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Quantitative Portfolio Strategy

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A Case for Rates Derivatives in Active Credit Portfolios

- Interest rate derivatives such as Treasury futures or interest rate swaps can effectively separate corporate bonds' credit spread from rates exposures. While most investors recognize the advantages of separating credit and rates factors, some are still restricted from using rates derivative overlays. We argue that this restriction often results in opportunity costs in the form of diluted alpha.
- We show that rates and credit strategies tend to add value in different periods. Credit spreads tend to rally in periods of low and rising interest rates and tighten when interest rates are high or in decline.
- We also find that rate and spread steepeners tend to be negatively correlated and add value over different periods. Credit spread slopes tend to steepen while the Treasury curve flattens. Investors are therefore justified to implement outright or slope views on rates in isolation from similar views on credit spreads.
- In the absence of synthetic rates overlay, creating intended (rates or spread) exposures requires complex portfolio reallocation across various maturity and quality cells. This often results in unintended risks related to significant shifts to maturity and quality subsets of the portfolio. These biases make implementation of intended strategies in rates and credit imperfect, which often results in diluted alpha.
- We use historical simulations with imperfect foresight to estimate the cost of the "no derivatives" constraint. We find a 40% reduction in the historical risk-adjusted returns of an outright credit timing strategy in the past 26 years. The cost is even higher for credit and rate slope strategies.

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Introduction

Credit portfolio managers often use rates derivatives to separate spread from rate exposures, and manage active credit and rate views independently from each other. Indeed, by utilizing derivative overlays, a portfolio manager is able to hedge out rate exposure and express a credit view on an isolated basis. For example, a portfolio manager who wants to increase credit exposure by buying long-maturity fixed-coupon corporate bonds can hedge the resulting exposure to rates with government bond futures or interest rate swaps.

While many institutional credit investors use synthetic rates overlays, investment constraints often limit the use of derivatives. Such constraints are typically motivated by aversion to leverage or to the perceived complexity of derivatives.

At the same time, opportunities in rates and credit tend to be negatively related. Panel A of Figure 1 shows that historical Treasury yields and corporate spreads tend to move in opposite directions: periods of high spreads usually coincide with periods of relatively low Treasury yields and vice versa. For an investor wishing to take advantage of high carry, the opportunities in Treasury yields and corporate spreads come at different times. For example, Treasury yields were high in 1999-2000 and 2006-2007, while credit spread carry peaked in 2001-2002 and 2008-2009.

Panel B of Figure 1 plots the slopes of US Treasury yield and of US corporate spread curves. It clearly illustrates that the rates and spread slopes are negatively related: periods of relatively high roll-down in spreads coincide with periods of low roll-down in rates and vice versa.

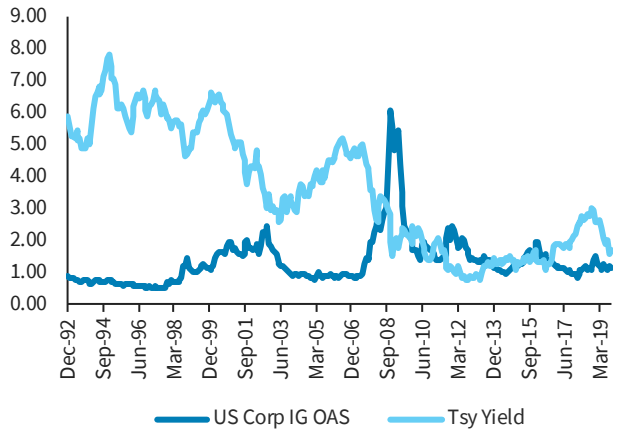
Figure 1 illustrates that investment opportunities in credit and rates, associated with the level or the slope of rates and spreads, can come at different times. As a result, the rates and credit components of corporate bond returns are usually negatively correlated. Taking advantage of these opportunities requires separating the spread from the rates components of corporate bonds. This can be achieved by using rates derivatives.

FIGURE 1

The levels (Panel A) and slopes (Panel B) of US Treasury yields and US corporate spreads have been negatively related

PANEL A

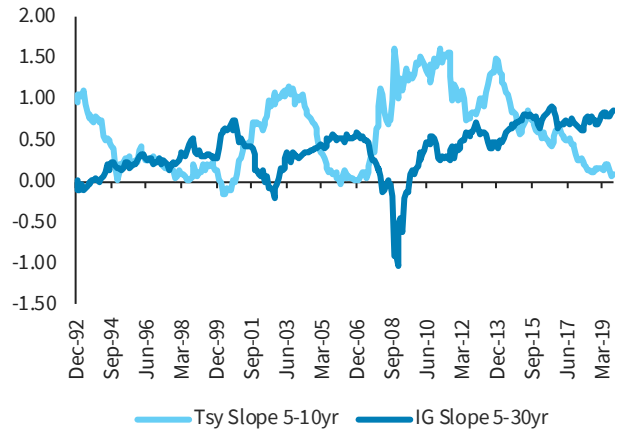
Yield to Worst of the Bloomberg Barclays US Corporate Index and OAS of the Bloomberg Barclays US Corporate Index



Source: Bloomberg, Barclays Research

PANEL B

Slopes of US Treasury Yield and US Corp Spread Curves



Note: US Treasury slope is measured as the difference between yields to worst of the Bloomberg Barclays 3-5 and 7-10 Year US Treasury indices. The credit spread slope is measured as the difference between the average OA spreads of senior bonds with maturities between 4-6 and 25-30 years issued by the same issuers. Source: Bloomberg, Barclays Research

Managing rates and credit views independently can be challenging without rate derivative overlays because fixed coupon corporate bonds bundle together spreads and rates exposures: investors who buy long-dated corporate bonds with a view to increase credit exposure simultaneously increase portfolio duration as a by-product.

In this report we explain that active management of credit portfolios is likely to benefit from separating spread and rates exposures using derivative overlays, especially when directional credit or spread slope strategies are considered.

We also show that it may be possible to overweight (underweight) different buckets of the corporate bond index to achieve a desired exposure tilt while remaining neutral high-level credit or rates exposures, but such indirect, bond-only, strategies can entail significant unintended risks and can perform differently from strategies that employ rates derivative overlays.

We use historical simulations with imperfect foresight to demonstrate that excluding rates derivative overlays results in significant alpha dilution, as bond-only rates or credit strategies come with unintended effects on portfolio allocation and performance.[1]

The report is organised as follows. The next section investigates rates and spread premia embedded in the IG corporate bond index and documents a negative correlation between the two. We then discuss how spread and rates macro-strategies can be implemented either with rates derivative overlays or with cash bonds only, and show how such implementation choices can result in different performance outcomes. After that, we simulate active strategies with imperfect foresight to quantify the reduction in performance associated with limits on derivatives overlays. The final section concludes.

Rates and Credit Spread Premia in the US Credit Market

Fixed coupon corporate bonds bundle together exposures to interest rates and to credit spread. These two components of risk are well understood by investors and bond index providers who report excess returns of corporate bonds over duration-matched Treasuries in addition to total returns. The difference between corporate bond total and excess returns is attributed to changes in Treasury rates, so we call this component *rate returns*.

While Figure 1 in the previous section shows that rates and corporate spreads as well as spread and rates slopes tend to be negatively related, observing strategy returns directly is more intuitive to investors. For this, we take the Bloomberg Barclays IG corporate bond index as a reference universe and monitor the returns of four strategies, which represent macro allocation views often used in corporate bond portfolios:

1. Long credit, represented by the excess returns of the index over duration-matched Treasury bond portfolios.

2. Long duration, represented by the rates returns of the index calculated as the difference between total and excess returns.

