

Corporate Bonds

Why Ratings Matter

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Abstract

Corporate bonds, which form a major portion of fixed income securities, are typically categorized by ratings. At times, we tend to shrug off ratings as they are slow moving and often late in their reaction. However, as we show in our research, the impact of ratings on performance is quite stark and can not be understated.

The historical total and excess returns of these rating buckets exhibit a tent-shaped structure, similar to the equity markets. Over the past three decades, BB rated bonds have offered the highest risk-adjusted performance.

The historical return attribution to defaults, downgrades and upgrades for each rating bucket reveals that risk-seeking investors receive higher returns in investment grade buckets, but the compensation does not extend to high yield rating buckets. This discrepancy between the two segments of corporate bonds contributes to the tent-shaped performance observed across the rating buckets. Particularly in the high yield market, there seem to be investors chasing higher yields in the lower rating bucket, often not compensated by higher returns.

In particular, the BB rating bucket's performance stands out. Part of this outperformance can be attributed to its position between investment grade and high yield. Often considered the "orphan child", BB bonds are overlooked by investors restricted to investment grade and those seeking higher yields in lower rating buckets. A significant driver of performance in these rating buckets is rating transitions from investment grade to high yield. We attribute 90% of the BB bucket's outperformance to fallen angels and rising stars compared to BBB and B rating buckets.

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Introduction

The credit rating is a financial indicator to potential investors of debt securities and is assigned by credit rating agencies. Ratings play a critical role in determining the cost to access debt market by various debt issuers. The global credit rating industry is highly concentrated with three leading agencies: Moody's, Standard & Poor's and Fitch. Although they use different letter ratings, we can map them effectively. For ease of notation, we will stick with the convention used by Standard & Poor's throughout this article. Bonds fall into coarse ratings such as AAA, AA, A, BBB, BB, B, CCC, CC, or C, with descending credit quality. Investment-grade (IG) bonds range from AAA to BBB, while speculative or high-yield (HY) bonds are rated BB or lower.

Bloomberg indices utilize these ratings to construct corporate investment grade and high yield indices (Bloomberg terminal tickers - [LUACTRUU](#) and [LF98TRUU](#) respectively). Our study examines the evolution and performance of various rating buckets, emphasizing risk-reward characteristics that differ significantly.

Characteristics of Rating Buckets

Table 1 represents the current corporate bond landscape in USD. In the investment grade universe, A and BBB rated bonds dominate, while the high yield universe is primarily composed of BB and B rated bonds. We observe that IG universe has longer average duration than the HY universe. The credit spreads go up as we go down the credit rating ladder, with CCC, CC and below buckets averaging 7% and 17% respectively.

Table 1: US Corporate Investment Grade and High Yield Indices (Mar 31 2024)

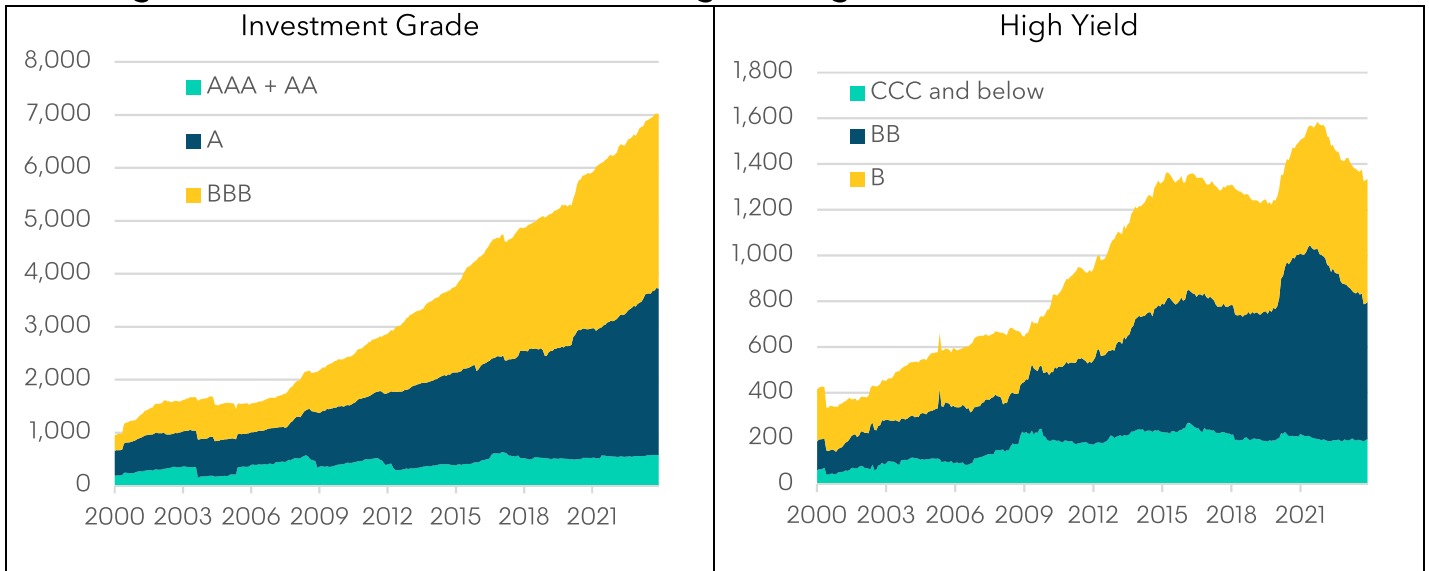
Grade	Ratings	Ticker	Member count	Issuer Count	Spread(%)	Duration(yrs)
Investment Grade	AAA	I08218US	80	13	0.33	10.2
	AA	I08219US	478	90	0.43	7.8
	A	I08220US	3341	263	0.74	6.8
	BBB	I08221US	4039	580	1.07	6.6
High Yield	BB	I00182US	934	396	1.82	3.5
	B	I00185US	715	425	2.80	3.00
	CCC	I00188US	252	177	7.19	2.9
	CC and below	I00191US	31	15	16.9	2.9

Source: Bloomberg.

The corporate bond universe has evolved significantly over the past two decades. The size of the investment grade corporate market, as measured by the total amount outstanding of the index, has more than quadrupled, soaring from \$1.6 trillion to \$7 trillion. At the same time, the size of the high yield corporate market has increased from \$520 billion to \$1.3 trillion. The

overall increase of the corporate bond market is partly a result of economic expansion and partly a response to the prolonged low yield curve environment. The total amount outstanding of corporate bonds as a percentage of the US GDP has also increased from around 15% in the early 2000s to over 30% in recent years.

