Mechanics of Convertible Bonds

Presented by Rahul Bhattacharyya

2004
Introduction

Mechanics of Convertible Bonds - An Overview
Rahul Bhattacharya will demystify the workings of convertible bonds and give you the toolkit to analyze a convertible bond in simple steps. This course will outline the basic mechanics of a convertible bond and its synthesis from equity; the need to issue convertible bonds from an issuer's point of view and the need to buy a convertible bond from an investor's point of view. The course will try to bring out the nuances of convertible bonds and their impact on equity markets, the different types of such bonds and the strategies that should be employed to trade them and invest in them. The course will cover the following points:

- The structure of a convertible bond and its synthesis from equity;
- The sensitivities of a convertible bonds - delta, gamma, etc.
- The pricing of a convertible bond;
- The impact of convertible bond on the equity market in general and the underlying equity in particular;
- The need to issue convertible bond by issuers;
- How to trade and invest in convertible bonds;

Course instructor
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A convertible bond is a derivative product combining a standard corporate bond with an option (to buy the underlying equity of the company).

The convertible feature allows the holder of the bond to convert the bond into a predetermined number of shares of common stock (known as the conversion ratio).

A convertible bond is sensitive to the interest rate (corporate yield curve), the spread over the treasury rate as well as the volatility of the underlying equity.
A CB must be worth at least the value of the non-convertible bond of similar characteristics, as the holder need not convert (he will then receive the coupons and the Principal back); However, the CB is worth more than this as the holder has the chance of participating from the share price movement);

The CB is also worth at least the value of the shares into which it converts (parity) as the holder can always exercise and take shares;

However, generally, a CB would be worth more as the CB is likely to give the holder of the bond a pick up in yield (normally, the coupon on the CB is higher than the dividend on the shares).
Callable CB: A callable CB allows an issuer to buy back the bond some time prior to the maturity at a pre-determined price. A “soft call” means that the issuer can only call the bond if the price of the underlying stock is above the strike price by at least a certain percentage;

Puttable CB: A puttable CB means that the investor can sell the CB back to the issuer within a certain timeframe before the maturity of the CB at a certain price; a put option raises the value of the CB;

Resettable CB: If the strike price is resettable, CB investors can gain additional exposure to the equity component; if the price of the underlying stock falls, the parity value of the CB falls as well and therefore by resetting the strike price, or raising the conversion ratio, the CB’s parity value increases. (Example: CBs issued by Japanese corporations in the mid-90s; these can be analyzed by path dependent options)
Companies: Why Issue a CB?

- CB raises the effective price of the share, so it is sold at a premium to current price;
- Reduces dilution;
- Less impact on the current share price than share issue;
- To make asset attractive to the market;
- Less impact on P & L statement;
- Lower coupon versus straight bond;
Investors: Why they Need to Buy CB?

- A CB offers lower risk;
- It has a built in protection in a risky market;
- A CB has a higher running yield than a share dividend;
Traders (Hedge Fund Managers): Why do they Need to Trade CBs?

- Primarily to trade Volatility; traders and hedge fund managers can go long volatility by doing a delta neutral hedge (buy a CB and simultaneously sell the underlying stock at the current delta); alternatively, they can short the Volatility buying doing the reverse;

- The convexity in the convertible price track offers traders the ability to capture gamma with minimal risk; this could be a very profitable strategy if done for a directional bias and the traders forecast comes true;

- To make other bets in the market using more sophisticated (and quantitative model based) strategies, such as Convertible Asset swaps, covered CB call option hedge, convergence hedges, etc.
The stock of a company, CBZ, trades at $110. The company has an outstanding 8% CB due on 1/1/05 (CBZ 8% - 1/1/05). The CBZ convertible is exercised into 300 shares of CBZ stock per 1000 nominal. The shares pay an annual dividend of $9.00 (gross) and the current value of the share is $270.

How much extra would an investor pay if he buys the CB of CBZ?

And why would he pay the extra premium?
Yield Pick-up: The convertible pays a running yield of 7.3% (=$8/$110) whereas the shares yield 3.3%($9/$270); therefore the CB has a yield advantage over the shares of 4%.

