

# A Unified Approach to Testing Stability of Conditional Distributions and Conditional Moments

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*Abstract:* Detecting and modeling structural changes in time series models have attracted great attention. However, most studies focus on the conditional mean. As suggested by recent empirical studies, the knowledge of the conditional distribution is essential in performing various economic policy evaluations, financial forecasts, derivative pricing and risk management and hence stability in the conditional distribution is of key interest in many scenarios. This paper proposes a unified approach to testing for distributional as well as moment changes. We develop a generalized Cramer-von Mises test for the stability of conditional distribution. We first apply the result in Billingsley (1995) to link the conditional distribution function to joint distribution function. Then, we estimate time-varying joint distribution nonparametrically and compare it with the estimate of the stable joint distribution. A significant difference between these two estimates would suggest the instability of conditional distribution. This test can also be applied to check for strict stationarity. Moreover, a class of easy-to-interpret diagnostic tests are supplemented to check possible moment instability. All tests have an asymptotic  $N(0, 1)$  distribution under the null hypothesis and are consistent against a vast class of smooth structural changes as well as abrupt structural breaks with possibly unknown break points alternatives. Simulation studies show that the tests provide reliable inference in finite samples.