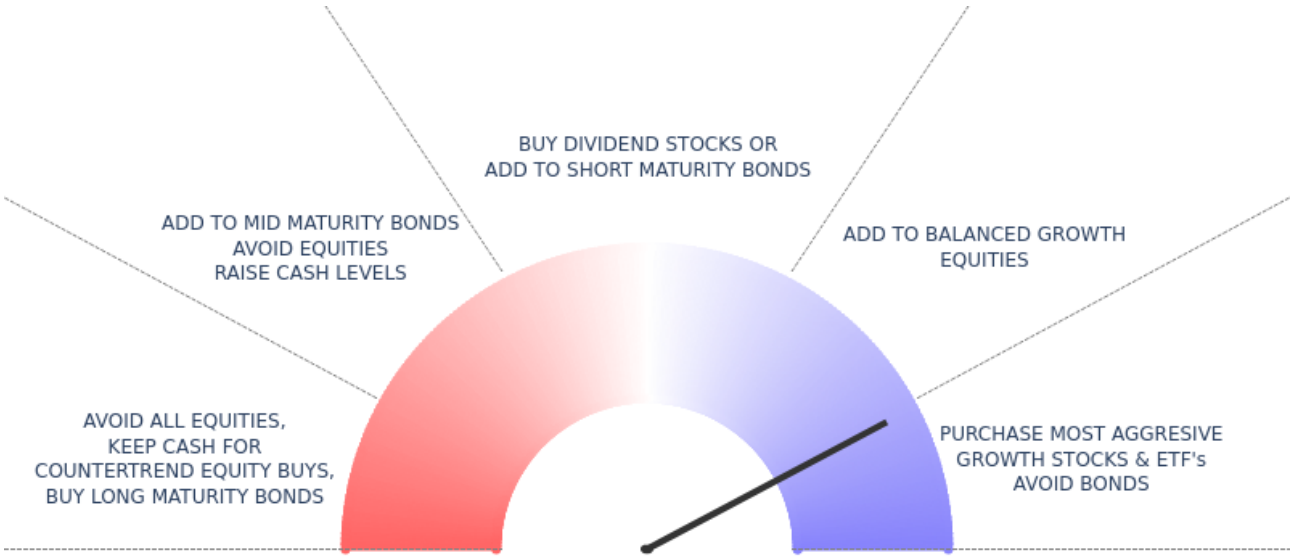


Model Score: 69.0

Daily Change: -18.0

Stance: Risk-On

Last Investment: SPY, 409.47, 2023-04-14

Updated:2023-09-15 18:15

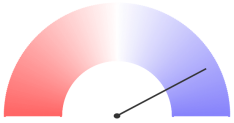
September 15, 2023

Learn how to use this report

The Riskdial model score research provides a complete analysis of the Riskdials Model.
It answers the questions:

