Bank of America

Introducing the consumption option

Bank of America provides an introduction to consumption options – which offer similar directional exposure to vanilla options while reducing the risk of overpaying for the implied volatility component – and describes their mechanics, costs and the opportunities they present

The changing equity derivatives landscape

When describing option costs, we often speak of the spread between implied and realised volatility as the risk premium embedded in option prices. Though this spread tends to be positive, option buyers look to minimise it and lessen the overall cost of an option. When implied volatility rises, as it has recently, the potential for overpaying for an option increases as well. When one-month SPX implied volatility was offered at 10 implied vol, option buyers faced little risk of overpaying for options in volatility terms: realised did not drop too far below 10. Now that SPX implieds are trading in the mid-30s and the VIX Index (SPX implied volatility index) has reached as high as 42, the risk of overpaying for options has increased. Consumption options provide similar upside/downside exposure as vanilla options, with almost no exposure to volatility. Consumption options are most effective when implieds are trading at a premium to realiseds, when no volatility market exists or in instances when traders prefer to express a fundamental view without gaining exposure to implied volatility.

Consumption options 101

As with vanilla options, consumption options can be expressed through calls or puts depending on the required exposure. Consumption options have a floating expiration date, which is determined by the level of realised volatility during the life of the trade. With a vanilla option, if realised volatility is lower than was anticipated, the option-holder has effectively overpaid for the option. With a consumption option, the holder is compensated for the lower volatility with an increased maturity date. The opposite is true if the underlying turns out to be more volatile than initially forecast. In this case, the option-holder would have underpaid for the option and would receive a shortened expiration date to offset this. With consumption options, the flexible expiration date is used as a normalising factor in an attempt to match the option price paid with a 'fair' expiration based on actual realised volatility.

We can think of consumption units as a gauge of how much the underlying moves. Consumption units are calculated as the (daily return) 2 x 10,000 where 10,000 is used to scale up the return for ease of use. Generally, the higher the forecasted future realised volatility, the more consumption units needed for the investors to cover the tenor for which they would like optionality:

Consumption units needed: (expected realised volatility) 2 x 10,000 x time expressed in years

Once the consumption units are consumed, the option will expire with two possible outcomes:

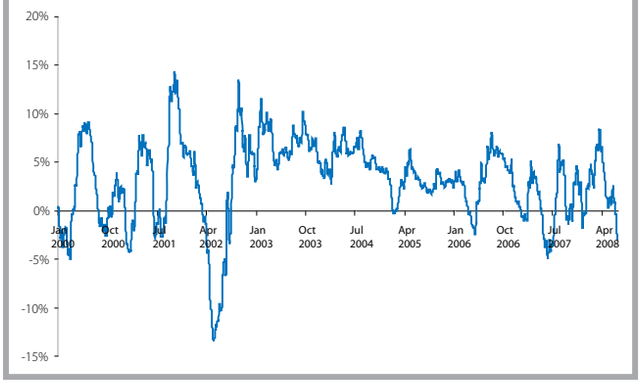
- Should volatility realise higher than expected, consumption units will be used up faster than anticipated and the option will expire before the expected maturity.
- Conversely, should volatility realise lower than expected, consumption units will be used up slower than anticipated and the option will expire after the expected maturity.

The payout is exactly the same as a normal option, except the consumption option does not have a set expiry date. However, a maximum maturity date is set on the initial trade date in order to protect the seller. It is conventionally equal to twice the expected maturity date. Pricing of consumption options is calculated through a Monte-Carlo simulation but can be estimated through Black-Scholes since the major difference between a vanilla and consumption option is time to maturity. Therefore, the expected realised volatility and estimated time to maturity will be key inputs into determining the price of the consumption option.

The role of volatility and the consumption option

Similar to listed options, as time to maturity increases, so too does the cost of the consumption options due to the amount of consumption units necessary to cover the investment horizon. Because pricing of the consumption option is almost entirely volatility independent, the only other variables are the forward of the underlying and the hedging and transaction costs of trading in the market in which the underlying is listed.

1 SPX 3m IVOL – 3m subsequent realised since 2000



Source: BAS, Bloomberg

A. SPX volatility premium		
Since	% time overpaid	Average vol overpaid
Since 2000	78%	3.1
Last three years	79%	2.3
Since 2007	68%	1.5

Source: BAS, Bloomberg

Figure 1 shows the difference between SPX 3M implied volatility versus subsequent realised. Any time the difference was positive, the investor paid a premium of implied to realised. Over the past three years, we see that investors purchasing typical SPX-listed options were paying an average premium of 2.3 vols over realised. Even over the past year, where the SPX emerged from its volatility coma, investors were still overpaying 68% of the time by an average of 1.5 vols.