Downside Protection: If the shares fall sharply the convertible will not fall as much, as the convertible holder has the choice as to whether to exercise or not, he can leave it as a bond if the shares have fallen sharply and redeem it later; therefore the CB must be worth at least as much as a straight bond with same characteristics:- in this example, a straight bond of ABC may yield 8% and hence a non-convertible (straight) 8% 2005 bond would trade at $100; even if the share price halves the CB should trade above $100 (this is the Investment Value)
Convertible Bond Pricing Model

\[ CB = IV + Call \]

\[ IV = \sum_{i=1}^{n} \left( \frac{C}{(1+i)^t} \right) + \frac{Par}{(1+i)^t} \]

\[ i = r + s \]

\[ Call = N(d_1)S e^{-q(T-t)} - e^{-r(T-t)} N(d_2) K \]

\[ d_1 = \frac{\ln(S/K) + (r - q + \sigma^2/2)(T-t)}{\sigma \sqrt{T-t}} \]

\[ d_2 = d_1 - \sigma \sqrt{T-t} \]
Conversion Ratio & Conversion Price

- The number of shares of common stock that the bondholder will receive from exercising the call option of a convertible bond is called the conversion ratio; further, the conversion privilege may extend for all or only some portion of the bond’s life, and the stated conversion ratio may change over time (it is always adjusted proportionately for stock splits and stock dividends).

- Suppose JBB Corp issued a convertible bond with a conversion ratio of 25.32 shares. The par value of the bonds is $1000. This means that for each $1000 of the par value of this issue the bondholder exchanges for JBB common stock, he will receive 25.32 shares;

\[
\text{Stated Conv Price} = \frac{\text{(Par Value of the CB)}}{\text{(Conv Ratio)}}
\]

\[
= \frac{1000}{25.32}
\]

\[
= 39.49
\]
Further suppose that the JBB convert has a maturity of 5 years, coupon of 6% per annum (payable annually) and that the current risk free rate is 2.5%; the CB has no dividend yield and the credit spread is zero;

- This will give the Investment Value (IV) of the CB as $1,162.60 (discounting for 5 years at the risk free rate of interest);

- The Strike Price, $K$ of the CB is therefore equal to $45.92 and is found out by:

$$ K = \frac{\text{(CB’s Investment Value)}}{\text{(Conversion Ratio)}} $$

$$ = \frac{1,162.60}{25.32} $$

$$ = 45.92 $$
### JBB Convert Pricing

(See Spreadsheet for details)

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<tr>
<th>Description</th>
<th>Value</th>
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<td>Coupon</td>
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<tr>
<td>Risk free</td>
<td>2.50%</td>
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<td>Spread</td>
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<td>R + S</td>
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**Bond (Investment) Value**  
$1,162.60

**Strike Price**  
$45.92

**Call Value**  
$6.87

**Convert Value**  
$1,169.47
Almost all CB issues are callable by the issuer;

Typically there is a non-call period from the time of issuance;

Some issues have a provisional call feature that allows the issuer to call the issue during the non-call period if the stock reaches a certain price;
Some hedge fund managers and traders value a CB as a combination of an issuer’s stock, with a relatively high yield, plus a European put option;

Instead of viewing a CB as a fixed income instrument with an embedded call option, because of its convertible feature one can think of it as a stock with a yield greater than its dividend;

The Investment Value can be looked upon as a put floor; the stock value is simply the conversion value (stock price multiplied by the conversion ratio) and the put value represents the fixed income value of the convertible.
Sony Corp has issued a zero-coupon CB with a par value of Yen 1 million, conversion ratio of 178.412 (a conversion price of Yen 5605) and it has a maturity of 4 years; the implied volatility of Sony stock is 26.43% (as of June 18, 2004) dividend yield of 0.63% and the one year JPY LIBOR is 2.43%.

