The Search for Relative Value in Bonds

Asset swaps are a seductive, but incomplete, approach.

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Abstract

Comparing asset swap spreads across bonds is a widely used tool to determine relative value. This approach leads portfolio managers to increase their risk exposure in ways that are not transparent. We utilize credit default swaps to demonstrate that a wide asset swap, as an indicator of relative value, is a mirage. We document the empirical regularities in the term structure of credit spreads and spread volatilities that make this result possible. In addition, we present empirical evidence of the imprint of widespread use of the asset swaps approach on corporate bond returns.

The Search for Relative Value in Bonds

1. Introduction

Fixed-income investors have long sought a one-dimensional measure of bond attractiveness. With such a measure, security valuation is reduced to a single test. The highest scoring portfolio in today's metric is likely to have the highest (risk adjusted) total rate of return over the coming periods. Yield to maturity is perhaps the most prominent example. Despite flaws that have been well known and well understood for more than 30 years, yield to maturity is still commonly employed in fixed income investors' investment selections and their predictions for holding period returns [see, e.g., Homer and Leibowitz (1972) and Schaefer (1977)]. Potential errors from this approach can be large, especially when a mixture of coupon paying bonds and zero-coupon bonds is under consideration, because the alternatives 'roll down' different yield curves. Bonds with embedded options realize holding period returns equal to their yields (either to maturity or to first call) only by numerical accident.

The search for a single measure of bond attractiveness continues unabated today. One tool that has gained broad currency recently is to asset swap every bond in the portfolio – or at least every bond that can be swapped – and determine which portfolio maximizes the spread over a reference curve, typically Libor. [1] The portfolio that swaps out best is deemed to be optimal.

An asset swap transforms a bond's cash flow from fixed to floating. This is accomplished through the combination of the long bond position with one or more swaps.

[1] We queried fixed-income practitioners as to how extensively asset swaps are used as a tool of relative value analysis. To a person, they agreed that asset swaps are a standard tool in the fixed-income analyst toolbox.

The mechanics are straightforward. Assume that an investor (the asset swap buyer) takes a long position in a coupon bond with a bullet maturity and simultaneously enters into an off-market interest rate swap with a tenor equal to the bond's remaining term to maturity. The asset swap buyer pays the semiannual coupon payments as the fixed-rate leg in exchange for floating-rate payments at LIBOR. plus (or minus) a spread. The spread over LIBOR that equates the present value of the bond's coupon payments (i.e., the fixed-rate leg) and the projected floating-rate payments, inferred from forward rates, is the asset swap spread. This spread is used as a measure of relative value regardless of whether the cash flows are actually swapped.

If portfolio managers followed this rule literally and their security selection decisions were otherwise unconstrained, they would be induced to buy bonds with the highest credit risk and longest maturity. Clearly, beneficiaries and plan sponsors impose constraints to avoid such an outcome.

The purpose of this paper is to show that maximizing the asset swap spread is a decision rule nearly certain to fail. To accomplish this task, we first place the search for the ultimate relative tool into context by exploring how fixed-income portfolio managers add value. In Section 3, we present the empirical regularities in the term structure of credit spreads and spread volatilities. These regularities influence asset swap spreads and push managers to move longer in maturity and down in credit. In Section 4, we then utilize credit default swaps to demonstrate that a wide asset swap, as an indicator of relative value, is a mirage. The next section documents the imprint of the widespread use of the asset swaps approach on corporate bond returns. After discussing what asset swaps do not tell us, we consider what role they can play in the search for relative value. Finally, we offer some conclusions.

2. How do fixed-income portfolio managers add value?

The performance of an actively managed fixed-income portfolio is measured against a designated benchmark (e.g., an index or liability structure). Portfolio managers employ four basic strategies to add value relative to the benchmark. First, bond portfolio managers may seek to outperform by extending duration before a rally and shortening duration before a sell off. Unfortunately, nearly no manager has shown a consistent ability to get this right. Consequently, plan sponsors and other supervisors typically impose fairly tight duration targets on portfolio managers.

