

Issuance Dynamics and Performance of Corporate Bonds¹

- The composition of market-weighted corporate indices is essentially a function of debt issuance and redemption. While bond investors try to achieve high returns, corporate Treasurers look to minimize their cost of capital. Can the objectives of these two groups of market participants be reconciled? What is the effect on corporate bond returns?
- We analyse effects of issuance dynamics on the performance of corporate bonds at three levels: macro, sectors, and issuers.
- At the macro level, debt issuance tends to be negatively related to subsequent corporate excess returns. High debt supply is typically followed by weaker returns, while higher returns are observed in periods following low supply.
- Issuance cycles cause the sector weights of corporate benchmarks to change over time. We find that sector weight dynamics reduced the returns of a broad index of US corporate bonds by about 14bp/year from 1994 to 2014.
- At the issuer level, we find that issuers that aggressively expand their debt tend to underperform conservative borrowers. This difference in performance has been persistent over time. On average, aggressive issuers underperformed by about 70bp/year from 1994 to 2014.
- We confirm our issuer-level findings across broad industry sectors and quality buckets. The results are stronger for industrial and utility sectors and slightly weaker for financials. Aggressive issuers significantly underperform moderate ones in all rating categories except Baa.
- We verify that the underperformance of aggressive issuers is not attributed to other bond characteristics such as spread exposure.
- We consider alternative index weighting schemes to reduce the performance drag associated with issuance pro-cyclicality.

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Introduction

Corporate bond investors often benchmark their portfolios to market-weighted indices. Such indices have several characteristics that make them attractive to market participants – they represent the asset class, have relatively low turnover, and are easy to replicate. Even though some investors have recently expressed interest in alternative weighting schemes, market-weighted indices remain dominant.

Market-weighted corporate bond indices automatically include newly issued securities that satisfy index inclusion rules. As a result, index composition often becomes a function of issuance dynamics. However, corporate issuers might have goals that differ from investors' objectives. While portfolio managers try to achieve high returns, corporate treasurers try to minimize cost of capital.

Are these conflicting objectives likely to be reconciled in the corporate bond market? On one hand, prices of newly issued securities should represent supply-demand equilibrium. Assuming market efficiency, abnormal future returns should be precluded. On the other hand, portfolio managers, whose performance is measured relative to an index, can have neutral views on securities added to the benchmark. From their perspective, buying newly issued bonds entails little risk because their benchmark buys them as well. At the same time, scrutinizing newly issued bonds with an objective to underweight unwanted names is typically a strategy with low alpha, especially in a tight spread environment.² Also, newly issued bonds are often priced at a concession relative to the secondary market.³ This can provide an additional incentive to add these securities to the portfolio. The lack of a strong motivation for a portfolio manager to scrutinize newly issued bonds included in their credit benchmark might lead to bond prices under-reacting to issuance announcements.

In this article, we analyse long-term effects of issuance on the subsequent performance of corporate bonds in the US credit market. We divide the study into four sections:

First, we document a negative relationship at the macro level between issuance rate and subsequent performance of corporate bonds as corporate treasurers exploit credit cycles to minimize their long-term cost of funding.

Second, we demonstrate a negative relationship between issuance and subsequent excess returns at the sector level as well. We show that this results in a performance drag for corporate bond indices, with dynamic sector weights working as a propagation mechanism. We explain and measure the negative contribution of sector weight dynamics to index performance.

In the third section, we focus on the issuer level. We show that historical excess returns of issuers borrowing at a high pace ("aggressive" issuers) have been consistently lower than those of their peers issuing at a lower rate ("moderate" issuers). We check the robustness of our conclusions by using alternative criteria to identify "aggressive" issuers and by controlling for spread exposure.

Finally, we discuss possible alternative weighting of credit indices that alleviate some of the problems associated with issuance dynamics.

² Active returns that can be generated by underweighting unwanted names are typically low because of benchmark composition constraints. The maximum underweight in a security cannot exceed its weight in the benchmark unless net short positions are possible. As a result, the strategy of underweighting issuers typically generates lower alpha than overweighting favourite names. This is especially true in low spread environments. See Dynkin, L., J. Hyman, and V. Konstantinovskiy, "Sufficient Diversification in Credit Portfolios", September 2010.

³ Our analysis of issuance concessions showed that new corporate issues in the primary market are typically priced at a concession relative to their peers in the secondary market. The study further analyses various factors that affect the size of the concession. The strategy that replaced old bonds in the portfolio with newly issued bonds of the same issuer has historically generated a positive alpha with relatively low market risk.

Debt issuance and credit performance

We begin by analyzing the relationship between debt issuance and subsequent performance of corporate bonds at the macro level. The data used in our study covers the entire range of USD-denominated corporate bonds – from investment grade to high yield.⁴ We combine Barclays US Credit Corporate, US 144A, and US HY indices into a composite US Corporate All Ratings index. Figure 1 shows the market structure of this composite index split into eight customized sectors as of 31 July 2014.⁵ Investment grade bonds represent 78.1% of the index market value. Banks and Brokerages have the largest weight (19%) among investment grade sectors. Other large industry sectors include Communication & Technology, Consumer Non-Cyclical, Transportation & Energy, and Basic & Capital Goods with respective weights of 11.5%, 10.1%, 10.0%, and 8.5%.

FIGURE 1

Market structure of the US Corporate All Ratings, 31 July 2014

Sector	# issuers	# bonds	Amount outstanding (\$bn)	Market value (%)	Yield to worst (%)	OAD (yr)	OAS (bp)
Total	2,091	8,207	5,599	100	3.61	6.3	167
Investment Grade	1,032	6,030	4,335	78.1	3.02	6.9	105
Basic and Capital Goods	171	757	475	8.5	3.27	7.3	120
Cyclical	70	395	275	4.9	2.70	6.5	84
Non-Cyclical	139	799	569	10.1	2.92	7.3	89
Communication and Technology	106	682	633	11.5	3.20	7.6	108
Transportation and Energy	130	867	548	10.0	3.34	7.7	117
Utilities	90	772	314	5.8	3.40	9.2	104
Banks and Brokerage	155	988	1,075	19.0	2.58	5.0	100
Financial Others	171	770	447	8.2	3.18	6.9	116
High Yield	1,059	2,177	1,264	21.9	5.70	4.3	388
Basic and Capital Goods	266	464	239	4.1	5.87	3.9	419
Cyclical	188	381	184	3.1	6.37	4.2	456
Non-Cyclical	133	240	152	2.6	5.58	4.1	381
Communication and Technology	159	419	303	5.3	5.62	4.5	373
Transportation and Energy	200	403	218	3.8	5.76	4.4	383
Utilities	22	66	42	0.7	5.23	4.9	333
Banks and Brokerage	24	58	42	0.8	4.42	5.3	253
Financial Others	67	146	86	1.5	5.07	4.0	332

