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## Response of Plant Productivity to Improved Agricultural Markets in India: An Advanced Application of Econometric Cross-Section Time Series Analysis

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### Abstract

Many decades of research in agricultural productivity witness mostly efforts to show the usefulness of the application of more and better inputs (e.g. fertiliser) and other important production factors (e.g. credit). Recent studies, in addition, pay increasingly more attention to the role of agricultural markets in achieving better productivity. These studies show significant relationships of productivity increasing with better market access however using only cross-sectional data thus not considering the dynamic effects and possible causalities. Our study investigates the impact of market access proxy variables on the aggregated plant productivity using a cross-section time-series dataset on 235 districts in India over a time period of 29 years.

In the article we present the case of South India comparing the newest findings with the previously published results. This article is a follow up of the earlier publications on the ongoing research, which, using more advanced methods of econometric analysis, attempts to prove the main hypothesis that better market access leads to improved productivity. In this contribution, we go beyond modelling for fixed- and random-effects (widely used models for panel data analysis), and we apply more sophisticated Generalised Least Squares (GLS) models which count for heteroskedasticity and serial correlation in panels (tested using Wooldridge test and likelihood-ratio test respectively). Our main variables of interest, road and market densities, are highly significant (and with the signs in expected direction) resulted from markedly improved model specifications confirming that we, in general, stay in accordance with our previous findings. New parameters demonstrate much less standard errors in addition to greater coefficients indicating towards considerable efficiency gains and more consistent results (also, 95 % confidence intervals are much narrower). The lag with which productivity responds to market access is around three years. Increase of 10 % in road density results directly in 2.3 % increase in productivity. A 10%-increase in the number of regulated markets in a given area would bring about 1 % productivity gain. The study also shows that other economic and socio-demographic variables, among others agricultural loans, literacy level, irrigated area, fertiliser application contribute immensely to increasing productivity.

**Keywords:** Direct effects, generalised least squares, market access, panel data, productivity