), high yield corporate bonds (HYs), and municipal bonds (Munis). For this research, IGs are represented by the Barclays Corporate Investment Grade Index, HYs are represented by the Barclays Corporate High Yield Index, and Munis are represented

¹ For example, see the following:

- Abrams, Ryan, et al, “Lintner Revisited: A Quantitative Analysis of Managed Futures in an Institutional Portfolio,” CME Group, 26 April 2012: <http://www.cmegroup.com/education/lintner-revisited-a-quantitative-analysis-of-managed-futures-in-an-institutional-portfolio.html>
- Kaminski, Kathryn, “In Search of Crisis Alpha: A Short Guide to Investing in Managed Futures,” CME Group, 5 April 2011: <http://www.cmegroup.com/education/featured-reports/in-search-of-crisis-alpha.html>

² “Managed Futures & Rising Rates,” Aspen Partners, December 2013: <http://www.aspenpartners.com/content/Docs/Aspen-ManagedFuturesRisingRates-2013-12.pdf>

³ As of this writing, CDS-based futures are available on the Intercontinental Exchange (ICE), but they are so thinly traded as to be inaccessible for all but the most low-turnover or low-AUM managed futures programs.

⁴ Some managed futures mutual funds hold credit instruments as part of their cash management strategy. However, as these are static long-only holdings, they are counter-productive to the goals of diversification and crisis alpha relative to a credit portfolio.

by the Barclays Municipal Bond Index. The managed futures category is represented by the BTOP50 Index, calculated by BarclayHedge (no relation to Barclays Bank, which maintains the three bond indices).⁵

Managed Futures as a Credit Diversifier

As noted above, the primary characteristic of a good diversifier is low correlation. Table 1 shows the correlation of managed futures to the three credit categories, using monthly returns since January 1987 (the inception of the BTOP50 Index).

Table 1: Correlation of Managed Futures and Investment Grade, High Yield, and Municipal Bonds

Correlation	Managed Futures	IG Bonds	HY Bonds	Muni Bonds
Managed Futures	1.00	0.15	-0.10	0.15
IG Bonds	0.15	1.00	0.51	0.72
HY Bonds	-0.10	0.51	1.00	0.32
Muni Bonds	0.15	0.72	0.32	1.00

The lowest correlation among the three credit categories is HY's 0.32 correlation to Munis. This is not a high figure, and it suggests that a credit investor can benefit from combining various types of credit into a single portfolio. However, the correlation of managed futures to each of the income categories is effectively zero. At 0.15, the correlation of managed futures to IG bonds represents an explanatory power (R-squared) of only about 2%. Managed futures is clearly a good diversifying investment to a credit portfolio.

Diversification is a powerful tool in portfolio construction. In a sense, it is the only “free lunch” in investment finance, since a portfolio that combines two assets will give the weighted average return for the two assets, but will have a volatility that is lower than the weighted average standard deviation of the two assets, provided the assets are less than perfectly positively correlated. Mathematically, for investments A and B with stand-alone expected return R_A and R_B , stand-alone volatility σ_A and σ_B , and correlation ρ_{AB} , in a portfolio with weightings w_A and w_B , the expected return is just:

$$R_{AB} = w_A R_A + w_B R_B$$

The expected variance (standard deviation squared) is:

$$\sigma_{AB}^2 = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2w_A w_B \sigma_A \sigma_B \rho_{AB}$$

If $\rho_{AB} = 1$, then $\sigma_{AB} = w_A \sigma_A + w_B \sigma_B$, but if the correlation is less than perfectly positive (i.e., less than 1), the standard deviation will be less than that amount (i.e., less than the weighted average standard deviation).

Using the historical returns, standard deviations, and correlations of managed futures, IGs, HYs, and Munis, we can calculate the following expected portfolio returns and standard deviations for portfolios that are composed of 80% credit / 20% managed futures:

⁵ Data source for all indices: Bloomberg; all series are total return indices.

