URBANIZATION AND THE IMPACT ON HEALTH AND THE ENVIRONMENT: A TALE OF TWO CITIES

CHAOYANG PENG, Ph.D.
The World Bank

XIAODONG WU, Ph.D.
University of North Carolina at Chapel Hill

GORDON G. LIU, Ph.D.
University of North Carolina at Chapel Hill

ABSTRACT

Rapid urbanization in China has increasingly impacted on the urban environment and the health of the growing urban population. Perhaps most visible is the smog that blankets the urban landscape. High ambient concentrations of airborne pollutants cause respiratory diseases among urban residents and also contribute to acid rain which damages the ecosystems beyond urban areas. In this paper, we use emission data collected in two Chinese cities to analyze pollution dispersion. Spatial models are developed to estimate population exposure to ambient concentrations of sulfate, a fine particulate most damaging to human health, and to assess the impact of acid deposition on the ecosystems surrounding urban areas. Dose-response functions are used to quantify the effects. The results show that the health costs are an order of magnitude larger than the damage to crops and forests. Policy implications are explored by evaluating the benefits and costs of alternative pollution control options.

Key words: urban development, air pollution, environmental health, ecosystems, spatial modeling.

JEL Classifications: O13, I100, Q010

* This study benefited from two projects sponsored by the World Bank. We thank Dr. Todd Johnson and Dr. Jitendra Shah who, respectively, led the China Sulfur Emission Mitigation Policies Project and the China Acid Rain Control Policies Project in the World Bank. We also thank Dr. Sarath Guttikunda at the University of Iowa, Dr. Fahe Chai and Dr. Fan Meng in the Chinese Research Academy of Environmental Sciences, and Ms. Guomei Zhou at the State Environmental Protection Administration in Beijing for their valuable assistance. Data collection in the cities of Shijiazhuang and Changsha was made possible by the support of the Environmental Protection Bureaus in the two cities. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors and should not be attributed in any manner to the involved institutions.

Correspondence: Professor Xiaodong Wu, Department of Economics, Gardner Hall 304, CB#3305, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3305. Tel: (919) 966 5373. Email: wux@email.unc.edu.