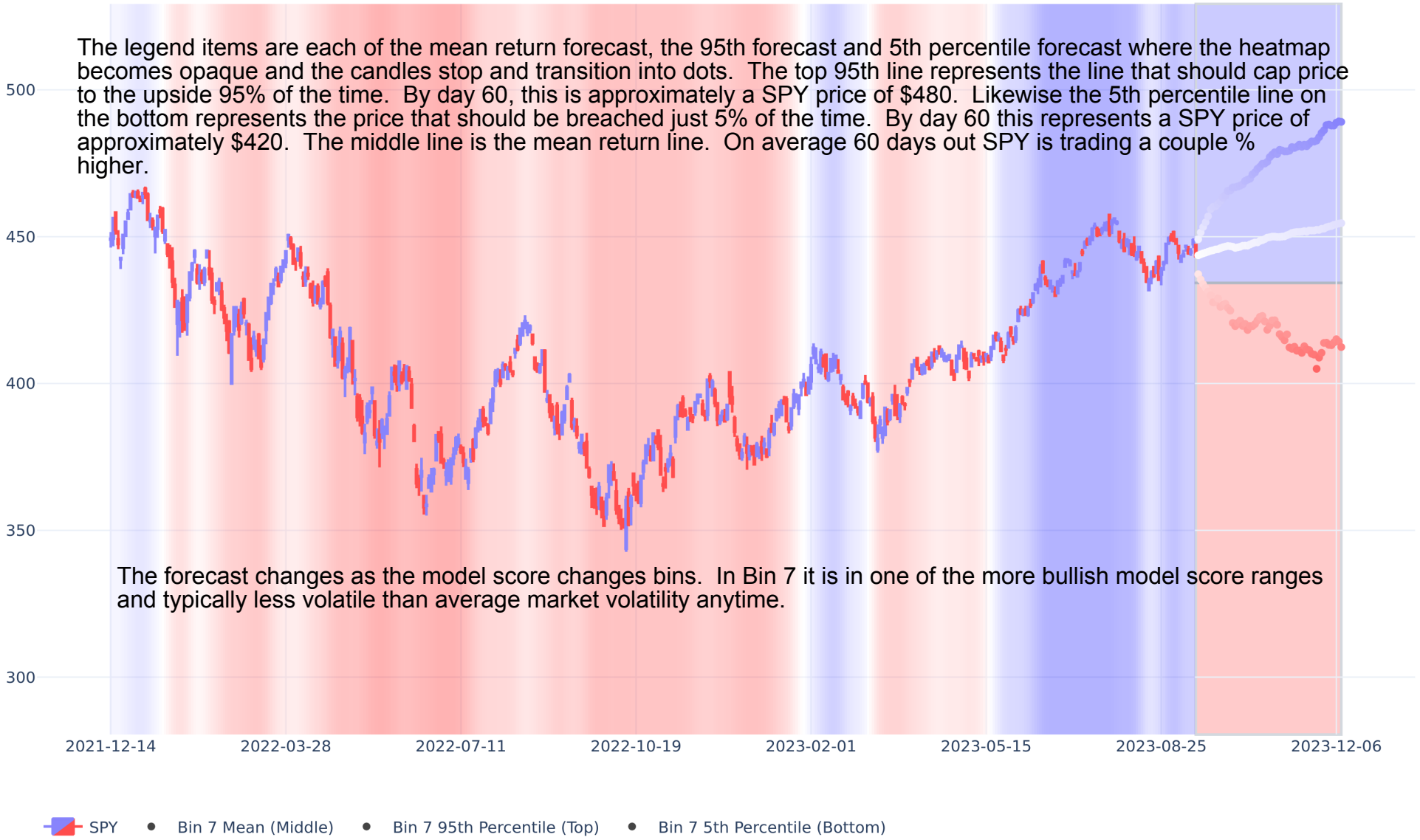
1. What kind of volatility can be expected for each model score range, and what does that volatility look like?
2. What kind of returns can we expect for each model score range?

The report answers these questions over a variety of timeframes and updates daily and as such it can help both set probable expectations of what might transpire in the future, as well as to prevent suprises.



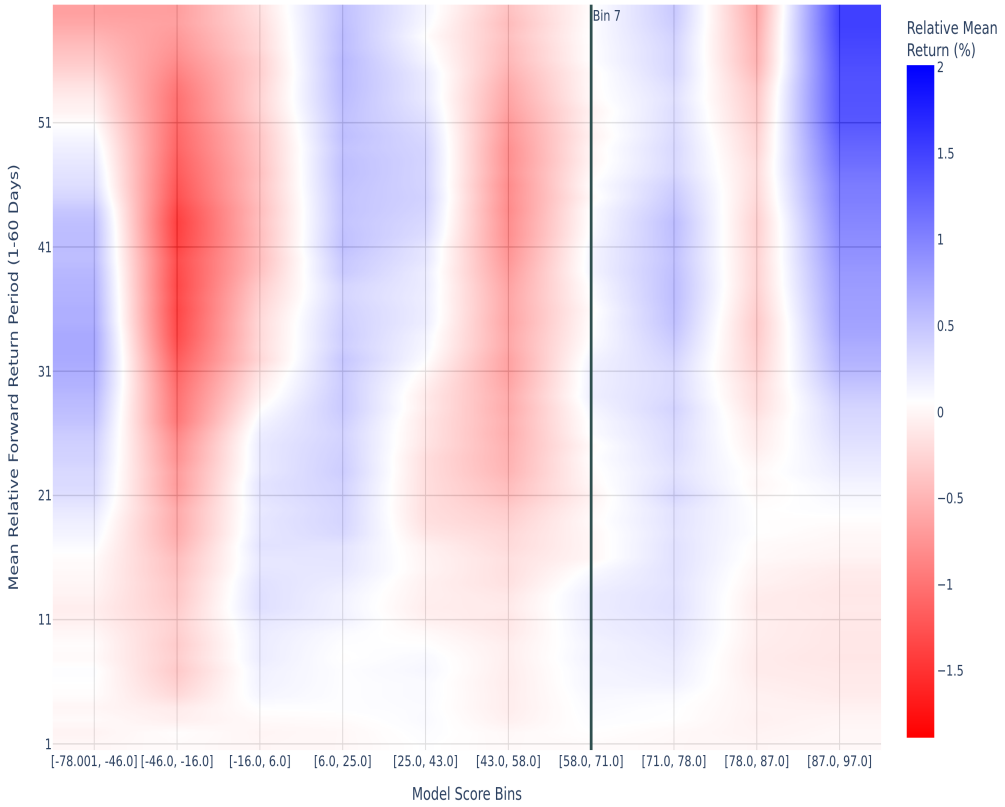
The model score is highlighted by the background heatmap. Darker reds are more negative model scores, blues more positive model scores.

