

TESTING FOR UNCORRELATED ERRORS IN ARMA MODELS

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ABSTRACT

A problem of interest in economic and finance applications is testing that ARMA errors are uncorrelated under weak assumptions, namely assumptions where the errors are neither iid nor a martingale difference. In this paper, the tests of serial correlation introduced by Andrews and Ploberger (1996, hereafter AP) are modified so that they can be used for testing ARMA errors under weak assumptions. The motivation for considering the original AP tests is that they are consistent against all non-white noise alternatives, have good all-round power against nonseasonal alternatives compared to several widely used tests in the literature, including those of Box and Pierce (1960, hereafter BP) and Ljung and Box (1978, hereafter LB) tests and do not require the setting of a maximum order of autocorrelation coefficient. The natural competitors to the modified AP tests are the modified BP and LP tests proposed by Francq, Roy and Zakoian (2005) and Hong and Lee (2007). The modified AP tests and the modified BP and LB tests are asymptotically valid under the same set of weak assumptions. In our Monte Carlo experiments we consider ARMA with GARCH, EGARCH and nonlinear MDS innovations. We find that the modified AP tests generally have better power than the modified LB tests and the HL tests, which suggests that the power advantage of the original AP tests extends to the more general framework considered in this paper.