A second way to outperform is to put on steepening trades before the yield curve steepens and flattening trades before the yield curve flattens. Barbells and bullets are among the most commonly used vehicles. A bullet portfolio contains bonds with maturities grouped near one point on the yield curve. A barbell portfolio is defined in reference to a bullet. Specifically, a barbell portfolio is constructed of some bonds with maturities shorter than the maturity of the bullet bonds and other bonds with maturities longer than bullet bonds'maturities. Portfolio weights are chosen so that modified/effective duration of the barbell is equal to that of the bullet. Flattening yield curves tend to favor barbells while a steepening yield curves tend to favor bullets. Most portfolio managers have more latitude to express curve shaping views than directional views, but they are still constrained and, even then, they may not utilize all the leeway that they have been afforded.

Next, managers employ convexity and volatility trades to outperform benchmarks. When there is a mismatch between a manager's view on volatility and implied volatility of bonds with embedded options, buying or selling convexity before realized volatility increases or decreases can enhance return.

Alternatively, instead of having realized volatility differing from implied vol, market participants may change their opinions about future volatility and, thereby, change implied vol (or pricing vol), which will enhance returns. The convexity and volatility trades can be through bullets and barbells, through bonds with embedded options, or through the interest rate derivatives markets.

Finally (and most frequently) portfolio managers attempt to outperform benchmarks through security selection. They attempt to overweight cheap issues and underweight rich issues to enhance total rate of return relative to their benchmark.

Security selection to enhance performance has lead to the search for effective relative value tools in bond markets. As noted, one widely used metric for relative valuation is an asset swap. An asset swap transforms the cash flows of a fixed rate bond into a synthetic floating rate instrument. To convert the cash flows of fixed-rate bonds, the interest rate swap is constructed to make fixed-rate payments match the timing of the fixed-rate bond's cash flows.

The swap's floating rate cash flows received are determined by a reference rate (almost always LIBOR) plus a spread S, the asset swap spread. If a fixed-income investor is considering five fixed-rate bonds that differ in maturity and risk for inclusion in his or her portfolio and wants to assess their relative value, he or she would simply find the highest asset swap spreads (S), which represent the best relative value.

In practice, however, asset swaps are typically employed as a relative value detector in the following manner. After choosing portfolio duration (and perhaps key rate durations to control shaping risk) and after choosing a credit mix (or perhaps an average credit rating), find the constrained portfolio that swaps out best. This portfolio presumably represents the best relative value for a given duration target and credit target – with or without distributional constraints on durations and credit ratings. Unfortunately, this approach increases risk as well as increasing expected returns. We will demonstrate that utilizing asset swaps as a measure of relative value in this manner masks the attending increase in risk.

3. The term structure of credit spreads and credit spread volatility

Term structures of credit spreads over matched-maturity Treasury yields are steeper for lower rated credits than for higher rated credits [see, e.g., Helwege and Turner (1999)]. Table 1 displays credit spreads by credit rating and by tenor for April 1991-April 2008. For the credit ratings of BB and B, yield data are only available for the years 1992-2008. The pattern is generally as we would expect with lower rated bonds trading at wider spreads and longer tenors within credit rating trading at wider spreads. Moreover, the credit curve slopes are generally increasing as credit quality declines.

(Table 1 about here)

Steeper credit curves for lower rated credits drive portfolio mix when the asset swaps criterion is used to measure relative value. Consider why this is so. The reason that the slope of the credit curves matters is that if a portfolio is constrained to hold, say, 2s and 10s in equal amounts and AA and BBB in equal amounts, the swap criterion is virtually certain to put all of the BBB in 10s and all of the AA in 2s. Using the duration and credit mix measures of risk, this is exactly equivalent to putting all of the AA in 10s and BBB in 2s. They are not equivalent portfolios. This result makes sense in light of the following facts: (1) spreads for each credit rating increase, on average, with maturity and (2) lower rated bonds have a higher rate of spread increase with maturity. Accordingly; allocating 50% of the portfolio to BBB 10s and the remaining 50% to AA 2s gives us the highest spread as can be seen from Table 1.

(Table 2 about here)

Table 2 shows spread standard deviations by credit quality and by maturity. For investment grade bonds through 10 years maturity, which represent a large majority of the corporate market, spreads become more volatile as maturities (and durations) extend and as credit quality declines.

We have seen that lower credit quality bonds have steeper term structures. They also have higher spread volatilities. The results in Table 1 and Table 2 suggest that the 'optimal' portfolios that result from the swap criterion will have the highest VaRs (value-at-risk). An investment criterion that encourages an investor, who starts with a maturity ladder and a matching credit ladder, to move some money into the high duration/high yield volatility instruments causes him or her to increase VaR. This increase in risk is ignored by the current implementation of the swaps criterion.

