

IS GREEN FISCAL POLICY AS A DRIVER FOR GREEN ENERGY ECONOMY: EMPIRICAL EVIDENCE FROM DEVELOPING COUNTRIES

Olimjon Saidmamatov, Junior researcher, +998919167140, saidolimjon@gmail.com
Bahtiyor Eshchanov, PhD, +998914330039, b.eshchanov@gmail.com

Overview

Energy is fundamental to human society, social development and economic growth (WEC, 2013). Global energy demand is projected to grow by around 45 percent by 2030: more than three-quarters of the increased demand will come from developing and transition countries (IEA, 2008). The paper attempts to research the contribution of green investments to electricity generation from renewable sources. Although, RE can bring socio-economic and environmental benefits, its implementation faces a number of obstacles, especially in non-OECD countries (Brunnschweiler, 2009) despite its socio-economic and environmental benefits. One of these obstacles is financing: underdeveloped financial sectors are unable to efficiently channel loans to RE producers. Churchill and Saunders (1989) argues that renewable energy projects have limited access to financing because RE projects compete against fossil fuel projects, which have a longer track record, relatively lower up-front costs and often relatively favorable treatment. Brunnschweiler (2010) suggests that a more highly-developed financial sector will have a positive impact on the development of the renewable energy sector.

These theoretical materials are tested empirically in a series of panel data regressions for 155 non-OECD countries. The empirical findings are fairly encouraging: they confirm the positive effect of green public policies and particularly green fiscal policies resulting to increase the amount of foreign direct investment on the dissemination of RETs in developing and transition countries.

The hypothesis:

Foreign Direct Investments, net flows in GDP of developing countries = “**A**”
Non-hydro renewable energy generation (in billion kilowatthours) = “**B**”
(Positive/negative) relation between two variables: **A and B**

When the research on investment issues of renewable energy generation is assessed in the case of OECD or developed countries, there is a positive relation between foreign direct investment and non-hydro renewable energy generation.

Methods

We model and evaluate the adoption of renewable energy sources across 155 developing countries between 1980 and 2012 comparing with foreign direct investment, net flows in GDP of the respective countries:

- a) As a measure of electricity generation from renewable resources (i.e. solar, wind, geothermal and biomass), we refer to the data of United States Energy Information Administration (EIA) for the period 1980-2010. Similar to the study of Pohl and Mulder (2013), we exclude hydroelectric power generation from our definition, because large hydropower projects are increasingly viewed as being unsustainable sources of power generation due to their often serious negative environmental and social externalities.
- b) World Bank (2003) provided information that large hydro projects in the developing world have been co-financed by multilateral financial institutions and the local governments, with little or no involvement sought of commercial finance. As a second variable, foreign direct investment, net flows are divided by the GDP of 155 developing countries in the period from 1980 till 2012. The data is collected from the World Development Index of World Bank (2015).

On its turn, our research is different from the papers of Brunnschweiler (2010), (B.Pohl and P.Mulder, 2013) and Eyraud et al. (2013) with a parameter that renewable energy generation is regressed against the proportion of foreign direct investments which results from efficient fiscal policy in GDP of 155 developing economies. Furthermore, we first propose and then apply econometric approach to identify cause-effect relationship between a) renewable energy generation in developing countries and b) proportion of foreign direct investment, net flows in GDP of aforementioned countries. The main problem is the large number of zero-valued parameters

surveyed in our dependent variable, because many countries do not yet, or have only recently started the investment on (non-hydro) renewable electricity generation.

Indeed, B.Pohl and P.Mulder (2013) found that a large share of hydropower lowers the probability of NHRE being adopted but nevertheless stimulates the amount of NHRE electricity produced, while the opposite is true when there is a diverse energy mix. Finally, there is weak support for a positive influence of the Kyoto Protocol on NHRE diffusion and no evidence at all for any influence resulting from financial sector development.

Data was collected from various sources towards providing qualitative and quantitative enrichment. We reviewed and analyzed the academic literature and findings on financing green energy economics in developing countries. As defined by Brunnschweiler (2006), lack of a more systematic empirical analysis of the correlation between financial sector and RE development is also due to the data problem regarding the quantification of the RE sector, especially in the developing world. However, U.S. Energy Information Administration (EIA) provided data on non-hydro renewable energy generation in 155 developing countries in the period from 1980 till 2012. As a first variable, NHRE is chosen to identify the level of green energy dissemination in emerging economies.

In panel data analysis, the following scenario is obtained:

Fixed-effects (within) regression	Number of observations =	4213
Group variable: Panel	Number of groups =	152
R-sq: within = 0.0001	Obs per group: min =	2
between = 0.0010	avg =	27.7
overall = 0.0001	max =	33

NHRE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
FDIGDP	.0045752	.0067397	0.68	0.497	-.0086384 .0177888
_cons	.3737481	.0535918	6.97	0.000	.2686788 .4788174

The electricity generation data for dependent variable Non-hydro Renewable Energy (NHRE) generation for the period 1980-2010 is freely available from the U.S. Energy Information Administration (EIA) and the variable of green investments is derived from World Development Index. In total, 4213 observations between FDI/GDP and NHRE are identified in the period of 33 years.

Results

In our research where focus is oriented to non-OECD countries, these statistical findings are tested in a series of panel data regressions for 155 non-OECD countries. The empirical findings are fairly discouraging: they confirm the negative effect of foreign direct investment on the generation of non-hydro renewable energy in developing countries. The situation can be explained that increase in the FDI in developing countries provide short-term effect on the local economy and poor infrastructure, low level of economic growth and ineffective infrastructure of aforementioned countries does not allow the FDI to generate marginal renewable energy generation.

Conclusions

The transition to a low carbon emission model will require large investments in alternative sources, because green technologies, such as wind turbines or solar panels, are capital intensive, especially in the early stages of development (Johnson and Lybecker, 2009).