

Efficiency and Productivity Analysis of Elementary Education in India

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Abstract

This study finds output oriented (TEOUT), input oriented (TEINP) technical efficiency and total factor productivity growth (TFPG) of Indian elementary education, primary and upper primary levels separately, for 2005-06 to 2013-14, using District Report Cards, District Information System for Education (DISE) data, for 16 major states and 461 districts (as per DISE), taking districts as unit of account. A variable returns to scale framework with two-output, four-input, representing both quantities and qualities and nonparametric data envelopment analysis are used. It decomposes TFPG into technical efficiency change (TEC), technical change (TC) and scale efficiency change (SEC) to see its main driver, finds whether used inputs can be reduced. A second stage panel regression is resorted to get state level determinants of TEOUT, TEINP and TFPG, using their first stage district level estimates, taking the effects of poor and favourable infrastructures, social and policy indicators, to see whether favourable infrastructure, social indicators and policy variables promote them and poor infrastructure inhibit those. Instead of using composite index of broad determinant categories, the effects of each variable are tested, as identification of appropriate policies needs tracing out of individual effect. The outputs are net enrolment ratio (NER) and percentage of students passed with 60% or more in the examination, giving output quality. The inputs are number of schools per lakh population, teacher pupil-ratio in the school, classroom-student ratio in the school and percentage of teachers with qualification graduate and above in the school, showing teacher input quality. Wide variations in TEOUT, TEINP and TFPG scores are found. On an average TC is the main driver of productivity changes, for both primary and upper primary. The role of infrastructural, social and policy variables is evident. An interstate comparison of TEOUT, TEINP and TFPG and of primary and upper primary is made. Policies are suggested for improvements.

Keywords: Elementary Education, Input and Output oriented Technical Efficiency, Total Factor Productivity Growth, Malmquist Productivity Index, Data Envelopment Analysis, Panel Data, India.