Consider a simple example. Dor, et. al. (Journal of Portfolio Management, 2007) propose duration times spread as the appropriate measure of risk in a bond portfolio. Our analysis of the swaps criterion agrees with their conclusion. To see what happens to risk, we use 1.86 for the Spread Duration and Modified Duration of 2s (consistent with a 6% coupon bond priced at par) and 7.43 for 10s (also 6% priced at par) with values in Table 1, we calculate:

$$.25 * 186 * 0.184 + .25 * 186 * 0.388 + .25 * 743 * 0.281 + .25 * 743 * 0.443 = 160.96$$

And

$$.5 * 186 * 0.184 + .5 * 743 * 0.443 = 181.58$$

The second portfolio is riskier than the first.

The swap criterion is typically applied only to bullet bonds, i.e. bonds without embedded options. Of course, synthetic callable bonds can be constructed from swaps and swaptions, but those synthetics are not typically used to identify relative value. Instead, for MBSs, CMOs and callable/puttable bonds, investors use option-adjusted spread (OAS) analysis with the Libor curve as the curve to which spreads are measured. OAS analysis tries to separate the pricing spread impacts of embedded options from the pricing spread impacts of credit and liquidity differentials. These results are comparable to the swapped bullets only to the extent that one believes the stochastic process driving Libor and the prepayment/call/put rules employed. This is damning with faint praise. The implication is that the swap criterion is useful only for a subset of the portfolio.

The swap criterion can be used to optimize the holdings of only a subset of a fixed income portfolio, once duration and credit targets are chosen. The bonds that can be analyzed this way are corporate debt without embedded options. Because lower credits swap out better at longer maturities, the resulting portfolio will almost certainly be one that maximizes spread-duration-dollars. But, because longer dated/lower credit spreads are noisier, the portfolio's VaR goes up. Investors have deluded themselves about finding increased value at constant risk. In the next section we demonstrate why this is so clearly the case.

4. Credit Default Swaps

Credit default swaps (CDS) are a vehicle to transfer credit risk from one counterparty to another. In the financial markets, CDS are referred to as "protection." The reason being the protection buyer pays the seller a periodic payment (premium) for protection against a *credit event* experienced by a *reference entity*. Simply put, the sellers of protection are assuming credit risk for a fee while protection buyers are paying to reduce their credit risk exposure. A CDS is, under certain simplifying assumptions, equivalent to a long position in an asset-swapped fixed-rate bond financed with a repurchase agreement. Accordingly, it is critical to address the linkage between asset swap spreads, CDS premiums and credit spreads. Practitioners access relative value by comparing CDS premiums and asset swap spread levels. In fact, the difference between the CDS premium and the asset swap spread is referred to as the *CDS basis*.

Duffie [1999] provides a thorough analysis of CDS valuation, with variations. His fundamental, arbitrage-driven, result for the baseline case of the swap expiration matching the bond maturity is that the credit swap annuity that a hedger must pay is the credit spread of the instrument being hedged. If the CDS expiration is shorter than the bond's maturity, the credit spread for a shorter maturity bond is the appropriate CDS spread. Of course, it is possible that no bond of that maturity exists, making it necessary to estimate the relevant credit spread, but that is a mere detail.

The most important variant of the base case is the instance when the bond to be hedged, which is the bond that the swaps writer would short, trades ‘special’ in the repo market. Traders often use the repo market to obtain specific securities to cover short positions. If a security is in short supply relative to demand, the repo rate on a specific security used as collateral in a repo transaction will be below the general (i.e., generic) collateral repo rate. When a particular security’s repo rate falls markedly, that security is said to be “on special.” Investors who own these securities are able to lend them out as collateral and borrow funds at attractive rates. Accordingly, the repo advantage is the difference between the general collateral rate and the special repo rate. In this case, the CDS spread would be the sum of the bond’s credit spread and its repo advantage.

