***Are different volatility indices good substitutes for each other?*** ***If they are substitutes (ECONOMIC DEFINITION OF SUBSTITUTE), they will have high correlation (scaled covariance) and similar variances.***

**DEFINITIONS:**

* 1. What is an equity index?
     1. Why buy the index? “Buying the market” (SOURCE)
     2. DJIA is a subset of S&P is a subset of Russell?
  2. What is a volatility index? “Fear index”
     1. Investors who are using it as a hedge---protect against market downturns (CBOE)
  3. Why does this matter?

**Exploratory Data Analysis/Insights**

1. Autocorrelation—do percentages correct for this?
2. Data distributions—normal?
3. Do volatility indices trend with each other? Do equity indices trend with each other?
   * 1. Rolling means over 15 days, 30 days, 6 months, 12 months
     2. Check for autocorrelation
     3. Null: No correlation between indices
   1. Why ten years?
      1. Lots of volatility in the past ten years
      2. Boom/bust cycle, crisis🡪 Swings
         1. GDP
         2. Unemployment
         3. CPI
      3. 2500 trading days, 6 attributes, 15000 datapoints
   2. Does it hedge on a 50/50 portfolio versus 100% either?
      1. Over ten full years
      2. Throughout ten years
      3. Bootstrap?

**Insights**

1. How do different volatility indices trend with equity indices?
   1. Null: Volatility does not correlate with matching
   2. Null: Volatility does not correlate with noncorresponding.
2. Boom/bust cycle, crisis🡪 Swings.
   1. GDP
   2. Unemployment
   3. CPI
3. Past ten years have been one of most volatile (SOURCE), so if this strategy works, then it should work for more nonvolatile/consistent times.