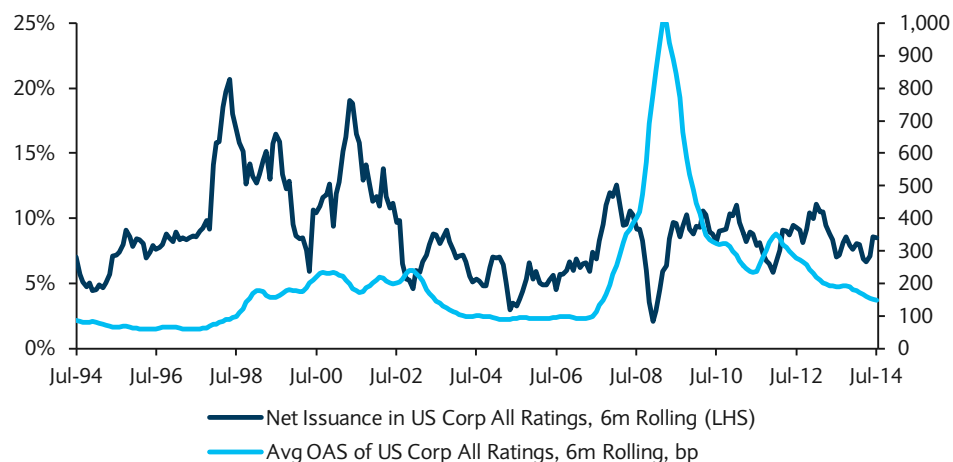
Source: Barclays Research

⁴ Combining IG and HY indices precludes situations in which issuers disappear from the universe due to a rating downgrade. This allows tracking individual issuers over long time horizons.

⁵ Customized sectors are defined to minimize issuer-specific effects. They are constructed by grouping together Class 3 industry categories of Barclays bond indices to ensure that all sectors remain sufficiently populated in our sample period.

The recent snapshot of the USD corporate bond universe presented in Figure 1 is a function of cumulative issuance over the preceding years. The issuance rate has varied significantly over time as a function of global and sector-specific cycles, as shown in Figure 2.⁶ Indeed, corporations aim to minimize their cost of capital by increasing debt issuance when rates and spreads are relatively tight. On the other hand, issuance typically declines when credit spreads are high.

FIGURE 2

Rolling 6-month net issuance, % of amount outstanding

Source: Barclays Research

We analyse the relationship between aggregate *net issuance rate* and subsequent excess returns of the US Corporate All Ratings index. We calculate net issuance in the index over 6-month rolling periods. *Issuance rate* is calculated as the ratio of 6-month net issuance to the amount of debt outstanding at the end of the period.⁷ We then report cumulative index excess returns over duration-matched treasuries in the subsequent six months.

We split all observations in our sample into issuance rate quartiles. Observations with net issuance rates in the bottom 25% of the sample are assigned to quartile 1 (Q1), while observations in the top 25% are assigned to quartile 4 (Q4). Panel A of Figure 3 shows average excess returns calculated for each quartile. Average issuance rate for each quartile is reported next to the quartile label of the x-axis.

⁶ We calculate net issuance in the index as the following: New Gross Issuance – Redemption – Maturing Bonds. The latter is measured by the amount of bonds excluded from the index with a 12-month lag as the index invests in bonds with at least one year remaining until maturity.

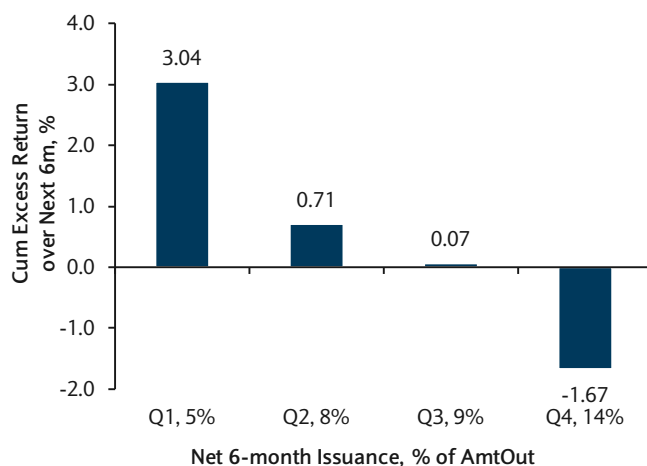
⁷ We use *end-of-the-period* amount outstanding (as opposed to *beginning-of-the-period*) to calculate the issuance rate. In the following sections, we will calculate issuance rates for individual issuers, so that using end-of-the-period debt will allow us to handle new issuers in the index. We use a similar approach at the macro level for consistency reasons. Using *beginning-of-the-period* amount outstanding leads to the same conclusions.

FIGURE 3

Credit performance per volume of net issuance, August 1994 – July 2014

PANEL A

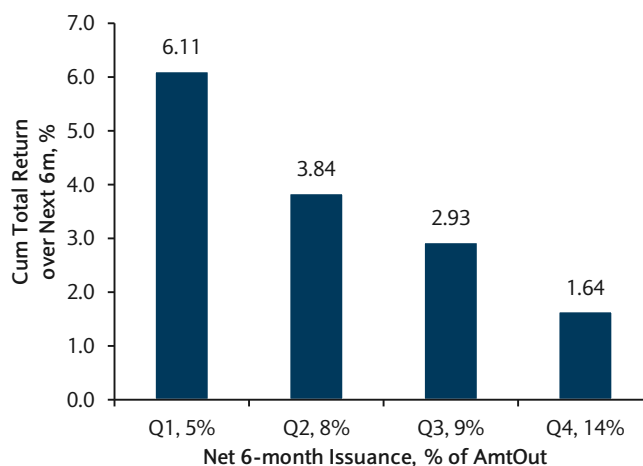
Credit excess returns per net issuance quartile



Source: Barclays Research

PANEL B

Credit total returns per net issuance quartile



Source: Barclays Research

Corporate excess returns seem to be negatively related to past issuance rates. Periods of low issuance are followed by higher excess returns. On the contrary, high issuance is typically followed by a relatively poor performance. A qualitatively similar pattern is observed for total returns, as shown in panel B of Figure 3.