Additional variants that can influence swap spreads or all-in costs include transactions costs, the treatment of accrued swap spreads when a credit event occurs, accrued interest on a risk-free bond in the synthetic position, floaters trading away from par and fixed rate bonds standing in for floaters. Lastly, when a credit event specified in the CDS contract occurs, the protection buyer has the option to deliver to the seller any qualifying bond issue in return for a payment of the full par value.[2] If the bonds in the deliverable basket trade at varying market prices, then it is highly likely that the protection seller will receive the lowest valued deliverable issue. It is nearly certain that this delivery option will be priced and impact the CDS spread. Even though all of these effects impact the CDS spread, they are nuances compared with the two main drivers – credit spreads and special repo rates.

Let us consider a CDS without special repo rates, in the context of evaluating relative value. In the previous section, we discussed an equally-weighted portfolio of 10-year BBB and 2-year AA bonds. Doing so creates a portfolio that swaps out better than the original maturity and credit ladder which is an equally-weighted portfolio of the two-year,AA, 10-year AA, 2-year BBB and 10-year BBB. Along with the higher spread, we contended that risk is increased in a manner that is ignored. Here, we can demonstrate not only that the risk exists, but that it is traded.

Table 3 presents the spreads to Treasuries for Libor, AA rated bonds, and BBB rated bonds for maturities of 6-months, 2-years and 10-years. Table 4 presents the spread to Libor for the same bonds and maturities. We utilize these spreads in our demonstration that credit default swaps will unmask the risk increase encouraged by following the asset swaps criterion.

(Table 3 about here)

Consider first the double-laddered portfolio which allocates half the portfolio to each maturity bucket and half the portfolio to each credit risk bucket. This portfolio trades at 35 basis points above 6-month Libor. That value comes from multiplying the portfolio share (0.25) times each of the swap spreads over 6-month Libor in Table 6:

(1) Asset swap = 0.35 = 0.25*10bp + 0.25*30bp + 0.25*30bp +0.25*70bp

[2] This assumes physical settlement.

Alternatively, the constrained portfolio that swaps out the best allocates half the portfolio to 2-year AAs and the balance in 10-year BBBs. This portfolio trades at 40 basis points above 6-month Libor:

(2) Asset swap = 0.40 = 0.5*10bp + 0.5*70bp

(Table 4 about here)

Now we introduce CDS into the mix. Table 5 presents the premiums (in basis points) for credit default swaps for the AAs and BBBs for all three maturities. Suppose the investor implements the following transactions: buy a CDS on half of the 2-year AA position, write a credit default swap on an equal amount of 2-year BBBs, sell a CDS on 10-year AAs equal to half of the 10-year BBB position and buy a CDS on half of the 10-year BBB position. The net impact of these transactions returns the maturity distribution of the credit risks to the initial double-laddered portfolio. This portfolio trades at 35 basis points above 6-month Libor:

(3) Asset swap = 0.35 = 0.5 *10bp + 0.5*70bp – 0.25 * 0bp + 0.25* 20bp + 0.25*0bp – 0.25*40bp

Precisely all of the yield pickup (spread pickup) disappears. The portfolio possesses its initial risk position and its initial total spread. The evaluative benefit of comparing portfolios on an asset swapped basis disappears, too.

(Table 5 about here)

Now, suppose that one or both of the underlying issues is trading at special repo rates. In this case, the asset swapping approach can identify relative value – it identifies special repo rates. But, those rates, in most instances, could be observed directly. In addition, unless the investor takes advantage of the special repo, the excess returns are purely hypothetical. No extra money will be collected over the holding period.

Consider the implications of having each of the components of the evaluation methodology trade. Indeed, it is possible to build an "optimal" portfolio synthetically. Instead of buying the portfolio of corporate bonds that swaps out best, investors could buy the synthetic. The portfolio would include the following components: (1) a long position in a risk-free floater; (2) a collection of pay floating/receive fixed swaps to match the desired maturity structure of the portfolio (e.g., ladder, barbell, etc.); and (3) selling CDS with the highest premium intake subject to maximum exposure constraints. Any investor reluctant to execute the synthetic, especially the third component, should be equally reluctant of constructing a corporate bond portfolio using asset swap spreads because they are equivalent portfolios.

