For Professional Investors Only

Global Asset Management

A visual guide to the credit universe

Blair Reid
Senior Portfolio Manager – Multi Asset & Income
BlueBay Fixed Income Team

David Horsburgh
Head of Client Solutions
BlueBay Fixed Income Team

Published

January 2022

Overview

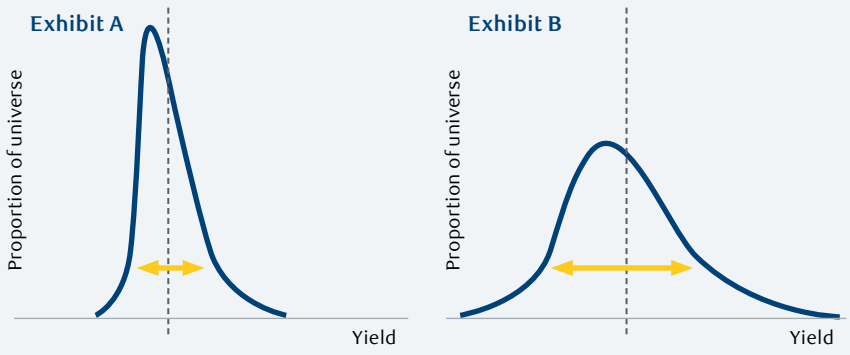
Bonds are typically described by a complex array of numbers that don't mean much to most people. In the spirit of 'a picture tells a thousand words', we shall attempt to provide a visual depiction of the bond universe and examine the breadth of the various markets to see what's on offer, from lower-yielding, higher-quality bonds all the way to bonds at the more speculative end of the spectrum.

Key takeaways:

- Credit asset classes vary considerably in their 'shape', by which we mean both the distribution of yields and credit quality.
- The average yield of an asset class, which many investors focus on when making decisions, can be materially different from the median yield when asset classes exhibit a strong 'skew'. This is particularly true in emerging markets.
- Yield and credit rating are more loosely linked than many might imagine i.e. bonds with the same credit rating can span the whole spectrum of yield, and this leads to thinking about 'efficiency' in terms of the 'yield to credit rating' trade-off.
- It is possible to be more creative in designing portfolios once we 'see' the choices available.

Purpose of this paper

Herein we explore the breadth of the opportunity set in a range of credit asset classes. The purpose is to illustrate the shape of the yield distribution of available securities i.e. are all securities bunched up near the average yield (exhibit A), or is there a wide array of choice (exhibit B)?



For each asset class, we will chart the distribution of credit ratings to get a sense of how credit quality and yield interact.

The average: very useful, to a point...

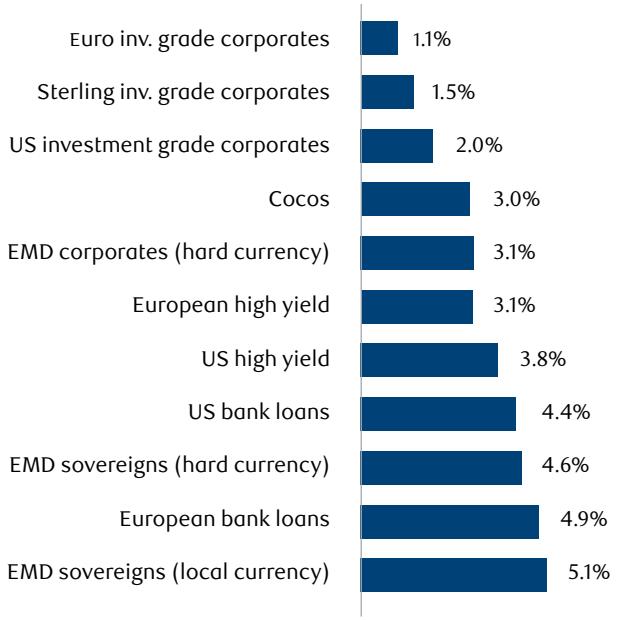
When investors consider a bond asset class, one quick summary statistic often used is the average yield. It conveys an awful lot in one number, and simplifies comparing asset classes. But it's also like describing a person solely by their age – there's a lot you can extrapolate from one number, but it doesn't give you the full picture.

Chart 1 depicts the average yields for a range of bond asset classes ranked in ascending yield order.

While it looks simple, in reality there's a whirlpool of complexity lurking just below the surface and it's some distance from comparing 'apples with apples'.

To make the comparison more considered, there are three key aspects to explore.

Chart 1: Index yields in USD terms[1]



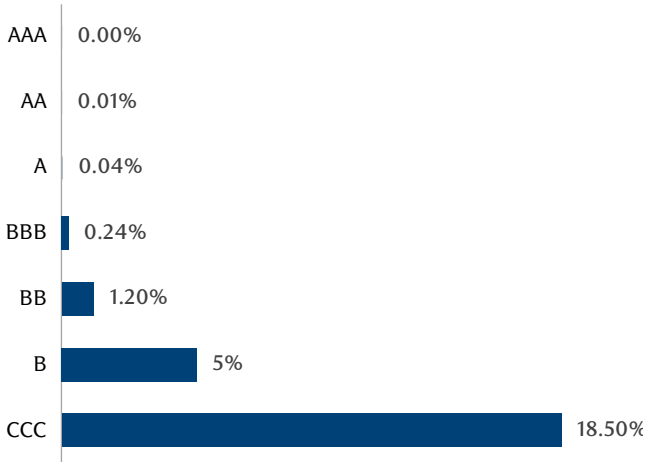
Source: Bloomberg, as at 16 September 2021. See Appendix 1 for index names. [1] USD yields are left unchanged. Euro yield is adjusted by +0.8% and GBP yields -0.2% (prevailing 1 year FX forwards as at 16 September 2021).

1. Credit rating

The largest contributor to yield differences is usually underlying credit risk – the possibility of an issuer not paying back the full contractual cashflows i.e. defaulting on its promise. Credit rating agencies (e.g. Fitch, S&P, Moody's) publish credit ratings for most bonds, from AAA, the safest, to CCC which are more speculative.

Chart 2 provides a long-term view of the default probability associated with each credit rating. The numbers represent the chance of a bond of a particular credit rating, selected at random, defaulting within a 12-month window. Note the probability of default rises on an exponential basis and is not linear.

Chart 2: Credit ratings & default probabilities



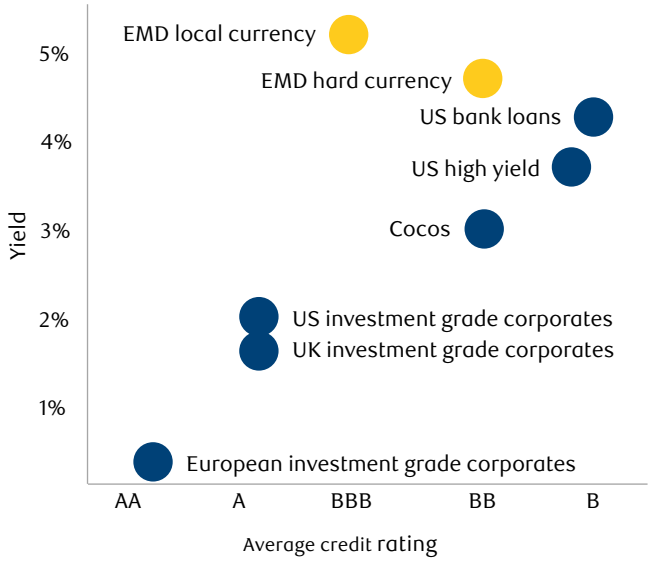
Source: Bloomberg default matrix, as at 3 November 2021. For illustrative purposes only. There is no assurance that any of the trends depicted or described herein will continue.

Default rates vary considerably over time. At present, defaults are generally lower than the long-term averages depicted.

To further complicate things, when a bond defaults, an investor usually gets back a proportion of their investment, known as the recovery value. This amount can vary considerably over time, and from sector to sector. We'll ignore recovery values herein, though in practice, a bond investor spends quite a bit of time estimating them.

One approach to take average credit ratings into account is to plot the average yield versus the credit rating, as shown in chart 3.

Chart 3: Credit rating versus average yield (in USD)



Source: Bloomberg, as at 16 September 2021.

If we focus on the dark blue dots we can see there is a broad, upward sloping relationship between yield and credit quality. The outliers are in the light blue – emerging markets – where we can see much higher yields given the average credit quality. The primary reason for this is emerging markets tend to be more volatile, so investors demand extra yield to take on a more volatile asset (also recovery rates can be both lower and slower due to foreign jurisdictions).

2. What type of yield?

Bonds are not all created equally (alas!). Some bonds are simple and have contractual cashflows for the entire term of the bond, paying coupons and principal on known dates. Others are issued with an embedded option for the issuer to repay early at certain dates. These bonds are termed 'callable'. Many government and high-quality investment grade markets fall into the simpler type; in high yield markets and other sub-investment grade sectors, callable features are prevalent. For example, 88% of the US high yield market is callable[2].

"Emerging markets offer an attractive yield/credit quality relationship, though exhibit higher volatility."

Investors and index providers tend to use the yield most relevant for the asset class. The three most common types are:

- **Yield to maturity:** the yield from holding the bond to its maturity.
- **Yield to call:** an issuer may choose pay the bond off before it reaches maturity. The yield to call is the yield achieved if the bond is held only to its call date (rather than maturity).
- **Yield to worst:** an investor will often compare the yield to maturity and yield to call. The lower figure is the yield to worst i.e. the lowest possible yield. Note that if a bond isn't callable, the yield to maturity and yield to worst are the same.

Most asset classes use yield to worst as the primary yield measure, noting, for example, that for US investment grade, the yield to maturity and yield to worst are the same for 43% of the bonds, thus more than half the bonds have callable features.

The various 'yield conventions' for the asset classes are listed in the Appendix 1.

3. Which currency?

A simple comparison of the yields for, say, US, UK, Japanese and European bonds ignores the different 'risk free' interest rates prevailing in each region. Bond yields are usually calibrated relative to a 'risk-free' government yield. To compare high yield bonds from the US and Europe, an adjustment for the different prevailing central bank rates is needed. The adjustment mechanism is currency forward rates, which broadly reflect the difference in short-term interest rates between two countries.

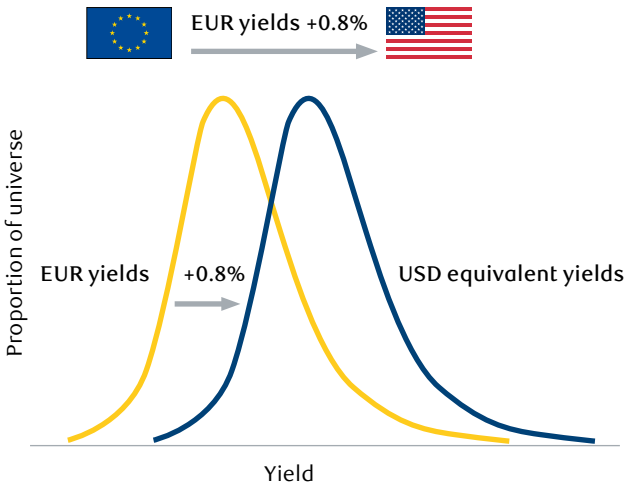
To compare different jurisdictions, we generally adjust yields to one currency, often 'USD equivalent'. A key point is there is no perfect way to do this as ultimate accuracy requires imputing currency hedging costs way into the future. In practice, a simpler adjustment is often made, and here we used the one year currency 'forward rate' as a proxy. This has the effect of removing the currency impact on a one-year view and further assumes that fixed adjustment all the way into the future.

Chart 4 is an example of one adjustment we have made. Bonds denominated in EUR have +0.8% added to the yield to approximate what a US investor would achieve by buying a European bond and hedging the currency. The net effect is a shift of the entire EUR yield distribution to the right.

Risk free and FX rates vary over time. In practice, investors purchasing overseas bonds usually use a series of 'rolling' currency hedges that protect against changing exchange rates over time. However, unless an investor hedges an asset to the maturity date, there will be some exposure to movements in risk-free rates over time.

Drawing all these aspects together, what is clear is bond comparisons are not as straightforward as one might hope. Nonetheless, it is possible to bring an analysis closer to 'apples with apples' by adjusting for currency effects and taking account of differing credit qualities.

Chart 4: Adjusting for FX: EUR to USD equivalent



Source: BlueBay (illustrative distributions), Bloomberg for FX, as at 16 September 2021 .

[2] Based on ICE BofA US High Yield Index. As at 16 September 2021.

