Abstract: The GARCH process is a popular parametric model for time-varying variance, and often used to analyze financial and economic time series. It is well-known that the quasi-maximum likelihood estimator (QMLE) for the process has good properties such as strong   consistency and asymptotic normality under mild assumptions. However, it is practically important to account for multiple temporal structure of time series at the same time. This talk investigates properties of the QMLE when there are multiple time-varying moments. Simultaneous estimation of the time-varying first and second moments (i.e. the ARMA-GARCH) is proved to be consistent and asymptotic normal under ergodic errors. The result gives justification to two-step estimation of the ARMA-GARCH and time-varying higher-order moments.