

Help Sheet: LOBO Call Probabilities

Arlingclose Online Spreadsheets

Purpose

The LOBO Call Probabilities spreadsheet is designed to calculate the chance of a lender calling (or exercising) its option under a lender's option borrower's option (LOBO) loan.

This spreadsheet links to the Borrowing workbook where details of your existing loans are saved and to the MarketData workbook in the library for forward interest rates and volatilities. You should enable links when opening the file.

You may make multiple worksheets within the same workbook by using the move or copy sheet function.

Input

Once you update links, cell B4 will show a dropdown menu to select loans from the Borrowing workbook where the interest basis has been set to "LOBO". Select the loan you wish to analyse.

The only other input required is the margin in cell E4. This converts the loan interest rate into a strike rate for the analysis. Broadly speaking, we would expect a lender to call a LOBO when market rates for the remaining term exceed the loan's contractual interest rate. But this could be affected by:

- The lender's cost of funding (negative margin)
- The lender's desire to exit for non-financial reasons (negative margin)
- The value of later options to further increase the interest rate (positive margin)

In many cases these effects will broadly offset each other and so a margin of zero may well be appropriate. But please seek our advice on the latest adjustments suitable for different lenders.

Outputs

The dates of forthcoming options are shown in column A, together with the final maturity date. The calculated probability of the option being called on that date is shown in column E and the cumulative probability in column F.

The probability of call is a function of the years to maturity (column B), the forward swap rate for the remaining life (column C) and the volatility of that swap rate (column D).

The average life is calculated in two ways: the mean life in cell E7 is the weighted average of the call probabilities, while the median life in cell E8 is the option date on which the cumulative probability exceeds 50%.

The first chart shows the cumulative probability of call increasing over time as a red line.

The second chart shows the forward swap rates as a dark grey line and a 50% probability range around this as a light grey area, alongside the strike rate as a horizontal brown line.

Methodology

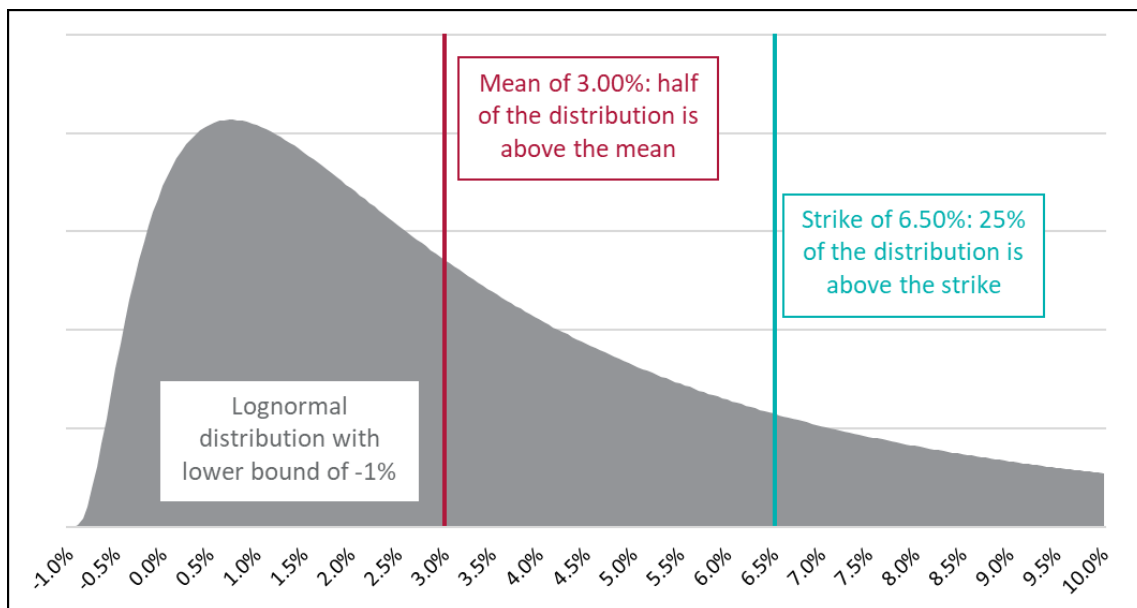
To calculate probabilities, we assume a lognormal distribution of interest rates with a -1% lower bound. A lognormal distribution recognises that there is a lower limit but no upper limit to what interest rates can

be. The mean of the distribution is the forward swap rate and the standard deviation is the volatility of historical rates back to November 2010.

In the example below, for a LOBO with 40 years to run and an option in 5 years' time, the mean (the forward 35-year swap rate in 5 years' time) is 3.00%, meaning that half of the probability distribution is above and half below this figure. In other words, the 35-year swap is equally likely to be above and below the market forecast of 3.00%.

But if the loan interest rate (more strictly, the strike rate) is 6.50%, only 25% of the distribution is above this figure. The probability of the 35-year swap rate exceeding 6.50% in five years' time is therefore 25%. This figure is dependent on the volatility, in this case $0.4142 \times \sqrt{5}$ where 0.4142 is the historical annual volatility of 35 year swap rates.

The excel formula used is $=\text{NORM.DIST}(\text{LN}(3.00+1), \text{LN}(6.50+1), 0.4142 \times \text{SQRT}(5), \text{TRUE}) = 0.24866$.



More Help

Further help sheets are available at <https://www.arlingclose.com/insights/help-sheets>.

If you have any further queries, please email the Arlingclose team at treasury@arlingclose.com.

Arlingclose Limited
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