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Cross-Asset Research

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Validity of Historical OAS Comparisons for USD Corporate Bonds

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"Spreads are at all-time tights." How often have we heard this, and similar, statements? Market practitioners and researchers often rely on historical comparisons when forming and expressing their views – whether to contrast the current environment with certain periods in the past, or to draw parallels.

But financial markets are fluid, and the corporate bond market is one of the most dynamic. Issuance patterns change in reaction to such things as changing interest rates, risk premiums, and regulatory developments. Financial crises change relative allocations among industry sectors and credit ratings. In short, is today's corporate market comparable to what it was 10, 15, 20 years ago?

In fact, two decades ago, the corporate market looked very different than it does today. For example, the IG index's Baa weight in 1995 was about 27% compared to 44% today. Callable bonds accounted for 33% in May 1993 versus 0.7% in March 2014. About 7% of the HY index was rated below B in 1993, but today its share is 17%. The list goes on. So, is it valid to compare today's spreads (OAS) and volatilities with those of earlier years? Maybe we are comparing apples and oranges.

To determine the validity of long-term comparisons in the corporate market, we must control for structural changes. Some of these changes are easier to deal with than others. For example, it is very difficult to control for the evolution in option pricing models, as well as rating-agency methodologies over the past 20 years. However, we can control for many other important structural changes, such as industry, quality, and duration allocations over time. We accomplish this by creating an index whose structure is invariant over time. In other words, we ask the following question: "What if the corporate market 20 years ago had been the same as today, and has never changed since?" An invariant corporate index makes it possible to more accurately compare today's market conditions with those of yesteryear. The degree to which spreads, returns, and liquidity of the invariant index are similar to those of the actual (published) index determines the validity of using published index data for historical comparisons. Our access to historical bond-level data provides an opportunity to answer this question in a precise, quantitative manner.

Structural characteristics of the corporate market fluctuate over time. Figures in the next section show significant deviations in sector and quality allocations, in the share of callable bonds, and monthly returns. However, after controlling for the many structural changes, we were able to reach a clear conclusion: the level of spreads and their volatility are largely no different than the historically published values. For us, this is surprising.

One may also wonder how different market spreads and volatility would be today if we assumed that the structural characteristics of the corporate market were frozen 20 years ago. Our fundamental conclusion remains the same.

We conduct our analysis separately for investment grade and high yield corporate markets, and our conclusions are similar for both. In the interest of space, we put all the figures pertaining to high yield in the Appendix.

Invariant Corporate Index Construction

We use stratified sampling to describe the index structure along several important risk dimensions. In our experiment, we define such dimensions and, having done that, measure the current (as of March 2014) published market value weights of the resulting buckets. In the next step, we use these weights to construct a composite index that keeps these weights constant going backwards in time (hence the name "invariant"). We then study the historical properties and performance of this invariant index.

The choice of risk dimensions would of course be different for different markets. For the Investment Grade Corporate index, we choose the following four dimensions:

Sector: Financial, Industrial, Utility

Quality: Aa-Aaa, A, Baa

OAD: <5, 5-10, 10+

Callability: Callable, non-callable.

This scheme results in 54 (3 × 3 × 3 × 2) buckets that describe the structure of the index quite accurately.

There is one notable aspect of the construction methodology with regard to the callability dimension. Over the past several years, there have been many new issues that can be called just a few months before maturity. In fact, today such bonds make up the bulk of all bonds labelled as "callable" in the corporate indices. For all practical purposes, these bonds are non-callable, and the market treats them as such.[1] However, technically, they are callable and, importantly for our study, they are so classified by index rules. As a result, beginning with 2012 onwards, we do not rely on the index's call flag field to define separate callable and non-callable buckets. Instead, we combine the two. Given the negligible weight of callable bonds in recent years (Figure 3), this simplification has no effect on the analysis.

For the significantly smaller High Yield Corporate index our breakdown is as follows:

Sector: Financial, Industrial, Utility

Quality: Ba, B, Caa and below

OAD (for Ba and B only): <5, 5+

[1] Bradley Rogoff and Eric Gross, Credit Strategy Research, drew our attention to this.

This scheme produces 15 buckets. We decided against separating the lowest quality component by duration. It is well known that sensitivity to interest rates movements declines with bonds' quality. For the lowest quality stratum of high yield, analytical durations are not very meaningful.

Constructing an invariant index presents some challenges. First, the rating agencies may have changed their rating criteria over time. An A-rated issuer today might have been Aa-rated back in 1993 if the rating agency had used its current methodology. If this is the case, applying today's weight of A-rated bonds weight to 1993 would effectively over-weight the invariant index to lower quality bonds. Unfortunately, there is little to do about this possibility. Our approach assumes implicitly that investors consider an A-rated, industrial bond today to be the same as an A-rated, industrial bond in, say, 1993.

Another challenge is that the Barclays Index Group has changed quality and sector definitions over time. Index quality ratings are based on composites of agency ratings. A bond may be rated differently by Moody's and S&P, or S&P and Fitch, in which case it is said to have a split rating. However, for the purposes of index construction, these differing ratings must be mapped into one "index" quality category. The mapping rules for Barclays indices were adjusted twice during our study period. Initially, Moody's was the primary rating agency for index classification, with S&P a secondary source for issues that Moody's did not rate. In September 2003, the quality classification criterion was adjusted to always use both Moody's and S&P ratings, choosing the more conservative (i.e., lower) of the two. The second adjustment was made in June 2005, when the quality criterion was made more inclusive by adding Fitch ratings to the mix and using the middle of the three. As a result, applying today's credit quality allocations retroactively inevitably introduces some imprecision. Another example is the December 1997 inclusion of private placement debt (144A) in the HY Index. Because these bonds were predominantly B-rated, the relative quality allocation within the index shifted.

Similarly, the Index Group has made some noticeable changes in index industry sector classifications. In December 1998, many telephone utilities (e.g., AT&T and Verizon) were reclassified as industrials. In September 2003, financing subsidiaries of auto-makers as well as some other manufacturing companies, such as John Deere and Caterpillar, were reclassified from financials to industrials.

In the next two sections, these structural changes will appear clearly as mirror "kinks" in plots comparing relative allocations of invariant and published indices. Fortunately, all these rules adjustments happened in relatively calm periods, when spread levels for various rating and sector categories were not too different from the current, so these disturbances are not likely to affect our analysis. In addition, and perhaps more importantly, none of these classification schemes changes required investors benchmarked to either IG or HY Corporate indices to buy or sell bonds. Because of that, these particular classification changes likely had very limited effect on the return dynamics of the indices.

Finally, there is the issue of changes to analytical models that calculate OAD and OAS. Index providers constantly strive to use state-of-the-art bond-level analytics. Model changes often have a strong effect on OAD and OAS values, which presents a methodological challenge to the construction of a truly "invariant" index.

