

Departmental Seminar 23.05.2022

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Title: Predictive regressions under heteroskedasticity

Abstract:

Typical financial predictive regressions are characterized by time-varying volatility, high persistence and endogeneity leading to biased estimators and inefficiency. A feasible solution for the latter two problems is the so-called IVX procedure which builds on an instrument which is decisively less persistent than the predictor. These instruments are self-generated and are used to construct a test statistic whose critical values are taken from a standard limiting distribution. In this work, we tackle the important problem of time-varying volatility. While IVX predictive regressions can be robustified against time-varying volatility, we focus here on improving estimation and inference by using weighted IVX methods. The newly proposed procedure builds on a local non-parametric volatility estimator. Observations in the predictive regression are weighted according to the volatility estimator. It can be shown that under a set of weak assumptions regarding e.g. smoothness of the volatility function, the limiting distribution of weighted estimators and statistics remain the same. In addition, the behavior under local predictability alternatives is investigated. In our extensive Monte Carlo study, we first consider the estimation accuracy of standard and weighted versions under a set of different volatility patterns. It turns out that MSE ratios can be reduced up to thirty percent under heteroskedasticity, while there is almost no loss (up to one percent only) under homoskedasticity. Second, we focus on the problem of testing hypotheses about the slope coefficients. We study the empirical size and power and find that noticeable power gains are achievable under time-varying volatility, while the newly proposed tests perform well in terms of size. Furthermore, feasible and infeasible versions are nearly indistinguishable from each other. In an empirical application, we consider CRSP data for the equity premium and the logarithmic book-to-market ratio. We study both in-sample and out-of-sample predictability. While standard IVX tests do not indicate in-sample predictability from 1926 to 2018, the newly proposed heteroskedasticity-weighted tests clearly reject the null. For the out-of-sample exercise from 2004 to 2018, we find that the weighted IVX estimator for the predictive regression provides the largest pseudo- R^2 measure in comparison to other approaches.