Rho – interest rate sensitivity

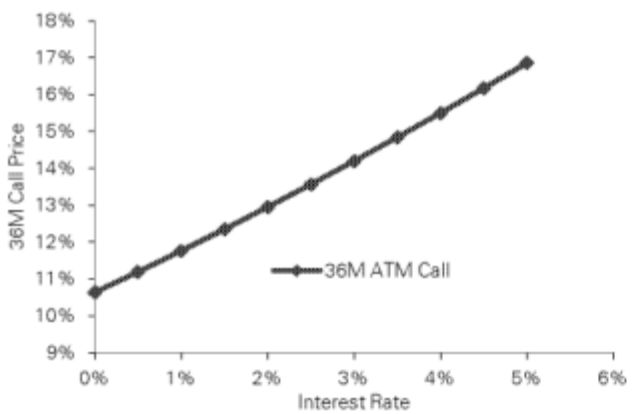
Interest rate levels drive the pricing of call options in two ways.

- The discounting or present value effect: the present value of the expected payoff from the call at maturity is lower.
- The forward effect: The cost of carry is lower and hence the expected spot is higher at maturity. This increases the value of the call.

The net effect of these two can be seen by the greek 'rho', which measures the sensitivity of an option with respect to interest rates. Rho is positive for a call option, meaning that the net effect of a rise in rates will be an increase in the call price. The price increase due to the forward rising is higher than the discounting effect.

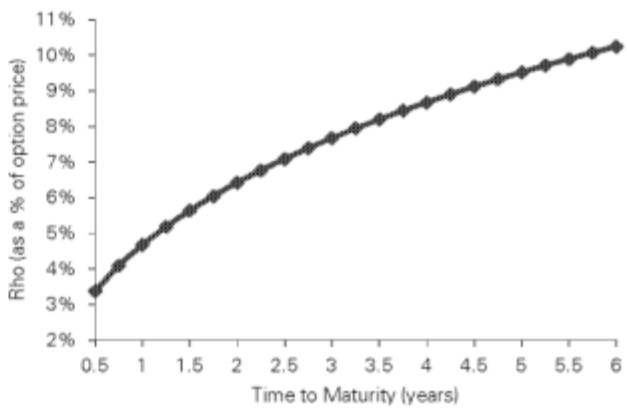
Longer-dated options have higher rate sensitivity (see Figure 27). This makes sense as the forward will be affected more for longer-dated options (as the rate is scaled by the time to maturity). Thus as an option becomes closer to maturity (all else equal), its exposure to changes in interest rates falls rapidly. Because of the changing nature of the interest rate sensitivity (see Figure 28) and the relatively small impact on P/L, investors shouldn't trade long-dated calls solely to gain exposure to higher rates. However, the currently low rates (and low rates volatility) do lead to optically better relative pricing for investors wishing to be long, and any rate increase will have a positive impact on call premia (see Figure 29 and Figure 30).

Figure 27: Call prices increase with rising rates



Source: Deutsche Bank

Figure 28: Rho for an ATM call increases with maturity



Source: Deutsche Bank

The figures below show the simulated P/Ls under different rate and spot scenarios after one-year has passed in the life of the trade. You can see for the 18M trade that a 5% up move in spot and a 100 bps increase in rates would cover the time value lost over the following year, all else equal.