

Bioenergy efficiency change and its determinants in EU-28 region: Evidence using Least Square Dummy Variable corrected estimation

ABSTRACT

Applying the data envelopment approach, this paper computes efficiency change (EFFCH) in terms of its components: pure technical and scale efficiency changes. The least squares dummy variable corrected (LSDVC) method was employed to examine the determinants of efficiency change of bioenergy industry of the EU28 countries covering the period 1990–2013. Results show that the bioenergy industry recorded an average annual rate of progress in efficiency change of 3.8% during the period studied. Interestingly, the region recorded a technical progress with both pure technical efficiency change and scale efficiency change increasing over the study period, however, scale efficiency was the major contributor to efficiency with annual increase of 4.5%. We also found variations in regional performance with EU developing region experiencing a slightly higher increase in efficiency at 3.86% while this figure is at 3.76% for the EU developed countries. Empirical finding show that economic growth, gross fixed capital formation, inflation and size of biomass input affected EFFCH of bioenergy industry of the EU28 region significantly during the period studied. Policy implications of these results are that the bioenergy industry should relentlessly pursue technical progress and aim to improve both technical and scale efficiencies simultaneously through optimal allocation of resources.

Keyword: Efficiency change; Pure technical efficiency change; Scale efficiency change; Bioenergy industry; Non parametric approach; Biased corrected least squares dummy variables