

# The benefits of convertible bonds

Convertible bond team | UBS Asset Management

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# Preface

In 2007 we published a white paper called “the benefits of convertible bonds”. In the paper we showed that convertible bonds (CBs) had historically exhibited attractive risk-return properties. We presented a number of arguments on why we thought it was likely that this would continue to be true going forward. As a consequence, we felt confident that a strategic allocation to CBs in multi asset portfolios was something which worked pre-2007 but likewise could remain an attractive value proposition thereafter.

At the time we did not know that we were just months away from the Global Financial Crisis. While the US managed to escape the crisis, the European Monetary Union entered a period of stress that put its existence into question. Both these crises contributed to extremely accommodative central bank policies that led to negative interest rates across significant parts of fixed income markets. And most recently, the world has had to deal with yet another crisis: a pandemic that has profound human, social and economic implications.

Given the multiple market regimes we had to face since we published our original white paper, we thought it would be valuable to test the conclusion we reached back in 2007. Do the assumptions on which we based our constructive view about the asset class still stand in today's world? Looking at CBs' performance since 2007 one can clearly state that an allocation to this asset class would have been beneficial from a risk-adjusted point of view.

This favorable behavior of the CB market since our first paper brings us into a comfortable position when thinking about creating a second edition of the white paper: There is no need to completely rewrite it. Rather, we refreshed some data and charts and added some insights we learned over the years. The arguments in favor of the asset class are mainly unchanged and are still valid 13 years after we first formulated them. Therefore, our previous view about the "Benefits of Convertible Bonds" remains unchanged.

*René Brupbacher, Maxime Daragon, Alain Eckmann, Uli Sperl, and Charles Tranier, UBS Asset Management, March 2021.*

# Introduction

Convertible bonds (CBs) were an attractive investment in the past. But – as the famous disclaimer says – past performance is not a reliable indicator of future results.

In addition to the question mark as to whether the future will be as attractive as the past, CB investors faced some very significant losses after the collapse of Lehman Brothers in 2008 which reinforced doubts that CBs are an attractive proposition after all.

We were not in the camp of the doubters and were convinced that CBs offered investors appealing features. We also believe that they should continue to exhibit attractive risk/return properties in the future. Nevertheless, our experience shows that many investors still do not have exposure to CBs. One reason seems to be the complexity of these instruments and the philosophical question whether they should be classified as equities or as bonds. Other explanations include misconceptions like the idea that CBs are a redundant investment that can be replicated by a dynamic combination of equities and bonds, as well as a general disbelief that the attractive risk-reward characteristics of CBs are here to stay. A last unfortunately insurmountable hurdle for some is the fact that the total CB market size is limited, which makes it non-investible for the biggest institutional clients. They are just too big to be able to benefit from this opportunity.

In the following we intend to summarize our thoughts about the attractiveness of CBs. We argue that they offer several benefits. First, they exhibit convex payoffs that appeal to many investors. Second, CBs offer diversification benefits: Adding them to a traditional equity / bond portfolio provides exposure to volatility, a non-traditional source of diversification. Furthermore, CBs tend to offer relatively cheap optionality. We will discuss a number of structural reasons that suggest that CBs will continue to show attractive risk/return characteristics in the future. Given this, we see a strong case for exposure to CBs in a strategic asset allocation framework.

This paper is organized as follows: Section one introduces basic CB features. Section two analyzes reasons why they cannot be replicated by a combination of other assets and therefore constitute an asset class in their own right. Section three gives an overview about the global CB market. Section four takes a closer look at the past risk-return properties of the asset class. Section five concludes with a discussion of structural reasons for the favorable performance of CBs.

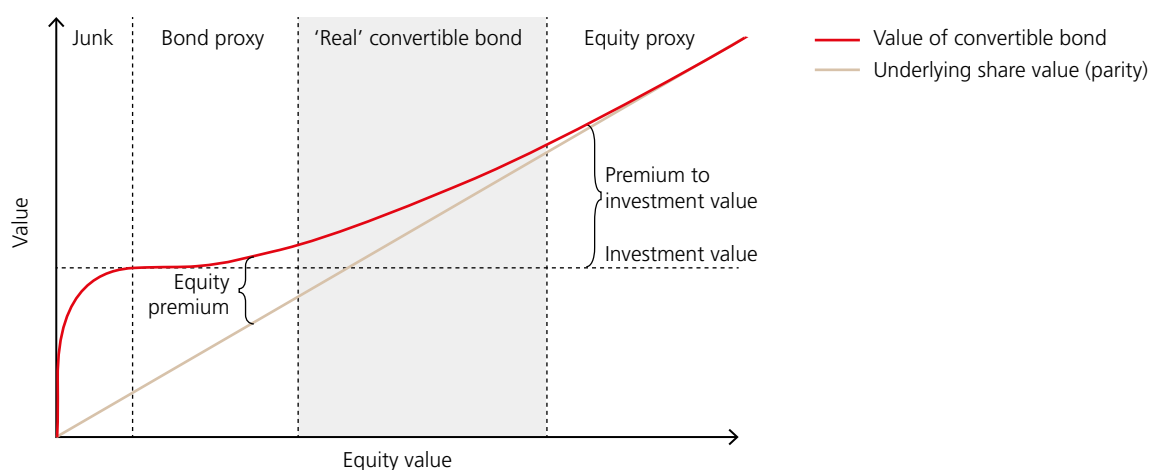
## SECTION 1

# Basic properties of convertible bonds

CBs are corporate bonds that have to be paid back by the issuer at a fixed price at maturity. Prior to that, investors may exchange a CB for a predetermined number of shares at their discretion. If the shares are performing well, the CB will increasingly behave like the underlying equity, and conversion probability will increase. If the shares fall in value, the CB will increasingly behave like a straight bond, and conversion probability will decrease.

Therefore, CBs are hybrid instruments that simultaneously offer the unlimited upside potential of equities while providing a limited downside in the form of a bond floor also called investment value. This means that a balanced CB will offer an asymmetrical payoff profile that gives investors a higher participation in upward movements in the underlying as opposed to downward movements in the underlying (Exhibit 1). Expressed somewhat more technically, CB prices are convex with respect to the price of the underlying.

