

An executive summary of the final report of work done on the Minor Research Project of Aruna Kalkur T. entitled “Tests for Equality of Coefficients of Variation for Correlated samples”, sanctioned by UGC, vide sanction letter no. MRP (S)-0111/12-13/KAMA 002/UGC-SWRO dated 30-09-2013.

## **Tests for Equality of Coefficients of variation for Correlated Samples**

The project was carried out in three phases and the outcome is as follows.

### **1. Tests for Equality of Coefficients of Variation for Two Normal Distributions for Correlated Samples**

To test for the equality of Coefficients of Variation (C.V) of correlated samples, six tests based on Wald, Likelihood Ratio and Score Tests were derived for C.V and Inverse Coefficients of Variation (I.C.V). The asymptotic null distribution of the entire test statistic is Chi-square distribution with 1 degree of freedom. The adequacy of the Chi-square approximation for finite samples is examined through simulation.

From the estimated Type I error rates and power of the tests it follows that Wald test for I.C.V maintain Type I error rate. When the power function of all the 6 tests are compared Wald test based on I.C.V emerges as the best test. The conclusion is based by comparing the power of the modest departures from the null hypothesis and rate of convergence of the power function to 1 in the right and left directions. Score test based on I.C.V emerges as the next best test. Wald test based on I.C.V has marginally higher power for modest alternatives compared to the Wald test based on C.V. The salient difference is that the rate of convergence of the power function to 1 is faster for the Wald test based on I.C.V compared to Wald test for the C.V.

### **2. Tests for Volatility of Stock Prices**

We proposed a test using expected Fisher information for testing equality of C.V and I.C.V of a Bivariate normal distribution and used it for the analysis of stock prices of Bombay Stock Exchange. The result indicates how the test can be used for taking suitable decision.

### **3 Pairwise Comparisons of Coefficients of Variation for Correlated Samples**

We proposed pairwise comparison procedure for testing equality of C.V of two or more groups when the observations are correlated and normally distributed. Twelve versions of the Wald tests based on C.V and I.C.V are proposed. The simulation results indicated that Wald test based on I.C.V, which uses the upper  $\alpha^{\text{th}}$  percentile value of the central Chi square distribution with 1 degree of freedom as critical value maintain experiment error rate and emerges as the best test in terms of power of the test. The procedure is illustrated by analyzing the stock prices of Bombay Stock Exchange, India.