3. Excess returns of a 5-10y credit steepener[2] calculated as the difference between excess returns of corporates bonds in the 4-6y maturity bucket and excess returns of corporate

[1] Our analysis does not consider leverage of exposure limits and is, therefore, conservative. For an analysis of the cost of leverage constraints in duration timing, see chapter 3 of *Quantitative Management of Bond Portfolios*, Princeton University Press, 2007

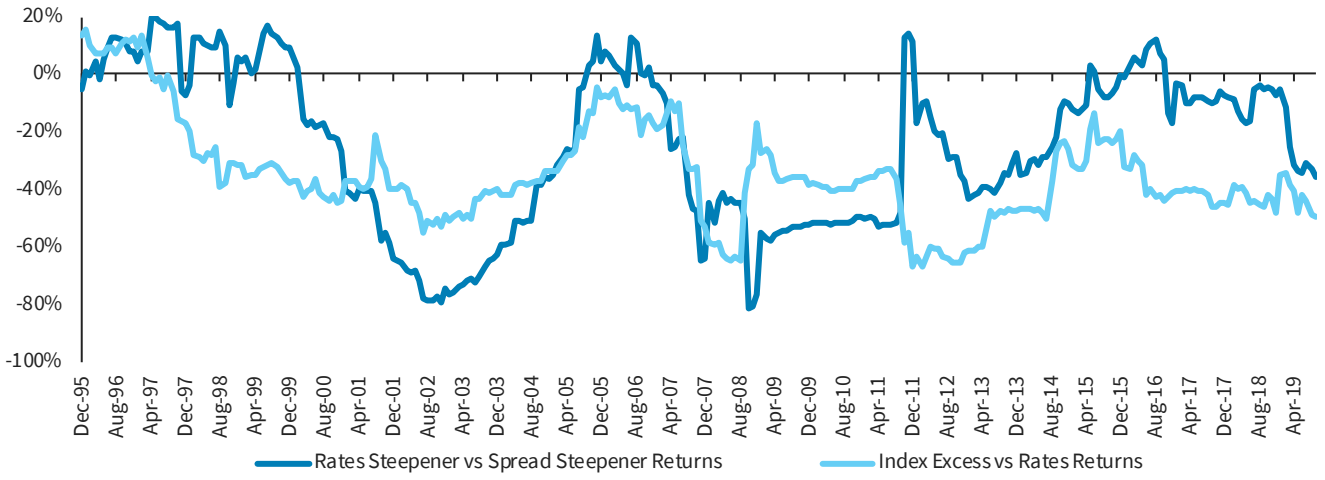
[2] Previous research has documented persistent outperformance of short over long dated credit portfolios. See a.o. *Maturity Dependence Of Corporate Bond Returns*, Barclays Research 2019 and *Do Short-Dated Corporates Outperform Long-Dated Corporates? A DTS^{SM}-Based Study*, Barclays Research 2008. Our objective here is to focus on how one can implement active dynamic strategies that involve timing exposures as opposed to the properties of stable exposures to credit steepeners.

bonds in the 9-11y maturity bucket (duration-matched). The population of bonds in the two buckets is issuer-controlled[3].

4. Returns of a 5-10y rates steepener calculated as the difference between unfunded rates returns of corporates bonds in the 4-6y and in the 9-11y maturity bucket (duration-matched). Unfunded rates returns are obtained by subtracting T-Bill returns from rates returns.

Figure 2 reports historical rolling correlations between monthly rates returns and credit excess returns of the corporate bond index on one hand, and between rates and spread curve steepeners on the other hand. These correlations are predominantly negative, indicating that rates and credit strategies tend to perform well in different periods.

FIGURE 2
Rolling 36-Month Correlations Between Credit and Rates Strategy Returns



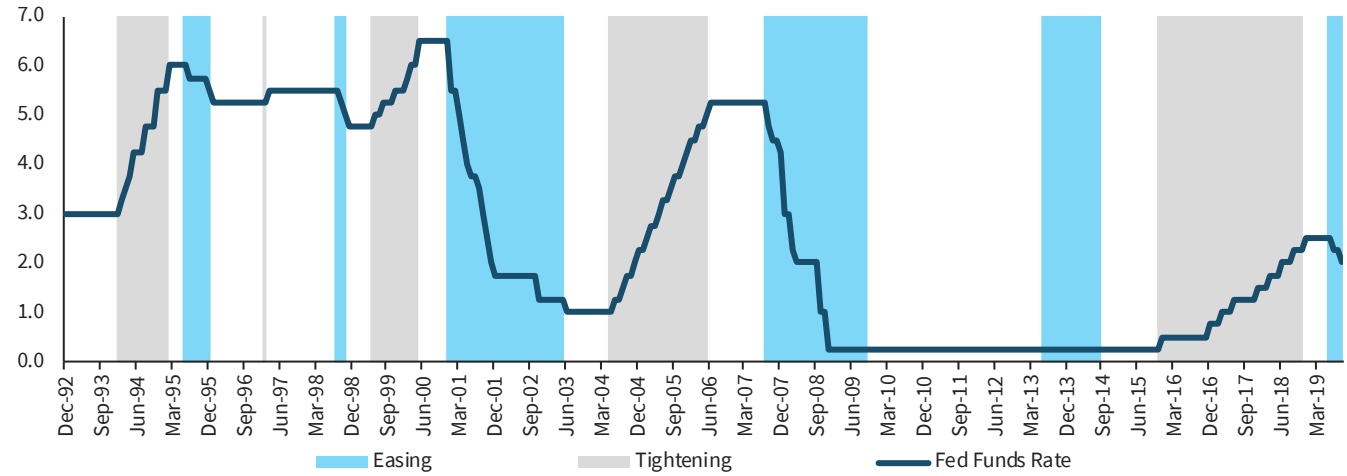
Source: Barclays Research

To document more precisely the relative performance patterns of rates and credit strategies, we consider different monetary and market environment regimes. Monetary regimes are determined from the evolution of Fed fund rates. Monthly observations are categorized as belonging to "easing" or "tightening" periods, depending on the path of Fed fund rates, as shown in Figure 3. Specifically, periods of rising Fed fund rate are labelled as "tightening", while periods of declining Fed fund rate are labelled as "easing".[4] In addition, transition periods following easing and tightening episodes are respectively labelled "post-easing" and "post tightening"

[3] Only issuers with bonds outstanding in both maturity ranges are included. Issuers are equally-weighted. Subordinated bonds are excluded.
[4] Post-2009 periods which are characterized by the annual growth of Fed balance sheet faster than 20% p.a. are also categorized as "easing".

FIGURE 3

Periods of monetary tightening or easing versus evolution of the Fed Funds rate



Source: Bloomberg; Barclays Research

Market environment regimes reflect the evolution of the slope of the Treasury curve over time. They allow for an alternative partition of historical observations based on market parameters that have a direct impact on curve strategy returns. For this we consider changes in the 5-10y slope of the US Treasury yield curve, as illustrated in Figure 4.

FIGURE 4

Periods of increasing or decreasing 10-5y slope of the US Treasury curve

Source: Barclays Research

For each one of these two sets of regimes, monetary or yield curve slope, Figure 5 reports average returns and information ratios of our four strategies. Shaded areas show that:

1. The outright credit strategy tends to outperform in Fed tightening and post-easing periods, while the outright rates strategy tends to underperform. In contrast, the outright credit strategy tends to underperform during Fed post-tightening and easing, when the outright rates strategy performs particularly well.

2. The credit steepener tends to outperform in periods when the slope of the Treasury yield curve declines, while the rate steepener (by definition) outperforms when the Treasury yield curve slope increases.

