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Is Electricity Consumption Stationary in Turkey?

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Abstract : The number of research articles analyzing the integration properties of energy variables has rapidly increased in the energy literature for about a decade. The stochastic behaviors of energy variables are worth knowing due to several reasons. For instance, national policies to conserve or promote energy consumption, which should be taken as shocks to energy consumption, will have transitory effects in energy consumption if energy consumption is found to be stationary in one country. Furthermore, it is also important to know the order of integration to employ an appropriate econometric model. Despite being an important subject for applied energy (economics) and having a huge volume of studies, several known limitations still exist with the existing literature. For example, many of the studies use aggregate energy consumption and national level data. In addition, a huge part of the literature is either multi-country studies or solely focusing on the U.S. This is the first study in the literature that considers a form of energy consumption by sectors at sub-national level. This research study aims at investigating unit root properties of electricity consumption for 12 regions of Turkey by four sectors in addition to total electricity consumption for the purpose of filling the mentioned limits in the literature. In this regard, we analyze stationarity properties of 60 cases . Because the use of multiple unit root tests make the results robust and consistent, we apply Dickey-Fuller unit root test based on Generalized Least Squares regression (DFGLS), Phillips-Perron unit root test (PP) and Zivot-Andrews unit root test with one endogenous structural break (ZA). The main finding of this study is that electricity consumption is trend stationary in 7 cases according to DFGLS and PP, whereas it is stationary process in 12 cases when we take into account the structural change by applying ZA. Thus, shocks to electricity consumption have transitory effects in those cases; namely, agriculture in region 1, region 4 and region 7, industrial in region 5, region 8, region 9, region 10 and region 11, business in region 4, region 7 and region 9, total electricity consumption in region 11. Regarding policy implications, policies to decrease or stimulate the use of electricity have a long-run impact on electricity consumption in 80% of cases in Turkey given that 48 cases are non-stationary process. On the other hand, the past behavior of electricity consumption can be used to predict the future behavior of that in 12 cases only.

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