Consumption options in motion – 3M SPX volatility grinds to a halt

From the beginning of April until the end of June – but most notably in May – SPX 30D realised volatility at one point slumped below 15 vols. While the index remained range bound, concerns that another financial institution would suffer the same fate as Bear Stearns weighed on the market. Because of the overriding unease surrounding the credit crisis and fragility of the US banking system, SPX implied vol stayed well bid with 3M at-the-money (ATM) put options trading at 22.5 vols (see figure 2) on 1 April, which equates to a premium of 4.4% for a 3M ATM put option (using the Black-Scholes model). From 1 April until 30 June, the index realised 17.8%, which would have equated to a 3.4% premium for the put. Thus, a consumption option would have benefited with extra time to maturity.

An investor looking to hedge their exposure to the SPX was thus forced to pay an extra 1% in premium through buying an ATM vanilla put as opposed to using the consumption put. In this case the payout of the consumption and vanilla put were the same, but the cost of the consumption option was much cheaper. This is due to the subsequent realised volatility of the underlying being, on average, 2.3 vols lower than the implied volatility of the vanilla option (see figure 2).

Figure 3 shows how the consumption units are devoured versus the performance of the SPX based on the purchase of a 3M ATM consumption put using 17.5% expected vol. We can see that, when the SPX was volatile in June, the consumption units depleted at a faster pace.

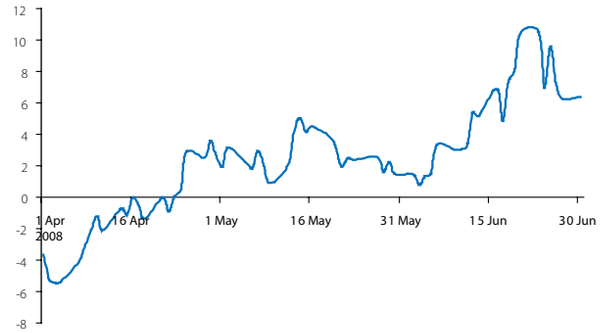
It is important to note that, if at the time of the trade the purchase was for a 22.5% forecasted volatility consumption option, the option would still have 49 consumption units left (10,000 x 22.5%[1] 2 x 0.25 years) – (10,000 x 17.5%[2] 2 x 0.25 years). In this case the option will expire when the final 49 consumption units are consumed or when the maximum maturity date is reached, in both cases the actual maturity date will be later than the estimated maturity when the option was purchased.

New products, new opportunities

As the credit crisis continues to roil the markets, investors are finding it more difficult to use options to express a view because of the higher implied volatility associated with the current trading environment. Through the use of the consumption option, investors can continue to seek the benefit of the use of options in that there is a defined risk limited to the premium (for an option buyer). Further, consumption option buyers benefit by avoiding overpaying while perceived market risk is high. As deleveraging in the financial space continues, it will be vital for financial institutions to manage their capital as efficiently as possible, and the consumption option is one way to achieve this.

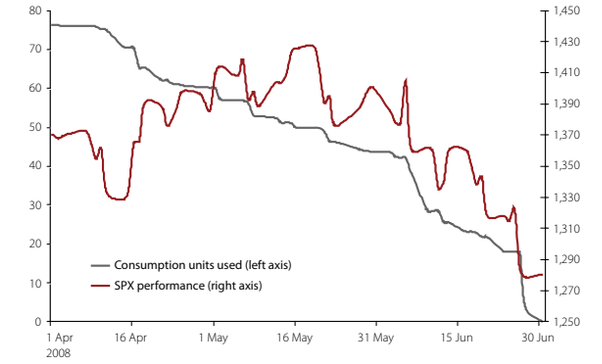
[1] *22.5% is expected realised volatility*
[2] *17.5% is actual realised volatility*

2 SPX 3m IVOL – 3m subsequent realised



Source: BAS, Bloomberg

3 SPX 3m consumption usage



Source: BAS, Bloomberg

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Bank of America

Samir Patel
E. Samir.p.patel@bofasecurities.com

Daniel Kirsch
E. Daniel.e.kirsch@bofasecurities.com

T. +1 646 855 8300
www.bofasecurities.com

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