BARCLAYS

Quantitative Portfolio Strategy

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Issuer Size Premium in Credit Markets

- We analyse the effect of issuer size on spread and performance of corporate bonds in US IG and HY markets.
- We use Barclays bond-level Liquidity Cost Scores (LCS) to control for liquidity when studying the size effect. Without this control, the corporate bond size premium would be overestimated as bonds issued by smaller issuers are typically less liquid.
- Our findings generally do not support the existence of a size factor that could be *systematically* exploited by credit investors in the same way many equity investors favour smaller capitalisation stocks with a view to enhance returns.
- We find that bonds issued by smaller issuers typically have higher spreads. However, when controlling for credit quality and liquidity, the average estimated spread premia attributed to size, were only 3bp in US IG and 5.3bp in US HY as of May 2018, but varied widely from negative to positive in the last 10 years.
- Excess returns of small issuer portfolios appear to be less volatile than those of large issuers, which is likely to be explained by the poorer liquidity of smaller size bonds.
- We show that portfolios of small issuers tend to underperform portfolios of large issuers after controlling for systematic risk exposures and characteristics, such as spread, sector, rating, and duration. The annualised underperformance between 1994 and 2018 was -67bp/yr in US IG and -32bp/yr in US HY.
- The few episodes when exposure-matched portfolios of small issuers outperformed those of large issuers were associated with market distress, when large borrowers underperformed, while bonds of small issuers were likely subject to stale pricing.

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Introduction

The effect of company size on stock returns has been well *documented* by investors and in academic literature: small firms tend to outperform large firms with similar fundamental characteristics. See, for example, *Asness et al. 2018*.

Size premium in credit markets is less well researched. *Houweling, P. and J. Van Zundert, 2017* find a positive size premium in corporate bonds, when using issuer's index weight as a measure of size. *Alquist, R., R. Israel, and T. Moskowitz, 2018* use market capitalisation of issuer's equity as a measure of size, and argue that the size premium in credit is weak or negative. This highlights a lack of consensus among investors regarding not only the existence of a size premium but also how size should be defined in credit markets. Indeed, it is possible to define issuer size in various ways. For example, Figure 1 reports size according to three different metrics for industry sectors of Bloomberg Barclays US IG (left panel) and HY (right panel) indices[1]. The figure also reports the total number of issuers and of public issuers in each sector. As of 31 May 2018, US Corporate IG and HY indices included 629 and 784 issuers (column 1 of each panel) or 573 and 576 public issuers (column 2 of each panel) domiciled in the US.

FIGURE 1

US corporate bonds: measuring issuer size by sector, 31 May 2018

	US Corporate IG, US Domiciled					US HY, US Domiciled				
	# Issuers	# Public Issuers	Index Amount, $bn	Total Debt, $bn	Equity Market Cap, $bn	# Issuers	# Public Issuers	Index Amount, $bn	Total Debt, $bn	Equity Market Cap, $bn
Basic industry	30	29	3.2	7.1	29.9	75	63	1.0	1.8	3.7
Capital goods	60	60	3.6	7.7	35.8	91	53	1.0	1.9	3.9
Cyclical	51	51	5.8	12.5	68.3	144	106	1.1	3.0	5.7
Non cyclical	108	76	7.1	15.7	61.6	98	67	1.8	4.9	6.6
Transportation	17	17	6.1	14.7	59.4	15	9	1.8	8.9	8.0
Communications	19	19	20.1	34.1	69.5	69	54	3.1	8.9	10.0
Technology	49	48	8.6	11.4	95.5	61	44	1.6	3.6	10.6
Energy	52	51	6.8	13.4	37.6	115	97	1.5	4.4	4.6
Industrial other	16	3	1.0	2.6	14.0	26	18	0.6	1.3	2.5
Utility	50	45	6.4	16.0	27.7	18	12	2.3	15.1	9.4
Banking	35	35	24.8	164.2	72.4	6	6	17.2	106.6	36.1
Brokerage & exchanges	19	19	2.1	4.5	23.2	10	6	0.7	4.8	11.7
Insurance	57	54	3.7	7.5	32.0	22	15	1.2	3.8	7.4
Finance companies	8	8	9.6	23.8	18.9	15	9	2.0	17.9	3.2
REITs & other	58	58	2.2	4.5	9.6	19	17	1.1	4.3	3.8
Total	**629**	**573**	**6.8**	**21.0**	**46.6**	**784**	**576**	**1.6**	**5.5**	**6.3**

Source: Bloomberg, Barclays Research

Column 3 of each panel of Figure 1 reports average issuer size defined as the amount of an issuer's debt outstanding in the index universe.[2,3] According to this measure, the average size of an issuer was $6.8bn in US IG and $1.6bn in US HY at the end of May 2018.[4]

[1] Please note that Bloomberg Barclays US Corporate and US HY indices also include USD-denominated bonds issued by foreign companies. Such bonds are often called *Yankees*. We exclude them from our analysis because, in principle, a large foreign issuer can have a relatively small representation in the USD market.
[2] This definition of issuer size is similar to the one used in *Houweling, P. and J. Van Zundert, 2017*, who used issuer index weights as the measure of size. Our motivation to consider issuer's outstanding amount rather than its market value is to make the size measure independent of bond pricing.
[3] We look at issuer's debt outstanding in both Bloomberg Barclays US IG and HY indices. Some issuers can appear in both universes, for example if an issuer has both senior and lower-rated subordinated debt.

Another way to measure size is to look at the total debt reported on an issuer's balance sheet. Average issuer sizes calculated using this approach are reported in column 4 of Figure 1. Relying on balance sheet information limits us to the universe of *public* companies which are obliged to publish financial statements.[5] In addition to publicly traded bonds, balance sheet reported debt includes bank loans, leases, and repurchase agreements, so that total debt is often significantly higher than the amount outstanding in corporate bond indices. Indeed, the average total debt of issuers in IG and HY is $21bn and $5.5bn, respectively. These numbers are more than 3x higher than the amounts included in corporate indices. For an issuer, index debt on average represents only 30% of its overall corporate debt.

Finally, similarly to equity markets, issuer size can be measured as its stock market capitalisation. This approach limits our analysis to the universe of companies whose stocks are traded on public exchanges. The average equity capitalisation of an issuer in our universe is $46.6bn in IG and $6.3bn in HY. Issuers included in corporate indices tend to be large.

Figure 1 shows that, irrespective of the way size is measured, substantial variations in issuer size exist across industry sectors. For example, issuer sizes in the Banking, Finance companies, Communication, and Technology sectors are much larger than those in Basic industry, Capital goods, Brokerage & Exchanges and Insurance. This suggests that portfolios sorted on size, without controlling for sector allocation, could potentially be over/under-represented in some sectors.

In our study, we take the amount of an issuer debt outstanding in the index as a size measure. This measure is relevant for corporate bond investors who utilise bond indices as performance benchmarks. Additionally, it is not exclusively restricted to public companies, so we can retain a broader set of issuers in our study. The other two size measures have serious drawbacks: equity capitalisation incorporates pricing information into the definition of size, so that the estimated size premium could be contaminated by valuation; total debt, on the other hand, is reported only quarterly with different firms having different reporting cycles.

In our report we analyse effects of issuer size on spread and performance of corporate bonds in US IG and HY markets. Is issuer size a priced factor in credit? Is it rewarded with a risk premium that can be captured in a systematic investment style? Would investing into bonds issued by smaller size issuers be a candidate to join Smart Beta strategies in credit markets[6]?

The report is organised as follows. The next section discusses properties of US IG and HY indices with respect to issuer size. We then discuss characteristics and performance properties of corporate bond portfolios sorted on size. Next, we estimate size spread premium, while controlling for other issuer characteristics, such as sector, rating, duration and liquidity. Finally, we isolate the size effect in corporate bond returns (SML factor) and analyse its performance premium.

Issuer size in the US corporate bond market

Taking the amount of debt outstanding in Bloomberg Barclays US Corporate IG and HY indices as a measure of issuer size, we can report its cross-sectional distribution in the IG index at a point in time.