- Using a zero-coupon valuation- at the JPY risk free rate - the Investment Value of the Bond is Yen 1,102,081;

- The conversion value – parity – of the stock is Yen 710,080 (using a spot price of Sony as Yen 3980);

- In the above example the strike price of the CB is Yen 6,177.16 (Yen 1,102,081/178.412);

- With this strike price the value of the put option (at 26.43% implied vol) is Yen 2072.18 and the CB’s embedded put has a value Yen 369,701.57 (using Black-Scholes model)

- Therefore the value of the CB is given by: CB = Parity + put value = Yen 1,079,782

- The above value is much closer the market value of the Convertible Bond of Sony (as of the closing of June 18, 2004) of Yen 1,095,000 than if we had calculated it using the IV plus call option method.
Binomial Tree for Convert Pricing

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## Black-Scholes Framework for Convert Valuation

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<th>Coversion ratio</th>
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<td>Coupon</td>
<td>10.25%</td>
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<td>R + S</td>
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<table>
<thead>
<tr>
<th></th>
<th>Bond (Investment) Value</th>
<th>Strike Price</th>
<th>Call Value</th>
<th>Convert Value</th>
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**Bond (Investment) Value**  
$1,227.30  

**Strike Price**  
$42.33  

**Call Value**  
$19.39  

**Convert Value**  
$1,246.68
Convertible Greeks

\[ \delta = e^{-q(T-t)} N(d_1) \]

\[ \gamma = \frac{N'(d_1)e^{-q(t-T)}}{S\sigma \sqrt{T-t}} \]

\[ \nu = S\sqrt{(T-t)} * N'(d_1)e^{-q(T-t)} \]

\[ \theta = \left\{ \frac{-SN'(d_1)\sigma e^{-q(T-t)}}{2\sqrt{T-t}} \right\} - rKe^{-r(T-t)}N(d_2) + qSN(d_1)e^{-q(T-t)} \]
\[ \rho = K(T - t)e^{-r(T-t)}N(d_2) \]

\[ o = \frac{\partial CB}{\partial (OAS)} \]

\[ \chi = \frac{\partial CB}{\partial (FX)} \]

\[ \text{upsilon} = \upsilon = \frac{\partial CB}{\partial (RR)} \]

\[ \phi = \frac{\partial CB}{\partial q} \]
The most bond like convertible is the zero coupon CB. The zero CB doesn’t pay any cash interest but it carries a series of (synthetic) accreting put options;

In effect the buyer has paid for a series of put options with the coupon streams that he has forgone;

The valuation of a zero CB must include a series of puts as well as series of calls that both the buyer and the issuer can claim as their right (the basic long stock plus long put model helps here);

The zero retains more bond like features at issue because the put option provides a bond floor that is close to the current value and this bond floor (put) accretes each year, helping to reduce the downside equity risk;
Mandatory Convertibles - PERCS

- Mandatories are the most equity-like of convertible issues (DECS, RERCS, etc.);

- The issues is preferred stock whose conversion into common equity is mandatory, usually in three years from the issuance;

- The mandatory convertible offers high dividend yields and a cap or a partial cap to upside equity participation (the PERCS security offers a high dividend yield but the upside participation with equity price moves is capped generally in the 40% to 80% range;

  \[ \text{PERCS} = \text{Long Stock} + \text{Short (OTM European) Call} + \text{Yield advantage} \]
DECS offer multiple options and offer a better risk-reward profile than PERCS;
DECS = Long Stock + short (ATM European) Call + Long (OTM European) Call + Yield advantage

The short European call option acts as a lower trigger and is usually struck at the current stock price at issue and has a conversion ratio equal to one;

The second option is the long European call option (the upper trigger) and is usually 15% to 30% out of the money (OTM) at issue; this upper trigger has a lower conversion ratio than the lower trigger (typically 80% of the lower trigger rate);

The area between the two triggers is a flat spot (deck) where the issue does not gain or lose significant values with the stock price movement;

Below the lower trigger the security declines one for one for the stock, but has a higher dividend yield; the price area greater than the upside trigger provides upside appreciation with stock price movements but at a lower conversion rate, therefore returning around 80% of the stock’s upside;
Mandatories - Delta

- At issuance the delta of a mandatory transitions from its high point based on the downside trigger rate to the upside trigger rate and lower delta in a smooth fashion;