Figure 1: Evolution of Amount Outstanding in Rating Buckets in \$ Billions (2000-2023)

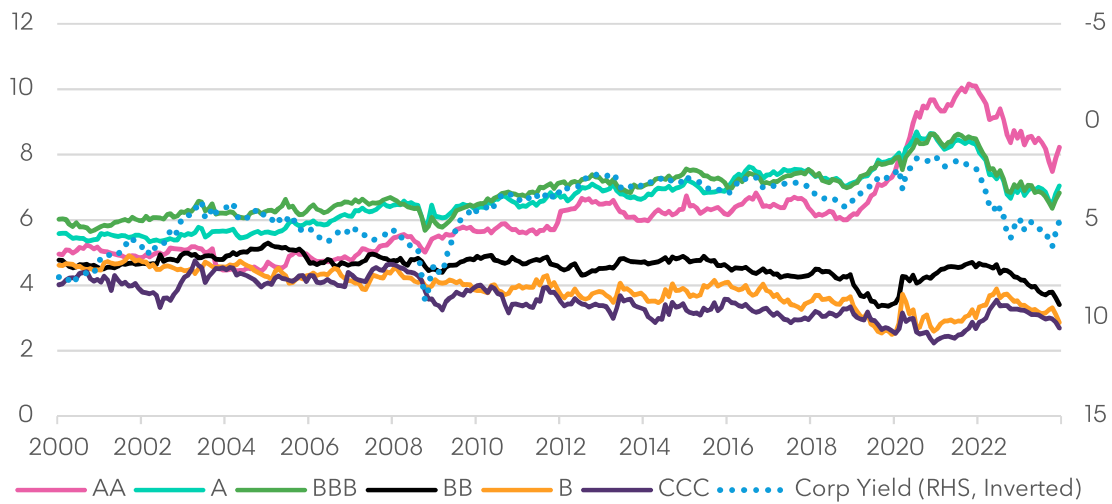


Source: Bloomberg.

Figure 2 illustrates the evolution of duration of various rating buckets. The three investment grade buckets have seen duration extended substantially from 5-6 years in 2000s to 8-10 years in 2020s. The duration has dropped significantly in the last couple of years as a result of rising interest rate. On the other hand, the duration of three high yield buckets have moved slowly but in the opposite direction.

The difference in the relationship between yield and duration of investment grade rating buckets and high yield rating buckets reflects the difference in convexity of these buckets. The investment grade rating buckets have positive convexity, with duration and yield having inverse relationship. While, the high yield rating buckets have close to zero convexity due to high number of callable bonds in these rating buckets.

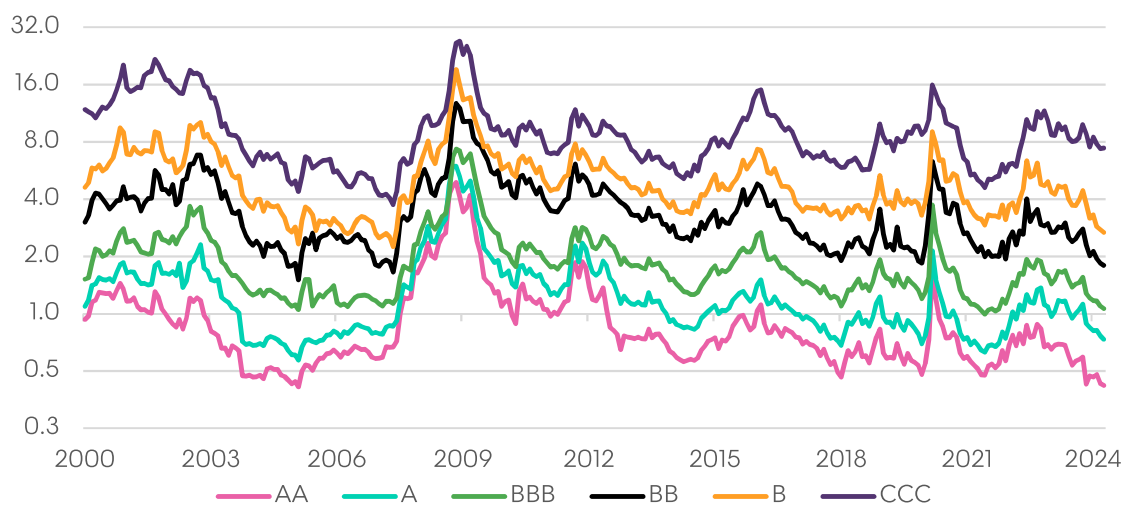
Figure 2: Evolution of Option Adjusted Duration of Rating Buckets (2000-2023)



Source: Bloomberg.

The evolution of spreads for various rating buckets is shown in Figure 3. The market has gone through a few credit cycles in this period with credit spreads widening significantly in periods of market stress. Investors require different level of spreads to compensate for principal loss due to defaults, and liquidity and credit premium. The spread is considered as a measure of ex-ante risk in corporate bonds. In the next section, we compare these ex-ante risk measures with ex-post returns and realized risks in each rating bucket.

Figure 3: Historical Evolution of Option Adjusted Spreads of Various Rating Buckets (2000-2023)

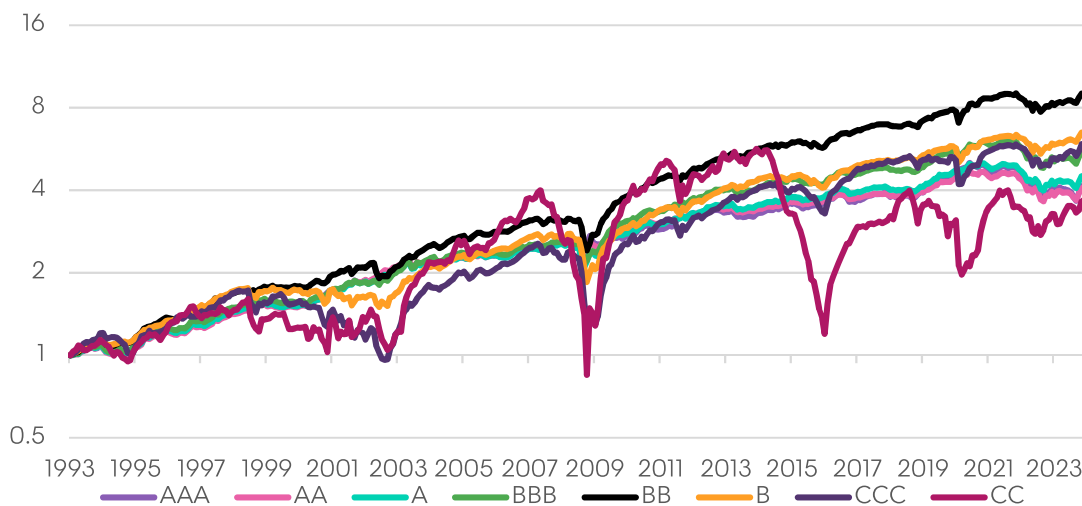


Source: Bloomberg.