Chart 5: US high yield – distribution of yields

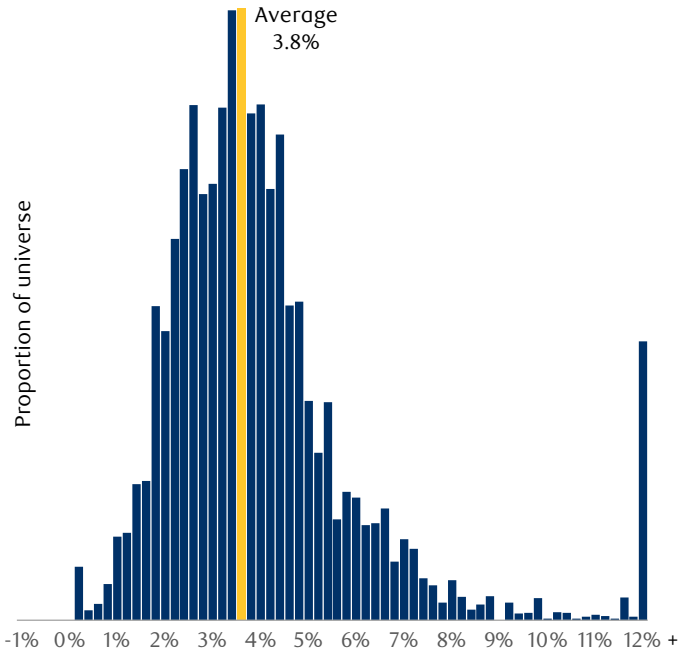
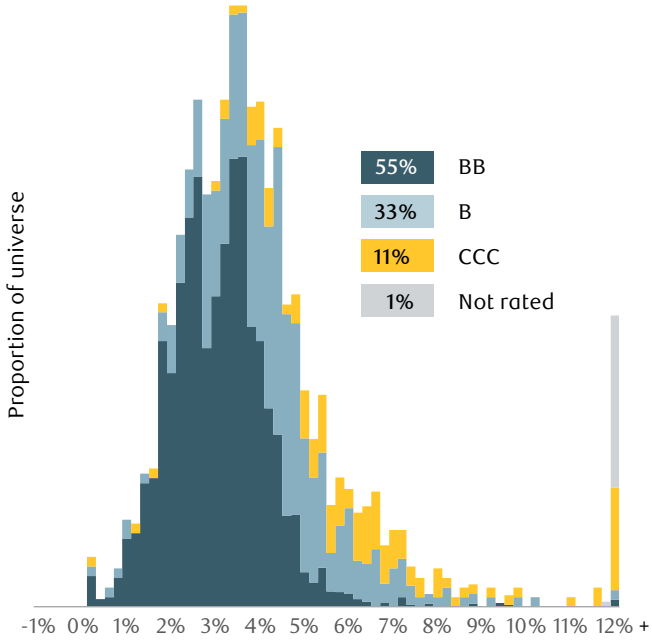


Chart 6: US high yield – distribution of credit ratings



Source for both charts: ICE BofA US High Yield Index (H0A0 Index). As at 16 September 2021. Yield = yield to worst.

High yield – distribution of yields

Let's move to exploring yield distributions, first considering the US high yield bond universe. We will use a common index, the ICE Bank of America US High Yield Index, noting there are manifold indices available for each asset class.

The characteristics of the US high yield index are:

- Number of securities 2,117
- Average yield 3.8%
- Median yield 3.5%
- Duration (interest rate) 3.6 years
- Average credit rating B+

Chart 5 shows the distribution of yields, divided into 0.2% buckets, with the height of each bar indicating the proportion of the universe within that yield range. The average is highlighted by the yellow bar.

We can observe the distribution is widely spread around the average, from less than 1% to 12%+. The '12%+' bucket is lower than expected and that is partly a function of the prevailing environment where default rates and company distress are lower than average.

"Credit ratings and yield are only loosely linked; up to a point, you can increase yield without additional credit risk."

From an active manager's perspective, this is an attractive asset class as it offers a lot of portfolio positioning choices, from a safer stance all the way to a portfolio that might have a yield twice the average.

Credit rating distribution

Chart 6 replicates chart 5, though illustrates the credit ratings of the securities – 55% is rated BB, 33% B and 11% CCC.

The key takeaway here is the wide spectrum of yields within each rating bucket i.e. bonds with the same rating (implied probability of default) can have very different yields. For example the BB rating bucket spans yields from 1% to 8%. For single B rated bonds it's even wider.

The natural question is how can one B rated bond yield 2% whilst another yields 10%. Reasons include:

- Term to maturity – bonds soon to be repaid can have much lower yields
- Liquidity – less liquid securities tend to have higher yields
- Sector – unloved sectors tend to have higher yields
- Published credit ratings can lag the real world
- Markets are not fully efficient

Another interesting data dive is to examine the issuers within a single ratings bucket. As an example, Appendix 2 details all the high yield bonds in the 6–6.2% yield bucket.

Emerging markets – distribution of yields

Turning to emerging markets, first we examine the sovereign hard currency market. This comprises bonds issued by emerging market governments and typically repayable in USD (and to a lesser extent EUR or GBP).

The characteristics of the emerging market sovereign hard currency index are:

- Number of securities 941 (73 countries)
- Average yield 4.6%
- Median yield 3.3%
- Duration (interest rate) 8.0 years
- Average credit rating BB+

Chart 7 shows the distribution of yields. We can see it's less 'bunched up' than high yield. Yield distributions tend to have 'right skew', or a longer tail on the right hand side as there tends to be a lower bound near zero, but no upper bound for distressed securities. For the statisticians, we have included the skewness measures in Appendix 3; for the rest of us, let's eyeball the distributions and consider the impact of a 'fat tail' on the right hand side.

The key feature of a right skewed distribution is the average yield is higher than the median yield. The median is the 50% point i.e. half the bonds have a lower yield and half have a higher yield. Note in the index characteristics above, the average yield is 4.6% versus a median yield of 3.3%. That is a very large difference!

"When a yield distribution is quite skewed, the median yield might be a better guide to likely returns than the average yield."

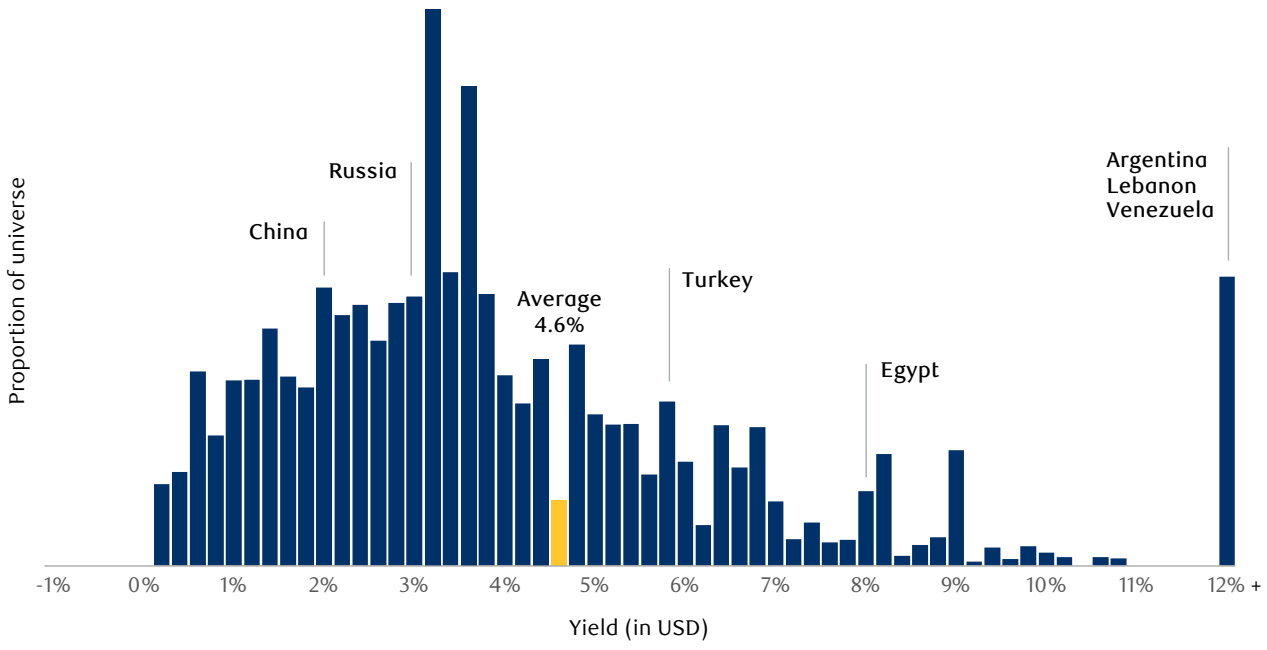
The median tends to remove the impact of outliers. We can see below that Argentina, Lebanon and Venezuela increase the average materially.

For an active manager wanting to outperform the average yield, it usually means being overweight the right hand side of the distribution. And if a manager decides against Argentina and Lebanon, for example, they need to be overweight other issuers on the right hand side to make up for it. Skewed distributions can represent a challenge for a manager wanting to beat the average.

Where an investor might not want exposure to the riskiest issuers in an asset class, the median yield may provide a better expectation of likely returns over time.

The moral here is where an asset class has a tail of issuers skewed to the right, an investor needs to be cognisant of the risk required to outperform the average yield.

Chart 7: Emerging market sovereign hard currency – distribution of yields



Source: JP Morgan EMBI Global Diversified Index (JPGCCOMP Index). As at 16 September 2021.

Emerging markets local currency

Another interesting distribution is emerging market local currency sovereign bonds (chart 8). The characteristics of the index are:

- Number of securities 290 (20 countries)
- Average yield 5.1%
- Median yield 3.9%
- Duration (interest rate) 5.2 years
- Average credit rating BBB

Again, the distribution is very spread out all the way up to Turkey on the right. What is unusual is how few bonds are near the average yield and there are broadly three groups: low yielders, slightly higher yielding countries and very high yielding (9%+).

Portfolios in emerging market local bonds tend to have higher tracking error over time for two reasons:

1. There are only 20 countries to choose from (the narrowest decision set of any index in this paper).
2. The distribution is so wide.

Convertible bonds

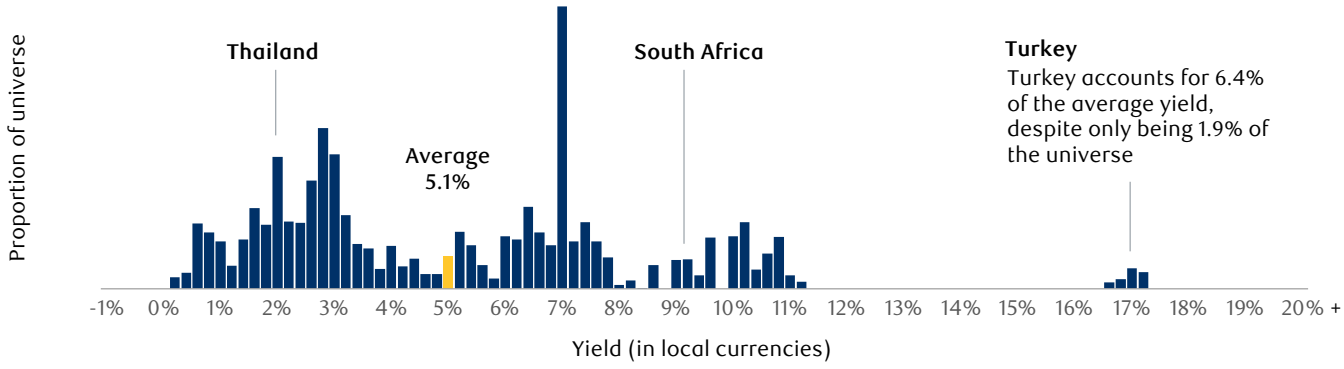
This is the most unusual of the yield distributions because the average yield is negative (chart 9). The index characteristics are:

- Number of securities 287
- Average yield -2.0%
- Median yield -1.2%
- Duration (interest rate) 3.8 years
- Average credit rating Mostly not rated

The average yield is negative because convertible bonds are 'hybrid' securities – a package of a conventional bond plus a call option on the equity price of an issuer. The yield ignores the potential for equity upside and where an issuer's equity price rises, so too does the overall return of a convertible bond.