The negative relationship between issuance and performance also holds for individual industry sectors. For each sector, we calculate historical issuance rates and subsequent excess returns over rolling 6-month periods. Monthly observations are partitioned into issuance rate quartiles. Figure 4 shows the difference in average excess returns between the first and the fourth quartiles. Positive differences indicate that sector returns are higher after low issuance (Q1) than after high issuance (Q4). We repeat this exercise for two sub-periods: from August 1994 to December 2005 and from January 2006 to July 2014. Even though the differences in average returns between bottom and top quartiles seem to vary, the results point to the same conclusion: periods of high issuance tend to be followed by lower returns.⁸ Differences in excess returns seem to be larger for sectors affected significantly by credit cycles (Cyclical, Communication & Technology and Financial). In the first sub-period, the negative relationship between issuance and performance holds for all sectors but is especially strong for Communication & Technology due to the dotcom crisis of 2001. The second sub-period is relatively short, so the results are strongest for sectors affected by the 2008 crisis: Financials and Cyclical. In contrast, the issuance cycle for Basic & Capital Goods and Communication & Technology in the second sub-period is relatively mild. As a result, the relationship between issuance and performance for these two sectors breaks down.

⁸ Note that return differentials for the two sub-periods on Figure 4 cannot be simply re-combined into the results for the overall sample because issuance ranking is implemented independently for each period in isolation.

FIGURE 4

Differences in average excess returns between bottom and top issuance quartiles by sector, % over six months

	Low (Q1) - High (Q4) Aug-1994 - Jul-2014	Low (Q1) - High (Q4) Aug-1994 - Dec-2005	Low (Q1) - High (Q4) Jan-2006 - Jul-2014
Basic and Capital Goods	0.56	2.11	-1.96
Cyclical	3.19	2.62	4.47
Non-Cyclical	0.40	1.00	0.61
Communication & Technology	4.45	6.10	-0.33
Transportation and Energy	2.66	3.14	2.58
Utilities	1.76	2.14	0.02
Banks and Brokerage	4.65	0.64	9.50
Financial Others	5.09	1.67	14.66
Total	4.72	2.61	7.26

Source: Barclays Research

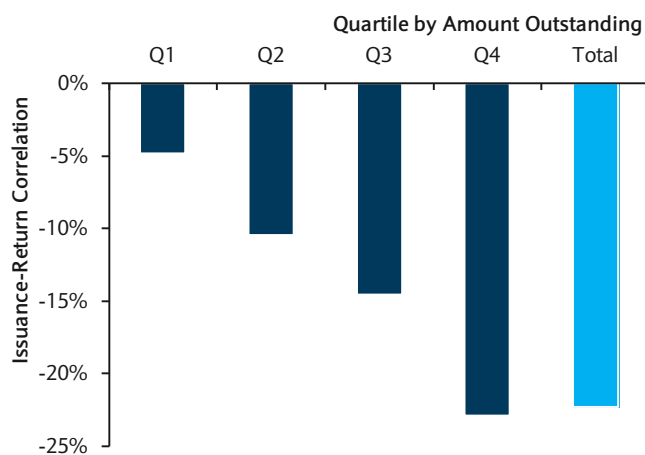
Does issuer size affect the negative relationship between issuance and performance? Intuitively, larger borrowers should be in a better position to exploit discretionary issuance with a view to manage their cost of capital. A stronger negative relationship between issuance and performance should therefore be expected for larger firms. To verify this, we sort issuers into quartiles of debt outstanding in the index. Small borrowers fall into the bottom quartile (Q1), and large ones into the top quartile (Q4). We calculate historical issuance rates over 6-month rolling periods together with subsequent 6-month excess returns for each quartile and report correlation between issuance rates and subsequent excess returns. Panel A of Figure 5 shows that correlations decline when issuer size increases, reaching almost -25% for the largest borrowers represented by the top quartile. Interestingly, 80% of the index market value falls into the top quartile of issuer size.⁹ This suggests that the previously obtained results are likely driven by large borrowers.

FIGURE 5

Correlations between issuance rates and subsequent excess returns, August 1994 – July 2014

PANEL A

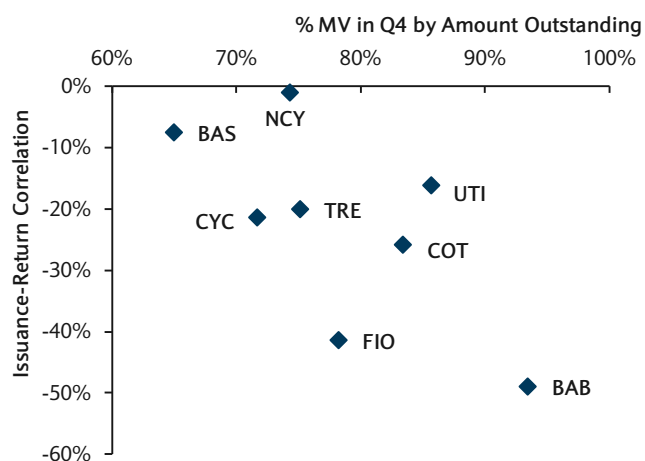
Issuance-return correlations by debt size quartile



Source: Barclays Research

PANEL B

Issuance-return correlations by sector



Source: Barclays Research

⁹ This result is not shown in the figure.