Historical Performance

Figure 4 plots the cumulative returns over the past thirty years for various rating buckets. Overall, it has been a favorable period for fixed income investments, with all rating buckets posting respectable cumulative returns. The bucket with the highest return (BB) delivered a return of 9.1 or annualized 7.34% over the period.

Figure 4: Historical Total Returns of Various Rating Buckets (1993-2023)

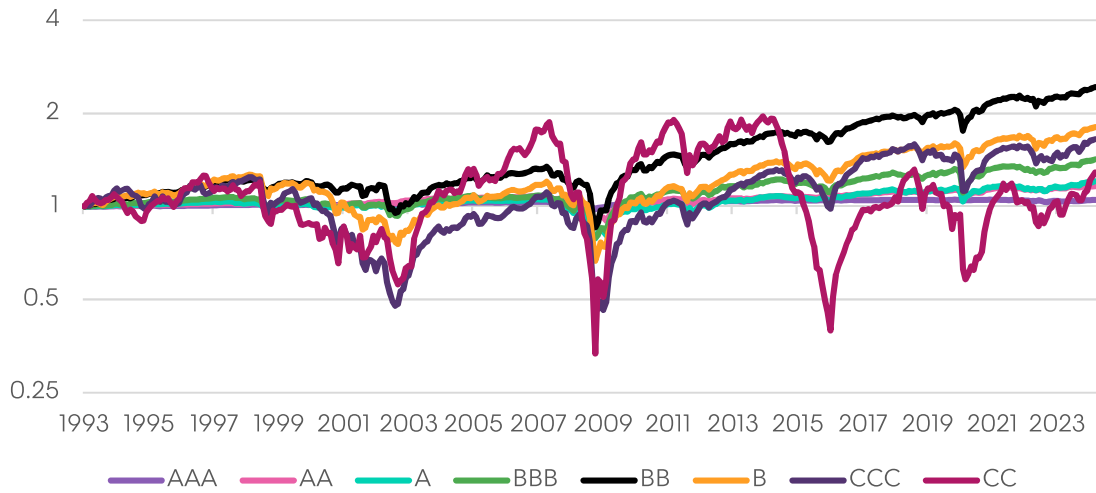


Source: Bloomberg.

Given that the difference in duration between investment grade and high yield bonds is rather large, the yield curve return should be excluded from the comparison. We plot the cumulative excess returns in Figure 5, where the excess return is computed as the difference of total return and yield curve return. The yield curve return of a corporate bond is computed from a monthly constructed portfolio of hypothetical treasury par bonds that perfectly matches the key rate duration profile of the corporate bond.

The volatility and higher drawdowns in the CC and CCC buckets indicate that these rating buckets perform strongly during recovery phases. Therefore, skillful investors looking to time market upswings can potentially benefit from these rating buckets. However, historical evidence suggests that, over the long term and through market cycles, these rating buckets may not provide returns comparable to other rating buckets.

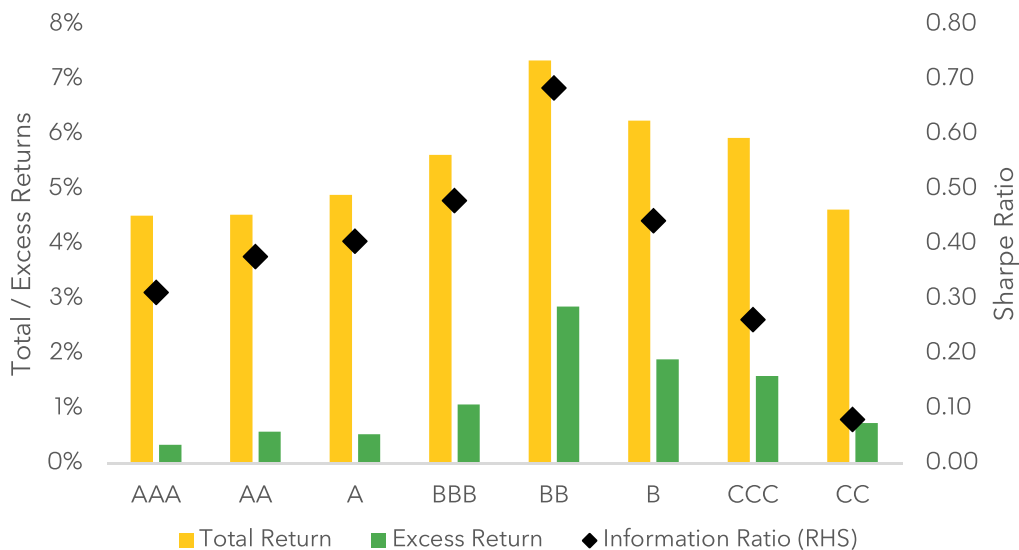
Figure 5: Historical Excess Returns of Various Rating Buckets (1993-2023)



Source: Bloomberg.

The annualized returns and risk-adjusted returns exhibit a tent-shaped pattern along the rating dimension with BB bucket having the highest returns and risk-adjusted return. If we consider a one-factor Capital Asset Pricing Model (CAPM) for corporate bonds, with OAS as a measure of risk, we would expect excess returns to be increasing over the rating buckets. This pattern holds true from AAA to BB, but returns start to decrease from BB to CC. The lower rating bucket not only delivered lower returns but also did so with significantly higher volatility.

