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Determinants of Multiple Adoption in Ethiopia and Effects on Income: A Double Selection Model

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Abstract

As most parts of the developing world, Ethiopia faces a fast growing population and the pressing need to increase agricultural production in order to be able to supply its people with sufficient and nutritious food. Land expansion is no option any more so that the focus lies on the intensification of production. While improved seeds and fertiliser are the traditional technologies of choice offered to the farmers by extension services, management practices like erosion prevention and conservation tillage have joined the circle of recommended innovations over the years. Numerous studies have tried to explain the mostly reluctant uptake by the smallholder farmers with results reaching from lack of information and access to all kinds of constraints, including lack of credit and insurance.

Adoption studies, however, mostly focus on a single technology, ignoring the fact that farmers are in reality facing a bundle of possible technologies among which they can choose from. Neglecting the simultaneity and interdependence of the adoption decisions leads to biased estimates. Even fewer studies investigate the effect of simultaneous adoption on outcome measures like income and thus inadequately check whether adoption indeed brought about the intended positive effect.

This paper models simultaneous adoption of five different technology types with a multivariate probit model and, in a second step, applies an elaborate double-selectivity model to answer the question of what the joint effects of sustainable soil management practices and improved seeds adoption on income are. Results show, first, that there is indeed a high interdependency of the adoption of the five technology types, namely that adoption of the different technologies have mutually encouraging effects. Second, factors encouraging (or discouraging) adoption vary between the technologies. And, third, in this case, adoption of soil management practices and/or improved seeds had no significant income increasing effects after controlling for the double selection bias.

Keywords: Adoption effects, agricultural technology, double selectivity correction, Ethiopia, multiple adoption, multivariate probit

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