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THETA AS AN ASSET CLASS

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It is essential to find new ways or asset classes to deliver consistent and uncorrelated returns within the asset management industry.

The “time value of options” can deliver a desirable risk return profile because it is one of the asset classes which is not inflated.

A memory refresher: An option premium pays for the risk a seller of an option encounters to buy/sell an asset which the option is related to. The dynamic of an option premium can be described by its partial derivatives, known as “greeks” (Fig. 1).

Figure 1

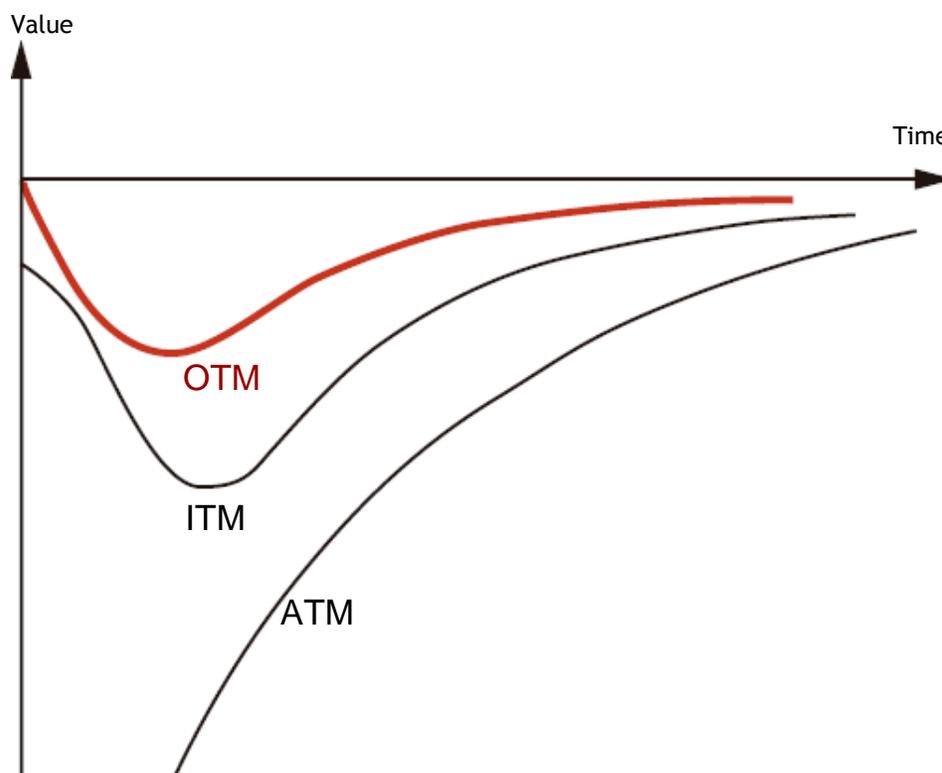
| | |
|-------|--------------------------------------|
| Greek | Option premium sensitivity versus... |
| Delta | Underlying |
| Gamma | Delta |
| Vega | Volatility |
| Theta | Time to maturity |
| Rho | Interest rates |

The time decay of an option premium (time value erosion = theta) is certain. The aim is to have as much time value/theta exposure as possible; hence you need to short options with high time value and a high time value erosion per day and think of the associated risks.

The premiums of options for out-of-the-money with short maturities consist mainly of time value; the intrinsic value is low and vega is very small at this point of time, which limits the risk exposure. Shorting an option closer to the money, would give more time value exposure which is positive but is associated with higher risks being exercised and a very high vega exposure (see Figure 2) which (for our purpose) is negative.

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Figure 2



OTM = "Out of The Money"

ITM = "In The Money"

ATM = "At The Money"

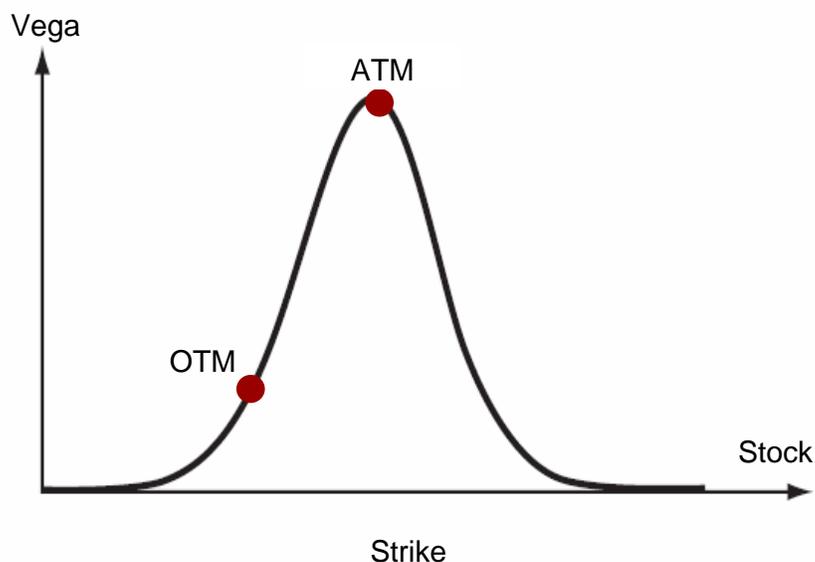
To minimise the risk exposure on the delta side and maximise the exposure to theta, you want short calls and puts at the same time (strangle), as a call shows a positive delta/gamma and a put shows negative delta/gamma; thus the underlying exposure can be netted down.