FIGURE 5

Performance of generic credit and rates strategies in monetary and yield curve regimes, January 1993 – September 2019

	Average Return (%/y)				Information Ratio			
	Index Excess Return	Index Rates Return	Credit Steepener	Rates Steepener	Index Excess Returns	Index Rates Returns	Credit Steepener	Rates Steepener
FED Monetary Regime								
FED Easing	0.19	**7.00**	0.48	1.26	0.03	**1.31**	0.29	**0.77**
Post-Easing	**1.79**	2.17	1.09	0.17	**0.59**	0.42	**1.87**	0.16
FED Tightening	**0.64**	-1.73	0.56	-0.66	**0.30**	-0.43	**1.38**	-0.96
Post-Tightening	-0.47	**6.83**	0.53	0.27	-0.24	**1.58**	**1.56**	0.46
Treasury Curve Regime								
Treasury curve flattens	0.63	3.98	**0.92**	-0.84	0.21	0.88	**1.93**	-0.99
Treasury curve steepens	-1.95	1.72	-0.28	**2.17**	-0.38	0.34	-0.20	**1.48**

Source: Barclays Research

In the bottom section of Figure 5, the average returns of rates and spread slope strategies have opposite signs in each of the two Treasury slope regimes considered. This means that implementing a rates curve steepening strategy with corporate bonds is highly likely to deliver a worse performance than implementing the same strategy with just Treasury instruments.

The fact that credit and rates exposures diversify each other often helps corporate bond indices deliver higher risk-adjusted returns than comparable government bond benchmarks. From the perspective of active investors, however, it is clear that spread and rates exposures belong to different strategies. This requires separating corporate bonds exposures, typically implemented with the help of rate derivative overlays.

If investment constraints prevent the use of rate derivatives, it is still possible to design strategies that over and under-weight corporate bonds to achieve a target net exposure to rates (or spreads) while remaining neutral to spreads (or rates) at a high level. But, as we show in the next section, such strategy implementations often entail unintended allocation shifts at a lower level of portfolio construction and are therefore likely to deliver different returns from intended ones, which could be obtained using rates derivatives.

Implementing Active Macro Credit and Rates Strategies

As we saw in the previous section, rate and spread strategies are different in nature given the negative correlations between changes in their level and in their slope. Interest rates and credit spreads are embedded in the pricing of fixed coupon corporate bonds, which bundle these two exposures together. However, investors often form active views on spreads in isolation from rates and vice versa. This assumes clean strategy implementation, with no unintended effects on the risk profile of the rest of the portfolio.

However, it can be hard to form views on clean rates and credit risk factors in corporate bond portfolios without using rate derivatives overlays. In that case, forming an isolated spread or rate strategy requires under and over-weighting corporate bonds that combine spread and rates exposures to various degrees in order to target a desired sensitivity to rates (Duration) or to spreads (DTS- Duration Times Spread)[5]. This can require shifts in portfolio allocation and consequently leads to unintended exposures, as we will see below.

In the following paragraphs, we explain how corporate bonds can be re-weighted to achieve target rates or spread exposures in the context of outright or slope strategies. We focus on four generic macro strategies typically found in corporate bond portfolios. We contrast implementation with or without synthetic rates overlay and explain how the absence of derivatives leads to unintended risks.

The four active strategies are explained below:

1. **Outright credit** which can be formulated as a bullish or bearish view on index excess returns (ER) over duration-matched Treasuries.[6] This view can be implemented in practice by over(under)-weighting the overall index while hedging the resulting duration exposure with Treasury futures.

2. **Outright rates** which can be formulated as a bullish or bearish view on the index rate returns (RR). This strategy can be implemented using a basket of Treasury futures that matches the duration profile of the index. Futures implementation ensures that the rates strategy can be implemented in isolation from the corporate bond allocation.

3. **Credit slope** which can be formulated as a bullish or bearish view on the excess returns of a DTS-neutral credit steepener that overweights short-maturity bonds and underweights long-maturity bonds. The duration exposure of the two legs of this trade is hedged with Treasury futures so that performance is immune to changes in rates and depends only on spread curve dynamics.

4. **Rates slope** which can be formulated as a bullish or bearish view on the returns of a duration neutral Treasury steepener that overweights short-maturity Treasury bonds and underweights long-maturity ones on a duration-neutral basis. The two legs of the trade can be implemented with short and long maturity Treasury futures with position sized to ensure that the overall net duration contribution of the trade is zero.

While it is straightforward to implement the four strategies using overlays of Treasury futures, complexity arises when it has to be done with corporate bonds only. The building blocks of our bond-only strategies consist of six cells obtained by partitioning the corporate bond index into three maturity and two rating buckets. The maturity partition separates bonds into 1-5 (Short), 5-10 (Intermediate), and 10+ (Long) year maturity buckets. The two rating buckets are based on index ratings Aaa-A3 (high quality) and Baa1-Baa3 (low quality). By relying on subsets of the corporate bonds index, we anchor our strategy definitions to the structure of the market.

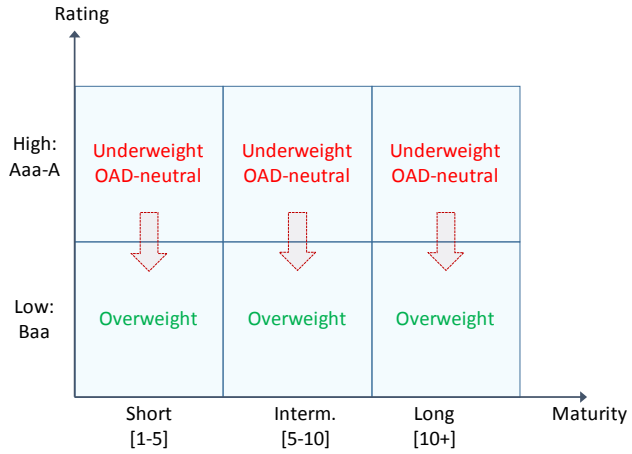
[5] For an introduction to Duration Times Spread, see *DTS℠ (Duration Times Spread)*, Journal of Portfolio Management, Winter 2007, and *A Decade of Duration Times Spread (DTS)*, Barclays Research. 2016.
[6] Corporate bond excess return over duration-matched treasury portfolio is the return component attributed to credit spreads, while the rate component, assumed to be hedged with treasury bonds or futures, is excluded.

FIGURE 6

Schematic implementation of credit and rates outright strategies in a corporate bond portfolio that cannot use rates overlays

PANEL A

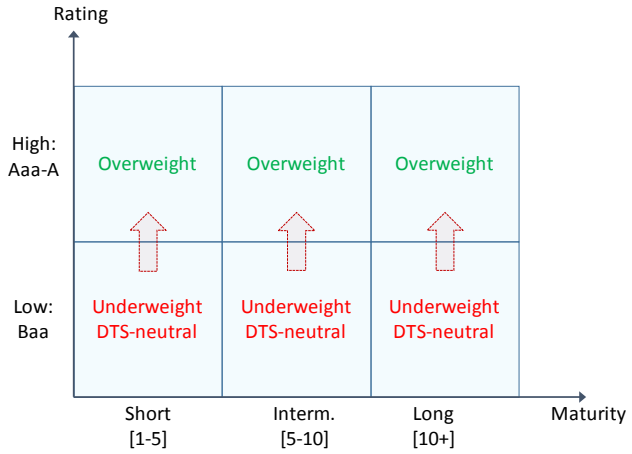
Bullish Credit View: Low vs High Quality (OAD-neutral)



Source: Barclays Research

PANEL B

Bullish Rates View: High vs Low Quality (DTS-neutral)



Source: Barclays Research

We start with outright credit and rates strategies which are illustrated in Figure 6. Panel A shows that a bullish *outright credit* view can be implemented by overweighting the low-quality buckets across all three maturity cells, while underweighting the high-quality buckets in order to hedge the *duration* exposure of the low quality leg. This strategy should result in a positive net credit exposure (DTS), similar to overweighting the market on a duration-neutral basis, because low quality (high spread) issues are traded against high-quality (low spread) ones. In a bullish scenario, low quality bonds should rally more than high quality bonds and strategy returns should be strongly correlated with the index excess returns.