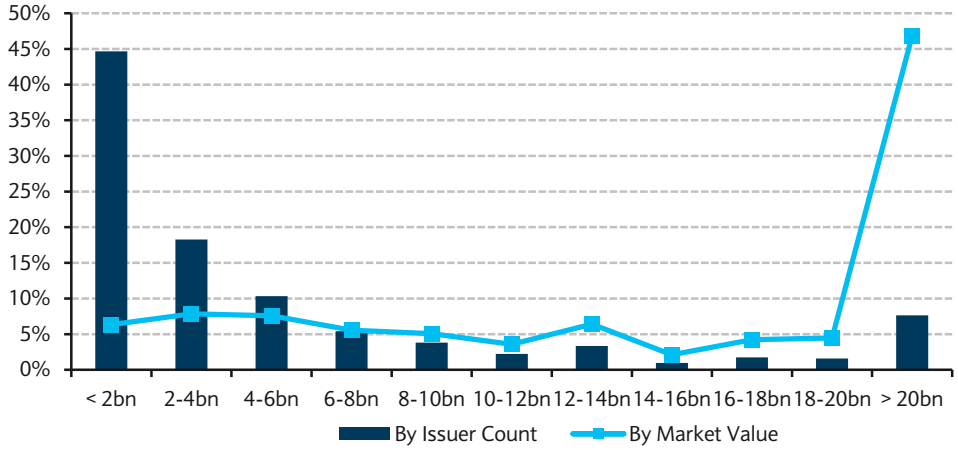
Figure 2 shows distributions of issuer count and percentage of market value by its size in the US Corporate IG index as at 31 May 2018. A large proportion of issuers have small-to-moderate size (equal or below $2bn), while only 7.6% of issuers have size above $20bn. At the same time, these large issuers represent 46.8% of the overall market value. Therefore, it should not be surprising that the corporate bond market's performance, measured by index

[4] Bonds with amount outstanding below $300m in US IG and $250m in US HY are excluded according to the index rules. This could potentially eliminate some small issuers.
[5] In cases when an issuer is a private subsidiary of a public company, we use financial data provided by the parent. Our methodology, therefore, implicitly assumes that a parent company would step-in if its issuing subsidiary falls into distress. This might not always be the case. For example, a holding company can allow its subsidiary to fall.
[6] Please see *Smart Beta in Credit*, Barclays Research, 13 June 2017.

returns, is more affected by returns of a few large issuers, while the contribution of small issuers is usually relatively low.

FIGURE 2

Distribution of issuer count and market value by size in the Bloomberg Barclays US Corporate Index, 31 May 2018

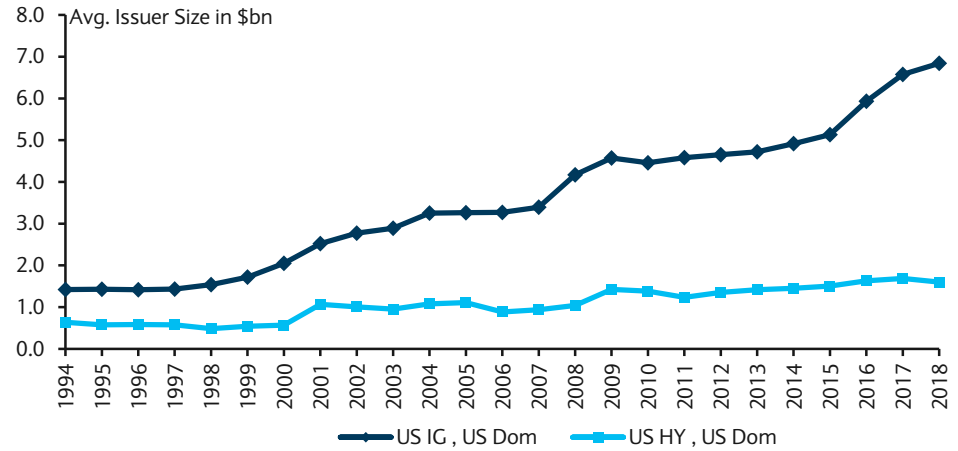


Source: Bloomberg, Barclays Research

While Figures 1 and 2 show recent snapshots of the corporate indices, the corporate bond market has evolved significantly over time. Figure 3 reports historical average sizes of US issuers in IG and HY since 1994. Average issuer sizes have grown dramatically over time: from $1.4bn to $6.8bn in IG, and from $0.6bn to $1.6bn in HY. The growth has been stronger in IG than in HY: 380% versus 150%. We therefore focus on the relative rather than absolute size of corporate issuers. In other words, we consider size relative to peers, which means that an issuer with the same amount outstanding could be qualified as 'large' in past years and as 'small' or 'medium' in recent years.

FIGURE 3

Evolution of average issuer size in the US Corporate IG and HY indices



Source: Bloomberg, Barclays Research

Relative issuer size is likely to be a slowly moving variable. Indeed, issuers can be expected to retain their size characteristics for a considerable time, as new bonds get issued and old bonds get retired only gradually. Figures 4 and 5 confirm this intuition by reporting average transition frequencies across issuer size deciles calculated over 12-month rolling periods in IG and HY markets, respectively. A US IG issuer that falls into the lowest-size decile (D1) in

the beginning of the period, has a 72% probability to remain in the same category after 12 months and only a 10% probability to move into the next larger-size category (D2). Persistence of relative size was even stronger for large-size issuers. Issuers in the largest-size category (D10) had 90% chance to remain there after 12 months, and only 10% probability to transit into the next lower-size decile (D9). Also, small issuers (D1-D2) had a good chance to transit into larger-size deciles (D3, D4, D5, and D6) after 12 months, growing their outstanding debt significantly. In contrast, the largest issuers in D10 almost never experienced a sharp decline in size, so that their probabilities to transit into lower-size deciles (D8, D7, D6, etc.) remained practically zero.

FIGURE 4

Average transition probabilities across issuer size deciles over 12m periods in US IG, Jan 1994 – May 2018

		Size in the end of the period (12 months)									
		D1 = Small	D2	D3	D4	D5	D6	D7	D8	D9	D10 = Large
Size in the beginning of the period (12 months)	D1 = Small	72%	10%	10%	6%	2%	1%	-	-	-	-
	D2	15%	59%	11%	8%	5%	2%	1%	-	-	-
	D3	7%	15%	53%	13%	8%	3%	1%	1%	-	-
	D4	2%	5%	18%	51%	15%	7%	2%	1%	-	-
	D5	1%	2%	5%	18%	47%	18%	6%	1%	1%	-
	D6	-	-	1%	4%	20%	50%	18%	4%	1%	-
	D7	-	-	-	1%	3%	18%	54%	20%	3%	-
	D8	-	-	-	-	-	2%	20%	59%	17%	1%
	D9	-	-	-	-	-	1%	1%	15%	71%	12%
	D10 = Large	-	-	-	-	-	-	-	-	10%	90%

Source: Bloomberg, Barclays Research

Figure 5 reports qualitatively similar results for HY issuers, although the contrast in transition probabilities of small- and large-size issuers is weaker.

FIGURE 5

Average transition probabilities across issuer size deciles over 12m periods in US HY, Jan 1994 – May 2018

		Size in the end of the period (12 months)									
		D1 = Small	D2	D3	D4	D5	D6	D7	D8	D9	D10 = Large
Size in the beginning of the period (12 months)	D1 = Small	86%	4%	3%	3%	2%	2%	1%	1%		
	D2	14%	71%	7%	3%	3%	2%	1%			
	D3	3%	18%	60%	7%	4%	4%	2%	1%		
	D4	3%	4%	16%	58%	9%	6%	3%	1%	1%	
	D5	1%	2%	6%	15%	54%	11%	7%	3%	1%	
	D6	1%	1%	2%	5%	14%	55%	13%	6%	2%	
	D7			1%	2%	5%	14%	55%	17%	5%	1%
	D8					2%	5%	15%	57%	19%	2%
	D9							3%	15%	68%	13%
	D10 = Large								1%	10%	89%

Source: Bloomberg, Barclays Research

Figures 4 and 5 indicate that investment strategies based on issuer size could be feasible for portfolio managers as they would be unlikely to generate excessively high turnover. However, do portfolios of smaller issuers systematically offer higher spreads and returns?

Corporate bond portfolios sorted on size

Similar to the approach frequently utilised in academic literature, we start our analysis by sorting issuers on size to form small, medium and large-issuer portfolios in the IG and HY markets. The small portfolio includes the bottom 30% of issuers when sorted on size, while the large portfolio includes the top 30%. The medium portfolio includes the middle 40%. Size portfolios are rebalanced at the beginning of each month when sorting is repeated.

Corporate bonds statistics (eg, durations, spreads, and returns) are first aggregated at the issuer level using bond market capitalisation weights and excluding subordinated issues. Individual issuers are then market capitalisation weighted to form size portfolios.

Figure 6 shows the historical average issuer sizes (in $mns) for the three size portfolios. The charts are plotted in logarithmic scale to accommodate the significant growth over time. Results for the IG and HY universes are reported in panels A and B. The sorting procedure clearly discriminates between small and large-size issuers. For example, average issuer sizes in small and large portfolios in the IG universe were $0.65bn and $18.5bn, respectively, as of 31 May 2018. In contrast, these were $0.14bn and $4.0bn in December 1993. In the HY universe, average issuer sizes in small and large portfolios increased from $0.14bn and $1.92bn to $0.31bn and $3.64bn between December 1993 and May 2018, respectively.