Model Score Derived SPY Price Ranges



SPY Mean Relative Forward Return by Model Score Bin map

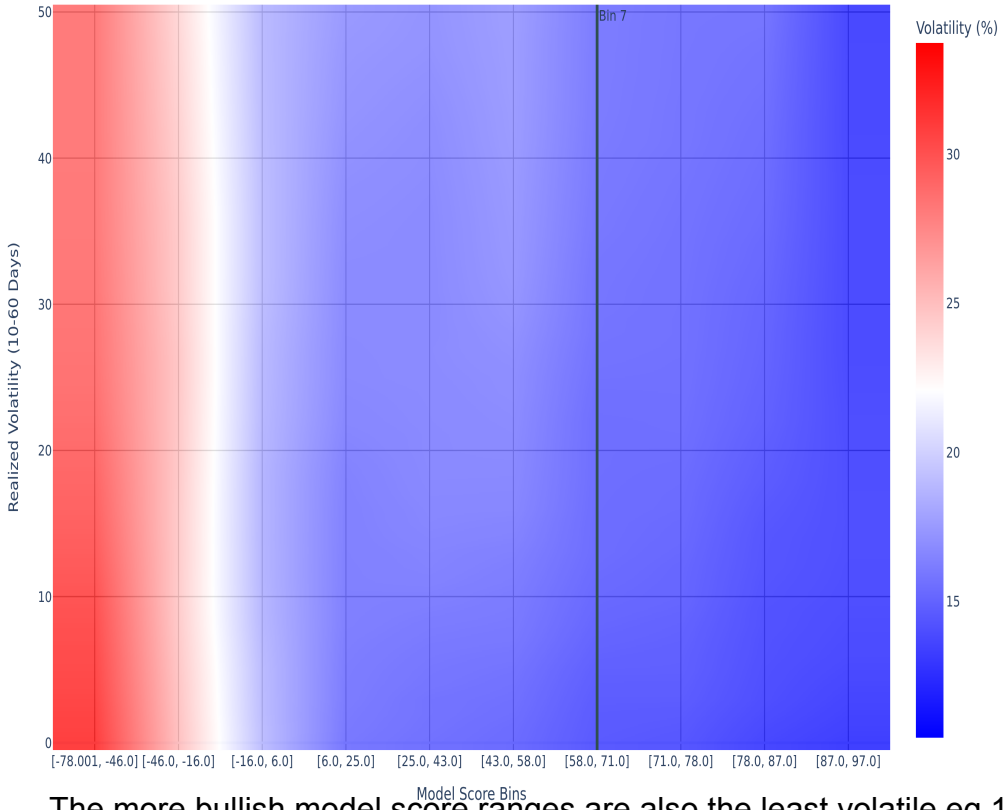
The mean relative return heatmap shows which model score binds are more bullish or more bearish on average, relative to normal SPY returns.



The heatmap calculates relative returns on each time period from 1 day to 60 days. In the image above it is clear the most bullish model score bin is where the score is the highest, and the most bearish is where the score is in the second lowest range. In each of these score ranges the SPY returns close to +2% above normal spy returns and -2% below normal SPY returns on a 40-60 day time period. More neutral ranges are depicted by lighter reds and blues.

S&P500 Forward Realized Volatility by Model Score Bin map

The volatility map shows average SPY forward realized volatility for 10 days to 60 days.



