



# Convertible Bonds

# Course Objectives

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**Understand** what convertible bonds (CBs) are and their various structures



**Identify** the buyers of CBs, as well as the benefits and risks of investing in CBs



**Comprehend** the math of CBs and understand various Greeks



**Appreciate** some methods used to trade CBs for arbitrage, hedging, and indexing



# Convertible Bond Basics

# CB Overview

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**Convertible bonds** have been around for almost 150 years.



**Simple Bond**



**CoCo Convertibles**



**CB Derivatives**

# CB Overview

**Convertible bonds** are a hybrid security with some of the characteristics of **both bonds and stocks**.

Convertible bonds (CBs) are corporate bonds that can be converted into a pre-determined number of shares of common stock.



**An exchangeable bond** is similar in concept, but the investor receives shares of another company.

## General Information

- Higher in the capital structure than common stock
- Issuers can raise funds, while minimizing share dilution, at a lower interest rate than straight debt
- Traded over-the-counter (OTC)

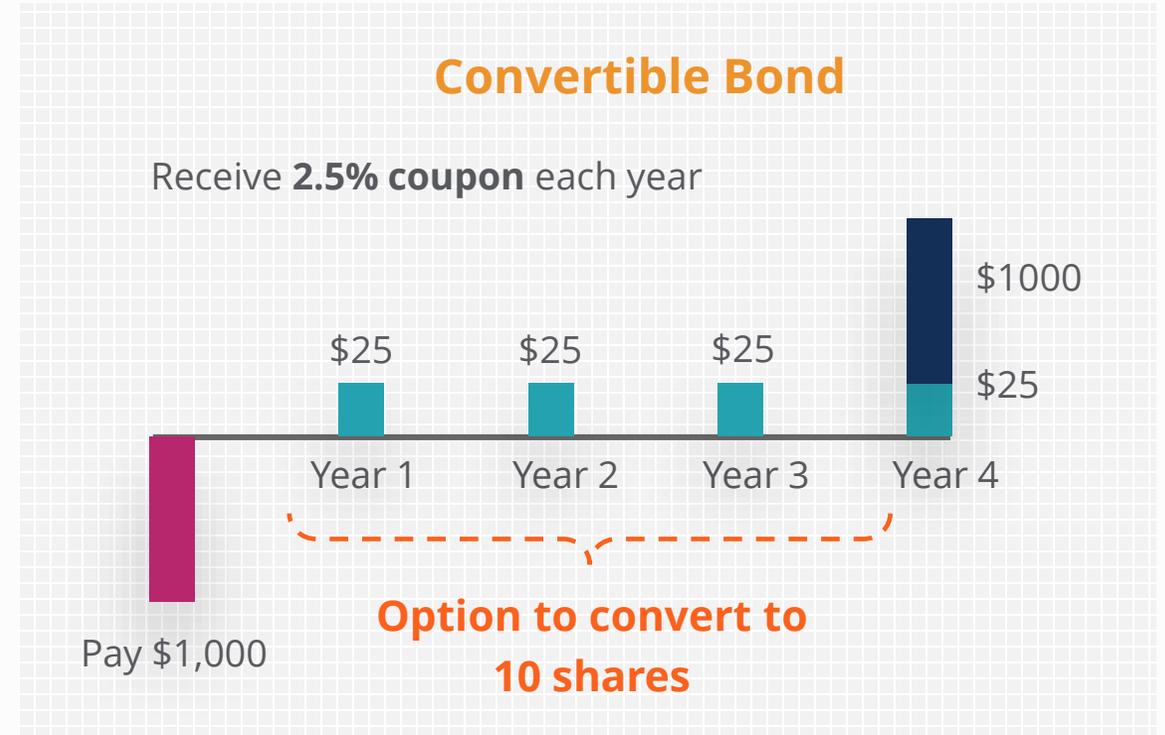
# CB vs. Straight Bond

**Convertible bonds** may be easy to understand but difficult to analyze due to the embedded call option.



**CB coupon < Straight bond coupon**

**CB coupon > Equity dividend yield**



**Share price > \$100: Convert**

**Share price < \$100: Don't convert**

# CB - Bloomberg Example

TSLA 2 05/15/24		\$ ↑ 140.553	+5.948	Yld -5.915
		As of 16 Dec	Vol 10.6MM	Source TRMT
TSLA 2 05/15/24 Corp	Settings	Actions	Page 1/12	Security Description: Convertible
		94 Notes	95 Buy	96 Sell
25) Convertible Bond		26) Underlying Description		
<b>Pages</b>	<b>Issuer Information</b>		<b>Identifiers</b>	
11) Bond Info	Name	TESLA INC	ID Number	ZS4501020
12) Addtl. Info	Industry	Automotive (BCLASS)	CUSIP	88160RAG6
13) Reg/Tax	<b>Convertible Information</b>		ISIN	US88160RAG65
14) Covenants	Mkt of Issue	US Domestic	Convertible	
15) Guarantors	Country	US	Currency	USD
16) Bond Ratings	Rank	Sr Unsecured	Series	
17) Identifiers	Conv Ratio	3.2276	Conv Price	309.8277
18) Exchanges	Stock Tkr	TSLA US	Stock Price	380.334...
19) Inv Parties	Parity	122.7569	Premium	14.4970
20) Fees, Restrict	Coupon	2.000000	Init Prem	27.500
21) Schedules	Type	Fixed	Freq	S/A
22) Coupons	<b>Calc Type (49) CONVERTIBLE</b>			
<b>Quick Links</b>	Pricing Date	05/02/2019		
32) ALLQ Pricing	1st Coupon Date	11/15/2019		
33) QRD Qt Recap	Convertible Until	05/13/2024		
34) TDH Trade Hist	Maturity	05/15/2024		
35) CACS Corp Action	\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.			
36) CF Prospectus				
37) CN Sec News				
38) HDS Holders				
39) OVCV Valuation				
66) Send Bond				
		<b>Bond Ratings</b>		
		Moody's	NA	
		S&P	B-	
		Composite	NR	
		<b>Issuance &amp; Trading</b>		
		<b>Amt Issued/Outstanding</b>		
		USD	1,840,000.00 (M)	/
		USD	1,840,000.00 (M)	
		<b>Min Piece/Increment</b>		
		1,000.00 / 1,000.00		
		Par Amount	1,000.00	
		Book Runner	JOINT LEADS	
		Reporting	TRACE	

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
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 As of 16 Dec Vol 10.6MM Source TRMT

TSLA 2 05/15/24 Corp Settings Actions Page 1/12 Security Description: Convertible  
 94 Notes 95 Buy 96 Sell

25 Convertible Bond 26 Underlying Description

Pages 1) Bond Info 2) Addtl. Info 3) Reg/Tax 4) Covenants 5) Guarantors 6) Bond Ratings 7) Identifiers 8) Exchanges 9) Inv Parties 20) Fees, Restrict 21) Schedules 22) Coupons Quick Links 32) ALLQ Pricing 33) QRD Qt Recap 34) TDH Trade Hist 35) CACS Corp Action 36) CF Prospectus 37) CN Sec News 38) HDS Holders 39) OVCV Valuation 66) Send Bond	<b>Issuer Information</b>		<b>Identifiers</b>	
	<b>Name</b> TESLA INC		ID Number	ZS4501020
	<b>Industry</b> Automotive (BCLASS)		CUSIP	88160RAG6
	<b>Convertible Information</b>		ISIN	US88160RAG65
	<b>Mkt of Issue</b>	US Domestic	<b>Convertible</b>	<b>Bond Ratings</b>
	<b>Country</b>	US	<b>Currency</b>	Moody's NA
	<b>Rank</b>	Sr Unsecured	<b>Series</b>	S&P B-
	<b>Conv Ratio</b>	3.2276	<b>Conv Price</b>	309.8277
	<b>Stock Tkr</b>	TSLA US	<b>Stock Price</b>	380.334...
	<b>Parity</b>	122.7569	<b>Premium</b>	14.4970
<b>Coupon</b>	2.000000	<b>Init Prem</b>	27.500	
<b>Type</b>	Fixed	<b>Freq</b>	S/A	
	<b>Calc Type</b>	(49) CONVERTIBLE		
	<b>Pricing Date</b>	05/02/2019		
	<b>1st Coupon Date</b>	11/15/2019		
	<b>Convertible Until</b>	05/13/2024		
	<b>Maturity</b>	05/15/2024		
	\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.			
	<b>Issuance &amp; Trading</b>			
	<b>Amt Issued/Outstanding</b>			
	USD	1,840,000.00 (M) /		
	USD	1,840,000.00 (M)		
	<b>Min Piece/Increment</b>			
			1,000.00 / 1,000.00	
	<b>Par Amount</b>	1,000.00		
	<b>Book Runner</b>	JOINT LEADS		
	<b>Reporting</b>	TRACE		

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TSLA 2 05/15/24 Corp Settings Actions Page 1/12 Security Description: Convertible  
 94 Notes 95 Buy 96 Sell

25) Convertible Bond 26) Underlying Description

Pages	Issuer Information	Identifiers
1) Bond Info	Name TESLA INC	ID Number ZS4501020
2) Addtl Info	Industry Automotive (BCLASS)	CUSIP 88160RAG6
3) Reg/Tax	<b>Convertible Information</b>	
4) Covenants	Mkt of Issue US Domestic Convertible	ISIN US88160RAG65
5) Guarantors	Country US Currency USD	Bond Ratings
6) Bond Ratings	Rank Sr Unsecured Series	Moody's NA
7) Identifiers	Conv Ratio 3.2276 Conv Price 309.8277	S&P B-
8) Exchanges	Stock Tkr TSLA US Stock Price 380.334...	Composite NR
9) Inv Parties	Parity 122.7569 Premium 14.4970	Issuance & Trading
10) Fees, Restrict	Coupon 2.000000 Init Prem 27.500	Amt Issued/Outstanding
11) Schedules	Type Fixed Freq S/A	USD 1,840,000.00 (M) /
12) Coupons	Calc Type (49) CONVERTIBLE	USD 1,840,000.00 (M)
Quick Links	Pricing Date 05/02/2019	Min Piece/Increment
32) ALLQ Pricing	1st Coupon Date 11/15/2019	1,000.00 / 1,000.00
33) QRD Qt Recap	Convertible Until 05/13/2024	Par Amount 1,000.00
34) TDH Trade Hist	Maturity 05/15/2024	Book Runner JOINT LEADS
35) CACS Corp Action	<b>\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.</b>	
36) CF Prospectus		Reporting TRACE
37) CN Sec News		
38) HDS Holders		
39) OVCV Valuation		
40) Seed Bond		

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# CB - Bloomberg Example

A greenshoe clause is an option that allows the leads to increase a new issue by up to 15% if investor demand is stronger than anticipated.

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<p>25) Convertible Information</p> <p>90 Buy 90 Sell</p>	
<p>Pages</p> <p>1) Bond Info</p> <p>2) Addtl. Info</p> <p>3) Reg/Tax</p> <p>4) Covenants</p> <p>5) Guarantors</p> <p>6) Bond Ratings</p> <p>7) Identifiers</p> <p>8) Exchanges</p> <p>9) Inv. Parties</p> <p>20) Fees, Restrict</p> <p>21) Schedules</p> <p>22) Coupons</p> <p>Quick Links</p> <p>32) ALLQ Pricing</p> <p>33) QRD Qt Recap</p> <p>34) TDH Trade Hist</p> <p>35) CACS Corp Action</p> <p>36) CF Prospectus</p> <p>37) CN Sec News</p> <p>38) HDS Holders</p> <p>39) OVCV Valuation</p> <p>40) Seed Bond</p>	<p>Name TESLA INC</p> <p>Industry Automotive (BCLASS)</p> <p><b>Convertible Information</b></p> <p>Mkt of Issue US Domestic Convertible</p> <p>Country US Currency USD</p> <p>Rank Sr Unsecured Series</p> <p>Conv Ratio 3.2276 Conv Price 309.8277</p> <p>Stock Tkr TSLA US Stock Price 380.334...</p> <p>Parity 122.7569 Premium 14.4970</p> <p>Coupon 2.000000 Init Prem 27.500</p> <p>Type Fixed Freq S/A</p> <p>Calc Type (49) CONVERTIBLE</p> <p>Pricing Date 05/02/2019</p> <p>1st Coupon Date 11/15/2019</p> <p>Convertible Until 05/13/2024</p> <p>Maturity 05/15/2024</p> <p><b>\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.</b></p>
<p>Identifiers</p> <p>ID Number ZS4501020</p> <p>CUSIP 88160RAG6</p> <p>ISIN US88160RAG65</p>	
<p>Bond Ratings</p> <p>Moody's NA</p> <p>S&amp;P B-</p> <p>Composite NR</p>	
<p><b>Issuance &amp; Trading</b></p> <p><b>Amt Issued/Outstanding</b></p> <p>USD 1,840,000.00 (M) /</p> <p>USD 1,840,000.00 (M)</p>	
<p>Min Piece/Increment</p> <p>1,000.00 / 1,000.00</p> <p>Par Amount 1,000.00</p> <p>Book Runner JOINT LEADS</p> <p>Reporting TRACE</p>	
<p>Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000</p> <p>Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2019 Bloomberg Finance L.P.</p> <p>SN 129457 EST GMT-5:00 17-Dec-2019 11:42:28</p>	