5. Empirical Implications

If the preceding analysis is correct and use of the asset swap criteria is widespread, we should be able to consistent with this decision-making in corporate bond return data. Specifically, we should find that the returns to lower rated bonds are too low relative to their exposure to risk because the asset swap spread intices users to purchase longer-maturity, lower-rated bonds,. If we find that return differentials for lower rated bonds compared to higher rated bonds are not significantly greater than zero, such evidence would be consistent with our conjecture. It is possible for short periods of time that the returns for lower rated bonds could be lower, but that ought not to persist. To investigate this possibility, we calculated Sharpe ratios for the returns to A-rated and BBB-rated corporate bond indexes, using returns for AAA/AA-rated bonds as the benchmark. Sharpe [1994] points out that the Sharpe ratio times the square root of the number of observations is a t-ratio. If historic Sharpe ratios for a group are computed using the same number of observations, the Sharpe ratios are proportional to the t-statistics of the means.

Data

Bond returns data are obtained from Citigroup's Yield Book, page 1.6 Historical Data. We have monthly observations from January 1980 through December 2006, for a total of 27 years. We used the following US Broad Investment Grade Bond Index Sectors: (1) AAA/AA Corporates 1-10 Year, (2) A Rated Corporates 1-10 Year, BBB Rated Corporates 1-10 Year, and (4) Treasury 1-10 Year. As we explain below, the monthly series of the indexes have different aggregate durations. Therefore, it is necessary to adjust the returns to make them comparable. To allow us to adjust the returns and then to calculate the Sharpe ratios, we obtained monthly observations for each portfolio for the following: local total return, modified duration, effective duration, and yield to maturity.

Kopprasch, et. al. (2003) discuss 'sequencing' in return attribution. They suggest that although, all of the forces that affect bond returns occur simultaneously, it is analytically useful to treat them as sequential.

- The first major effect is the passage of time, which leads to yield, rolldown, and – in the case of corporate bonds – spread. Yield return captures the return

- The second effect is the impact of parallel curve shifts, including both duration and convexity. Short-term returns on most bond portfolios depend primarily on the duration effect.
- Finally, the third major effect is curve reshaping, i.e. steepening, flattening, straightening or bowing.
- Other effects include volatility changes and mortgage-specific effects.

We want to isolate the impact of credit quality difference on return differences so we need to adjust returns for variations the indexes' other characteristics. Of these, duration differences matter most. Duration differences are the only ones for which we adjust. We do not adjust for differences in shaping risk or convexity. These latter effects should be of second-order importance.

A corporate bond's realized return is the sum of its horizon return given an unchanged benchmark yield curve and its return from changes in the benchmark yield curve. We have the monthly returns for each of the corporate bond indexes, but they must be adjusted before we can engage in any meaningful comparisons. The durations of the bonds comprising the indexes differ across the indexes, making the return series differences into an amalgam of genuine difference and difference attributable to impacts of yield changes with the different durations. Ideally, we would adjust the monthly index returns using effective duration but it is available only for the period January 1989 through December 2006. During the overlap periods, the average difference in the adjustment calculation using nominal instead of effective duration is 0.003 with a max of 0.15 and a minimum of -0.12. We can ignore the effective/nominal duration distinction. This result is likely attributable to the scarcity traditional fixed-price callable corporate bonds. Only 72 issues of the 2,935 issues in the Citigroup BIG Credit Index are callable, and they represent only 1.5% of the market value. More than half the issues have 'make whole' calls, but those calls do not have a measurable effect the bonds' durations.[3]

In adjusting returns for duration differences, we calculate the monthly yield change times duration difference. To measure duration difference, it is necessary to choose one of the series to be the numeraire. We chose the 1-10 Year AAA/AA-rated corporates, the benchmark index for our Sharpe ratio calculations. The difference between AAA/AA corporates' duration and A-rated corporates' duration averaged 0.27 years with a range of -0.10 to 0.67. For BBB-rated corporates, the duration difference averaged 0.36 years with a range of -0.20 to 0.80. By leveraging or deleveraging portfolios, portfolio managers are able to make durations of two index portfolios identical, if they choose. Consequently, the 'comparable' returns that we calculate are achievable in reality, as well as being the theoretically correct measure.

To calculate the adjusted returns, we also need a measure of yield change. Because spread narrowing and widening are part of the total returns to the different series that we want to include, we chose changes in the average yield of the 1-10 Year Treasury index as the measure of yield change for all corporate sectors. Summarizing to this point, the adjusted return accounts for parallel shifts in the benchmark yield curve (proxied by

[3] This is an implication of the make-whole option pricing model in Powers and Tsyplakov (2006).

