



The University of Chicago
Department of Statistics

Master's Seminar

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**Kernel-based Estimation of the Density for the Autoregressive
Conditional Heteroskedastic Process**

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ABSTRACT

We construct a new kernel-based nonparametric estimator of the density function for the autoregressive conditional heteroscedastic(ARCH) process. Several nonparametric estimators of the density function have been suggested and used over the years. However, they often lack desirable asymptotic properties. We derive a new kernel-based estimator of the density using the Convolution Theorem. It turns out that the derived estimator possesses better asymptotic properties than the traditional nonparametric estimators. The study shows that the new density estimator is not only consistent, but also converges to the asymptotic normality faster than the traditional ones. In simulation study, we compare the traditional kernel estimator and the new estimator of the densities for the threshold autoregressive process(TAR) and the ARCH.