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	Name TESLA INC		ID Number	ZS4501020
	Industry Automotive (BCLASS)		CUSIP	88160RAG6
	Convertible Information		ISIN	US88160RAG65
	Mkt of Issue	US Domestic	Convertible	
	Country	US	Currency	USD
	Rank	Sr Unsecured	Series	
	Conv Ratio	3.2276	Conv Price	309.8277
	Stock Tkr	TSLA US	Stock Price	380.334...
	Parity	122.7569	Premium	14.4970
	Coupon	2.000000	Init Prem	27.500
	Type	Fixed	Freq	S/A
	Calc Type (49) CONVERTIBLE		Issuance & Trading	
	Pricing Date	05/02/2019	Amt Issued/Outstanding	
	1st Coupon Date	11/15/2019	USD 1,840,000.00 (M) /	
Convertible Until	05/13/2024	USD 1,840,000.00 (M)		
Maturity	05/15/2024	Min Piece/Increment		
\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.		1,000.00 / 1,000.00		
		Par Amount	1,000.00	
		Book Runner	JOINT LEADS	
		Reporting	TRACE	

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	Name TESLA INC		ID Number	ZS4501020
	Industry Automotive (BCLASS)		CUSIP	88160RAG6
	Convertible Information		ISIN	US88160RAG65
	Mkt of Issue	US Domestic	Convertible	
	Country	US	Currency	USD
	<b>Rank</b>	<b>Sr Unsecured</b>	<b>Series</b>	
	Conv Ratio	3.2276	Conv Price	309.8277
	Stock Tkr	TSLA US	Stock Price	380.334...
	Parity	122.7569	Premium	14.4970
	Coupon	2.000000	Init Prem	27.500
	Type	Fixed	Freq	S/A
	Calc Type	(49) CONVERTIBLE		
	Pricing Date	05/02/2019		
	1st Coupon Date	11/15/2019		
Convertible Until	05/13/2024			
Maturity	05/15/2024			
\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.				
Bond Ratings		Issuance & Trading		
Moody's	NA	Amt Issued/Outstanding		
S&P	B-	USD	1,840,000.00 (M) /	
Composite	NR	USD	1,840,000.00 (M)	
		Min Piece/Increment		
			1,000.00 / 1,000.00	
		Par Amount	1,000.00	
		Book Runner	JOINT LEADS	
		Reporting	TRACE	

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Pages	Issuer Information		Identifiers			
1) Bond Info	Name	TESLA INC	ID Number	ZS4501020		
2) Addtl. Info	Industry	Automotive (BCLASS)	CUSIP	88160RAG6		
3) Reg/Tax	Convertible Information		ISIN	US88160RAG65		
4) Covenants	Mkt of Issue	US Domestic	Convertible	Bond Ratings		
5) Guarantors	Country	US	Currency	USD		
6) Bond Ratings	Rank	Sr Unsecured	Series	Moody's	NA	
7) Identifiers	Conv Ratio	3.2276	Conv Price	309.8277	S&P	B-
8) Exchanges	Stock Tkr	TSLA US	Stock Price	380.334...	Composite	NR
9) Inv. Parties	Parity	122.7569	Premium	14.4970	Issuance & Trading	
20) Fees, Restrict	Coupon	2.000000	Init Prem	27.500	Amt Issued/Outstanding	
21) Schedules	Type	Fixed	Freq	S/A	USD	1,840,000.00 (M) /
22) Coupons	Calc Type	(49) CONVERTIBLE	Pricing Date	05/02/2019	USD	1,840,000.00 (M)
Quick Links	1st Coupon Date	11/15/2019	Convertible Until	05/13/2024	Min Piece/Increment	
32) ALLQ Pricing	Maturity	05/15/2024	\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.		1,000.00 / 1,000.00	
33) QRD Qt Recap	Reporting	TRACE	Par Amount		1,000.00	
34) TDH Trade Hist	Book Runner		JOINT LEADS		Reporting	
35) CACS Corp Action	Reporting		TRACE		Reporting	
36) CF Prospectus	Reporting		TRACE		Reporting	
37) CN Sec News	Reporting		TRACE		Reporting	
38) HDS Holders	Reporting		TRACE		Reporting	
39) OVCV Valuation	Reporting		TRACE		Reporting	
66) Send Bond	Reporting		TRACE		Reporting	

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	Country	US	Currency	USD
	Rank	Sr Unsecured	Series	
	Conv Ratio	3.2276	Conv Price	309.8277
	Stock Tkr	TSLA US	Stock Price	380.334...
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	Type	Fixed	Freq	S/A
	<b>Calc Type</b>	<b>(49) CONVERTIBLE</b>		
	Pricing Date	05/02/2019		
	1st Coupon Date	11/15/2019		
Convertible Until	05/13/2024			
Maturity	05/15/2024			
\$240MM GREENSHOE EXERCISED IN FULL EFFECTIVE 5/3/19.				
Bond Ratings		Issuance & Trading		
Moody's	NA	Amt Issued/Outstanding		
S&P	B-	USD 1,840,000.00 (M) /		
Composite	NR	USD 1,840,000.00 (M)		
Min Piece/Increment		1,000.00 / 1,000.00		
Par Amount		1,000.00		
Book Runner		JOINT LEADS		
Reporting		TRACE		

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25) Convertible Bond 26) Underlying Description

Pages	Additional Information						
11) Bond Info	51) Details	52) CV	53) Cpn	54) Dflt	56) Struct	57) ECB/EU	58) Wgts
12) Addtl Info	Conversion Information			Calls and Puts			
13) Reg/Tax	Conv Price (USD)	309.8277		Next Call Date	None		
14) Covenants	Conv Ratio	3.2276		Next Call Price	None		
15) Guarantors	Initial Premium	27.50%		Next Put Date	None		
16) Bond Ratings	Convertible From	10/01/2019		Next Put Price	None		
17) Identifiers	Convertible Until	05/13/2024		Soft Call Start Date	None		
18) Exchanges	Interest Accrual Date	05/07/2019		Soft Call Trigger	None		
19) Inv Parties	Contingent Convertible	Yes		Provisional Price	None		
20) Fees, Restrict	Dividend Protection						
21) Schedules	Current Threshold	0					
22) Coupons	Threshold Units	Absolute					
Quick Links	71) Conversion Ratio Refix History		72) Dividend Protection Schedule				
32) ALLQ Pricing	Reason	Effective Date	Conv Price (USD)	Conv Ratio			
33) QRD Qt Recap	Initial	05/07/2019	309.8277	3.2276			
34) TDH Trade Hist							
35) CACS Corp Action							
36) CF Prospectus							
37) CN Sec News							
38) HDS Holders							
39) OVCV Valuation							
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Pages	Additional Information						
	51 Details	52 CV	53 Cpn	54 Dflt	56 Struct	57 ECB/EU	58 Wgts
1) Bond Info	Conversion Information				Calls and Puts		
2) Advt. Info	Conv Price (USD)		309.8277		Next Call Date		None
3) Reg/Tax	Conv Ratio		3.2276		Next Call Price		None
4) Covenants	Initial Premium		27.50%		Next Put Date		None
5) Guarantors	<b>Convertible From</b>		<b>10/01/2019</b>		Next Put Price		None
6) Bond Ratings	<b>Convertible Until</b>		<b>05/13/2024</b>		Soft Call Start Date		None
7) Identifiers	Interest Accrual Date		05/07/2019		Soft Call Trigger		None
8) Exchanges	Contingent Convertible		Yes		Provisional Price		None
9) Inv Parties	Dividend Protection						
10) Fees, Restrict	Current Threshold		0				
11) Schedules	Threshold Units		Absolute				
12) Coupons	71 Conversion Ratio Refix History				72 Dividend Protection Schedule		
Quick Links	Reason		Effective Date		Conv Price (USD)		Conv Ratio
32) ALLQ Pricing	Initial		05/07/2019		309.8277		3.2276
33) ORD Qt Recap							
34) TDH Trade Hist							
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Pages	Additional Information							
1) Bond Info	5) Details	52 CV	53 Cpn	54 Dflt	56 Struct	57 ECB/EU	58 Wgts	
2) Advt. Info	<b>Conversion Information</b>			Calls and Puts				
3) Reg/Tax	Conv Price (USD)		309.8277	Next Call Date				None
4) Covenants	Conv Ratio		3.2276	Next Call Price				None
5) Guarantors	Initial Premium		27.50%	Next Put Date				None
6) Bond Ratings	Convertible From		10/01/2019	Next Put Price				None
7) Identifiers	Convertible Until		05/13/2024	Soft Call Start Date				None
8) Exchanges	Interest Accrual Date		05/07/2019	Soft Call Trigger				None
9) Inv Parties	Contingent Convertible		Yes	Provisional Price				None
10) Fees, Restrict	Dividend Protection							
11) Schedules	Current Threshold		0					
12) Coupons	Threshold Units		Absolute					
Quick Links	71 Conversion Ratio Refix History		72 Dividend Protection Schedule					
32) ALLQ Pricing	Reason		Effective Date		Conv Price (USD)		Conv Ratio	
33) ORD Qt Recap	Initial		05/07/2019		309.8277		3.2276	
34) TDH Trade Hist								
35) CACS Corp Action								
36) CF Prospectus								
37) CN Sec News								
38) HDS Holders								
39) OVCV Valuation								
66) Send Bond								

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2019 Bloomberg Finance L.P.  
 SN 129457 EST GMT-5:00 17-Dec-2019 11:50:32

# Conversion Price and Conversion Ratio

A convertible bond has the feature of being convertible into a pre-determined number of shares.

## Conversion Ratio

- The number of shares the convertible exchanges into (per bond)
- Forms part of the offering terms and will not change during the life of the CB
- Based on the conversion price

## Conversion Price

- The price the CB converts at

## Tesla CB Example

- **Conversion Price:** \$309.8277
- **Bond Denomination:** \$1,000 (face value)

$$\begin{aligned}\text{Conversion Ratio} &= \frac{\text{Bond Denomination}}{\text{Conversion Price}} \\ &= \frac{\$1,000}{\$309.8277} \\ &= 3.2276\end{aligned}$$

# Parity Value

**Parity value (intrinsic value)** is one of key financial terms of convertible bonds.

$$\text{Parity} = \text{Conversion Ratio} \times \text{Current Share Price}$$



- The value of your investment if you were to convert the CB into shares of stock at the current share price
- Used to determine when to convert a bond into shares