As described, to construct an invariant index, we use today's published weights and apply them backward through time. We cannot do the same for analytics, though. Consequently, the invariant index's OAS and OAD time series reflect contemporaneous analytics. For example, consider a hypothetical callable bond which today has published OAS and OAD of 160bp and 5.0, respectively. Back in time, an identical bond in the same market environment may have had very different published analytical values. Changing analytics

has the largest potential effect on callable corporates, given the uncertainty of their cash flows. Fortunately for our exercise, the invariant's current allocation to callables is near zero. Applying a zero weight to callables back in time essentially removes the distortion from changing analytics[2]. The analytics for non-callables have been fairly consistent over the study period[3].

Comparing the Investment Grade Invariant and Published Corporate Indices

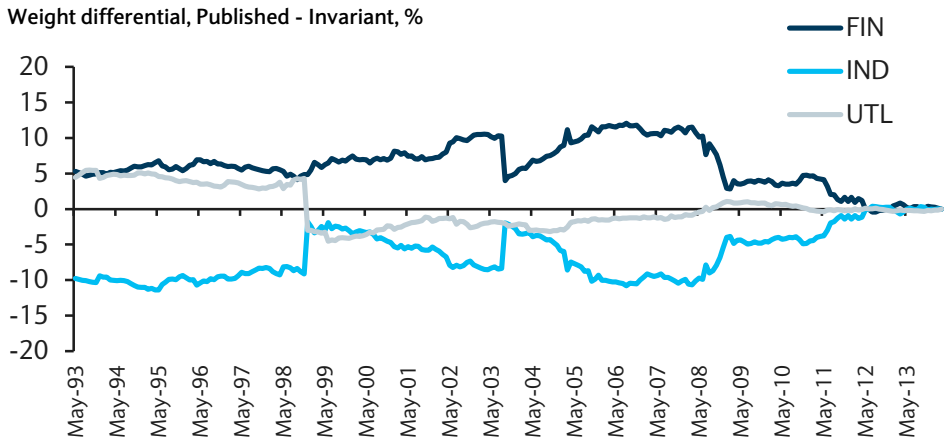
Figures 1 and 2 show the sector and quality allocation differences between the published and invariant indices. These figures plot the sector, quality, and callability weight differentials, respectively (a positive value means that the published index has a larger weight).

These figures confirm the dynamic nature of the index composition. For example, Figure 1 shows that the weight to financials has gradually decreased since 1993. Shortly before the 2008/2009 crisis, the allocation to financials was more than 10% higher than it is today. This overweight quickly disappeared in the aftermath of the crisis. The weight to financials today is about 5% less than it was back in 1993.

FIGURE 1

Allocation Differences vs. Invariant Index, Investment Grade, by Sector, May 1993 – March 2014, %

(A positive value means that the weight in the published index was higher than in March 2014)



Unless stated otherwise, the source for all figures is Barclays Research

Figure 2 shows a gradual quality deterioration since 1993. Using today's market weights, the Corporate Index in the early 1990s would have approximately 12% more Baa-rated bonds. We have already explained that the sharp change in Baa/Aa-Aaa weights in the 2003-05 window owed to a revised index rating convention and did not reflect any market event. During the crisis, however, there were real jumps in relative quality allocations between the published and invariant indices. As many Aa-rated financials were downgraded, there was a sharp increase in the weight differential in A-rated bonds, and a commensurate decrease in the weight differential in Aa-Aaa-rated bonds.

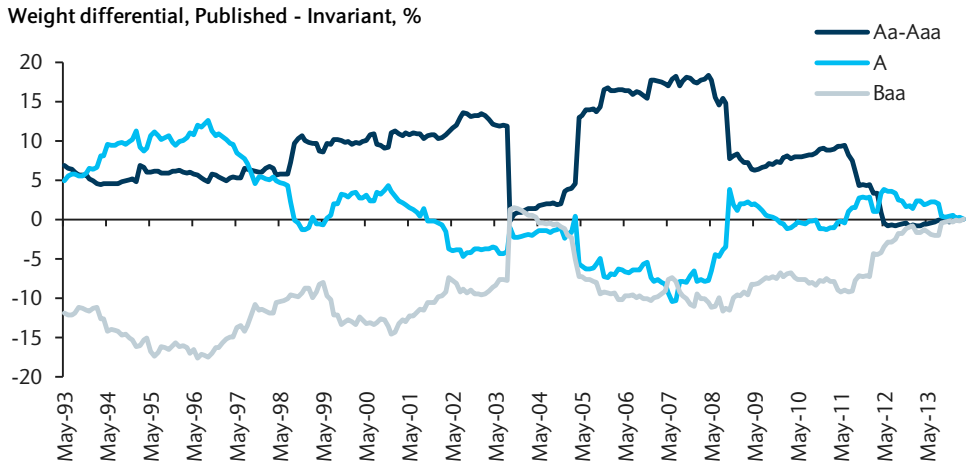
[2] This issue (among others) would make the construction of an invariant MBS index, for example, very difficult, if not impossible.

[3] One potential source of distortion would have been a switch to "default-adjusted" analytics (which Barclays produces). However, the Barclays Family of Indices has not implemented these methodologies.

FIGURE 2

Allocation Differences vs. Invariant Index, Investment Grade, by Quality Rating, May 1993 – March 2014, %

(A positive value means that the weight in the published index was higher than in March 2014)



Figures 3 and 4 deal with the other two dimensions: callability and time to maturity. Here we also see significant evolution. The proportion of callable bonds declined steadily over much of the study period, from approximately 33% in 1993 to less than 1% in 2014.

In terms of time to maturity, Figure 4 shows that, most of the time, the invariant index has a longer time to maturity than the published index. Over the whole period, the average maturity of the invariant index was about one year longer.

FIGURE 3

Percent of Callable Bonds by Market Value, Published Index, May 1993 – March 2014

