

## Scope of Work

Hedge funds strategists require extensive statistical analysis of historical data on securities prices in order to identify and predict trading opportunities. For this project we employed a battery of statistical and time series techniques such as autocorrelations and ARCH models.

## Project Details and Methodology

### **A: Testing probability distribution of the returns of chosen securities**

Our client proposed normality as null hypothesis regarding the distribution of returns. We tested the null hypothesis using a set of statistical tests. Client had asked us to test for and determine periodicities for cycles in observed behavior. Lillifors and Anderson-Darling tests were employed along with Jarque-Bera in order to discount for smaller sample sizes such as one month.

### **B: Studying autocorrelation structure and mean reversion in price data**

Analyzing autocorrelation structure of the price series helps in quantifying memory of the series and the kind and extent of influence the past observations have on prices. Negative autocorrelations imply tendency of mean reversion in the price series. This property is especially important in deciding the entry and exit points for hedge funds taking positions in various securities. We identified significant autocorrelation coefficients as well as lags with negative autocorrelations.

### **C: Predictive models**

Using the results of earlier section (Sec B), we were required to build predictive models for the data. We focused on GARCH-class models for the price data. The final model was selected after simulating out-of-sample fits of various probable models.