Table 2: Expected Portfolio Statistics for 80% Credit/20% Managed Futures (MF) Portfolios

	IG	MF	HY	MF	Muni	MF
Annualized Return	7.06%	8.09%	7.99%	8.09%	6.12%	8.09%
Standard Deviation	5.33%	9.87%	8.67%	9.87%	4.45%	9.87%
Sharpe(T-Bill)	0.71	0.49	0.54	0.49	0.64	0.49
Correlation	0.15		-0.09		0.14	
Expected Portfolio Return	7.27%		8.01%		6.52%	
Expected Portfolio Std. Dev.	4.97%		7.05%		4.31%	
Expected Portfolio Sharpe	0.78		0.66		0.72	

Unremarkably, in all three cases the expected 80/20 portfolio return, per portfolio theory, is between the stand-alone returns of the credit category and the managed futures index. What is more notable about these results is that in all three cases the expected volatility of the combined portfolio is lower than the volatility of the stand-alone credit series, despite the fact that the stand-alone volatility of managed futures is higher than that of all three credit series. The result is meaningfully higher Sharpe ratios for all three portfolios relative to the stand-alone credit Sharpe ratios.

These results illustrate the “free lunch” effect of diversification using uncorrelated asset classes. Note that these results are obtained assuming that there is no “crisis alpha” and no positive convexity for managed futures relative to credit. i.e., the correlation of managed futures to the credit categories is assumed to be invariant under up/down return regimes for the categories. We will revisit these assumptions below.

Managed Futures and Credit “Crisis Alpha”

The lack of correlation between managed futures and credit is sufficient to achieve improvements in risk-adjusted returns through their combination in a portfolio, but the question still remains whether managed futures can produce “crisis alpha” relative to credit instruments, as it is famous for doing relative to equities. In brief, “crisis alpha” refers to the ability of managed futures to produce meaningfully positive returns in periods when traditional assets are going through major drawdowns.⁶ Whereas managed futures tends to be merely uncorrelated to traditional assets over the long run, it tends to be negatively correlated during crises, and that return characteristic enhances the diversification attractiveness of the asset class beyond what low correlation alone would imply.

As noted in the introduction, one plausible explanation for the ability of the managed futures asset class to produce positive returns during drawdowns for equity or interest rate instruments is that there are futures contracts tied directly to those traditional asset classes, and managed futures programs can take an outright short position that profits directly from those drawdowns. The same argument does not apply to credit, since there are no liquid futures contracts tied to the returns of credit instruments.⁷ Given this potential handicap, does managed futures have any chance of generating crisis alpha for a credit portfolio? The empirical evidence indicates that indeed it does.

Consider Tables 3, 4, and 5, which show the performance of managed futures during the ten largest drawdowns for IG, HY, and Muni bonds, respectively.

⁶ Kaminski, “In Search of Crisis Alpha”; see also the Aspen Partners research note “Managed Futures ‘Crisis Alpha,’ What It Is and What It Isn’t”: <http://www.aspenpartners.com/content/Docs/Aspen-CrisisAlpha-2013-05.pdf>

⁷ See footnote 3 above.

Table 3: Managed Futures Returns During 10 Largest Investment Grade Drawdowns, 1/1987 through 12/2016

BTOP50 during deepest Barclays IG Drawdowns					
	Depth	Peak	Trough	Months	BTOP50
1	-15.4%	Feb-08	Oct-08	15	2.3%
2	-6.8%	Jan-94	Jun-94	14	4.7%
3	-6.2%	Feb-87	Sep-87	10	22.3%
4	-5.0%	Apr-13	Jun-13	11	-2.9%
5	-4.6%	May-03	Jul-03	6	-4.2%
6	-4.2%	Jan-96	May-96	8	-3.0%
7	-4.0%	Jan-99	Aug-99	17	5.8%
8	-3.8%	Mar-04	May-04	4	-5.6%
9	-3.8%	Jan-15	Jun-15	13	-6.9%
10	-3.7%	Aug-16	Nov-16	4	-4.6%
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Average	-5.8%			10	0.8%

Given the relatively low-volatility nature of investment grade corporate debt, most of the drawdowns in Table 3 are probably too small to be considered crises, but in the IG drawdowns of 6% or greater magnitude, managed futures offset those losses with positive return in all three cases. Although results are less compelling for the smaller drawdowns, managed futures still manages a positive average return over the full set of ten drawdowns. (Notable aside: The two most recent IG drawdowns were actually driven primarily by rising base interest rates. The losses in BTOP50 over those periods are probably partly driven by long fixed income biases among many modern CTAs—a topic we address in detail elsewhere.)