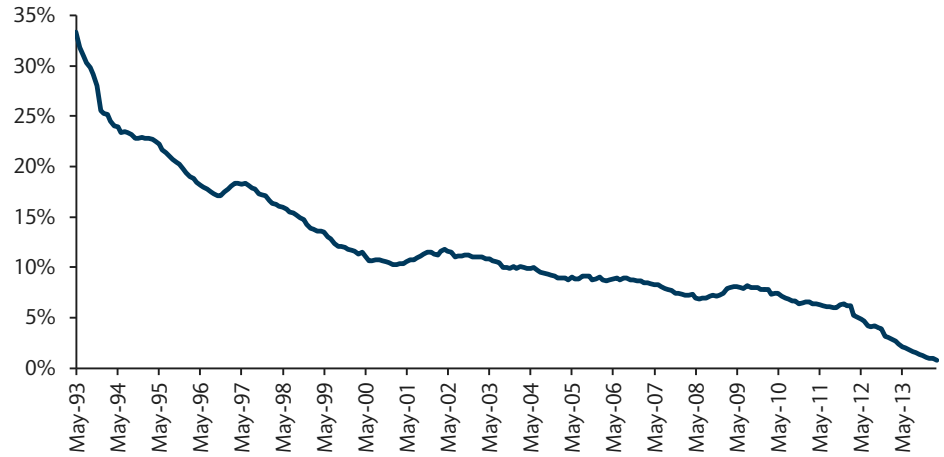
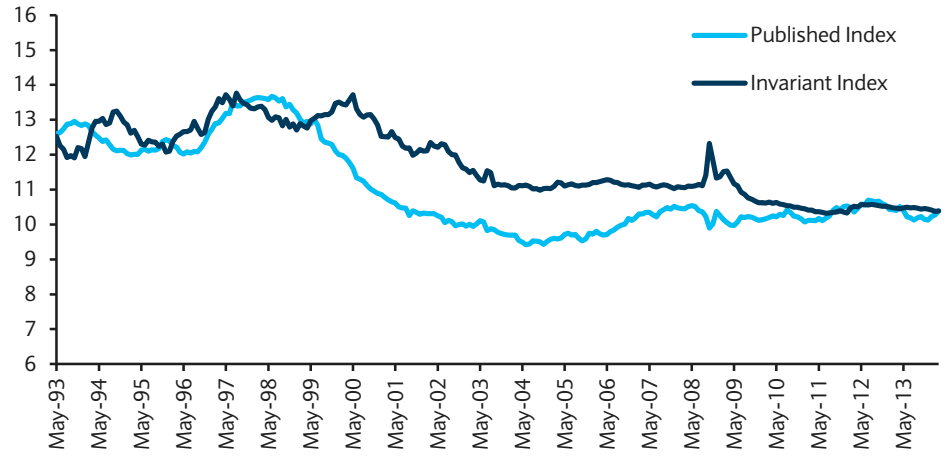


FIGURE 4

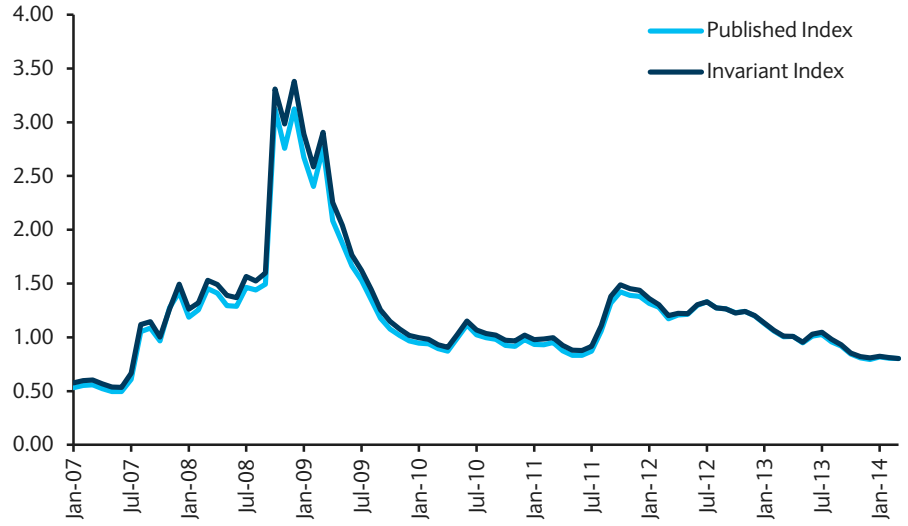
Time to Maturity, Investment Grade, May 1993 – March 2014, yr



We also look at relative liquidity of the two indices, using Barclays' Liquidity Cost Score (LCS) metric available since January 2007. The only period of noticeable (although still modest) difference was the 2008 crisis period when the invariant index became slightly less liquid (higher LCS means lower liquidity). That owed primarily to its underweight in financials which, despite the financial crisis, remained one of the more liquid sectors of the corporate market.

FIGURE 5

Liquidity Cost Score (LCS), Investment Grade, Jan 2007 – March 2014, %



USD Corporate LCS are available since January 2007

Having examined the structure of the two indices, we now look at their relative performance. Given the large structural differences, we might expect to see a large performance difference as well. Figure 6 shows the monthly excess return difference between the published index and the invariant index. Most of the time, the difference is relatively small. The only exception is the 2008 crisis period and its aftermath.

Strong underperformance of the invariant index in October 2008 was followed by strong outperformance in January and May 2009. Both were caused primarily by Baa-rated bonds, particularly financials. It was this sector that suffered the most in October and recovered

strongly in early 2009; and the invariant index had about 10% more in Baa than the published index had in the fall of 2008.

So far, we have seen meaningful discrepancies between both the structural properties and performances of the two indices. But the ultimate test, and the answer to the question posed in the title, lies in comparing cumulative performance and, more importantly, credit spreads. How do performance and spread levels of the invariant and published indices differ, given all the allocation differences?

FIGURE 6

Excess Return Differential; Published vs. Invariant Index, Investment Grade, May 1993 – March 2014, %

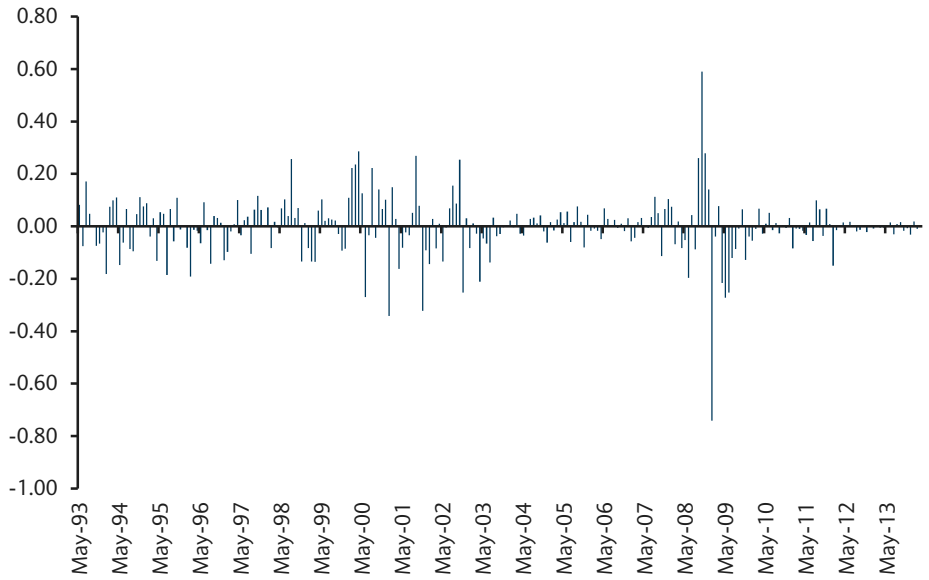


FIGURE 7

Detailed Breakdown of the Financial Sector: September 2008 vs. March 2014, Investment Grade, %

		Sep-08 (Published index)	Mar-14	Difference
		Sep-08	Mar-14	Difference
Fin < 5	Aa-Aaa	12.25	2.39	-9.86
Fin < 5	A	8.22	12.19	3.96
Fin < 5	Baa	1.66	4.18	2.52
Fin 5-10	Aa-Aaa	6.22	0.47	-5.75
Fin 5-10	A	7.51	5.23	-2.27
Fin 5-10	Baa	1.54	3.40	1.87
Fin 10+	Aa-Aaa	1.74	0.18	-1.57
Fin 10+	A	1.80	2.82	1.02
Fin 10+	Baa	0.05	1.67	1.62
		40.98	32.53	-8.45
	Total Aa-Aaa	20.21	3.04	-17.18
	Total A	17.53	20.24	2.71
	Total Baa	3.24	9.25	6.01

Figures 8 and 9 plot cumulative excess and total returns of the two indices, respectively. As Figure 8 shows, in May 2008, 16 years since the beginning of the study period, the two ended practically in the same place. Only the shock of the 2008 crisis introduced a gap which has persisted (this persistence indicates very similar post-crisis performance of the two). Even though the invariant index ended up with higher *cumulative* underperformance than the published index, the performance of the two indices has been almost identical subsequent to the crisis. In fact, the average monthly excess return difference over the *whole* period is approximately one basis point. Thus, despite all the historical variations in sector and quality weights, the two indices ended the 21 years of the study period very close to each other.