## Tesla CB Example

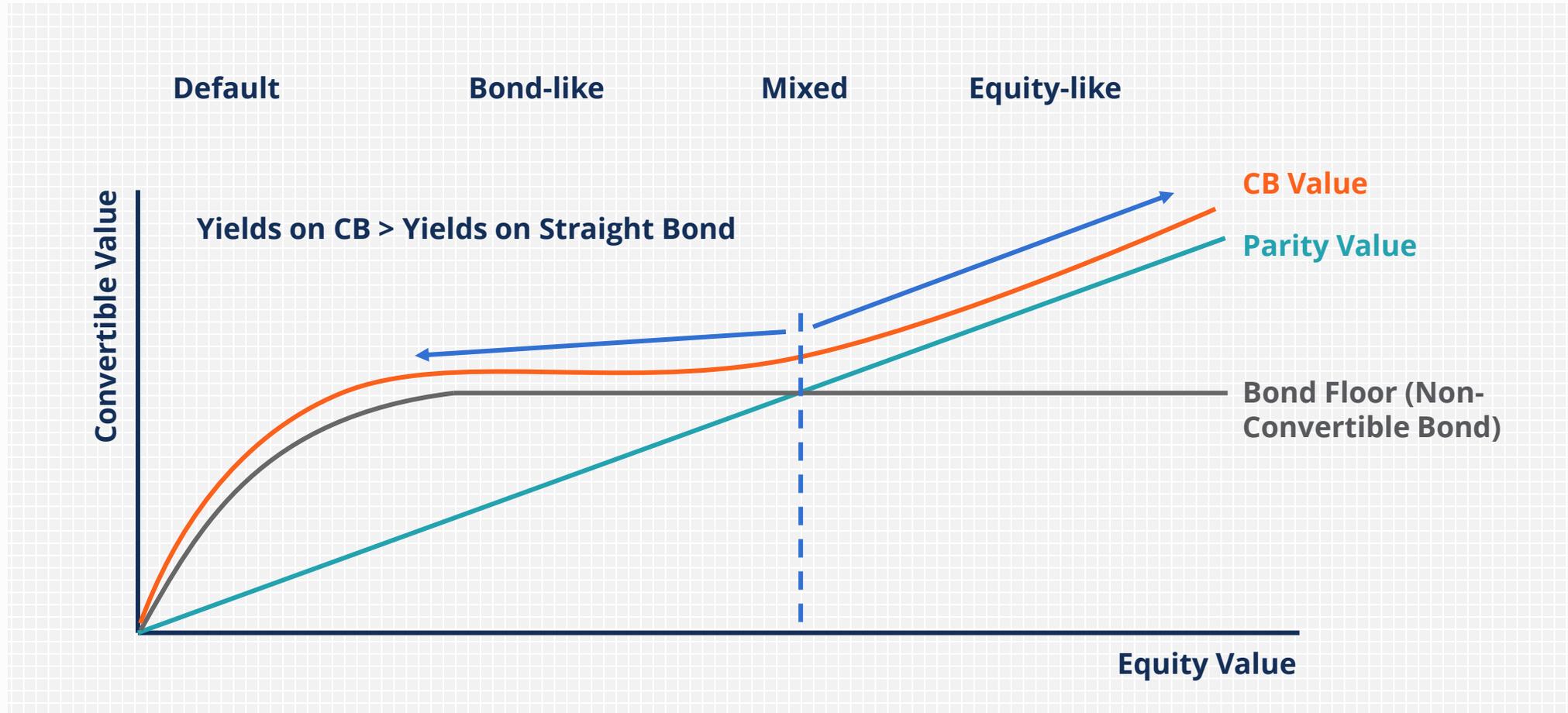
- **Current Price:** \$380.344
- **Conversion Ratio:** 3.2276

$$\text{Parity} = 3.2276 \times \$380.344 \\ = \$1,227.56$$

Conv Ratio	3.2276	Conv Price	309.8277
Stock Tkr	TSLA US	Stock Price	380.334...
Parity	122.7569	Premium	14.4970
Coupon	2.000000	Init Prem	27.500
Type	Fixed	Freq	S/A

# CB Value Diagram

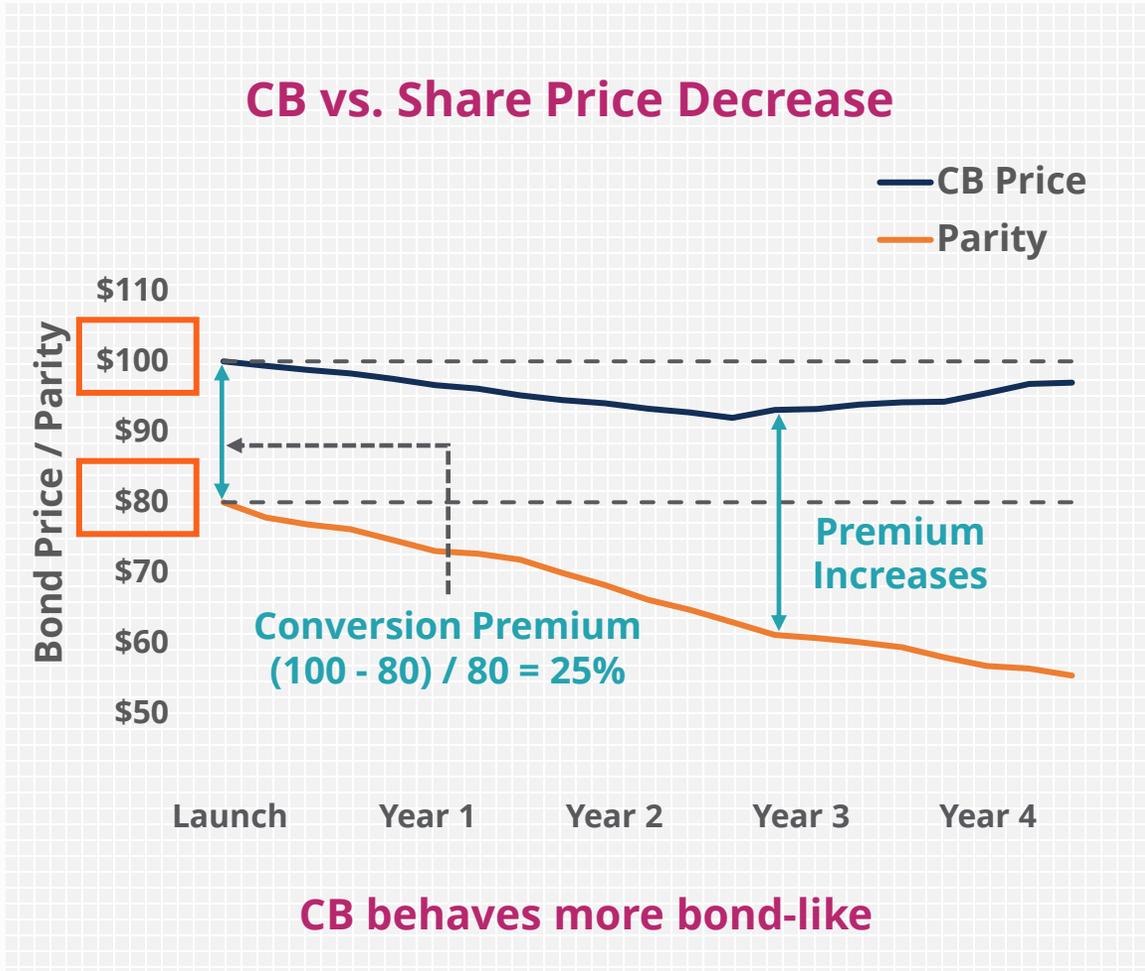
## Value Diagram (CB)



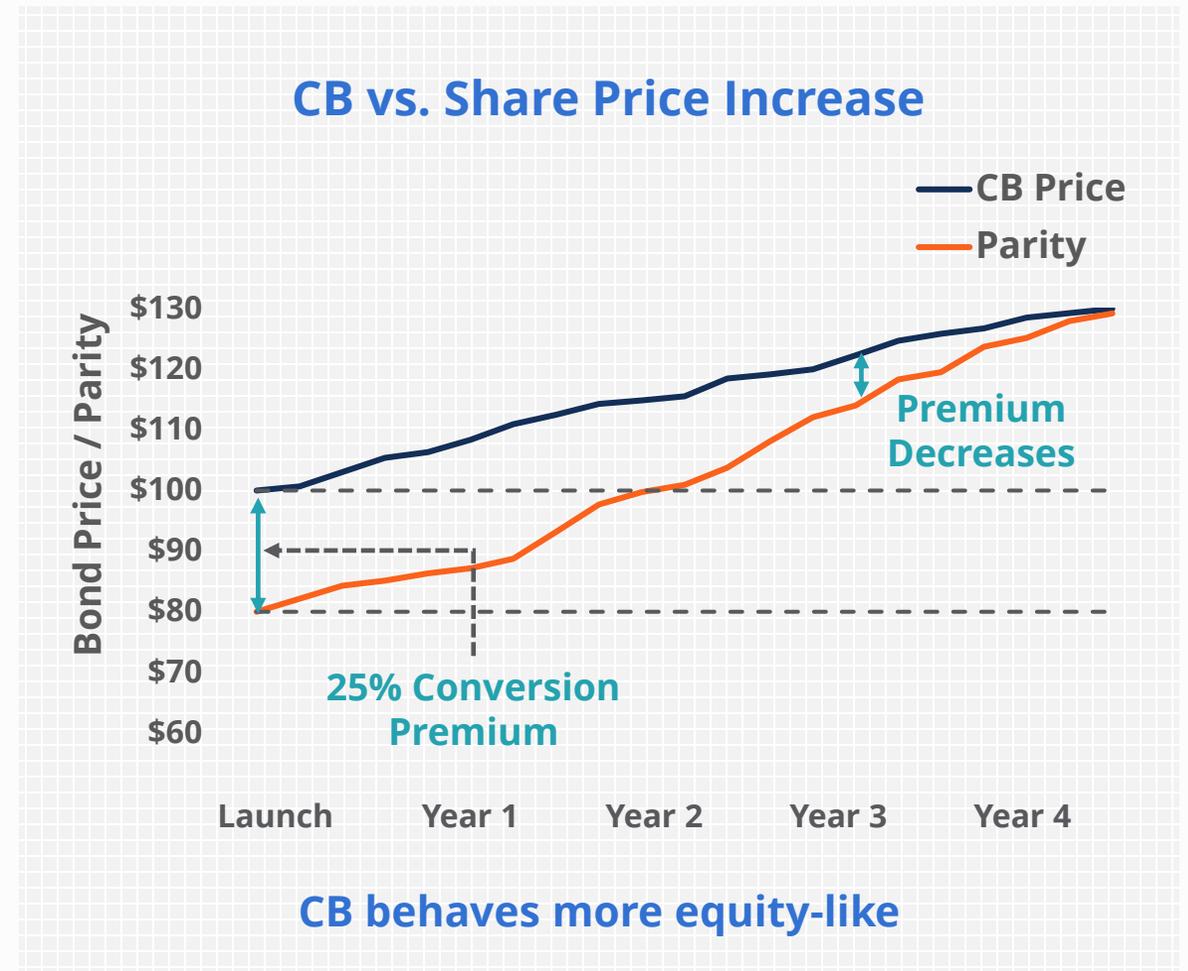
# CB vs. Share Price

How would **the price of a CB** move with **changes in the underlying equity price** over time?

## CB vs. Share Price Decrease



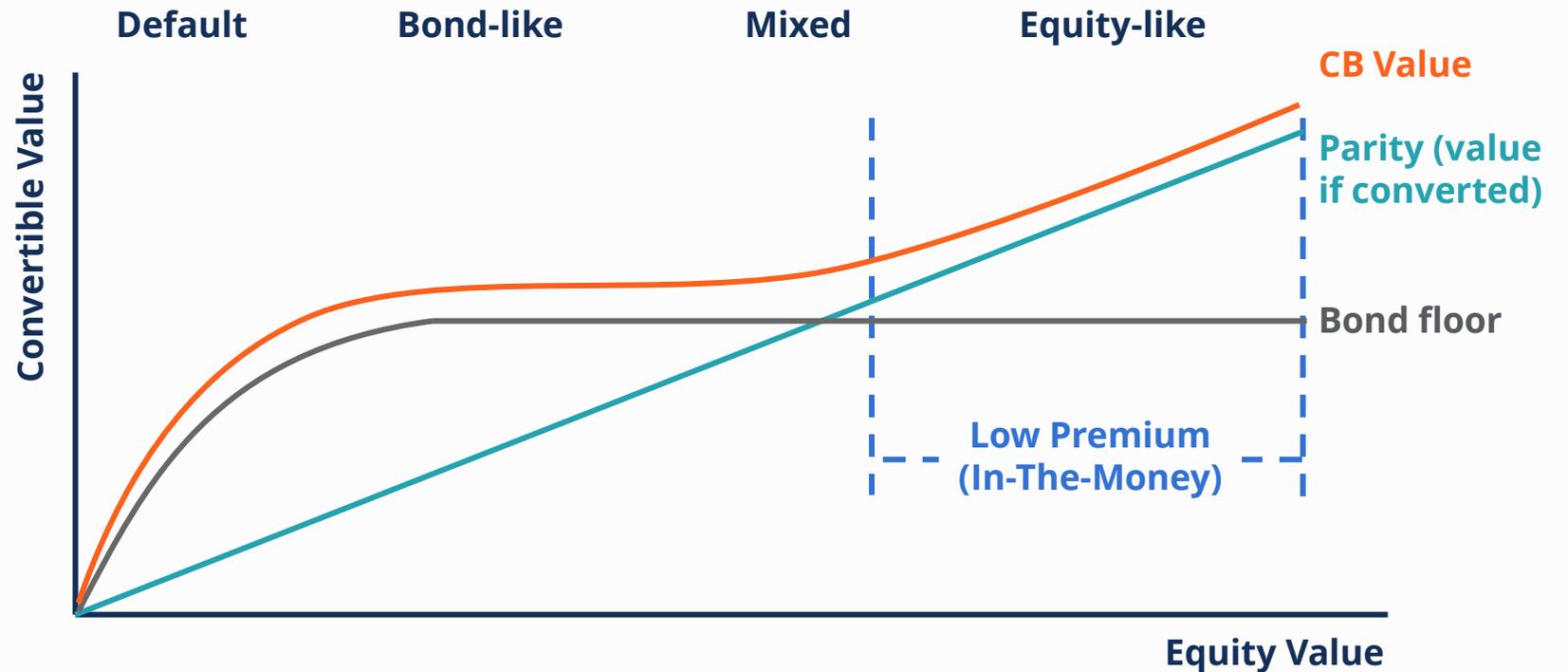
## CB vs. Share Price Increase



# Low Premium

CB investors have special terminology to describe each of the different scenarios of a CB given the premium.

