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Determinants of Residential Electricity Demand: Empirical Evidence from Pakistan

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Abstract

This study is based on the estimation of residential demand of electricity for Pakistan with major focus on the income elasticities and the luxury appliances impact over the demand. The monthly electricity unit consumption is used as dependent variable that is constructed through backward induction method from monthly electricity expenditure that help to find clear dimensions of the demand. For estimation of demand Two Stage Least Square method of estimation has used with the five explanatory variables; household monthly income, household size, dwelling size, appliances and luxury appliances. The empirical analysis is conducted by using Two Stage Least Square methods. The empirical findings represent the positive significant income elasticities that are almost the same across the different income groups in various regions. The household demand for electricity has strong response to the luxury appliances. The household size revealed negative significant response to the residential demand for electricity. The dwelling size and appliances have shown positive significant or insignificant impact over the residential electricity demand.

Keywords: Residential Demand, Backward Induction Method, Income Elasticities, Pakistan.

Introduction

There are two notable features of demand for electricity especially in developing countries. Firstly, an exponential increase in demand for electricity; forecast estimate shows that the global demand for energy rises by 25 percent by 2040 which comes from developing countries and demand could have more than doubled without efficiency gains (EMC, 2016). Structural transition including migration from rural to city settings and shift from under developed to developing or developed stage and change in growth paradigm; such as increase in per capita consumption of modern energy, population growth and demonstration effect are held responsible for exponential growth of demand for electricity. Secondly, huge demand supply gap emerges in developing countries causing economic losses both at micro and macro levels.

After the paradigm shift of Pakistan government into new phase of democracy by the end of Musharraf regime 2008, load shedding problem was started and due to aforesaid factors of energy demand, exponential increase became sever energy crisis. On average, shortage of 7000 MW badly hit the all sectors of the economy including manufacturing, services and residential sectors (Javid & Qayyum, 2014; Nawaz, Iqbal, & Anwar, 2013; Nawaz