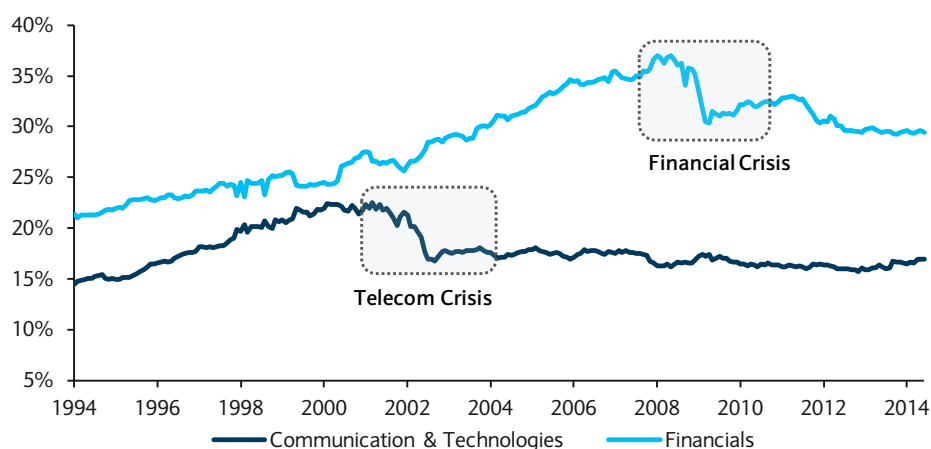
Correlations between issuance rate and subsequent returns can also be calculated for individual sectors. To infer whether a sector is represented by larger borrowers, we measured the percentage of sector's market value in the top size quartile according to amount of debt outstanding. Panel B of Figure 5 shows that sectors represented by larger companies generally have more negative correlations between issuance rate and subsequent excess returns. The most negative correlation of -49% is observed for Banks & Brokerage (BAB) as 93% of this sector falls in the top size quartile. In contrast, only 67% of debt issued by the Basic Goods sector falls in the top quartile, so the issuance-return correlation for this sector is only -7.6%.

Sector weights dynamics and index performance

The negative relationship between issuance and performance can be detrimental to the returns of a market-weighted corporate bond index. Dynamic sector weights, which represent cumulative net issuance over time, work as a transmission mechanism for the performance drag. Sector weights tend to be high during periods of poor performance as high issuance is followed by poor returns. On the other hand, sector weights tend to be low during recovery periods as low issuance is followed by stronger performance.

We illustrate this with simple examples: Figure 6 shows the historical weights of the Communication & Technology and Financial sectors in the US Corporate All Ratings index. Both sectors experienced episodes of significant underperformance at different times. The Communication & Technology sector was strongly affected by the 2002 crisis, while Financials suffered in 2008. Both sectors entered their respective crises with relatively high weights as firms had been issuing debt aggressively in prior years. Elevated sector weights during market downturns made negative contributions to index performance relatively high. In contrast, the weights of both sectors experienced sharp declines during and after their respective crises as affected corporations lost their ability, or willingness, to issue new debt. As a result, sector weights were relatively low during post-crisis recoveries. This limited the contribution of any recovery in sector performance to index returns. These two examples illustrate that time-varying sector weights associated with issuance dynamics can have an adverse effect on the performance of a market-weighted corporate index over time.

FIGURE 6
Historical market weights of selected corporate sectors



Source: Barclays Research

To quantify the effect of sector weight dynamics on index performance, we create an *alternative* corporate benchmark with constant sector weights. These weights are set to time-average weights of respective sectors in the US Corporate All Ratings index. The contribution of weight dynamics can be measured as the incremental excess return of the standard (market-weighted) index over the one with constant sector weights.

Figure 7 reports the return statistics for the market-weighted and alternative indices over different periods. The alternative index with constant (time-average) sector weights significantly outperforms the market-weighted one. The right-most column shows the excess return attributed to sector weight dynamics calculated as differences between the excess returns of the two indices. Since sector weights are identical when averaged over time, the return differences represent contributions from weight variations. The performance drag attributed to sector weights dynamics in the US Corporate All Ratings index is 14bp/year from February 1994 to July 2014. This effect is more than doubled in the global financial crisis from 10bp/year before to 23bp/year during and after the crisis. This underperformance of the market-weighted index is persistent over time, with an information ratio of -0.60.

FIGURE 7

Contribution of dynamic sector weights to index performance

US Corp All Ratings	Historical market weights (Dynamic)	Time-Average weights (Constant)	Weight contribution (TE) (MW-Const)
Feb 1994 - Jul 2014			
Avg Exc Ret (annualized), %/yr	0.98	1.12	-0.14
Volatility (annualized), %/yr	5.38	5.40	0.24
Information Ratio	0.18	0.21	-0.60
Feb 1994 - Jun 2007			
Avg Exc Ret (annualized), %/yr	0.63	0.73	-0.10
Volatility (annualized), %/yr	3.10	3.03	0.13
Information Ratio	0.20	0.24	-0.79
Jul 2007 - Jul 2014			
Avg Exc Ret (annualized), %/yr	1.66	1.89	-0.23
Volatility (annualized), %/yr	8.27	8.36	0.36
Information Ratio	0.20	0.23	-0.64

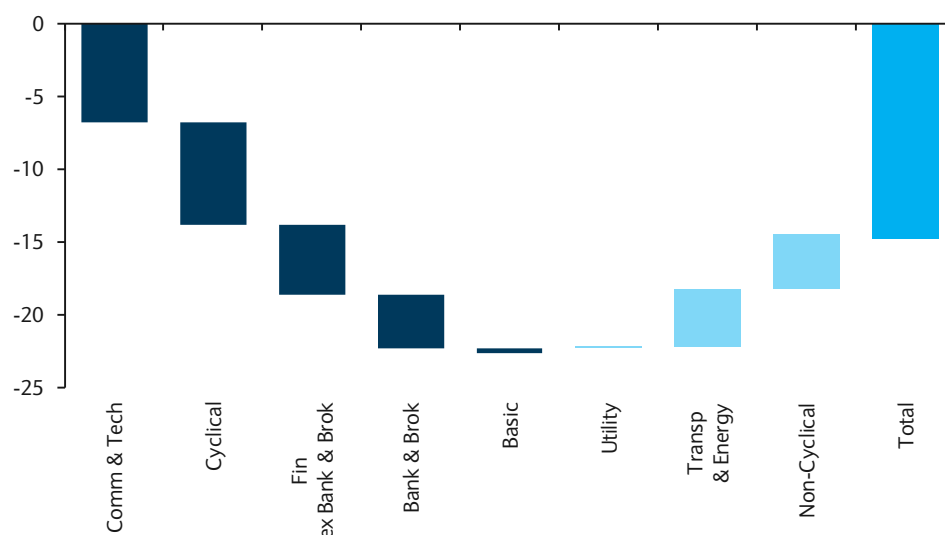
Source: Barclays Research

The performance drag of 14bp/year can be decomposed into contributions from individual sectors. The contribution of an individual sector is calculated as a time average of the product of excess returns and sector weights minus the product of time-average excess returns and time-average weights. Figure 8 shows the attribution results.

