J.P.Morgan

Global Quantitative & Derivatives Strategy
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# Tactical Equity Derivatives Strategy

## Analyzing How Single Stock Gamma Imbalances Impact Volatility Skew and Earnings Moves

**Market Fragility and the Evolution-Impact of Dealer Gamma Imbalances:** U.S. market depth remains thin (Fig. 1), sparked by bouts of volatility in 2018 related to rising rates and fears of a less accommodative Federal Reserve. Since, the market has not been able to reach escape velocity from what we previously refer to as market fragility (here), a vicious cycle and feedback loop between liquidity, volatility and investor flows. The COVID-19 pandemic is the latest volatility event (i.e., the spark) to cause a market fragility event. This low liquidity environment lays the groundwork for dealer positioning (i.e., gamma imbalances) that can further exacerbate existing market trends, and volatility dynamics (e.g., prices up/volatility down to prices up/volatility up). As such, market participants now closely follow large dealer gamma imbalances ahead of potentially impactful macro events, primarily in options on the S&P 500, to gauge potentially trend accentuating dealer flows.

A similar positioning interest is now evolving in single stock options as we are witnessing a surge in single stock option volumes (Fig. 2), driven primarily by large-cap technology and momentum stocks (here). Single stock option volumes now constitute ~38% of total option volume, up from ~19% last year, and a longer-term trend average of ~17%. Recent media attention (here, here) surrounded a number of large call option trades in advancing large-cap technology stocks (e.g., FB, GOOG, ADBE, AMZN, MSFT, CRM, etc.), that were recently suspected of catching dealers short gamma, requiring dealers to hedge positioning, and fuel an existing advancement of these stocks higher. However, as these positions rolled off the stocks retraced gains. While we are not concerned about the overall impact of dominant whale-type investors, exceptionally large trades in thin markets, especially in sectors (e.g., technology) or investment styles (e.g., momentum) considered overbought or oversold, increase the potential for exacerbated stock moves as dealers hedge exposure.


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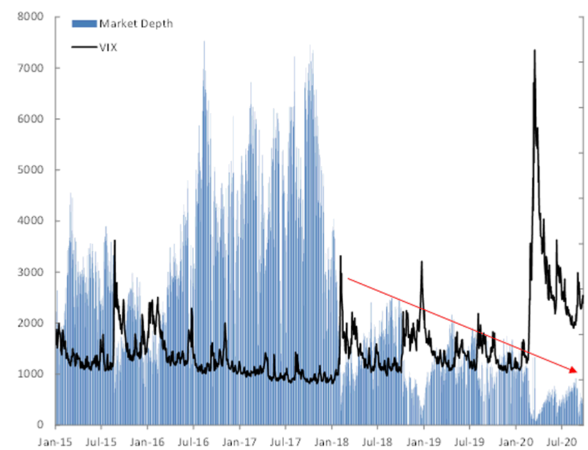
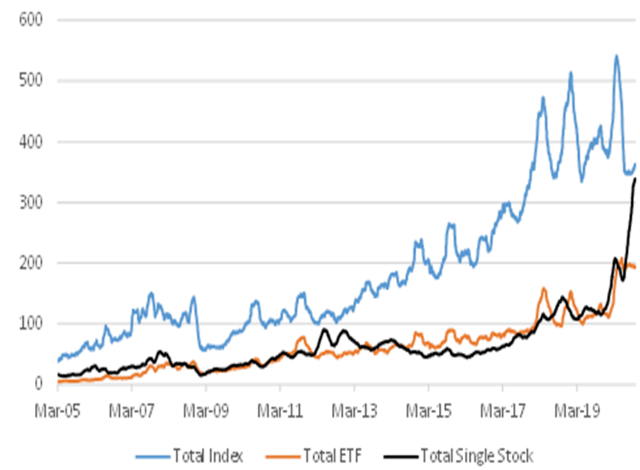
We find this particularly true when market depth is thin and when a specific stock / sector catalyst is approaching. Below, using the option liquid members ($10M avg. notional value over a 20d period) of the S&P 500, we analyze the impact of single stock gamma imbalances on volatility skew and stock performance around earnings reports.

**Figure 1: The vicious cycle of thinning market depth and elevated volatility stands to become more apparent in single stock options as their market share grows**




Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg.

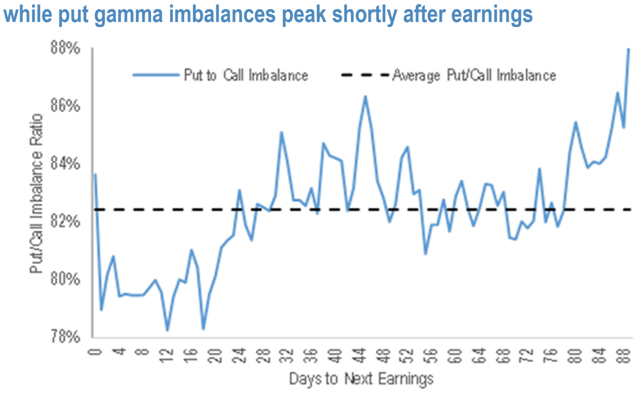
**Figure 2: Single stock option volume has spiked in 2020 and now accounts for ~38% of total option volume**




Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg.