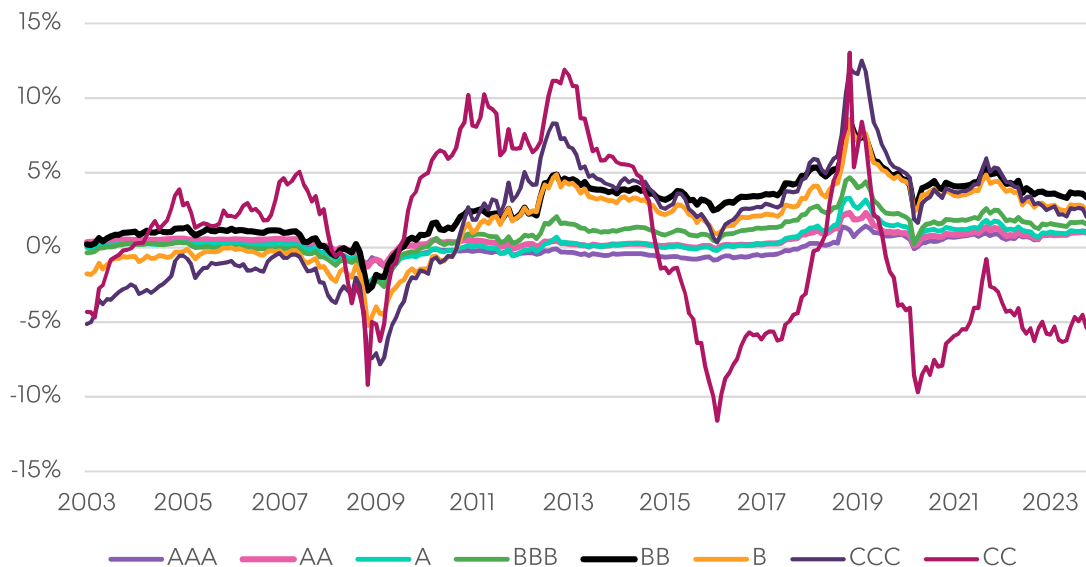
Figure 6: Performance Metrics by Credit Rating Buckets (1993-2023)



Source: Bloomberg.

BB rating bucket has been consistently outperforming most other rating buckets in US Corporate bond market. Apart from the low rating buckets, which have highly cyclical returns, which have highly cyclical returns, BB bucket has delivered best excess returns in most 10-year periods.

Figure 7: Rolling 10y Excess Returns by Rating Buckets (1993-2023)



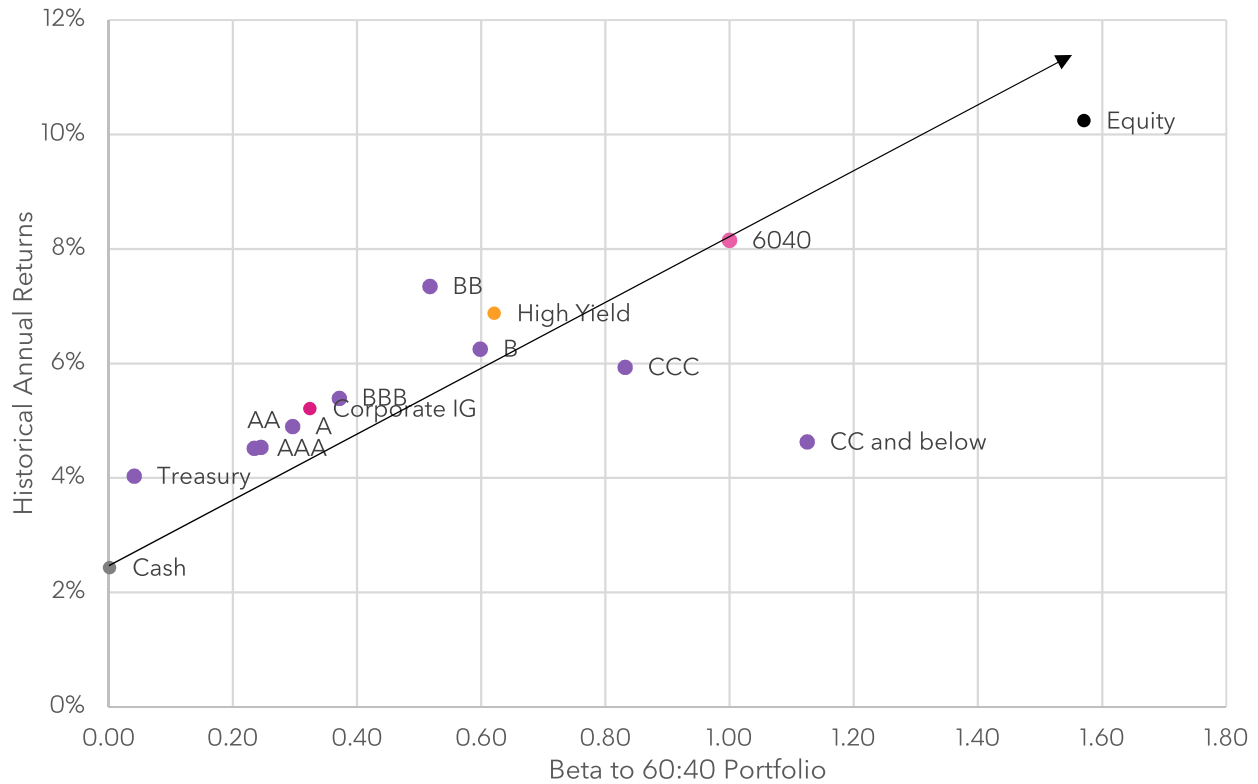
Source: Bloomberg.

The two key observations we make based on historical returns of these rating buckets are a) the tent shaped structure of returns and b) consistent outperformance of the BB rating bucket.

Comparison with Equity Markets

To understand the interesting tent shaped structure in absolute and risk adjusted returns in credit market, we look into basic asset pricing model CAPM and draw analogy with the risk return trade-off in equity markets. The credit rating buckets offer a wide range of risk-reward characteristics, ranging from treasury-like to equity-like attributes. Assuming a market portfolio composition of 60% US equities and 40% US Aggregate Bond Index, we find that most rating buckets offer higher rewards, with BB displaying the best characteristics than the theoretical CAPM. The lowest rating buckets, however, show low returns with higher beta. The line in Figure 8 represents the theoretical CAPM.

Figure 8: Risk Return Characteristics Credit Rating Buckets (1993-2023)



