European Commission

ANNUAL RESEARCH CONFERENCE 2022

KINGA BARBARA TCHÓRZEWSKA
Kozminski University & Barcelona Institute of Economics
ktchorzewska@kozminski.edu.pl

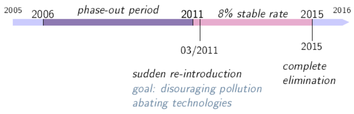
Environmental Investment Tax Incentive and Green Technologies.
How do firms respond?

INTRODUCTION

Firms are reluctant to adopt green technologies. The reason? High fixed costs and the resulting capital market failure (Meyer, 1993).

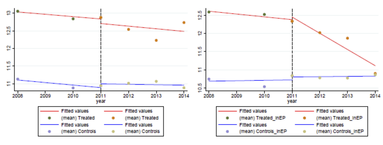
- Could Environmental Investment (EI) tax incentives be successful at encouraging green technology adoption? (IV strategy)
  - Superior cleaner production technologies (CP)
  - Inferior end-of-pipe technologies (EP, solely pollution abating) e.g. filters
- How do firms react to the modifications in existing EI tax credits with respect to technology, employment and innovation decisions? (DID analysis)

Spanish EI tax credit was introduced to Spanish Corporate Income Tax in 1996 (OECD, 2018; OECD, 2015) at 10% of total investment cost available to all industrial firms, with no clear eligibility criteria.
- in 2006 announced a slow phase-out by 2% each year until full elimination
- unexpectedly re-introduced in 2011



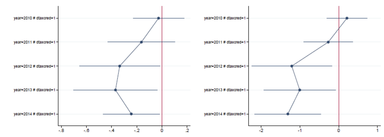
RESULTS

1. Parallel Trends



(a) CP (b) EP

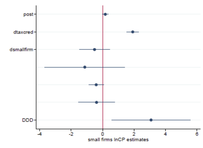
2. DID General Results:
- no evidence for a statistically significant change in investment in cleaner production technologies
- visible reduction in financing of end-of-pipe technologies



(e) green size (f) green salary

3. DID Dynamic Results:
- Decrease in the number of green employees and their salaries

4. DID Heterogeneous Results:
- Increase in adoption of cleaner production technologies for small firms



(a) Small firms (<50)

5. Instrumental Variable Results

1. EI tax credit was successful at inducing adoption of green technology (direct effect)
   - Although favouring air pollution reducing over energy efficient technologies
2. Was increasing the number of green employees and even private environmental R&D (indirect effect)
   - Positive externality

CONCLUSIONS

I find evidence of the success of EI tax credit and its modification

1. EI tax incentives stimulate adoption of green technology similarly to general tax incentives (Ohrn, 2019) and generate positive externalities (green innovation ↑)
2. Firms decreased their investment in inferior end-of-pipe technologies (success of the policy change)
3. Firms decreased the number of green employees and their salaries
4. Small firms (<50) increased their investment in superior cleaner production technologies (success of the policy change)

POLICY IMPLICATIONS

This study encourages **further re-design of the EI tax credit** such as to encourage adoption of cleaner production technologies (especially energy efficient technologies) - rather than a complete removal.

Finally, **despite the financial burden** of tax deductions and subsidies, their use may **have economic justification**. For example, when **they generate positive externalities**, such as more green private R&D, as it is the case here.

Spain is a representative country for other European countries, especially Poland.

ACKOWLEDGEMENTS

I acknowledge financial support from the Chair of Energy Sustainability (IEB, University of Barcelona) and from the Ministry of Economy and Competitiveness (Project ECO2015-69107-R, MINECO/FEDER, EU, Project RTI2018-100710-B-100) as well as ZEW Mannheim, University of Mannheim and Kozminski University. The research leading to these results has received funding from RecerCaixa (RecerCaixa project 2016: The climate change challenge: policies for energy transition).)

Most importantly I would like to thank Jose Garcia-Quevedo for excellent advice but also I am very grateful to Pierpaolo Parrotta, Megan Bailey, Ulrich Wagner and Kathrine von Graevenitz for their useful comments. I would like to thank the participants of the EAERE Annual Conference 2022, AERE Annual Summer Conference 2020, 75th Annual Congress of the IIPF, EAERE-FEEM-VIU Summer School 2019 and IWSD Workshop 2019 at Columbia University for their feedback, comments and numerous discussions. Last but not least, I would like to thank Spanish Institute of Statistics (INE) for the access to data.

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