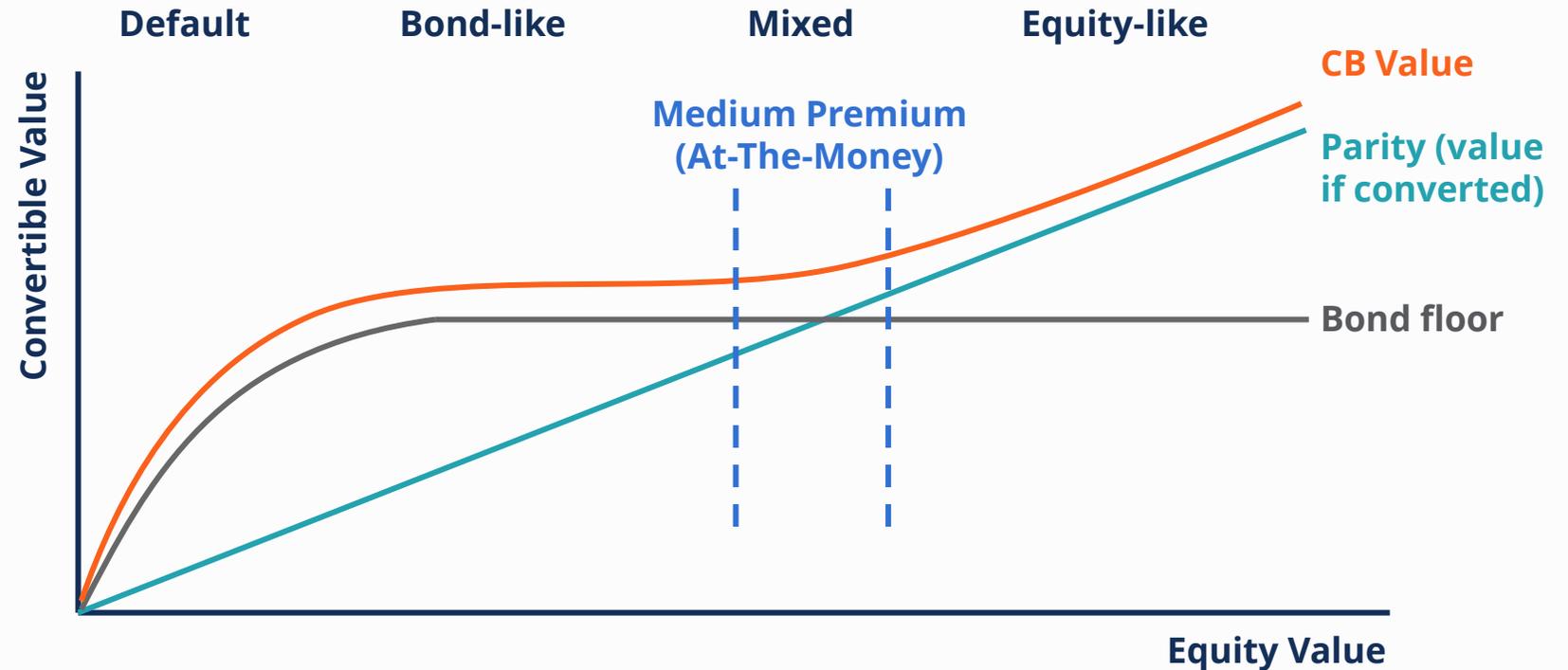
- High underlying stock price
- Value of CB reacts sharply to parity value changes and less to interest rate changes
- Also referred to as “butane”



# Medium Premium

CB investors have special terminology to describe each of the different scenarios of a CB given the premium.

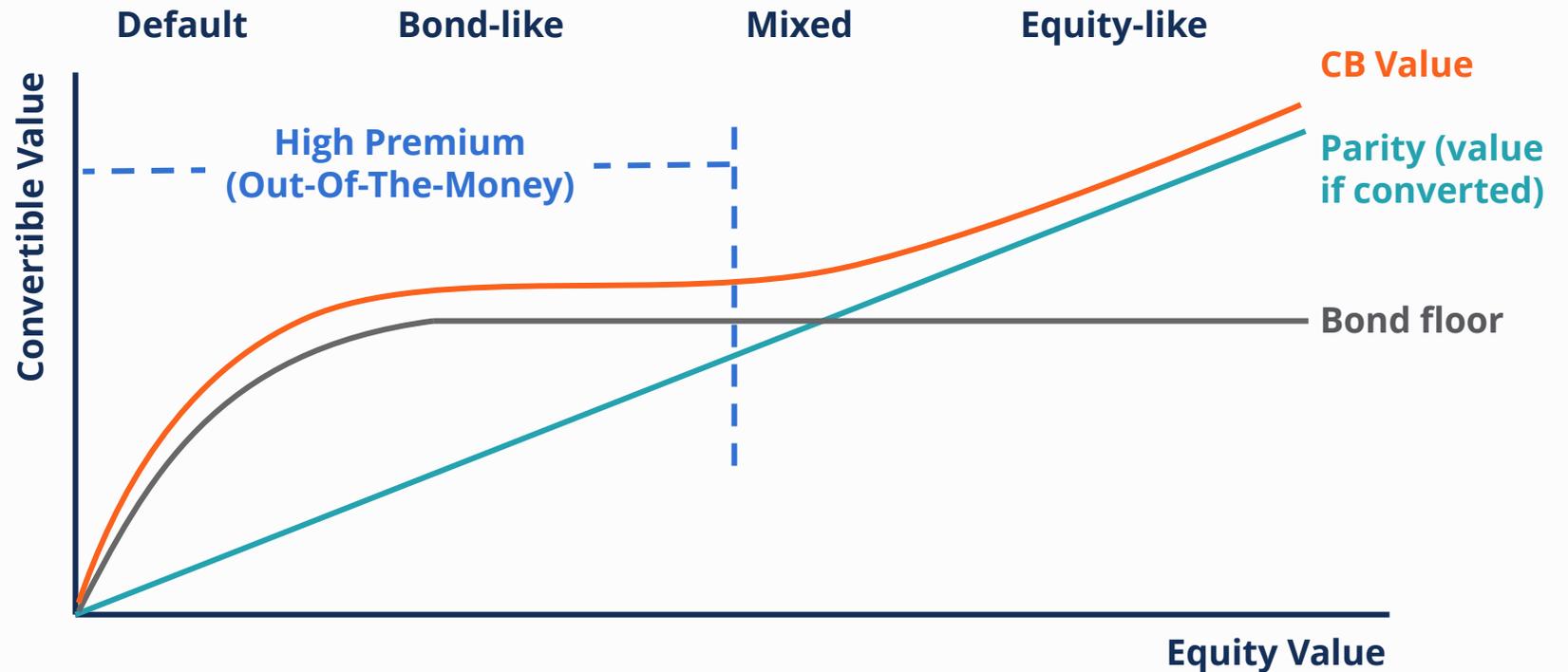
- Parity value is the main factor, but the CB is also sensitive to interest rates
- Usually where new issues come from
- Also referred to as “balanced”



# High Premium

CB investors have special terminology to describe each of the different scenarios of a CB given the premium.

- The underlying stock price falls significantly
- CB acts like a straight bond as long as the issuer doesn't default
- CB isn't sensitive to changes in the underlying stock price, but reacts to changes in yield
- Also referred to as "busted"



# CB Redemption

We have **redemption** when a convertible bond comes up for maturity and has not been converted.



**Mandatory Basis**

**Issuer Redeems the CB**



**Voluntary Basis**

**Investor Redeems the CB**

**Conversion:** CB is converted or exchanged into stocks.

**Redemption:** An option to receive the invested principle back in cash.

# CB Redemption

We have **redemption** when a convertible bond comes up for maturity and has not been converted.



## Mandatory Basis

### Issuer Redeems the CB

- **Call feature:** the issuer can redeem before maturity at a prespecified price.
- The call price will be high in the earlier years and decline towards par close to maturity.
- A sinking fund establishes a schedule of redemption at preset prices.



## Voluntary Basis

### Investor Redeems the CB

- **Put feature:** the investor can sell the bonds back to the issuer at a predetermined price.
- It is usually continuous with few restrictions for the investor.
- It is a very uncommon feature outside of its use in a change of control scenario.

# Types of CBs

---

**Adjustable Rate  
Convertibles**

**Convertible  
Preferred Stock**

**Convertible Stock  
Notes**

**Exchangeable  
Convertibles**

**Exchangeable  
Convertible  
Preferred**

**Mandatory  
Convertible  
Securities (MCS)**

**Puttable  
Convertible Bonds**

**Zero-Coupon  
Convertible Bonds**

# Types of CBs

## Adjustable Rate Convertibles

- May have an interest rate or dividend that is adjusted periodically
- Usually have floors and ceilings, which limit their adjustments

## Convertible Preferred Stock

- Pays a fixed dividend and is convertible into the underlying common stock
- The dividend can be deferred at request without triggering default
- Ranks above common stock in dividend priority and is treated like equity

## Convertible Stock Notes

- Referred to as Pay-In-Kind (PIK)
- Issuer can pay the interest and principal in either cash or stock

## Exchangeable Convertibles

- Issued by one company with the shares of another company as the underlying
- Issuer can receive the stock sale proceeds while deferring capital gains

# Types of CBs

## Exchangeable Convertible Preferred

- Lets the issuer exchange its convertible preferred bonds for a convertible bond
- Gives issuer flexibility by substituting a non-tax-deductible item for one that is

## Mandatory Convertible Securities (MCS)

- Converted into a fixed amount of equity at maturity
- Should be considered yield-enhanced common stock
- Limited downside protection other than their higher yield

## Puttable Convertible Bonds

- Permits the holder to sell the bond back at par or premium above par prior to maturity
- Includes the put to shorten the maturity and raise the investment value
- Offers downside protection

## Zero-Coupon Convertible Bonds

- Pays no coupon and is issued at a deep discount to par
- Positive YTM and accretes towards par over its life
- Usually issued with low conversion premiums

# The CB Market



- Over **4,850** individual CBs
- **Minimum** outstanding of ~ \$10MM USD equivalent.
- **Total market** ~ \$745Bn USD

## Data from Bloomberg Terminal as of March 2020



- #1: EUR** (~46%)
  - #2: USD** (~35%)
  - #3: RMB** (growing rapidly)
- Issued in every major market