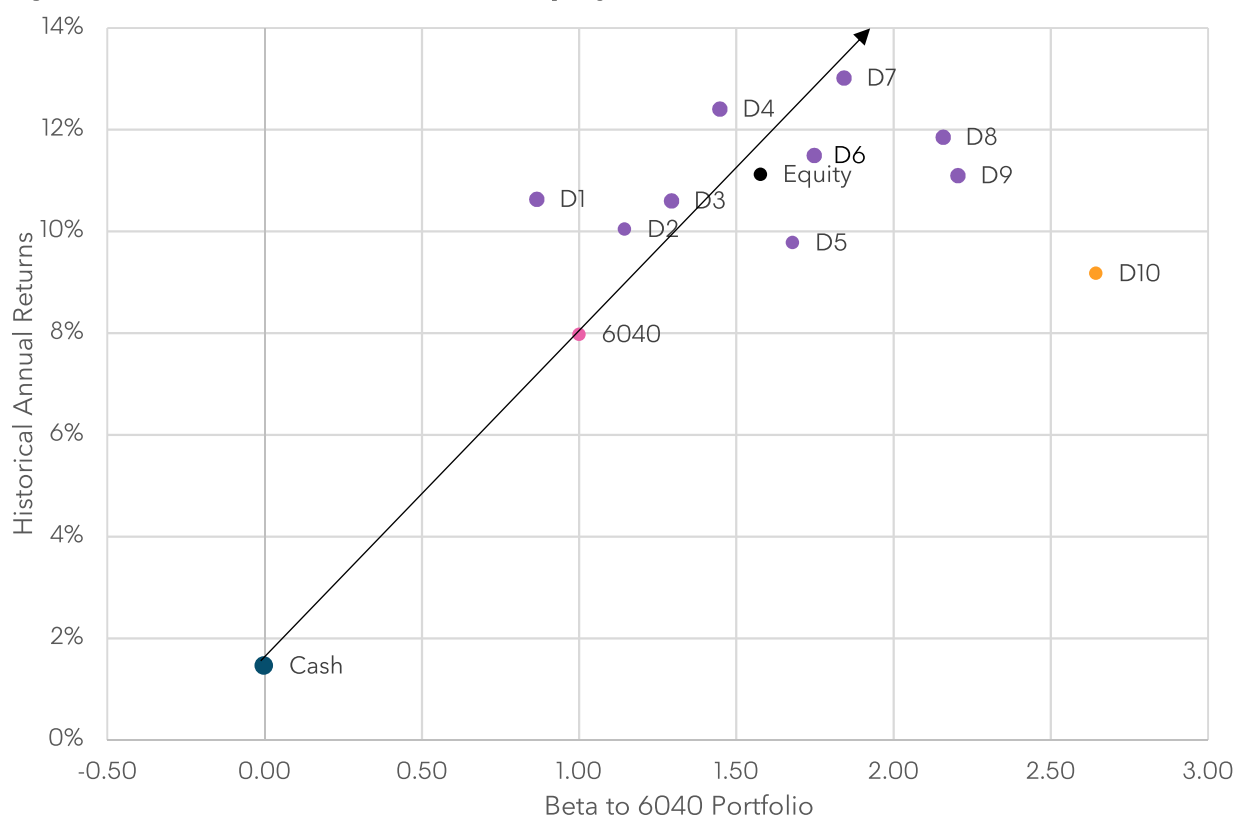
Source: Bloomberg.

In the Equity markets, as suggested by Ang et al. [2004]¹, stocks with high idiosyncratic volatility also tend to exhibit lower average returns. Our results suggest that in corporate bonds market, bonds with high idiosyncratic risks in lower rating buckets demonstrate comparable characteristics. This phenomenon is often attributed to investors overpaying for high-risk assets in pursuit of lottery-type returns. In other words, the low returns of the lowest rating buckets and high beta stocks suggest a greater number of market participants seeking to capitalize on these assets, thereby diminishing their premium.

In Figure 9, we divide the [Bloomberg US 1000 index](#), which comprises of 1000 large stocks in US, into 10 deciles on a quarterly basis using their market beta and compare their annualized returns along with their beta with a 60/40 market portfolio. The highest decile, with high market beta, exhibits the lowest return among all stocks, akin to the CC and below bucket in corporate bond ratings.

¹ Ang, Andrew and Hodrick, Robert J. and Xing, Yuhang and Zhang, Xiaoyan, The Cross-Section of Volatility and Expected Returns (October 2004). NBER Working Paper No. w10852, Available at SSRN: <https://ssrn.com/abstract=611363>

Figure 9: Risk Return Characteristics Equity Market Deciles (2003-2023)



Source: Bloomberg.

A key difference between equities and corporate bonds lies in the belly of this distribution. While in equities, there is no clear pattern for returns for the first 9 deciles, the corporate bond rating buckets have a cleaner pattern where BB stands out as an outlier in historical performances. In the next section, we go deeper into the potential reasons for this unique feature in corporate bonds.

Another difference is around the low beta effect. In equities, the lowest volatility stocks tend to have a higher sharpe ratio, also known as the low volatility anomaly. This, however, does not seem to be the case in corporate bonds. The sharpe ratio increases for corporate rating buckets, i.e. the risk seeking investor is compensated for additional risk on rating spectrum even on risk-adjusted basis.

An astute credit investor will point out that exposure to credit risk is usually measured by the product of spread duration and spread. In this analysis, we focus on the rating buckets dimension and ignore the spread duration dimension as this study aims to understand the dynamics of the rating buckets. However, the low volatility anomaly along the duration dimension is well documented in literature.

Historical Return Attribution

In this section and the next, we will focus on understanding the driver for the superior performance of the BB bucket. A corporate bond's yield can be broken into duration matched treasury yield and credit spreads. In the long run, changes in spreads have a smaller impact on performance as they tend to mean revert. Only permanent losses, which may result from defaults or rating downgrades, have a significant impact on the performance over extended periods. Therefore, we attribute the returns to defaults, downgrades and upgrades over a long historical period to estimate the historical risk premium for each rating bucket. It is important to note that this is a simplification, as the risk premium is time varying and other factors such as liquidity and taxes may influence this premium.

We construct a transition matrix of rating buckets to analyze historical movements from one rating bucket to another. Table 2 represents the weighted probability of a bond's rating in the next month given its starting rating as indicated in the respective row. High values on the diagonal indicate rating stickiness, while values in the top-right corner signify downgrades and those in the bottom-left corner indicate upgrades.

We make following observations from the table:

- a) Default rates in the investment grade rating buckets are very low
- b) More than 95% of the bonds that transition from investment grade to high yield are rated BBB before they move to high yield
- c) Rating changes are more common in high yield compared to investment grade, with an equal probability of upgrade and downgrade in most cases
- d) Among the adjacent downgrades, the downgrade rate from BBB to BB has been the lowest historically. Such a downgrade is effectively a move from investment grade to high yield market

Table 2: Transition Matrix for Credit Rating Buckets (2000-2023)

	End AAA	End AA	End A	End BBB	End BB	End B	End CCC	End CC	Defaulted
Beg AAA	99.16	0.77	0.06	0.003	0	0.004	0	0	0
Beg AA	0.019	98.73	1.24	0.006	0	0.001	0	0	0
Beg A	0.008	0.27	99.16	0.55	0.004	0.002	0.001	0	0.012
Beg BBB	0.004	0.020	0.35	99.25	0.35	0.01	0.002	0.001	0.005
Beg BB	0	0.006	0.02	0.96	97.86	1.03	0.06	0.04	0.03
Beg B	0.001	0.002	0.015	0.06	0.91	97.93	0.99	0.07	0.02
Beg CCC	0	0	0.019	0.011	0.06	1.58	96.98	0.84	0.50
Beg CC	0	0	0.004	0	0.02	0.33	3.03	91.73	4.89

Source: Bloomberg.