FIGURE 8

Cumulative Excess Returns, Investment Grade, May 1993 – March 2014, %

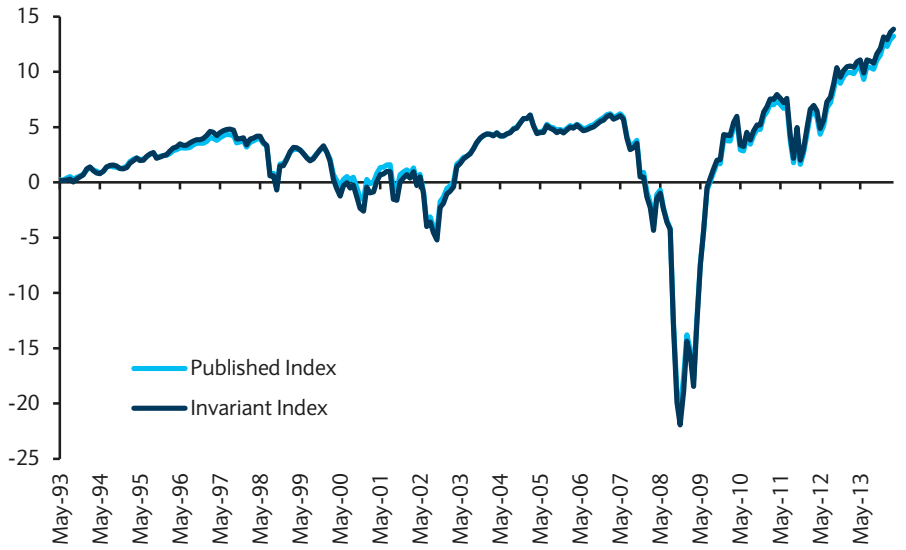
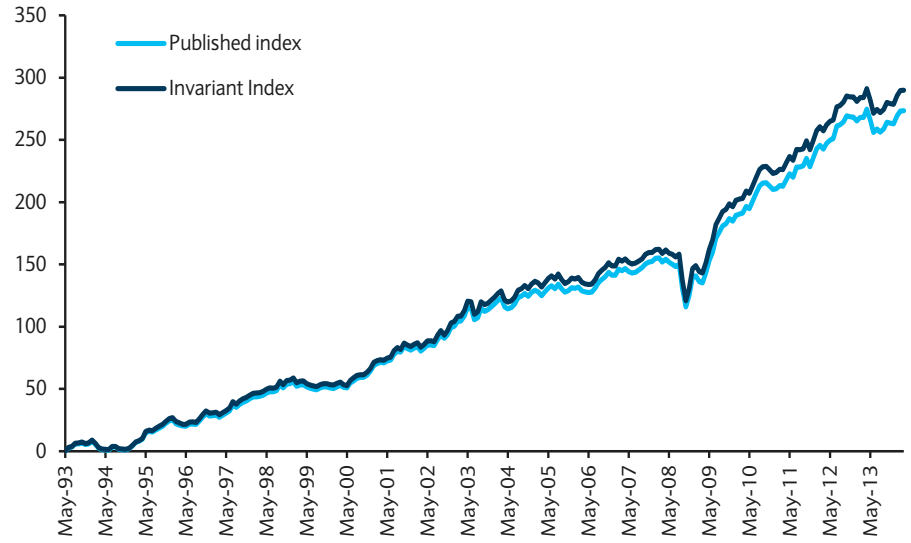


FIGURE 9

Cumulative Total Returns, Investment Grade, May 1993 – March 2014, %



The cumulative excess return gap introduced in October 2008 affected the cumulative total return as well, with the effect gradually amplified by compounding during the ensuing extended fixed income rally. Besides, the published index had somewhat lower duration at the time, and so benefited less from the rally. However, the average difference in monthly total returns of the two indices since October 2008 was just -1.9bp. In fact, this average over the whole period of almost 21 years was almost identical, -2.3bp

Finally, we examine the property that we are most interested in: credit spreads. In a way, the purpose of this study is to find out whether published corporate spreads (OAS) are comparable over time. Figure 10 compares the time series of OAS for the invariant and published indices. Overall, over the past 21 years, spreads of the two indices have remained remarkably close to each other. The lower portion of Figure 10 shows the difference between the two. During the first several years, the invariant index had an OAS that was approximately 12bp larger than the OAS of the published index. While this difference is not immaterial, it is surprisingly small in light of all the structural changes in the corporate market over such a long period of time. This OAS difference persisted for a while, and then gradually disappeared as we moved closer to the present. The explanation for the convergence lies in the invariant's Baa overweight versus the published index (Figure 2). As the two indices converge, the overweight goes away, and the spreads of the two indices move steadily closer.

This rather surprising result should provide some comfort to both practitioners and researchers. Statements such as "spreads are at historically low levels" are roughly valid, after all. Recognizing that the Corporate index includes thousands of bonds, which might throw doubt on the importance of the overall average, we complete the analysis by looking at cross-sectional volatility of OAS. As Figure 11 shows, even that measure has been very consistent for the two indices.

