

EFFECTIVENESS OF RENEWABLE ENERGY POLICY IN LATIN AMERICA: AN ECONOMETRIC APPROACH

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Overview

This paper investigates factors influencing country-level renewable energy investments by applying a panel data regression analysis. Investments in new renewable energy technologies for electricity production (NREe) have greatly increased around the world over the last decades. However, the growth rate of NREe vary markedly between countries and continents. For many years it was a concern of developed countries with Europe playing a leading role through an ambitious program of promotion policies (feed-in tariffs, auctions system, green certificates, etc). In the last decade, investments have accelerated in emerging and developing countries, with China and Latin America playing a major role. Once again countries in this region have implemented distinct policy mixes with divergent results. Moreover, others factors related to macroeconomics, energy sector structure and politics in each country can also explain the different rates of NREe diffusion.

The objectives of this article are twofold. First analyze the effectiveness of different policy instruments for the promotion of new renewable energies; second, analyze the influence of country-specific politico-economic determinants. This is, to the best of our knowledge, the first econometric analysis about NREe determinants that includes a large panel of latin american countries.

Methods

The analysis is based on panel data throughout 20 countries in Latin America for the period 1995-2015. The dependent variable in our model is the new installed capacity of NREe including wind, solar, geothermal, biomass and small hydroelectric plants. The explanatory variables are grouped into three categories: macroeconomic, energy related and promotion policy determinants.

We have first performed a deep literature review about the determinants of investment in new energy technologies and particularly about the influence of public policy. Second, we have built a data base, including the type of renewable energy policy instruments applied by each country in every year, using data from the IRENA, the IEA and government sources. Most of the quantitative variables data were obtained from ENERDATA, the World Bank and the IDB. Third, we have calculated and presented the descriptive statistics and the simple correlations. These preliminary results have helped us build our econometric model. The main estimation method used was PCSE (Panel Corrected Standard Errors). In order to improve the results robustness, two alternatif methods were applied. Finally we have discussed our findings with respect to the literature and we propose some policy recomendations.

Results

The influences of the following factors were calculated and discussed: implementation of promotion policies, type of policy (FIT, quotas, auctions, and tax incentives), structure of the electricity sector, electricity consumption growth rate, coal and gas production per capita, energy dependence rate, CO2 emissions, GDP per capita and equity and credit market development.

Regarding the effect of the policies, the results show a positive impact of the main policy instruments only from the third period which seems to confirm the hypothesis on a delayed impact of the incentive policies. The model shows that these policies have been globally effective although no conclusive differences were detected regarding a different effectiveness of the price or quantity instruments. Furthermore, it's clear that NREe have spread more rapidly in the countries of the region with a higher level of per capita income (with the exception of Argentina) and there is also a correlation with the level of capital markets development.

Conclusions

Our analysis provides new insights about the effectiveness of the different policy instruments and the relative influence of macroeconomic determinants, especially the financial markets development. It confirms the hypothesis about the policy-driven deployment of renewables in Latin America beyond the instrument used.

Furthermore, despite the decline in the cost of renewables, specific promotion policies will yet be necessary in the coming years, particularly policies facilitating the access to funding in Latin America and other emerging regions. However, it is essential to adapt the design of such policy to the situation of each country (and the development phase of each technology) in order to avoid possible adverse effects.

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