Exhibit 1



For illustration purposes only

<sup>1</sup> We refer to CBs as “balanced” if their conversion option trades at-the-money. If the option trades in-the-money, the CB behaves similar to the equity it is convertible into. If the option trades out-of-the-money, the CB behaves similar to a straight bond.

The payoff asymmetry is by no means negligible. Exhibit 2 gives an impression of the magnitude of this effect for Sika 0.15% 2025.<sup>2</sup> If for example Sika's common stock would instantly gain 25% in value, investors could expect the CB to gain 18.6% in value. If the stock was to fall by 25%, CB investors would lose only 15.1%.<sup>3</sup>

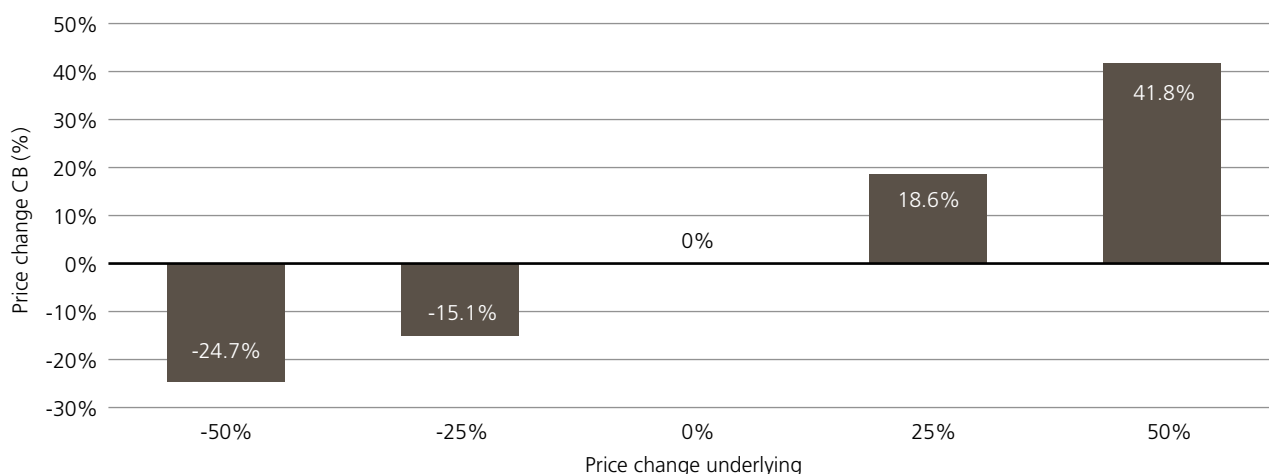
This intuitively attractive property of CBs comes at a price. While an investor in a convex strategy clearly benefits from large directional movements in the underlying, the strategy will lose over time if the underlying either does not move significantly or just oscillates around its starting value<sup>4</sup>.

Clearly, individual CBs' convexity should translate into convexity for a CB portfolio as well. But there is a second impact on the portfolio level that can be advantageous for CB investors. If equity markets show a flat performance over a given period, typically some stocks will show a positive performance while other stocks decline in value. Given the asymmetric behavior of CBs this means that the asset class as a whole can benefit as the impact of positively performing underlying shares will be stronger than the impact of underlying shares that fall in value. That way, the CB market benefits from dispersion in the underlying stocks' performance.

Another property of CBs that is often quoted as a reason for their continuing attractiveness is their inherent diversification benefit. Since a balanced CB offers not only equity and bond exposure but also exposure to volatility, it is a better diversifier than a comparable equity and bond mix without any optionality. This diversification benefit is quite pronounced since the level of volatility tends to be inversely correlated with equity and credit market movements, especially in periods of market turmoil. In other words, when equity markets are down, there is a direct negative impact on the CB market. Rising volatility on the other hand is beneficial for the CB market and helps to dampen the downturn in addition to the natural convexity which is inherent in this market.

While convexity and diversification benefits can reasonably be expected to continue to exist in the future, they alone represent relatively weak arguments to invest in CBs. An investor could achieve similar benefits by adding (equity) options to a mixed equity and bond portfolio. Along this line of reasoning it is often claimed that CBs could be replicated by some combination of equities, bonds, and options. If true, that would mean that CBs are effectively redundant. This redundancy argument often leads to the conclusion that CBs are not a true asset class. We address this line of thought below.

**Exhibit 2: Change in theoretical value of Sika 0.15% 2025**



Source: UBS Asset Management, Bloomberg, data as of December 31, 2020

**Past performance is not a reliable indicator of future results.**

2 This CB is issued by Sika, the Swiss building materials company, and is rated Investment Grade by Standard & Poor's at the time of writing. With an outstanding amount of 1.65 bn CHF it is currently one of the largest CBs in Europe and is included in all major benchmark indices.

3 In order to calculate these figures we used a standard CB valuation model and assumed sudden share price movements while all other input factors like volatility and credit spread stay the same. For large downward movements in the share price this assumption is somewhat unrealistic as changes in credit spreads and implied volatilities are to be expected in this case.

4 For a more detailed analysis of convex vs. linear or concave investment strategies see Perold (1988).

## SECTION 2

# Convertible bonds cannot be replicated

CBs have several features that make it virtually impossible to replicate them through a combination of other instruments such as equities, bonds, and options.

### 2.1 Bond as exchange property

One of the most fundamental differences between a CB and a replicating portfolio consisting of a corporate bond and an equity call option lies in the exchange property, that is what exactly can be exchanged into equity shares. In the case of a CB, the holder can obtain a certain amount of underlying shares in exchange for the entire CB structure. In the case of the replicating portfolio containing a bond and an option, the owner has the right to exercise the option to receive shares in exchange of a predefined cash amount.

If conversion of a CB was only possible at maturity, there would be no material economic difference between a CB's conversion and the exercise of an equity option. In both cases the investor would have to give up a fixed amount of wealth in exchange for the shares. For an option, this amount is defined as the strike while the value of a bond at maturity is equal to its redemption value.