Table 4: Managed Futures Returns During 10 Largest High Yield Drawdowns, 1/1987 through 12/2016

BTOP50 during deepest Barclays HY Drawdowns					
	Depth	Peak	Trough	Months	BTOP50
1	-33.3%	May-07	Nov-08	26	16.4%
2	-17.2%	Jul-90	Oct-90	7	9.6%
3	-12.0%	Feb-01	Jul-02	24	12.2%
4	-9.7%	May-15	Jan-16	12	0.6%
5	-8.9%	Apr-99	Nov-00	21	-3.5%
6	-8.0%	Aug-89	Feb-90	10	0.5%
7	-7.1%	Jul-11	Sep-11	5	-0.3%
8	-7.0%	Jul-98	Oct-98	8	12.4%
9	-6.9%	Mar-87	Oct-87	9	19.7%
10	-4.7%	Jan-94	Apr-94	12	-0.9%
<hr/>					
Average	-11.5%			13	6.7%

Of the three credit categories, high yield debt is most prone to substantial, prolonged drawdowns. In response, managed futures is most likely to produce offsetting, sizable gains. Seven of the ten largest drawdowns for high yield were offset by gains in managed futures. Moreover, of the three drawdowns for which managed futures posted losses, the average managed futures loss was only 1.6%, and was always substantially smaller than the high yield loss. Conversely, the average BTOP50 gain in the HY drawdown periods where managed futures was up, was 10.2%. Once again, managed futures generated strong, positive returns for each of the three largest drawdowns in this credit category. For what it's worth, high yield bonds are the most equity-like of the three credit categories. The largest high yield drawdowns tend to happen at the same time as equity drawdowns as a result of a negative financial backdrop that causes equity values to decline while default pressure on junk-rated debt tends to increase. Consequently, it is not surprising that the well-documented crisis alpha managed futures offers for equities would carry over to the largest drawdowns experienced by high yield debt.

Table 5: Managed Futures Returns During 10 Largest Municipal Bond Drawdowns, 1/1987 through 12/2016

BTOP50 during deepest Barclays Muni Drawdowns					
	Depth	Peak	Trough	Months	BTOP50
1	-8.3%	Jan-94	Nov-94	13	2.8%
2	-6.5%	Feb-87	May-87	10	17.6%
3	-6.2%	Apr-13	Aug-13	11	-5.2%
4	-5.7%	Aug-08	Oct-08	5	4.9%
5	-5.2%	Aug-16	Nov-16	4	-4.6%
6	-5.0%	Aug-10	Jan-11	10	4.0%
7	-4.6%	Jan-08	Feb-08	6	4.8%
8	-3.9%	May-03	Jul-03	5	-4.2%
9	-3.6%	Jan-99	Jan-00	16	4.5%
10	-3.1%	Feb-04	May-04	5	-6.4%
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Average	-5.2%			9	1.8%

In the case of municipal bonds, managed futures posted negative returns in four of the ten largest bond drawdowns; however, two of those negative returns occurred during relatively small -3.1% and -3.9% drawdowns for Munis.

Another evidence for crisis alpha potential is convexity, which is the degree to which managed futures (or any diversifier) has higher correlation and beta during up-periods for traditional markets and lower correlation/beta during down-periods.⁸ Table 6 splits the correlation and beta of managed futures into up and down periods for the three credit bond categories.

Table 6: Managed Futures Correlations During All, Up, and Down Periods for Credit Categories

	Investment Grade Correlation/Beta		
	Overall	Up-Period	Down-Period
BTOP50 Correl.	0.15	0.14	-0.08
BTOP50 Beta	0.28	0.38	-0.19
	High Yield Correlation/Beta		
	Overall	Up-Period	Down-Period
BTOP50 Correl.	-0.10	-0.02	-0.36
BTOP50 Beta	-0.11	-0.04	-0.44
	Municipal Bond Correlation/Beta		
	Overall	Up-Period	Down-Period
BTOP50 Correl.	0.15	0.24	-0.17
BTOP50 Beta	0.33	0.88	-0.47

Relative to all three credit bond categories, managed futures shows higher correlation and higher beta during up-periods and lower correlation and lower beta during down-periods, and by no small margin.