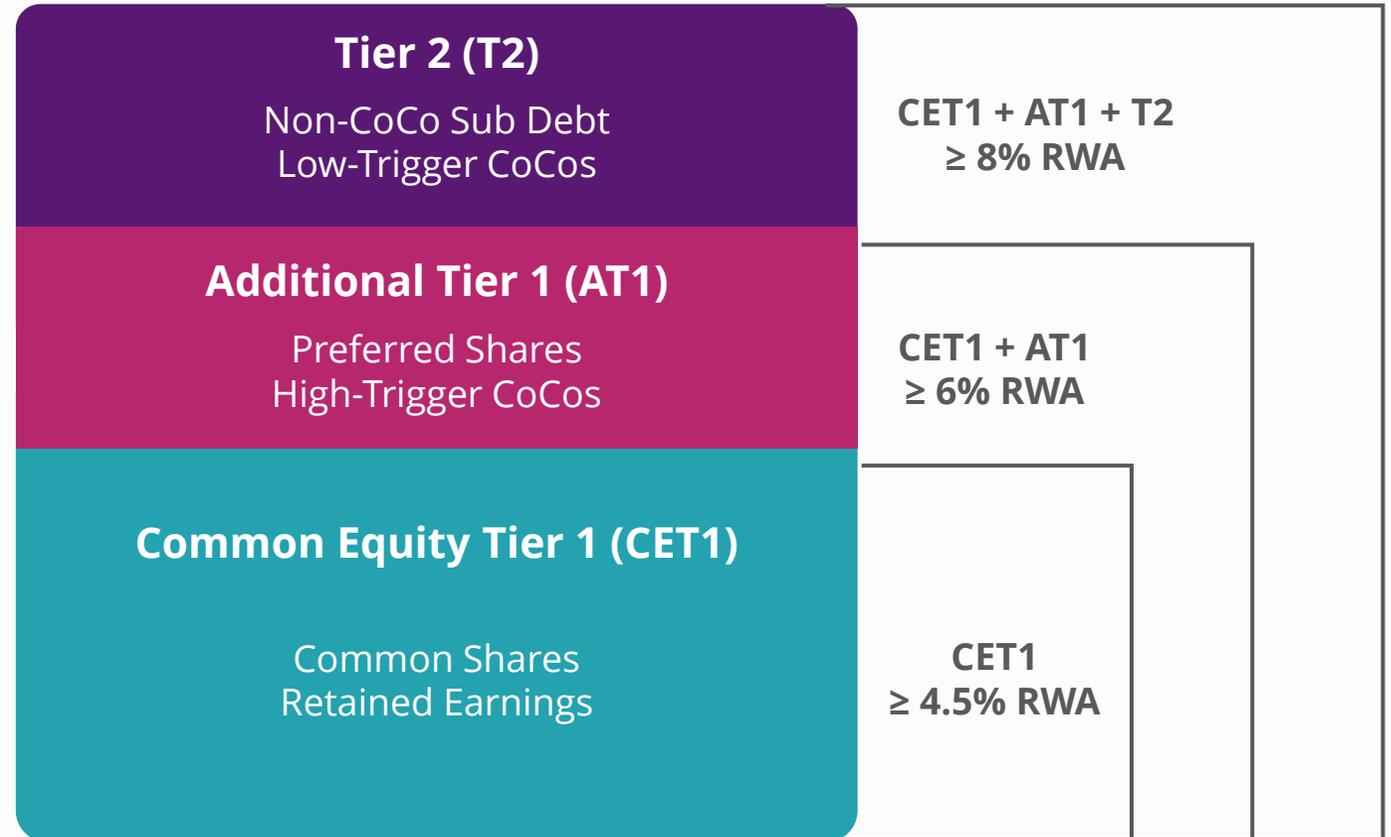
- **Average** issue size worth ~\$150MM USD
- **Largest** issues are ~\$3Bn USD

# Bank Capital

Banks must issue **CoCos (contingent convertibles)** as part of the Basel III requirements by the BIS (Bank for International Settlements).

Based on the sum of the risky assets on a bank's balance sheet, the BIS has enacted guidelines for banks to follow.

CoCos absorb losses so that the losses will not have to be borne by depositors.



## CoCo

**01**

CoCo bonds are a hybrid capital security.

**02**

CoCo bonds absorb losses when the issuing bank's capital falls below a certain level.

**03**

Converted into common equity (CE-type bonds) or principal written-down (PWD-type bonds).

**04**

Triggers occur if the issuing bank's capital falls below a pre-determined fraction of its risky assets.

# CB Benefits

Why would a company choose to issue convertible bonds?

These are some of the **key advantages of issuing CBs** for a corporate issuer.



## Low Cost of Borrowing

- Subordinated to an issuer's senior debt
- The cost of borrowing CB is lower
- Investors accept a lower yield-to-maturity (YTM) for the potential equity upside



## Covenants

- Typically less restrictive covenants relative to high yield bonds
- Investors are willing to pay for the privilege of speculating on equity price appreciation



## Share Price

- A firm may be able to sell common stock at a better price through a CB
- Less dilutive to earnings-per-share (EPS) in the short term

# Who Issues CBs and Why?

Globally, there is significant interest for companies to issue CBs. However, a company needs to have stock outstanding to issue convertible bonds.

Sovereign, agency, or government issuers will not issue convertible bonds.



## Growth Companies

- A conversion price higher than common share price
- Less stringent covenants
- Strengthen the company's balance sheet



## Mature Companies

- More favorable terms
- Higher premium cheaper to their stock price
- Cheaper financing than straight bonds or loans
- Tax benefit



## Declining/ Turnaround Companies

- Issue an exchangeable bond using the shares from the asset buyer
- Generate cash upfront and defer the tax on the sale of the shares



## Banks

- Issue CoCos to bolster their balance sheets
- Issue exchangeable bonds as part of their structured product business and sell them to the high-net-worth clients

# CB Investors

Since CBs can be viewed as hybrid securities, the investors that look at convertible bonds are also diverse.

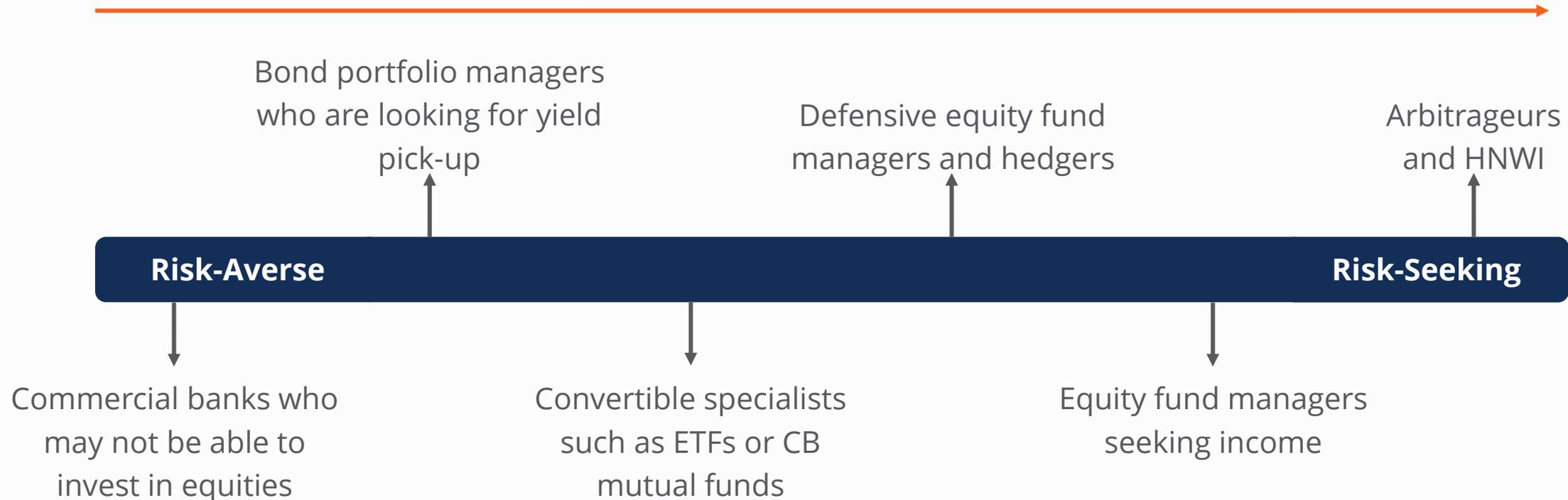
## Risk-averse investors:

look at CBs as a yield enhancer

## Risk-loving investors:

look at the highest yielding distressed CBs

Increasing Risk



# Why Buy CBs?

There are multiple reasons to consider convertible bonds as an investment.

## Equity Alternative

- Equity upside: provides returns closer to equity
- Bond downside: provides protection

## Fixed-Income Alternative

- Participate in the upside for equities
- Try to outperform the index by purchasing CBs

## Diversification

- Have exposure to names that don't issue straight bonds
- Return diversification

## Arbitrage & Hedging

- CBs have characteristics of both
- Sell them separately to take advantage of mispricing

## Currency Play

- Buy credits in certain currencies without having to hedge the FX exposure
- Buy CBs that convert or exchange into foreign equity markets

# CB Key Risks

A CB can be thought of as a bond plus an equity call option. The risks in investing in CBs would be like investing in both fixed-income and equities.



## Bond Value

- Creditworthiness (liquidity, leverage, debt service, asset cover, profitability)
- Yield-to-maturity or redemption
- Duration and convexity



## Option Value

- Stock price movement
- Time left on the option
- Dividend of the underlying stock
- Risk-free rate
- Market movements

# CB Structural Risks

Structural risks make it difficult for investors to compare one CB to another.

## Forced Conversion

- The issuer may force conversion if rates fall significantly or the underlying security price exceeds the conversion price

## Call Protection

- **Hard call protection:** prevent the issuer from calling the bond for a set period of time
- **Soft call protection:** prevent the issuer from calling the bond until the stock price rises to a certain percentage above the conversion price

## Clean Up Calls

- Issuer may redeem the remaining CBs if a large percentage have been converted
- Sweep-up-call

## Guaranteed Conversion

- CB holder gets stock at maturity guaranteed
- Low downside protection (more equity-like)

## Screw Clause & Other Structures

- Upon conversion the CB holder may not receive accrued interest (e.g. conversion rights may expire before interest is paid)

# How Are CBs Issued?

**Most bond offerings are sold privately** under SEC's rule 144a; thus, they are made via qualified and accredited investors.

**01**

Investment bankers work with equity capital markets (ECM) to discuss the specifics of the CB issuance.

Bring in help from debt capital markets (DCM) if needed.



**02**

The leads start conducting the due diligence to prevent misrepresentation or fraud.



**03**

The leads arrange for a bond prospectus to be put together.

Rating agencies are engaged to start their rating process.

**04**

Large investors may be provided with price talk and if they want to participate, they may leave indications of interest (IOIs).



# How Are CBs Issued?

**05**

Issuer's management team goes on a road show to pitch the transaction.  
They may educate sales staff at the teach-ins.



**06**

Once the leaders are satisfied with the demand, bond terms are finalized and books are open for investors to leave orders.  
Books may stay open for a few hours up to a few days.



**07**

The books are closed and the deal is priced.  
Price talk may be refined or tightened with demand.



**08**

The bonds are free to trade in a day or two.  
Market makers may begin to buy and sell the bonds in the secondary market

# How Are CBs Issued?



CB leads are well-compensated for their efforts.

- CB deal: 3% to 5%
- High-grade deal: 10 to 50 basis points



Investors like to invest in CBs via primary issuance. It allows for price appreciation in the secondary market once the deal breaks.



New issues also offer good investors a larger allocation for supporting the transaction.



When a new issue is free to trade, there tends to be a pop in prices, as under-allocated investors look to buy more in the secondary market.



# The Math of Convertible Bonds

# Analyzing CBs Example

$$\text{Parity} = \text{Conversion Ratio} \times \text{Current Share Price}$$

$$\text{Premium} = \text{CB Price} - \text{Parity Value}$$

$$\text{Conversion Ratio} = \frac{\text{Bond Denomination}}{\text{Conversion Price}}$$

# Analyzing CBs Example

CFI Education issued a \$1Bn USD 5-year convertible bond.

- **Bond Denomination (Face Amount):** \$1,000
- **Annual Coupon:** 4% (\$40 per year)
- **Conversion Price:** \$250 per share
- **Current Stock Price:** \$200 per share
- **Current Market Price of the CB:** \$1,060 (106 bond points)
- **Present Yields:** 8%
- **Dividend Yields:** 1% (1% x \$200 = \$2 per share)



# Analyzing CBs – Conversion Price and Conversion Ratio

## Conversion Price

- The price that the CB converts at
- Set at the time when the CB is first issued
- Based on investor feedback at that time

**Conversion Price = \$250**

Above the current stock price of \$200

## Conversion Ratio

- The number of shares the convertible exchanges into (per bond)

$$\begin{aligned}\text{Conversion Ratio} &= \frac{\text{Bond Denomination}}{\text{Conversion Price}} \\ &= \frac{\$1,000}{\$250} \\ &= \mathbf{4 \text{ shares}}\end{aligned}$$

# Analyzing CBs – Parity and Conversion Premium

## Parity

**Conversion Ratio** x **Current Share Price**



The pre-determined number of shares for which the CB may be converted

$$\text{Parity} = \$4 \times \$200 = \mathbf{\$800}$$

The holder would be unlikely to convert the bond into shares at this time ( $\$800 < \$1000$ )

## Conversion Premium

**Market Price of the CB – Parity**  
**Parity**

$$\begin{aligned}\text{Conversion Premium} &= \frac{\$1060 - \$800}{\$800} \\ &= \mathbf{32.5\%}\end{aligned}$$

The investors are willing to pay a 32.5% premium in order to have the bond features available.