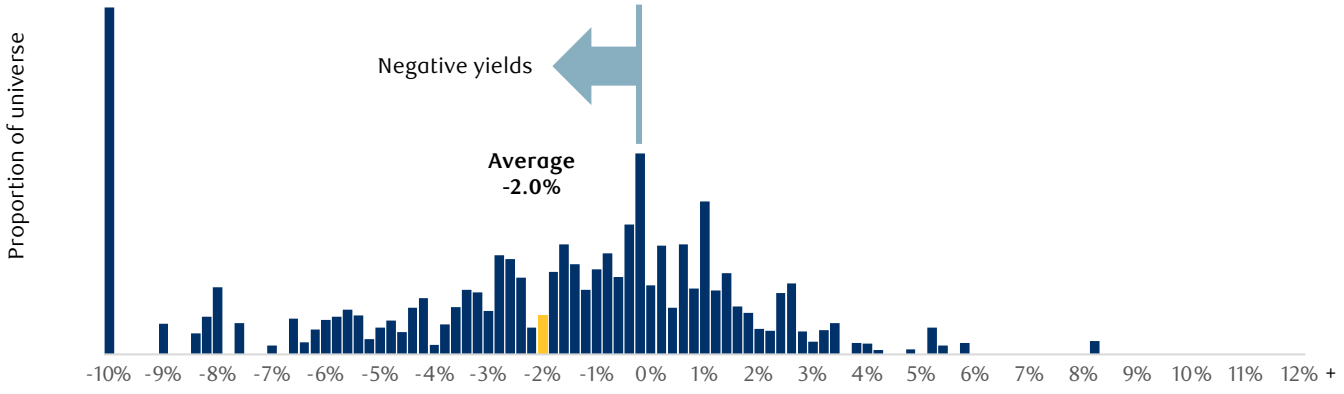
Most investors don't pay much attention to convertible bond yields as they poorly reflect the likely return. In multi-asset credit portfolios, some investors ignore the convertible bond component when calculating the overall portfolio yield.

Chart 8: Emerging market local currency – distribution of yields



Source: JP Morgan GBI-EM Global Diversified Index (JGENVUUG Index). As at 16 September 2021.

Chart 9: Convertible bonds – distribution of yields



Source: JP Morgan GBI-EM Global Diversified Index (JGENVUUG Index). As at 16 September 2021.

Other analyses

There are myriad other angles we can (and do) investigate. Examples include:

- ESG: it is possible to chart the yield distributions and overlay ESG factors to investigate the extent to which ESG ratings change with yield. Chart 10 illustrates this and we can see as yields rise, the average ESG quality deteriorates. We would note that although the gradient looks shallow, ESG scores have a strong central tendency and the slope is material.
- Liquidity: where data is available, we can analyse the yield distribution by liquidity to discern an estimate of the liquidity premium.
- Size of issue: what is the yield impact of smaller or larger bond issues – do smaller bond issues yield more?

The other key analysis is for investors to take their own bond portfolios and produce the charts – it can be illuminating, especially the outliers.

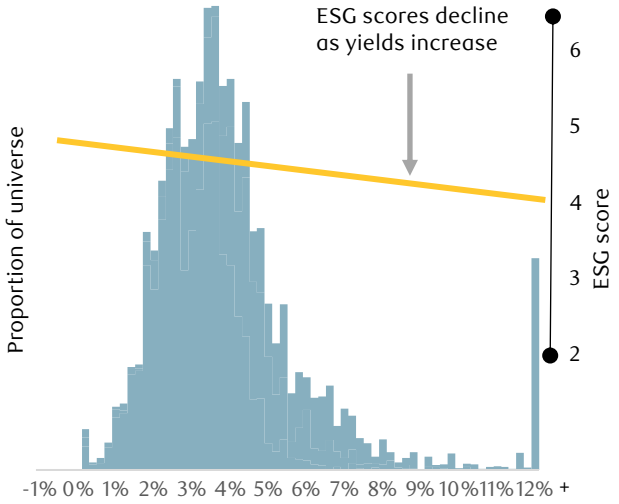
Summary

The message here is simply to dig a little deeper as averages tell a partial story and all the asset classes exhibit different opportunity sets.

We have not included all asset classes, notably structured credit, as there are many sub-sectors within structured credit, each with its own characteristics and we did not set out to be exhaustive. Nonetheless, reach out to us if you have a distribution you'd like to see.

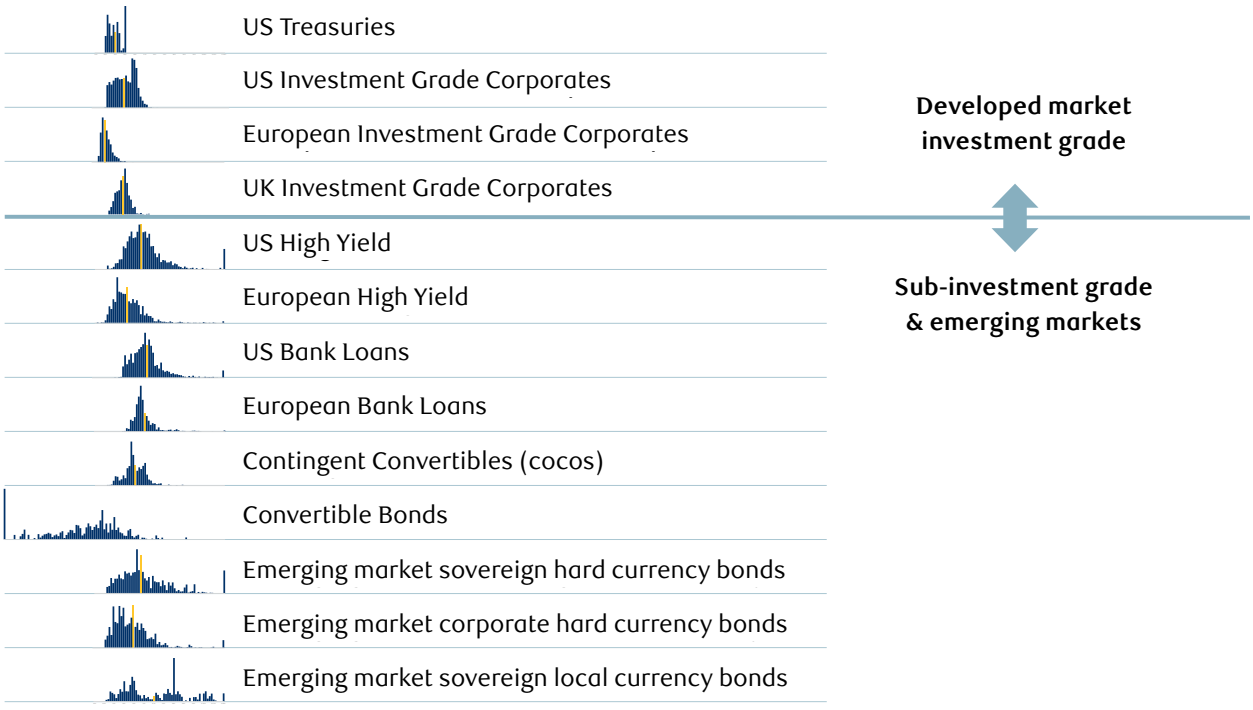
The remainder of this paper illustrates the distributions for each of the asset classes and the diagram below provides an overview.

Chart 10: US high yield versus ESG ratings



Source: MSCI ESG data; ICE BofA US High Yield Index (H0A0 Index). As at 16 September 2021.

Yield distribution overview



Note: see Appendix 1 for index names. As at 16 September 2021.

Contents

Summary data

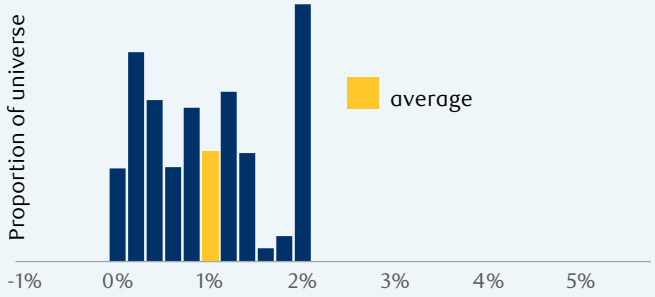
Data as at 16 September 2021. See Appendix 1 for index names.

Index	Average Credit	Average Yield (%)	Median Yield (%)	Number of Securities	Duration (interest rate)
US Treasuries	AAA	1.06	0.98	266	7.2
US investment grade corporates	A-	2.01	2.06	6,902	8.8
European investment grade corporates	AA-	0.24	0.15	3,258	5.2
UK investment grade corporates	A-	1.69	1.73	877	8.6
US high yield	B+	3.83	3.48	2,117	3.6
European high yield	BB-	2.31	1.99	785	3.3
US bank loans	B	4.39	4.06	1,627	0.2
European bank loans	B-	4.07	3.77	450	0.2
Contingent convertibles (cocos)	BB+	3.04	2.95	254	3.6
Convertible bonds	BB	-1.96	-1.17	287	3.8
EM sovereign hard currency bonds	BB+	4.60	3.29	941	8.0
EM corporate hard currency bonds	BB+	3.06	2.62	808	4.6
EM sovereign local currency bonds	BBB	5.07	4.71	290	5.2

Key investment grade markets

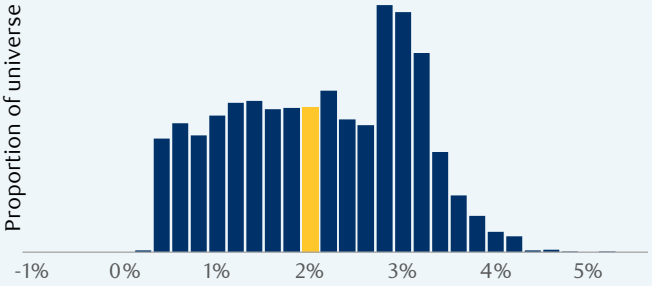
For index names see Appendix 1. All data as at 16 September 2021.

US Treasury market



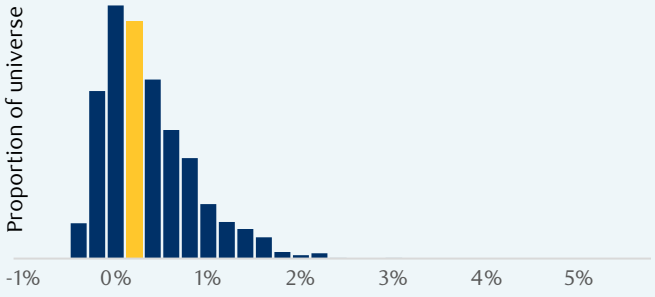
Securities	**267**
Average yield	**1.1% (USD)**
Duration	**7.0 years**

US investment grade



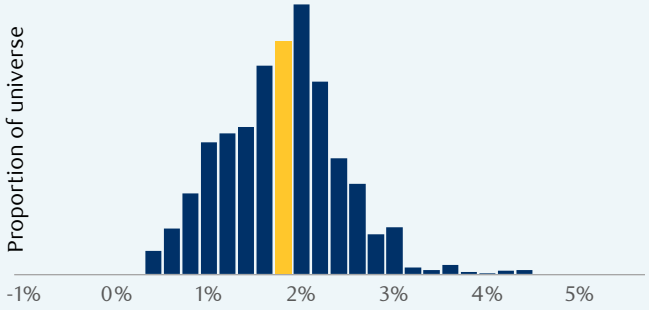
Securities	**6,902**
Average yield	**2.0% (USD)**
Median yield	**2.1%**
Duration	**8.8 years**

European corporates



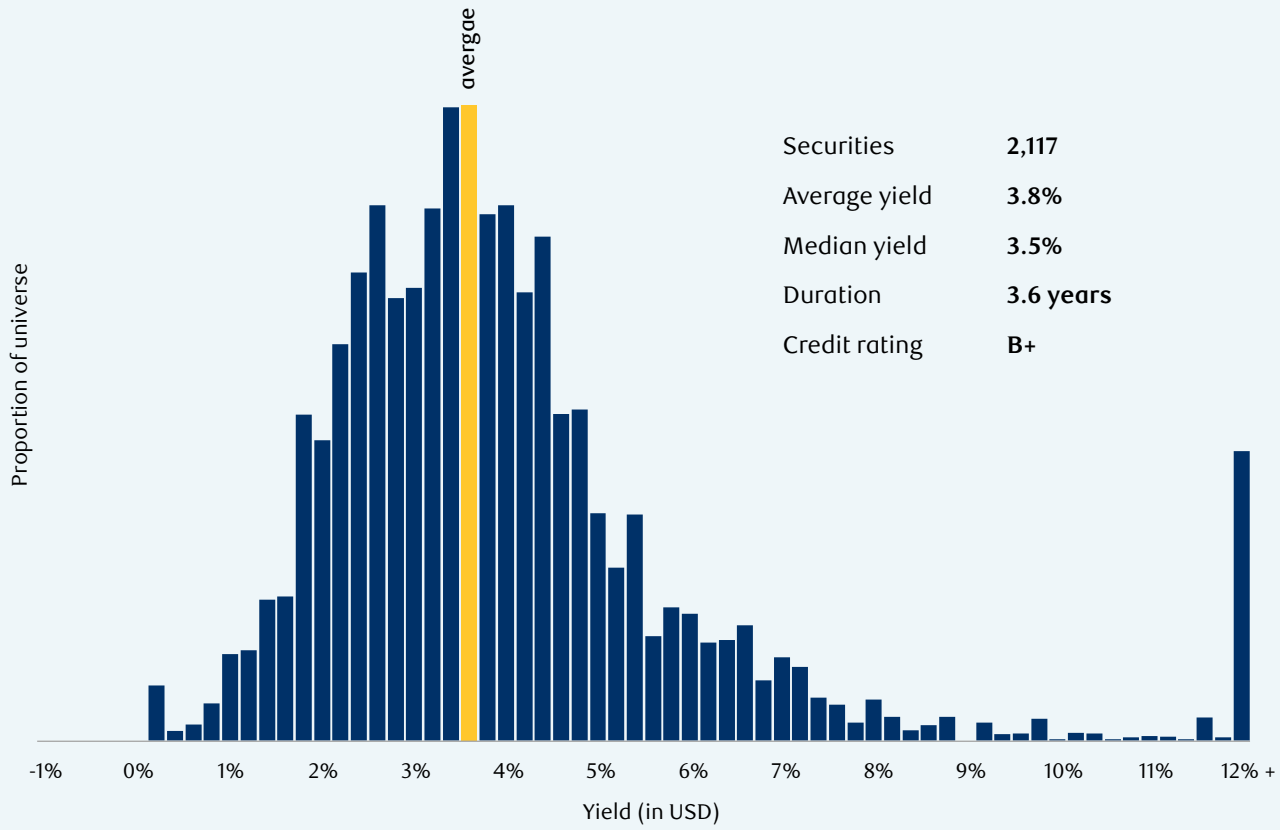
Securities	**3,258**
Average yield	**0.2% (€)**
Median yield	**0.2%**
Duration	**5.2 years**