Dynamic weights of sectors affected by credit cycles (Cyclical, Communication & Technology, and Financials) contribute negatively to index excess returns. Other, more stable sectors (Non-Cyclical, Energy, and Utilities) have positive contributions. Different signs of individual sector contributions are not surprising because changes in weights in the index are relative – an increase in weight of one sector results in a weight decrease for others.

FIGURE 8

Contributions of dynamic weights to index returns by sector, February 1994 – July 2014



Source: Barclays Research

Do aggressive issuers tend to underperform?

Our results suggest that, at the sector level, the negative relationship between debt issuance and credit returns translates into a performance drag for market-weighted corporate indices. Is this negative relationship between issuance and performance also observed at the issuer-level? Do issuers that opportunistically rely on debt financing (“aggressive” issuers) tend to underperform their conservative peers (“moderate” issuers) over time?

In this section, we limit our universe to issuers successfully mapped to Compustat GVKEY identifiers. The Compustat database contains historical financial report data of individual firms. Using Compustat identifiers allows us to track debt issued by individual firms historically.¹⁰ This reduced universe covers about 80% of the bonds in the original corporate bond index.

For each issuer in the new universe, we calculate *issuance rate* as the ratio of net issuance over past 12 months divided by the amount of debt outstanding in the index at the end of the period.¹¹ Because the amount of debt outstanding in the index changes and, in general, increases over time, we consider the rate of issuance of individual firms relative to the index. If a company issuance rate exceeds the one of the index, we classify that issuer as “aggressive”; otherwise, it is called “moderate”. Panel A of Figure 9 shows the performances of market-weighted portfolios of aggressive and moderate issuers by broad sectors between August 1994 and July 2014. The portfolio of aggressive issuers underperformed the portfolio of moderate issuers in all three sectors. At the aggregate level, the average excess return of moderate issuers is almost double that of aggressive issuers. At the same time, excess return volatilities of both portfolios are similar. Panel B of Figure 9 compares cumulative excess returns of aggressive and moderate issuers. The underperformance of aggressive issuers seems to be persistent over time.

¹⁰ In contrast, corporate bond tickers were not always suitable to track individual issuers historically. The mapping between our bond and Compustat universes is described in Ben Dor A., and J. Xu, ‘BEAM (Bonds in Equity Asset Momentum): Value of Bond Market Information in Equity Momentum Strategies’, June 2014.

¹¹ We measure issuance rate with respect to the amount outstanding *at the end* of the period to process issuers appearing in the index for the first time. The amount outstanding of those issuers at the beginning of the period is zero, which would not make possible to define issuance rate based on beginning-of-the-period debt outstanding. This problem can be avoided by excluding new issuers from the sample. This alternative approach does not change results qualitatively.

FIGURE 9

Performance statistics of aggressive and moderate issuers by broad industry sectors, August 1994 – July 2014

PANEL A

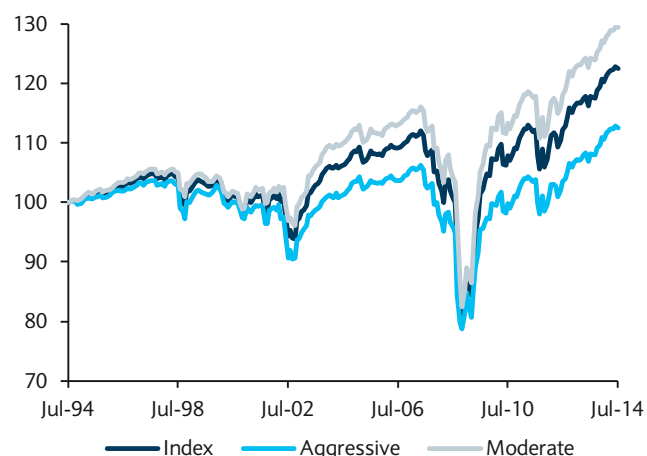
Performance statistics, August 1994 – July 2014

Sector	Statistics	Mod	Aggr	Mod - Aggr
IND	Avg Exc Ret, [bp/m]	12.0	8.7	3.3
	Volatility, [bp/m]	163	154	49
	Information Ratio	0.26	0.20	0.24
UTI	Avg Exc Ret, [bp/m]	12.8	5.9	6.9
	Volatility, [bp/m]	171	165	61
	Information Ratio	0.26	0.12	0.39
FIN	Avg Exc Ret, [bp/m]	10.3	6.8	3.6
	Volatility, [bp/m]	151	167	82
	Information Ratio	0.24	0.14	0.15
Total	Avg Exc Ret, [bp/m]	11.9	6.1	5.9
	Volatility, [bp/m]	154	150	60
	Information Ratio	0.27	0.14	0.34

Source: Barclays Research

PANEL B

Cumulative excess returns: aggressive vs moderate issuers



Source: Barclays Research

A possible explanation of the outperformance of moderate issuers is that this group might include many bonds downgraded into high yield (fallen angels). Indeed, companies downgraded below investment-grade may be constrained in their capacity to issue new debt and therefore become moderate issuers. At the same time, fallen angels are known to outperform their peers after they have been downgraded below investment-grade.¹² They should therefore contribute positively to the performance of the group of moderate issuers, assuming their capacity or willingness to issue new debt is limited.

Figure 10 reports the performance of aggressive and moderate portfolios in each rating category. Aggressive issuers underperform moderate ones across all ratings except Baa. The average excess returns of moderate issuers are over double those of aggressive ones, while volatilities are broadly comparable. This result is strongest for the Ba-B bucket, where the information ratio of return differential (moderate over aggressive) reaches 0.69. However, moderate issuers slightly underperform aggressive ones in the Baa quality bucket.

Results for Baa and Ba-B buckets can be influenced by downgraded bonds (fallen angels). Fallen angels are likely to be classified as moderate issuers because their capacity to issue new debt is likely to be constrained. Companies might partially lose their market access before a downgrade or could reduce borrowing to avoid higher cost of capital. Prior to a downgrade to high yield, most fallen angels fall into the Baa category and tend to underperform their peers. After the downgrade, fallen angels most often end up in the Ba-B rating category and generally experience a strong recovery. Therefore, excess returns of moderate issuers over aggressive ones are low in the Baa bucket and relatively high in the Ba-B bucket.

¹² See Ben Dor A., and J. Xu, 'Fallen Angels: Characteristics, Performance, and Implications for Investors', Barclays Research, December 2010.