Panel B of Figure 6 explains how a bullish *outright rates* view can be implemented with corporate bonds. The strategy overweights high quality cells across all maturities and underweights the low-quality buckets in order to hedge the *spread* exposure of the high quality cells. It results in a positive net duration exposure as the DTS exposure of high quality (low spread) bonds is hedged by underweighting of low-quality (high spread) bonds.

Allocation mechanisms are further illustrated in Figure 7 where outright credit and outright rates strategies are assembled with and without an overlay of rates derivatives. The middle section reports strategy weights across the six cells used as building blocks. The two rightmost columns show duration and credit exposures of these six cells. The bottom section summarizes strategy intended and unintended risk exposures.

The bullish credit strategies both implement a net exposure of 0.5 units of DTS. But while that exposure is balanced between high and low quality corporate bonds (DTS contributions or 0.19 and 0.31, respectively) when the strategy is hedged with Treasury futures overlays, the bond-only implementation requires overweighting low quality (DTS contribution of 1.25) over high quality (negative DTS contribution of -0.75) to achieve duration neutrality.

A similar but even more aggressive quality re-allocation is required to implement an outright rates strategy with only corporate bonds, as shown at the bottom of the fourth column of Figure 7.

FIGURE 7

Example allocations to outright credit or duration strategies on 30 September 2019

	Outright Credit with Synthetic Rates Overlay	Outright Credit with Bonds Only	Outright Rates with Synthetic Rates Overlay*	Outright Rates With Bonds Only	Cell OAD	Cell DTS
Use Cash Bonds	Yes	Yes	No	Yes		
Use Futures	Yes	No	Yes	No		
Allocation across index cells						
High Quality 1-5Y	0.9%	-3.0%	*1.3%*	6.2%	2.6	1.4
High Quality 5-10Y	0.6%	-2.8%	*0.8%*	4.2%	6.4	5.5
High Quality 10+Y	0.8%	-3.0%	*1.1%*	5.3%	15.2	18.6
Low Quality 1-5Y	0.7%	2.9%	*1.0%*	-3.3%	2.7	2.6
Low Quality 5-10Y	0.7%	2.9%	*1.0%*	-2.6%	6.2	8.8
Low Quality 10+Y	0.8%	3.3%	*1.2%*	-3.5%	13.8	28.0
Exposure contributions						
OAD	0	0	**0.50**	**0.50**		
DTS	**0.50**	**0.50**		0		
DTS High Quality	**0.19**	**-0.75**		**1.30**		
DTS Low Quality	**0.31**	**1.25**		**-1.30**		

Note: * The rates strategy with synthetic rates overlay doesn't invest in any bonds. The allocation across index cells is indicative of the allocation of rates exposures across maturities.
Source: Barclays Research

The strategies shown in Figure 6 and 7 are designed to create positive spread (DTS) or rates (OAD) exposures. However, the notional amounts required to implement them in bonds-only portfolios are typically higher than when futures are allowed. This is illustrated in Figure 8 which compares the historical DTS and OAD of the US Corporate IG index versus those of bond-only strategies aiming to be outright long credit or duration.

Panel A of Figure 8 shows that the net DTS exposure of the outright credit strategy without futures overlays is significantly lower than the DTS of the index. This is expected because part of the DTS exposure of low quality bonds is offset by the underweight to high-quality bonds needed to neutralize duration.

Although lower, the DTS of the bond-only strategy followed the index DTS most of the time except when the spread of A-rated bonds, especially financials, widened dramatically in 2008. During that period, the differences in spread and in DTS between high and low quality buckets became small, meaning that the strategy that favored Baa-rated relative to higher quality bonds according to the structure of the index could not produce a substantially net positive DTS.

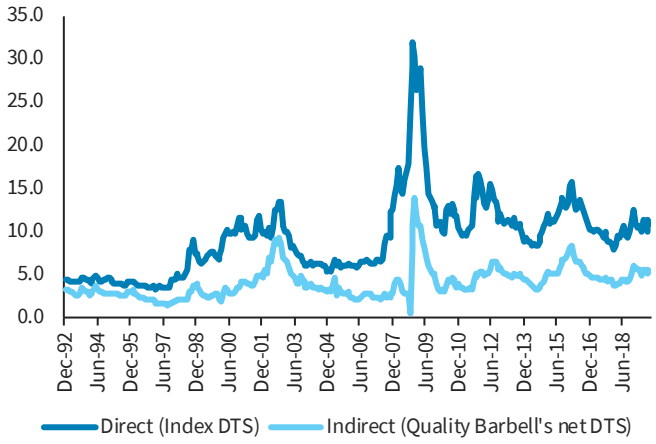
Similarly, Panel B of Figure 8 shows that the net OAD exposure of the outright rate strategy implemented with only corporate bonds has been substantially lower than that of the index. This is because the OAD of the high-quality leg is partially offset by the OAD of the low-quality leg used to neutralize credit (DTS) exposure. The strategy OAD varies quite significantly over time because changes in credit spreads affect the hedge ratio required to neutralize DTS. The strategy OAD was very low in the 2008 crisis when DTS exposures of high and low quality buckets became similar.

FIGURE 8

DTS and OAD exposures of outright credit and rates strategies implemented with or without rates derivatives

PANEL A

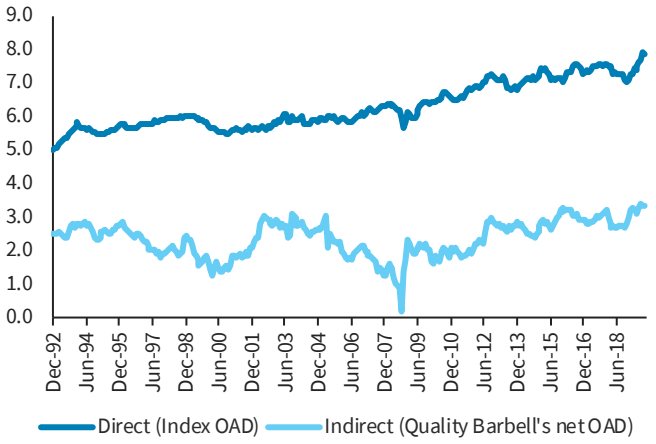
DTS Exposures of Bullish Credit Views



Source: Barclays Research

PANEL B

OAD Exposures of Bullish Rates Views



Source: Barclays Research

One could expect that the two different implementations of the outright credit and rates strategies (using futures or limited to bonds only) would deliver highly correlated returns given that they isolate exposure at a macro level. However, this has not always been the case because the bond-only implementations entail different allocations to quality subsets of the bond markets, as illustrated in Figure 7.

Panels A and B of Figure 9 plot 36-month rolling correlations between returns of the strategies implemented with[7] and without rates overlays for outright credit and rates views, respectively. While the correlations between the two implementations are high during benign environments, they can drop significantly during volatile periods, such as the telecom crisis of 2001 and the financial crisis of 2008. More recently, however, correlations were high.

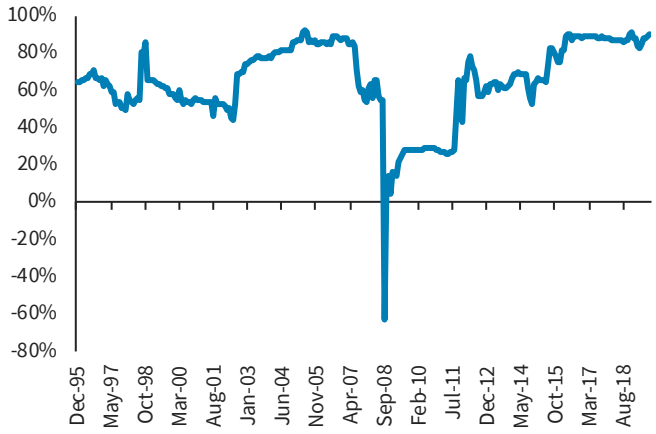
[7] For the purpose of our analysis, we assume that a combination of cash bonds and synthetic rates overlay would deliver the exact same return as the index-published excess returns.