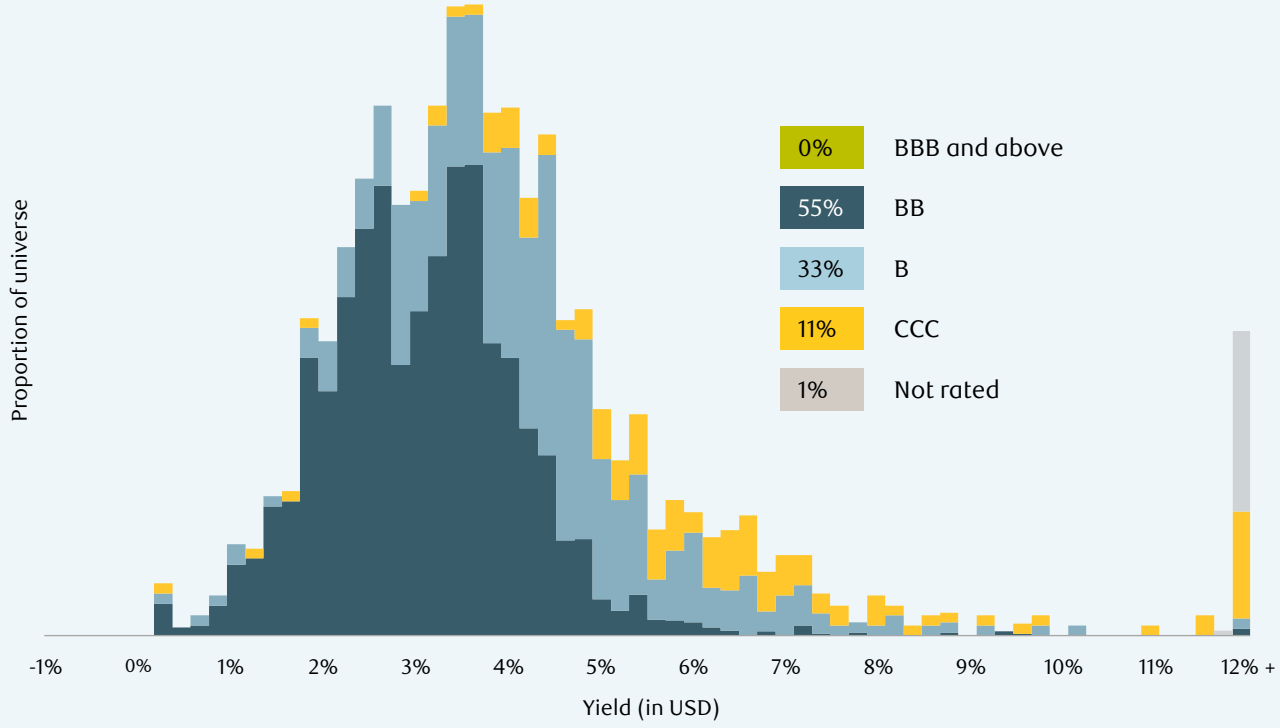
UK sterling corporates



Securities	**877**
Average yield	**1.7% (£)**
Median yield	**1.7%**
Duration	**8.6 years**

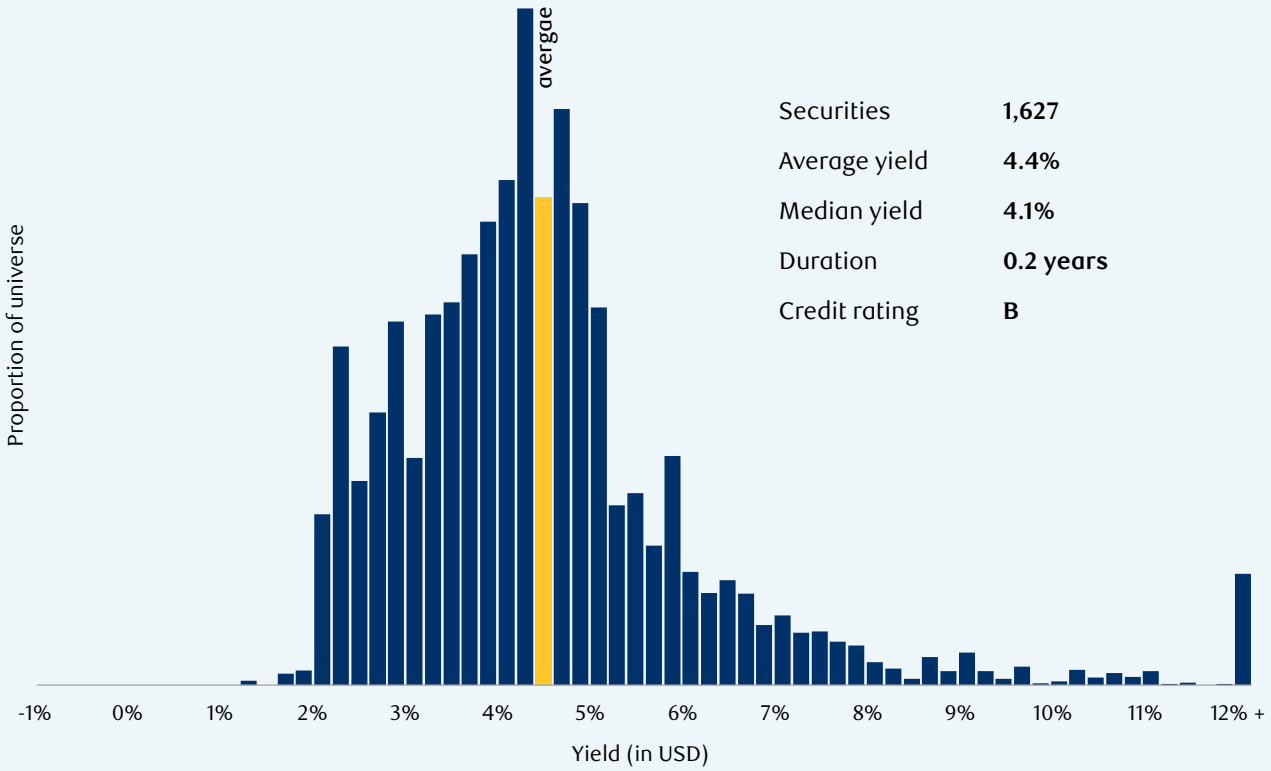
US high yield

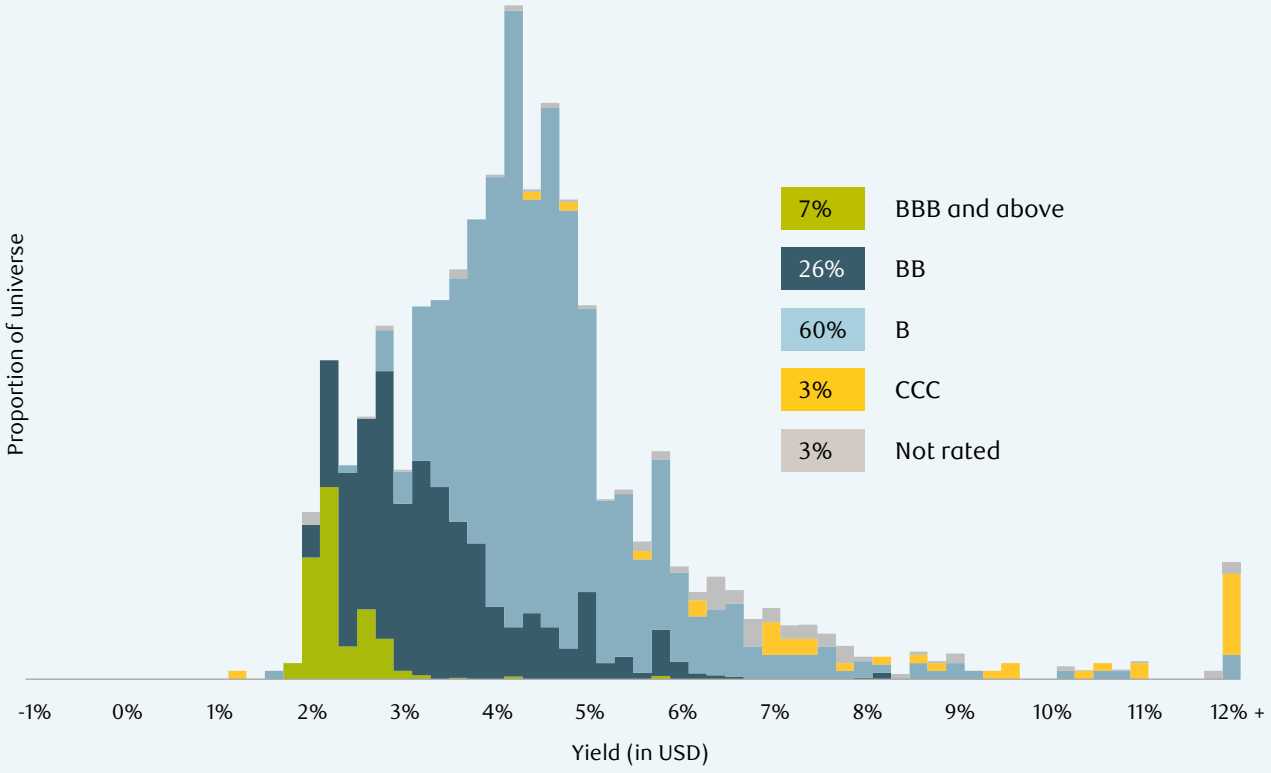




Source: ICE BofA US High Yield Index (H0A0 Index). As at 16 September 2021. Yield = yield to worst.