FIGURE 10

Performance statistics of moderate and aggressive issuers by rating category, August 1994 – July 2014

Rating	Average excess returns (bp/m)			Volatility (bp/m)			Information ratio		
	Moderate	Aggressive	Difference	Moderate	Aggressive	Difference	Moderate	Aggressive	Difference
AAA - AA	4.9	1.5	3.4	96	95	52.6	0.18	0.05	0.23
A	7.6	-3.7	11.3	130	147	82.0	0.20	-0.09	0.48
BAA	7.3	10.3	-3.0	156	163	52.8	0.16	0.22	-0.20
BA - B	31.8	14.0	17.8	255	279	88.9	0.43	0.17	0.69
CAA - C	54.2	23.1	31.1	489	565	387.9	0.38	0.14	0.28
Total	11.9	6.1	5.8	154	150	60.1	0.27	0.14	0.34

Source: Barclays Research

The fact that aggressive issuers tend to underperform moderate ones across most rating categories (except Baa) shows that the phenomenon cannot be explained by the presence of fallen angels only. Indeed, most fallen angels transit from Baa into Ba-B and so cannot explain performances in other rating categories.

Another possible cause of the poor relative performance of aggressive issuers might be related to differences in credit exposure. If moderate issuers have systematically higher spreads or longer durations than aggressive issuers, one could expect a portfolio of moderate issuers to outperform over the long term.¹³ We, therefore, try to measure the relative performance of the two portfolios, while controlling for issuer spread exposure, as measured by duration times spread (DTS).¹⁴

Each month we run a cross-sectional regression of individual issuers' excess returns on their DTS, distinguishing between aggressive and moderate issuers in broad sector categories using dummy variables.¹⁵

$$\text{Exc Ret} = \text{Exc Ret Per DTS} \times \text{DTS} \times 1\{\text{issuance}\} \times 1\{\text{sector}\} + \text{Residual}$$

Estimated coefficients correspond to monthly average excess returns of aggressive and moderate issuers *per unit of credit exposure* (DTS) in three broad sectors. Figure 11 shows that moderate issuers continue to outperform aggressive ones after controlling for DTS exposure. The outperformance is 0.38bp/month and 0.42bp/month for industrial and utility sectors, respectively. Information ratios are also significant with the exception of Financials, for which exposure-adjusted outperformance of moderate issuers over aggressive is relatively weak. These performance numbers are reported per unit of DTS (eg, one unit of DTS would correspond to a duration of 2.5 years and a spread of 40bp). For an actual corporate bond portfolio, DTS is typically higher. Assuming a portfolio DTS of 10 (close to the current DTS of the US Corporate All Ratings index), these numbers become 3.8bp/month and 4.2bp/month, respectively. This is broadly consistent with the results reported in Panel A of Figure 9.

¹³ Higher credit risk is typically compensated by higher risk premium; see Ng, K. Y., and B. Phelps, 'Structure of US Corporate Excess Returns: The Hunt for a "Low-Risk" Anomaly', Barclays Research, May 2014.

¹⁴ Previously published research shows advantages of using DTS to measure portfolio credit risk; see Ben Dor, A., et al, 'DTS: A New Measure of Spread Exposure in Credit Portfolios', Barclays Research, February 2009.

¹⁵ We remove observations with extreme return realizations. Observations in top and bottom 1% of the sample sorted by excess returns are eliminated.

FIGURE 11

Returns per unit of DTS for different issuer categories, August 1994 – July 2014

	Avg. excess return (bp/m)			Volatility (bp/m)			Information ratio		
	Mod	Aggr	Mod - Aggr	Mod	Aggr	Mod - Aggr	Mod	Aggr	Mod - Aggr
Industrial	1.23	0.85	0.38	8.25	9.60	2.80	0.52	0.31	0.47
Utilities	1.14	0.72	0.42	9.05	10.10	4.31	0.44	0.25	0.34
Financial	1.22	1.13	0.09	7.87	8.99	3.52	0.54	0.44	0.09

Source: Barclays Research

Are our results robust with respect to the definition of “aggressive” and “moderate” issuers? After all, there are other ways to measure issuer aggressiveness that do not rely on amounts outstanding in a bond index. In fact, our definition of an aggressive issuer is subject to two caveats. First, we define ‘issuance rate’ as the ratio of net issuance to existing amount outstanding in the corporate bond index. As a result, large companies with relatively little outstanding debt (examples include Apple Inc., Microsoft Corp. and Pfizer Inc.) could be classified as aggressive when issuing new bonds, although their leverage remains modest. Second, bond indices might not represent all liabilities of a firm because they do not include private debt, bank loans, or credit lines from consumers’ suppliers. Therefore, our results could be less relevant for companies that obtain financing outside of the corporate bond market.

So, we refine our analysis by introducing an alternative definition of “aggressive” and “moderate” issuers based on accounting data from issuers’ financial statements rather than bond index data. Instead of looking at 12-month net debt issuance in the index, we consider the net increase in firm’s liabilities divided by the total assets of the firm at the end of the 12-month period.¹⁶ As a result, we obtain a rolling 12-month net increase in liabilities as a percentage of total assets for each company in our sample. Firms that grow liabilities at a higher pace than the index average are classified as aggressive, while firms that issue at a slower than average pace are called moderate. Figure 12 reports performances of market-weighted portfolios of aggressive and moderate issuers using this new partitioning by growth in liabilities as a percentage of total assets.

¹⁶ Historical measures of firms’ assets and liabilities are taken from Compustat, which stores financial statement data published by individual companies. We take total assets at the end of the period to be consistent with our previous methodology of calculating issuance rate.

