A Note on the Treatment of Heteroscedasticity for Pricing Area-Yield Crop Insurance Contracts

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ABSTRACT. We build upon contemporary heteroscedasticity treatments for yield data by introducing an operational improvement to the empirical approach of Harri et al. (2011) which estimates a heteroscedasticity coefficient that is subsequently used to recover homoscedastic yields. For sample sizes common with existing yield data (≤ 50), the variance on the estimated coefficient is relatively high: 57% of county-level estimates violated the a priori constraint set by Harri et al. (2011). We propose pooling county-level yield data to the crop reporting district to stabilize the estimation procedure. Using corn and soybean data for Illinois, Indiana and Iowa, we demonstrate our pooling procedure leads to non-trivial differences in premium rates and using an out-of-sample simulation it leads to economically and statistically significant improvements in crop insurance rates. These findings are noteworthy in that RMA currently uses the Harri et al. (2011) approach in constructing rates for area-yield programs which carried $3.7 billion in liabilities in 2012. In addition, this methodology is under consideration for rating the proposed shallow loss programs under consideration in the new farm bill.

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