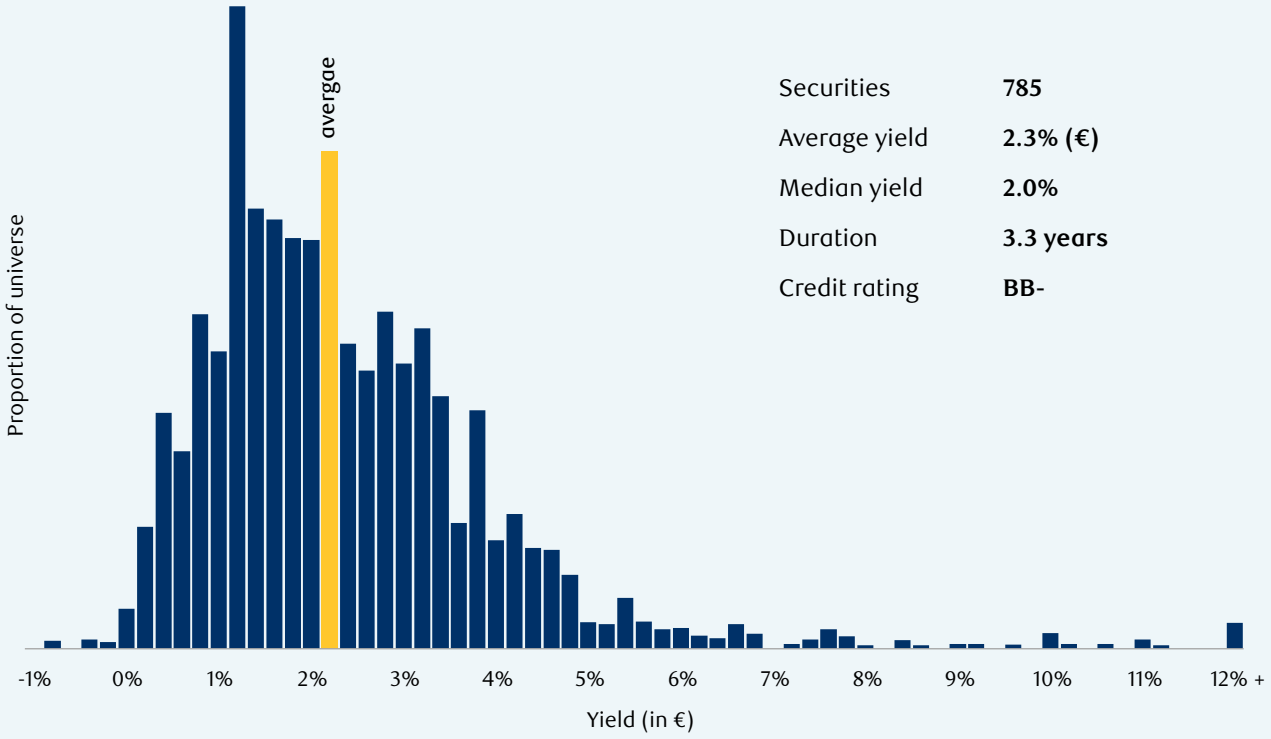
US bank loans

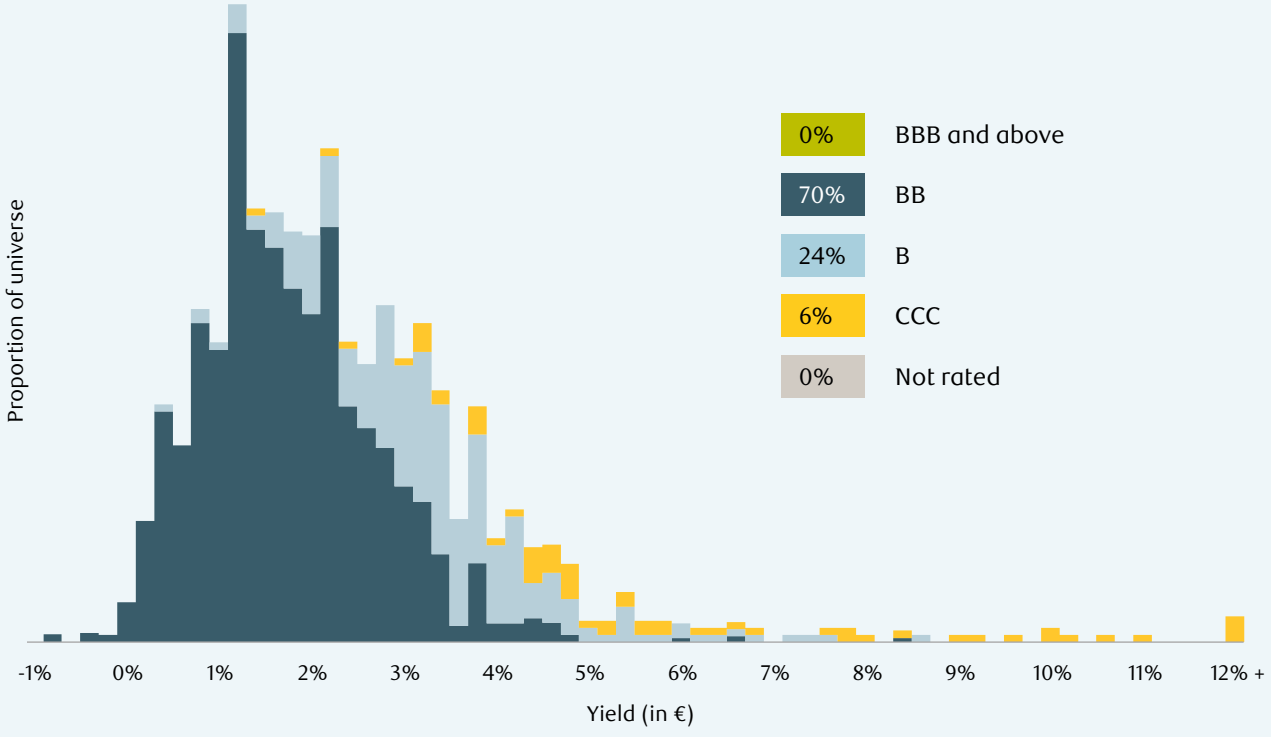




Source: JP Morgan Leveraged Loan Index (JLLILLI Index). As at 16 September 2021. Yield = yield to 3 year takeout.

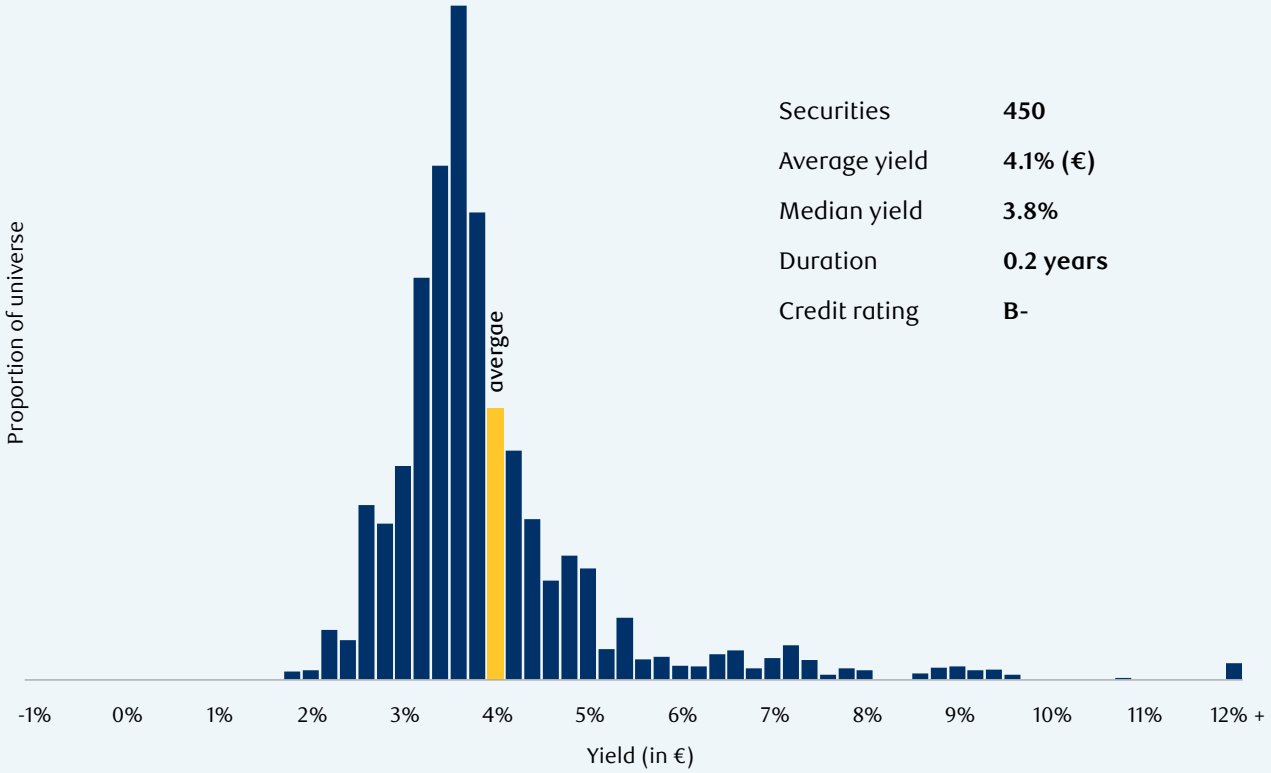
European high yield

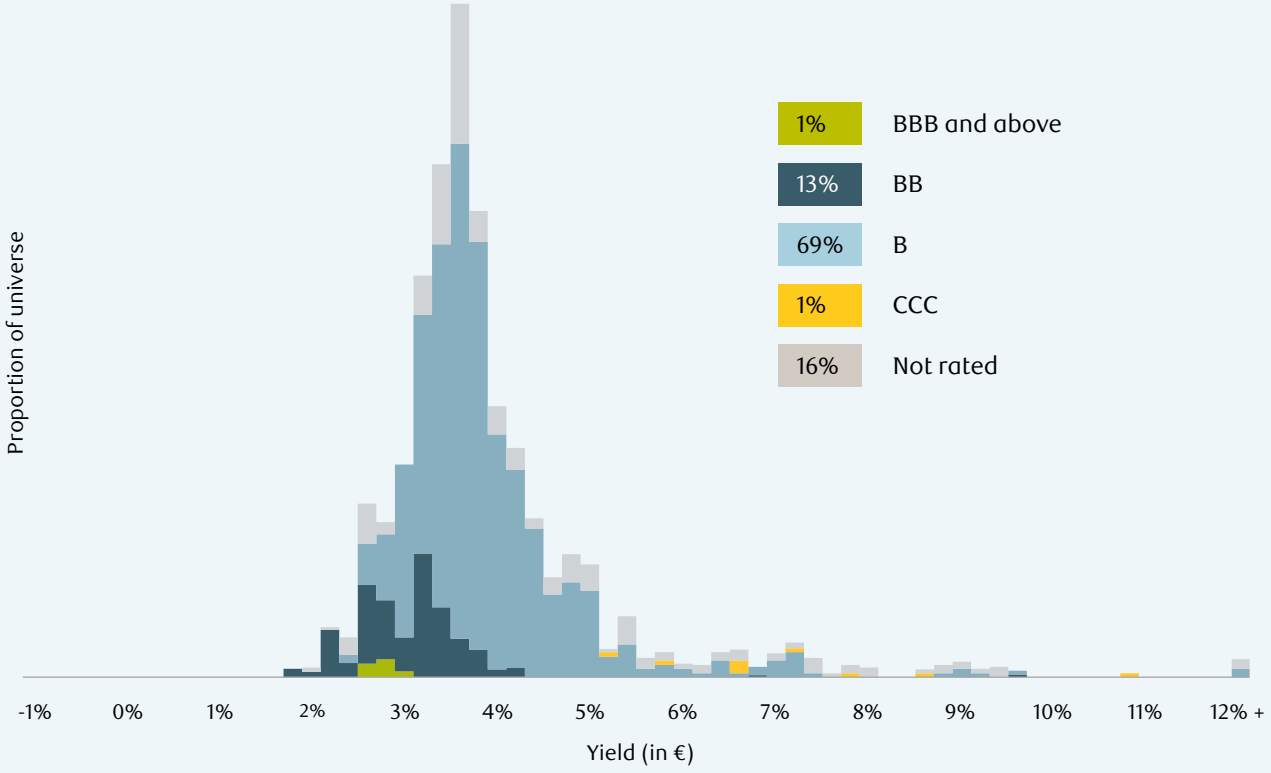




Source: ICE BofA Euro High Yield Constrained Index (HEC0 Index). As at 16 September 2021. Yield = yield to worst.