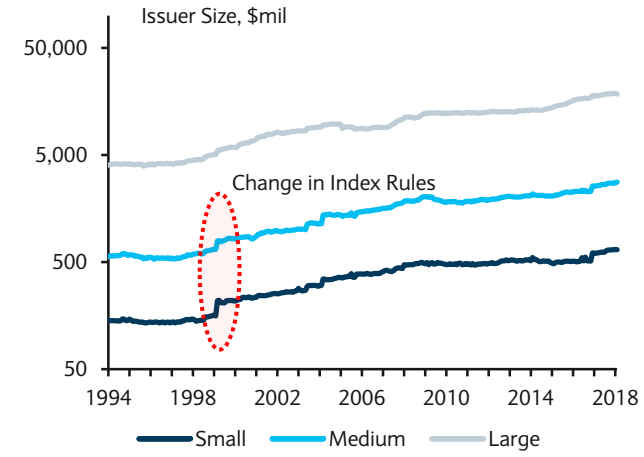
Panels A and B of Figure 6 show jumps in average issuer sizes in 2000, which correspond to increases in the minimum amount outstanding for index-eligible bonds. These changes in index rules pushed bonds with small outstanding amounts out of the universe, which led to increases in the average size of issuers remaining in the index.

Figure 7 compares performance and risk of our size portfolios in IG and HY markets over different periods. Average risk-adjusted returns (information ratios) of small-size portfolios are higher than those of large-size portfolios. This result holds true both in the IG and HY markets in all periods: 1994-2006 and 2007-2018.

Portfolio statistics in Figure 7 reveal that there are two factors that contribute to the higher risk-adjusted returns of small-size portfolios. First, Small-size IG portfolios have higher average excess returns than large-size portfolios. In HY, however, small-size portfolios had higher average excess return than large-size portfolios only in the period from 2007 to 2018.

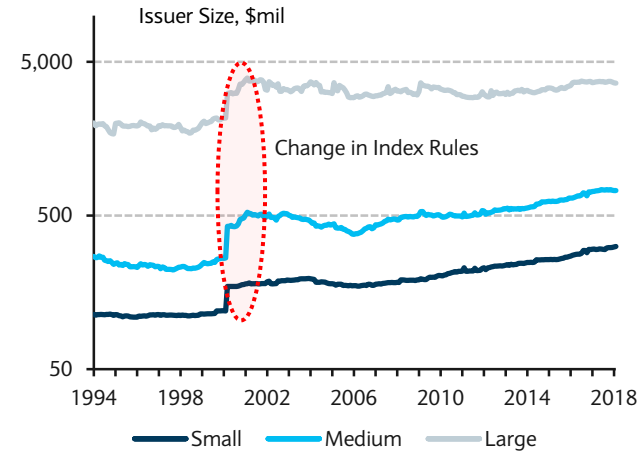
FIGURE 6
Average issuer size of sorted portfolios (log-scale)

PANEL A
US Corporate IG



Source: Bloomberg, Barclays Research

PANEL B
US Corporate HY



Source: Barclays Research

The second factor contributing to the higher information ratios of small-size portfolios is the volatility of portfolio excess returns. Small-size portfolios, as shown on Figure 7, have lower volatilities than large-size portfolios in both sub-periods, in both IG and HY markets.

FIGURE 7
Performance of size portfolios

	US Corporate IG			US Corporate HY		
	Small	Medium	Large	Small	Medium	Large
Jan 1994 - May 2018						
Avg. ExcRet, %/yr	1.12	0.66	0.68	2.60	2.21	2.61
Volatility, %/yr	3.48	3.91	4.20	7.82	9.14	10.63
Max Drawdown, %	-25.5	-24.3	-22.8	-41.6	-45.8	-45.5
Information Ratio	0.32	0.17	0.16	0.33	0.24	0.25
Jan 1994 - Dec 2006						
Avg. ExcRet, %/yr	0.72	0.25	0.34	1.19	0.71	1.70
Volatility, %/yr	1.69	2.19	2.35	5.95	7.35	9.33
Max Drawdown, %	-7.0	-10.2	-9.4	-30.0	-38.9	-41.0
Information Ratio	0.43	0.11	0.15	0.20	0.10	0.18
Jan 2007 - May 2018						
Avg. ExcRet, %/yr	1.58	1.13	1.08	4.21	3.92	3.65
Volatility, %/yr	4.77	5.23	5.63	9.52	10.85	11.97
Max Drawdown, %	-25.5	-24.3	-22.6	-41.6	-43.0	-45.5
Information Ratio	0.33	0.22	0.19	0.44	0.36	0.30

Source: Bloomberg, Barclays Research

In our previous research, we have shown that volatility of portfolio excess returns is a liner function of credit exposure, Duration Times Spread (DTS) [7], irrespective of sector, or credit rating. So, in order to understand better the differences in volatilities of excess returns between small- and large-size portfolios, we provide average DTS along with return volatilities on Figure 8. The figure includes two time periods: 1994-2006 and 2007-2018. Surprisingly, we observe that small-size portfolios tend to be *less* volatile than large-size portfolios despite having *higher* average credit exposures (DTS).

Figure 8 also reports volatilities of portfolio monthly excess returns *normalised* by beginning-of-month DTS. Volatilities of normalised excess returns usually tend to be invariant with respect to portfolio characteristics, such as duration, rating or industry sector. This, however, does not seem to hold for portfolios sorted on issuer size. Indeed, volatilities per unit of DTS of small-size portfolios are roughly 30% lower than those of large-size portfolios in IG and 20% lower in HY. The differences are larger in the recent period (2007-2018). Is there a plausible explanation for this anomaly?

[7] Duration times spread (DTS) measures exposure of corporate bond portfolios to changes in credit spread, please see *A New Measure of Spread Exposure in Credit Portfolios*, Barclays Research, 3 February 2010.

FIGURE 8

Spread exposure and excess return volatility of size portfolios

	US Corporate IG			US Corporate HY		
	Small	Medium	Large	Small	Medium	Large
	Jan 1994 - May 2018					
Volatility (%/y)	3.5	3.9	4.2	7.8	9.1	10.6
Avg. DTS (% x y)	10.8	9.8	9.0	23.4	21.7	21.3
Volatility Per DTS, %/m	**6.6**	**8.0**	**9.6**	**8.8**	**10.2**	**11.2**
	Jan 1994 - Dec 2006					
Volatility (%/y)	1.7	2.2	2.3	6.0	7.3	9.3
Avg. DTS (% x y)	7.8	7.5	6.5	22.2	20.7	19.9
Volatility Per DTS	**5.8**	**7.0**	**8.4**	**8.9**	**10.0**	**11.1**
	Jan 2007 - May 2018					
Volatility (%/y)	4.8	5.2	5.6	9.5	10.9	12.0
Avg. DTS (% x y)	14.3	12.4	12.0	24.7	22.9	22.9
Volatility Per DTS	**7.4**	**9.1**	**10.9**	**8.7**	**10.4**	**11.3**

Source: Bloomberg, Barclays Research

One possible explanation for the lower excess return volatility of small-size portfolios is that bonds issued by small issuers tend to be less liquid than those issued by larger ones. We confirm this directly using average liquidity cost scores (LCS) of size portfolios[8]. Figure 9 shows that the average LCS of small-size portfolios are more than 50% higher than those of large-size portfolios for both IG and HY issuers.

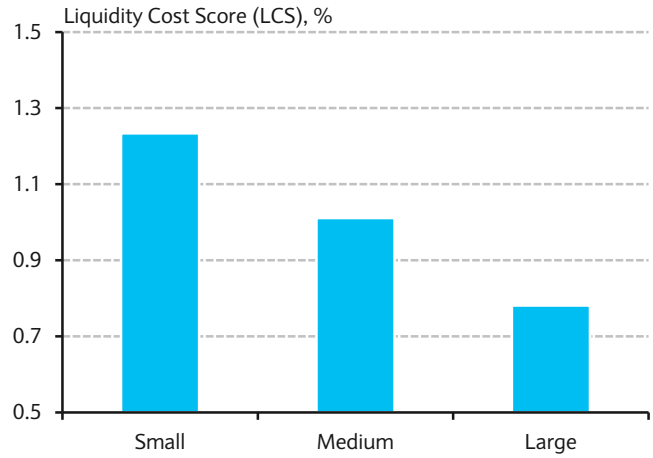
Illiquidity of smaller issuers is likely to manifest itself in less-frequent trading and, as a result, in auto-correlated portfolio excess returns. This occurs because prices of less-liquid bonds often adjust more slowly to new information than those of liquid ones. To verify this, we plot in Figure 10 the average autocorrelations of size portfolios returns for one- and two-month lags. Autocorrelations of excess returns are much higher for small-size portfolios than for large ones.