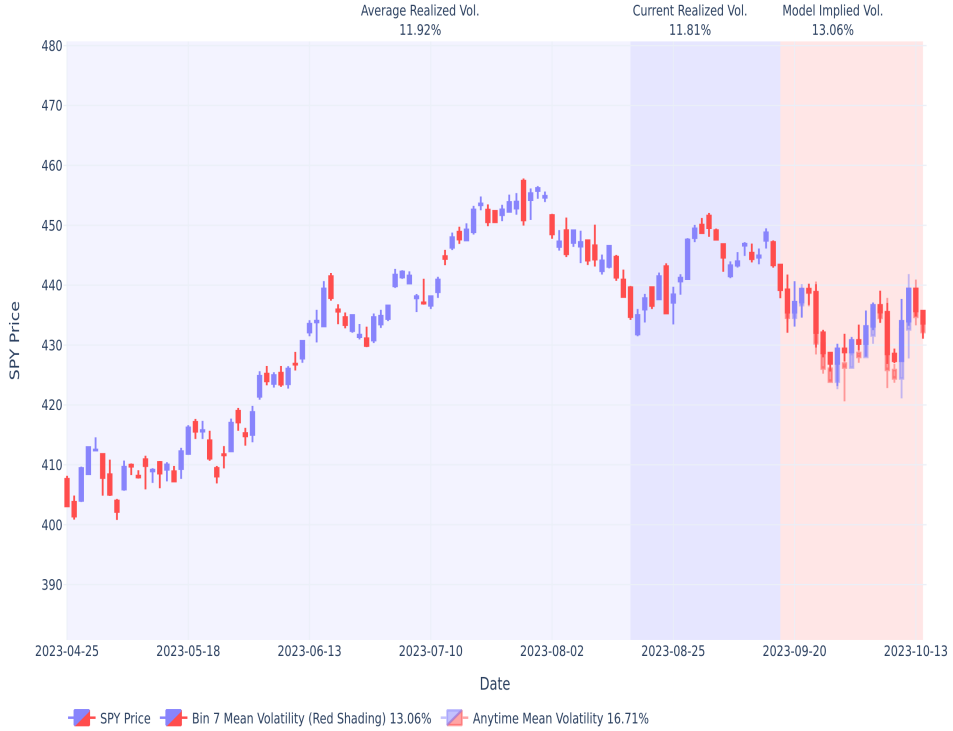
The more bullish model score ranges are also the least volatile eg 11%. As the model score goes lower, the volatility goes higher, on average until it goes materially higher in the bottom 2 model score ranges and averages about 33%.

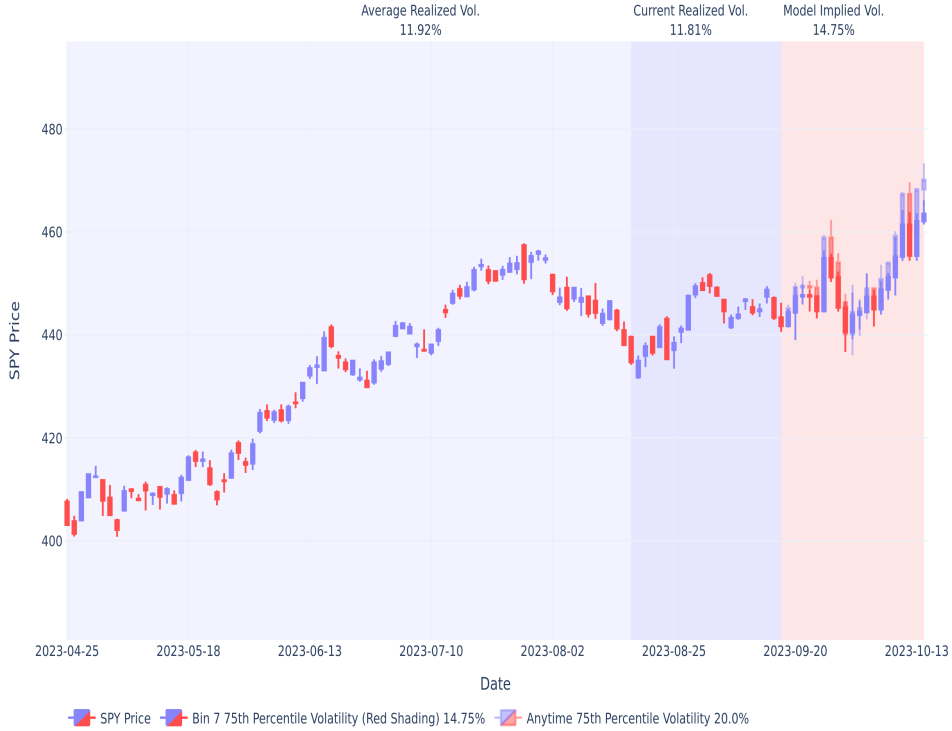
The main thing that updates on these charts on a daily basis are the charcoal lines which indicate the current model score range.

