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# What shapes the impact of environmental regulation on competitiveness? Evidence from Executive Opinion Surveys



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### ABSTRACT

In diametrical opposition to standard predictions, the theory of lead markets conjectures potential competitiveness gains from environmental regulation. Evidence for the actual impact direction and its determinants has however so far been inconclusive. Examining different regulation characteristics and distinguishing between their long-term and short-term effects brings the two seemingly contradictory concepts in line. Based on Executive Opinion Surveys that are annually conducted by the WEF and the IMD, country-level competitiveness effects are evaluated and the determinants are estimated in a panel regression. The estimation results call for a flexible regulation design that allows for different ways of achieving compliance. The fact that regulatory pressure is found to be strongly associated with a more positive perception of long-term impacts lends support to the induced-innovation-hypothesis. While controlling for potential effects from affluence, market size and trade openness, the impact on long-term competitiveness seems also to be affected by environmental quality institutions.

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## 1. Introduction

In which way a country's competitiveness is affected by environmental regulation continues to be controversially debated. Different schools of economic thought produce diametrically opposite expectations about the direction of regulatory impact. While standard economic models predict

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negative effects, evolutionary approaches of induced innovation defend the potential of positive impacts. This study confirms the standard notion of negative compliance costs effects and provides empirical support for the induced innovation hypothesis by showing that the direction of regulatory impact depends on the considered time horizon.

Under neoclassical assumptions the strengthening of national environmental regulation is supposed to erode international competitiveness, because imposing new constraints on business activity would create additional costs at the firm-level. More efficient investments would be crowded out by expenditures to reduce pollution externalities in compliance with regulation (Jaffe et al., 1995; Palmer et al., 1995), putting domestic firms at a disadvantage relative to their international competitors. According to the Pollution Haven Hypothesis, firms would eventually leave the country for less strict (and hence less expensive) regulatory regimes. Although the effect has so far been difficult to demonstrate empirically, concerns about the loss of competitiveness are immediately raised when governments seek to strengthen environmental regulation.

The opposite proposition, namely that international competitiveness may actually be increased following regulation-induced improvements in product quality and production processes, has been more emphatically articulated over the last two decades by proponents of a neo-Schumpeterian approach. Porter (1991) claims that environmental regulation will enhance a country's competitiveness, based on the assumption that there are fundamental market imperfections that can be overcome by regulatory pressure. The Porter Hypothesis, according to which properly designed environmental regulation can create incentives for innovation that may offset the related costs (Porter and van der Linde, 1995), most prominently challenged the conventional wisdom.

Similarly, the concept of lead markets for environmental innovations (Beise and Rennings, 2003, 2005; Jacob et al., 2005) conjectures potential competitiveness gains at country-level from implementing ambitious national environmental policies. According to this view, the adaptation of a local production system to a stringent regulatory landscape can create early-mover-advantages for the national economy by anticipating global trends and directing technological change towards emerging fields of eco-innovation.

With very few exceptions (Brunnermeier and Cohen, 2003; Lanoie et al., 2008) previous empirical studies usually relied on contemporaneous comparisons. By distinguishing between long-term and short-term competitiveness effects of environmental regulation the two seemingly contradictory concepts are brought in line. Since technological change takes time to become effective, the immediate impact on competitiveness is likely to be different from the long-term effect of environmental regulation. It is reasonable to expect that competitiveness is primarily affected by compliance costs at the beginning, while induced innovation effects dominate the impact later on.

Many empirical studies lack a clear definition of the underlying concept of international competitiveness. In this study, the relevant competing entity is the national economy composed of many firms in different sectors. It is considered to be competitive if it sustains a large number of businesses ready to successfully compete on world markets. Although there is a growing evidence that countries are less competitive in certain sectors with a stringent environmental regulation (Ederington, 2010), at the country-level this could be compensated by competitiveness gains in other sectors. Putting a higher price on pollution could actually foster the transition of the whole economy by promoting innovation through new market entrants, by strengthening less polluting firms and by developing a strong environmental industry (Feess and Mühlheuser, 1999).

The general business response to regulatory pressure may also hinge on certain framework conditions. The realization of competitiveness gains likely depends on the ability of domestic firms to timely draw on economies-of-scale and learning curve effects and to consequently set dominant designs in emerging green markets. Reliable market information on environmental performances may be an important precondition for the ability of businesses to effectively translate cleaner production achievements into market success. Hence, the overall performance of the national innovation system and the prevalence of certain quality institutions may significantly contribute to the explanation of observable country differences.

This study contributes to the long-lasting debate by providing novel insight on how the regulatory impact on competitiveness is affected by the instrument design of environmental policy as well as by relevant framework conditions. Opinion data from two annually conducted expert surveys allows for

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