

Are Economic Growth and Foreign Direct Investment bad for the Environment?

Eskandar Elmarzougui, Bruno Larue and Lota Tamini

Centre for Research on the economics of the Environment, Agri-Food, Transport and Energy (CREATE)
Quebec, Canada



Environment and liberalisation

Much negotiation capacity has been invested in multilateral and bilateral trade agreements since the mid 1980s, but environmental issues have been typically excluded from these talks. Yet, as Kellenberg (2009) point out, there are concerns about the impact of trade and investment liberalization on countries' competitiveness and the environment.

The pollution haven hypothesis (PHH) posits that firms undertake foreign direct investment (FDI) in countries with loose environmental standards to avoid tight environmental standards. The theoretical foundation of the PHH is firmly established, but the empirical evidence remains mixed.

Methodological approach

We developed a dynamic econometric framework that explains environmental quality (pollutants emissions) in terms of national income, trade and investment openness as well as participation in international environmental agreements. As in Frankel and Rose (2005), explanatory variables are endogenized: that is we take into account the fact that they might be influenced by unobserved factors that also influence environmental quality. The model is estimated with the dynamic generalized method of moments.

Sample and data

Our sample covers 41 to 162 countries, depending on which pollutant is considered. Three kinds of pollutants are analysed: 6 global pollutants (CO₂, HFC, PFC, SF₆, N₂O and CH₄), 4 local pollutants (NO₂, CO, SO₂ and SPM), and Water biochemical oxygen demand (BOD). Our sample spans 20 years (1988-2007).

Findings

Air Global Pollutants

Variables	CO ₂ /pop	HFC, PFC & SF ₆ /pop	N ₂ O /pop	CH ₄ /pop
Lagged dep var	0.872***	0.016*	0.428***	-0.274**
GDP/pop	189.043**	33.640**	-6.078	155.541***
Squared GDP/pop	-3.617***	-0.613***	-0.28	-1.941***
Trade openness	-6.711	4.693***	-12.305***	419.799 ***
FDI/pop	18.094***	5.705***	-0.674	-0.806
Kyoto protocol	626.746	5.263	228.402	-1671.383

Air Local Pollutants

Variables	NO ₂ /pop	CO /pop	SPM /pop	SO ₂ /pop
Lagged dep var	0.723***	0.845***	0.952***	0.710***
GDP/pop	0.839	0.356	0.592***	-0.115
Squared GDP/pop	-0.002	-0.019**	-0.014**	0.019***
Trade openness	-0.029***	-0.024	-0.327***	-0.127***
FDI/pop	-0.142***	0.044	0.017	-0.092***
Sofia protocol	-18.868***	-8.970	4.028	-23.875***

Biochemical Oxygen demand (BOD)

Variables	BOD /pop
Lagged BOD pop	0.707***
GDP pop	219.134***
Squared GDP pop	-4.609***
Trade openness	-30.499***
FDI pop	23.103***
Water protocol	-27.422

In all tables above, *, ** and ***: denote significance at 10, 5 and 1% levels.

Results and Conclusion

We found that in the early stages of development, economic growth increases the emission of most air global pollutants, BOD and local pollutants. Trade openness increases the emission of HFC, PFC & SF₆ and CH₄, reduces the emission of N₂O, NO₂, and SO₂, and do not affect the emission of the rest of pollutants. Once a threshold level of per capita income has been reached, economic growth induces pollution reductions for many pollutants. The threshold level varies across pollutants (e.g., 19k for CO, \$80k for CH₄) The pollution haven hypothesis is supported by the full sample for global pollutants (CO₂, HFC, PFC and SF₆) and BOD, but not for local pollutants (NO₂ and SO₂), for which the pollution halo hypothesis (i.e., FDI is good for the environment) could not be rejected.

The signatures of the Sofia, EMEP and Oslo protocols have induced reductions in the emissions of NO₂, CO and SO₂ respectively, while the signature of other protocols has had no noticeable effects. While not reported, the sub sample results show that when developed and developing countries are separated, we found that foreign direct investment (FDI) increases the emission of global pollutants and BOD in developing countries, but we do not find an effect for developed countries. FDI reduces the emission of local pollutants in both developed

References

- Kellenberg, D.K., 2009. An empirical investigation of the pollution haven effect with strategic environment and trade policy. *Journal of international economics* 78, 242-255.
- Frankel, J.A., Rose, A.K., 2005. Is trade good or bad for the environment?. *The Review of Economics and Statistics* 87, 85-91.