**Intervention analysis, change point detection**

**Background:** An interesting experiment took place beginning in April 1979 in Albuquerque, New Mexico. The local police department tried a procedure they thought might have the effect of reducing driving-while-intoxicated (DWI) related accidents. The procedure was quite simple. A squad of police officers used a special van that housed a blood alcohol testing (BAT) device; the van became known as the “Batmobile”.

**Data:** The file contains quarterly information on the following variables:

**ACC** = injuries and fatalities from Wednesday through Saturday nighttime accidents

**FUEL** = Fuel consumption (millions of gallons) in Albuquerque

KPI = ACC / FUEL

The first 29 observations in the data set are a control period before the implementation of the Batmobile program. The following 23 quarterly observations are the experimental period.

**Task:** Your job is to explain statistically using forecasting procedures whether the Batmobile program was effective.

**Solution**

Conduct 2 sample t test to compare average number of accidence before BM program and after. Is the BM program effective?

1. Question: Is BM effective? (Ha: BM is effective)
2. Answer(Assumption): BM is NOT effective (Ho)
3. Set tolerance level: alpha = 0.05 = 5 / 100 = proportion of mistakes (incorrectly conclude that BM is effective when it is not)
4. Test statistic = [(average after – average before)-0] / sqrt(Variance after / Sample size after + Variance before / Sample before) =R calculates the test statistic
5. P-value = is the probability/likelihood that the assumption in 2. is a correct answer to question in 1.
6. Conclusion:
   * if p-value > alpha -> the data does not provide statistically significant evidence against the assumption in 2. , i.e. BM is NOT effective.
   * if p-value < alpha -> the data provides statistically significant evidence against the assumption in 2. , i.e. BM is effective.