FIGURE 10

OAS, Levels and Difference, Investment Grade, May 1993 – March 2014, bp

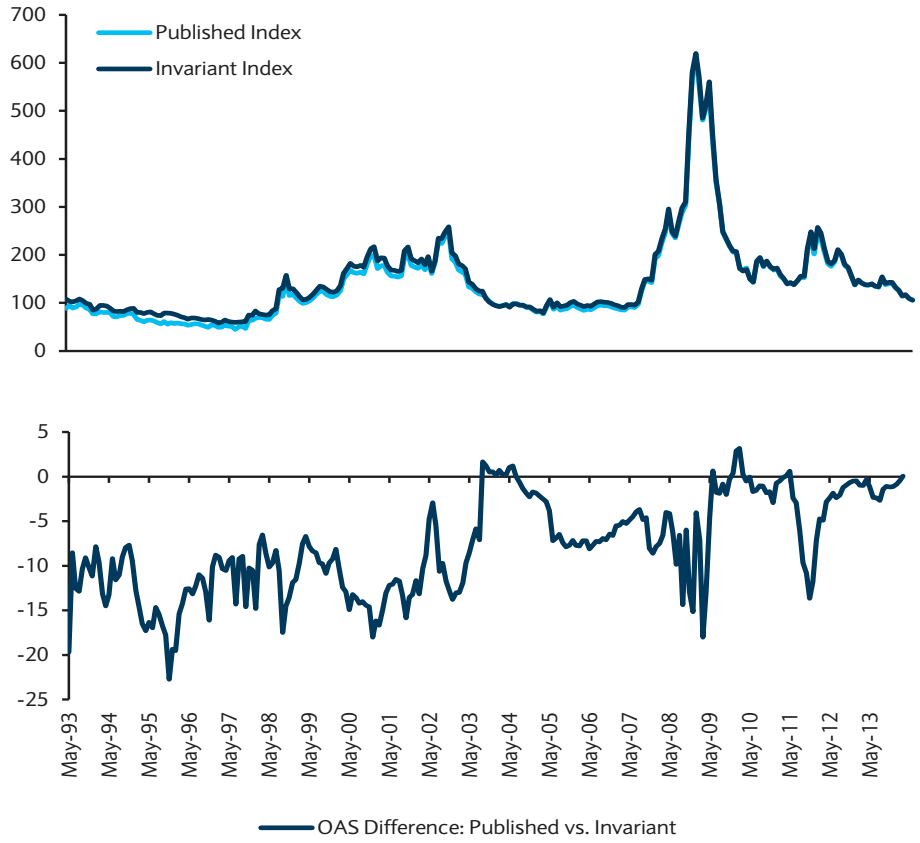
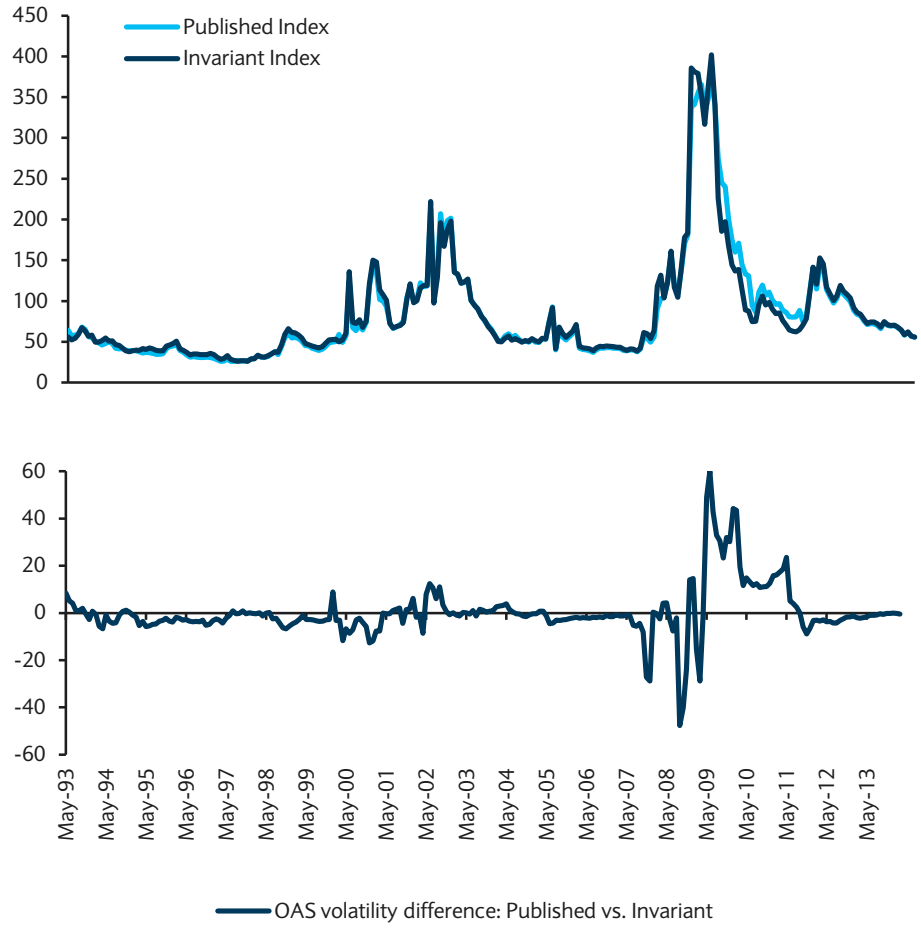


FIGURE 11

Cross-Sectional Volatility of OAS, Levels and Difference, Investment Grade, May 1993 – March 2014, bp



Comparing the High Yield Invariant and Published Corporate Indices

As mentioned earlier, we repeat our analysis for the High Yield Corporate index. We find many similarities. Sector and quality allocations were also very dynamic over the period. The High Yield index was affected by the same changes in index quality and sector classification rules. Just like investment grade, during the turbulent crisis period of 2008-2009, the relative performance of the published and invariant high yield indices experienced a month of high return difference, albeit a different one.

In the end, we arrived at similar conclusions. Despite all the fluctuations in market structure, the important properties of the high yield market, namely spread levels and volatility, as well as cumulative performance, turned out to be amazingly similar to the published index, in some cases, even more so.

We did not feel it necessary to comment on every figure in the high yield part of the analysis. To save space, we placed all the figures in the following Appendix and added some notes where appropriate.

Appendix: The High Yield Analysis

FIGURE A1

Allocation Differences vs. Invariant Index, by Sector, High Yield, May 1993 – March 2014, %

(A positive value means that the weight in the published index was higher than in March 2014)

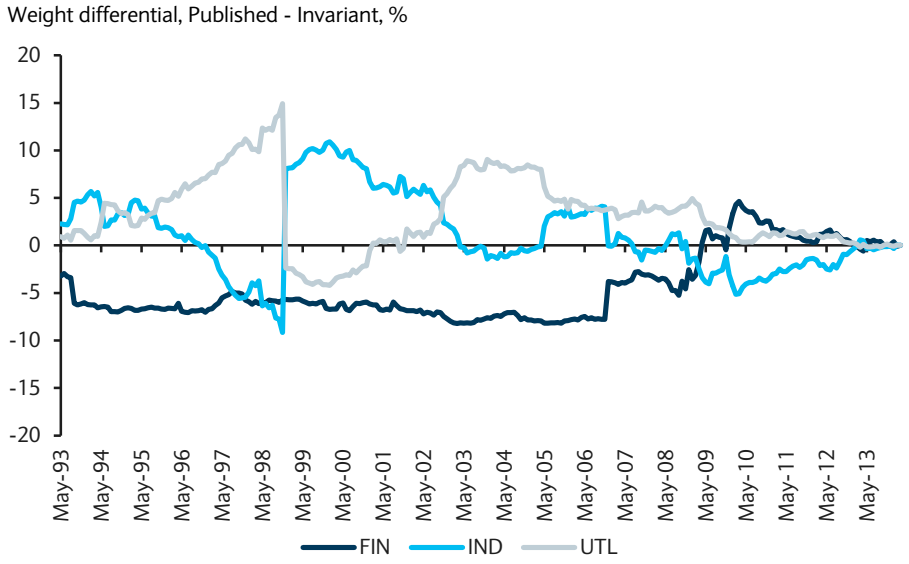


FIGURE A2

Allocation Differences vs. Invariant Index, by Credit Rating, High Yield, May 1993 – March 2014, %

