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Title: Does Unobserved Land Quality Bias Separability Tests? A Case Study of Rwanda



Agricultural policy design and impact analysis relies heavily on behavioral models to both predict and evaluate the effect of alternative policies. Modeling behavior accurately is particularly important, and difficult, for policies designed to ameliorate poverty in the developing agricultural context—where households tend to act as both producers and consumers of food. The widely used agricultural household model (AHM) addresses this problem by integrating households’ production and consumption decisions into a single theoretical framework. The standard application of the AHM assumes that households make their production decisions separately from their consumption decisions. Any analysis which models small-scale agricultural producing households as profit maximizers implicitly makes this assumption of separability. If it holds, then empirical analysis of agricultural policy can leverage strong results from profit maximization theory; however, if it fails, then households’ behavioral responses to policy may be vastly different than those predicated on profit maximization.

While many past studies have tested separability, most rely on cross-sectional or household panel data. Using simulated data, I show how tests of separability using cross-sectional or household panel data can lead to biased inference when unobserved plot-level characteristics are correlated with household demographic characteristics (e.g. if poorer households tend to be larger and have poorer quality plots). I then test for separability using a detailed, plot panel dataset from rural Rwanda. This dataset enables the use of plot fixed effects to control for unobserved, time invariant plot-level unobservables, a major threat to identification in many previous studies. It also provides an updated, rigorous analysis of separability in a Sub-Saharan African (SSA) context. Using this approach, I reject the null hypothesis of separability. To the extent that my results hold in other SSA contexts, these findings suggest that profit maximization is not the appropriate theoretical framework for evaluating the behavioral responses of small-scale farm households to agricultural policy. Unlike most previous studies of separability, this study’s results are robust to unobserved characteristics that are fixed at the plot level and correlated with household demographic characteristics. These findings emphasize the importance of local institutional context in the design and evaluation of sustainable agricultural policies.