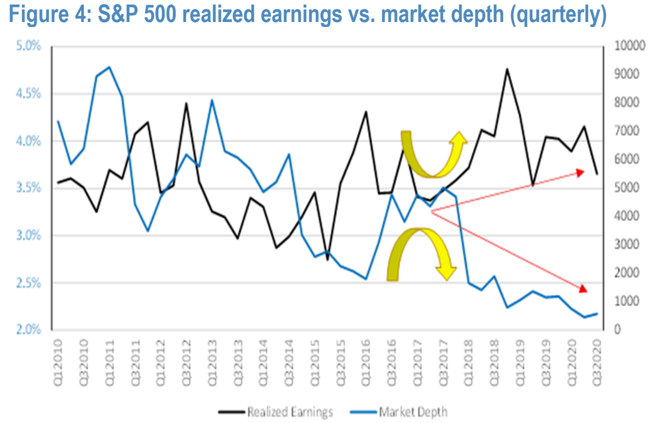
**Analyzing the Impact of Single Stock Gamma Imbalances around Earnings:** Investors may find the duration of peak imbalance with respect to a stock's earnings date by analyzing how the put gamma outstanding to call gamma outstanding ratio varies for each stock with respect to the next earnings release date (i.e., the time between today and the next earnings release). We then average out the ratio for each stock to see variations with respect to upcoming earnings. Our key takeaways suggest the average imbalance largely skews towards call gamma as the average ratio of put imbalance / call imbalance is less than one. The call gamma outstanding spikes as earnings approach, evident as the put / call ratio is lowest closest to the earnings release. The put gamma also spikes on the earnings date and is the highest just after the day of the release with the onset of the next quarter and drops in the weeks that follow (Fig. 3).

**Figure 3: Single stock call gamma imbalances spike into earnings while put gamma imbalances peak shortly after earnings**




Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg.

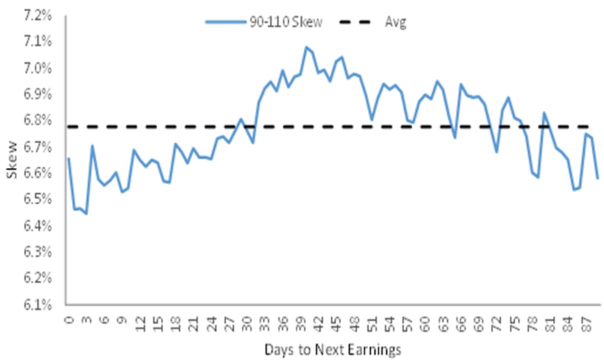
**Figure 4: S&P 500 realized earnings vs. market depth (quarterly)**




Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg.

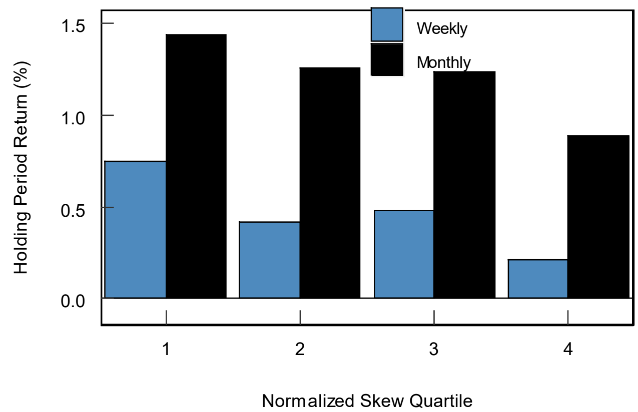
**Directional Signal of Option Implied Skew:** The put / call ratio alone contains insufficient information to draw conclusions on investor positioning as an increase in option open interest could represent either buying or selling activities. However, by looking at the change in skew, it is clear that call option buying dominates the trading activity into earnings. Short dated single stock skew on average flattens materially as the earnings date approaches (Fig. 5), indicating increased demand for calls. Academic literature suggests that the dynamics in skew may be driven by informed investors, as they prefer to use short dated options to express high conviction views[1]. In the past, we show that skew carries directional signals in general market environments[2]. When applied to earnings, the effects are more pronounced. When we sort the 1M 90-110% skew, normalized by ATMF volatility, of all reporting names over the last 5 years into quartiles, and measure stock performances, we find that flat skew names outperforms steep skew names. Below, we show the subsequent one-week and one-month performances sorted by quartile (Fig. 6). **The flat skew quartile outperforms the steep skew quartile by around 53 - 54 bps** in both time windows. Our results are consistent with the informed trading interpretation of short dated skew, and show that most of the profits accrue relatively quickly around earnings.

**Figure 5: The evolution of single stock skew into and after earnings**




Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg.

**Figure 6: Post earnings stock performance sorted into normalized skew quartiles (1 = flat skew, 4 = steep skew)**




Source: J.P. Morgan

[1] What does the individual option volatility smirk tell us about future equity returns? Xing, Y., X. Zhang, and R. Zhao, Journal of Financial Quantitative Analysis, 2010

[2] Signals from Option Markets: why stock investors should follow options even if they don't plan to trade them, M. Kolanovic et al. 19 May 2010

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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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