(A positive value means that the weight in the published index was higher than in March 2014)

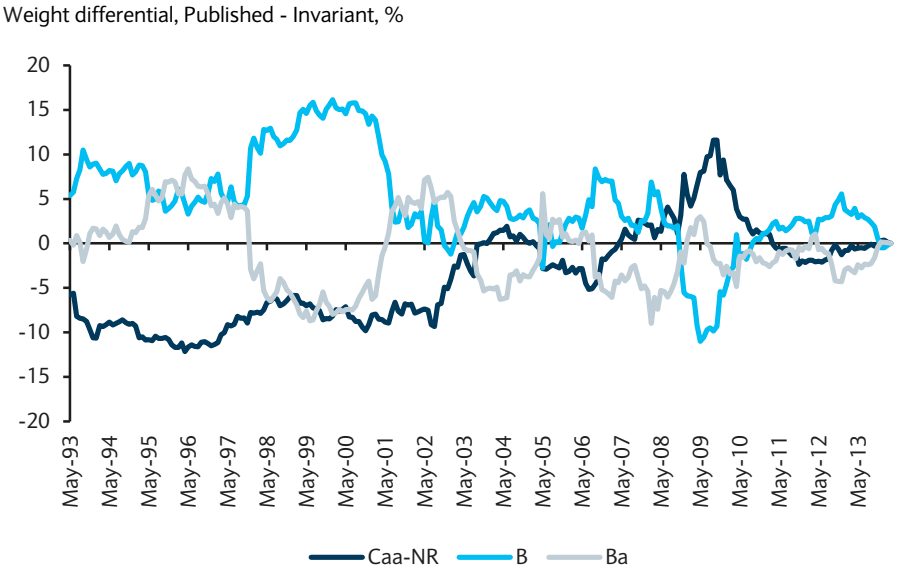


FIGURE A3

Time to Maturity, High Yield, May 1993 – March 2014, yr

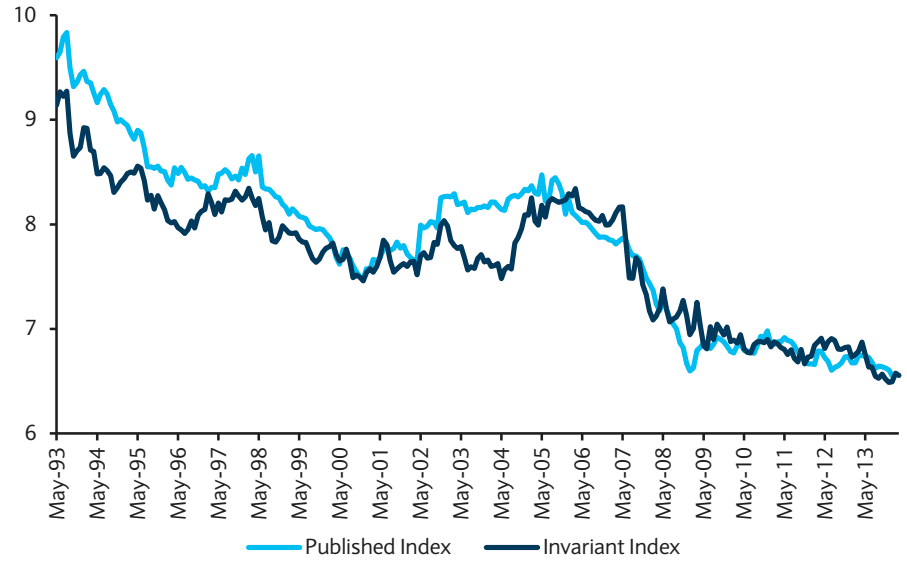
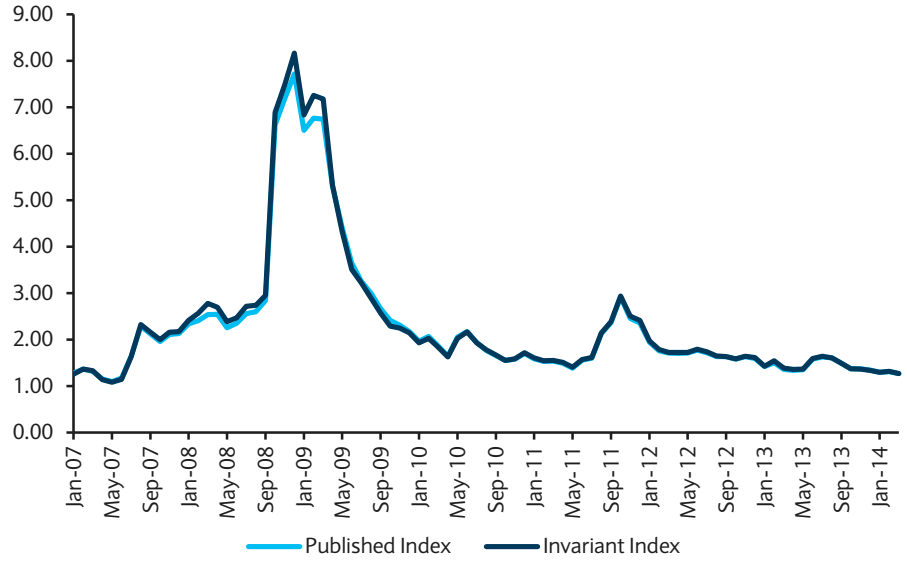


FIGURE A4

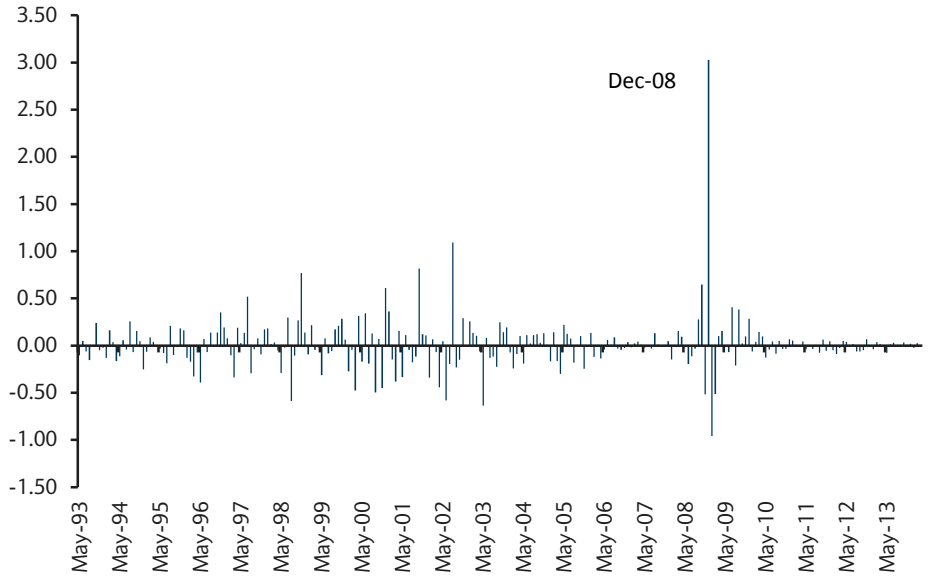
Liquidity Cost Score (LCS), High Yield, January 2007 – March 2014, %



