

## Call provision/put provision

Call put provision refers to the embedded options offered in some bonds. (see embedded options). They can provide the bond issuer lots of flexibility. As such, the structuring of call put provision on bonds and in particular municipal bonds constitutes an important part of the financial engineering activity of debt capital market desks. Option provisions are mainly used in two different ways:

- First, additional rights to the issuer, like the right to call back the bond (right to buy back the bond in the future at an agreed price, see below for a further explanation). In return, she/he pays a higher coupon to the bond investor. Because of the yield enhancement due to the premium for the embedded option, the bond looks quite attractive to an investor.
- Second, lower cost of borrowing by selling options to the investor like in a puttable bond (right for the investor to sell back the bond in the future at an agreed price). As a result of her/his additional rights, the investor receives a lower coupon.

Call provision are quite common with many corporate bonds and municipal bonds. Although bonds with put call provision are initially sold as a total package, traders like to value the option separately, in order to estimate the fair value of the bond and compare to bonds with no embedded options. Moreover, there exists a large market for call rights on its own.

## Call provision on callable bonds

A bond with a call provision known as a callable bond provides to the issuer the right but not the obligation to buy back the bond at a specified price in the future. The right may be exercisable only once (European case), many times (multi-callable bond, Bermudean or mid-Atlantic option) or during a time window (American option). A callable bond can be decomposed into a fixed rate non callable bond and a call option on this bond. Market professionals measure the cost of this option by the yield spread (yield differential, referred to as the option-adjusted-yield) between callable bonds and non-callable bonds. Professionals also quote the spread between the bond yield and the corresponding swap rate, referred to as the option adjusted yield spread.

For instance, a municipal bond, maturity 2020, may be offered with traditional 10-year, 102.5% call features to yield 6.45%. In the same market, *mutatis mutandis*, the non callable version of the bond may be offered at a yield of 6.40%. In this particular case, the call option costs an additional 5 basis points over the life of the bond. Other call provisions may be purchased at other yield spreads according to different market condition and bond characteristics.

## Pricing of the call provision

The valuation of this embedded option plays an important role in the pricing of the bond. Accurate pricing can be fairly complicated especially when taking into account credit and liquidity risk as well as good modelling of the interest rates term structure. Like other bond components, the call option has to be isolated and fairly priced.

Traders often use the Black Scholes model to price European call put provision. This option can be evaluated indifferently as an option on the bond or on the yield. However, traders commonly take the point of view of an option on the yield. The key variable for the pricing are the forward value of the yield, the strike of the option in terms of its equivalent yield strike, the yield volatility and the maturity of the option. Like for standard calls, high volatility assumption will result in high option premium. For multi-callable bond, a term structure model of the interest rate curve and a corresponding model for the yield may be required. Standard numerical method like a tree, a PDE or even new recent development on American Monte Carlo would provide the result. An other important element may be the appropriate modelling of the credit risk and liquidity risk of the bond.

#### Non-Standard or Exotic Call Provisions

Non-standard call provisions provide additional flexibility to the issuer at a customised price. Standard call provision on municipal bonds, ten years of call protection from the issuance date and a redemption price that drops to par in twelve years may not meet the need of the bond issuer. She/he may want some more aggressive provisions like ten-year calls at par, calls with tailor-made maturity from 2 to 8 years. They may also want a cheap provision priced at almost zero cost, taking advantage of particularity of the interest rates term structure.

A typical example of exotic call provision may be a very short call provision like a two years option. An issuer may expect his funding rate to be rapidly

lower, because of a quick recovery of a temporary credit liquidity crisis or because of an expected credit rating upgrade. To have the ability to refinance her/his debt rapidly at a lower rate, she/he may be interested in a short-term call provision. For issuers that are prohibited under Federal tax law from executing an advance refunding, this shorter call will enable them to refund themselves much sooner than in the traditional structure.

### Municipal Call Rights

Interestingly, municipal call rights can be traded along, as an independent and separate asset from the bond. And by trading the call rights separately, the issuer may in general generate more proceeds than the traditional package, creating synthetic non-callable debt at attractive levels, as in many cases, the bond market does not price the embedded options efficiently.

Because of the ability to trade municipal call rights on its own, there exists a market (and quotes) for call provision. This information can be used by issuers, investors and traders to evaluate accurately the market value of embedded call provisions. Subsequently, in the case of a mispricing, they can generate profits. In the previous example, the difference between the callable version of the 10 year-maturity bond and its corresponding non-callable version was 5 basis points. The municipal call rights may value the option higher, for instance 7 basis points. In this particular case, the investor may want to sell the call rights separately to cash in the additional 2 basis points.

The motivation to sell the call rights may be twofold:

- First, the investor/trader may want to cash in the time value of the option. As for any option, the value of the provision option is composed of intrinsic value and time value. On one hand, intrinsic value for a call is the difference between the value of the underlying bond and the strike price of the option. For calls embedded in bonds, intrinsic value is initially worth zero as strikes are usually set up to be over par for par bond (for instance a strike price of 102% for a par bond). This intrinsic value will only be positive if the bond price increases or alternatively interest rates decline. On the other hand, time value represents an average of all the future scenarios that would create some value for the option (cases where interest rates go down). As such, time value is a function of yield volatility. Time value can be cashed in by selling the call rights, while exercising the municipal call rights leads to renounce to any time value, as any potential increase is non-longer available.
- Ability to do advance funding by selling the call rights. Advance refunding is expressly prohibited under Federal tax law. The sale of call rights may restore this flexibility and approximate or improve upon the economics of an advance refunding.

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<sup>1</sup> The views and opinions expressed herein are the ones of the author's and do not necessarily reflect those of Goldman Sachs