- Low premium: in-the-money
- Medium premium: at-the-money
- High premium: out-of-the-money

# Analyzing CBs - Investment Value

## Investment Value

- The price of the CB as if it were a straight bond
- Used if the underlying stock price falls far below the conversion price

$$PV = FV \times \frac{1}{(1 + i)^n}$$

$$PV1 = \$40 \times \frac{1}{(1 + 8\%)^1}$$

$$PV2 = \$40 \times \frac{1}{(1 + 8\%)^2}$$

$$PV3 = \$40 \times \frac{1}{(1 + 8\%)^3}$$

$$PV4 = \$40 \times \frac{1}{(1 + 8\%)^4}$$

$$PV5 = \$1040 \times \frac{1}{(1 + 8\%)^5}$$

Total PV = \$840.29

# Analyzing CBs – Investment Premium

## Investment Premium

The percentage that the buyer must pay beyond the value of the straight bond to have the privilege of being able to convert

Market Price of the CB – Investment Value  
**Investment Value**

$$\begin{aligned}\text{Investment Premium} &= \frac{\$1,060 - \$840.29}{\$840.29} \\ &= \mathbf{26.1\%}\end{aligned}$$



# Analyzing CBs – Current Yield and Yield Advantage

$$\text{Current Yield} = \frac{\text{Annual Dollar Coupon Amount}}{\text{Market Price of the CB}}$$

**Yields** are the potential return for holding a bond

- Interest payments
- Coupons
- Capital gains or losses
- Principal repayments or buy backs
- Income from reinvesting the coupons

$$\text{Current Yield} = \frac{\$40}{\$1,060} = 3.77\%$$

**Yield Advantage**

**Current Yield – Dividend Yield**

$$\begin{aligned}\text{Yield Advantage} &= 3.77\% - 1\% \\ &= 2.77\%\end{aligned}$$

# Analyzing CBs – Break-Even Period

## Break-Even Period

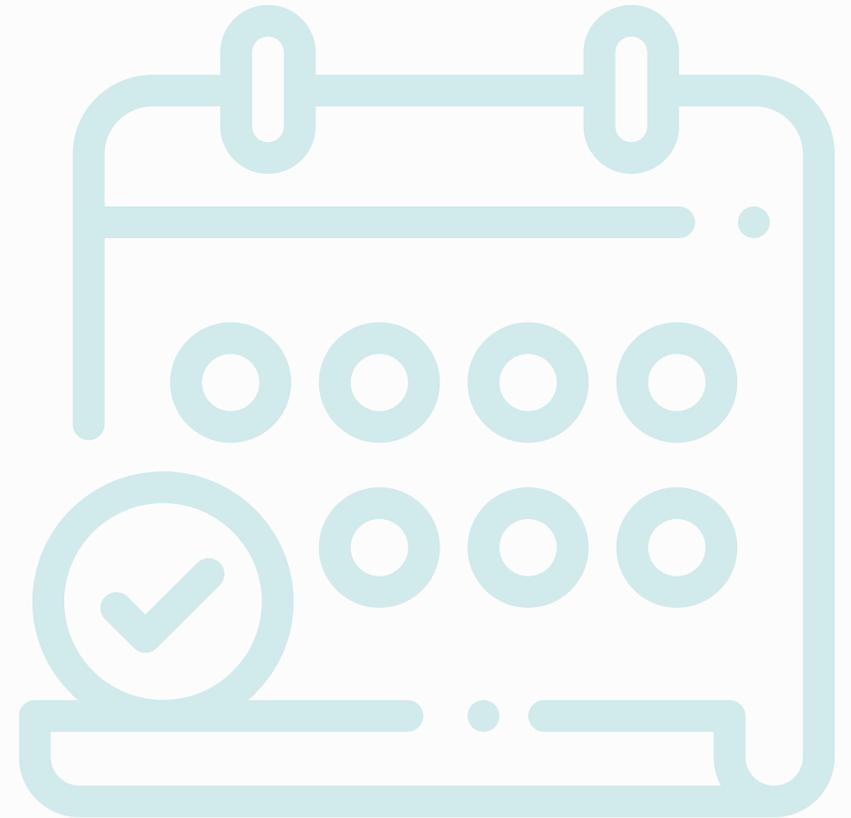
- How long it would take for a particular CB to be held in order to recapture the conversion premium

$$\text{Breakeven Period} = \frac{\text{Conversion Premium}}{\text{Yield Advantage}}$$

$$= \frac{32.5\%}{2.77\%}$$

$$= \mathbf{11.7 \text{ years}}$$

The CB is five years in total maturity, so this break-even period indicates that the CB is trading quite rich.



# Analyzing CBs – Break-Even Cash Flow

## Break-Even Cash Flow

- A more advanced payback analysis method

$$\text{Dollar Difference} = \text{Coupon Amount} - (\text{Conversion Ratio} \times \text{Dividend Amount})$$

$$= \$40 - (4 \times \$2) = \$32$$

The excess cash we get for holding the CB versus holding the shares for a year.

$$\text{Breakeven Cash Flow} = \frac{\text{Market Price} - \text{Parity Value}}{\text{Dollar Difference}}$$

$$= \frac{\$1,060 - \$800}{\$32} = 8.125 \text{ years}$$

It would take 8.125 years to recoup the premium paid for the CB based on the cash difference of \$32 a year.

# Real Market Examples

## CONVERTIBLE MARKET STATISTICS

	10/31/19 ICE BOFAML ALL U.S. CONV. INDEX (VXA0)	9/30/19 ICE BOFAML ALL U.S. CONV. INDEX (VXA0)
--	--	---

Average Current Yield	2.5%	2.5%
Average Conversion Premium	34.0%	35.4%
Average Investment Premium	31.1%	33.0%
Average Quality Rating	BB2	BB2

## NEW ISSUES STATISTICS

	10/31/19 ICE BOFAML ALL U.S. CONV. INDEX - NEW ISSUES (VNEW)	9/30/19 ICE BOFAML ALL U.S. CONV. INDEX - NEW ISSUES (VNEW)
--	--	---

Average Current Yield	2.0%	2.0%
Average Conversion Premium	33.4%	33.2%
Average Investment Premium	32.3%	35.0%
Average Quality Rating	BB2	BB2

Source: BofA Merrill Lynch Global Research, ICE Data Indices, LLC; VXA0 Index, VNEW Index.



# Trading Strategies

# Bond Value and Price

---

## Bond Value

The discounted value of all future cash flows generated by the bond

## Technicals

## Fundamentals



## Market Value

The market price may not be the same as what a model predicts. It is up to the investor, trader, or speculator to determine whether a CB is underpriced, overpriced, or fairly priced.

# Bond Value Inputs

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Important inputs of pricing a straight bond will include:



**1. Issue Price**



**2. Coupon Payment**



**3. Maturity**



**4. Discount Rate**



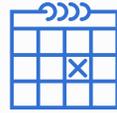
**5. Redemption Price**

# Option Value Inputs

Important inputs of pricing a CB stock option will include:



**1. Underlying Price**



**2. Expiration Date**



**3. Conversion  
Premium/Price**



**4. Call or Put**



**5. Exercise Features**



**6. Dividend Forecasts**



**7. Assumed Volatility**

# Option Value

**Option Value or Option Premium**

**Intrinsic Value**

**Actual price of the underlying security - strike price of the option**

**Extrinsic (Time) Value**

**Time to expiration**

**Volatility of underlying stock**

**Interest rates (opportunity cost)**

**Dividends**

# Intrinsic Value vs. Extrinsic (Time) Value



## Intrinsic Value

- Remains the same for an option as long as the underlying price doesn't move

VS



## Extrinsic (Time) Value

- Doesn't stay the same due to time decay
- Decreasingly valuable as the option approaches expiration
- The portion of an option's price that exceeds the intrinsic value

Even when the option is out-of-the-money and the intrinsic value is zero, it never gets negative.

Extrinsic value may still have value even when intrinsic value is zero, especially if the volatility of the underlying asset is high, as the option may swing back to being in-the-money.

# Implied Volatility

The inputs into valuing a CB option are all straightforward except for volatility. The reason is that volatility cannot be observed until after it happens.

## Implied Volatility

- Refer to prices of longer-dated option instruments in the future
- Use these market prices from those instruments
- Work backwards to derive volatilities that are closer to the present



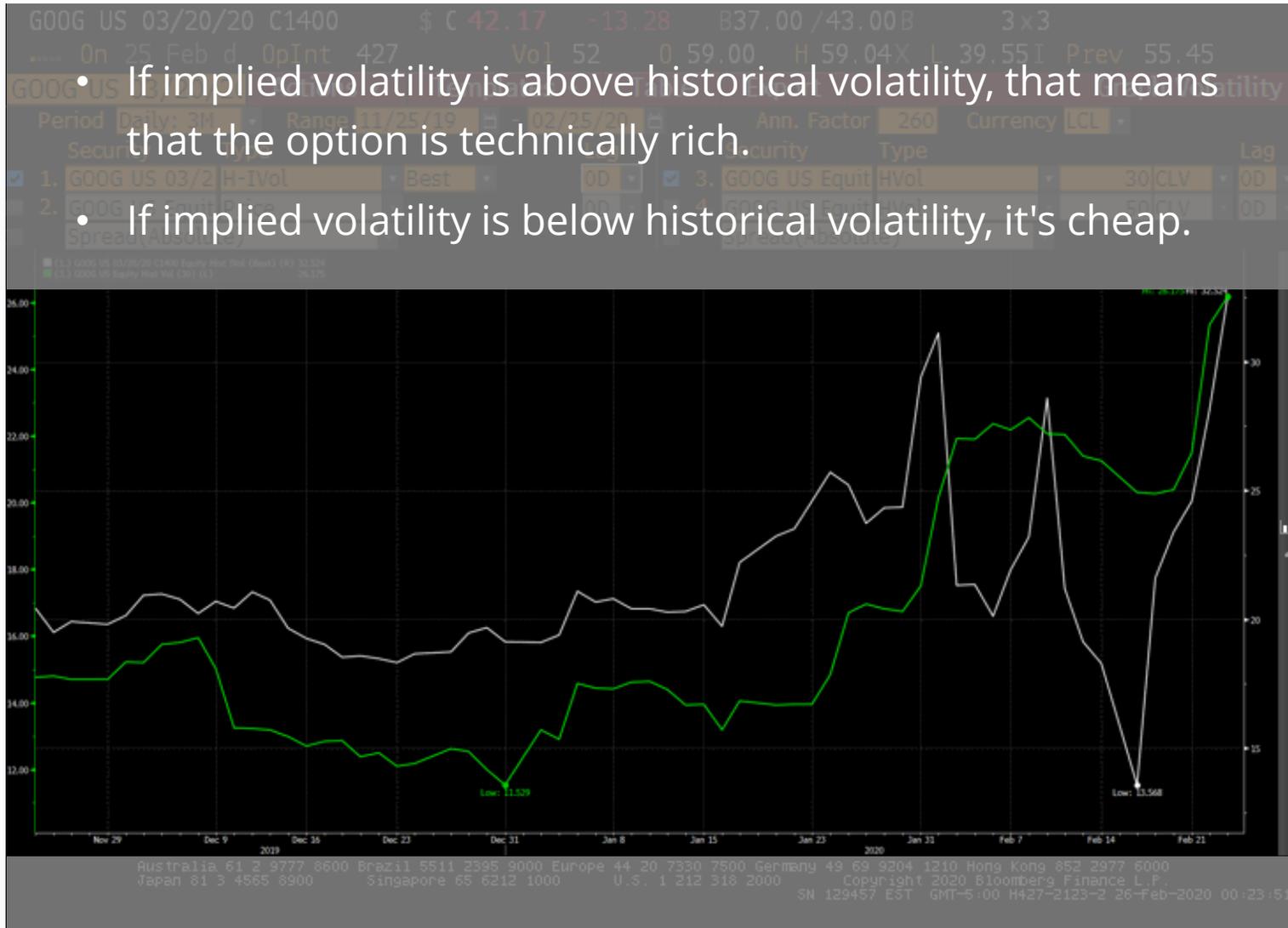
- Past volatility is not always a good predictor of future volatility
- Normally, market makers use implied volatility to price options

# Implied Volatility vs. Historical Volatility



# Implied Volatility vs. Historical Volatility

- If implied volatility is above historical volatility, that means that the option is technically rich.
- If implied volatility is below historical volatility, it's cheap.