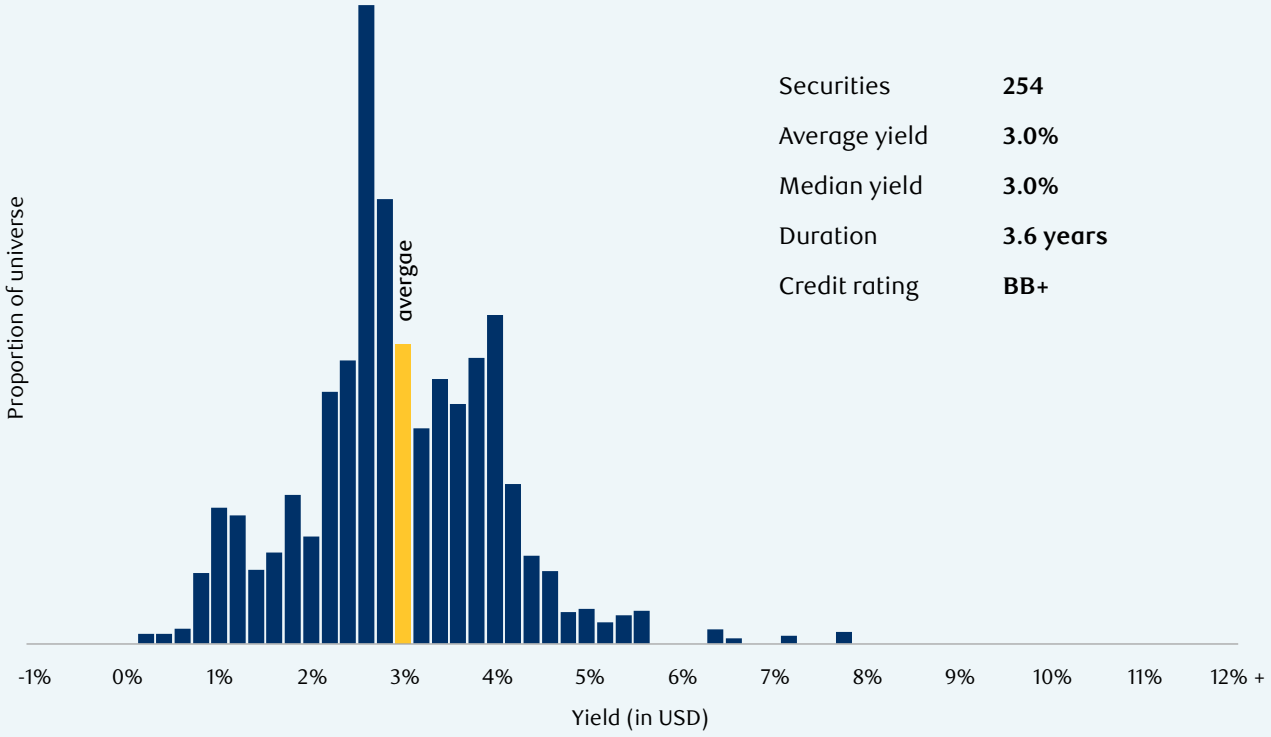
European bank loans

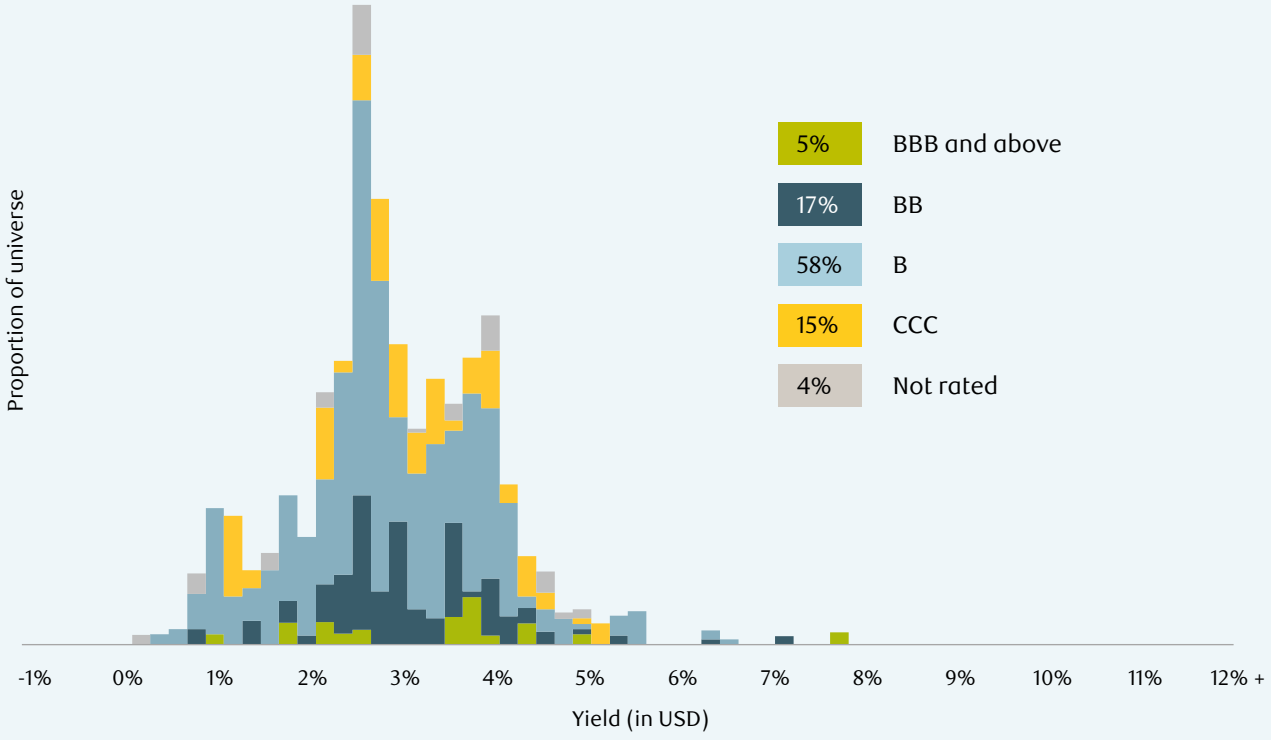




Source: JP Morgan European Leveraged Loan Index (JPLLLILI Index). As at 16 September 2021. Yield = yield to 3 year takeout.

Contingent convertibles (cocos)

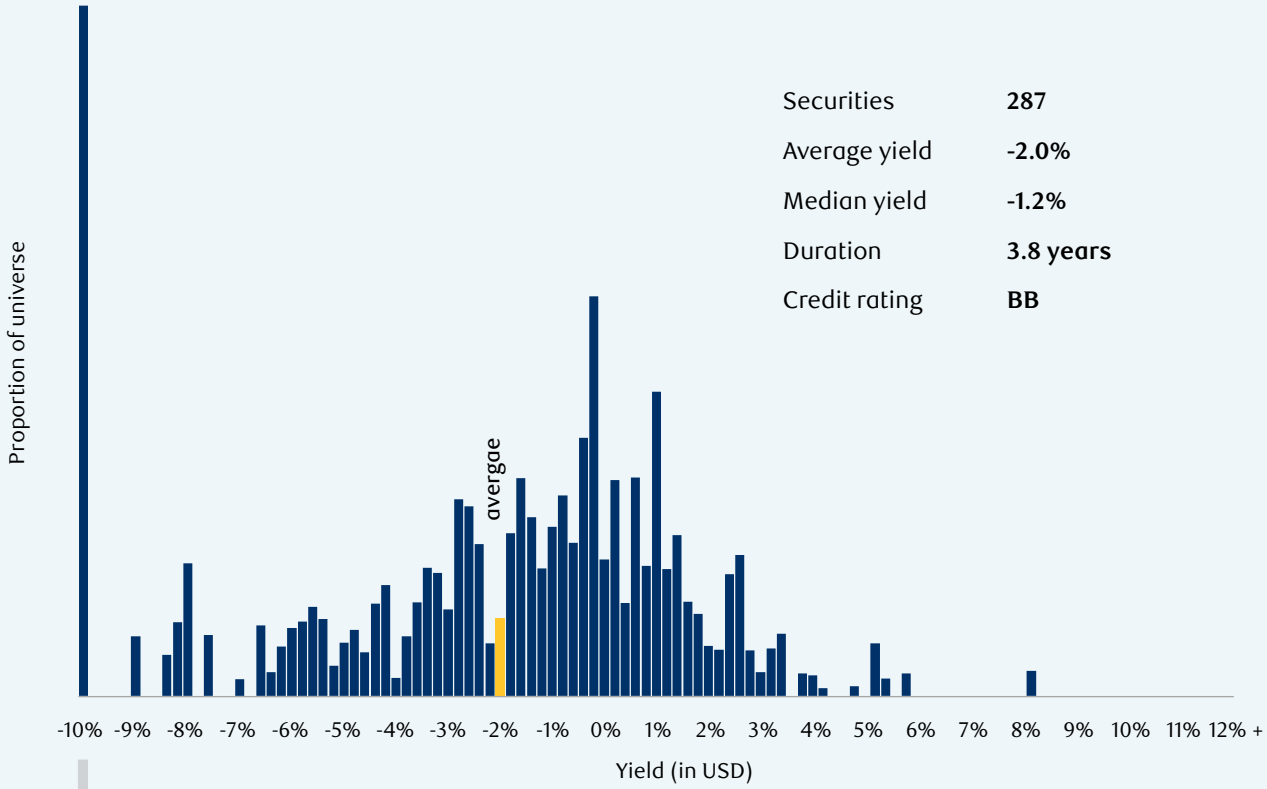


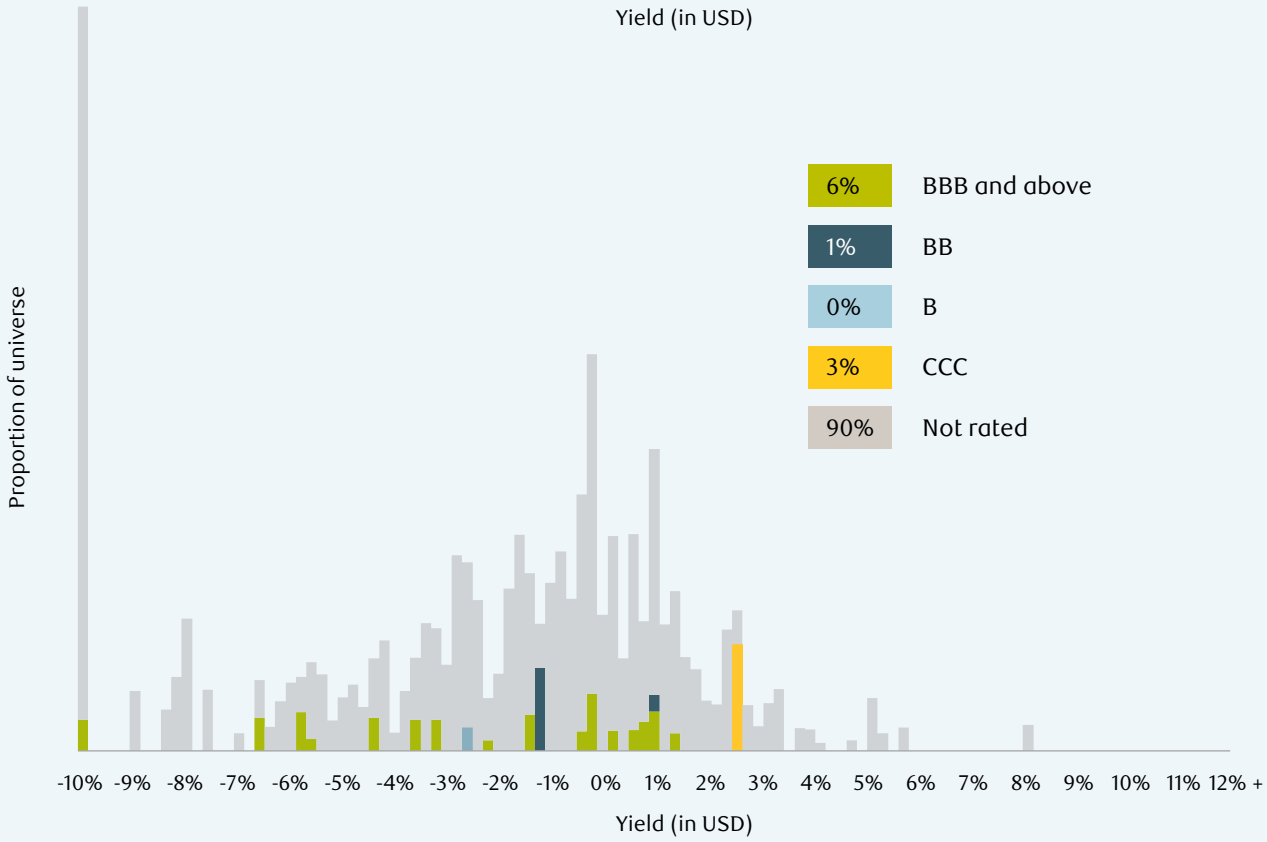


Source: ICE BofA Contingent Capital Index (Coco Index). As at 16 September 2021. Yield = yield to worst.

