

COMPARISON OF SECONDARY EDUCATION PISA RESULTS IN EUROPEAN MEMBER STATES AND TURKEY VIA DEA AND SEM

Fatma Lorcu, Bilge Acar Bolat

Abstract

The Programme for International Student Assessment (PISA) conducts educational research that involves students in the 15 year old age group and seeks to measure their proficiency in, Mathematics, Reading and Science Literacy. This study compares the results of effectiveness of education at secondary level in Turkey and the EU member states using Data Envelopment Analysis (DEA) and Structural Equation Model (SEM). In the analysis, the PISA “Mathematics”, “Reading” and “Science” literacy test scores are used as output, while the “Student-Teacher Ratio” and the “Public Expenditure on Education as a percentage of GDP” are used as the input variable. First SEM is used to examine relationship between the input and output variables of education. In this analysis, the input latent variable indicates the independent variable and the output latent variable is the dependent variable. The input latent variable is represented by “Student-Teacher Ratio” and “Public Expenditure on Education as a percentage of GDP” observed variables while the output latent variable is represented by the “Mathematics”, “Reading” and “Science” literacy test scores observed variables. Then DEA is used to compare secondary education PISA results in European member states and Turkey. Results of the SEM show that the most effective input variable is the public expenditure on education as a percentage of GDP, and the most effective output variable is the science literacy test score. Results of DEA in the above-mentioned variables show that the same variables are most in need of improvement. In addition, the results of the analysis indicate that Turkey could not achieve total and technical efficiency and obtained the lowest efficiency value.

Keywords: Education efficiency, Data Envelopment Analysis, Structural Equation Modeling, European Union