Model Bin Implied Mean Volatility

Model Bin Implied 75th Percentile Volatility

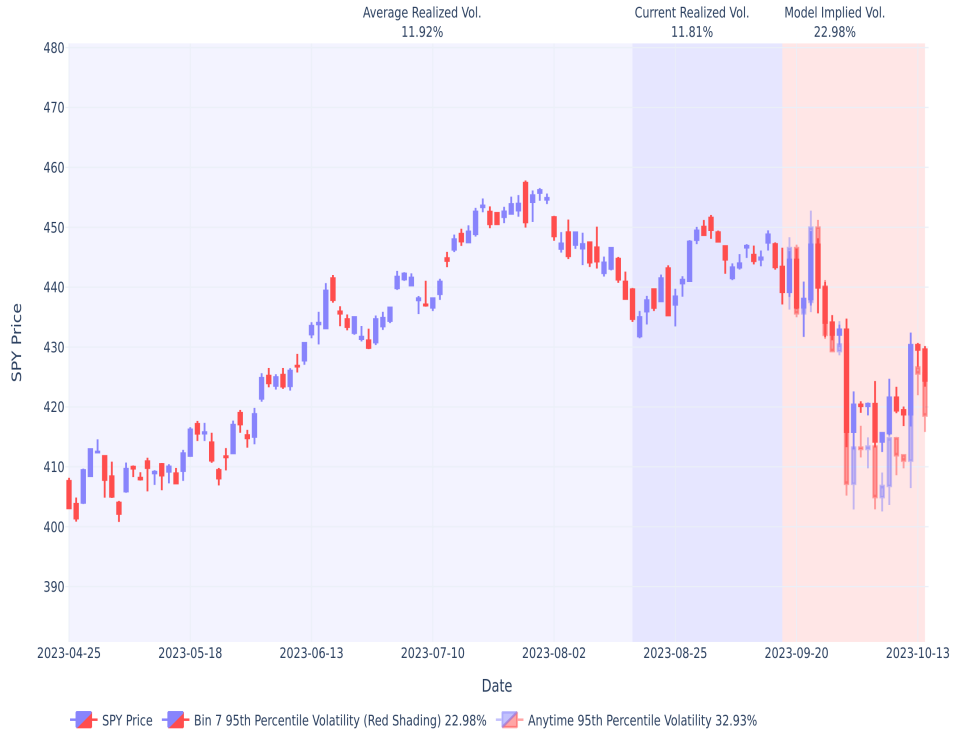
What does a given number of realized volatility, either forecast or historical look like? These candlestick charts visually contextualize 21 day realized volatility numbers by what the average of the realized volatility on the chart to date (light blue), the last 21 days of realized volatility (darker blue) and what the model expects realized volatility to be COMPARED to what anytime volatility is on the SPY. These comparisons are done for each of the average volatility, the 75th percentile volatility, the 95th percentile volatility and the 99th percentile volatility.



