MPP-E1180: Collaborative Social Data Analysis
Assignment 2

Camila Vieira & Tarun Khanna

28 October 2016

Introduction

Today it is widely known the fact that climate change imposes real challenges to societies' environmental and economic wellbeing. This state of affairs urges us to think on ways to cope with the effects of climate change as well as finding potential alternatives to the roots of this human-caused phenomenon. Consequently, this pressure has put into question the traditional energy sources in use which have contributed to high levels of pollution and greenhouse gas emissions worldwide. Renewable energy adoption constitutes a means to deal with this challenge and renewable energy sources have been increasingly adopted worldwide for being a consistent way of improving energy efficiency by reducing energy consumption levels. Recent studies of Eyraud et al. (2011) and Del Río, Tarancón, and Peñasco (2014) identified that renewable energy sources will be the key drivers of the energy sector in coming years. Our main goal with this research project is to identify what are the determinants of investments in renewable sources of energy, namely wind and solar power energy, across European countries and to what extend factors, such as economic growth, changes in fuel prices, and interest rates have a significant impact on green energy investments.

Literature Review

According to Eyraud et al. (2011), green investment can be defined as "investments intended to significantly reduce air pollutants and greenhouse gas emissions (GHG), without significantly reducing the production and consumption of non-energy goods". Ilas (2014) shares Eyraud's understanding and use 'green investments' and 'investments in renewable resources' interchangeably.

Two thirds of total carbon dioxide emissions in the world come from the energy sector and their effect on human livelihood is increasingly negative. There are two potential ways of offsetting the impact of such emissions - adaptation and mitigation. While adaptation refers to the efforts to limit human exposure to climate change, mitigation is related to human activities intended to reduce the magnitude of climate change and its impact on human life. Mitigation further involves a two-fold strategy - reduction of carbon dioxide emissions through efficiency gains in energy consumption and production, and the shift to other, cleaner forms of energy production through the adoption of alternative sources.

The increasing importance of generating cleaner energy as a mitigation measure led the IMF to publish a article in its 2013 Energy Policy Journal containing explanation and trend analysis of the green investments. This research articles served as a bases for Ilas (2014) study on the factors affecting green investments at an international level. And now we aim to apply a similar methodology to verify the determinants of green investments in EU countries.

Determinants of Renewable Energy

This research aims to identify key determinants of green investments in renewable energy sources in Europe. This is done by analyzing data on economic, demographic, and political factors which may be responsible for delimiting a scenario for investment opportunities. We start this project having the following hypothesis.

- Economic growth and income generate a higher demand for energy and clean air, and the same can be said about increasing population levels.

- Innovation is essential for advancements in the energy sector as to guarantee environmental-friendly efficiency. It means that human capital and new technologies may play an important role behind green investments. Therefore, by veryfing the percentage of GDP which has been allocated to Research and Development as well as enrollments in tertiary education in EU countries we can attest the role of innovation in investments in renewable energy sources. An alternative would be to look at the number of renewable energy patents filed in each country.
- The macroeconomic theory on interest rates, which states that low interest rates are beneficial for long-run investments as it ensures availiability of larger amounts of capital.
- The costs of fossil fuels' energy. The higher the prices of fossil fuels give an incentive for a reduction in renewable energy sources costs. Therefore, we can assume that increases in fossil fuels' prices have a positive effect on the green investments.

Besides those macroeconomic indicators, countries' political tendencies (including support of renewable energy among the voters) and energy-related policies, such as carbon taxes, cap-and-trade limits, and feed-in-tariffs, may encourage or discourage green investments.

Data Sources and Methodology

A panel data approach will be used to assess the determinants of green investments in EU countries. This cross-country analysis will take into account historical data from Bloomberg, Eurostat and World Bank databases covering the period 2010-2015. The model is estimated in real terms using fixed effects methodology. The impact on green investment is calculated on the basis of covarities exposed in the previous section and takes into account country specific fixed effects.

References

Wickham and Francois (2016) and R Core Team (2015) works on R Programming were used as reference for this research proposal.

Del Río, Pablo, Miguel Angel Tarancón, and Cristina Peñasco. 2014. "The Determinants of Support Levels for Wind Energy in the European Union. an Econometric Study." *Mitigation and Adaptation Strategies for Global Change* 19 (4). Springer: 391–410.

Eyraud, Luc, Abdoul Aziz Wane, Changchang Zhang, and Benedict J Clements. 2011. "Who's Going Green and Why? Trends and Determinants of Green Investment." *IMF Working Papers*, 1–38.

Ilas, Andrei. 2014. "Macroeconomic and Political Determinants of Green Investment: A Cross-Country Econometric Analysis." PhD thesis.

R Core Team. 2015. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. http://www.R-project.org/.

Wickham, Hadley, and Romain Francois. 2016. *Dplyr: A Grammar of Data Manipulation*. http://CRAN.R-project.org/package=dplyr.