

INVESTING IN ENVIRONMENTAL PROTECTION: DOES IT FOSTER INNOVATION?

Amjad Naveed, Aarhus University, Denmark, amjadnaveed9@yahoo.com

Cong Wang, Macquarie University, Australia

Overview

An effective regulation system not only provides incentives for firms but also maintain competitive environment that induce firms to realise innovations. Similarly, government spending on environmental protection is essential for enhancing environmental quality as it directs market investment, provides funds for environmental treatment, and encourages energy efficiency (Fan et al., 2022). Recent crises, such as the COVID-19 pandemic and the Russia-Ukraine war, have had an effect on the global economy and particular the energy sector. As a results, many significant issues has been emerged, such as fluctuations in energy demand, energy prices, income inequality and slow down of overall economic growth. Along with these issues, another challenge is determining how to protect the environment without compromising on innovation and economic growth, which is regarded as essential tools for promoting sustainable development. (Song et al., 2020). This paper evaluate the effect of environmental protection expenditures (EPE) on innovation for the group of EU countries. The specific aims of the paper are threefold. First, we consider the total environmental protection expenditures by both public and private sector and then empirically analyse their impact on innovation for the group of EU countries. Second, it has been questioned in the literature whether to use patent or R&D expenditures as a measure of innovation. Therefore, we use both R&D expenditures and Patent for the robustness our findings. Third, the effect of EPE on innovation might differ for the countries with different level of climate change patter based CCPI (climate change performance index).

Methods

It's highly plausible that we encounter endogeneity issues when analyzing the relationship between innovation and environmental protection expenditure, as the two variables could be simultaneously influenced by a third variable such as institutions (see e.g. Wang (2013) and Young (2003)). In addition, reverse causality could be another issue. While environmental protection expenditure can potentially influence innovation, it's certainly plausible that an economy with improved innovative activity and research intensity could stimulate the progress of environmental protection as well. To control for unobserved heterogeneity and endogeneity, we adopt both Fixed Effect and System GMM estimation techniques. We collect unbalanced panel data on innovation, environmental protection expenditure and control variables (trade openness, financial development, labour force and human capital for 32 mainly European countries from 2006 to 2020).

Results

In an aggregate model, we find a positive effect of environmental protection expenditures on innovation. The results are consistent by using both FE effect and system GMM that takes care of endogeneity. Concerning group of countries, the magnitude of the effect vary significantly between countries depending on their Climate Change Performance Index (CCPI). We divide the sample based on median values of CCPI index and named it as high CCPI and low CCPI groups. For detail see, Burck et al. (2022). Both low and high group confirm a positive effect of environmental protection expenditure on innovation. However, the size of the effect are not similar in both groups. In the group of countries where climate change performance is better (high CCPI) have lower effect on innovation compared with those where climate change performance less (low CCPI).

Conclusion

To conclude, this paper empirically explores the potential causal impact of environmental protection expenditure on innovation, which is motivated by existing theoretical arguments on this matter. By utilizing both the panel FE and System GMM estimator that addresses endogeneity, we have found evidence that support the following: First, we found a significant positive effect of environmental protection expenditure on innovation after controlling for financial development, labour force, human capital and trade openness. Second, this result is robust to an alternative measure of innovation (patent) and alternative estimators that take care of endogeneity (Mundlak, 1978; Hausman-Taylor, 1981). Third, we find that the impact of environmental protection expenditure on innovation varies in different countries with different levels of Climate Change Performance Index (CCPI).The results are highly relevant for policy purpose. For instance, spending on environmental protection not only considered better for the environment but also enhance innovation that further support the idea of sustainable development.

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