Since converting a CB is almost always possible prior to maturity, there is a meaningful distinction between a CB and the replicating portfolio. In the case of a CB, the exchange property's value at the time of conversion is not a fixed

amount but is the current value of the bond component, which depends on the prevailing yield and credit spread levels. Therefore, the economic benefit of conversion does not only depend on the CB's equity part, but also on the value of the bond component that has to be traded in for conversion. That is why a CB's value depends not only on the value of the bond and the value of the equity option, but also on the interaction between the two<sup>5</sup>. If one would try to mimic the behavior of a CB by combining a straight bond with a non-exotic equity option, one would clearly miss this correlation impact. We strongly believe that there are no portfolio strategies using standard building blocks that would replicate this feature.

### 2.2 Better investor protection compared to traditional options

Dividend increases or cash takeovers can have negative consequences for investors that hold long call positions on an affected underlying. Increasing a dividend payment reduces expected future stock prices and therefore disadvantages investors in call options. Cash takeovers have the potential to reduce or eliminate the volatility of the underlying and thus hurt investors in affected options.

In the CB market some investors faced serious losses following special dividends and cash takeovers. This has been particularly true for hedge funds, a very significant group of CB investors. They tend to short the equity underlying the

<sup>5</sup> This interaction is especially visible for dual currency bonds. Such bonds are issued in one currency and can be exchanged into shares that trade in another currency. An example for that kind of bond is STMicroelectronics 0% 2025. This USD denominated bond can be exchanged into shares that trade in EUR.

CB in order to immunize their CB holdings from movements in the underlying stock. This is called "delta hedging". This allows them to purely exploit anomalies in valuation of convertible bonds. As a consequence they were overly exposed to the negative impact of dividend changes or cash takeover.

Following such events there has been plenty of innovation in the CB prospectus features that specifically address dividend and takeover risks. Usually, these provisions compensate the holders of CBs for special dividends and cash takeovers<sup>6</sup> by increasing the exchange property if a certain trigger event takes place. The aforementioned protection features have essentially become standard within the CB universe. The degree of protection these provisions offer exceeds the protection prevailing for options in the exchange-traded and over-the-counter markets. These built-in protections clearly benefit all types of CB investors, not only hedge funds.

Looking at the situation from a fundamental standpoint one could expect that CBs deserve a lower equilibrium return than options as the additional protection features make them less risky. But as CBs are not perfectly replicable and therefore cannot be perfectly hedged their valuation does not reflect these features on average. Only in rare cases where takeover probability is perceived as very high do secondary market prices reflect this difference between instruments.

### 2.3 Optionality for companies without liquid equity options

In some areas of the CB market, it is simply not possible to mimic a CB by buying a bond and option combination because no straight bonds and / or no liquid options are available. This is often the case for less liquid stocks (such as small caps) and for stocks that for other reasons may be difficult to short. A lack of stock lending hinders efficient hedging of such option positions, making it unattractive for investment banks to issue them, as they would use too much risk capital. As an active CB manager one can benefit from these opportunities, taking the role of a liquidity provider for these non-hedgeable instruments.

From the discussion above it should be quite clear that replication strategies are bound to miss important structural features of the CB market. It is exactly some of these features which are at the heart of why we believe convertible bonds are such an attractive investment proposition.

<sup>6</sup> See section 5.2 for a more detailed discussion of takeover protection features.

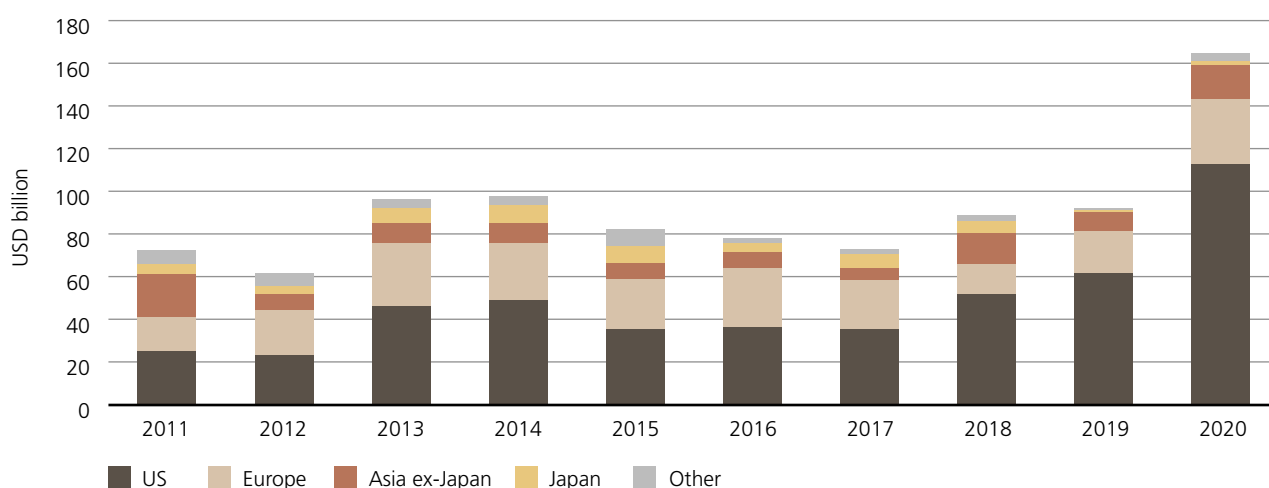
## SECTION 3

# The global convertible bond market

The CB market has grown significantly since the early days, when US railroad companies dominated issuance. Today companies use CBs as a financing instrument very broadly, irrespective of their sector or country of domicile. In addition, so-called exchangeable bonds (bonds which can be converted into shares of a company different from the issuing company) have become a common method used by companies and governments to (potentially) dispose of non-strategic holdings.

Exhibit 3 shows global issuance of CBs annually since 2011. Even if there is some cyclical activity in new issuance, there is a substantial stream of new CBs coming to the market each year. Variations in issuance activity can be attributed to changes in companies' financing needs, equity market performance, levels of interest rates, implied volatilities, changes in the regulatory environment and finally the general risk appetite in the CB market.

**Exhibit 3: Annual convertible bond issuance**



Source: UBS Convertibles Marketing / Refinitiv. Data as at end-December 2020



Table 1 shows the global CB market capitalization and number of outstanding issues as of the end of 2020. The size and diversity of the asset class give an indication that the market is broad and allows for appropriate diversification when constructing global CB portfolios.