FIGURE 9

Average liquidity cost Scores (LCS) of size portfolios, January 2007 – May 2018

PANEL A

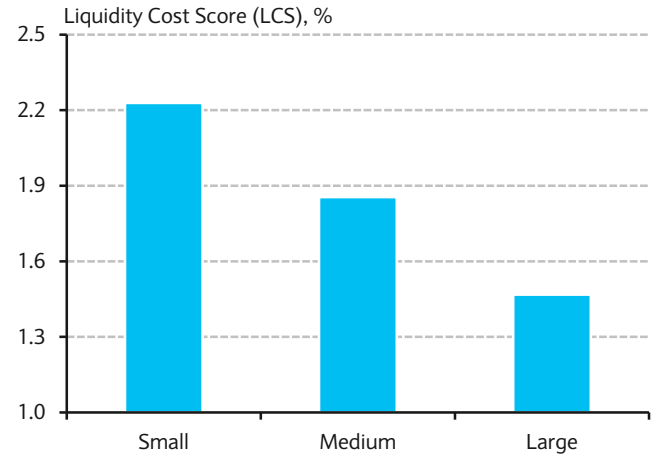
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

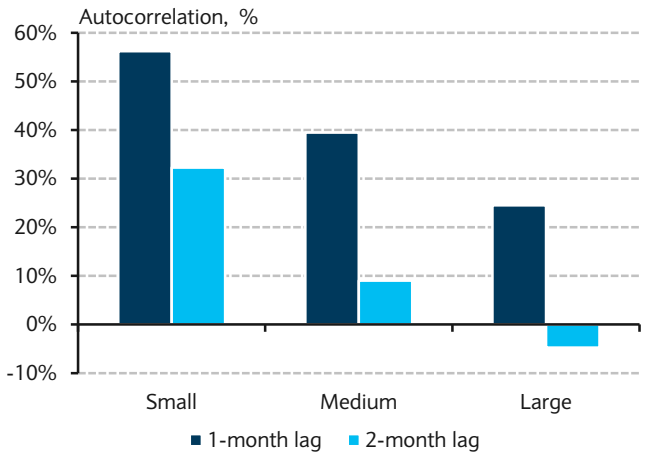
[8] Liquidity cost scores (LCS) are based on trader bid-offer quotes and measure a round-trip transaction cost in individual bonds. Higher LCS correspond to less liquid securities. QPS makes regularly updated bond-level scores (LCS) available to investors as a commercial service. See *Measuring Bond-Level Liquidity: Liquidity Cost Scores (LCS)*, Barclays Research, 24 July 2015 for more details.

FIGURE 10

Autocorrelations in excess returns of size portfolios, January 1993 – May 2018

PANEL A

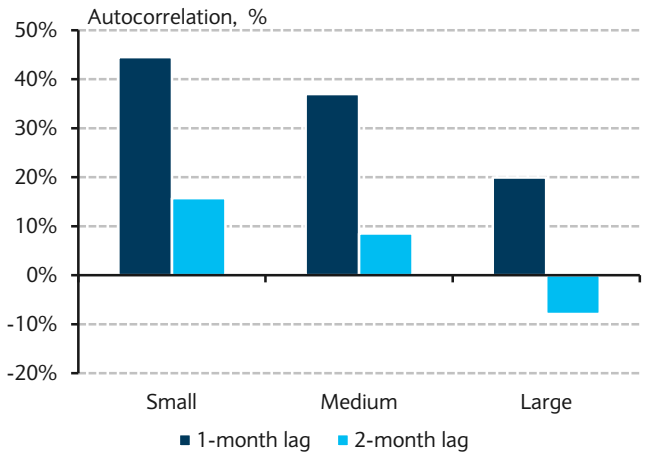
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

High positive autocorrelations of small-size portfolios suggest that their low return volatility could be an artefact of illiquidity. Volatilities measured over longer horizons could be more in line with the volatilities of large-size portfolios. In order to verify this, we report on Figure 11 annualised volatilities based on monthly, quarterly, and semi-annual excess returns[9].

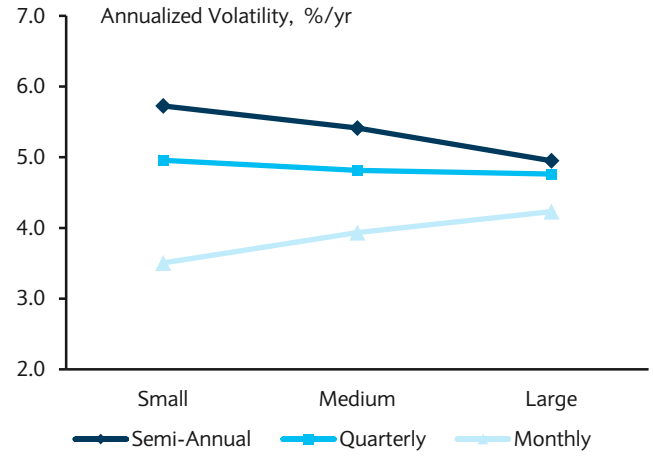
In IG, volatilities of small-size portfolios become higher than those of large-size portfolios when returns are measured over quarterly or semi-annual periods. This clearly demonstrates that eliminating the effect of autocorrelation (due to stale pricing), by

FIGURE 11

Size portfolios' excess returns volatilities measured over different horizons, January 1993 – May 2018

PANEL A

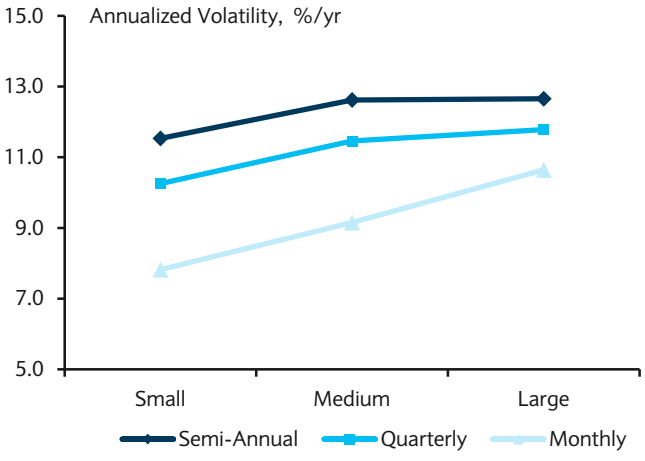
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

[9] We annualise volatilities of monthly, quarterly, and semi-annual returns by multiplying them by square roots of 12, 4, and 2 respectively. Volatilities of quarterly and semi-annual returns are calculated from overlapping return time-series sampled monthly. Even though the overlapping returns are auto-correlated, the resulting volatility estimates remain consistent and utilise available information more efficiently than would be the case with non-overlapping quarterly or semi-annual returns. Please see Harri., A., and B. W. Brorsen, 2009 for details.

measuring returns over longer time intervals, makes volatility estimates more realistic. Panel B of Figure 11 shows that annualised volatilities of small-size portfolios in HY also increase proportionately more than those of large-size portfolios when returns are measured over longer time intervals, so that the difference between volatilities of small- and large-size portfolios declines. However, in contrast to our results in IG, small-size HY portfolios remain slightly less volatile than large ones. We conclude that the benefits to risk-adjusted returns of smaller-size portfolios attributed to their seemingly low volatilities are induced by illiquidity and might be fictitious in reality.

Portfolios sorted on issuer size can have different characteristics or sector composition. Figure 12 compares the characteristics of small- and large-size portfolios in the IG and HY corporate markets as of 31 May 2018. The small-size portfolio has higher spread and lower quality than the large-size portfolio. The spread differences between small- and large-size portfolios (SML) are 14bp in IG and 86bp in HY. The average differences in rating numbers are respectively 0.6 and 1.5.[10] The small-size portfolio is less liquid than the large one. Liquidity is measured using Liquidity Cost Scores (LCS). The differences in LCS between small- and large-size portfolios were 0.29% in IG and 0.45% in HY. Bonds in the small-size portfolio also experienced significantly lower trading volumes as a percentage of their amount outstanding compared to those in the large-size portfolio: 4.2%/month versus 7.2%/month in IG, and 11.7%/month versus 13.9%/month in HY.

The lower panel of Figure 12 shows that sector allocation in small-and large-size portfolios are quite different, and are broadly consistent with average issuer sizes reported in Figure 1.