FIGURE 9

36-month rolling correlations between outright strategies implemented with and without rates derivatives

PANEL A

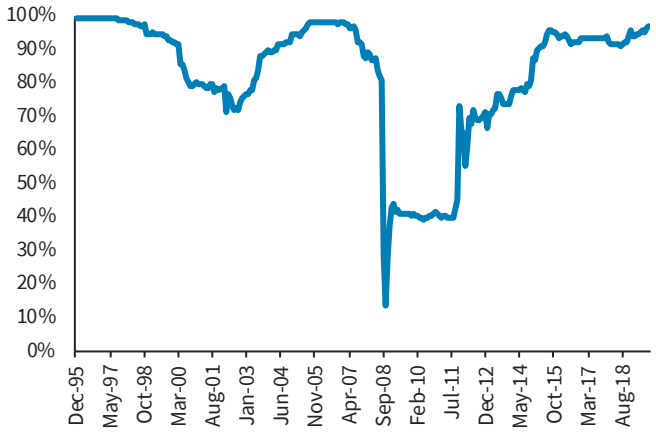
Credit Bullish Views



Source: Barclays Research

PANEL B

Rates Bullish Views



Source: Barclays Research

In addition to outright rates and credit strategies, we consider credit spread and rate slope steepeners. These strategies shift risk exposure from long to short maturity cells.

The two strategies can be easily implemented if futures overlays are allowed. Indeed, a spread slope steepener combines an overweight to short-maturity corporate bonds and a DTS-neutral underweight to long-maturity bonds, together with a rates overlay that hedges rates exposure. A rate steepener can be implemented by trading short-maturity versus long maturity Treasury futures on a duration-neutral basis, without changing any credit bond allocations.

Implementing such steepening strategies without rates derivatives is more complex. Panel A of Figure 10 shows the bond-only implementation of the credit steepener. It overweights *low-quality short-maturity* bonds and underweights *low-quality long-maturity* bonds on a DTS-neutral basis. However, this creates an incidental rates steepener exposure since rates and credit components cannot be separated without derivatives overlays. Duration exposure is neutralized using *high-quality short-* and *long-maturity* bonds, respectively.

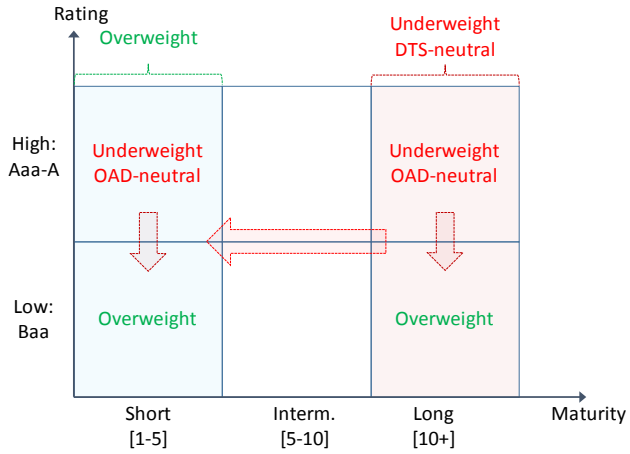
Panel B of Figure 10 illustrates the bond-only implementation of a rates steepener. The trade overweights *high-quality short-maturity* and underweights *high-quality long-maturity* bonds on a duration-neutral basis. This also results in an unwanted credit steepener which must be neutralized using *low-quality short* and *long-maturity* buckets.

FIGURE10

Schematic implementation of credit and rates steepeners in a corporate bond portfolio that cannot use rates overlays

PANEL A

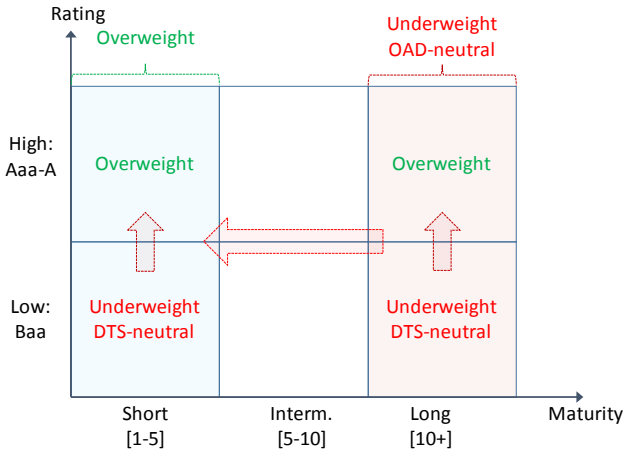
Credit Steepener: Low vs High Quality (OAD-neutral)



Source: Barclays Research

PANEL B

Rates Steepener: High vs Low Quality (DTS-neutral)



Source: Barclays Research

The example shown in Figure 11 contrasts the allocations and exposures of slope strategies implemented with or without synthetic rates overlay. The credit slope strategies are designed to reallocate 0.25 units of DTS from long to short maturity buckets, while being immune to changes in rates. The rates steepeners aim to reallocate 0.25y of duration from long to short maturity cells while remaining DTS neutral.

The first two columns relate to credit steepeners and show that the absence of synthetic rates overlay forces the strategy to take large positions to high quality cells in order to neutralize duration risk. These positions are of opposite sign relative to the clean strategy. While both strategies achieve the same macro-level risk exposures, the bond-only one results in non-zero net DTS contributions to quality subsets of the index.

Columns 3 and 4 of Figure 12 relate to the rates steepening strategy. Implementing it with only corporate bonds requires large position shifts as shown in the middle section of the figure. This results in large exposures to quality subsets of the index as shown at the end of the bottom section of Figure 12. Relative to clean strategy implementations that can use derivatives, bond-only portfolios are therefore exposed to decorrelation risk within the corporate market because they come with unintended and potentially large net exposures to different subsets of the credit market.

FIGURE 11

Example allocations to credit slope or rate slope strategies on 30 September 2019

	Credit Steepener with Synthetic Rates Overlay	Credit Steepener With Bonds Only	Rates Steepener with Synthetic Rates Overlay	Rates Steepener With Bonds Only	Cell OAD	Cell DTS
Use Cash Bonds	Yes	Yes	No	Yes		
Use Futures	Yes	No	Yes	No		
Allocation across index cells						
High Quality 1-5Y	7.2%	-22.5%	*5.2%*	21.1%	2.6	1.4
High Quality 5-10Y	-	-	-	-	6.4	5.5
High Quality 10+Y	-0.5%	2.1%	*-0.9%*	-4.2%	15.2	18.6
Low Quality 1-5Y	6.0%	21.7%	*4.3%*	-11.1%	2.7	2.6
Low Quality 5-10Y	-	-	-	-	6.2	8.8
Low Quality 10+Y	-0.5%	-2.3%	*-0.8%*	2.8%	13.8	28.0
Exposure contributions						
OAD	0	0	0	0		
DTS	0	0		0		
DTS Short Maturity	**0.25**	**0.25**		0		
DTS Long Maturity	**-0.25**	**-0.25**		0		
OAD Short Maturity		0	**0.25**	**0.25**		
OAD Long Maturity		0	**-0.25**	**-0.25**		
DTS High Quality	0	**0.08**		**-0.49**		
DTS Low Quality	0	**-0.08**		**0.49**		

Note: * The rates strategy with synthetic rates overlay doesn't invest in any bonds. The allocation across index cells is indicative of the allocation of rates exposures across maturities.
Source: Barclays Research

For rates as well as for credit strategies, the two implementations of steepener strategies provide similar a high-level risk profile: they similarly shift risk exposures from long to short maturities while remaining OAD and DTS neutral in all cases. One could therefore expect the returns of these strategies to be highly correlated, but this is not always the case.

