

Environmental Regulation and Competitiveness: An Interpretive Update

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Competitiveness?



- **Costs**
- **Balance of Trade**
- **Foreign Direct Investment**
- **Plant Location**
- **Innovation**
- **Productivity Growth**
- **Economic Growth**

Jaffe, Peterson, Portney and Stavins, 1995



“Overall, there is relatively little evidence to support the hypothesis that environmental regulations have had a large adverse effect on competitiveness, however that elusive term is defined.”

“... there is also little or no evidence supporting the revisionist hypothesis that regulation stimulates innovation and improved international competitiveness.”

Generic Difficulties



- **Measuring stringency of regulation**
- **Endogeneity**
- **Left-out variables**
- **Unknown counterfactual**
- **Ideology**

Trade, FDI and Location



- **Some evidence of effects for LDCs, but measures of regulatory stringency are problematic**
 - **Kolstad and Xing (air pollution)**
 - **Unteroberdörster (participation in treaties)**
- **New evidence on U.S. indicates modest negative impacts**
 - **Becker and Henderson on ozone**
 - **Greenstone on 4 criteria pollutants**

Productivity



- Are “actual” costs more or less than reported PACE expenditures?
- Gray and Shadbegian--more (but left-out variables)
- Morgenstern, Pizer and Shih--less (but stay tuned)
- Berman and Lui --less (in L.A. oil refineries)
- Greenstone --more (implicitly, but a very small amount)

Economic Growth



- **Michael Greenstone: best econometric evidence yet:**
 - plant-level data for all of manufacturing
 - plants identified with counties and with industries, allowing very detailed controls for other drivers
 - exogenous measure of regulatory stringency: counties' CAA compliance status for each criteria pollutant
- **Result: statistically significant but very small reductions in economic growth**

The “win-win” debate: Areas of agreement



- **Much existing environmental regulation uses inflexible mechanisms likely to stifle innovation.**
- **“Incentive-based” mechanisms are likely to be more conducive to innovation.**
- **Firms are boundedly rational so that external constraints can sometimes stimulate innovation that will leave the firm better off.**

Areas of agreement (2)



- **Environmental regulation is likely to stimulate R&D and other searches for less-polluting technology and processes. (Jaffe and Palmer)**
- **This is likely to result in innovation that makes the regulation less costly.**
- **Forecasts of compliance costs for new regulations are likely to be overstated.**
- **First-mover advantages may result from domestic regulation that correctly anticipates world-wide trends.**

Analytical/factual disagreements



- **Widespread case-study evidence indicates significant “innovation offsets” are common.**
- **Innovation in response to regulation is evidence of offset.**
- **Case studies are highly selective. Firms believe regulation is costly.**
- **Even if cost-reducing innovation occurs, need to worry about “opportunity cost” of R&D and management effort.**

Analytical/factual disagreements (2)



- **Pollution is evidence of waste, suggesting reason why cost-reducing innovation in response to regulation might be the norm.**
- **Existing productivity or cost studies do not capture innovation offsets.**
- **Costs are costs; even if firms aren't at the frontier, side-effects of pollution reduction could just as easily be bad as good.**
- **Existing studies show that innovation offsets have been very small.**

Analytical/factual disagreements (3)



- We have found a lot of evidence of innovation offsets even though existing regulations are badly designed. This suggests that offsets from good regulation would be large.
- Economics is Panglossian.
- Since you agree that bad regulations stifle innovation, the beneficial effects of existing regulation only shows that case studies are highly misleading.
- Economics is the dismal science.

The Jaffe Hypothesis[®]

(You heard it here first.)



- **Second-order effects (good or bad) are small relative to first-order effects.**
- **Implications:**
 - **Measured costs do not grossly understate *or* grossly overstate actual costs**
 - **Innovation does not make regulation free, just cheaper than industry says in advance (but you knew that already)**

Parting Thought



- **We all agree that much existing regulation stifles innovation.**
- **Replacing inflexible regulations with incentive-based approaches would make regulation either less stifling or else positively innovation-enhancing.**
- **Why don't we focus on achieving this?**