1-10 Year Treasury yield change) times the duration difference from a series to the numeraire (in our case, AAA/AAs). We calculated adjusted return using:

(4) adjusted return = return + Treasury yield change × (duration $_{target}$ - duration$_{(AAA/AA)}$)

For example, if Treasury yields increase by 10 basis points and the target series is question has a lower duration than AAA/AA, the series return should be adjusted upwards. Therefore, the product of a ten basis point increase in yield and a negative duration difference is added to raw returns. Once we have two adjusted return vectors (A-rated and BBB-rated), it is a simple matter to subtract monthly returns to AAA/AA-rated corporates to calculate excess returns. The Sharpe ratios are the average excess returns divided by the standard deviation of excess returns. If the t-statistics arising from our Sharpe ratio calculations are not significantly above zero, then investors are not being compensated on average for bearing more credit risk in lower rated bonds. Formally, the null hypothesis is the average monthly excess return is equal to zero and the alternative hypothesis is the average monthly excess return is greater than zero at the 5% percent level of significance using a one-tailed test.

Results

Table 6 displays our results. For the overall period, 1980-2006, the average excess returns are as we would expect, A-rated bonds outperformed AAA/AA bonds and BBB-rated bonds outperformed by more. A-rated bonds outperformed AAA/AA rated bonds by an average of 32 basis points per year for the 27-years. B-rated bonds averaged 49 basis points of outperformance. The overall averages mask important changes over time.

Because the swaps criterion was not a widely employed portfolio management strategy for our entire twenty-seven year sample period, we divided the data into thirds.

(Table 6 about here)

For our first sub-period, 1980-1988, A-rated bonds outperformed by 41.6bp and BBB-rated bonds outperformed by 103.3bp. The t-statistics confirm that investors were paid for bearing more credit risk. From the first sub-period to the second, the performance of both A-rated bonds and BBB-rated bonds deteriorated compared with AAA/AA rated bonds. In the latest sub-period, A-rated bonds improved marginally while BBB-rated bonds not only gave up their performance advantage, they actually underperformed AAA/AA bonds for nearly a decade.

To test for robustness, we bootstrapped varying histories of returns. First, we used all 324 months of returns. This exercise will shed some light on whether the results are driven by a few observations. We drew sets of 108 months, without replacement. Then we calculated Sharpe ratios and t-scores for each nine year period. In 5,000 simulations, only 212 instances have significantly positive returns for BBB portfolios. When we repeated the exercise using only the first 216 months, 1,613 of the 5,000 simulations had both the first and second subperiods with significantly positive returns. The difference between the two sets of simulations is striking. The final nine years of observations 'poisons' the returns history for BBB bonds, making their typical returns insignificantly different from AAA/AA bonds.

The results in Table 6, which represent the actual history of returns, are consistent with our hypothesis that widespread adoption of a swap criterion to find relative value in corporate bonds has lead investors to take on more risk in their portfolios without being compensated, simultaneously, through higher returns. The time pattern of Sharpe ratios and the statistical significance of excess returns, especially comparing BBB-rated corporates with AAA/AA-rated corporates, shows the 'footprints' of the swap criterion being adopted. We hasten to add this is just one potential explanation that is consistent with the empirical record. There are no doubt other market factors or investor biases which have caused lower relative returns on low-rated corporate bonds. Further investigation is necessary to sort out these competing explanations.[4]

5. How is this approach useful?

If swapping every bond opens portfolio managers to the risk of increasing VaR in unrecognized ways, does that mean that the measure is without merit? Absolutely not. Suppose the portfolio manager wants to increase exposure to BBB bonds and two bonds, in particular, swap out wider than the rest of the universe. One possibility is that these two bonds are trading at wide spreads because they are about to be downgraded. Another possibility is that some investor has dumped supply and the spreads are likely to tighten back to average levels. Asset swap results will not tell you which of these cases is more likely. That will require additional analysis by skilled credit analysts. Still, the asset swap information can help set the research agenda; it can identify those cases most likely to become outperformers.

6. Alternatives

It is not enough to criticize an approach to portfolio management. One must discuss alternatives that are likely to be superior. Here, we consider two alternatives to choosing bonds based on asset swaps.