FIGURE 12

Performance statistics of aggressive and moderate issuers by sector using accounting data, August 1994 – July 2014

PANEL A

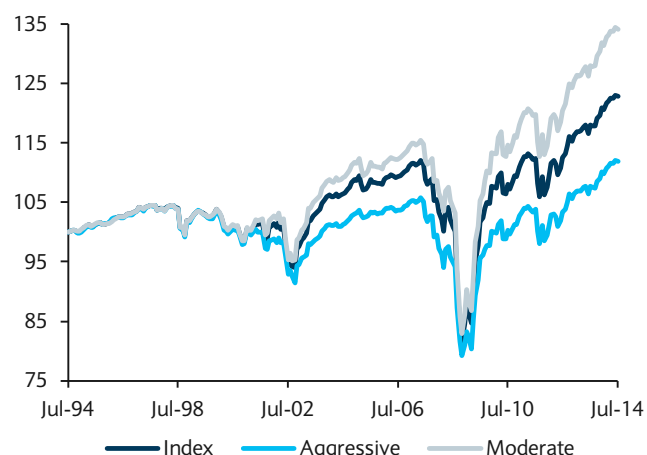
Performance statistics, August 1994 – July 2014

Sector	Statistics	Mod	Aggr	Mod - Aggr
IND	Avg Exc Ret, [bp/m]	14.2	6.0	8.2
	Volatility, [bp/m]	161	152	43
	Information Ratio	0.31	0.14	0.66
UTI	Avg Exc Ret, [bp/m]	12.3	6.2	6.1
	Volatility, [bp/m]	162	190	90
	Information Ratio	0.26	0.11	0.23
FIN	Avg Exc Ret, [bp/m]	10.0	9.8	0.2
	Volatility, [bp/m]	179	136	67
	Information Ratio	0.19	0.25	0.01
Total	Avg Exc Ret, [bp/m]	13.5	5.6	7.9
	Volatility, [bp/m]	158	134	39
	Information Ratio	0.30	0.14	0.70

Source: Barclays Research

PANEL B

Cumulative excess returns: aggressive vs moderate issuers



Source: Barclays Research

Similar to our previous findings in Figure 9, issuers that grow liabilities at a faster pace (aggressive) significantly underperform issuers that grow liabilities at a lower rate (moderate). The difference between average excess returns of moderate and aggressive issuers becomes even larger than in the previous case based on net debt issuance in the bond index. Information ratios of excess returns of moderate over aggressive issuers increase as well.¹⁷ Results for financial sector are weaker, which is probably not surprising given inherent difficulties in objectively measuring assets and liabilities of financial firms.

Possible departures from market weights in the index

We have shown in the previous sections that issuance dynamics is generally detrimental to the performance of market-weighted corporate indices. At the index level, dynamic sector weights contribute negatively to index performance. At the issuer level, aggressive issuers tend to underperform moderate ones.

We now discuss two possible departures from market weights in corporate bond indices that alleviate problems related to issuance dynamics. The first weighting scheme, implemented at the sector level, is designed to address the negative contribution to index performance from the dynamics of sector weights. This is achieved by weighting all sectors in the index equally.¹⁸ The second departure from market weights is implemented at the level of individual issuers and under- (over-)weight aggressive (moderate) issuers relative to market capitalization-based weights.

Starting with sector-based customization, Figure 13 reports performances of market-weighted, equally-weighted, and equal-notional corporate bond indices. The equal notional sector allocation is very similar to equal sector weights. It should, however, have a lower turnover because changes in relative prices of corporate bonds would not lead to rebalancing. Results in Figure 13 show that alternatively weighted indices outperformed the market-weighted one by 1.4-1.5bp/month (or about 17bp per annum), with information ratios close to 0.4.

¹⁷ We also repeated the analysis of excess returns per unit of DTS for the alternative definition of aggressive issuers. Results are qualitatively similar to Figure 11 and available upon request.

¹⁸ Essentially, the key is to impose constant sector weights, thus removing the influence of issuance patterns. Equal weights are selected here for simplicity, but other constant weighting schemes could be considered as well.

FIGURE 13

Alternative sector weighting – comparative statistics, February 1994 – July 2014

	MW Index	Equal Sector Weights	EW - MW	Equal Sector Notional	EN - MW
Average Excess Returns (bp/m)	8.1	9.7	1.5	9.5	1.4
Volatility (bp/m)	156	156	12	155	14
Information Ratio	0.18	0.21	0.42	0.21	0.35
Worst Month (bp)	-907	-999	-91	-1005	-97
Best Month (bp)	671	693	99	677	108

Source: Barclays Research

Figure 14 shows cumulative excess returns of the equal sector weight index over the market-value weighted one. The former outperformed the latter by 3.5% from January 1994 to July 2014, predominantly during crisis periods and in subsequent recoveries. This is not surprising given the sector weight dynamics discussed previously. More generally, investors could consider indices with constant sector weights as alternative benchmarks that reduce the performance drag associated with issuance cycles (dynamic sector weights) in standard market-weighted corporate bond indices.

FIGURE 14

Cumulative excess return performance of the index with equally-weighted sectors over the market-weighted index, January 1994 – July 2014 (January 1994 = 100)

Source: Barclays Research

Next, we discuss an alternative corporate index designed to underweight aggressive issuers and overweight moderate ones relative to market capitalization-based weights. We call this new issuer weighting scheme *contrarian*. At inception date, all issuers in the new index are market-value weighted, as in the standard index. Issuer weights in the contrarian index are then adjusted each month. The weights of aggressive issuers are reduced by the net percentage increase of their debt over the percentage growth of debt in the overall universe of eligible bonds. On the other hand, the weights of moderate issuers are increased by the net percentage changes in their outstanding debt over the percentage growth of amount outstanding in the bond universe. Monthly weight changes are limited to +10% or -10% of beginning-of-month issuer weights to avoid extreme changes in the index composition. New issuers are included into the index at their full market weights.

FIGURE 15

Numerical examples of contrarian issuer weighting

PANEL A

Aggressive issuer

	Month 0	Month 1	Month 2	Month 3
Index rate		2.0%	2.50%	3.0%
Issuer rate		5.0%	8.0%	11.0%
Weight change		-2.9%	-5.1%	-7.2%
Issuer weight	5.00%	4.86%	4.61%	4.28%

Source: Barclays Research

PANEL B

Moderate issuer

	Month 0	Month 1	Month 2	Month 3
Index rate		2.0%	2.50%	3.0%
Issuer rate		0.0%	0.5%	-8.0%
Weight change		2.0%	2.0%	10.0%
Issuer weight	5.00%	5.10%	5.20%	5.72%

Source: Barclays Research

Figure 15 shows numerical examples of contrarian issuer weighting for aggressive and moderate issuers. Panel A shows changes in market weights of an aggressive issuer. The original market weight of the issuer in the index is 5%. The first row of the table reports the rates of issuance for the entire index. The total amount of debt outstanding in the index increased by 2% in month 1 while amount outstanding of our aggressive issuer increased by 5%. According to the contrarian methodology, the issuer weight is then reduced by 2.9%,¹⁹ which is the excess issuance rate of our example issuer over that of the index. Panel B shows a similar example for a moderate issuer. The issuance rate for this issuer in the first month is 0%, while the index rate is 2%. As a result, the issuer weight increases by 2%.