FIGURE 12

Comparing characteristics and allocations of issuer size portfolios, 31 May 2018

	US Corporate IG				US Corporate HY			
	Small	Medium	Large	SML	Small	Medium	Large	SML
OAS, bp	126	118	112	14	434	378	348	86
OAD, yr	7.7	7.1	7.5	0.3	3.3	3.6	4.0	-0.8
DTS, % x yr	10.1	9.6	10.2	-0.1	13.4	13.4	14.7	-1.3
Rating Number	8.7	9.1	8.1	0.6	16.3	16.0	14.8	1.5
Liquidity Cost Score, %	0.86	0.74	0.57	0.29	1.31	1.11	0.86	0.45
Monthly Volume, % Amount/m	4.2%	5.1%	7.2%	-3.0%	11.7%	13.5%	13.9%	-2.2%
Broad Sector Allocation								
Basic & Capital Goods	24%	19%	6%	18%	32%	26%	12%	20%
Cyclical	7%	9%	7%	0%	21%	17%	12%	9%
Non-Cyclical	18%	13%	20%	-2%	9%	15%	17%	-8%
Comm. & Technology	6%	14%	22%	-16%	14%	16%	28%	-14%
Transport. & Energy	6%	11%	12%	-6%	11%	16%	18%	-7%
Utilities	6%	5%	5%	1%	3%	1%	4%	0%
Banks & Brokerage	8%	6%	20%	-13%	2%	1%	1%	1%
Financial Others	25%	22%	7%	17%	7%	8%	7%	0%

Source: Bloomberg, Barclays Research

In particular, the small-size portfolio in IG significantly overweights Basic & Capital Goods and Financial Others but underweights Communication & Technology, Transportation & Energy, and Banks & Brokerage. Similarly, the small size portfolio in HY overweights Basic & Capital Goods and Cyclical and underweights Non-Cyclical, Communication & Technology, and Transportation & Energy.

The differences in characteristics of the small- and large-size portfolios have been persistent over time, as shown in Figure 13 which covers different time periods: 1994-2006 and 2007-

[10] Bond index rating numbers vary from 1 to 24 on a linear scale with higher number representing lower credit rating.

2018. Small-size portfolios have higher spreads, higher-duration times spread (DTS), lower quality (higher rating number), lower liquidity (higher LCS) and lower trading volumes. While the differences are more pronounced in the recent period (2007-2018), they were also present in the earlier period (1994-2006).

FIGURE 13

Comparing characteristics of size portfolios in different periods

	US Corporate IG				US Corporate HY			
	Small	Medium	Large	SML	Small	Medium	Large	SML
	Jan 1994 - May 2018							
OAS, bp	172	151	133	39	656	554	483	174
OAD, yr	6.2	6.3	6.2	-0.1	3.8	4.1	4.7	-0.9
DTS, % x yr	10.8	9.8	9.0	1.8	23.4	21.7	21.3	2.1
Rating Number	8.8	8.5	7.4	1.4	16.2	15.8	14.9	1.3
	Jan 1994 - Dec 2006							
OAS, bp	132	119	103	28	578	505	427	150
OAD, yr	5.7	6.1	5.7	0.0	4.1	4.2	4.9	-0.8
DTS, % x yr	7.8	7.5	6.5	1.3	22.2	20.7	19.9	2.4
Rating Number	8.6	8.1	7.3	1.3	15.8	15.5	14.7	1.2
	Jan 2007 - May 2018							
OAS, bp	218	188	166	52	746	610	546	200
OAD, yr	6.7	6.5	6.9	-0.1	3.4	3.9	4.4	-0.9
DTS, % x yr	14.3	12.4	12.0	2.3	24.7	22.9	22.9	1.7
Rating Number	9.0	9.0	7.6	1.4	16.6	16.0	15.1	1.5
Liquidity Cost Score, %	1.23	1.01	0.78	0.45	2.23	1.86	1.47	0.76
Monthly Volume, % Amount	5.0%	6.3%	7.6%	-2.6%	6.3%	8.2%	10.4%	-4.1%

Source: Bloomberg, Barclays Research

Differences in portfolio characteristics and sector allocations can affect spread premia as well as excess returns. Therefore, it is important to control for rating and sector allocations when attributing spread or returns due to a size factor.

Estimating size spread premium

In order to measure the spread premium associated with size, we account for differences in sector, rating allocations, and liquidity between small and large size portfolios. We use a statistical technique [11] where spreads of individual issuers are attributed to their characteristics, including size, duration, sector, rating, and liquidity. We illustrate the incremental steps in spread attribution by using three regression models. Model 1 includes size dummy variables for small (bottom 30%) and large (top 30%) issuers while controlling for duration and sector allocation. Model 2 adds control variables for rating quality. Finally, Model 3 includes liquidity cost score (LCS) per unit of duration in addition to the control variables used in model 2.

The spread difference between small and large issuers can be measured as the difference between spreads attributed to small and large issuers in the tree models. This difference changes as we control for an increasingly large set of issuer characteristics.

Figure 14 shows the estimated spread difference between small and large issuers (SML) in US IG and HY as of 31 May 2018, using different sets of control variables. It also highlights control variables included into different models[12].

[11] Our approach is similar to Fama-MacBeth cross-sectional regression; please see *Fama, E., and J. MacBeth, 1973*.
[12] Model details including estimated coefficients and t-statistics is provided in the Appendix.

FIGURE 14

Estimating size spread premium, 31 May 2018

	US Corporate IG			US Corporate HY		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
SML	17.2	5.7	3.0	69.1	6.9	5.3
Control variables						
Duration	Y	Y	Y	Y	Y	Y
Sectors	Y	Y	Y	Y	Y	Y
Ratings	-	Y	Y	-	Y	Y
Liquidity	-	-	Y	-	-	Y
R-sq	26%	72%	73%	4%	34%	35%

Source: Bloomberg, Barclays Research

According to Model 1, the spreads between small and large issuers are 17.2bp in IG and 69.1bp in HY. This does not account for the fact that small-size issuers tend to have lower credit ratings. Model 2 accounts for this by controlling for quality and reports a smaller spread difference between small and large issuers: 5.7bp in IG and 6.9bp in HY. Controlling for liquidity, as done in Model 3, reduces SML spread difference further to 3.0bp in IG and 5.3bp in HY markets.

The regression analysis in Figure 14 is run as of 31 May 2018. This analysis can be repeated each month in our sample, so that historical spread differences between small- and large-size issuers can be decomposed into to size, liquidity, and rating components. The rating component reflects the spread due to differences in credit ratings between small and large issuers. The liquidity component is the spread portion attributed to differences in liquidity between small and large issuers. Finally, the size component reflects the spread differential between small and large issuers when controlling for sector, rating, duration, and liquidity.

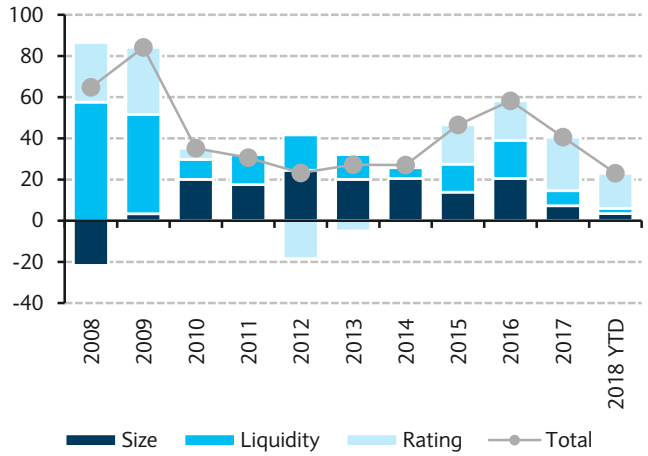
Panes A and B of Figure 15 show the attribution results of historical spread differences between small and large issuers in IG and HY universes. Bond-level liquidity cost scores are only available from 2007 so the results cover a relatively recent period. Monthly results are aggregated to obtain yearly averages.

FIGURE 15

Attributing spread difference between small- and large-size issuers

PANEL A

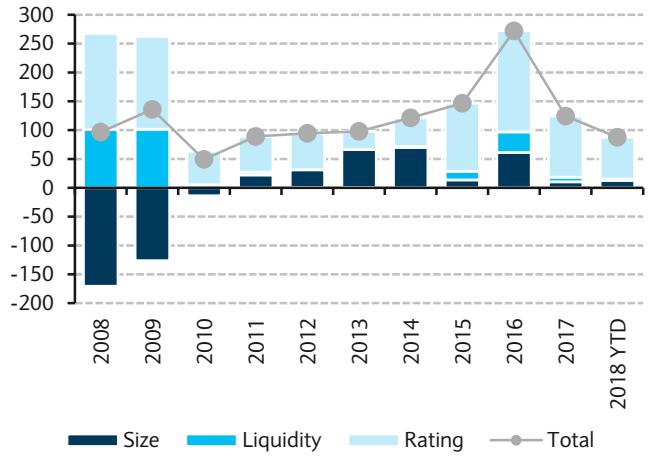
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

In the IG universe, the two most important factors affecting spread differences are rating and liquidity. Once they are taken into account, the remaining spread premium is relatively low. The size premium varied significantly over time: from -22bp in 2008, when smaller-size issuers had tighter spreads than large ones, to 24bp in 2012. More recently in 2018, the size premium has been small (3bp), while the spread difference between small and large issuers attributed to differences in credit rating has been sizable (17bp). The spread premium attributed to differences in *liquidity* between small- and large-size IG issuers also varied significantly over time. It declined from 48-58bp in 2008-09 to only 3bp in 2018.

