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Is There Too Much History in Historical Yield Data

In many applications including crop insurance, yield data are detrended and adjusted for possible heteroscedasticity and then assumed to be independent and identically distributed. For most major crop-region combinations, county yield data exist from the 1950s onwards and reflect very significant innovations in both seed and farm management technologies; innovations that have likely moved mass all around the support of the yield distribution. Despite correcting for movements in the first two moments of the yield data generating process (dgp), these innovations raise doubt regarding the identically distributed assumption. This manuscript considers the question of how much historical yield data should be used in empirical analyses. The answer is obviously dependent on the empirical application, crop-region combination, econometric methodology, and chosen loss function. Nonetheless, we hope to provide some guidance by tackling this question in three ways. First, we use distributional tests to assess if and when the adjusted yield data may result from different dgps. Second, we consider the application to crop insurance by using an out-of-sample rating game--commonly employed in the literature--to compare rates from the full versus historically restricted data sets. Third, we estimate flexible time-varying dgps and then simulate to quantify the additional error when the identically distributed assumption is erroneously imposed.

Friday, March 22 | 12:00 pm | AGLS 129