Figure 16 reports the performances of the US Corporate All Ratings index and its contrarian counterpart by sector. The contrarian index outperforms the market-weighted one in terms of absolute and risk-adjusted returns across most sectors. Contrarian issuer weighting almost doubles average excess return and information ratio at the overall index level. It also reduces excess return volatility slightly, even though volatilities of some individual sectors are higher than in the market-weighted index.

A practical problem with the contrarian issuer weighting scheme is high turnover and, hence, high transaction costs. This problem is likely to be exacerbated by the relatively low liquidity of the contrarian index compared with the market-weighted index. Newly issued bonds with large amounts outstanding tend to be more liquid than the average liquidity in the index. Underweighting such bonds is likely to reduce the average liquidity of the portfolio.

FIGURE 16

Contrarian vs market issuer weighting in US Corp All Ratings, February 1994 – July 2014

Sector	Market Issuer Weights			Contrarian Issuer Weights		
	Avg Exc Ret, bp/m	Volatility, bp/m	Inf Ratio	Avg Exc Ret, bp/m	Volatility, bp/m	Inf Ratio
Basic & Capital Goods	12	136	0.30	19	163	0.41
Cyclical	13	203	0.23	18	284	0.22
Non-Cyclical	10	116	0.30	13	115	0.39
Communication & Technology	9	201	0.15	15	188	0.28
Transportation & Energy	12	152	0.27	12	107	0.40
Utilities	9	162	0.19	11	151	0.25
Banks & Brokerage	9	156	0.19	13	140	0.33
Fin Oth	11	177	0.22	19	194	0.34
Total	9	148	0.22	15	146	0.35

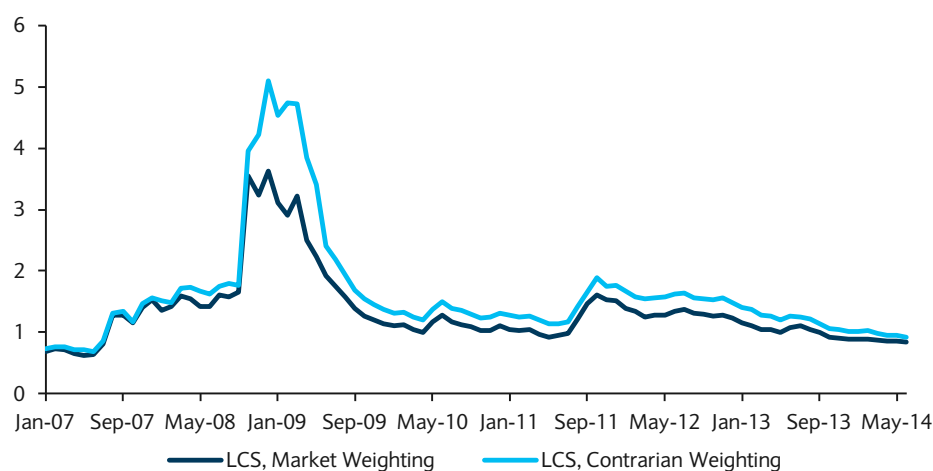
Source: Barclays Research

¹⁹ The reduction in issuer weight is obtained as the growth in outstanding issuer debt relative to the growth of debt in the index: $(1+2\%) / (1+5\%) - 1 = -2.9\%$.

We can use liquidity cost scores (LCS) of the market-weighted and contrarian indices to verify this conjecture. Barclays has been publishing LCS of individual securities in the US corporate bond market since 2007. Liquidity cost scores are defined as estimates of a round-trip transaction cost, so less-liquid bonds have higher LCS than more-liquid ones.²⁰ Figure 16 shows that the average LCS of the contrarian index has been systematically higher than that of the market-weighted index, especially during the 2008 crisis.

FIGURE 17

Liquidity cost score (LCS) of corporate indices with contrarian and market issuer weighting, February 1994 – July 2014



Source: Barclays Research

The transaction costs associated with maintaining a contrarian index could be controlled in various ways. Portfolio rebalancing styles could include avoiding new issues of aggressive issuers, but then the average portfolio LCS would increase over time, or attempting to maintain liquidity and capture new issue concessions by replacing older bonds with newly issued ones. We can discuss these strategies upon request.

Conclusion

We find that debt issuance tends to be negatively related to the subsequent returns of corporate bonds at three levels. At the macro level, high debt supply occurs in periods of low risk aversion, typically signalling weaker future returns. On the other hand, debt issuance often slows in periods of market distress, which are eventually followed by recovery.

Likewise, issuance cycles cause sector weights in corporate bond indices to change over time. We provide empirical evidence that sector weight dynamics contribute negatively to index performance.

At the issuer level, we find strong evidence that aggressive issuers tend to underperform conservative borrowers. The difference in performance is significant and persistent over time. This result holds across broad industry sectors and quality buckets. Controlling for the credit exposure of individual issuer or using an alternative definition of issuance aggressiveness based on balance sheet data does not change our conclusions.

Possible departures from market-capitalization weighting in benchmark indices include imposing constant sector weights and overweighting moderate issuers over aggressive ones. Investors might also consider similar approaches as part of active strategies.

²⁰ See Phelps, B., and S. Dastidar, 'Introducing LCS: Liquidity Cost Scores for US Credit Bonds', Barclays Research, October 2009.

References

Ben Dor A., and J. Xu, 'BEAM (Bonds in Equity Asset Momentum): Value of Bond Market Information in Equity Momentum Strategies', Barclays Research, June 2014.

Ben Dor A., and J. Xu, 'Fallen Angels: Characteristics, Performance, and Implications for Investors', Barclays Research, December 2010.

Ben Dor A., L. Dynkin, P. Houweling, J. Hyman, E. van Leeuwen, O. Penninga, 'DTS: A New Measure of Spread Exposure in Credit Portfolios', Barclays Research, February 2009.

Dynkin, L., J. Hyman, and V. Konstantinovskiy, 'Sufficient Diversification in Credit Portfolios', Barclays Research, September 2010.

Ng, K. Y., and B. Phelps, 'Structure of US Corporate Excess Returns: The Hunt for a "Low-Risk" Anomaly', Barclays Research, May 2014.

Phelps, B., and S. Dastidar, 'Introducing LCS: Liquidity Cost Scores for US Credit Bonds', Barclays Research, October 2009.

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