

Executive Summary: Environmental Accounting for Pollution in the United States Economy

In “Environmental Accounting for Pollution in the United States Economy” (*American Economic Review*, 101(5): 1649–75, DOI:10.1257/aer.101.5.1649), Nicholas Z. Muller, Robert Mendelsohn and William Nordhaus present a framework to include environmental externalities into the system of national accounts.

Muller, Mendelsohn, and Nordhaus (MMN) estimate the air pollution damages for each industry in the United States. Their approach measures the Gross External Damages (GED) caused by each industry. The conceptual basis of GED is similar to output measures in standard national accounts as being a price (or marginal value) times a quantity. In this case, the price is calculated as the marginal external damages and the quantity is the volume of emissions (pollution) at each source location for each industry. The study shows how such measures fit into standard accounting frameworks and some of the difficulties involved in deriving estimates.

The estimates use existing inventories of emissions, along with a reduced-form air quality model (the APEEP model), and health impacts estimates derived from the public health literature. Integrating these different data and models, they calculate the physical and economic damages from air-pollution emissions for each county in the U.S. for each industry, and then aggregate these to produce national totals.

The main empirical finding is that solid waste combustion, sewage treatment, stone quarrying, marinas, and oil and coal-fired power plants have GED larger than their value added. Put differently, if the accounts estimated net value added as including environmental damage, the net value added of these industries would be negative.

The finding that GED exceeds value added signifies that a unit increase in output of these industries have additional social costs that are higher than the increased revenues. This calculation assumes that the incremental changes are equal to the average of each of the variables, as is customary in national-accounts calculations.

In making the calculations, MMN have used alternative assumptions about the social cost of carbon and health impacts to report a range of the GED. The largest industrial contributor to external costs is coal-fired electric generation, whose estimated environmental damages range from 0.8 to 5.6 times its value added. The two sectors with the highest GED/VA ratio are agriculture (38 percent) and utilities (34 percent). They are responsible for \$32 billion and \$63 billion of damages, or 17 percent and 34 percent of the total damages produced by market activities, respectively.

Muller, Mendelsohn, and Nordhaus show that it is possible to develop augmented national accounts that include pollution. Given the size and distribution of damages found in this study, it seems clear that a more detailed set of accounts is desirable. The authors believe that this should be undertaken by national statistical agencies because a full set of accounts needs the full-time staff, professional expertise, and access to proprietary source data that only a government agency possesses. It is important to understand the implications of these findings. Some might interpret the results as saying that the industries with negative net value added should be closed. This is not the correct interpretation. Rather, the results indicate that the air pollution from these industries is higher than would be appropriate if all costs and benefits were included. Put differently, if all air-pollution damages were included as costs to firms (or internalized), then pollution would decline from its current level. Under most conditions, then, output of the industry would fall and output prices (reflecting the inclusion of external costs) would rise.