Mohammad Reza Farzanegan

THE EFFECTS OF THE SHADOW ECONOMY ON THE ENVIRONMENTAL POLLUTION: AN EMPIRICAL INVESTIGATION

Centre for European Economic Research (ZEW) & TU Dresden, Germany, +496211235337,
Farzanegan@zew.de

OVERVIEW

Several studies have investigated the relationship between official economic development and environmental quality; however the role of the shadow economy in this nexus is not examined. This study investigates the effects of shadow economy activities on the different indicators of air and water pollution in a cross-country context for a sample of 139 countries. The environmental indicators divided into international and local pollution, e.g. CO_2, SO_2 and BOD indicators. Shadow economy activities as a share of GDP have a significant and increasing effect on water pollution, controlling for other important determinants of environmental pollution.

The shadow economy includes many pollution intensive activities such as leather tanning, brick and tie making, metal working, transporting passengers in urban areas and many other small scale or family type factories which are not obliged to follow environmental standards. Due to the size of the shadow economy, in particular within developing countries the environmental hazards of this section can be significant [1]. The activities of this hidden part of the economy are difficult to monitor and regulate. Indeed, one of the challenges of developing countries in regulating environmental standards is the persistence of shadow economy activities [2]. Except for a few policy studies, the existing empirical literature is silent on the effect of the shadow economy on different environmental indicators.

METHODS

Our estimation strategy is ordinary least squares. The dependent variable is a linear combination of the independent variables. Different dependent and independent variables have used to check for robustness. I also use white heteroskedasticity-consistent standard errors and covariance. Furthermore, lagged values of main independent variables are used in order to reduce the possible endogeneity.

This cross-section analysis has the following specification:

$$Pollution_i = cons. + \beta_1.Shadow_i + \beta_2.Controls_i + \varepsilon_i \qquad (1)$$

where the *i* denotes each country in the sample, pollution is the CO2, SO2, and BOD indicators, *shadow* is the size of shadow economy in GDP and *Controls* are other control variables such as GDP per capita and its square , Openness to trade, foreign direct investment as a share of GDP, population density and the share of urban population in total population, consumption of fossil fuels, energy use per capita, the share of fossil consumption in total energy consumption and energy efficiency measured as GDP per unit of energy use, financial development, share of banking credit to private section as a percentage of GDP, level of corruption measured by CPI index of Transparency International, ICRG index of corruption and World Governance Indicators for corruption.

RESULTS

We can observe the increasing and statistically significant effect of shadow economy activities on local pollution. Shadow economy activities effects on the local environment can be traced through controlling water pollution. On average, 1% increase in the size of the shadow economy increases water pollution by 0.17%. It seems that there is a U-link between GDP per capita and water pollution. Upon passing an income threshold, increasing income leads to higher problems in water quality. Increasing the urban population accompanies the problems in water quality as well. A 1% increase in the urbanization increases water pollution by 0.23% on average. The effect of population density on water pollution is negative and highly significant. A 1% increase in the population density, reduces the water pollution by 0.06%, *ceteris paribus*. Increasing the population density increases the health, social and political risks of water pollution. Thus, the government may pay more efforts in controlling the quality of water in the most densely populated regions. The effect of energy use per capita on water pollution is negative and highly significant. A 1% increase in energy use per capita reduces water pollution by 0.37%. Often richer countries have higher levels of energy consumption. Thus, increase of this variable reflects also the development aspects of a country. The correlation between energy use per capita and GDP per capita in our sample is 0.76 which is highly significant.

CONCLUSIONS

This study examined the effect of the shadow economy activities on different indicators of environmental quality across 139 countries in a cross-country framework. There have been large efforts in the literature to estimate the size of the shadow economy, but there has been less attention in the empirical studies on the effect of this important part of the economy on the environment. The results show that hidden activities in the shadow economy are detrimental for the local water quality. A 1% increase in the size of shadow economy raises the water pollution by 0.17%. The agents in the shadow economy have limited financial resources to update their production technology. This is mainly due to their unregistered feature which impedes them from accessing official financial sources. They are also usually small scale firms which can not benefit from the advantages of large scale production. The agents in the shadow economy do not commit themselves to national environmental standards and there is no effective control on their economic activities by the government. The quality of their production is low and energy intensive. All these issues cause their activities in the economy to put an extra burden on the environment.

REFERENCES

1. Blackman, A. (2000). Informal section pollution control: what policy options do we have? World Development 28, 2067-2082.
2. Chaudhuri, S. (2005). Pollution and welfare in the presence of informal sector: is there any trade-off? Working Paper, University of Calcutta. Available at: http://129.3.20.41/eps/othr/papers/0510/0510012.pdf