⁸ For further discussion on convexity, see the Aspen Partners whitepaper, "The Ultimate Diversifier": <http://www.aspenpartners.com/content/Docs/Aspen-MFBI-UltimateDiversifier-2013-12.pdf>; see also the following research paper, which demonstrates that higher up-beta than down-beta is a mathematical indicator of successful market-timing: Henriksson, Roy D. and Robert C. Merton, "On Market Timing and Investment Performance. II. Statistical Procedures for Evaluating Forecasting Skills," *The Journal of Business*, Vol. 54, No. 4, (October 1981), pp. 513-533: <http://www.people.hbs.edu/rmerton/onmarkettimingpart2.pdf>

Combining Credit Instruments and Managed Futures in a Portfolio

Table 7 shows how a portfolio that includes a 20% allocation to managed futures, rebalanced monthly, would have performed historically relative to a stand-alone allocation to investment grade, high yield, and municipal credit.

Table 7: Credit Portfolios With and Without a 20% Managed Futures Allocation, 1/1987 through 12/2016

	100% IG	80% IG / 20% MF	100% HY	80% HY / 20% MF	100% Muni	80% Muni / 20% MF
Annualized Return	7.03%	7.24%	8.28%	8.31%	5.92%	6.35%
Standard Deviation	5.31%	4.95%	8.60%	6.97%	4.47%	4.33%
Sharpe(T-Bill)	0.58	0.66	0.50	0.62	0.44	0.55
Max Drawdown	-15.42%	-11.97%	-33.31%	-25.74%	-8.26%	-6.06%

In every case, the 80/20 portfolio has lower volatility than does the stand-alone credit category. As noted above, this is true despite the fact that stand-alone managed futures volatility is higher than that of any of the credit indices. Interestingly, in every case, the 80/20 portfolio volatility turns out to be exactly what was predicted in theory, thanks to the power of non-correlation and diversification.

The portfolios' absolute returns, however, do not match the theory—they exceed it. This is the beauty of convexity. Because the correlation of managed futures to credit is higher in up-periods and lower in down-periods for credit, the inclusion of managed futures in a credit portfolio tends to accentuate runups and dampen drawdowns, with the result that the overall long-run standard deviation is as predicted in theory, but it is more concentrated to the upside and less to the downside than predicted—resulting in higher than predicted long-run portfolio return. Note that even high yield, the one credit category whose stand-alone return was higher than that of managed futures, sees its absolute return improve slightly with the addition of managed futures. And needless to say, all three 80/20 portfolios have Sharpe ratios that are higher than predicted, let alone higher than is produced by the credit instruments on their own.

Finally, notice the effect on max drawdowns. Even though the weighting to managed futures is only 20%, the max drawdowns of all three series are reduced by more than 20% in magnitude. This is the mark of crisis alpha, and it demonstrates the power of including a convex diversifier like managed futures in a credit investment portfolio.

Important Disclosures

Past performance is no guarantee of future results.

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Data has been obtained from reliable sources. Aspen Partners believes the information herein to be reliable; yet no warranty or guarantee is made as to its accuracy or completeness.

These benchmarks are unmanaged and do not represent the attempt of any manager to generate returns on an investment. These benchmark indices do not include transaction costs, fees, and other expenses. An investor cannot invest directly in an index.

Benchmarks & Indices

“IG Bonds” represents the Barclays Corporate Investment Grade Index, an unmanaged index consisting of publicly issued US Corporate and specified foreign debentures and secured notes that are rated investment grade (Baa3/BBB- or higher) by at least two ratings agencies, have at least one year to final maturity and have at least \$250 million par amount outstanding.

“HY Bonds” represents the Barclays Corporate High Yield Index, an index of fixed rate, non-investment grade debt, including corporate and non-corporate sectors.

“Managed Futures” represents the Barclay BTOP50 Index, an index of the largest investable CTA programs, as measured by assets under management.

“Muni Bonds” represents the Barclays Municipal Bond Index, a market value weighted index of investment grade municipal bonds with maturities of one year or more.

These Benchmarks are unmanaged and do not represent the attempt of any manager to generate returns on an investment. These benchmark indices do not include transaction costs and other expenses.

Definitions

Annualized Return: The year-over-year growth rate of an investment over a specified period of time. The rate of return that, if compounded every year, would have produced the same total return as was produced by the investment.

Correlation: A statistical measure of how an index moves in relation to another index or model portfolio.

Maximum Drawdown: The greatest peak-to-trough decline during a specific period of an investment.

Sharpe Ratio: A measurement of risk-adjusted performance which subtracts the “risk-free” rate of return from an investment’s performance.

Standard Deviation: A measurement of the annual rate of return’s dispersion from its mean, indicating an investment’s volatility.