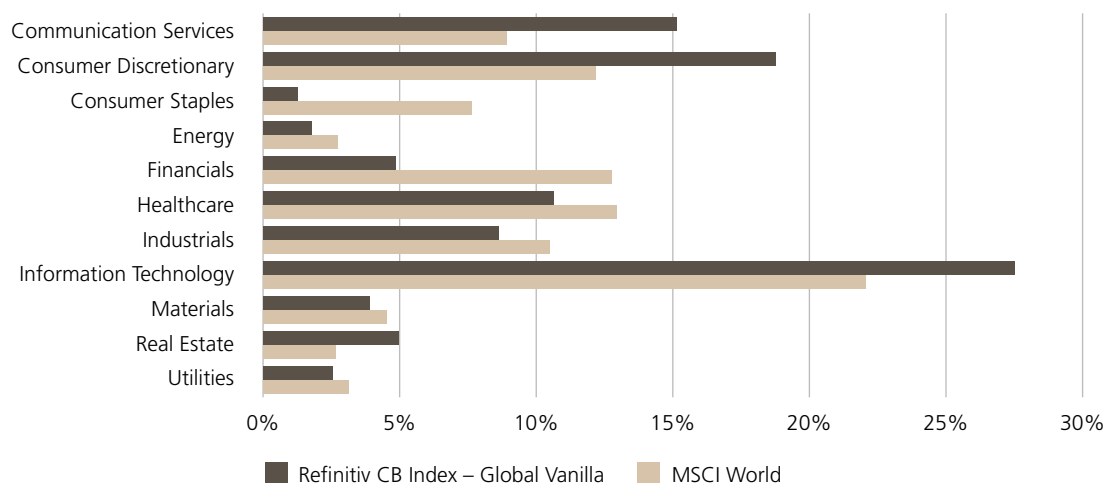
Region	USD billions	Number of CBs
US	413	811
Europe	119	282
Japan	19	85
Asia ex Japan	76	377
Other	18	181
<b>Total</b>	<b>645</b>	<b>1,736</b>

Source: UBS Asset Management, Refinitiv; data as of December 31, 2020

It is noteworthy that since the first edition of this white paper in 2007 the overall size of the Global CB market measured in USD is almost unchanged. The US market has risen in size while the European and Japanese CB markets became smaller. The number of outstanding bonds has decreased across all regions.

From a sectoral view, the global CB market offers diversification opportunities that are broadly similar to those available in the global equity market<sup>7</sup>. Exhibit 4 shows the sector composition of the Refinitiv Global Convertible Bond Index – Global Vanilla in comparison to MSCI World index<sup>8</sup>. Overall, the sector composition does not deviate too much but the CB market is currently tilted somewhat more towards technology companies and away from financials and consumer staples.

**Exhibit 4: Sector distribution (of underlying equity)**



Source: UBS Asset Management, Refinitiv, MSCI; data as of December 31, 2020

<sup>7</sup> We define sectors as the sector of the potential equity conversion and not as the sector of the company issuing the bond (e.g. if a financial company issues a bond that is exchangeable into shares of a telecom company, we classify the bond as belonging to the telecom sector).

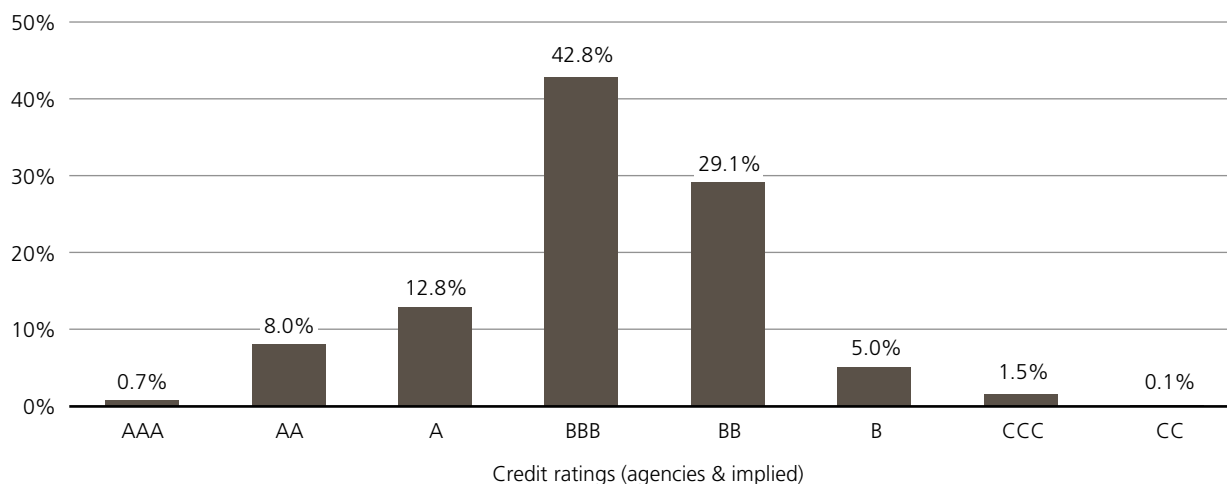
<sup>8</sup> The Refinitiv Global Convertible Bond Index is a widely accepted CB index family. It was previously called Thomson Reuters Convertible Bond Index and before that UBS Convertible Bond Index. In any case the calculation was always done independently from UBS. We use the "Global Vanilla" sub-index as this is the broadest index within the Refinitiv universe and excludes mandatory CBs.

The market for CBs differs significantly from the straight bond market when it comes to bonds without official ratings. While straight bonds nearly always carry an agency rating as they could hardly be sold without one, unrated CBs are a common phenomenon. For example, as at the end of 2020, issues carrying neither an S&P nor a Moody's issue rating accounted for more than 75% of the capitalization of the Refinitiv Convertible Bond Index - Global Vanilla. In order to get a sense of the non-rated bonds' credit quality we use so-called market implied ratings. These are calculated based on observable market prices in a two-step process. In a first step, market implied credit spreads for CBs are determined. Similar to the way implied volatilities can be backed out from

option prices, implied credit spreads can be backed out from CB prices using CB valuation models. In a second step, market implied ratings are assigned to individual CBs based on the respective implied credit spreads. This is done by using a table that maps implied ratings on implied credit spreads.