In the HY universe, differences in credit rating have been the most important contributor to the spread differential between small and large issuers: the rating spread premium has always been positive and varied in a range between 32bp (in 2013) and 175bp (in 2016). Currently (in 2018) differences in credit rating contribute 73bp to the spread differential between small and large issuers. Interestingly, the liquidity component seems to be less important in HY than in IG. It became sizable during market distress (eg, during the financial crisis in 2008-09 or the energy crisis in 2015-16) but otherwise remained relatively low. In 2018, the spread premium attributed to liquidity has only been 2bp.

The size spread premium in HY has varied significantly over time. It was negative in 2008-10, reached a maximum of 70bp in 2014, and was only 13bp in 2018.

Interestingly, the size spread premium is not necessarily a monotonous function of issuer size. Figure 16 plots average spread premium (controlling for sector, rating, duration and liquidity) for size deciles in January-May 2018[13]. Both small and very large issuers in IG and HY seem to have a positive spread premium.

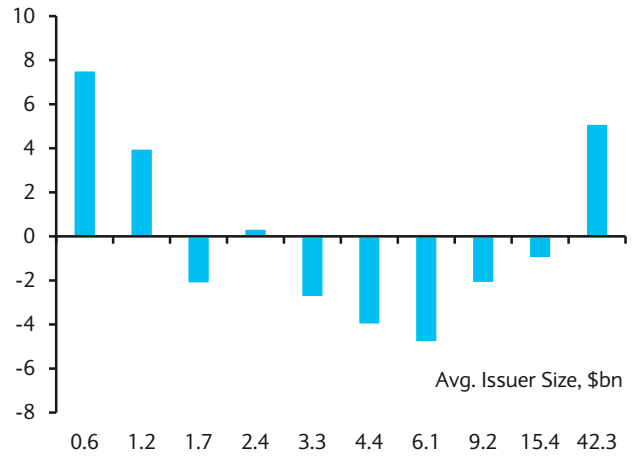
There could be several explanations for a positive spread premium of the largest issuers. One possibility is that very large issuers can create a significant risk concentration in credit portfolios benchmarked to the index. Investors may accordingly demand an additional spread premium for holding those names. Another explanation is that very large issuers have become large by issuing debt more aggressively than their peers. Since aggressive issuers tend to underperform moderate issuers, especially during market turmoil,[14] the

FIGURE 16

Average size spread premium by issuer-size deciles, January 2018 – May 2018.

PANEL A

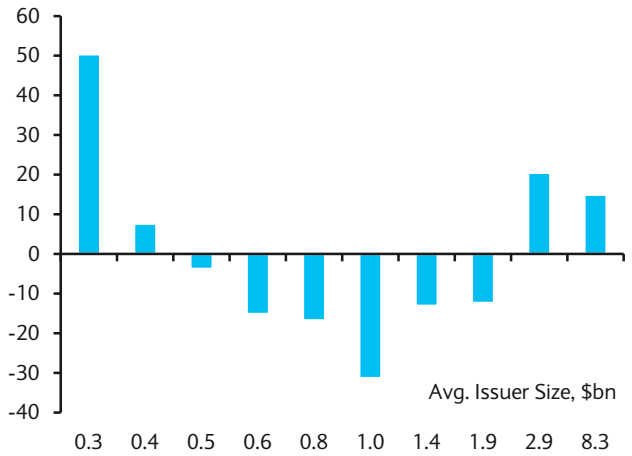
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

[13] The spread premium as function of issuer size is obtained by averaging regression residuals by issuer size deciles. Issuer spreads are regressed on (a) sector dummies, (b) rating dummies, (c) duration, and (d) liquidity cost scores normalized by the duration. Average spread premium across all issuer sizes is zero.

[14] See *Issuance Dynamics and Performance of Corporate Bonds*, Barclays Research, 15 September 2014.

market could demand extra spread premium as compensation. Spread premia for different issuer sizes can change over time according to the market environment.

Performance of exposure-matched size portfolios

Using the analogy form equity markets, we call return differentials between small and large size portfolios the SML returns or SML factor. As shown in previous sections, portfolios sorted on issuer size can be very different in terms of their sector and rating allocations.[15] Such differences could have a large effect on performance and dwarf the effect of a pure SML return factor. To isolate the effects of issuer size on portfolio returns, we assemble two exposure-matched portfolios that have very similar allocations and systematic risk characteristics, but different issuer sizes.

The portfolios are built by minimizing (small size) or maximizing (large size) issuer size subject to constraints that make portfolio exposures identical to the ones of the Bloomberg Barclays US Corporate IG or HY indices.

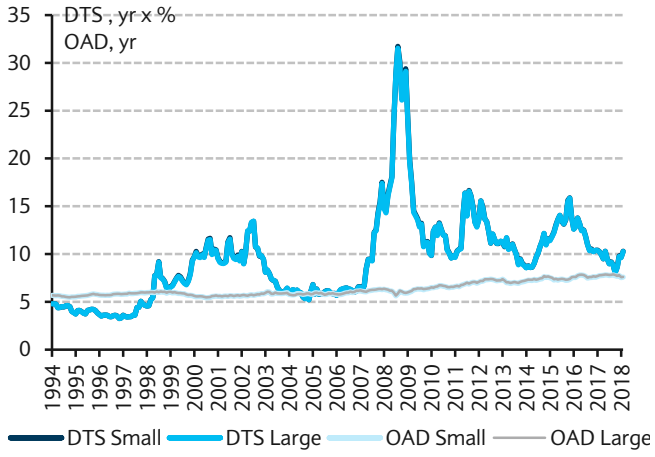
At the beginning of each month, the two portfolios are required to match option-adjusted spread (OAS), option-adjusted duration (OAD), and duration times spread (DTS) of the index. In addition, the portfolios have identical weights, OAD and DTS contributions across 16 sector-maturity buckets and identical weights and duration contributions across rating buckets. Finally, in order to ensure sufficient diversification, we impose strong restrictions on issuer concentration in terms of deviations from index weights and DTS contributions.

As a result, at the beginning of each month, we obtain two exposure-matched portfolios with very different issuer sizes, but identical exposures to systematic risk. Figure 17 plots historical OAD, DTS (Panel A) and OAS (Panel B) of small- and large-size portfolios in the US IG universe. The two portfolios seem indistinguishable on any of these characteristics. Exposures are similarly matched for sector, maturity, and rating partitions.

We next verify that the two portfolios are sufficiently diversified to limit issuer-specific risk with a view to isolate the 'size factor'. Figure 18 shows the average number of bonds and issuers in each portfolio over different periods. Small-size portfolios included on average around 500 bonds of 300 issuers, while large portfolios included around 400 bonds of 110

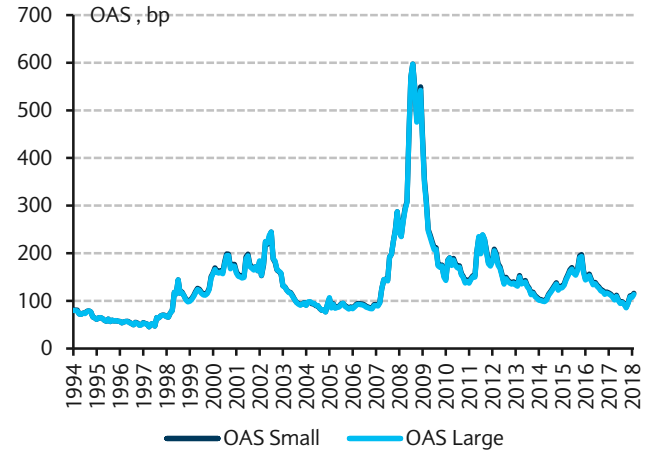
FIGURE 17
Historical characteristics of exposure-matched portfolios in US IG

PANEL A
OA duration (OAD) and duration times spread (DTS)



Source: Barclays Research

PANEL B
OA spread (OAS)



Source: Barclays Research

[15] See Figures 12 and 13.

issuers. In both cases, size portfolios were sufficiently diversified. Large-size portfolios are more concentrated because concentration limits are anchored to issuer weights in the capitalization-weighted index. Figure 18 also reports the large and intended differences between average issuer sizes in small and large-size portfolios.

FIGURE 18

Characteristics of exposure-matched portfolios in US IG by period

	# bonds		# Issuers		Size in $bn	
Period	Small	Large	Small	Large	Small	Large
1994-1998	491	401	306	105	0.27	1.40
1999-2003	503	380	316	108	0.45	3.23
2004-2008	481	371	282	110	0.81	4.21
2009-2013	529	397	297	119	0.90	5.02
2014-2018	569	417	332	127	0.88	5.91

Source: Bloomberg, Barclays Research

We next compare historical performance of small- and large-size portfolios in US IG and HY markets.[16] Figure 19 summarizes performances in different periods. Small underperformed large-size portfolios by 67bp/yr and 32bp/yr in the US IG and HY markets respectively, with a stronger underperformance in the period from 2007 to 2018. In HY, small-size portfolios outperformed their large-size peers by 12bp/yr between 1994 and 2006, while in IG small size portfolios underperformed by 28bp/yr over the same period. Given the fact that, small and large-size portfolios are otherwise exposure-matched, the difference in their returns can be attributed to issuer size.

