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METHODS

Environmental policy in the European Union: Fostering the development of pollution havens?

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ABSTRACT

A pollution haven occurs when dirty industries from developed nations relocate to developing nations in order to avoid strict environmental standards or developed nations imports of dirty industries expand replacing domestic production. The purpose of this study is to determine whether the European Union (EU) has increased its imports of “dirty” goods from poorer, less democratic countries during a period of more stringent environmental standards. Previous empirical studies such as those by Levinson and Taylor [Levinson, A., and Taylor, M.S., in press. Unmasking the Pollution Haven Effect. *International Economic Review*.], Ederington, Levinson and Minier [Ederington, J., Levinson, A., and Minier, J., 2005. Footloose and Pollution-Free. *Review of Economics and Statistics*, 87: 92–99.], Kahn and Yoshino (2004), and Ederington and Minier [Ederington, J., and Minier, J., 2003. Is Environmental Policy a Secondary Trade Barrier? An Empirical Analysis. *Canadian Journal of Economics*, 36: 137–54.] find evidence that United States imports are responsive to changes in environmental stringency, but the effects of EU policy have not been examined as thoroughly. Our study follows Kahn [Kahn, M.E., 2003. The Geography of Us Pollution Intensive Trade: Evidence from 1958 to 1994. *Regional Science and Urban Economics*, 33: 383–400.] and examines the impact of industry energy intensity and toxicity, measured by an energy index and a Toxic Release Inventory (TRI) index, on imports into the EU, at the 2-digit industry level from 1970 to 1999. We use the signing of the Maastricht Treaty to signify a period of more uniform and stringent community wide environmental standards (1993–1999), and identify the level of per capita GDP within an EU trading partner. We find an increased amount of EU energy intensive trade with poorer countries during the period with more stringent EU environmental standards. This result is not robust, however, when poorer countries are defined by OECD membership and geographic region. We do not find an increased amount of EU toxic intensive trade with poorer countries although there is some evidence of increased EU imports of toxic goods from poorer OECD and non-EU European countries. For our full sample of trading partners in all regions, the evidence supports the PHH for EU energy intensive trade, but not for toxic intensive trade. Results for regional trade analysis are less clear.

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1. Pollution havens

The 1990s was a decade in which environmental standards were tightened throughout the developed world. This rise in environmental stringency has led to a discussion about the pollution haven hypothesis (PHH). The PHH proposes that environmental stringency differences between developed and developing countries, encourages developing countries to specialize and gain a comparative advantage in the production of “dirty” goods. If the PHH holds, developed nations should observe a rise in imports of “dirty” goods from developing nations, during a period of increased environmental stringency. In this paper we examine the PHH with respect to the European Union (EU). In particular, we are interested in determining whether the EU has increased its imports of pollution intensive goods from poorer, less developed countries during a period of more stringent and uniform environmental standards.

There is a substantial theoretical and empirical literature on the PHH. Brunnermeier and Levinson (2004) provide a good review and critique of this literature.² Much of the previous research focuses on the U.S., a fact likely due to the quality and coverage of U.S. data. In this paper we are able to look at the PHH from the perspective of the EU, something the previous literature has not yet done. We follow the strand of empirical literature that examines inter-industry FDI flows within a single country.³ Levinson and Taylor (in press), Ederington, Levinson, and Minier (2005), Mulatu, Florax, and Withagen (2004), Kahn and Yoshino (2004), Cole (2004), Ederington and Minier (2003), Eskeland and Harrison (2003), and Kahn (2003) all examine whether industry imports (net imports or FDI) into the United States, (Mulatu et al. include Germany and the Netherlands as well) are influenced by increased domestic environmental stringency.

The literature on the PHH has found inconclusive evidence about its existence. One explanation for this inconclusive work is the endogeneity of environmental regulations. Ederington and Minier (2003) claim that some countries, the U.S. in particular, treat environmental regulations as endogenous — a secondary trade barrier, and this treatment of regulations may mask pollution haven behavior. They show that when environmental regulations are modeled as endogenous, environmental stringency has a significant impact on trade flows. As Levinson and Taylor (forthcoming) point out this theory assumes that environmental regulations impose a cost large enough to impact international competitiveness. An alternative explanation for the lack of evidence that pollution havens exist is that the additional costs of more stringent

environmental standards are such a small fraction of total costs that they do not impact international trade competitiveness (Jaffe et al. 1995). However, Levinson and Taylor (in press) claim that neither of these explanations are the reason for the inconclusive evidence about the PHH, but rather the lack of evidence is due to the measure of industry dirtiness that studies have used, abatement costs.

Levinson and Taylor (in press) believe that the lack of consistent pollution haven results are not due to the endogeneity of environmental standards or the size of costs, but the endogeneity of abatement costs. They show that the use of pollution abatement costs as a measure of industry cleanliness may mask the pollution haven effect. In particular, they point out that a negative relationship may exist between pollution abatement costs and net imports due to unobserved foreign pollution taxes, which will conceal evidence of pollution haven behavior. In this paper we examine the impact of industry dirtiness on imports into the EU during a period of more stringent environmental standards. We use an energy index and a toxicity index similar to those that Kahn (2003)⁴ and Kahn and Yoshino (2004) employ in order to avoid the endogeneity problem associated with the use of abatement costs that Levinson and Taylor (in press) describe. Kahn (2003) finds no strong evidence in support of the PHH — that the U.S. increased its imports in dirty industries during a period of more stringent environmental standards. We follow Kahn's (2003) approach to test the PHH for the EU.

In our empirical estimation we control for trade with other nations that have similar environmental standards and footloose industries as Ederington, et al. (2005) suggest. Ederington, et al. (2005) show that industry abatement costs are inversely related to industry mobility and once footloose behavior and trade with other industrialized countries is controlled for, higher industry abatement costs reduced net imports into the U.S. Cole (2004) cautions against only examining trade in a nation's dirtiest sectors. Cole shows that for a series of North–South trade-pairs net exports as a proportion of consumption is declining in the both the dirtiest and cleanest sectors, but that this effect is fairly small compared to other variables. In our case this should not be a problem as we are examining trade in all manufacturing industries.

Mulatu, et al. (2004) and Ederington and Minier (2003) find that environmental stringency alone does not determine the pattern of dirty trade but that industry and sector endowments, and state fixed effects also play a role. Eskeland and Harrison (2003) find that U.S. outbound investment is largest in sectors with low abatement costs, once they control for industry and sector effects. They offer little evidence in support of the PHH. We include country fixed effects but do not control for sector and industry endowments, due to data limitations.

In this paper we examine whether the EU has increased its imports of “dirty” goods from lesser developed countries during a period of more stringent environmental standards.

² Cole and Elliot (2003), Antweiler et al. (2001), Copeland and Taylor (2004, 2003, 1994) all provide theoretical models that examine the relationship between environmental regulation and trade.

³ Millimet and List (2004), Fredriksson, List, and Millimet (2003), Keller and Levinson (2002), and Levinson (1996, 2000) examine the effect of stricter environmental standards on inter-state/country FDI. While Smarzynska Javorcik et al. (2004), Cole and Elliot (2003), Xing and Kolstad (2002), and Antweiler et al. (2001) examine the effect of environmental regulations on a firm's inter-country location choice.

⁴ Kahn uses an energy index based on U.S. production technology, while we employ a similar index for the EU based on data compiled from the International Energy Agency (IEA) (OECD, 2004). The toxicity index is the same.

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