- Since the mandatory is short a call option at lower trigger or strike price and a long call option at the upper strike price, the delta transitions or reverses at or near these strikes;

- As the mandatory approaches maturity, the transition is less smooth and the delta curve exhibits more severe changes in delta.
Mandatories - Gamma

- The gamma profile of the mandatory convertibles exhibits big shift in delta and swings to negative near maturity;
- The gamma actually rebounds to positive territory and therefore hedging the negative gamma proves to be very difficult;
- The swing to negative gamma occurs because of the higher downside trigger conversion ratio with the short call option and the theta (option premium decay) occurring in the last few months of the maturity;
- The negative gamma territory becomes more severe as time passes and the maturity date is approached.
Mandatories - Vega

- The Vega profile of a mandatory convertible is also very interesting; the lower strike call option is short, causing the vega to move into negative territory as the stock price moves toward the through the lower strike;

- The Vega swings into positive territory as the stock price increases and moves toward the long option at the upper strike;

- The vega profile also becomes more pronounced as the mandatory moves towards maturity;

- At issue, the vega curve slopes upwards as the stock price increases but at maturity the vega curve resembles a sign curve.
An ordinary least square estimate should be done to estimate the regression line for the CB value and the parity;

CB Value and the parity will in almost all cases have a linear relationship and therefore the slope of the line can be determined;

The slope is the delta given the trading history between the CB and the stock and should be compared with the theoretical (Black-Scholes delta) of the issue
Sony Zero-coupon CB Trading History
(18 June 2003 – 18 June 2004) – see spreadsheet analysis

Fujitsu Convertible Bond
6 Jan 1995 - 8 Dec 1995
**Sony CB** (see spreadsheet analysis)

\[ y = mx + c \]
\[ CB = 0.49 \times Parity + 797,527 \]

\[ \delta_{\text{Trading}} = 0.49 \]
\[ \delta_{\text{Black–Scholes}} = 0.324 \]

\[ \gamma = 0.001685 \]
\[ vega = 2821.85 \]
\[ strike = 6,177.16 \]
\[ spot = 3980 \]
Put Options to hedge the Credit Risk of CBs

- Put options can also be used as a means to hedge the credit risk for issues that do not have well defined Investment Values;

- Many low grade convertibles have investment value that are moving targets because of high correlation between declining stock prices and their companies’ corresponding credit spreads (negative gamma results);

- The trader may choose to carry this type of position in his book with a stock hedge that is much higher than the theoretical delta implies (bearish hedge) – but this type of a hedge may cause significant upside losses if the stock price moves up sharply;

- Since the strike price of the embedded convertible is a function of the fixed income value, puts can be purchased with a strike price near the expected fixed income value’s determined strike price.
A basic convertible asset swap entails synthetically separating the convertible’s fixed income component from its embedded equity component.

The trader identifies a CB that is inexpensive and purchases the issue, and then sells the convertible to a broker and receives an option to repurchase the CB (the trader’s loss exposure is limited to the capital invested in the equity option component);

The broker finds an investor who is interested in the credit and the structure and sells the fixed income component; (thus the trader’s option provides the equity exposure while the bond buyer holds the fixed income component);

Normally the bond buyer purchases the fixed income component or credit value for a price determined by discounting the security by a pre-determined spread over LIBOR (the spread allows the bond buyer to receive a floating rate while the broker retains the fixed rate);

The asset swap credit value is protected against an early call or conversion with a recall spread that determines the price at which the credit seller must repurchase the convertible;
Convertible Bond CDS

- Since much of the global CB issuance comes from companies carrying credit ratings below what is typically asset swapped (single A or better) the credit default swap (CDS) market is another useful tool for managing credit risk of a CB;

- The CDS provides the convertible investor with a means of transferring the credit risk of an issue to the swap seller for a specified time period and at a fixed spread over LIBOR (the spread, of course, takes into consideration the duration of the position and the issue specific credit risks, including default probabilities and recovery rate);

- Although the credit risk is transferred the ownership of the CB is not; instead the CDS is like an insurance policy purchased against the specific issue;
When the credit risk is sold to the CDS seller, the investor has effectively created a short sale on the credit protection of the convertible;