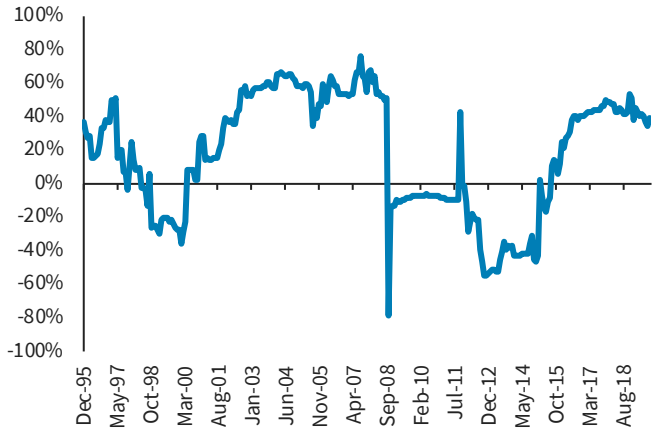
Figure 12 plots historical 36-month rolling correlations between the return of slope strategies implemented with rates overlays or with only bonds. Panel A relates to credit and Panel B to rates. In both cases, correlations vary significantly over time, decreasing in volatile market conditions and increasing during benign periods.

FIGURE 12

36-month rolling correlations between pure and bond-only implementations of credit and rates steepeners

PANEL A

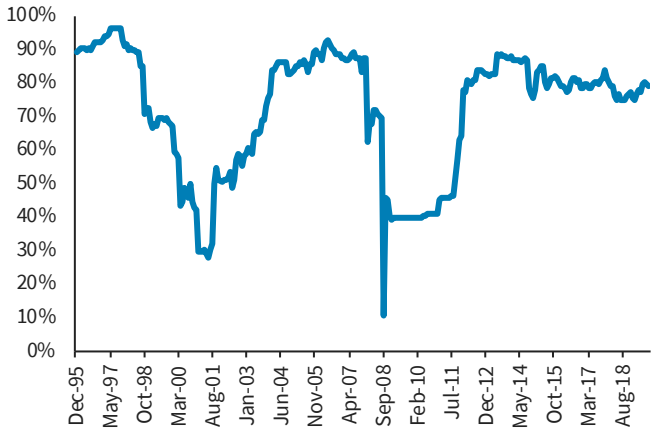
Credit Steepeners



Source: Bloomberg, Barclays Research

PANEL B

Rate Steepeners



Source: Barclays Research

The imperfect correlations due to the "no-derivatives" constraint can result in a performance cost to active macro strategies. Indeed, portfolio managers do not get what they aim for if the implementation of their views is not perfectly correlated with the isolated risk dimension (rates or credit) they aim to capture. Incidental risks make actual performance different from what is intended and investors able to time the behavior of spread or of rates may see their skill diluted it they are unable to implement strategies consistently with the way views are formed. In the next section, we measure the performance loss that results from such imperfect strategy implementation.

Estimating the Performance Cost of the No-Derivatives Constraint

We saw in the previous section that macro credit and rates strategies implemented with only cash bonds can deliver unintended exposures relative to clean implementations that use rates overlays. This can result in imperfect correlations between returns of unconstrained and constrained strategies. To assess the performance cost associated with restricting the use of derivatives overlays, we perform an empirical analysis of imperfect foresight[8] applied to historical returns realised in the US IG credit markets over the past 26 years.

We calculate historical monthly returns of the direct (with rates derivative overlay) and indirect (no derivatives) strategies introduced in the previous section: outright rates and credit views as well as credit spread and rate curve steepeners. We consider a hypothetical portfolio manager who is able to anticipate monthly movements of rates and credit markets to some degree. We call this ability "imperfect foresight" and assume that it applies to the direction of rates and credit spreads taken in isolation. Our manager forms views on and demonstrates skill at predicting the direction of clean strategy returns implemented *with* rates overlays. However, as discussed in the previous section, strategy implementation is different and more complex if overlays are not allowed.

In this context, "skill" quantifies the *excess* probability of a portfolio manager to correctly anticipate the direction of future returns. For example, a skill of 20% implies that a portfolio manager has a 60% chance to call the direction of a future return correctly and 40% chance to do it incorrectly. A skill of 0% corresponds to the balanced probability of 50% to be right or wrong, which is equivalent to tossing a fair coin in an attempt to call the direction of a future market move. A skill of 100% corresponds to perfect foresight, when a portfolio manager calls the future market direction with perfect accuracy.

Figure 13 shows the full list of rates and credit strategies implemented with or without rates overlays in terms of average position sizes and return volatility over the entire period of our study (from 1993 to 2019). Positions are scaled so that historical return volatility is identical within each strategy pair (with or without rates overlay) over the full period.

FIGURE 13

Average weights of active strategies across quality x maturity cells, January 1993 – September 2019

	High Quality: Aaa-A			Low Quality: Baa					
	Short 1-5Y	Interm 5-10Y	Long 10+Y	Short 1-5Y	Interm 5-10Y	Long 10+Y	Use Cash Bonds	Use Tsy. Futures	Volatility %/yr
Outright Credit / Futures Overlays	2.5%	2.0%	1.8%	1.1%	1.4%	1.2%	Yes	Yes	0.41
Outright Credit / Cash Instruments	-5.2%	-6.2%	-5.4%	5.1%	6.3%	5.6%	Yes	No	0.41
Outright Rates / Futures Overlays*	*2.5%*	*2.0%*	*1.8%*	*1.1%*	*1.4%*	*1.2%*	No	Yes	0.49
Outright Rates / Cash Instruments	7.4%	5.8%	5.1%	-4.4%	-3.8%	-3.5%	Yes	No	0.49
Credit Steepener / Futures Overlays	13.8%	-	-2.5%	6.2%	-	-1.2%	Yes	Yes	0.21
Credit Steepener / Cash Instruments	-12.4%	-	2.9%	12.2%	-	-3.0%	Yes	No	0.21
Rates Steepener / Futures Overlays*	*13.8%*	*-*	*-3.5%*	*6.2%*	*-*	*-1.6%*	No	Yes	0.27
Rates Steepener / Cash Instruments	10.3%	-	-3.1%	-6.2%	-	2.2%	Yes	No	0.27

Note: * The rates strategy with synthetic rates overlay doesn't invest in any bonds. The allocation across index cells is indicative of the allocation of rates exposures across maturities.
Source: Barclays Research

[8] The concept of imperfect foresight is explained in the first chapter of Quantitative Management of Bond Portfolios, Princeton University Press, 2007 and in *Value Of Skill In Macro Strategies For Global Fixed Income Investing*, Barclays Research

Imperfect foresight is applied to the returns of strategies implemented with futures overlays as they represent clean, isolated risk exposures. The same signals applied to the strategies implemented with cash instruments should, in principle, generate similar returns because the payoffs of the bond-only (indirect) and futures overlay (direct) strategies should be positively correlated given they target similar macro exposures. A difference in performance between the constrained (bond-only) and unconstrained (with rates overlay) strategies represents the cost of not being able to implement the strategy as intended.[9]

Assuming a skill of 10% and a monthly horizon, we simulate historical returns of active strategies introduced in the previous section. Figure 14 summarizes performance for different periods and illustrates alpha-dilution for bond-only strategies. Their information ratios are significantly lower than those of their peers implemented with rates overlays. Indeed, the information ratio of the outright credit strategy implemented with cash bonds is 42% lower than that of the outright credit strategy implemented with futures overlays (0.12 versus 0.20) for the entire period of the simulation. This reduction in strategy information ratio is significantly larger in 1993-2008 than in 2009-2019: 48% versus 28%, respectively.