USD Corporate LCS are available since January 2007

FIGURE A5

Excess Return Differential vs. Invariant Index, High Yield, May 1993 – March 2014, %



Note: The dramatic underperformance of the invariant index in December 2008 owes to a very strong performance of a small number of low-rated financial issues in which the invariant index was significantly underweighted. Figure A6 explains this in detail. As a result, a single month accounts for the subsequent cumulative excess return advantage in the published index (Figure A7). Just to demonstrate the unique nature of this disruption, Figure A7-1 shows cumulative excess returns without the December 2008 differential. The lines practically merge.

FIGURE A6

Analysis of December 2008 underperformance

		Dec-08 (Published index)	Mar-14	Difference
Fin < 5	Ba	1.597	5.113	3.516
Fin < 5	B	0.333	1.620	1.286
Fin 5+	Ba	0.641	2.743	2.102
Fin 5+	B	0.000	0.448	0.448
Fin	Caa-NR	5.240	0.450	-4.790
		7.812	10.373	2.562
	Total Ba	2.24	7.86	5.62
	Total B	0.33	2.07	1.73
Total Caa-NR		5.24	0.45	-4.79

Top 10 performers in December 2008 (all Financials Caa-NR):

	Market Value %	% Cntr to ExcRet
Published	3.41	40.0%
Invariant	0.29	7.3%

FIGURE A7

Cumulative Excess Returns, May 1993 – March 2014, High Yield, %

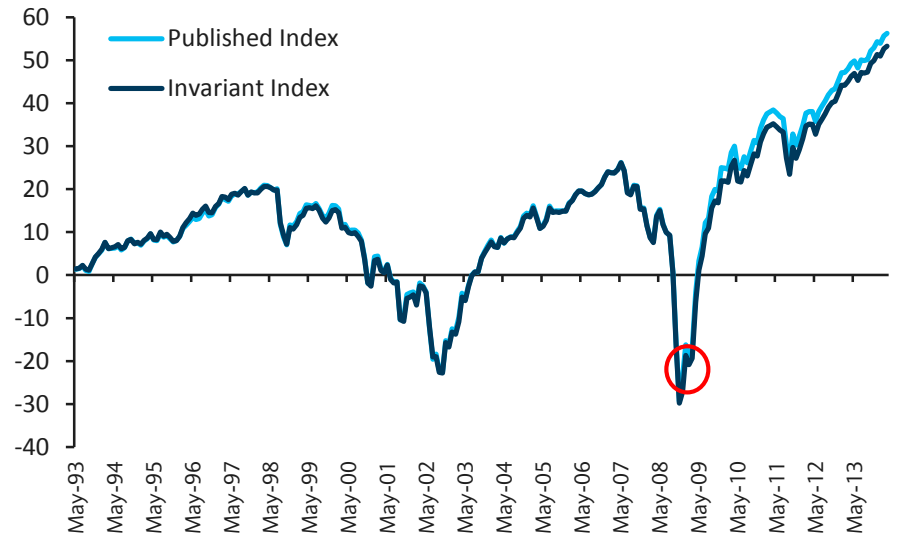


FIGURE A7-1

Cumulative Excess Returns without December 2008 Differential, High Yield, May 1993 – March 2014, %

