Market Makers' Gamma Exposure Projection

Why Track Gamma Exposure?

Tracking gamma provides traders with critical insight into how market makers hedge their massive options portfolios as the underlying price fluctuates. The sheer size of market makers' positions makes these hedging flows significant. With the recent surge in popularity of daily 0DTE (zero days to expiration) options, understanding gamma exposure has never been more crucial.

The Obsolete Approach to Gamma

Traditionally, gamma has been viewed through a linear lens, calculated by simply multiplying open interest (OI) by the gamma at each strike price. However, in today's market, this method is outdated and flawed for three main reasons:

- **OI Doesn't Reflect Market Makers' Positions:** *(Click here to learn more).*
- **Gamma Is Cumulative Across All Options:** All options in a market maker's portfolio contribute to the overall gamma landscape
- **Gamma Is Dynamic and Convex:** Gamma peaks around the strike price and increases as expiration nears (illustrate with a figure).

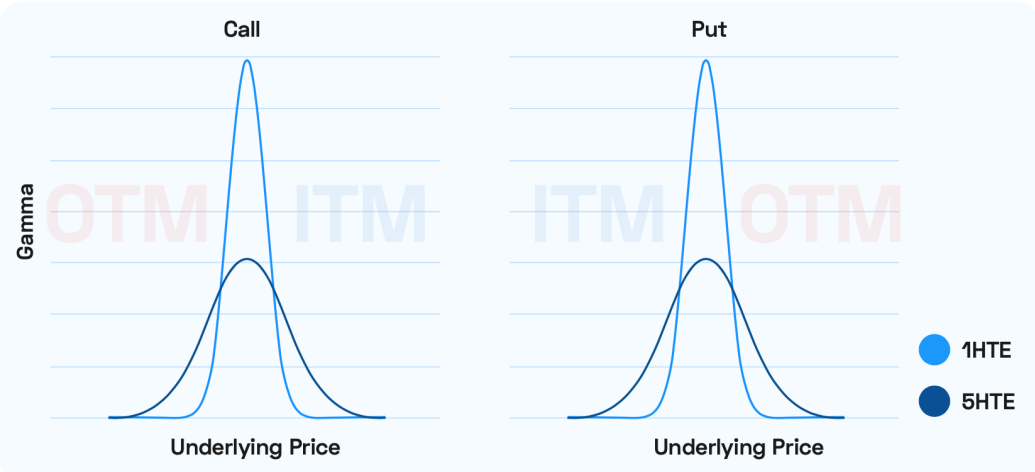

Figure 1. Options Gamma vs Underlying price

A Modern Approach: Our Gamma Exposure Heatmap

We pioneered this approach in the spring of 2022 to address the limitations of traditional gamma tracking methods. Our heatmap corrects these shortcomings by calculating the entire gamma exposure of market makers' portfolios and projecting it throughout the trading session. Instead of a linear value, we provide a surface map where positive gamma is shown in blue and negative gamma in red.

You'll notice heightened convexity as the session progresses, largely due to the increased influence of 0DTE options as they approach expiration.

The Dynamic Nature of Hedging

Market makers' hedging is a constantly shifting process, with multiple players competing in real time. Our tool captures this broader context by visualizing the complete gamma exposure landscape.

Visualization Options

We offer multiple ways to explore gamma exposure:

- **3D Surface:** This visualization shows a surface map, with yellow markers representing the closing prices of candlesticks for your chosen timeframe.
- **Heatmap:** A flattened version of the 3D surface for easier analysis.

