J.P.Morgan

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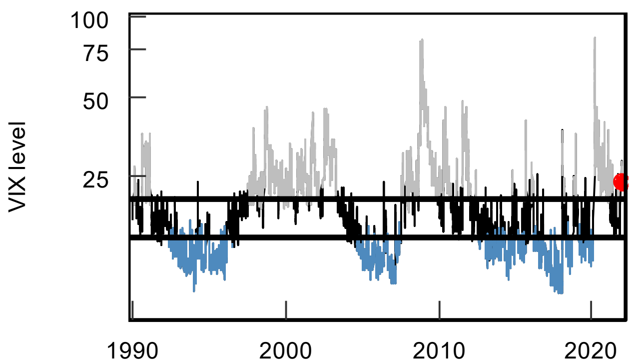
Global Equity Derivatives

Systematically harvest VIX carry in volatile environments

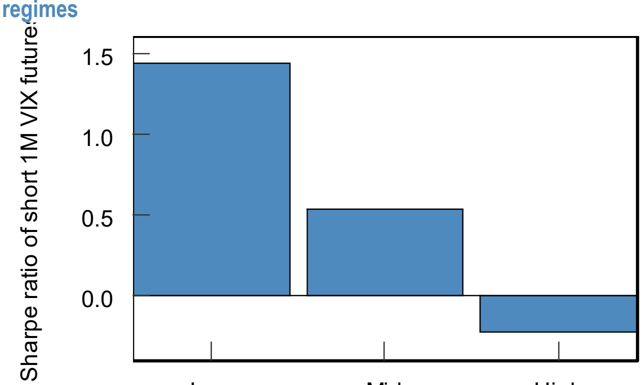
- VIX has oscillated between medium and high vol regimes, as defined by our machine learning based regime model, for much of the year (Figure 1). As discussed in our previous reports, in such an environment, the performance of naïve VIX term structure carry strategies tends to be tepid, and face drawdown risk from potential vol spikes (Figure 2). It is also worth noting that since Jan 2020, VIX has not spent any time in the low vol regime, which is the most favourable environment for VIX carry.

Figure 1: VIX regimes as defined by our machine learning model



Source: J.P. Morgan

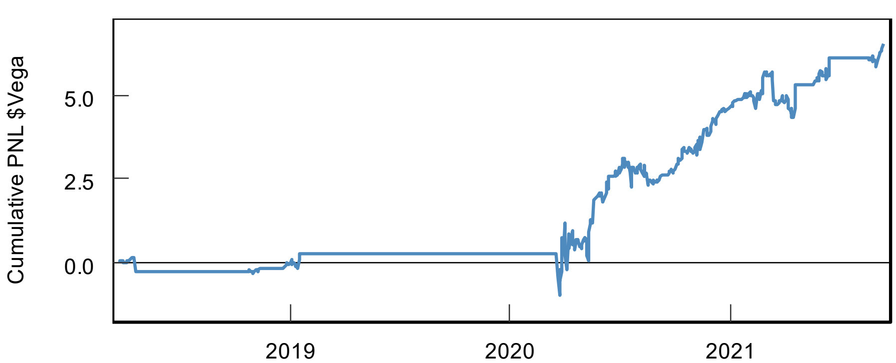
Figure 2: Performance of short VIX strategy conditional on VIX regimes



Source: J.P. Morgan

- Under such circumstances, how can investor harvest VIX term structure premium in a protected manner? We propose a VIX calendar strategy which has shown to deliver alpha systematically. Specifically, when VIX is above 20, we sell the front month 20 delta put and buy the second month 20 delta put, at a 1:1 ratio. The trade is carried till the expiry of the front month contract, and unwound if VIX is 20 or below, and if VIX is above 20, rolled into the same put calendar structure. The back test P&L (before transaction cost), where trades are entered on monthly VIX expiry dates, is seen in Figure 3 and Table 1.