Exhibit 5 shows the rating distribution for Global CBs using agency ratings where available, and market implied ratings for bonds that carry no agency rating by S&P or Moody's. The rating distribution of CBs ranges all the way from AAA to CCC but is skewed heavily towards the BBB and BB rating buckets. The mean and the average<sup>9</sup> of the rating distribution fall into the BBB category.

**Exhibit 5**  
**Rating distribution: Refinitiv Global Convertible Index - Global Vanilla Hedged (EUR)**



Source: UBS Asset Management, Refinitiv; data as of December 31, 2020

<sup>9</sup> Assuming a linear relationship between rating buckets (AAA = 1, AA = 2, and so on)

## SECTION 4

# Historical risk and return characteristics

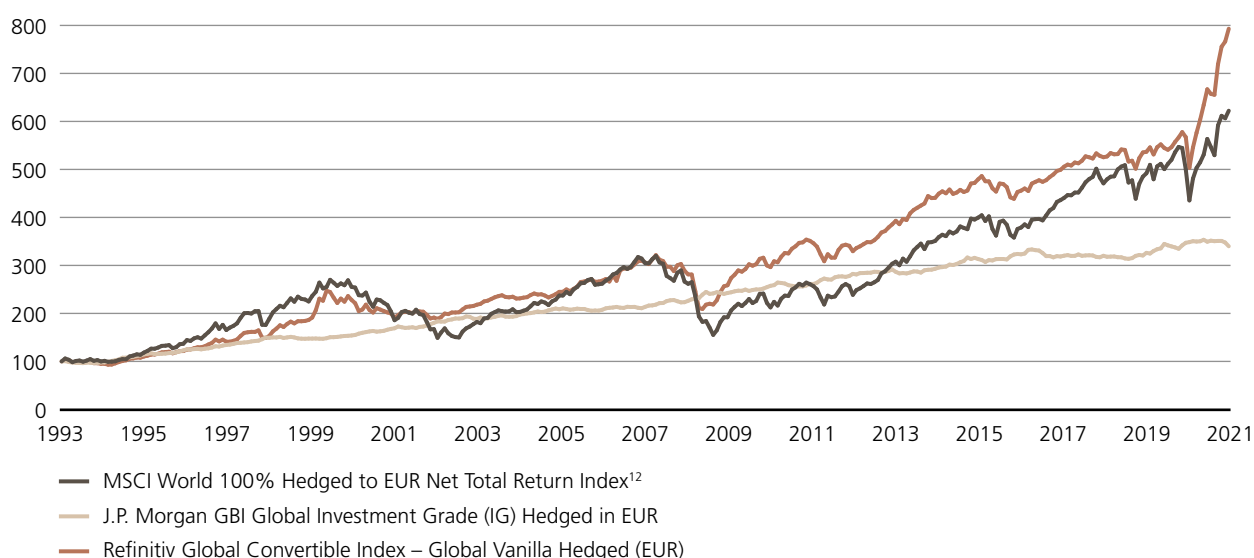
Now that we have demonstrated some structural attractions and particularities of the CB market, let us turn to its historical risk and return. Exhibit 6 shows the historical risk-return characteristics of global CBs, equities, and traditional bonds. In order to minimize distortions caused by currency movements we use indices that are hedged into EUR. Risk is defined as annualized standard deviation. We focus on a time frame starting on 31 Dec, 1993 since this is the inception date for the Refinitiv Global CB Index data series<sup>10</sup>.

The chart shows in an impressive way how attractive the risk-return relationship of CBs has been in the past. Over the full period they have exhibited the highest return with a moderate level of volatility. Similar risk-reward features are apparent in numerous studies of this subject<sup>11</sup>. This is true for most time frames, irrespective of the region, and for different CB indices. So, in our view, based on historic data, it seems that CBs, not equity, are the best place to take equity risk.

**Exhibit 6: Risk and return in comparison**

	Return (p.a. %)	Volatility (%)
Convertibles	7.9	10.1
Equities	7.0	14.1
Bonds	4.6	3.2

**Convertible bond index performance versus bond and equity indices**



Source: Bloomberg, Refinitiv, internal calculation, data as at 28 February 2021, rebased to 100 as at 31 December 1993. These figures refer to the past. **Past performance is not a reliable indicator of future results.**

<sup>10</sup> To the best of our knowledge, there are not any reliable Global CB indices for which a longer time series is available.

<sup>11</sup> See for example Chan et al (2019), Kahnowitz et al. (2017), and Youngworth (2020).

<sup>12</sup> Internal calculation for data prior to December 2001.

If one looks at the chart over time it becomes clear that the long-term convexity of the asset class played a crucial role for this outstanding performance. In the 1990s, CBs rose with equities, and the longer the bull market lasted, the higher the participation rate became. When markets peaked in 2000, CBs started to fall with equities but the participation rate declined over time. This allowed CBs to lose much less than equities and as a consequence to start from a higher base than equities in 2003 when a new cycle began.

Something unusual happened in late 2008: CBs fell much more than they were supposed to do according to theoretical models given how equities performed. Following the demise of Lehman Brothers, the CB market faced unprecedented turmoil caused by Lehman's counterparties liquidating CB positions they received as collateral and hedge funds being faced with short-selling bans, margin calls and redemptions. All this led to a self-reinforcing sell-off that pushed CBs to levels that were completely irrational from a valuation perspective. In many cases, CBs of quality issuers traded at higher yields than *pari passu* straight bonds without conversion option. In a rational world this should just not happen as it is equivalent to say that investors were paid to receive an option that had positive economic value.

Still, the CB market was able to start to recover from this crisis even before equity markets posted their lows. In early 2009, CBs started to gain in value as the dramatic misvaluations started to correct while equity markets still fell. This behavior

points to an important feature of the CB market when it comes to deviations from fair value: It has a strong tendency to revert to equilibrium even in an environment of limited arbitrage activities. First of all, each CB will reach its fair price at expiration at the latest as each bond gets either paid back or converted as long as the issuing company does not default. Given that CBs are often issued with an expected life span of around five years, as time goes by there is a tendency for the market valuation to normalize on its own as the individual bonds expire. The primary market can serve as another automatic stabilizer for the CB market. In times of market distress and depressed valuations primary market activity tends to be very limited. This influences the supply-demand balance positively in times when it's most needed. While old bonds continue to approach maturity and coupons are paid, there is less supply of new bonds. In a similar way, companies that use market dislocations to buy back their own bonds contribute to normalization as the buy backs reduce supply of CBs as well.