[4] We thank an anonymous referee for bringing this to our attention.

- Choose an index. Once a plan sponsor or beneficiary chooses an index for a portfolio manager to match or beat, he or she has made a decision about risks in multiple dimensions. If one choose the Lehman Aggregate Index, the array of credits (and their spread durations), exposure to negative convexity through embedded optionality, aggregate duration, aggregate convexity and aggregate vega have all been chosen. To be sure, the plan sponsor might have preferred an index that had lower exposure to optionality, but with more exposure to credit. A large number of off-the-shelf indexes or a custom index, for that matter, allows quasi-independent choice of the risk exposures. If one asks the portfolio manager to add value relative to the index, it is paramount to ensure that the deviations from index risk are constrained or one could easily end up with the same portfolio as the asset swapping analyst would recommend – and the same unrecorded risks.
- In many instances, as when the assets are chosen to fund a specific set of liabilities, portfolio managers' choice of risk parameters comes pre-determined. Assets should match the duration, convexity, vega, spread duration, basis risk, etc. of the liabilities. Deviations in an attempt to minimize funding costs must, once again, be constrained.

Either of these alternatives allows portfolio managers to make better choices than simply maximizing the asset swap spread assuming all assets and liabilities are swapped to floating.

7. Conclusion

We examined a widely used approach to identifying relative value in bonds, utilizing asset swap spreads   Comparing asset swap spreads has considerable appeal because it reduces the complicated question of relative value to a single dimension answer. The approach is misleading because it coaxes portfolio managers to increase spread duration risk in ways that are not readily apparent. The consideration of CDS confirms this intuition. If the asset swaps criterion is augmented with CDS, as well as interest rate swaps, then bond portfolios return to being equally attractive. Asset swap spreads are nevertheless useful for identifying bonds that are trading ‘special’ in repo markets and for setting a research agenda on specific credits trading away from their mean rating spread.

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Table 1
Average credit spread of industrial bonds to equal tenor Treasuries, by credit rating, April 1991-April 2008 (bp).

	2s	5s	10s	30s
AAA	36.2	44.2	53.1	60.3
AA	44.2	51.5	61.5	74.4
A	62.9	74.6	85.1	100.8
BBB	98.4	110.8	123.8	145.9
BB	223.9	247.3	277.4	288.0
B	356.1	387.0	400.4	417.8

Source: Bloomberg

Table 2
Standard deviation of average credit of industrial bonds to equal tenor Treasuries, by credit rating, April 1991- April 2008 (bp)

	2s	5s	10s	30s
AAA	17.1	22.0	26.8	26.0
AA	18.4	23.9	28.1	29.4
A	25.0	29.0	32.5	36.4
BBB	38.8	41.0	44.3	43.3
BB	117.1	97.3	83.9	84.7
B	143.3	120.1	109.9	122.3

Source: Bloomberg

Table 3 Hypothetical Spreads (in basis points) to Treasuries

	Libor	AA	BBB
6-month	10	10	20
2-year	20	20	40
10-year	40	40	80

Table 4 Hypothetical Spreads (in basis points) to 6-month Libor

	AA	BBB
6-month	0	10
2-year	10	30
10-year	30	70

Table 5 Hypothetical Credit Default Swap Premiums (in basis points)

	AA	BBB
6-month	0	10
2-year	0	20
10-year	0	40

Table 6

Sharpe ratios with AAA/AA as benchmark
t-ratios = Sharpe ratios x sqrt(T)

		1980-2006	***1980-1988***	***1989-1997***	***1998-2006***
	N=	324	108	108	108
		A-rated corporates			
Return difference (monthly, basis points)		2.68	3.46	2.13	2.45
Return difference (annualized, basis points)		32.21	41.60	25.59	29.44
Standard Deviation		0.2047	0.2745	0.1235	0.1891
Sharpe ratio		0.131	0.126	0.172	0.130
t-statistic		2.36***	1.31*	1.79**	1.35**
		BBB-rated corporates			
Return difference (monthly, basis points)		4.10	8.57	4.38	-0..64
Return difference (annualized, basis points)		49.31	103.33	52.69	-7.68
Standard Deviation		0.5297	0.5127	0.3140	0.6937
Sharpe ratio		0.077	0.167	0.139	-0.009
t-statistic		1.39*	1.74**	1.45*	-0.10