Convertible bonds

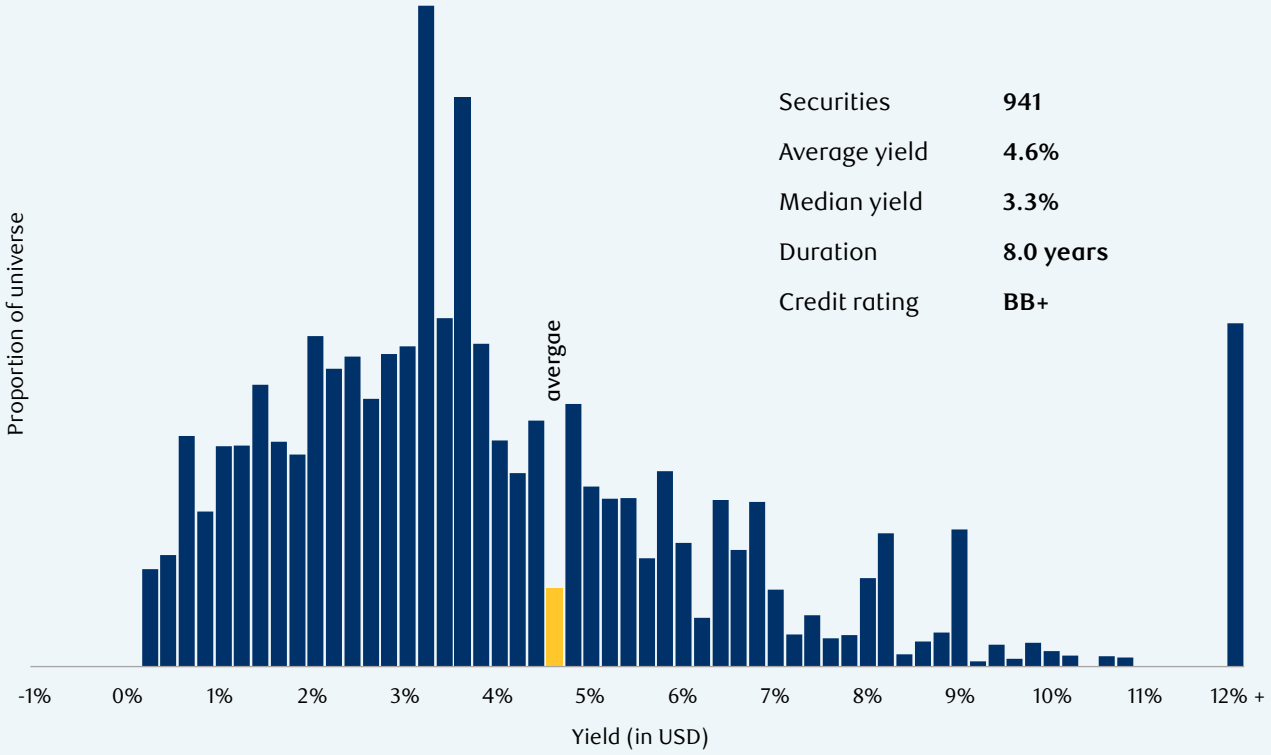
Note: convertible bonds have far lower yields than the other asset classes presented herein (note the axis down to -10%). This is because yield is only one part of the potential return of a convertible bond. A convertible bond has embedded within it a call option on the equity value of the company; should the equity price exceed a predetermined strike price, the bond can be converted to equity. Therefore, yield provides an incomplete picture. Nonetheless, should the equity price not exceed the strike price, the yield does indicate the expected return.

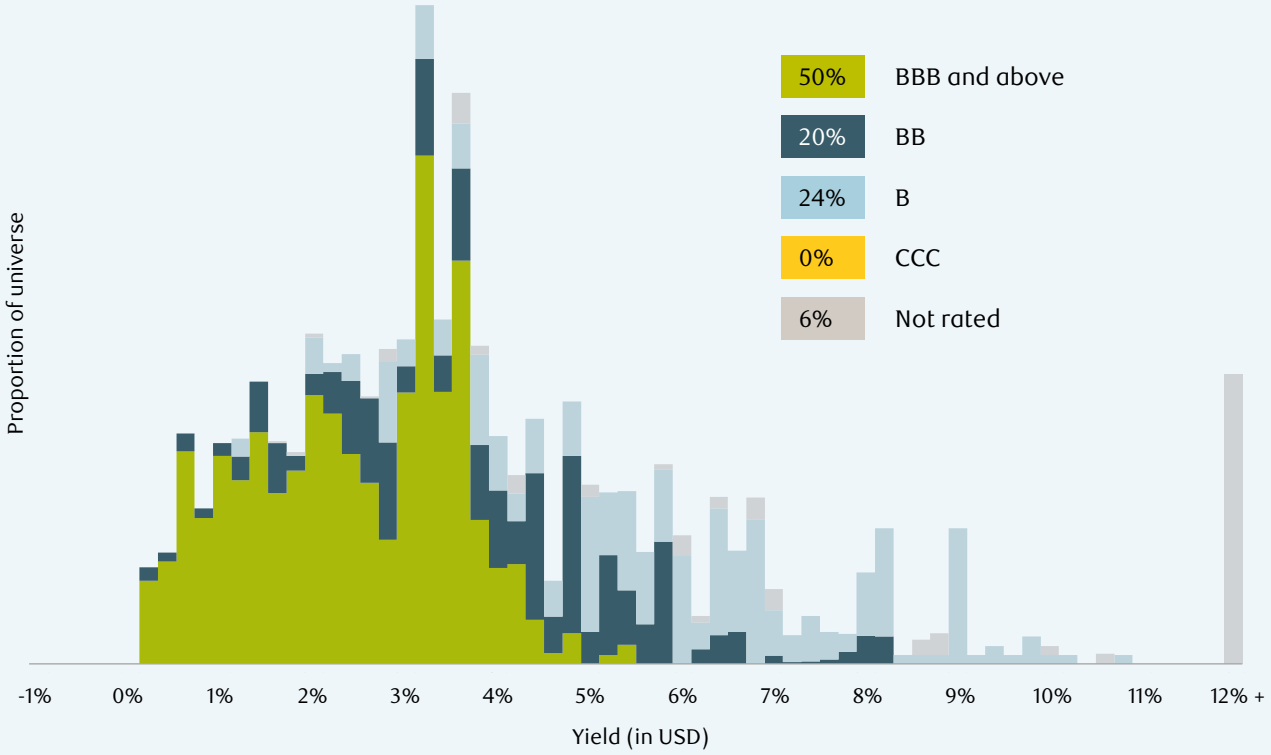




Source: Refinitiv Convertible Global Focus Hedged Index (UCBIFX02 Index). As at 16 September 2021. Yield = yield to maturity.

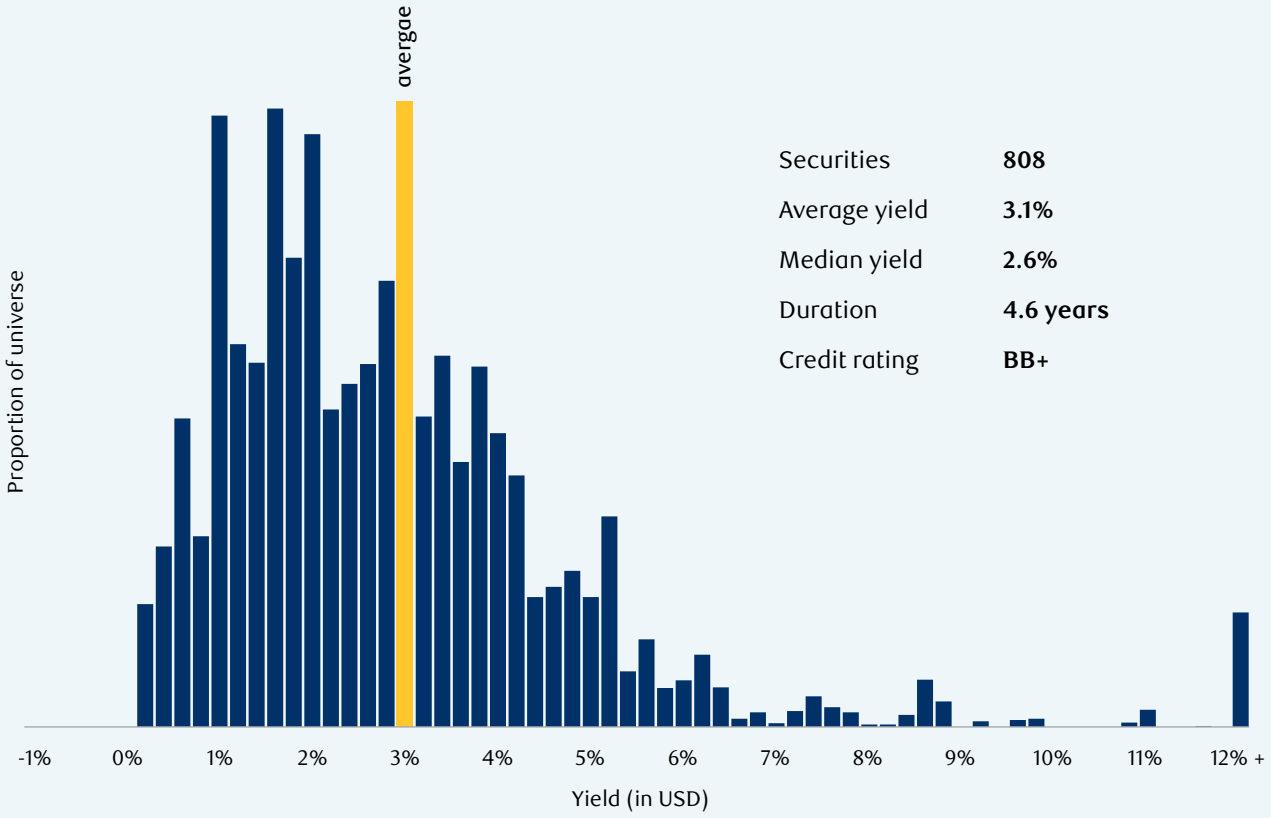
Emerging market sovereign hard currency bonds

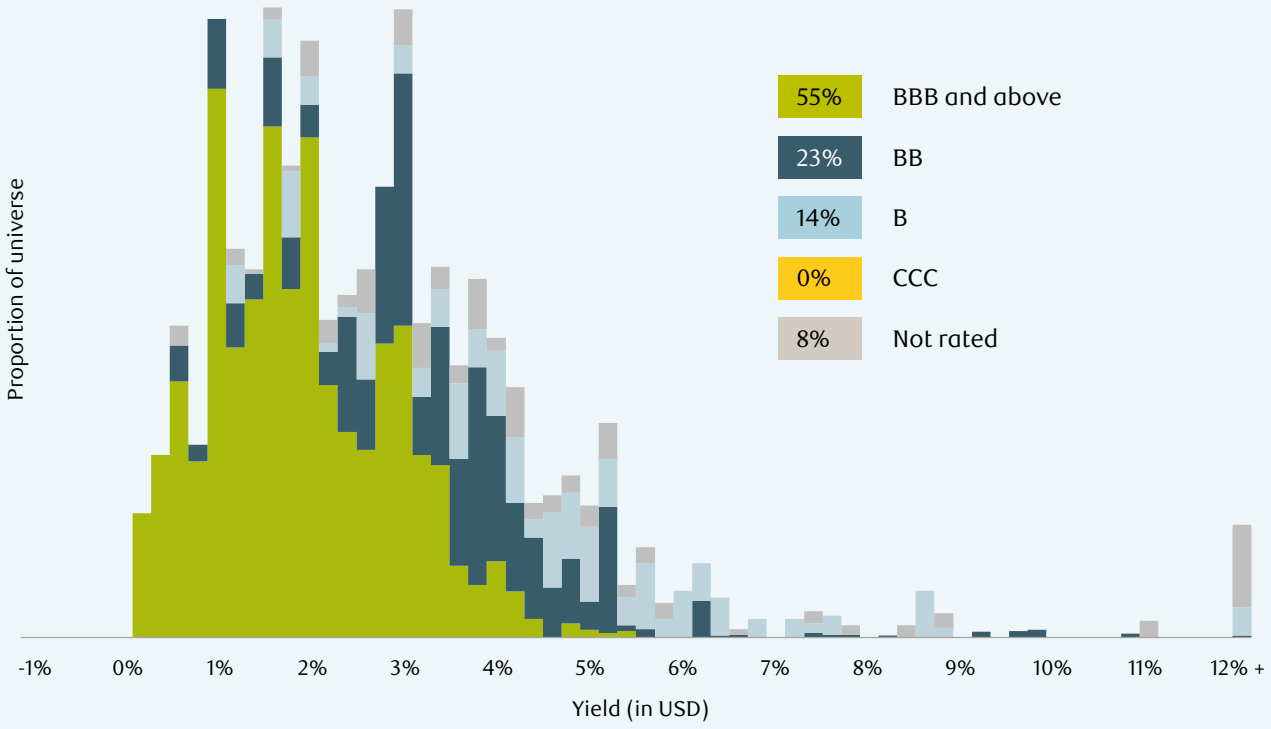




Source: JP Morgan EMBI Global Diversified Index (JPGCCOMP Index). As at 16 September 2021. Yield = yield to worst.