Since this is a synthetic short position, there is no optionality in the CDS and the CDS seller has purchased a synthetic long bond position providing a fixed return for the terms of the swap contract;

The CDS seller may in fact purchase the synthetic bond at a price that is superior to what is available in the bond market for the same or similar paper and may end up shorting the actual convertible in the marketplace as a hedge against the swap sold;
In effect, the CDS acts like a put option because of its payoff profile and the fact that the buyer of the CDS has the right to sell the protected bond back to the CDS seller for par value if a credit event occurs;

The cost of purchasing puts to cover the difference between par value of the bonds and the recovery rate can be compared to the present value of CDS premiums to determine if equity put options offer better opportunity to protect the hedge;

Since equity price is highly correlated with credit spreads and volatility, especially as credit becomes impaired, equity put options offer a viable alternative to CDS;
Convertibles CDS

- CDS Buyer
- CDS Seller
- Spread Fee
- Zero Payment
- No credit event
- Credit event
- Contingent Settlement

Spread Fee flows from CDS Buyer to CDS Seller.
Zero Payment flows from CDS Seller to CDS Buyer.
No credit event and Credit event connect CDS Seller and CDS Buyer.
Contingent Settlement connects CDS Buyer and CDS Seller.
In a delta neutral hedge the trader goes long on a convertible and shorts the underlying stock at the current delta (the position is set up such that no profit or loss is generated from very small movements in the stock price but cash flow is captured from both CB’s yield and the short interest rebate);

The hedge is neutral in delta (zero delta) but has a rho (interest rate risk) and vega (volatility risk); because of vega it is called a long volatility trade;

If the trader believes that the implied volatility level is unsustainable and that the actual volatility in future will be less than the current vol then the trader can short the CB and go long on the underlying stock; this is a short volatility trade – the position has a negative vega.
Convertibles with very little or no call protection remaining can be subject to a perverse effect of increased volatility;

As vol increases it has the effect of reversing the time value of an option and as volatility decreases it has the effect of increasing the time value of the option;

\[
Time = \left( \frac{\log(\text{Trigger}) - \log(\text{Parity})}{\sigma \cdot \text{NORMSINV}(\text{probability})} \right)^2 \cdot (\text{tradingDays})_{\text{year}}
\]

\[
(\text{Trigger})_{\text{Call}} = (\text{Parity})_{\text{Call}} \cdot \left( 1 + \left( \sigma \sqrt{dt} \cdot \text{NORMSINV}(\text{prob}) \right) \right)
\]
Example

- If the CB has no call protection remaining and will only be called to force conversion, then the trader can estimate how much above the call price the parity level (trigger) should move before it may be called with a given probability and expected volatility.

- For example, if the trader has determined that the parity level must be 120% of the call price for the company to safely call the issue, then he can estimate – using the previous formula – the amount of time premium that should be built into the CB’s embedded option;

- For example: how much time will it take with an 80% probability for the trigger level to be reached for the CB with a parity of 102 and a trigger level of 120 and a 3-month annualized vol of 40%;

\[
Time = \left( \frac{\log(120) - \log(102)}{(0.40 \times 0.84162)} \right)^2 = \left( \frac{0.1625}{0.3366} \right)^2
\]

\[
Time = 23\% \times 255 = 59
\]

- Time value is equal to 23% of the number of trading days in a year or roughly 59 trading days
The trader can work with the formula in another way: say, a callable convertible with a 30-day call notice period has a parity level of 102 and a 3 month vol of 60%. The trader wants an 80% probability (of the trigger happening); then what would be the trigger level?

\[
\text{Trigger} = 102 \times (1 + (0.60 \times \sqrt{\frac{30}{255}} \times 0.84162)) = 119.66
\]
Why a CB may be Called Back by the Issuer

- CBs may be called to refinance at a lower rate or they may be called because they are deep in the money to force conversion into stock;

- Most companies calling CBs to force conversion into stock generally have call notice period of 30 days; and therefore, they must allow the parity level to move up in the money enough to ensure that under reasonable circumstances (volatility) the parity will not fall below the call price;