# How Options Are Priced

Three main categories of modeling for valuing derivatives:

Black-Scholes

Binomial/ Trinomial

Monte Carlo

Varies in the way that the probability distribution for future stock prices are generated

Drivers (Increase)	Call	Put	Greek
Strike price	↑	↓	-
Underlying price	↑	↓	Delta & Gamma
Term	↑	↑	Theta
Volatility	↑	↑	Vega
Interest rate	↑	↓	Pho
Credit spread/ dividend	↓	↑	Omicron/Phi

# The Greeks of CBs

Drivers	Call	Put	Greek
Increase in underlying price	↑	↓	Delta & Gamma

$\Delta$  Delta

- Change in CFV per unit change in the underlying stock price

$\Gamma$  Gamma

- How quickly the Delta changes given a change in the underlying stock price

**CFV = Convertible Fair Value** (The market price of the CB)

# The Greeks of CBs

Drivers	Call	Put	Greek
Increase in term	↑	↑	Theta

⊖ Theta

- Change in CFV for a 1-day change in the number of days to expiry
- Also referred to as time decay

**CFV = Convertible Fair Value** (The market price of the CB)

# The Greeks of CBs

Drivers	Call	Put	Greek
Increase in volatility	↑	↑	Vega

## V Vega

- Change in CFV for a 1% change in the underlying stock's implied volatility
- Also referred to as "Tau"

**CFV = Convertible Fair Value** (The market price of the CB)

# The Greeks of CBs

Drivers	Call	Put	Greek
Increase in interest rate	↑	↓	Pho
Increase in credit spread	↓	↑	Omicron
Increase in dividend	↓	↑	Phi

$\rho$  Rho

- Change in CFV for a 10 basis points (bps) change in interest rates

$\omicron$  Omicron

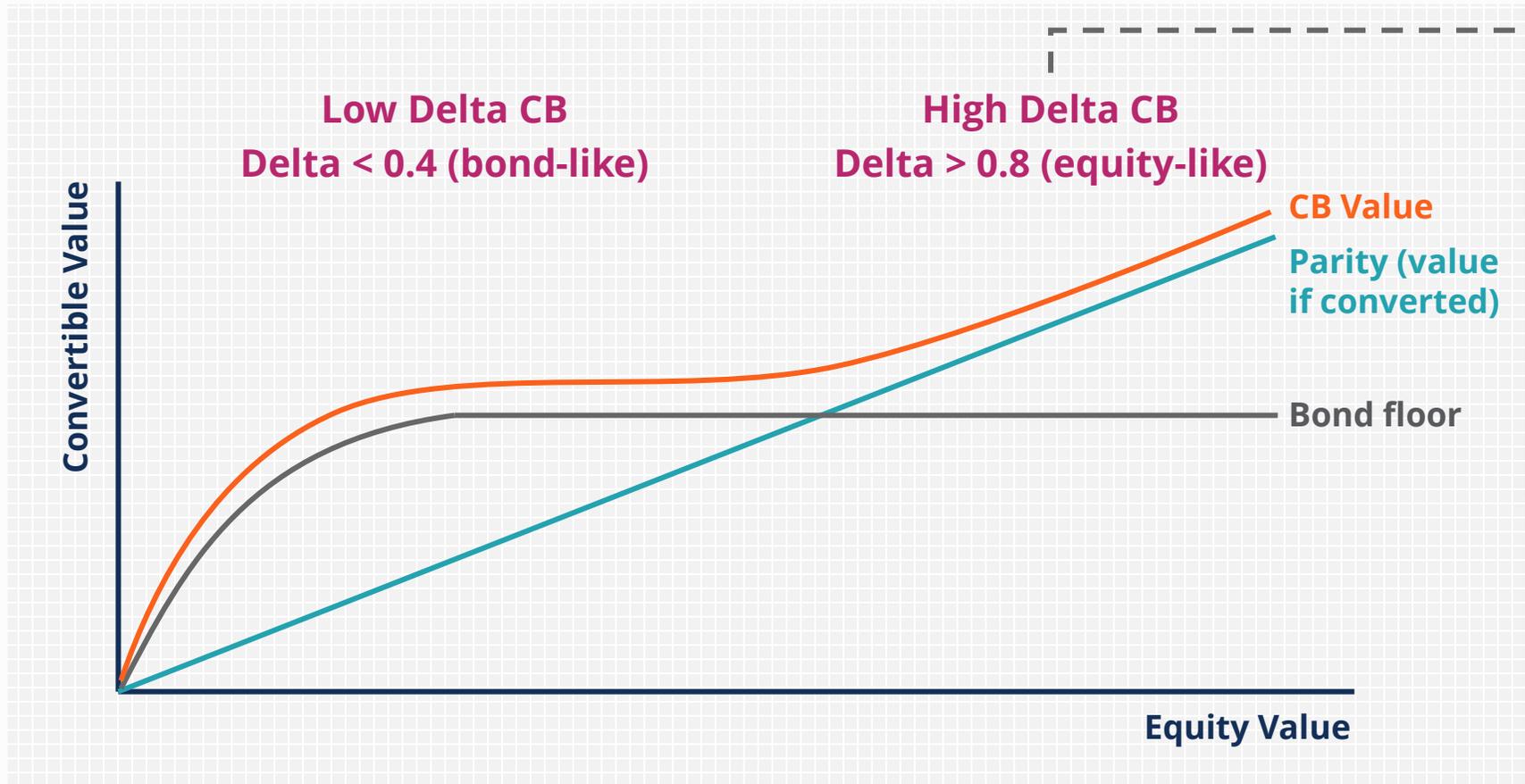
- Change in CFV for a 10 bps change in credit spread of the issuer

$\Phi$  Phi

- Change in CFV with respect to the underlying stock dividend yield

# An Example of Using a Greek

The reason for using Greeks is that this allows traders and investors to have a standardized short-hand to describe changes in the price of their option based on the variables.



A \$1 increase in the underlying stock price will mean at least an \$0.80 increase in the price of the CB.

# How to Value CBs

E

TSLA 2 05/15/24      91) Actions ▾      92) Settings ▾      Convertible Valuation

Bond ZS4501020      Stock TSLA US Equity

11) Pricing Analysis   12) Cash Tender   13) Historical Analysis   14) Scenario Analysis   15) Nuke/Hedge

21) Analysis   22) IR Curve   23) Credit Curve   24) Dividends   25) Volatility

Market Price   Spread (Credit)   Volatility   Stock Price   Borrow Cost

189.170   391.440   64.46   545.450   0.0 %

Flat 5 Year Spre...   Flat 2Y Implied

---

Trade Date   Settle Date   Model   E2C   Greeks based on

04/07/2020   04/09/2020   **Black-Scholes & Jump-Diffusion**

Fair Value	200.481	Bond Floor	90.751	IR Sens	-1.764	Yield to Mty	-13.541
Cheapness							N.A.
Implied Spread	751.789	Parity	178.049	Phi	N.A.	Yield to Put	N.A.
Implied Vol	50.203	Premium (%)	7.453	Chi	N.A.	Yield to Worst	-13.541
Delta (%)	89.042	Gamma	0.165	Upsilon	0.099	Current Yield	1.057
Delta (pts)	1.568	Vega	0.773	Convexity	0.066	Breakeven (Y)	6.560
Effective Trig	0%/0.000	Theta	0.007	Effective Dur	0.880	CF Payback (Y)	6.560
Unit Prc	2.005M	Exp Life (Fugi...	3.596			Accrued Int	0.800
Hedge Ratio	0.287						

Description

Bond CUR	USD	Conv Prc	309.8277	Issue Amt	1.84MMM	Next Call Date	None
Stock CUR	USD	Conv Ratio	3.2276	Amt Out	1.84MMM	Next Put Date	None
Stock Ticker	TSLA US	Proj Conv Ratio	3.2276	Issue Date	05/07/19	Next Call Price	None
Cusip	88160RAG6	Init Prm (%)	27.50	Maturity	05/15/24	Next Put Price	None
Collateral	SR UNSECURED	Coupon	2% FIXED	Conv From	10/01/19	Prov Trig	None
Par Amount	1000.00	Cpn Freq	Semi-Annual	Conv Until	05/13/24	Prov Start	None

Australia 61 2 9777 8600   Brazil 5511 2395 9000   Europe 44 20 7330 7500   Germany 49 69 9204 1210   Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900   Singapore 65 6212 1000   U.S. 1 212 318 2000   Copyright 2020 Bloomberg Finance L.P.  
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Jump-diffusion model considers the likelihood of default of the issuer using credit default swaps, or credit spreads

# How to Value CBs

E

TSLA 2 05/15/24 91) Actions 92) Settings Convertible Valuation

Bond ZS4501020 Stock TSLA US Equity

11) Pricing Analysis 12) Cash Tender 13) Historical Analysis 14) Scenario Analysis 15) Nuke/Hedge

20) Analysis 21) IR Curve 22) Credit Curve 23) Dividends 24) Volatility

Market Price 189.170 Spread (Credit) 391.440 Volatility 64.46 Stock Price 545.450 Borrow Cost 0.0 %

Flat 5 Year Spre... Flat 2Y Implied

Trade Date 04/07/2020 Settle Date 04/09/2020 Model Jump Diffusion E2C 0.0 Greeks based on Spread & Vol

<b>Fair Value</b>	<b>200.481</b>	Bond Floor	90.751	IR Sens	-1.764	Yield to Mty	-13.541
Cheapness (%)	5.642	Option Value	109.730	Spread Sens	-3.671	Yield to Call	N.A.
Implied Spread	731.789	Parity	176.049	Phi	N.A.	Yield to Put	N.A.
Implied Vol	50.303	Premium (pts)	13.121	Psi	-2.455	Yield to Worst	-13.541
Delta (%)	89.042	Premium (%)	7.453	Chi	N.A.	Current Yield	1.057
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**Market Price** Spread (Credit) Volatility Stock Price Borrow Cost

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# How to Value CBs

E							
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Bond ZS4501020		Stock TSLA US Equity					
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20) Analysis		22) IR Curve		23) Credit Curve		24) Dividends	
25) Volatility		26) Nuke/Hedge					
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		Flat 5 Year Spre...		Flat 2Y Implied		Borrow Cost	0.0 %
Trade Date	04/07/2020	Settle Date	04/09/2020	Model	Jump Diffusion	E2C	0.0
						Greeks based on	Spread & Vol
Fair Value	200.481	Bond Floor	90.751	IR Sens	-1.764	Yield to Mty	-13.541
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# Trading CBs

How do we trade these convertible bonds?



- CBs trade differently to their investment-grade and even high-yield counterparts.
- High-yield bonds trade on swaps or cash price based on their credit. CBs have embedded equity options to consider.



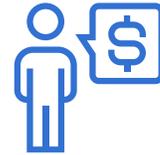
- Many investors prefer investing in new issues. This allows them to gain access to new issuers, new deals, cheaper levels, and larger allocations.
- These bonds also trade in the secondary market after the deal is free to trade.

# Trading CBs

CBs trade over-the-counter (OTC) between a market maker and a client.



Market makers may show a two-way price that gives the indication of how much they'd be willing to pay for a CB and how much they'd be willing to sell that same CB.



CB traders would use their salespeople to speak with the clients on buying or selling an issue. They also use inter-market brokers to help source or offload bonds.



The bid-ask or bid-offer spread in CBs tends to be much wider than investment-grade bonds and varies from issue to issue.



CBs are normally considered an equity product, so most institutional investors would have dedicated salespeople for CBs.

# Trading CBs

The Bloomberg runs screen RUNZ in the way that CB traders and salespeople will be able to broadcast what they're looking to do.

TSLA 2 05/15/24 \$↑179.675 +.000 Yld N.A.  
 As of 07 Apr Vol 1.0MM Source TRMT

TSLA 2 05/15/24 Corp Settings All Quotes

20:14:36 ALLX Mode Overlay Axes Split Bid/Offer 94 Switch 99 Buy 96 Sell

Spreads vs T 0 03/31/25 @ CBBT 100-08 100-08+ .448 / .446 20:14

Edit Filters Venue BGM Legend

PCS	Firm Name	Bid Px / Ask Px	Bid Yld / Ask Yld	BSz(M) x ASz(M)	Time
20)	TRAC FINRA - TRACE	188.500 Last Trd	-13.458 Last Trd	26 Last Trd	d04/07
21)	BVAL BVAL (Score: 8)	188.544 / 188.995	-13.464 / -13.519	x	16:00
22)	Last Trade	179.675	-12.337	1000	d12:25
23)	SSMB CITIGROUP NEW YORK	188.17 / 189.17	-13.418 / -13.541	x	20:12
24)	BGN BLOOMBERG GENERIC	188.568 / 189.168	-13.467 / -13.541	x	17:00
25)	TRST FINRA TRACE (<=1MM)	188.500 Last Trd	-13.458 Last Trd	26 Last Trd	d15:22
26)	EXCH EXCHANGE TRADED	188.500 / Last Trd	-13.458 / Last Trd	x Last Trd	d04/07
27)	EDFA ED&F MAN	165.000 / 190.033	-10.326 / -13.647	389 x 345	04/07
28)	TRCM FINRA TRAC 1MM+/5MM+	179.675 Last Trd	-12.337 Last Trd	1000+ Last Trd	d04/07
29)	TRL1 FINRA TRACE (>=1MM)	179.675 Last Trd	-12.337 Last Trd	1000+ Last Trd	d04/07
30)	TRMT FINRA TRACE (>=250M)	179.675 Last Trd	-12.337 Last Trd	1000+ Last Trd	d04/07
31)	TRMB FINRA TRACE (>=500M)	179.675 Last Trd	-12.337 Last Trd	1000+ Last Trd	d04/07

# Trading CBs

The Bloomberg runs screen RUNZ in the way that CB traders and salespeople will be able to broadcast what they're looking to do.