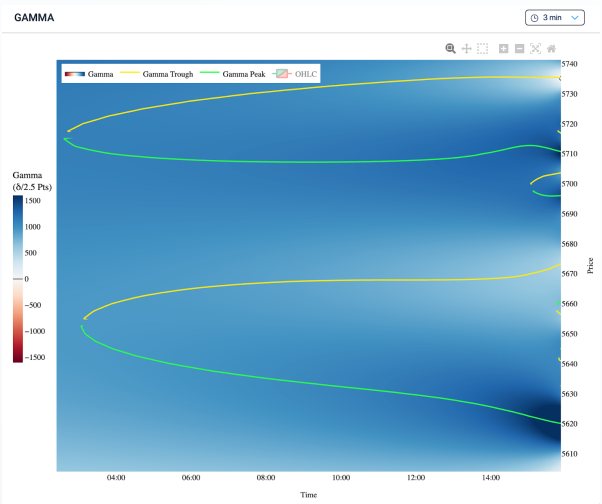

Figure 2. Hetmap

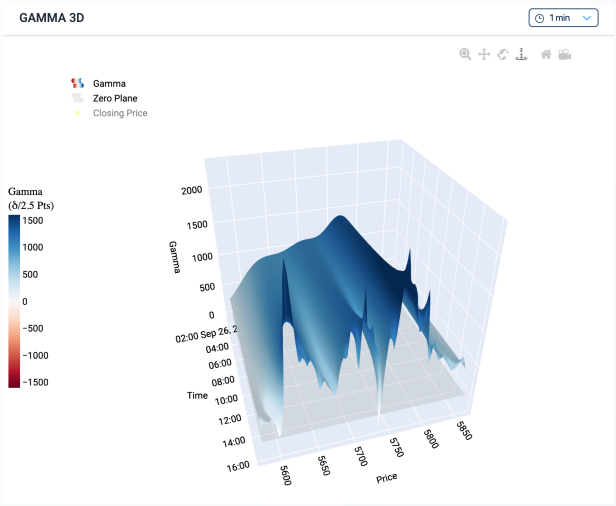

Figure 3. 3D Surface

How to Read the Gamma Heatmap

Positive Gamma Exposure

In a **positive gamma environment** (blue background), market makers hedge by trading the underlying asset—typically ES futures for SPX options—against price movements. As gamma increases, market makers are more likely to suppress volatility, which often leads to slower price movements or even price rejections.

- **Gamma Peaks:** Represented by green lines, these peaks indicate areas where gamma's influence is strongest, often acting as support or resistance levels.
- **Gamma Troughs:** Represented by yellow lines, these are areas of low gamma influence, often referred to as "paths of least resistance," where the underlying asset is less likely to encounter strong hedging pressure related to gamma.

Looking at the 3D surface, you can think of it like climbing a mountain—it's much harder to climb uphill than to come down. The same idea applies to gamma. The higher the surface, the higher the gamma exposure. As the price moves against this "uphill" gamma exposure, we expect stronger hedging pressure from market makers to resist the price movement. The top of the mountain represents the key support or resistance levels, where price movement tends to slow down. Once the price moves over the peak, it can fall into the valley with less resistance.

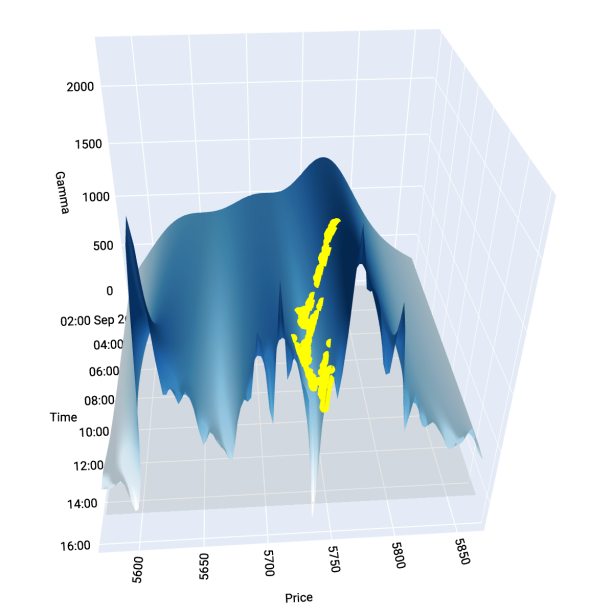

Figure 4. 3D Surface with candle stick closing price

Negative gamma exposure

In a **negative gamma environment** (red background), market makers hedge their options portfolio by trading with the price movements of the underlying asset. In these environments, market makers extract liquidity from the market, leading to higher volatility and wider price swings. The most volatile point typically occurs where gamma exposure is locally low because the hedging flows are strongest there. Keep in mind, as market makers actively hedge their positions, a large customer order can quickly change the market landscape. In this case, the underlying price becomes more sensitive to large orders.