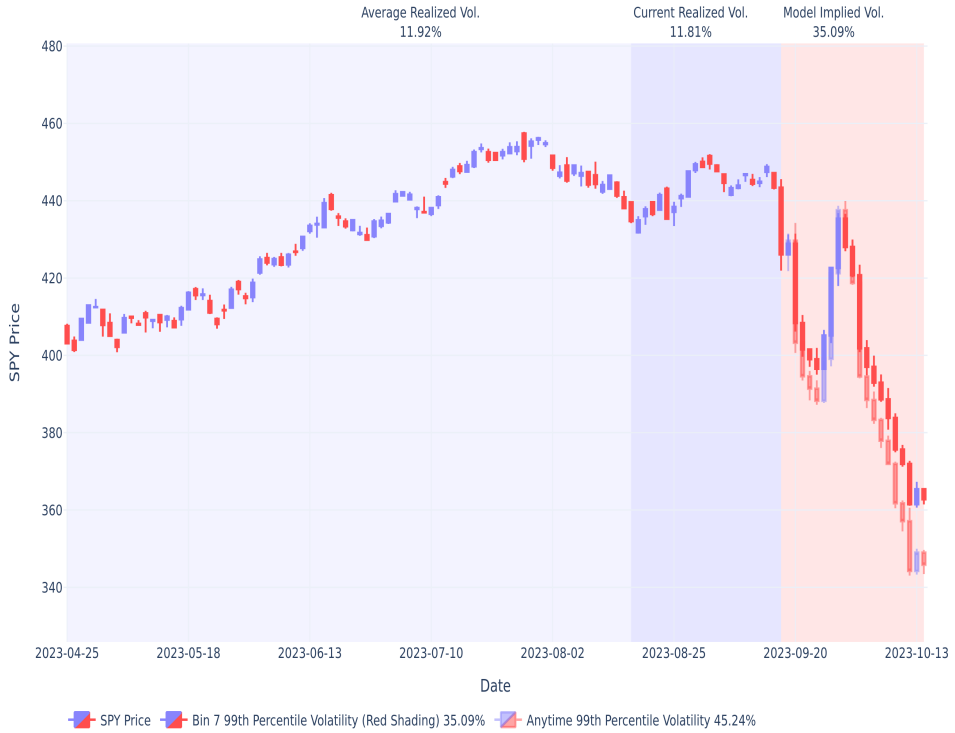


The point of the forecast in the red shading is not to illustrate a price destination but rather to compare how the model implied volatility is different to anytime volatility in the SPY. If the model score is more bullish the candles should move around less than normal volatility and vice-versa. This is depicted on the charts above but the difference is not particularly material. Visually you can see the opaque candles moving around slightly less than the translucient candles. The legend also shows you the volatility that can be expected. The model predicts an average of 13% Vs. anytime of 16.7% a 3% difference. The model predicts a 75th percentile of 14.75% compared to an anytime of 20%, a 5% difference. Since this model is meant to cut off tail risk by following relative trends in Risk-On to Risk-Off assets, we should see a material difference, both visually and numerically on the next page.