We aim to estimate historical impact from defaults and rating movements by categorizing securities based on the reasons they exit the rating bucket. The potential reasons considered are defaults, downgrades, and upgrades. We calculate the contribution to excess returns from such securities in each rating buckets. Table 3 compares the loss from each of these categories and total loss in each rating bucket with the average spread in the respective rating bucket.

Key observations from these results are as follows:

- a) A significant portion of losses comes from downgrades in all rating buckets except the CC rating bucket, where defaults lead to higher losses
- b) Within investment grade rating buckets, total losses do not strictly increase as we move down to lower quality rating buckets
- c) BBs exhibit the highest difference between spread and total loss, implying a higher expected return. This is partly driven by the strong outperformance of bonds that upgrade to higher rating buckets
- d) Higher risks in high yield buckets are not proportionately compensated. This lack of compensation for higher risk may be attributed to investors overestimating their security selection capabilities and seeking higher yields offered by lower rating buckets

Table 3: Return Attribution for Rating Buckets (2000-2023)

	Defaults	Downgrades	Upgrades	Total Loss	OAS	OAS - Loss
AAA		0.79		0.79	0.66	-0.13
AA		0.50	0.00	0.50	0.76	0.27
A	0.16	0.60	0.00	0.75	1.12	0.37
BBB	0.04	0.68	-0.10	0.62	1.71	1.09
BB	0.09	1.64	-0.93	0.80	3.20	2.40
B	0.15	3.39	-0.52	3.02	4.68	1.66
CCC	1.89	6.18	-1.65	6.42	8.23	1.81
CC and below	22.13	0.13	-5.47	16.79	20.41	3.62

Source: Bloomberg.

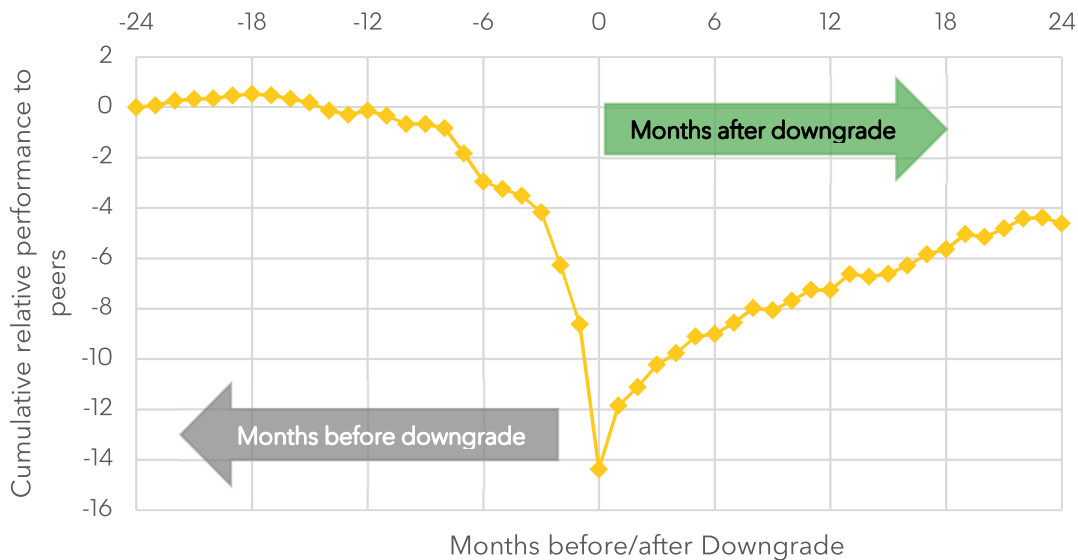
One potential reason for the outperformance of the BB rating bucket is the inefficiencies created by the market segmentation between investment grade and high yield. Some market participants prefer or are restricted to holding investment grade bonds, reducing the natural demand for BB-rated bonds. Conversely, managers focusing on yield may choose to bypass BB-rated bonds in favor of higher-yielding, lower-rated bonds. This dynamic could also contribute to the decline in the risk premium for rating buckets below BB. The separation of investment and high yield contributes to the superior performance of the BB bucket via bonds downgraded from investment grade to high yield, which we will analyze in more details in next section.

Fallen Angels and Rising Stars

Investment grade investors are forced to sell fallen angel bonds, which are bonds that are downgraded from investment grades to high yields. This selling typically takes place in a short window overwhelming the demand in the smaller high yield market. This causes disproportionate spread widening and price declines around the downgrade month, which often reverts once trading activity normalizes. BB rated bonds benefit from this temporary price dislocation and therefore exhibit superior risk adjusted performance.

Figure 10 illustrates the average performance of a fallen angel bond compared to its peer group². The relative performance of a fallen angel starts to significantly deteriorate three months prior to the downgrade, bottoming out on the month of the downgrade. These bonds outperform their new peer groups for a few months after the downgrade.

Figure 10: Fallen Angels' Relative Performance to Peers (2000-2023)

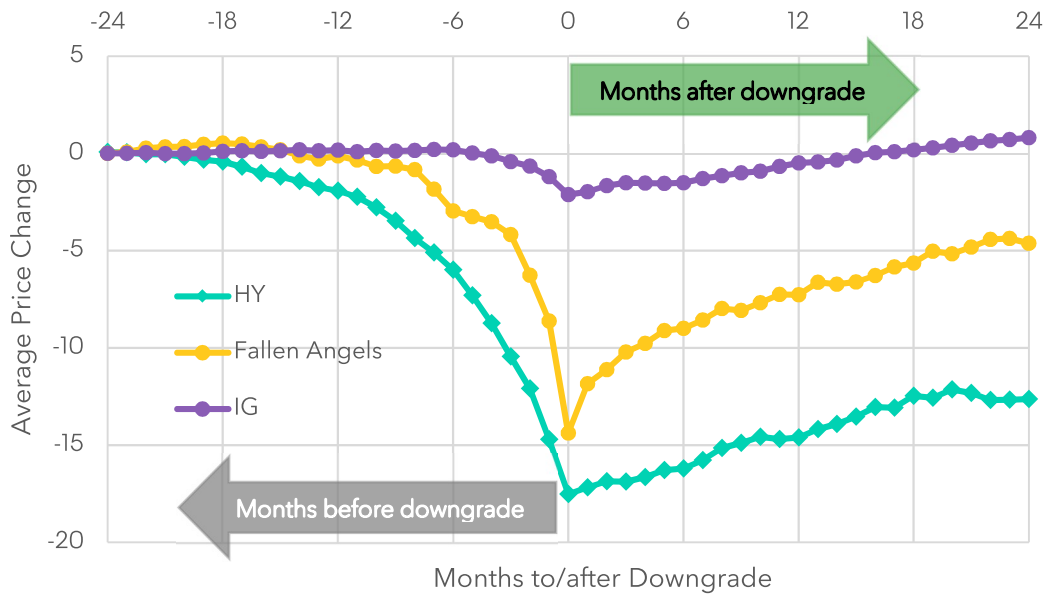


Source: Bloomberg.

