The Dynamic Impact of Unilateral Environmental Policies

David Hémous

PII: S0022-1996(16)30105-2
DOI: doi: 10.1016/j.jinteco.2016.09.001
Reference: INEC 2978

To appear in: *Journal of International Economics*

Received date: 15 June 2014
Revised date: 12 September 2016
Accepted date: 13 September 2016

Please cite this article as: Hémous, David, The Dynamic Impact of Unilateral Environmental Policies, *Journal of International Economics* (2016), doi: 10.1016/j.jinteco.2016.09.001

The Dynamic Impact of Unilateral Environmental Policies

David Hémous*

University of Zrich, INSEAD and CEPR

Abstract

This paper builds a two-country, two-sector (polluting, nonpolluting) trade model with directed technical change, examining whether unilateral environmental policies can ensure sustainable growth. The emission rate of the polluting sector depends on its relative use of a clean and a dirty input. A unilateral policy combining clean research subsidies and a trade tax can ensure sustainable growth, while unilateral carbon taxes alone increase innovation in the polluting sector abroad and generally cannot ensure sustainable growth. Relative to autarky and exogenous technical change respectively, trade and directed technical change accelerate environmental degradation either under laissez-faire or with unilateral carbon taxes, yet both help reduce environmental degradation under the appropriate unilateral policy. I characterize the optimal unilateral policy analytically and numerically using calibrated simulations. Knowledge spillovers have the potential to reduce the otherwise large welfare costs of restricting policy to one country.

Keywords:
climate change, environment, directed technical change, innovation, trade, unilateral policy
JEL: F18, F42, F43, O32, O33, O41, Q54, Q55

Previous versions were circulated under the titles "Environmental Policy and Directed Technical Change in a Global Economy: Is There a Case for Carbon Tariffs?" and "Environmental Policy and Directed Technical Change in a Global Economy: The Dynamic Impact of Unilateral Environmental Policies."

*University of Zrich, Schnberggasse, 1, 8050 Zurich, Switzerland. +41 44 634 61 18
Email address: david.hemous@econ.uzh.ch (David Hémous)
URL: http://www.econ.uzh.ch/en/people/faculty/hemous.html (David Hémous)