- **Gamma Peaks:** Represented by green lines, these indicate areas where price movement is expected to be least volatile, similar to what we see in a positive gamma environment. These levels often act as support or resistance.
- **Gamma Troughs:** Shown by yellow lines, these represent areas of high volatility. The hedging flows here are stronger and follow the direction of the underlying price movement, making the price more sensitive to large customer trades.

Continue to the next page for case studies →

Examples

The following examples showcase how our daily model heatmaps work. The same dynamics apply for the intraday model.

Rejection of High Gamma Exposure Area

In this image, the SPX is in a positive gamma environment (blue color). As the underlying price rises and moves toward a region of higher gamma exposure (darker blue), we expect strong selling pressure from market makers hedging against price movements. In such cases, the high gamma level acts as resistance to the price.

Figure 5. Rejection of an overhead high gamma area

Remember, gamma works both ways. In a positive environment, the hedging pressure works against price movement in both directions. If the price moves downward into an area of high gamma exposure, we would expect market makers to apply buying pressure, acting as a support level.

Figure 6. Support found in a high gamma area below.

Slowdown in a High Gamma Area

A rejection may not always occur. However, in areas of high gamma exposure, we often see a significant slowdown in price movements.

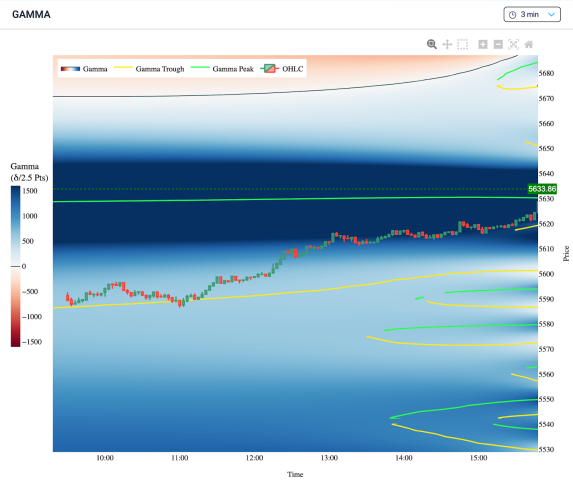

Figure 7. Trend Slowdown in High Gamma Zone

Path of Least Resistance: Low Gamma Areas

Understanding these dynamics, one can see that moving toward areas of lower gamma exposure should structurally be easier for the underlying price, as there is less counter trend hedging flow compared to moving into a high gamma environment.

Figure 8. Underlying Price Seeking Path of Least Resistance

Transitioning Between Gamma Environments

Moving From a Negative to Positive Gamma Environment

In a negative gamma environment, market makers hedge with the price movement—buying in a rising market and selling in a downtrending one. This creates a more volatile landscape, with sharper and wider price swings.

If the price moves from a negative gamma environment to a positive one, a major shift in dynamics occurs. Instead of hedging with the price movement, market makers now hedge against it. It's like going from pressing the gas pedal to suddenly hitting the brakes.

This shift often provides significant support or resistance, depending on the direction of the move. Remember, gamma impacts price movement both ways.

Figure 9. Underlying Price Finds Support as Gamma Flips Positive

Figure 10. Underlying Price Encounters Resistance as Gamma Flips Positive

Moving From Positive to Negative Gamma

On the other hand, moving from a positive gamma environment to a negative one creates a different scenario. In this case, market makers go from hedging **against** price movement to no longer being influenced by gamma (where gamma equals 0). If the price continues into a negative gamma environment, market makers would now hedge **with** the price movement, potentially amplifying the existing trend.

Figure 11. Acceleration in Price Movements as Gamma Flips Negative