We examine bonds that were downgraded within investment grade and high yield buckets to observe if similar movements occur with other downgrades. The relative performance of these bonds also follows a similar pattern as fallen angels, albeit with much different magnitudes. Bonds that are downgraded within investment grade ratings don't move as much as fallen angels. While, bonds in high yield buckets, on average, recover slowly and not as much as the fallen angels.

² The peer group is defined as bonds with similar industry, rating and duration

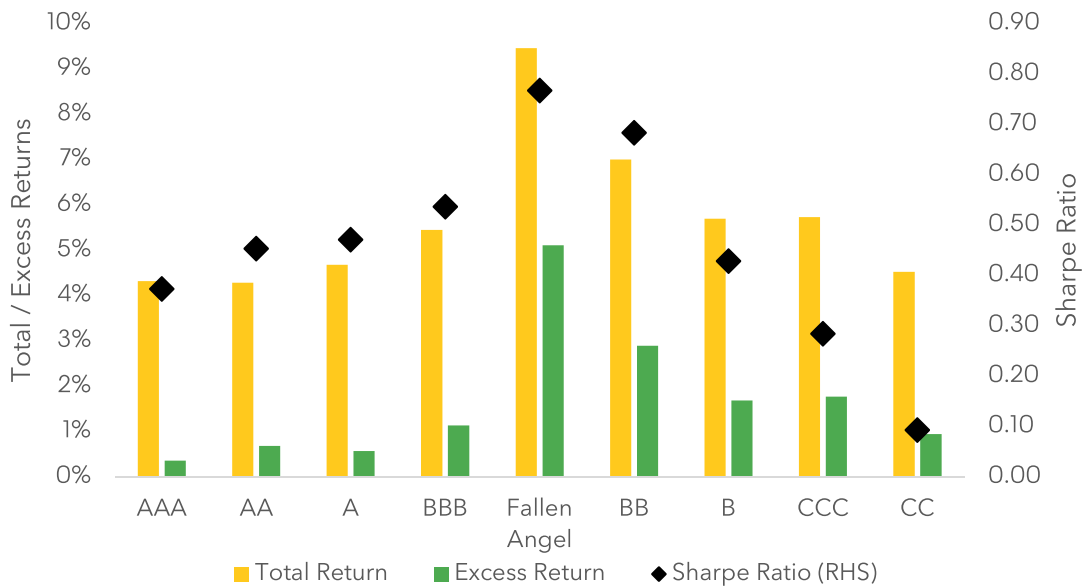
Figure 11 Relative Performance of downgraded securities (2000-2023)



Source: Bloomberg.

The Bloomberg's Fallen Angel index (Ticker: [BHYFTRUU](#)) has outperformed the best performing rating bucket, BB, by about 2.5% p.a. in the last 20+ years.

Figure 12 Performance Metrics by Credit Rating Buckets (2000-2023)



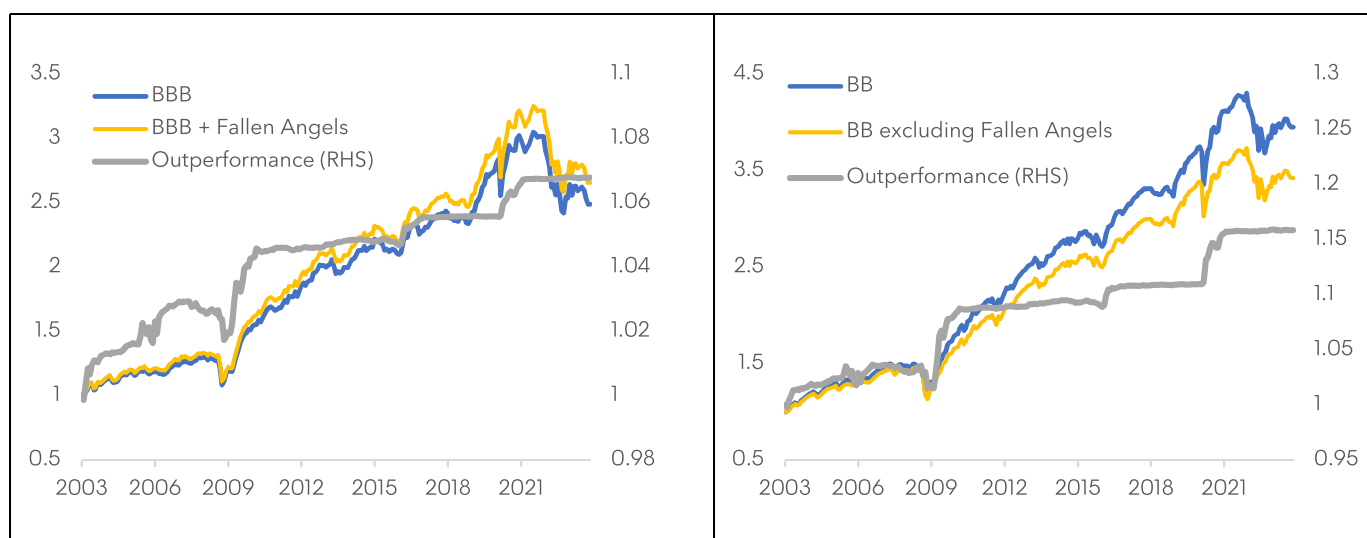
Source: Bloomberg.

To understand the impact of Fallen Angels on the performance of BBB and BB rating buckets, we create two hypothetical indices -

- **BBB + Fallen angels** - A flexible investor with potential to hold the fallen angels for 1 year after the downgrade would have achieved 32 bps p.a. additional return historically. Instead of selling the fallen angels immediately after the downgrade, this proposed index sells such bonds one year after the downgrade.
- **BB excluding Fallen angels** - A hypothetical portfolio that includes fallen angels only 1 year after the downgrade instead of including them in the month immediately following the downgrade underperforms the BB rated bonds by 71bps p.a. In other words, about 71bps p.a. of performance in BB bonds can be attributed to fallen angels.

