

# ABSTRACT

The time series models with conditional heteroscedasticity have been commonly used in economics and finance. The portmanteau test based on residual autocorrelations is one of the most frequently used tools for checking the adequacy of the fitted model. In this thesis, we study Chand and Kamal (2014) mixed portmanteau statistic based autocorrelations and partial autocorrelations of the residuals. The main idea is to check whether there is any dependence structures in the residuals of the fitted models. It is shown that this statistic is sum of Ljung-Box (1978) and Monti (1994) portmanteau statistics. The performance of the Chand and Kamal (2014) and other portmanteau tests are compared in the finite sample through simulations. Monte Carlo experiments were conducted to demonstrate the appropriateness of the theories and methods developed above. Our results suggested that empirical size and power of  $T_S$  and  $T_W$  statistics highly depend upon the choice of  $M$  for first data process AR models and in the second data generation process AR-ARCH model. The  $M = 6$  is considered to be an appropriate choice. We also found that these test statistics are not robust or strong to heavy tailed data. Applications to the daily exchange rate of United States Dollars (USD) to New Taiwan Dollars (TWD) and the daily log returns on BMW share price provided some new insight into these time series.