FIGURE 14

Simulated returns of macro credit and rates strategies with 10% skill

	1993-2019			1993-2008			2009-2019		
	Avg. Ret, %/yr	Volatility, %/yr	Inf. Ratio	Avg. Ret, %/yr	Volatility, %/yr	Inf. Ratio	Avg. Ret, %/yr	Volatility, %/yr	Inf. Ratio
Outright Credit w Overlays	0.08	0.40	**0.20**	0.06	0.37	**0.17**	0.11	0.45	**0.24**
Outright Credit w Cash Only	0.05	0.41	**0.12**	0.04	0.44	**0.09**	0.06	0.35	**0.17**
Outright Rates w Overlays	0.13	0.50	**0.27**	0.14	0.51	**0.27**	0.13	0.47	**0.27**
Outright Rates w Cash Only	0.08	0.49	**0.16**	0.08	0.58	**0.15**	0.07	0.34	**0.22**
Credit Steepener w Overlays	0.04	0.22	**0.20**	0.04	0.23	**0.17**	0.05	0.20	**0.25**
Credit Steepener w Cash Only	0.011	0.21	**0.05**	0.014	0.27	**0.05**	0.005	0.08	**0.06**
Rates Steepener w Overlays	0.07	0.27	**0.24**	0.07	0.28	**0.24**	0.06	0.25	**0.25**
Rates Steepener w Cash Only	0.024	0.27	**0.09**	0.021	0.33	**0.06**	0.028	0.13	**0.22**

Source: Barclays Research

We find a similar drop in risk-adjusted return for the outright rates strategy. The bond-only strategy delivered an information ratio 40% lower than its implementation with Treasury futures: 0.16 versus 0.27, respectively. As for credit, the reduction in information ratio is much stronger in 1993-2008 than in 2009-2019 (46% vs. 18%, respectively), which is consistent with the high recent correlation between the two implementations (see Panel B of Figure 9).

The reduction in information ratios is even larger for credit and rates steepeners implemented with cash instruments only. The credit steepener IR drops by 75% (from 0.20 to 0.05), while the rates steepener IR drops by 64% (from 0.24 to 0.09) when considering the entire period.

The degree of alpha dilution shown in Figure 14 varies over time. The information ratios of the outright rates and credit strategies are reported in Figure 15 for non-overlapping three-year windows. Panel A shows that information ratios of the credit strategy implemented

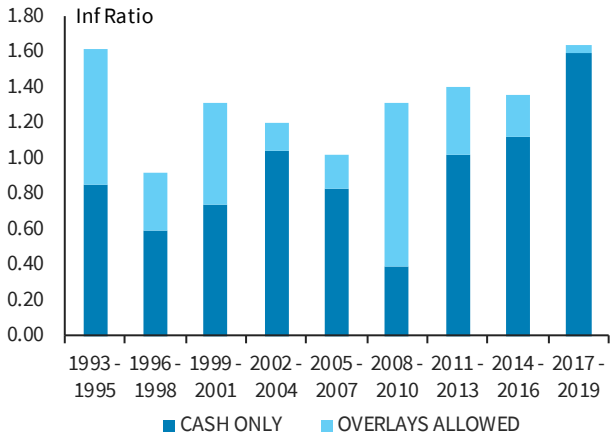
[9] Our foresight simulations do not account for limits to risk budget allocation that result from implementation choices. For example, constraints on the use of derivatives can require large bond reallocations in order to implement exposures to the strategies considered. Without leverage, such portfolio shifts can potentially hit funding or leverage limits, which could in turn hinder risk budget allocation. In addition, implementing macro strategies using cash credit bonds has a spillover effect on the active risk allocated to other credit strategies such as issuer selection. Our study ignores these considerations as well as transaction costs involved in various types of strategies. It can therefore be seen as providing a conservative estimate of the performance cost of the "no rates overlay" constraint in credit portfolios.

FIGURE 15

Performance drop due to excluding rates overlays from outright strategies timed with 10% skill, three-year intervals

PANEL A

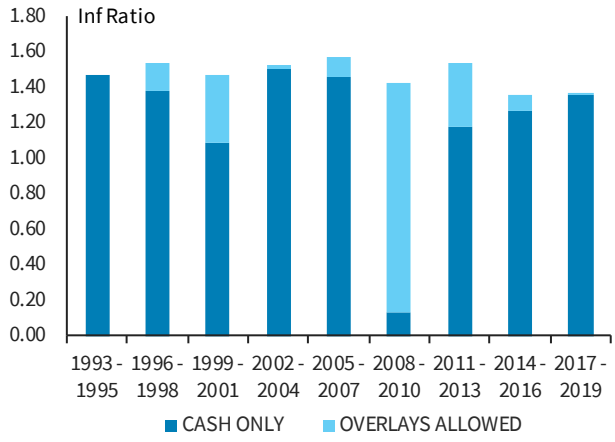
Credit Outright: Excluding or Including Rates Overlays



Source: Bloomberg, Barclays Research

PANEL B

Rates Outright: Excluding or Including Rates Overlays



Source: Barclays Research

with cash instruments are significantly lower than those of the strategy implemented with rates overlays during the volatile periods: 1993-1995, 1999-2001, and 2008-2010. In contrast, in the last three years (2017-2019) the difference between risk-adjusted returns of the two implementations is small.

Similarly, panel B shows that information ratios of the outright rate strategy implemented with cash are close to those implemented with Treasury futures except for 1999-2001 and 2008-2010. This is consistent with historical correlations between strategy returns reported in Figure 9: declines in information ratios are stronger in periods when return correlations between the two implementations are lower.

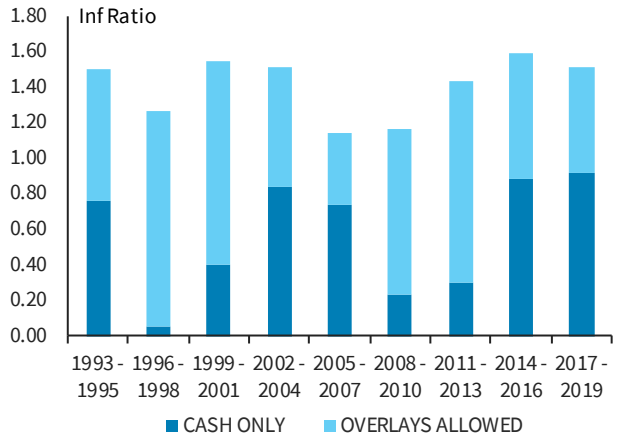
Figure 16 reports information ratios of credit and rates steepeners over non-overlapping 3-year periods. The bond-only implementation significantly reduces risk-adjusted returns of the two strategies. Performance decline has been more severe for the credit steepener strategy than for the rates one.