The performance difference tends to be concentrated around the credit crisis as the number of downgrades are higher in these periods.

Figure 13: Impact of Fallen Angles in BBB and BB Buckets (2003-2023)

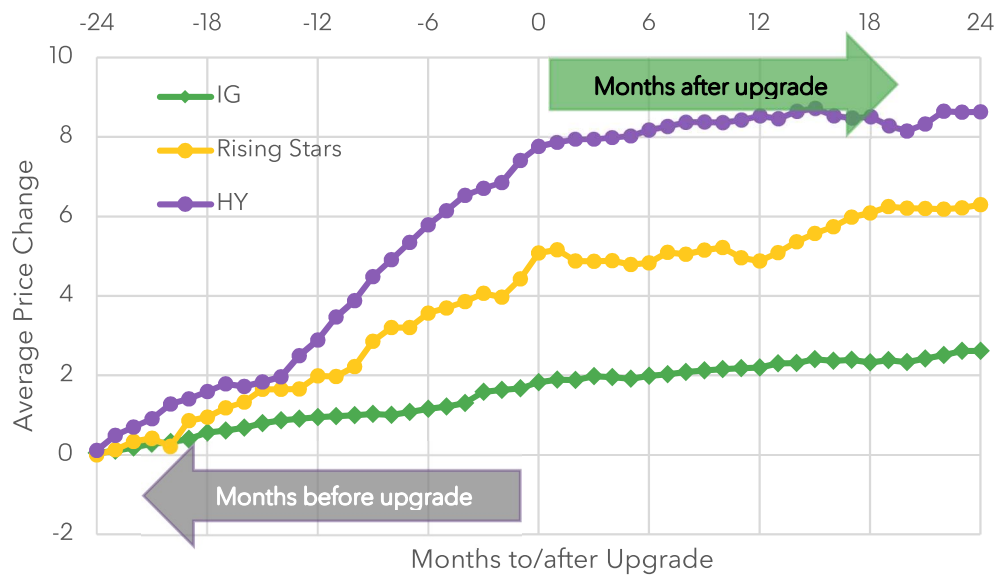


Source: Bloomberg.

The opposite case of 'rising stars' also contributes to the performance of the BB rating bucket. Rising stars are bonds that are upgraded from a high yield rating to investment grade. In the case of HY, the BB rating bucket benefits in the last month in particular, when the passive investors tracking investment grade market buy these upgraded bonds.

Figure 14 shows a comparison of average price move of the upgraded securities upgraded within investment grade and high yield along with those of rising stars. Similar to the fallen angels where prices drop in the last month, we find the prices for rising stars increase in the month of upgrade. While in the months following the upgrade, the prices flatten out or even decline in the case of rising stars.

Figure 14 Relative Performance of upgraded securities (2000-2023)

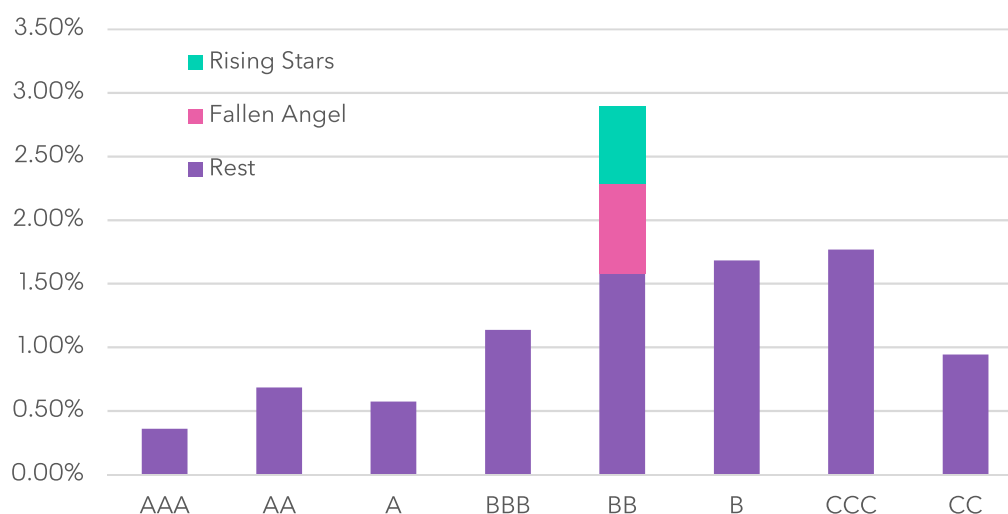


Source: Bloomberg.

As demonstrated in Table 3, such bonds add 93 bps p.a. to the performance of the BB rating bucket. One way we could estimate the attribution of rising stars is the average upgrade rate and the average outperformance compared to their peers. From Table 2, average upgrade rate from BB to IG is about 1% per month and ~5% peer outperformance from Figure 14 suggests around 60 bps (annualized) performance attributed to rising star.

Therefore, approximately 130 bps p.a.(including 71bps from fallen angels) of the BB rating bucket's outperformance could be attributed to the forced buying/selling of bonds moving between investment grade and high yield. In the same period, the BB rating's performance is about 150bps p.a. higher than the BBB and B rated buckets on average. Our results suggest that almost 90% of BB rating bucket's outperformance relates to the fallen angels and rising stars.

Figure 15 Excess Return of Rating Buckets with fallen angel and rising star attribution (2000-2023)



Source: Bloomberg.

Conclusion

Our analysis highlights the dynamic interplay between rating movements and bond performance within the corporate bond market. The tent-shaped returns of rating buckets can be explained by differing risk-seeking behavior among investors in the investment grade and high yield markets.

BB rating bucket, positioned on the edge of the investment grade and high yield buckets as “orphan child”, has the best performance among rating buckets. We observe that fallen angels and rising stars play significant roles in shaping the performance of the BB rating bucket. Together, these bonds attribute to around 90% of BB’s outperformance relative to its adjacent rating buckets. This underscores the impact of forced buying/selling dynamics between investment grade and high yield on the performance of BB-rated bonds.

For passive investors, our results suggest

- Fallen angels have historically offered one of the best opportunity in the overall corporate bond space for unconstrained investors
- HY investors are historically not compensated for high spread risks and long term investors may consider excluding the lowest rating buckets
- IG investor may benefit by holding the fallen angels for a bit longer after the downgrade
- IG investors are usually compensated for taking additional risks along rating buckets. Hence, those with higher risk appetite may benefit from taking these risks

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