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## **RENEWABLE ENERGY DRIVERS: A NOVEL ECONOMETRIC APPROACH**

### **Abstract:**

The paper analyses the impact of some macroeconomic drivers (carbon emissions per capita, energy consumption, income, innovation, energy dependency, European directives...) on the use of renewable energy sources (Wind, Hydro, Biomass...) in a set of 24 European countries over the 1990-2015 period.

We show that previous literature failed to take into account both non stationary issues and non linearity in panel econometric frameworks. Using very recent non stationary panel econometric methods (panel unit root tests with breaks and common factors, cointegrations tests with cross sectional dependence and breaks), we focus on socioeconomic and political factors and show that the main factors explaining the renewable dynamics are income per capita (income effect: a higher income is associated to more easy investments in Renewables and a proxy of high environmental protection in line with the Kuznets Curve literature), energy dependency (comparative advantage effect in energy resources: low resources and high dependency are associated to high renewables use) and the level of oil prices (however, no evidence of a substitution effect between fossils and renewables). In contrary, we do not find evidence of environmental concerns explaining the growth of renewables use since we show a negative and statistically significant relationship between CO2 emissions and the log of the renewable share in countries. In addition, we show that energy consumption/use signal is positive and statistically significant and robust. Using high levels of energy to drive the growth would lead to promoting RE (probably a mean effect, using quantiles we expect a negative sign for very high levels of energy consumption). Further work is in progress to investigate non linear effects using PSTR (Panel Smooth Transition Regression) models. Endogeneity (CO2, Energy Use) issues should also be taken into account by simultaneous models and Granger causality tests. Finally, introducing political policies as other drivers of renewables growth would also be an improvement of the existing work.

### **Keywords:**

energy economics, renewables, cointegration, panel

**JEL Classification:** Q42, Q43, C33