An additional mechanism which helps the CB market to participate in an upturn is that steady issuance injects new upside participation to the market long before it reaches its old levels. The fact that each CB has a finite life also helps to lock in gains as during a longer bull market many convertible bonds mature at prices much higher than 100%. This is equivalent to say that the gains on these positions are realized and cannot be lost again when the market reverses.

## SECTION 5

# Why should risk and return remain attractive?

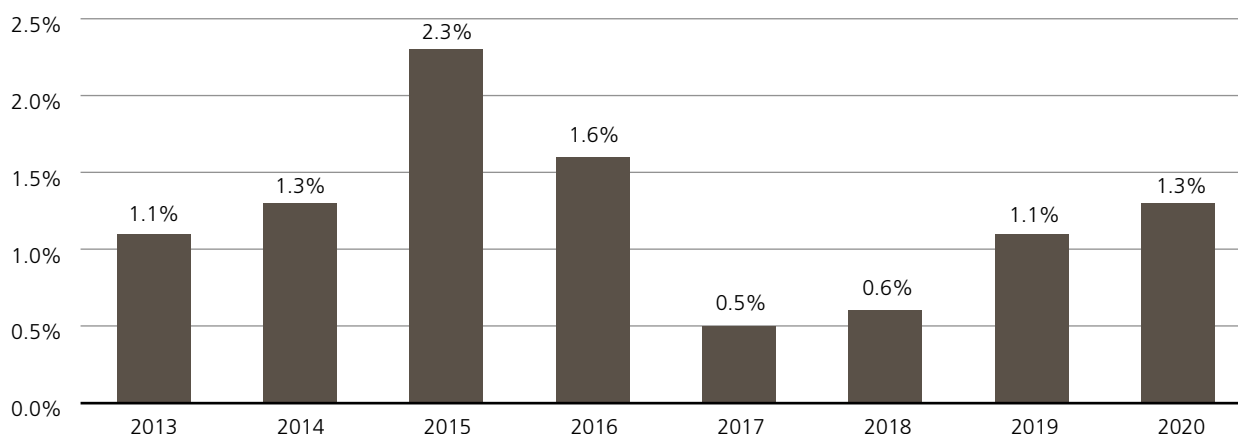
We see four major reasons why CBs should continue to represent a good deal for investors in the future. First, CBs are often issued cheap relative to theoretical value. Second, the aforementioned takeover protection clauses offer extraordinary benefits in change-of-control situations. Third, some issuers have a tendency to make "suboptimal" use of their call rights. Finally, for some CBs, high borrowing fees on the underlying make convertible bond exposure for outright investors<sup>13</sup> attractive. We will elaborate on all four of them below and underline why we believe all these value sources to be structural and as a consequence are here to stay.

### 5.1 Cheap issuance

One of the most important features of the CB market is its primary market behavior. Empirical evidence demonstrates that on average, CBs are issued cheap<sup>14</sup>. Exhibit 7 gives an impression of new issue cheapness<sup>15</sup> for the US. Anecdotal evidence points to similar new issue cheapness in Europe and even more cheapness in Asia. In this respect it is interesting to refer back to Exhibit 3 which shows that the amount of new issuance has been material over the years.

While the empirical evidence for CB new issue cheapness is strong, the theoretical reason for the cheapness is less clear-cut. One argument why CBs are issued cheap says that issuers and underwriters are willing to accept some new issue cheapness as a form of insurance premium to make sure that a deal can be launched successfully. By doing so, they try to avoid the liquidity and reputational costs that a failed deal may generate. Undoubtedly, this argument also holds for

**Exhibit 7: US convertible bond new issues average cheapness**



Source: Barclays CB InsightTM, Data as of December 31, 2020

<sup>13</sup> We refer to investors that hold CBs without engaging in hedging transactions as "outright investors". They contrast to hedged investors that partially or totally hedge out risks inherent in their CB positions.

<sup>14</sup> For academic research on new issue cheapness see Amman et al. (2003) and Loncarski et al. (2009).

<sup>15</sup> We refer to new issue cheapness as the difference between the new issue price of a CB and the respective theoretical value, expressed as a percentage of the issue price.

the issuance of other instruments like common equity. This phenomenon is more material for the CB market than for the equity market due to the much higher ratio of new issuance to total outstanding market capitalization within the CB market. As CBs have an expected lifetime of about five years at issuance, about 20% of the CB market gets replaced by new issues every year. This also matches the number shown in Exhibit 3. The comparable percentage for equity placements relative to equity market capitalization is in the low single digits.

A second reason cited for new issue cheapness is that in certain instances the CB market acts as a funding source of last resort for companies whose ability to issue new straight bonds or equity is seriously limited. CB markets are offering funds to such issuers because hedged investors are able to create portfolios that are basically immunized from movements in the credit and equity of the underlying. Typically this is done by buying CBs and simultaneously shorting stock.

Therefore, if a new deal is priced attractively enough, arbitrageurs will buy a new deal just to exploit the cheapness. Along this line of reasoning, new issue cheapness can be seen as a function of an issuer's need to attract hedged investors to a deal.

Another argument concerning new issue cheapness starts with the observation that CB issuers monetize their own shares' volatility. This implies that they are selling something that they otherwise might not be able to sell. Therefore, the opportunity costs of not selling a convert far outweigh the potential benefits of a slightly better pricing. In such a setting it seems reasonable that issuers tend not to be too price sensitive.

A further point worth keeping in mind is that when a company does a seasoned equity placement, it typically happens at a discount to the prevailing market price. This is something a treasurer clearly has in mind when comparing alternative financing possibilities. In the case of a stock

placement, existing shareholders usually get subscription rights. This means that the discount is handed back to participating shareholders. In the case of a CB placement, the discount is received by the party that buys the new bonds.

Finally, tax and regulatory considerations have to be taken into account when discussing CB new issue pricing. There are examples of CB issues that are very equity-like but are structured as a bond. For issuers, this has the advantage of combining the economic and regulatory benefits of equity issuance with the tax shelter that coupon payments offer. Again, it is conceivable that this proposition is so attractive to issuers that their price sensitivity is somewhat curbed.