JPM 0 1/8 01/01/23		\$ ↑ 103.631	+ .069	103.107 / 104.156	-1.000 / -1.371
		At 11:15		-- x --	Source BVAL
JPM 0 1/8 01/01/23 Corp		Settings		All Quotes	
12:59:11	ALLX Mode	Overlay Axes	Split Bid/Offer	94 Switch	99 Buy 98 Sell
Spreads vs	T 0 1/2 03/15/23	@ CBBT	100-16 / 100-17 <sup>a</sup>	.329 / .310	12:59
Edit Filters	Venue	BGM			Legend
PCS	Firm Name	Bid Px / Ask Px	Bid Spd / Ask Spd	BSz(M) x ASz(M)	Time ↓
20)	TRAC FINRA - TRACE	104.150 Last Trd	-173.3 Last Trd	180 Last Trd	d04/07
21)	BVAL BVAL (Score: 7)	103.107 / 104.156	-132.9 / -168.4	x	11:15
22)	Last Trade	104.150	-173.3	180	04/07
23)	SSMB CITIGROUP NEW YORK	102.79 / 104.79	-121.5 / -190.5	x	07:55
24)	EXCH EXCHANGE TRADED	104.150 / Last Trd	-169.2 /	x Last Trd	d04/07
25)	TRST FINRA TRACE (<=1MM)	104.150 Last Trd	-173.3 Last Trd	180 Last Trd	d04/07
26)	TRMT FINRA TRACE (>=250M)	103.405 Last Trd	-143.7 Last Trd	790 Last Trd	d04/06
27)	TRMB FINRA TRACE (>=500M)	103.405 Last Trd	-143.7 Last Trd	790 Last Trd	d04/06
28)	TRCM FINRA TRAC 1MM+/5MM+	101.764 Last Trd	Last Trd	1000+ Last Trd	d04/03
29)	TRL1 FINRA TRACE (>=1MM)	101.764 Last Trd	-77.6 Last Trd	1000+ Last Trd	d04/03

# Trading CBs

The Bloomberg runs screen RUNZ in the way that CB traders and salespeople will be able to broadcast what they're looking to do.

CCL 5 ¾ 04/01/23 \$ **↑131.119** +15.079 -432.6 bp vs  
 As of 07 Apr Vol 157.0MM Source TRMT

CCL 5 ¾ 04/01/23 Corp Settings All Quotes

12:57:41 ALLX Mode Overlay Axes Split Bid/Offer 94 Switch 95 Buy 96 Sell

Spreads vs T 0 ¾ 03/15/23 @ CBBT 100-16 / 100-17¾ .329 / .310 12:57

Edit Filters Venue BGM Legend

PCS	Firm Name	Bid Px / Ask Px	Bid Spd / Ask Spd	BSz(M) x ASz(M)	Time↓
20)	TRAC FINRA - TRACE	131.119 Last Trd	-432.6 Last Trd	1000 Last Trd	d04/07
21)	BVAL BVAL (Score: 8)	132.722 / 133.272	-477.4 / -490.0	x	11:15
22)	Last Trade	131.119	-432.6	5000	04/07
23)	EDFA ED&F MAN	126.750 / 135.250	-315.8 / -541.3	500 x 500	02:51
24)	EXCH EXCHANGE TRADED	131.119 / Last Trd	-431.6 /	x Last Trd	d04/07
25)	TRWD Tradeweb APA PostTrd	108.287 / Last Trd	250.3 /	.1 x Last Trd	d4/06
26)	TRL1 FINRA TRACE (>=1MM)	131.119 Last Trd	-432.6 Last Trd	1000 Last Trd	d04/07
27)	TRMT FINRA TRACE (>=250M)	131.119 Last Trd	-432.6 Last Trd	1000 Last Trd	d04/07
28)	TRL5 FINRA TRACE (>5MM)	131.119 Last Trd	-432.6 Last Trd	5000 Last Trd	d04/07
29)	TRMB FINRA TRACE (>=500M)	131.119 Last Trd	-432.6 Last Trd	5000 Last Trd	d04/07
30)	TRST FINRA TRACE (<=1MM)	126.262 Last Trd	-300.8 Last Trd	500 Last Trd	d04/07
31)	TRCM FINRA TRAC 1MM+/5MM+	125.735 Last Trd	Last Trd	5000+ Last Trd	d04/07
32)	BADT BBG APA Post-Trade	101.700 / Last Trd	480.0 /	x Last Trd	d4/03

# Trading CBs



Liquidity in CBs will not be as good given the market is much smaller.

- CB: \$750Bn
- High-yield: \$1.2Trn
- Investment-grade: \$7Trn



Many CBs are called away before they actually mature, which has the effect of reducing liquidity in any given bond.



Many CBs are bought for hedging and arbitrage purposes, these bonds don't trade as often since they're locked up in structure trades.

# CB Indexes

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An index is a basket of representative financial instruments. They can be as broad as a global aggregate index with thousands of securities down to very small subsets.

Indexes are looked after primarily either by or in conjunction with a global investment bank.



# CB Indexes

---

The purpose of indexes is generally the following:

## Performance Target

- Fund managers can be benchmarked against the index that's similar or consistent with their investment mandate.
- The fund manager's performance will be directly tied to their relative performance to these indexes.

## Informational Measures For the Asset Class

- Indexes give investors a quick and easy way of measuring the risk and return of an asset class.
- They can compare returns and use the data in developing, back testing, and evaluating their investment models and strategies.

## References for Index-Linked Products

- Exchange-traded funds (ETFs)
- Exchange-traded notes (ETNs)
- Other structured notes

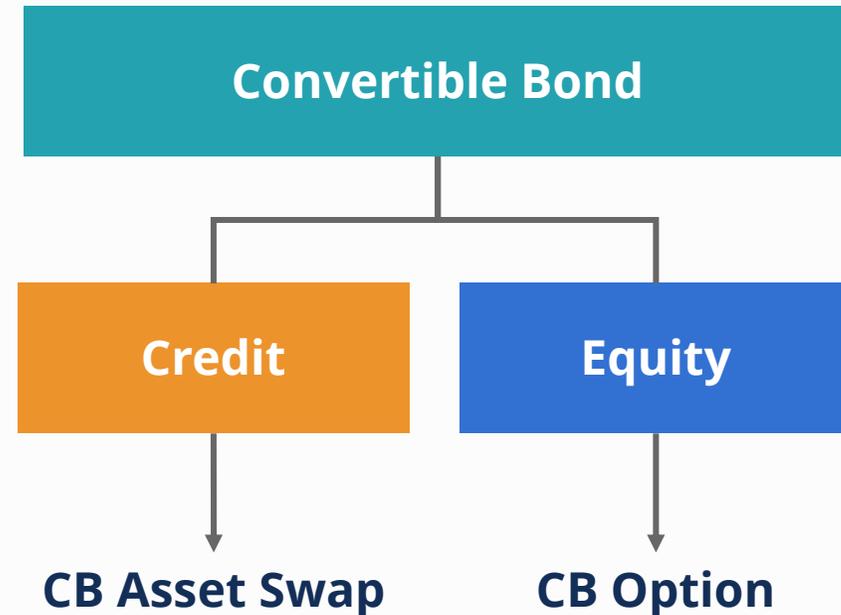
# CB Trading Strategy #1 – Asset Swap

Investors can profit by taking advantage of mispricing between convertible bonds and the **underlying cash bond, underlying equity,** and the **equity derivative.**

**Arbitrage:** riskless profit from mispricing in the market

## CB Asset Swaps

Arbitrage the preferences between fixed-income and equity investors



# CB Asset Swap Diagram

The CB asset swap has call dates so that if and when the CB option is exercised, the investment bank may also call away the CB asset swap to avoid positional risk.

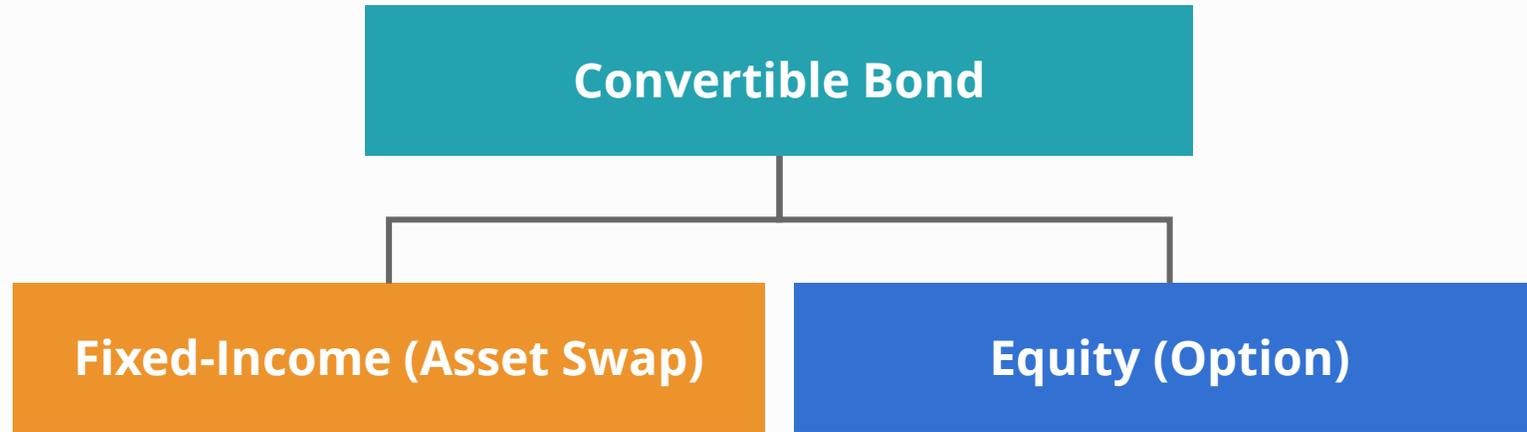
Owens the defaulted CB if the issuer defaults



- Sells the CB at par value
- Spreads over floating rate index (LIBOR) in exchange for the fixed-rate coupon

- Sells the CB option as an OTC derivative
- Gives a bit of the premium to the CB asset swap buyer

# CB Asset Swap



- Opportunity to buy a fixed-income exposure
- Receive more spread than a straight bond
- Reduce duration

- Opportunity to purchase the same equity call option
- Cheaper than the equity market or equity derivative market

## CB Trading Strategy #2 – Arbitrage

Because CBs offer efficient arbitrage mechanisms, there's much demand by hedge funds.

Hedge funds arbitrage the value of CBs in different ways depending on **where the CB is relative to its stock and bond valuations.**

### Low Premium (In-The-Money) Equity-Like – Butane

- Sell the stock and buy the CB with no net exposure to the share price
- Receive the coupon and the interest earned from the short stock position
- Pay the cost of borrowing the stock and the cost of dividends forgone
- Highly risky, such as increased dividends from the shorted stock, the CBs being called, or changes to the market

# CB Trading Strategy #3 – Arbitrage

Because CBs offer efficient arbitrage mechanisms, there's much demand by hedge funds.

Hedge funds arbitrage the value of CBs in different ways depending on **where the CB is relative to its stock and bond valuations.**

## Medium Premium (At-The-Money)

- Option-like features are at their maximum
- Volatility trade: buy the CB and sell the stock to create a delta neutral position
- The position needs to be actively managed by selling more stock when shares rise, and bought when shares fall (delta hedging)
- Profit from the carry (CB interest – dividends and stock borrow costs)
- Bigger profit comes from the cost in hedging and re-hedging the stock

# CB Trading Strategy #4 – Arbitrage

Because CBs offer efficient arbitrage mechanisms, there's much demand by hedge funds.

Hedge funds arbitrage the value of CBs in different ways depending on **where the CB is relative to its stock and bond valuations.**

## High Premium (Out-Of-The-Money) Bond-Like – Busted

- Bonds combined with out-of-the-money options, low delta
- Sell the bonds as the CB falls to the valley region
- The optionality is small but any significant rise in the stock will benefit the BC holders
- Requires intense credit analysis, as the company may default