Volatility is not the prime revenue source for such strategies. However, it is a factual risk exposure, although very low. As shown in Figure 3, volatility tends to influence option prices significantly only if the underlying gets closer to the strike. When the options are written far out-of-the-money, vega is less important.

This is a very critical fact as theta strategies are often confused with volatility trading strategies.

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Figure 3



OTM = “Out of The Money”

ATM = “At the Money”

The sensitivity of an option premium to changes in interest rates is negligible within the three month maturity space, hence rho is not that important.

We now want to try and put the theory into practice and see what the issues are. First, you need to think of markets in which you want to trade the strategy and think of a system to create and manage the risk associated with the theta strategy.

It is key to find an underlying which has favourable properties in terms of trading range/market amplitudes and a liquid option/futures market.

Interest rates are difficult to handle, as the option market is not very liquid and option premiums are relatively low. Fat tails occur more frequently and are of higher magnitude compared to equity markets, hence bonds do not seem to be appropriate.

Commodity indices can be used from a technical point of view, although it can be difficult from a risk management perspective because the commodity derivatives exchanges do not guarantee the trade execution as they do in the well-organised equity derivative markets.

Equity derivatives seem to be the right choice, although single stock options do not. Liquidity can dry up quickly and unsystemic risk (in particular fat tails) is hard to handle.

Hence, it is suggested that we use standard indices like the DOW JONES EURO STOXX 50 or the S&P 500. Derivative exchanges, a liquid market in options and futures which facilitates portfolio/risk management, makes the strategy scalable to a reasonable trading volume.

Nonetheless, you need to think of a position size which allows the manoeuvring of the ship under any circumstance and that the initial margin utilisation is a natural indicator of the initial risk you want to take.

For a very good reason this limits the number of contracts you can use.

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When you have found the number of options you want to short, you need to look out for options with a high probability to expire worthless within the one to three month maturities time frame. The prime indicator can be the current market volatility (realised volatility). The higher it is, the wider the trading range shall be defined, i.e., the higher the call strikes, the lower the put strikes. It is noteworthy that the defined trading range ought to be non-symmetric, as markets tend to be negative skewed in the short term - an important assumption for risk construction and risk management. Consequently, you short less puts with a lower strike price than you do on the call side, where, in principle, the strikes should be lower and the number of contracts should be higher.

The second indicator is the expectation value of a premium to remain within the portfolio, which should be maximised. The probability distribution can be based on an empirical analysis of historical market amplitudes.

Once a number of option contracts with various strikes and maturities are written, the portfolio delta must be kept around zero and you need to take out risks where necessary and especially when risk is closed out, renew the position by rolling the strangles forward and monitor the greeks in due course.

Buying calls and puts and re-opening them at different levels/different maturities (rolling) does work very well in normal market conditions i.e. side- ways, positive or negative trending markets, but coming to an event, it can mean trouble if you want to buy back the put positions with the various maturities and strike prices - in fact, you are trying to catch a falling knife! To preserve capital in an event, it is possible to short futures, although this is far from a perfect hedge as the futures are a linear contract ($\text{Gamma} = 0$) and options contracts are non linear ($\text{Gamma} \neq 0$).

When options come closer to the money, the sensitivity of the option premium to changes in volatility tends to rise (see Figure 3). In the case of an event, volatilities tend to increase dramatically, thus option prices tend to increase more than the delta can explain.

The number of futures to hedge the delta and the futures adjustment rate according to Gamma and the volatility impact needs to be calculated in advance. This is so that the appropriate number of futures can be executed quickly in case an event happens. This “emergency brake” should be released, after enough money has been made from the futures to close out the put position and subsequently re-open them at different strike levels. Hence, the futures are for hedging only, not for downside speculations.

The call position is to be adjusted accordingly to keep the net delta in line.

In general, it is of major importance to be very disciplined and rigorous throughout the “risk creation” and risk management of such positions. When you are not disciplined, one event is enough to wipe out a big chunk of the invested capital.

Now, where does such a strategy work best and what are the caveats to it?

As long as markets move within the earlier defined trading band, the strategy should deliver decent returns made of option time value. Sideways moving markets are perfect but also up/down trending markets or even bull/bear markets are good to deal with and can deliver decent uncorrelated returns.

Once the investment process and risk management is carefully structured and based on the assumption that markets are negative biased in the short run, negative fat tails should not be a big issue.

Trouble begins when markets suddenly tend to be positively biased/positively skewed over a sustainable period of time, let us say three months or so, as volatility levels decrease and the constant rolling of calls can become costly.

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Summary

Theta as an asset class seems to be rather appealing, as it is capable of delivering consistent uncorrelated returns in most market environments.

To access the time value seems to be straight forward by extracting from it written equity index options.

An option time value strategy seems to be rather complex on the one hand but on the other hand, straight forward because most of the questions can be answered by simply applying basic option theory.

After all, in due course, it comes down to having a disciplined approach to carefully constructing and modeling the risk you are managing. An extensive experience and deep knowledge of trading in option markets can only help because theory, as we all know, has its pitfalls.

It is certainly a great advantage that time value strategies are not followed by many. It is a niche strategy which can deliver an attractive risk/return profile with low correlations to equities, bonds and even major hedge fund strategies.