DOES ECONOMIC FREEDOM INFLUENCE ENVIRONMENTAL POLLUTION: THEORY AND EVIDENCE

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Economic freedom is considered as a factor of economic growth. From the other side atmospheric pollution is a kind of market failures. We assume negative relation between pollution and economic freedom. However economic freedom itself can not be considered as an explanatory variable for pollution trend. A set of macroeconomic determinants should be considered also. Moreover we should be aware of country specific effects (transition or developed economies, structure of energy resources) and time effects (for ex. scientific progress, economic slowdowns, crises).

Turning to literature that covers economic factors and economic consequences of environmental regulation (government intervention) we are particularly interested in two hypothesis: environmental kuznets curve (EKC) hypothesis and Porter hypothesis.

Researchers D. Grossman and Alan Krueger found empirical evidence, that environmental pollution (specified by pollutants) growth with the growth of GDP per capita, reaches maximum and then decreases. Theodore Panayotou, named this tendency – Environmental Kuznets Curve (EKC) in honor of Simon Kuznets hypothesis.

A lot of works were published after this initialization. But there is no consent exists. A good current review of the investigations and problems proposed by Christoph Martin Lieb.

EKC hypothesis were tested for Ukraine by the EERC alumni – Iryna Piontkivska. She finds supporting evidences for the hypothesis and also included institutional (stringency of environmental regulation) and economic characteristics (such as business activity). But technological side (efficiency of natural resource transformation) of relation were omitted. Abatement effect were represented by GDP per capita. Two questions arise here. First question is the multicollinearity of independent variables, second – the stringency of environmental regulation. Traditionally the indicators of stringency of environmental regulation are defined ex post, in other words if country succeed in cutting down pollution environmental regulation considers as effective and stringent. The questions mentioned complicate the choice of controlled instrumental indicators for policy recommendations.

Interesting ideological conclusion and empirical finding is one of William Brock and Scott Taylor. The researchers proved that technological progress in abatement technologies is the source of cutting down pollution, from the other side scientific progress is the determinant of economic growth.

We are intended to reveal maximum of economic determinants (using econometric analysis) which are explain the dynamics of major industrial and agriculture pollutants as well as to explain the mechanisms of their influence. The idea is not to investigate weather EKC exists or not, but the objective is how to focus environmental-economic policy for cutting down environmental pollution and for economic growth.

We want to extend existing approaches. From one side using Ukrainian and other transition country data, from another side combining technological effect with regulatory effect.

Initially we have analyzed the relation between economic freedom (proxy – Index of economic freedom IEF) and environmental capacity of GDP, caused by economic activity (proxy – SO_2 capacity of GDP). The second proxy equals: country emissions of SO_2 (thousand tons) divided by real gross domestic product (billion dollars). We have employed the method of least averages for selection of the fitted curve. Ordinary least square regressions have been run for the purpose of coefficient testing.

On the second stage we have analyzed the relation "atmospheric pollution – IEF and macroeconomic indicators". Since GDP represents a key macroeconomic indicator we have excluded it from the left hand side. For atmospheric pollution we have incorporated factor analysis (method of principal components) for the purpose of revealing latent structure within the set of variables. Doing multiple regression analysis we have run stepwise regressions, estimated fixed and random effect models.

We have used panel data. Data set includes observations of 25 European countries (including Ukraine and post-soviet transition European economies) for the period 1990-2003. Macroeconomic indices were collected from WDI, we use emissions data from European Environmental Agency data sets and IEF scores from the Heritage Foundation.

Conclusions. Using regression analysis we have proved that economic freedom has statistically significant impact on GDP environmental capacity. Increase in the level of economic freedom lowers GDP environmental capacity. In particular we have found that environmental elasticity of IEF is equal 2*IEF. Therefore the effect of IEF on GDP environmental is elastic and the magnitude of the effect is much higher in transition economies than in developed.

Increase in the level of economic has a powerful statistically significant negative effect on countries' SO_2 emissions but only together with interaction term – negative effect of government expenditures on the emissions. From the other side no effect of the mentioned factors have been found for NO_x.

The most promising fact for liberal vector of reforms is the following: an increase in the share of high-technologies in GDP has a strong negative impact on both SO_2 and NO_x. Moreover fixed time effect models have showed better statistics then random effect models, therefore we can conclude that technical progress as a function of time supports our results. Considering technical progress as an indirect characteristic of countries' economic freedom we have verified our hypothesis also.