Consistent with Figure 8, excess returns of small-size portfolios appear less volatile than those of large ones, despite the fact that systematic exposures are closely matched. Indeed, volatilities of excess returns of small and large-size portfolios are respectively 3.37%/yr and 4.50%/yr in IG; and 8.06%/yr and 10.27%/yr in HY.

FIGURE 19

Performance of exposure-matched IG and HY size portfolios over different periods

	US Corp IG			US Corp HY		
	Small	Large	Diff (SML)	Small	Large	Diff (SML)
Jan 1994 - May 2018						
Avg. ExcRet, %/yr	0.30	0.97	-0.67	2.62	2.93	-0.32
Volatility, %/yr	3.37	4.50	1.65	8.06	10.27	4.31
Inf. Ratio	0.09	0.22	-0.41	0.32	0.29	-0.07
Max. Drawdown, %	-24.6	-24.4	-15.9	-43.0	-46.0	-21.0
Jan 1994 - Dec 2006						
Avg. ExcRet, %/yr	0.28	0.56	-0.28	1.64	1.53	0.12
Volatility, %/yr	1.73	2.36	1.02	6.25	8.29	3.54
Inf. Ratio	0.16	0.24	-0.27	0.26	0.18	0.03
Max. Drawdown, %	-7.5	-7.8	-5.8	-29.9	-40.0	-10.5
Jan 2007 - May 2018						
Avg. ExcRet, %/yr	0.31	1.43	-1.12	3.72	4.53	-0.81
Volatility, %/yr	4.57	6.07	2.15	9.71	12.12	5.05
Inf. Ratio	0.07	0.24	-0.52	0.38	0.37	-0.16
Max. Drawdown, %	-24.3	-24.4	-13.8	-43.0	-45.9	-17.8

Source: Bloomberg, Barclays Research

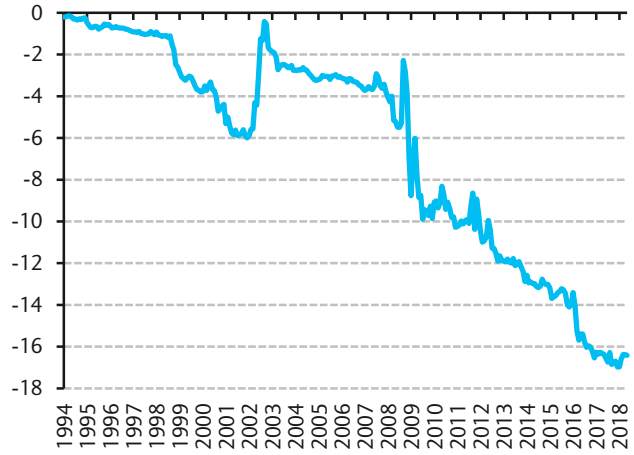
[16] Small- and large size exposure-matched HY portfolios are build using the methodology analogous to the one described for the IG market.

FIGURE 20

Cumulative SML returns obtained as return differentials between small and large exposure-matched portfolios

PANEL A

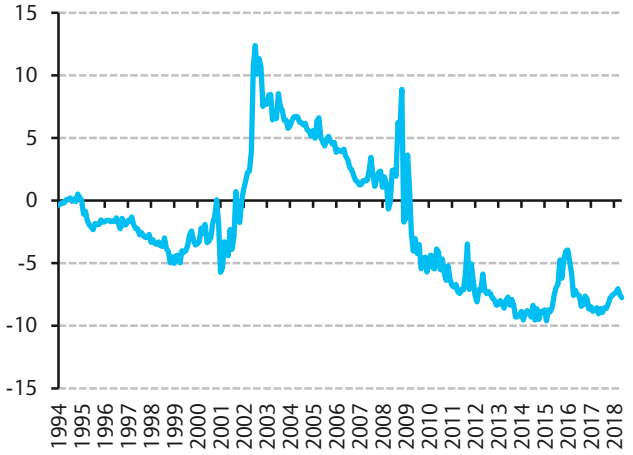
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

Cumulative SML returns are reported in Figure 20 and illustrate the performance dynamics of exposure-matched size portfolios in IG and HY markets.

Panel A shows that in IG, Small-size portfolios consistently *underperformed* large-size portfolios. Panel B shows similar results for HY. In both cases, SML underperformed during benign environment but outperformed during the telecom (2001-2002) and the financial (2008) crises. Figure 21 details SML performance during the crises across sectors.

Unsurprisingly, the strongest SML returns occurred in the Communication & Technology sector in 2001-2002. Indeed, Small size portfolios outperformed by 20.22% in IG and by 43.25% in HY in the Communication & Technology sector. Similarly, strong SML returns during the 2008 crisis were observed in the Financial sector: 5.56% in IG and 38.67% in HY.[17]

FIGURE 21

SML returns across industry sectors during market distress

	US Corporate IG						US Corporate HY					
	Jan 2002 - Sep 2002			Jul 2008 - Sep 2008			Jan 2001 - Jul 2002			Apr 2008 - Nov 2008		
	Small	Large	SML	Small	Large	SML	Small	Large	SML	Small	Large	SML
Basic & Capital Goods	2.23	1.41	0.82	-3.22	-5.76	2.54	-1.36	2.01	-3.37	-27.32	-33.29	5.96
Cyclical	-0.15	-3.19	3.05	-4.32	-5.73	1.40	6.46	3.11	3.35	-37.75	-49.05	11.30
Non-Cyclical	1.16	0.81	0.35	-4.33	-4.37	0.04	8.79	18.89	-10.10	-22.36	-24.73	2.37
Energy	2.21	2.90	-0.69	-5.91	-9.24	3.33	2.50	5.80	-3.30	-33.25	-32.39	-0.86
Comm. & Technology	-3.91	-24.13	20.22	-4.74	-6.17	1.44	-20.58	-63.84	43.25	-33.81	-38.43	4.62
Utility	-3.53	-15.68	12.15	-6.01	-6.21	0.19	-21.78	-36.25	14.46	-29.52	-28.89	-0.63
Financial	0.18	-2.01	2.20	-13.12	-18.68	5.56	6.21	2.18	4.03	-31.78	-70.46	38.67
Total	-0.56	-6.14	5.58	-8.51	-11.71	3.20	-5.95	-20.18	14.23	-31.50	-39.08	7.58

Source: Bloomberg, Barclays Research

[17] Please note the differences in respective periods for IG and HY markets. In both episodes, Small size portfolios started outperforming Large size portfolios earlier in HY than in IG markets.

Significant reversals of the SML factor during market distress can be explained by the fact that larger, potentially more aggressive and leveraged, debt issuers tend to suffer more during the crisis than their smaller, moderate, counterparts[18]. Additionally, bonds issued by small issuers tend to be illiquid during market distress, which can make the process of price discovery difficult.

Results reported in Figures 19 and 20 indicate that SML credit factor tend to have a negative risk premium other things equal: bonds issued by small issuers, with otherwise similar characteristics to those issued by large issuers, tend to *underperform*.[19] This is probably not surprising, as access to capital markets might be generally harder for smaller issuers.

Conclusion

We found that bonds issued by smaller issuers typically have higher spreads. However, a large portion of this spread premium is attributed to difference in sector and rating allocation between portfolios of small- and large-size issuers. When accounting for differences in sector allocation, credit rating and liquidity, the average spread premium attributed to size, was 3bp in IG and 5.3bp in HY in May 2018, but varied widely from -22bp to 24bp in IG and from -171bp to 70bp in HY.

Excess returns of smaller issuer portfolios seem less volatile than their larger counterparts. However, this phenomenon is likely related to the poor liquidity of bonds issued by small issuers.

When controlling for systematic risk exposures and characteristics, we find that portfolios of small issuers tend to underperform portfolios of large issuers. The annualised underperformance between 1994 and 2018 was -67bp/yr in US IG and -32bp/yr in US HY. A few episodes when small issuer portfolios outperformed those of large issuers were associated with market distress.

Our findings generally do not support the existence of a size factor that could be exploited by credit investors the same way many equity investors systematically favour smaller capitalisation stocks with a view to enhance returns.

[18] Please see *Issuance Dynamics and Performance of Corporate Bonds*, Barclays Research, 15 September 2014.
[19] At the same time, we recognise that investors usually receive a spread premium for investing into small issuers. This additional spread carry can, at least partially, offset the documented underperformance of smaller size issuers. We repeated our analysis of exposure-matched Small and Large issuer size portfolios, where we allowed the portfolios to have slightly different spreads (OAS) and duration time spread (DTS), but left other exposure constraints (sector, rating allocation and duration contributions) intact. As a result, Small size portfolios acquired additional spread premium related to size and liquidity. The performance results are reported in Figures 24 and 25 in the Appendix.