Model Bin Implied 95th Percentile Volatility

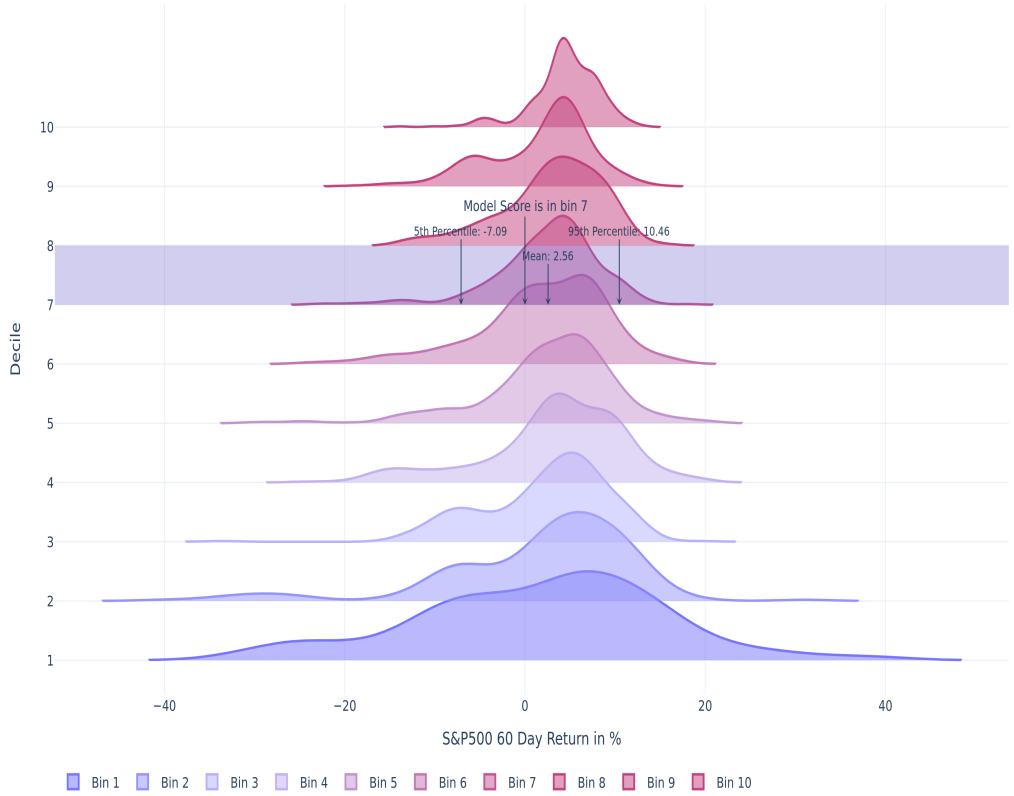


Model Bin Implied 99th Percentile Volatility

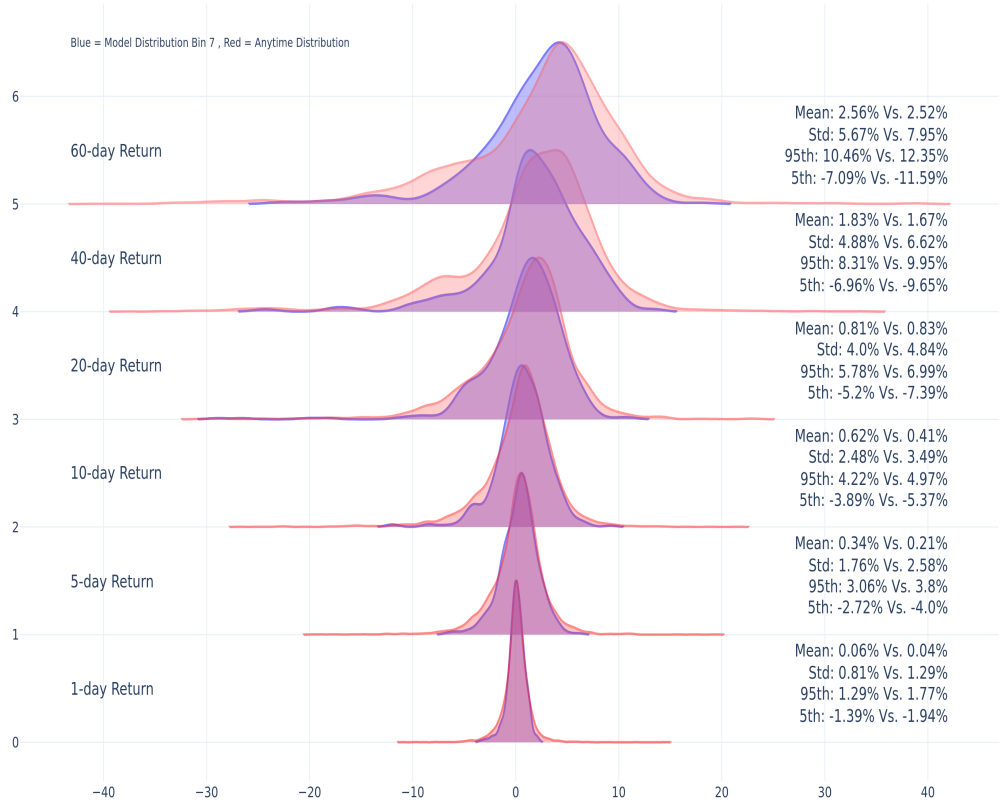


This page highlights both the 95th percentile realized volatility and 99th percentile realized volatility for the current model score range compared to the anytime SPY volatility. The candlestick forecasts are diverging materially. On a 95th percentile basis the SPY can be expected to realized lower than 23%, compared to the anytime 95th percentile of lower than 33%, approximately 10% lower volatility. The exact same phenomena can be seen with the 99th percentile. The main point here is that when the tails of volatility suggested by the model score are about 10% lower than the tails of the anytime SPY volatility, the model is likely suggesting a risk-on environment. The opposite is true of much lower model score ranges. It is very important to understand that these candlesticks are not predicting price direction at all, they are simply simulating a mostly random price path based on the current market score and giving you a visual comparison of how that might differ to a symmetric normal market volatility.

SPY 60 Day Return Distributions by Each Model Bin



SPY Multi Day Return Distributions by Current Model Bin



These two distribution charts highlight the range of SPY returns that can be expected given the current model score on a 60 day basis (left) and over multiple time periods (right). The important thing to note from these charts is that higher model scores are associated with lower volatility (peakier distributions and tails that do not extend as far. The chart of the left highlights the model score range on the current day (7th bin) and overall consistent with a Risk-On environment. As the model score goes lower the range of SPY returns widens and the distribution of returns flattens. SPY returns are much more volatile, consistent with a Risk-Off envioronment.

Chart 1 - Model Score Derived SPY Price Ranges

The Model Score Derived SPY Price Ranges presents two main pieces of information, the historical SPY price (candlesticks) and associated model score bin (background heatmap) as well as the forecast based on the model score bin.