FIGURE 16

Performance drop due to excluding rates overlays from steepeners timed with 10% skill, three-year intervals

PANEL A

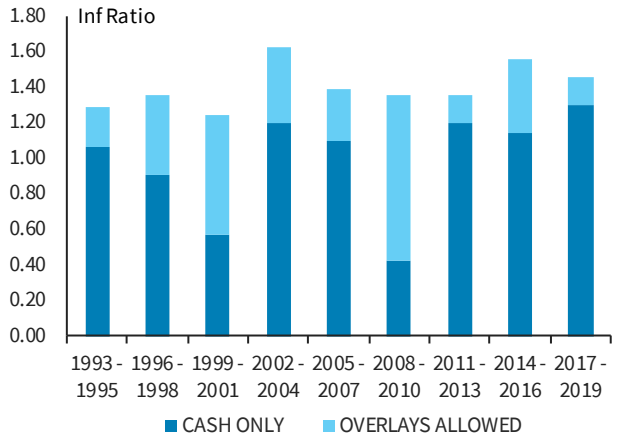
Credit Steepener: Excluding or Including Rates Overlays



Source: Bloomberg, Barclays Research

PANEL B

Rates Steepener: Excluding or Including Rates Overlays



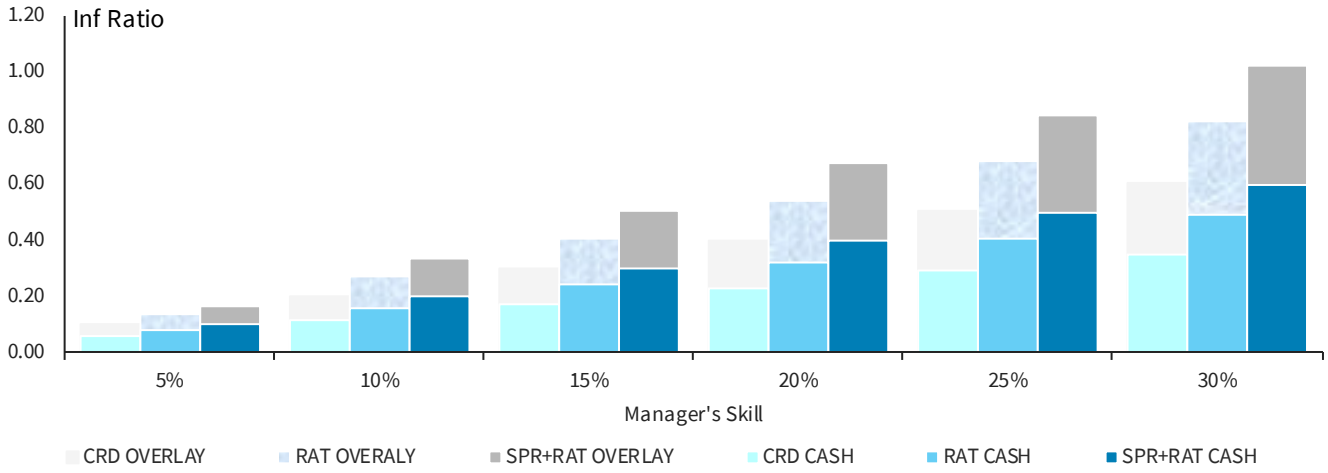
Source: Barclays Research

There are two ways for a portfolio manager to improve risk-adjusted performance. One is increasing skill, which can be difficult to achieve in practice. Another is to combine different active strategies together to diversify strategy-specific risks. Figure 17 shows information ratios of individual outright strategies for different levels of investor skill, from 5% to 30%. It also reports realised information ratios of strategy portfolios that equally weight credit and rates strategies.

Figure 17 shows that the implementations with *bonds only* lead to alpha dilution for all skill levels as strategy information ratios are lower than when rates overlays can be used. Additionally, information ratios of the credit strategy are lower than those of the rates strategy because historical returns of the credit strategy have extreme realizations in 2001 and 2008. In comparison, historical returns of the rates strategy have few outliers. Finally, combining credit and rates strategies into a portfolio leads to higher information ratios for all skill levels. This is especially significant for strategies implemented with futures overlays, where the portfolio information ratio reaches 1.02 for 30% skill.

FIGURE 17

Information ratio for various levels of skill at timing outright strategies, January 1993 – September 2019

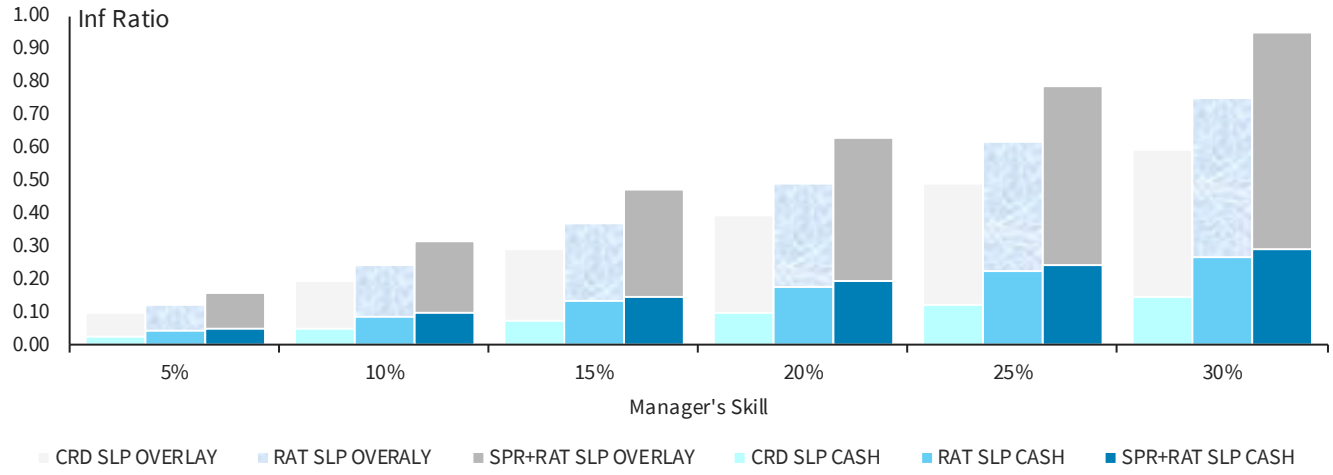


Source: Barclays Research

Figure 18 shows information ratios of credit and rates steepeners implemented with futures overlays or cash instruments. As previously, the constraint on rates derivative overlays results in a significant reduction of risk-adjusted returns, larger than is the case for outright strategies. It also appears that the difference in information ratio is larger for strategy combinations than for individual slope strategies taken in isolation.

FIGURE 18

Information ratio for various levels of skill at timing slope strategies, January 1993 – September 2019



Source: Barclays Research

The imperfect foresight analysis helps quantify the performance loss, expressed in terms of information ratio, from excluding rates overlays in actively managed credit portfolios. Historical simulations over 25+ years are summarized in Figures 17 and 18 and show that the cost of the constraint increases with investor skill and varies according to the macro strategy involved: it is higher for more complex strategies such as slope trades than for simpler ones such as outright duration or credit strategies.

The cost of the constraint is also higher when active strategies are combined together, as is often the case in actively managed portfolios that implement a diversity of macro views. In that case, the benefits of risk diversification across multiple strategies are reduced in the presence of a no-derivatives constraint. This last point is illustrated in Figure 18 where the rightmost bars of each group of simulated strategies (the strategy combination case) shows a large marginal increase in IR when rates overlays are allowed but only a small marginal increase when the constraint applies.

Conclusion

Although widely used by most institutional investors, interest rates derivatives, such as Treasury futures or interest rates swaps, are not always allowed in actively managed credit portfolios. This restriction can prevent investors from efficiently implementing active macro views on rates or on credit spreads, two risk dimensions that have fundamentally different dynamics.

Complex portfolio construction can help approximate in bond-only portfolios the net risk exposures that are available when using rates overlay, but this often results in significant performance mismatches between intended and realized returns.

We quantify the performance cost of different implementation choices for four generic strategies which are frequently utilized in credit portfolios. An imperfect foresight analysis run over 25+ years helps quantify the cost of prohibiting rate derivatives overlays when implementing credit and rates strategies. It shows that active views formed on isolated

exposures but indirectly implemented by re-weighting corporate bonds has systematically delivered lower risk-adjusted performance than if implemented directly using rates derivatives overlays. The performance drop is larger when investor skill is high, for slope strategies, and when considering outright and slope strategies in combination.

Our study focused on one practical aspect of strategy implementation and ignored other considerations such as leverage and exposure constraints, transaction costs, or indirect effects on issuer selection or sector allocation. We therefore believe that the performance costs are conservatively estimated.

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