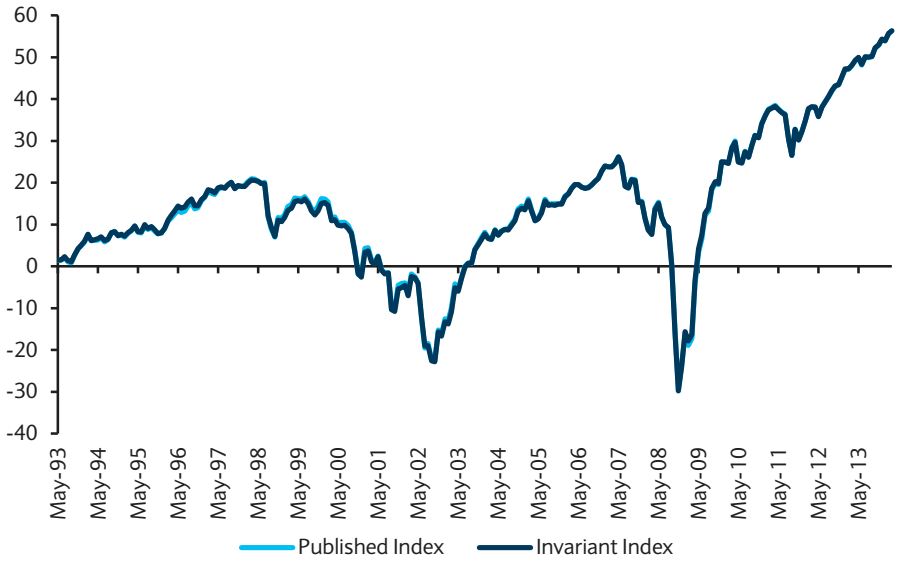


FIGURE A8

Cumulative Total Returns, May 1993 – March 2014, %

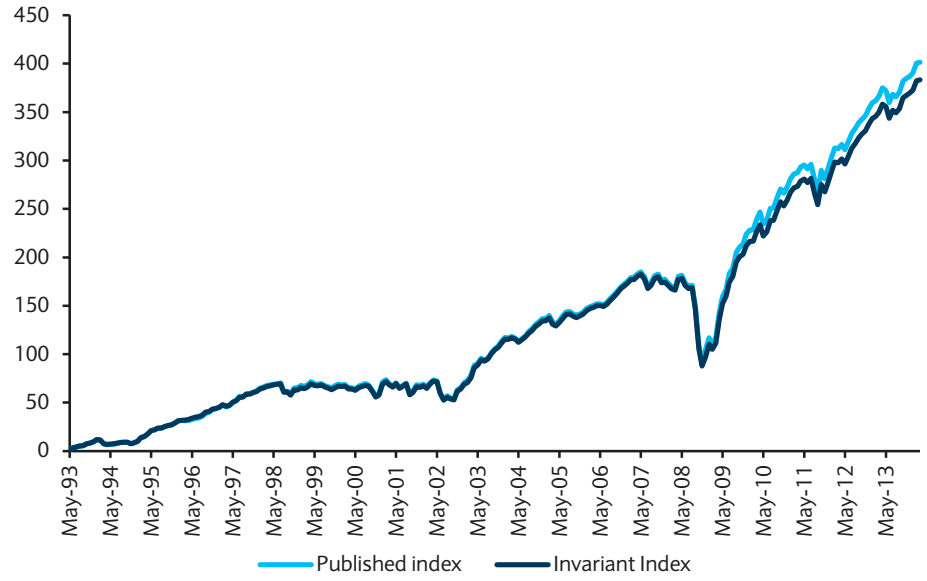
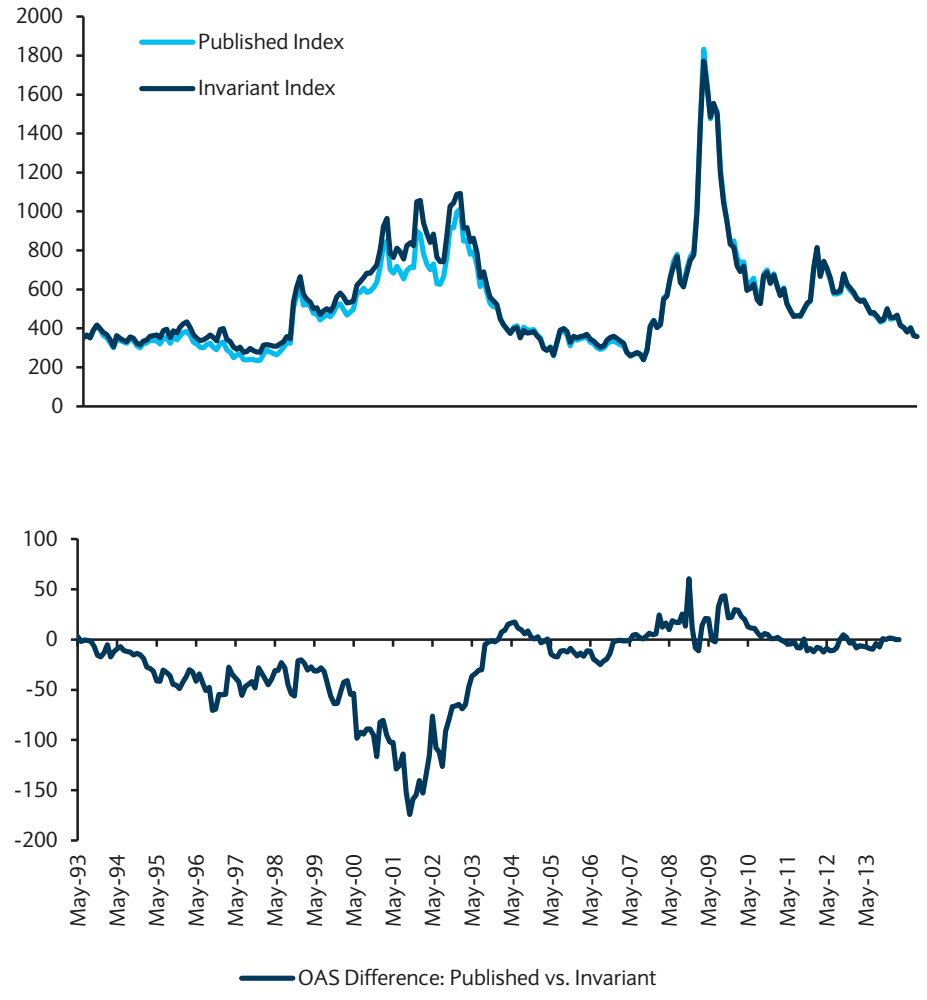


FIGURE A9

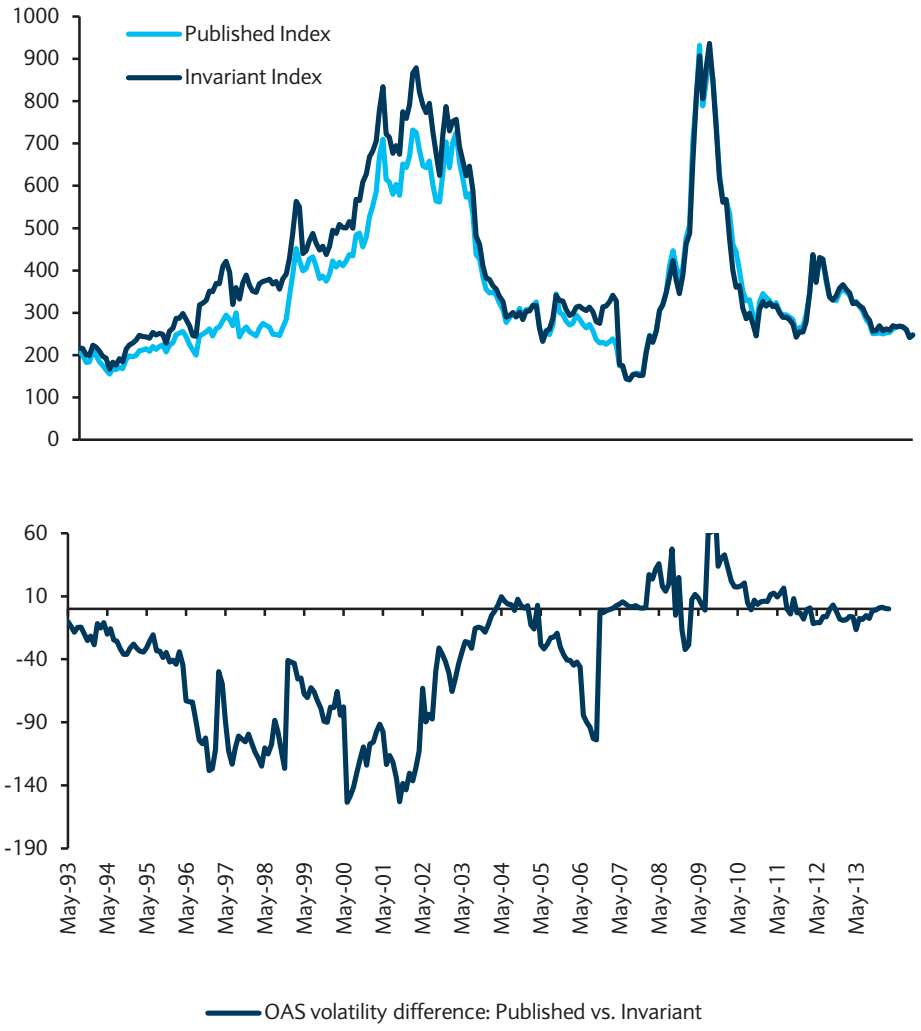
OAS, Levels and Difference, May 1993 – March 2014, High Yield, bp



Note: Figure A9 shows that the OAS of the published index was significantly lower during 2000-2002, reaching -174bp in October 2001. Those were recession years that followed the dotcom debacle. As typical, the lowest quality credits suffered the most. The published index had a significantly smaller allocation to the lowest quality bucket than the invariant index, 10.6% vs. 18.6%. This explains the tighter spreads in that period.

FIGURE A10

Cross-Sectional Volatility of OAS, Levels and Difference, High Yield, May 1993 – March 2014, bp



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