- The amount of time it takes for the parity level to reach trigger level is a function of volatility; as volatility changes so does the expected life of the convertible and its value;

- If the parity level falls below the call price the issuer will be forced to pay cash instead of stock to the holders of the Convertible;
### Delta Neutral Arbitrage using Leverage
(see spreadsheet)

#### XYZ Co.
(Non-Investment Grade BBB Convert)

<table>
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<th>Hedge</th>
<th>arty at Risk</th>
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<td>long convert</td>
<td>1,000</td>
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<tr>
<td>short stock</td>
<td>16,000</td>
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<tr>
<td>Total Cash Flow</td>
<td>$91,200</td>
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</table>

#### Value at Risk

| Correlation | 0.85 |
| Long Convert | $61,559 |
| Short Stock | ($261,752) |

#### 95% VaR ($211,923)
(annualized)

#### 95% 3 Day VaR ($23,123)

#### Credit Loss

| Expected Credit Loss | $1,764 |
| Maximum Loss | $1,050,000 |
| 95% Maximum Credit Loss | $672,000 |
| Unexpected Credit Loss | $670,236 |

#### Annual Cash Flows

- coupon: $60,000
- short interest rebate: $31,200
- stock dividend: $0
- Total Cash Flow: $91,200

#### Capital Required for Hedge

<table>
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<tr>
<td>Rating</td>
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<td>1 year prob of default</td>
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<td>Recovery Rate</td>
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<td>95% vol of Recovery Rate</td>
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### XYZ Co.

- **Settlement**: 25-Feb-04
- **Maturity**: 25-Feb-05
- **Stock price**: $39
- **stock beta**: 0.85
- **convert par price**: $1,000
- **convert price**: $1,050 (105% of par)
- **convert coupon**: 6%
- **conversion premium**: 19.65%
- **delta**: 0.594
- **implied vol**: 30%
- **short credit interest**: 5.00%
- **margin for leverage**: 15%
- **borrowing rate**: 7.00%

### Credit Data

| Rating | BBB |
| 1 year prob of default | 0.28% |
| Recovery Rate | 40% |
| 95% vol of Recovery Rate | 10% |

### Leverage

- Levered un-hedged LMV: $63,945
- plus lesser amount of:
  - margin*delta*LMV: $93,555
  - (LMV - Parity)*delta: $31,200

### Margin

- **margin*delta*LMV**: $93,555
- **(LMV - Parity)*delta**: $31,200

### Total Capital Required

- **Total Capital Required**: $157,500

### Carrying cost of the position

- **Carrying cost of the position**: $62,475
Hedging Volatility with Volatility Swaps

- Vega risk at the position level can be managed by selling call options against a position when the high volatility level is unsustainable;

- At a portfolio level the overall vega risk of the book can be hedged by using volatility or variance swaps;

- The vol swap allows an investor to gain long or short exposure to the market volatility; the swaps will not only allow risk reduction but also provide a means of dynamically re-balance the delta neutral hedge profile;

- Volatility is generally positively correlated with credit spreads and negatively correlated with equity prices (equity market indices) and this can complicate portfolio hedge decisions;
Omicron risk can also be hedged with volatility swaps (under this scenario the positive correlation between volatility and credit spreads is expected to hold);

The trader estimates the dollar exposure to a credit exposure widening and then overlays a vol or a variance swap to protect the portfolio from spreads widening further;

But unlike the vega hedge the trader needs long exposure to volatility to hedge the credit risk;

Since the hedge is not a direct credit spread hedge but a “correlation” hedge, the expected correlation (and the changes in it) should be taken into account to use a multiplier in the hedge;

It is more common that the vol swap is either used to hedge vega when vol is already high and credit spreads are wide or to hedge the credit-spread risk when the vol is low and the credit spreads are narrow; rarely would the tactic be used to achieve both types of protection simultaneously;
Synthetic CBs

- An investor can also construct a synthetic convertible to fill gaps in his portfolio or to exploit the inefficiencies in the options market;

