

Impact Evaluation and Technical Efficiency in Ethiopia: Correcting for Selectivity Bias in Stochastic Frontier Analysis

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Abstract : The purpose of this study was to estimate the impact of LIVES project participation on the level of technical efficiency of farm households in three regions of Ethiopia. We used household-level data gathered by IRLI between February and April 2014 for the year 2013 (retroactive). Data on 1,905 (754 intervention and 1,151 control groups) sample households were analyzed using STATA software package version 14. Efforts were made to combine stochastic frontier modeling with impact evaluation methodology using the Heckman (1979) two-stage model to deal with possible selectivity bias arising from unobservable characteristics in the stochastic frontier model. Results indicate that farmers in the two groups are not efficient and operate below their potential frontiers i.e., there is a potential to increase crop productivity through efficiency improvements in both groups. In addition, the empirical results revealed selection bias in both groups of farmers confirming the justification for the use of selection bias corrected stochastic frontier model. It was also found that intervention farmers achieved higher technical efficiency scores than the control group of farmers. Furthermore, the selectivity bias-corrected model showed a different technical efficiency score for the intervention farmers while it more or less remained the same for that of control group farmers. However, the control group of farmers shows a higher dispersion as measured by the coefficient of variation compared to the intervention counterparts. Among the explanatory variables, the study found that farmer's age (proxy to farm experience), land certification, frequency of visit to improved seed center, farmer's education and row planting are important contributing factors for participation decisions and hence technical efficiency of farmers in the study areas. We recommend that policies targeting the design of development intervention programs in the agricultural sector focus more on providing farmers with on-farm visits by extension workers, provision of credit services, establishment of farmers' training centers and adoption of modern farm technologies. Finally, we recommend further research to deal with this kind of methodological framework using a panel data set to test whether technical efficiency starts to increase or decrease with the length of time that farmers participate in development programs.

Keywords : impact evaluation, efficiency analysis and selection bias, stochastic frontier model, Heckman-two step

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