

Project #2: Predicting implied volatilities based on historical data

Description: The objective of this program is to determine whether we can predict the direction of implied volatilities with statistical significance.

Pseudocode for program:

Let Threshold = Percentile Ranking for which only implied vols above/below this value will be considered.

For each security x in [ImpliedVolatility.csv]

{

1. Assign a percentile ranking for each day after 1/1/2001. Percentile ranking should be from 0 – 100 and extend over past 200d. We only use data after 1/1/2001 because data prior to 1/1/2001 is not as reliable.
2. For each day from 1/1/2001 to Present: {
 - a. Check if Percentile Ranking > Threshold.
 - b. If PR > Threshold then:
 - i. Compute percentage change in implied volatility between current day and current day + 1. This change can go in vector named Exit_1_d.
 - ii. Compute percentage change in implied vol between current day and current day + 2. This value can be inserted into vector named Exit_2_d.
 - iii. Continue this for current day + 100. There should be 100 vectors, each of which represent percentage changes in implied volatility from the current day to the current day + x, where x ranges from 1 – 100.

After a trade qualifies, the next trade cannot qualify until at least 5 business days. The purpose of this is to minimize the problem of auto-correlated trades.

} // end for each day from 1/1/2001 to Present.

} //end for each security x in [ImpliedVolatility.csv]

Compute summary stats for all 100 vectors (daily t-stat, mean, stdev, skew, kurt, % winning trades, % losing trades) and graph the mean as a function of time.

//end pseudocode

Example #1: Set the threshold to be 90. If the Percentile Ranking of Implied Volatility is greater than 90 (or in top 10%), then we sell implied volatility. The hypothesis is that when implied volatility is very high it will fall very sharply in the near future.

Example #2: Set the threshold to be 10. If the Percentile Ranking of Imp Vol is **less** than 10 (or in bottom 10%) then we **buy** implied volatility. The hypothesis is that when implied volatility is very low, it will rise sharply in the near future.