To conclude, for a treasurer it is always convenient to be in a situation where he or she can sell the proverbial glass as being "half-full" in all scenarios: If equity markets rise, the issued CB will get converted and the stock was basically sold at a premium to the stock price at issuance. If that does not happen the company has benefited from relatively cheap debt. With that in mind, the main downside scenario would be if a deal goes really badly and cannot be placed with investors. Who would not be on the cautious side when fixing a new issue's terms with the above in mind?

## 5.2 "Change of Control" clauses

Many CBs have takeover protection features that can lead to extraordinarily attractive payoffs in M&A situations. Occasionally, CBs profit more from a takeover than their respective underlying equity.

There are two main forms of takeover protection features: Investor puts and premium compensation clauses. The investor put gives CB holders the right to have their bonds immediately repaid at 100% if the issuing company is acquired. The basic rationale for such a clause is to protect investors from the takeover's potential adverse credit implications (for example if the credit quality of the new, combined entity is worse than the original issuer's credit quality, which would be the case if the acquirer intends to do

a leveraged buyout). Obviously, an investor put is especially attractive for bonds that trade at a substantial discount to par prior to the takeover announcement. For example, holders of the Seacor 3.25% 2030 CB gained the right to put their bonds back to the company at par after private equity firm American Industrial Partners announced an agreement to buy Seacor in early December 2020. The CB was quoted at about 82% of par on 4 December, 2020<sup>16</sup>, the last day before the offer was announced. Based on this, it will gain 22% until the closing of the transaction, while the takeover premium on the underlying shares was only about 15%. The outperformance of the CB vs. the underlying equity is even more impressive if one considers that before the announcement, Seacor 3.25% 2030 was trading as an out-of-the money convertible with hardly any equity exposure.

The other principal form of takeover protection are premium compensation features. These clauses give CB investors the right to convert their CB into the underlying shares at a temporarily increased conversion ratio if a takeover takes place. The number of additional shares depends on the takeover price and the timing of the takeover. In the US, the number of additional shares is typically defined via a table in the prospectus while in Europe and Asia it is most often calculated using so-called "ratchet" formulas. Such premium compensation features were introduced to compensate hedge funds for the loss of optionality in a cash takeout but can yield outsized returns for outright investors. The takeover of Inmarsat by a group of private equity investors in 2019 is a good example of a very beneficial application of a ratchet clause. From the day before the offer was made public in March 2019 until the transaction's closing in December 2019, Inmarsat 3.875% 2023 returned more than 30% while the underlying shares gained "only" 24%<sup>16</sup>. As Inmarsat's CB was trading with only a modest equity sensitivity pre announcement, this example clearly demonstrates the significant upside offered by premium compensation features.

Given how attractive these features are in takeover situations, one wonders why any issuer would offer such a generous contractual clause? To solve this puzzle, one has to take into account the prominent role arbitrageurs play in the CB

market. These market participants do not invest in CBs with a view about the underlying equity but with a view about the relationship between a CB's price and the underlying equity (i.e. the premium above parity – the value of the shares you would receive in case of conversion – at which a certain CB trades). If an arbitrageur is of the opinion that this premium is too small he or she would buy the CB and hedge out the equity risk by shorting the underlying equity. By doing so, he or she effectively is only exposed to changes to the CB's premium. Generally, the higher the underlying shares' volatility, the larger this premium tends to be. So, what happens if the company is taken over for cash? As the new underlying of the convertible bond is now a fixed amount of cash, which by definition has no volatility, the premium collapses toward 0% and the arbitrageur suffers a major loss. After a number of hedge funds suffered severe losses in such cash takeover situations, arbitrageurs started to demand premium compensation clauses that protect them from cash takeovers' adverse consequences on their CB positions. Given that arbitrageurs are a very important investor group for CBs, it is hardly a surprise that premium compensation clauses have become standard.

Generally, CBs are valued taking into account numerous input factors such as the underlying stock's volatility, credit spreads and dividend payments. These input factors can be combined using option pricing models to come up with an estimation of a CB's fair value. These calculations typically do not take into account the potentially valuable takeover protection clauses as valuing these would require – among other things – having an estimation of a given company's probability of being taken over. Clearly, it is almost impossible to come up with a sensible estimation of a given company's probability of being taken over. Therefore, CB fair value calculations hardly ever address the valuable protection features outlined above. While this is sensibly conservative on a single CB level, the systematic abstraction of these features is source of additional value add on a CB market level, as in any given period one should expect at least some CB issuers to be taken over. From this point of view, one can make a strong case that a CB market that looks to be at fair value based on an aggregation of single CB valuations is in reality still somewhat cheap because of neglected takeover protection features.

### 5.3 “Suboptimal” call exercise

Call features are a very common prospectus clause for CBs. They give the issuer the right to call a CB at a fixed price, typically at par. In many cases the call right is time dependent (for example a bond becomes callable three years after issuance) and most frequently also conditional on the underlying's performance (for instance the bond becomes callable if the underlying trades above a certain trigger level, a “soft call feature”). Usually, if the issuer decides to call a bond, the bond's holders have the opportunity to convert the bond for a period of typically 30 days (“conversion period”). Investors will prefer conversion as long as the value of shares to be received upon conversion exceeds the value the issuer has to pay back in cash following its exercise of the call. This has two implications: First, investors faced with an issuer call will usually wait until the last day possible to decide whether to convert in order to avoid a decision that becomes uneconomic due to market movements. Secondly, if an issuer calls a bond that is deep in-the-money, the issuer can usually expect bondholders to convert. In that case, the call is simply a means to force conversion.

Theoretically, a rational issuer will call a bond as soon as it is economically beneficial to do so, that is, as soon as the underlying's share price exceeds the call price and the period in which it can be called started<sup>17</sup>. Clearly, this rational call behavior by issuers is what valuation models reflect as well. Still, we can observe that many issuers do not behave as suggested by these models. On the one hand, some issuers do not call as they have certain tax benefits from not calling. And there is another reason for issuers to exercise caution when it comes to calling a CB: Forcing conversion by calling a CB can go terribly wrong.