1. Candlesticks and Heatmap: The candlesticks and heatmap allow a visual representation of historical price and the model score range through history.

- Heatmap Color: The heatmap color denotes the bin that the model was trading in through history. Deeper blues indicate strongly positive model scores while deeper reds indicate strongly negative model scores, on average.

2. Model Score Bin Forecast: The model score bin displays a forecast range using a mean return, 95th percentile return, and 5th percentile return.

- Mean Return: The historical average return for the SPY ETF associated with the current model score bin.

- 95th Percentile: Indicates a return that you would expect, based on history, to be exceeded just 5% of the time.

- 5th Percentile: The return that you would expect lower just 5% of the time.

- Color Shading: Positive returns will receive blue shading while negative returns will receive red shading. The mean return line is indexed to the 5th and 95th percentile lines - if the range of values between the 95th and 5th percentile returns is large the mean return line is likely to appear a neutral white. This helps explicitly show the lesser significance of the mean return forecast.

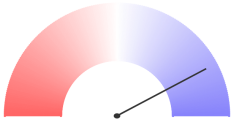


Chart 2&3 - Model Score Relative Returns and Volatility Maps

These maps quantify both relative returns (return in excess or deficit of normal SPY returns) and realized volatility (how much price can be expected to move around) for each of the 10 model bins.

1. Relative Returns Maps: The relative returns map calculates SPY returns for each day from 1-60 days as well as each model bin. This allows us to very quickly detect where returns may be more positive or more negative than normal, and on what time-period those returns occur on.

- Heatmap Color: Deeper blues indicate stronger positive relative returns. Deeper reds indicate stronger negative relative returns. Lighter blues, whites and lighter reds indicate returns are closer to normal market returns.

2. Volatility Maps: The volatility maps calculate SPY realized volality for each period from 10 day realized volatility to 60 day realized volatility and for each model Bin.

- Heatmap Color: Deeper blues indicates lower realized volatility in a given model score bin. Deeper reds indicates higher realized volatility.

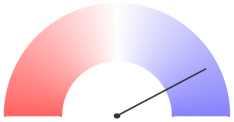


Chart 4 to 8 - Model Bin Implied Volatilities

These four candlestick charts simulate expected realized volatility based on the model score bin and compare them to a symmetric scenario of normal market realized volatility.

These charts are useful for identifying when expected realized volatility is materially different from normal market volatility.

1. The charts presented each show the mean, 75th, 95th and 99th percentile volatilities for the current market bin, respectively.

- Background Color Shading: Each candlestick chart is presented with a light blue (the average realizedd volatility to date (as shown on the chart), a medium blue (the average realized volatility of the past 21 trading days) and a red (the expected realized volatility contrasted to the normal market volatility).

- Candlestick Color Shading: The historical candlesticks are presented in the blue/red combination. Similarily the model derived volatility forecast candlesticks are in the same shade. The normal market volatility candlesticks are compared in a translucient shade.

- Candlestick Forecast Divergence: A model Bin is particularly important when it's volatility forecasts differ materially from the normal market volatility. This phenomenon is evident in both the more bullish and bearish deciles when the candlesticks exhibit significantly different returns and ending points.

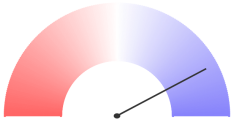


Chart 9 and 10 - Model Bin Return Distributions

The Model Bin Return Distributions visualize return assymetries and biases of SPY returns and volatility. Two charts are presented. The first chart depicts SPY 60 day returns for each Model Bin (1-10). The second chart depicts multi-time period returns (1-60 days staggered) for the current Model Bin.

1. SPY 60 Day Returns by Model Bin

- This chart shows the point in time SPY returns at 60-days forward broken out in each row by model Bin. The top of the chart shows Bin 10, the most bullish model score range. The bottom of the chart shows Bin 1, the most bearish model score range. A peakier distribution with less values distributed widely amongst the X axis eg. Bin 10 indicates a more predictable bullish distribution. A flatter, wider distribibution is indicative of a more volatile Bin and where point in time estimates are more unpredictable eg Bin 1.

2. SPY Multi Period Returns By Current Bin

- This chart filters the data by the current Model Score Bin - and then plots multi period returns from each day from 1 days starggered to 60 days. The chart compares each periods return to the markets normal returns during that period to highlight similarities and anomalies.