- The trader buys a long term option (call on a stock) and attaches a coupon paying bond to it to create an undervalued CB (the bond is actually carried on the trade books as part of the position that provides cash flow and risk reduction, if necessary)

- The bond may be from a government issuer or a completely different corporate issuer and therefore not correlated to the option (the downside company specific risks are reduced);

- Synthetic Convertible notes are created when an investor identifies options that are trading below the long term implied vol but cannot establish a reasonably sized position because of lack of meaningful liquidity in the options market;

- Brokerage houses can created OTC options and convertibles (and generally medium term notes are attached to these options);
The implied vol convergence hedge offers convergence without directional bias;

The investor goes long one undervalued CB (below expected implied vol) and simultaneously selling another overvalued CB (above the expected implied vol) from the same issuer;

In practice the investor will find a two convertible securities from the same issuer – one that is fairly priced and the other that is significantly mispriced;

When setting up the hedge, the differences in the equity sensitivities between the two issues must be neutralized (matching the deltas of the issues by varying the amount of each issue owned neutralizes the equity sensitivity differences of the two issues;
Arbitraging relative price discrepancies between the CB and the company’s straight debt is a common capital structure trade;

The investor goes long a CB and short a high yield debt of the same company creates a synthetic long call option (free) and neutralizes the credit risk;

The short high yield debt position eliminates the credit risk (or reduces it significantly);

Also, a long straight (high yield) debt and a short an overvalued CB creates a short call option (thus locking in a positive yield spread, lowering the time to maturity);

Often equity markets and the debt markets are at odds with each other – in terms of the valuation of the company; (CBs and straight bonds may sell at a very depressed levels for a long time, like the Pan Am CB, while the company’s equity cap can appear very large);

Therefore, another cap structure hedge could be to purchase such convertible bonds (trading flat and at very cheap levels) and shorting the underlying stock at delta of one;
Amazon CB combined with the company’s straight debt was an interesting trade in March, 2000; Amazon 4.75% CB due 2009 was trading at 40% of par with a yield of over 19% (but with a very little value assigned to the embedded call option);

At the same time the 10% straight bond due 2008 was trading at 58% of the par with a YTM of 15% (the bond did not actually pay a coupon of 10%, since it was zero coupon with a clause to start paying cash interest payment on March 1, 2003);

Traders were long 145 CB at 40.00 and short 100 straight high yield at 58 thus creating an equal dollar offsetting investment netting to zero;

By mid-July 2000 the Amazon CB traded at 54 (gain on the long CB) and the straight high yield traded at 66 (loss on the short position) thereby realizing a net gain on $12,300 on an investment of zero.
Another interesting trade is the negative gamma trade for CBs trading in the distressed zone;

If the investor identifies a CB (company) that in all likelihood will go bankrupt then he can establish a net short position (in the hopes that the company does not survive);

Since this is a one-delta hedge (the delta of the CB is very near one) the stock is shorted at a rate that equates to a dollar hedge near 100% of the long bond value;

The profit in this hedge is a result of the CB bottoming out near the expected recovery rate while the stock goes to zero, or very close to zero;

A big risk in such trades is that the CB may drop in value much more than the stock (delta becomes greater than 1.0) because of the change in the distressed credit status of the company (credit improving) and this can cause the investor significant losses;
In Reset CBs the conversion ratio changes (resets) to protect the buyer of issue in the event that the stock price declines;

The reset is (generally) triggered at predetermined dates if the underlying stock price declines below some predetermined levels (the long position therefore has the conversion rate increased as the stock price drops below the threshold and this reset keeps the CB from declining significantly);

The reset can become fatal for a company ("death spiral") since as stock price declines the hedge calls for shorting additional shares as the reset kicks in (or expected to kick in) and the shorting of the stock puts additional pressure on the stock price pushing it further down in value and hence it forms a vicious circle;

Prime examples were Japanese banks in mid-90s who were very desperate to raise capital and had to entice the investors who had very little or no appetite for normal CBs or straight bonds due to very low yield;

Valuation of reset convertibles (with resetting strike price) is quite complicated as the underlying option is a path dependent option and the pricing model has to take into account that;
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