Appendix

Estimating SML spread premium

Figures 22 and 23 detail the estimation of size spread premia in the IG and HY markets using regression models similar to the Fama-MacBeth approach. As discussed in the text, we use three models, which sequentially add control variables to the analysis. Model 1 controls issuer spread for duration and sector. Spread premium (SML) is estimated as the difference between coefficient of size dummy variables for bottom and top 30% of issuers sorted on size. Estimated SML spread before controlling for ratings and liquidity is 17.2bp as of 31 May 2018. Figure 22 also shows a significant variation in sector spreads.

FIGURE 22

Size premium in US Corporate IG, 31 May 2018

		Model 1: Sector		Model 2: Sector + Rating		Model 3: Sector + Rating + Liquidity	
Category	Variable	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
	SML	**17.2**		**5.7**		**3.0**	
Size	Small	11.8	3.0	8.1	3.3	6.6	2.6
	Large	-5.4	-1.4	2.3	0.9	3.6	1.4
OAD	OAD	4.8	8.0	6.8	17.9	7.2	18.2
Sector	BAS	105	24.0	37	5.1	37	5.2
	CYC	120	21.3	50	6.8	51	6.9
	NCY	117	24.7	46	6.5	47	6.7
	COT	123	24.6	55	7.8	55	7.9
	TRE	142	28.6	60	8.3	61	8.5
	UTI	105	16.5	40	5.1	39	5.0
	BAB	105	17.6	61	8.0	63	8.3
	FIO	127	29.4	63	8.9	62	8.8
Rating	A1	-	-	10	1.1	9	1.0
	A2	-	-	29	3.9	28	3.9
	A3	-	-	40	5.7	40	5.7
	BAA1	-	-	59	8.5	59	8.5
	BAA2	-	-	78	11.4	78	11.5
	BAA3	-	-	103	15.1	103	15.2
Bid-Ask	Liquidity	-	-	-	-	0.79	3.2
	R-sq	26%		72%		73%	

Source: Bloomberg, Barclays Research

Next, we add rating dummies to the set of explanatory variables in Model 2. As expected, credit ratings explain a large portion of SML spread estimated in Model 1: SML spread declines from 17.2 to 5.7bp when controlling for rating quality. Finally, SML drops to only 3bp when controlling for liquidity.

Figure 23 estimates SML spread premium in the US HY market as of 31 May 2018. It drops from 69.1bp in Model 1 (before controlling for rating and liquidity) to only 5.3bp in Model 3.

FIGURE 23
Size premium in US Corporate IG, HY May 2018

		Model 1		Model 2		Model 3	
Category	Variable	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
	SML	**69.1**		**6.9**		**5.3**	
Size	Small	56.8	2.1	18.1	0.8	19.5	0.9
	Large	-12.3	-0.5	11.2	0.5	14.2	0.7
OAD	OAD	-7.9	-1.0	19.9	3.0	25.9	3.7
Sector	BAS	316	11.6	149	3.5	145	3.5
	CYC	356	13.4	202	4.8	200	4.8
	NCY	402	17.3	201	4.7	198	4.7
	UAE	421	15.3	237	5.6	236	5.6
	FIN	281	6.0	156	3.0	150	2.9
Rating	BA2	-	-	33	0.7	35	0.7
	BA3	-	-	49	1.1	52	1.2
	B1	-	-	69	1.6	70	1.6
	B2	-	-	144	3.4	143	3.4
	B3	-	-	196	4.6	201	4.7
	CCC and below	-	-	445	10.4	445	10.5
Bid-Ask	Liquidity	-	-	-	-	0.21	2.9
	R-sq	4%		34%		35%	

Source: Bloomberg, Barclays Research

Exposure-matched portfolios with relaxed constraints

The report explains that SML factor returns are estimated by building exposure-matched portfolios of small and large issuers. Among other things, we required that the average spread and DTS of the small and large portfolios be identical.

However, investors who buy bonds issued by small issuers often wish to collect a positive spread premium (please see Figures 14 and 15). This additional spread carry can, at least partially, offset the underperformance of SML seen above. We therefore repeated our analysis of exposure-matched small- and large-size portfolios, but this time allowed the portfolios to have slightly different spreads (OAS) and DTS exposures while keeping other constraints (sector, rating allocation and duration contributions) unchanged. In particular, portfolio spreads and DTS exposures were allowed to deviate by 10% from the spread of the underlying index.

As before, the portfolios are built by minimising (small size) or maximising (size) issuer size subject to remaining constraints.

Figure 24 shows performance statistics for IG and HY exposure-matched size portfolios with relaxed spread and DTS constraints. Over the entire period, SML continues to underperform in IG (-16bp/yr), and has a negligible return in HY.

FIGURE 24

Performance of exposure-matched size portfolios with relaxed spread and DTS constraints

	US Corp IG			US Corp HY		
	Small	Large	Diff (SML)	Small	Large	Diff (SML)
Jan 1994 - May 2018						
Avg. ExcRet, %/yr	0.52	0.68	-0.16	2.72	2.69	0.03
Volatility, %/yr	3.40	4.44	1.70	8.36	10.49	4.59
Inf. Ratio	0.15	0.15	-0.09	0.33	0.26	0.01
Max. Drawdown, %	-24.1	-24.6	-8.0	-43.8	-46.3	-17.2
Jan 1994 - Dec 2006						
Avg. ExcRet, %/yr	0.38	0.40	-0.03	1.44	1.56	-0.12
Volatility, %/yr	1.71	2.34	1.08	6.38	8.61	3.92
Inf. Ratio	0.22	0.17	-0.02	0.23	0.18	-0.03
Max. Drawdown, %	-6.9	-9.1	-3.4	-32.4	-40.0	-11.6
Jan 2007 - May 2018						
Avg. ExcRet, %/yr	0.69	1.00	-0.31	4.18	3.98	0.20
Volatility, %/yr	4.62	6.00	2.20	10.13	12.28	5.26
Inf. Ratio	0.15	0.17	-0.14	0.41	0.32	0.04
Max. Drawdown, %	-24.0	-24.5	-6.8	-43.8	-46.3	-13.3

Source: Bloomberg, Barclays Research

Finally, Figure 25 shows the cumulative return of the SML return factor obtained as return differentials between exposure-matched portfolios with relaxed spread and DTS constraints.

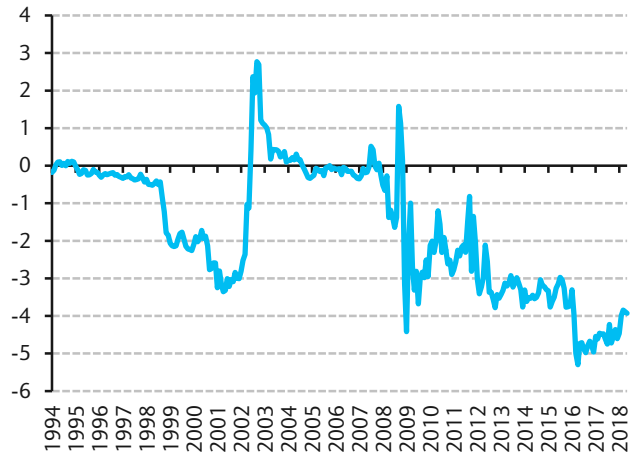
Overall, our findings do not support the existence of a size factor that could be systematically exploited by credit investors, even though opportunistic allocation to smaller-size issuers is possible on a tactical basis.

FIGURE 25

Cumulative SML returns obtained from exposure-matched portfolios with relaxed spread and DTS constraints

PANEL A

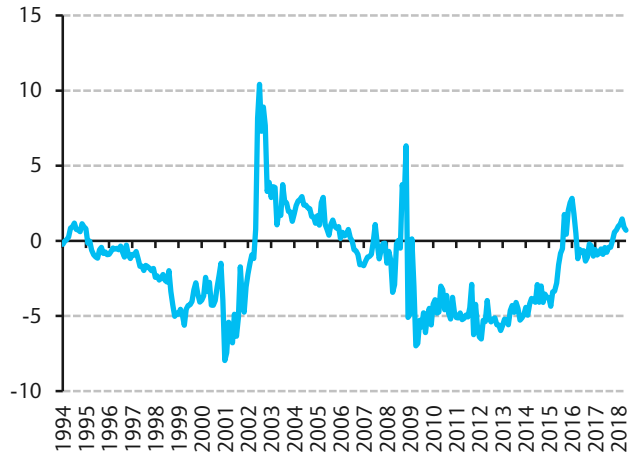
US Corporate IG



Source: Barclays Research

PANEL B

US Corporate HY



Source: Barclays Research

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