

Reviews of ECONJOURNAL-D-23-00069R1

The Impact of Environmental Regulation on Technological Innovation of Enterprises: Based on Empirical Evidences of the Implementation of Pollution Charges in China

Round 1

Reviewer 1

In this paper, the authors utilized the "Regulations on the Administration of the Collection and Use of Pollutant Discharge Fees" implemented in China in 2003 as an exogenous impact to construct a DID model, and examined in detail the impact and mechanism of the implementation of pollutant discharge fees on enterprise technological innovation. The research results indicate that government environmental regulations have significantly improved the level of technological innovation of enterprises, and the conclusion remains valid after a series of robustness tests. The results of parallel trends validate the rationality of the double difference setting, and the dynamic effect indicates that pollution fees have a sustained promoting effect on enterprise technological innovation. The mechanism verification found that the government's strengthening of environmental regulation played a role in the level of enterprise innovation by promoting enterprises' fixed assets investment and government subsidies, and ultimately promoted the improvement of enterprises' technological innovation level. However, some concerns could be fixed, as below.

- (1) In the background, some main examples of government environmental regulations on enterprise innovation can be mentioned. The practical motivation is necessary.
- (2) Why do environmental regulatory policies have an impact on enterprises? In the introduction, it can be explained that the motivation for the focus is reasonable.
- (3) More discussions on the existing studies mentioned in section 2 could be added, to highlight the research gap and motivation from the literature.
- (4) In the theory of Traditional economy, enterprises' increasing investment in environmental protection will increase their operating costs and hinder their further development. Explain this position in detail.
- (5) More details needed in the institutional background and literature review section.
- (6) The literature review focuses on the impact of local environmental regulations on corporate performance, as well as the impact of government environmental regulations on corporate innovation, which can be further expanded.
- (7) State-owned enterprise management has a significant social obligation to

incentivize an increase in research and development expenditures following the implementation of environmental regulation policies. After the implementation of environmental regulation policies, the innovation capabilities of private businesses will be enhanced, as they are subject to intense market competition. Explain this position in detail.

(8) There are some grammar issues in the article that need to be addressed in a more standardized manner.

(9) The research and development activities of enterprises will be influenced by government policy incentives. The 2003 "Pollutant Discharge Fee" policy is essentially a punitive measure for high polluting enterprises, and there are policy incentives and corresponding subsidy policies for low polluting enterprises and enterprises that actively reduce emissions. This needs to be explained in detail.

(10) How should we actively guide market entities to comply with environmental regulations and play the role of environmental regulations in promoting enterprise innovation?

Reviewer 2

1. The most important point / critique to be made is that some assumptions are made about the role of regulation for innovation, but no reference is made to the impact of competition on the rate and speed of innovation - in particular in page 6 Mechanisms Analysis and in point 2 of the conclusions. How much innovation will occur following a regulatory change will be influenced by rivalry, as competitors fight to adapt quicker if they risk losing sales to competitors. Reference could be made here to OECD High Level Symposium on Pro-competitive policies and the paper published therein

(<https://www.oecd.org/daf/competition/high-level-symposium-on-procompetitive-policies-for-a-sustainable-economic-recovery.htm>) and to Griffith, Rachel; Reenen, John Van, Product market competition, creative destruction and innovation (2021). This should also be mentioned in point 2 of the conclusions.

2. On page 6, a couple of other items: i) Sentence of first para starting "Some scholars.." is unclear and needs redrafting. ii) it may be worthwhile to mention that regulation can limit externalities and thus correct innovation distortions: Distorted Innovation: Does the Market Get the Direction of Technology Right? Daron Acemoglu, 2023, AEA Papers and Proceedings, vol 113, pages 1-28.

3. At page 16 - Conclusion 1 starting "Therefore, enterprises have..." is unclear and needs to be re-drafted.

4. A thorough language review would be needed to clear up some typos and wording issues / imprecision.

Round 2

Reviewer 1

The paper can be accepted for publication.

Reviewer 2

Authors addressed all of my comments and the paper can be accepted in the current form.