The case of VNU, the Dutch publishing company, shows the potential problems. On February 26th 2001, VNU announced its intention to call its 2.75% 2005 CB at 100% with effective date 17 April 2001, which was the first day on which this bond was callable. On the announcement date, the bond's parity (value of the shares you would receive in case of conversion) stood at 117.80%, which indicated a very high probability that bondholders would choose to convert their bonds. Most unluckily for VNU, its share price fell in the weeks after the announcement by more than 20%. On 4 April 2001, the last day bondholders could convert their bonds, parity was down to 92.50%, so nearly all bondholders chose not to convert. Therefore, VNU was confronted with an unanticipated cash outflow of about 340 million EUR. The only way VNU could provide the necessary liquidity was to issue a new CB. The reason we had to choose such an old example is by itself proof that since then companies have learned from it.

Given the potential unintended consequences of calling a CB, it comes as no surprise that issuers do not always handle calls in a theoretically rational fashion. In order to avoid the VNU scenario, some issuers tend to call a bond only if the current CB price comfortably exceeds the call price.

The flipside of this alleged “irrational” behavior of issuers is some “free” implicit call protection for bondholders or, stated differently, longer optionality for free. This should increase the CB's value as coupons accrue for longer and investors benefit from additional optionality. The value of this additional call protection can be seen by including some “call cushion” into fair value calculations. In practice, this is of limited help since such a procedure is highly sensitive to the call cushion's level, which relies on somewhat arbitrary assumptions. But even if the value of call delay on a single bond level is hard to measure, it is obvious that the asset class overall can only benefit if calls are exercised late.

17 See Ingersoll (1977) for details on the optimal call policy for CBs.



## 5.4 Benefits of high borrow costs

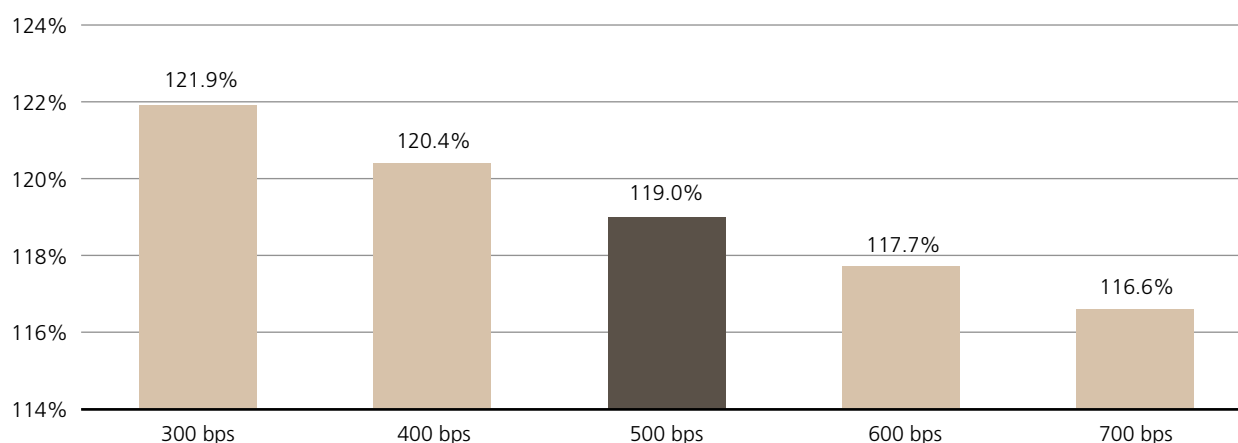
Somewhat surprisingly, outright CB investors can profit from high lending fees on underlying shares. The reason for this is that the marginal, price-setting investor in the CB market is usually a hedged investor. Since these investors have to short the underlying, stock lending fees (how much a hedged investor needs to pay to borrow the shares they want to short) will be reflected in the value they assign to a bond<sup>18</sup>. Higher borrow costs on the underlying make a short position more expensive. Thus, a higher lending fee also implies a lower theoretical value of a CB.

Since outright investors do not short the underlying, they do not face hedging costs. Therefore, a high lending fee can offer outright investors an additional source of return as with higher borrow costs the same bond can simply be bought much cheaper. The consequence is that with time passing outright investors can benefit as if they were earning lending fees themselves.

The implicit accrual of lending fees via an outright CB holding can be significant. Exhibit 8 shows the theoretical value of Bharti Airtel 1.5% 2024<sup>19</sup> for different levels of lending costs assuming all other factors stay unchanged<sup>20</sup>. A reduction of that cost from 500 bp to 400 bp p.a. would immediately increase this security's theoretical value by around 1.4%.

It's important to keep in mind that the borrow costs will accrue to outright CB investors over time, even if the level of lending fees remains unchanged. The reason for this is that the borrow-induced valuation discount will become smaller as time passes as the period over which the shares need to be borrowed by hedge funds becomes shorter and shorter. In other words, a real cost for arbitrageurs becomes a real return for outright investors.

**Exhibit 8: Theoretical Value of Bharti Airtel 1.5% 2024 for Various of Shorting Costs**



Source Bloomberg, Data as of December 31, 2020

**Past performance is not a reliable indicator of future results.**

<sup>18</sup> CB valuation tools capture this market behavior by incorporating lending fees in the valuation process.

<sup>19</sup> We use Bharti Airtel 1.5% 2024 as example as it is a large liquid bond whose terms and conditions are pretty standard and its credit quality is solid based on agency ratings.

<sup>20</sup> Due to regulatory restrictions in India it is impossible to sell the underlying stock short but one can create a synthetic short via offshore single stock futures. The costs of such a hedging position is currently roughly 500 bps p.a. and can interpreted in the same way as borrow fees.

# Conclusion

We have shown that convertible bonds have not only exhibited appealing risk-return characteristics in the past but also that there are a multitude of structural reasons why this has been the case. These make the asset class a unique opportunity which cannot be replicated by combining equities, bonds and options. Even more importantly, these reasons comfort

us in our view that convertible bonds are likely to remain an attractive value proposition in the future. Therefore, we think allocating to CBs within a diversified portfolio is a pragmatic and valuable investment decision. It allows investors to not only gain convexity and diversification benefits, but also to enjoy the attractive risk-return properties of CBs.

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