Figure 3: VIX put calendar performance conditional on VIX is greater than 20 at inception



Source: J.P. Morgan

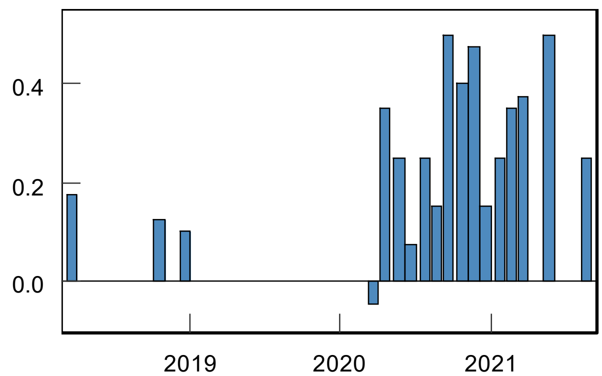
Table 1: Performance of the put calendar since Jun 2016

VIX at Inception	Mean P&L per trade (vega)	Standard Deviation	Annualized Sharpe	Trades
<= 20	-0.069	0.425	-0.7	47
> 20	0.364	0.415	1.6	18

Source: J.P. Morgan

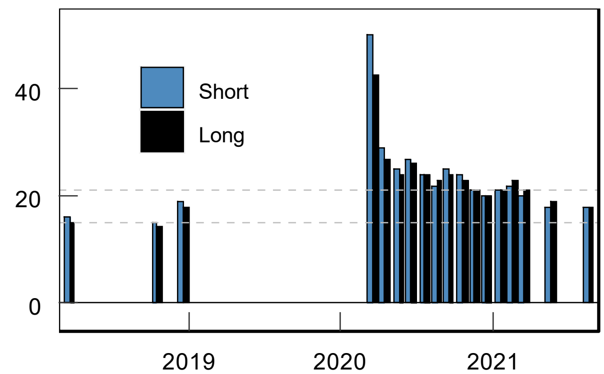
- What's the economic rationale behind the profitability of the put calendar? When VIX is > 20, the term structure tends to be flat to upward sloping. Therefore, the put calendar enjoys the positive roll yield of being long the front month futures delta. In exchange, the structure generally requires a small premium to be paid upfront (Figure 4). In scenarios of sustained high volatility, or temporary vol spikes, the front month puts are likely to expire worthless, and allow the investor to own the second month put option outright. The strikes of the respective long/short legs can be seen in Figure 5. The premium of the remaining put options should more than offset the initial premium paid at trade inception. The dotted lines are technically important VIX levels of 21 and 15 for reference. The downside scenario to the trade would be if the term structure steepens substantially in the front month. We choose 20 delta puts so that even in this scenario, the front month options are still likely to expire worthless.

Figure 4: Premium paid at trade inception ($) before transaction cost



Source: J.P. Morgan

Figure 5: Put calendar front month (short) and second month (long) strikes



Source: J.P. Morgan

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Put Sale. Investors who sell put options will own the underlying asset if the asset's price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the underlying asset's price below the strike potentially to zero, and they will not participate in any price appreciation in the underlying asset if the option expires unexercised.

Call Sale. Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

Call Overwrite or Buywrite. Investors who sell call options against a long position in the underlying asset give up any appreciation in the underlying asset's price above the strike price of the call option, and they remain exposed to the downside of the underlying asset in the return for the receipt of the option premium.

Booster. In a sell-off, the maximum realized downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long position in the underlying asset, upside losses are capped (as for a covered call), but downside losses are not.

Collar. Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any price appreciation in the underlying asset above the strike price of the call option.

Call Purchase. Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is below the strike price of the call option.

Put Purchase. Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is above the strike price of the put option.

Straddle or Strangle. The seller of a straddle or strangle is exposed to increases in the underlying asset's price above the call strike and declines in the underlying asset's price below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the underlying asset would have limited losses should the underlying asset rally. Covered writers are exposed to declines in the underlying asset position as well as any additional exposure should the underlying asset decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the underlying asset above the strike price of the call option.

Put Spread. The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher-ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower-struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying asset will have downside protection between the higher-strike put and the lower-strike put. However, should the underlying asset's price fall below the strike price of the lower-strike put, investors regain exposure to the underlying asset, and this exposure is multiplied by the number of puts sold.

Call Spread. The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the underlying asset and gives up the spread between the two call strikes should the underlying asset rally.

Butterfly Spread. A butterfly spread consists of two spreads established simultaneously – one a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price; the maximum loss is the net debit.

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