Emerging market corporate hard currency bonds

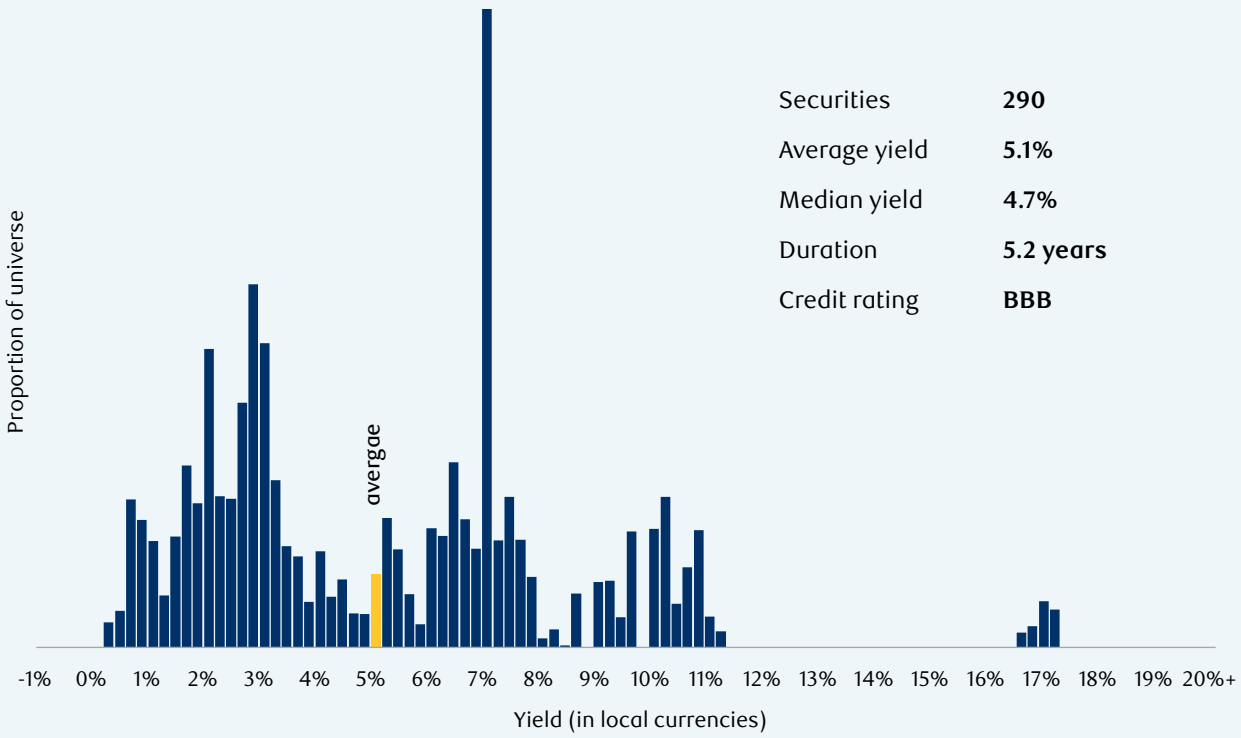


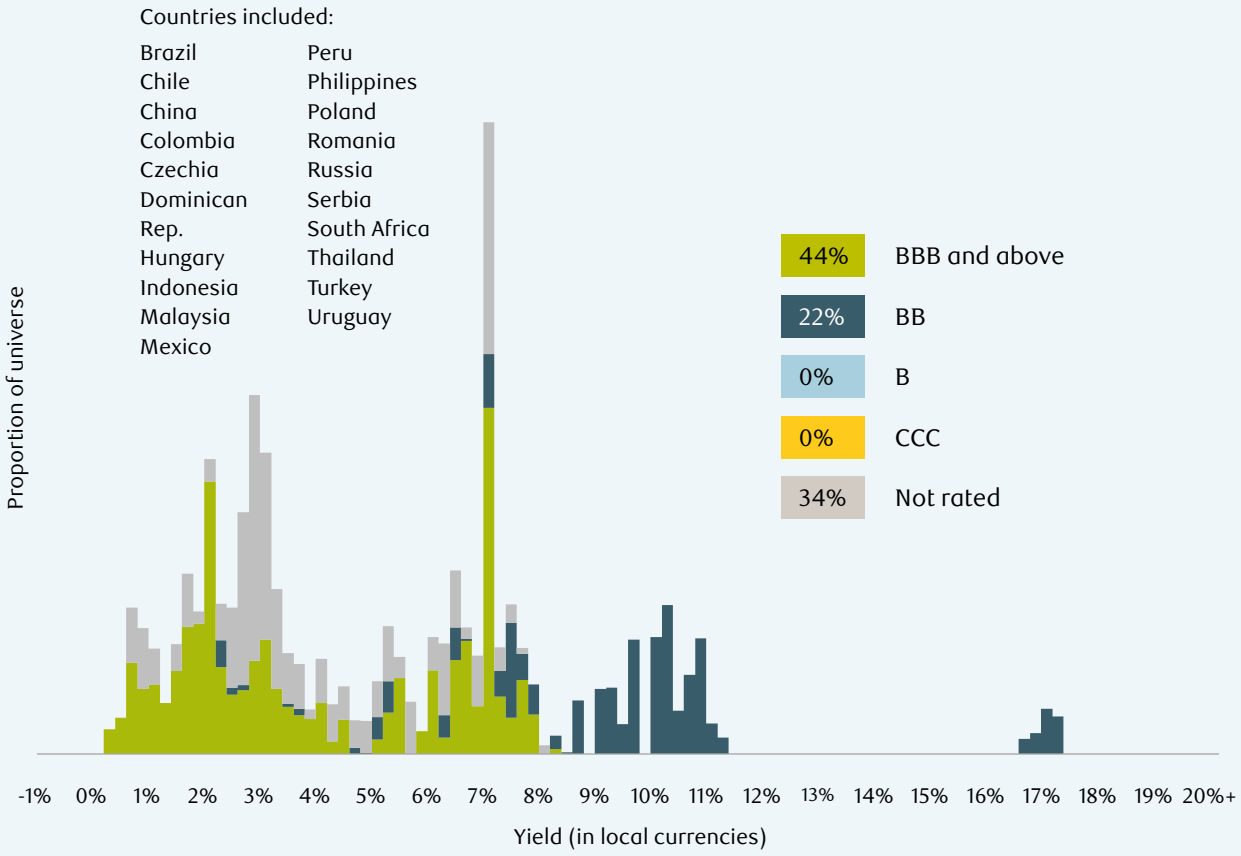


Source: JP Morgan CEMBI Diversified Index (JCMDCOMP Index). As at 16 September 2021. Yield = yield to worst.

Emerging market sovereign local currency bonds

Here we do not adjust for currency and yields are shown in a country's local currency.





Source: JP Morgan GBI-EM Global Diversified Index (JGENVUUG Index). As at 16 September 2021. Yield = yield to worst.

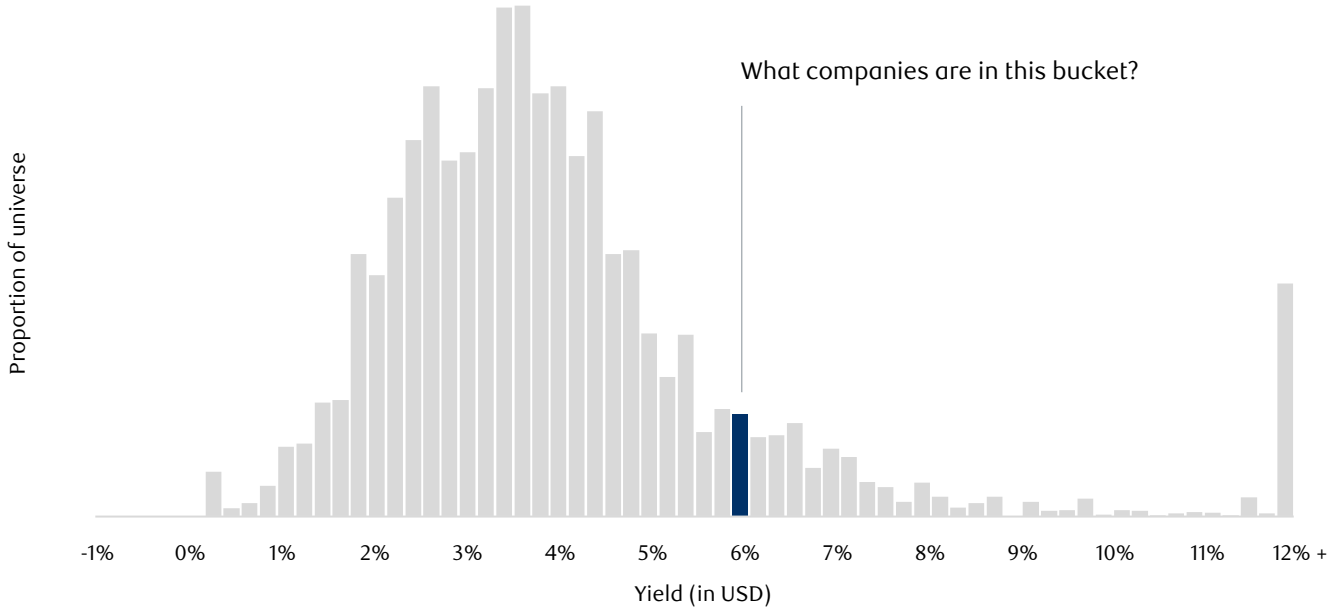
Appendix 1: Index names and yield convention

Asset class	Index (and Bloomberg code)	Yield convention
US Treasuries	Bloomberg US Treasury Index (LUATTRUU Index)	Yield to worst
US investment grade corporates	Bloomberg US Corporate Bond Index (LUACTRUU Index)	Yield to worst
European investment grade corporates	Bloomberg Euro-Aggregate Index (LBEATREU Index)	Yield to worst
UK investment grade corporates	Bloomberg Sterling Corporate Bond Index (LC61TRGU Index)	Yield to worst
US high yield	ICE BofA US High Yield Index (H0A0 Index)	Yield to worst
European high yield	ICE BofA Euro High Yield Constrained Index (HEC0 Index)	Yield to worst
US bank loans	JPM Leveraged Loan Index (JPLLLILI Index)	Yield to 3-year takeout[1]
European bank loans	JPM European Leveraged Loan Index (JPLLELLI Index)	Yield to 3-year takeout[1]
Contingent convertibles (Cocos)	ICE BofA Contingent Capital Index (Coco Index)	Yield to worst
Convertible bonds	Refinitiv Convertible Global Focus Hedged Index (UCBIFX02 Index)	Yield to maturity
Emerging market sovereign hard currency bonds	JP Morgan EMBI Global Diversified Index (JPGCCOMP Index)	Yield to worst
Emerging market corporate hard currency bonds	JP Morgan CEMBI Diversified Index (JCMDCOMP Index)	Yield to worst
Emerging market sovereign local currency bonds	JP Morgan GBI-EM Global Diversified Index (JGENVUUG Index)	Yield to worst

[1] **Yield to three-year takeout:** while most leveraged loans have a longer maturity than three years, loan refinancing, prepayments and corporate actions have typically reduced the weighted average life of loans to approximately three years. As such, its more appropriate to calculate a yield based on that horizon.

Appendix 2: US high yield (6–6.2% yield)

The table below shows the issuers included in one small bucket of the US high yield universe.



The table below shows the sector and is arranged by credit rating, highest to lowest.

Sector	Credit rating	Sector	Credit rating
Gas distribution	BB+	Non-electric utilities	B-
Telecom – wireline integrated & services	BB-	Pharmaceuticals	B-
Gas distribution	B+	Media content	B-
Metals/mining excluding steel	B+	Telecom – wireline integrated & services	CCC+
Oil refining & marketing	B+	Aerospace/defence	CCC+
Metals/mining excluding steel	B	Support services	CCC+
Support services	B	Insurance brokerage	CCC+
Specialty retail	B	Beverage	CCC+
Pharmaceuticals	B	Chemicals	CCC+
Energy – exploration & production	B	Software/services	CCC+
Energy – exploration & production	B	Food – wholesale	CCC
Gaming	B-	Investments & misc financial services	CCC
Packaging	B-	Recreation & travel	CCC
Gaming	B-	Support services	CCC

Source: ICE Bank of America High Yield Index (H0A0). As at 16 September 2021.
The information provided is to illustrate the investment process of the emerging market strategies at BlueBay and should not be deemed a recommendation to buy or sell any security or financial instrument.

Appendix 3: Skewness

Skewness refers to the level of distortion versus a normal distribution (symmetrical bell curve) with a normal distribution having a skew of zero. A distribution with a tail to the right has positive skew, and a left-hand tail is referred to as negative skew.

Notable in the table are the skewness figures for emerging markets and, to a lesser extent, high yield.

Asset class	Skewness
US investment grade corporates	-0.09
European investment grade corporates	1.08
UK investment grade corporates	0.37
US high yield	8.61
European high yield	5.27
US bank loans	8.92
European bank loans	5.24
Contingent convertibles (cocos)	0.33
Convertible bonds	-1.55
Emerging market sovereign hard currency bonds	44.88
Emerging market corporate hard currency bonds	14.48
Emerging market sovereign local currency bonds	0.90

Source: BlueBay, as at 16 September 2021.

Why do credit asset classes have positive skew in their yield distributions?

Yields generally have a lower bound and this is driven by the desire for most investors to receive back all, or most, of their principal investment. As a result, the tail on the left side tends to be somewhat shorter than the right, where there is scope for yields to move higher as issuers become stressed and move towards default.

January 2022

Global Asset Management