The Environmental Propaganda Agency

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In 1990 the U.S. Environmental Protection Agency (EPA) published *Environmental Investments: The Cost of a Clean Environment*. That work became the most widely cited source of compliance-cost data used in studies reported in economic journals. An impressed Congress, in the 1990 revision of the Clean Air Act, required the EPA to conduct a thorough cost-benefit analysis of its clean air requirements imposed since 1970. Finally, in October 1997, the EPA submitted to Congress *The Benefits and Costs of the Clean Air Act, 1970 to 1990*. (The whole study has been published on the Internet.) Although the EPA acknowledges that it has imposed clean-air-compliance costs totaling \$523 billion from 1970 to 1990, it claims that its rules have produced benefits worth \$22.2 trillion (measured in dollars of 1990 purchasing power). For comparison, the U.S. Department of Commerce estimates that in the early 1990s all U.S. fixed reproducible tangible wealth totaled less than \$20 trillion.

To estimate the benefits and costs of the Clean Air Act, the EPA compared the differences in economic, health, and environmental outcomes under two alternative scenarios: a "control scenario" and a "no-control scenario" (U.S. Environmental Protection Agency [U.S. EPA] 1997, ES-1). The "control scenario" is based on actual historical data. The "no-control scenario" is the EPA's hypothetical description of what the United States would have experienced had no air-pollution controls been established beyond those in place prior to enactment of the 1970 amendments (ES-1). The EPA claims to have, by 1990, eliminated 99 percent of lead emissions. It also claims to have effected reductions of 40 percent in

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average atmospheric levels of sulfur dioxide, 30 percent in nitrogen oxides, 50 percent in carbon monoxide, and 15 percent in ground-level ozone (ES-3). The "control scenario" involves reduced "acid rain," a 45 percent reduction in total suspended particulate matter, and a 45 percent reduction in smaller particles (PM10 and PM2.5) (ES-4). The particulate matter is the most important pollutant in the EPA's benefit assessment.

The costs of the Clean Air Act include expenditures due to requirements to install, operate, and maintain pollution-abatement equipment, costs incurred in monitoring and reporting regulatory compliance, and other costs of maintaining the regulatory bureaucracy. Many of these costs showed up as higher prices for goods and services. The benefits of the Clean Air Act were estimated by aggregating a dollar-value estimate of the entire harm that would have been done by the greater levels of air pollution that would have occurred in the "no-control scenario." The EPA concluded that many premature deaths would have resulted from the air pollution. Other projected health problems included chronic bronchitis, hypertension, hospital admissions, respiratory-related symptoms, restricted activity, decreased productivity of workers, soiling damage, lost visibility, and agricultural output reductions (U.S. EPA 1997, ES-7). The EPA estimated dollar values for each of the negative effects and concluded that total monetized benefits ranged between $5.6 trillion and $49.4 trillion, with a central estimate of $22.2 trillion, whereas EPA-estimated costs were $0.5 trillion (ES-8). When the EPA's Science Advisory Board criticized the study, the EPA prepared an alternative estimate using a modified methodology and reported benefits ranging between $4.8 trillion and $28.7 trillion, with a central estimate of $14.3 trillion (ES-9).

The EPA's conclusions: "First and foremost, these results indicate that the benefits of the Clean Air Act and associated control programs substantially exceeded costs." The EPA has produced such a large benefit estimate that it goes on to claim, "Even considering the large number of important uncertainties permeating each step of the analysis, it is extremely unlikely that the converse could be true" (U.S. EPA 1997, ES-9). The EPA, therefore, has produced a cost-benefit study that, if true, should forever silence opponents who contend that our air-pollution regulations have cost more than they were worth.

But the truth has eluded the authors of the EPA report. Their study actually represents a milestone in bureaucratic propaganda. Like junk science in a courtroom, the study seemingly attempts to obtain the largest possible benefit figure rather than to come as close as possible to the truth.

Valuing Lives Allegedly Saved

The EPA valued each life saved as a $4.8 million benefit. The underlying concept is sensible enough. Environmental regulations are forcing people to spend money and divert valuable resources from other uses in order to reduce certain environmental health risks. Citing respectable studies, the EPA concludes that workers will accept lower-wage jobs to reduce the probability of being accidentally killed on the job. Installing windows in tall buildings pays better than installing them in one-story houses partly because of the difference in the worker's risk. The claim is not that a human life is worth only $4.8 million but rather that improving safety is worth $4.8 million in the sense that people are spending that much per life saved in other contexts.

Government is largely specialized in the business of saving human lives. This is part of the duty of the military, the police department, the fire department, the public health agency, the Federal Aviation Administration, the highway department, and various other agencies of the various levels of government. Government passes laws and spends money to improve public safety. Cost-benefit analysis is simply a method of assisting in saving the greatest number of lives per dollar spent. If one government activity saves lives at a lower cost per life saved than another, then the same total money expenditure could save more lives if some of the spending were reallocated in favor of the former at the expense of the latter. The Department of Transportation spends no more than $2.7 million to save a statistical life (Hopkins 1997, 6 [March 1996 figure]). If the EPA balanced clean-air costs against benefits, then the Department of Transportation could still save almost two lives for every one life the EPA would save with the same mandated spending. Unlike the Department of Transportation, which values saving the average motorist at $2.7 million, the EPA is theoretically valuing at $4.8 million the saving of some elderly person to live a short time longer on his deathbed.

Valuation of the saving of a life allegedly lost to small amounts of smoke and dust in the outdoor air is critical in generating the EPA's large benefit total. A recent article in *Risk in Perspective* (July 1999) deals with "Valuing the Health Effects of Air Pollution." The article explains that the EPA's figure of $4.8 million per life lost comes from the idea that an average worker might be paid $480 per year to accept an added fatality risk of one in ten thousand on the job. But a healthy middle-aged worker is quite different from an elderly person with a serious cardiac or respiratory disease. The EPA, the article reports, demonstrates that more realistic estimates of what a particulate-pollution casualty has actually lost result in dramatic reductions in the estimated value of life-years saved.

The EPA is notorious for overzealous mandates ostensibly intended to save a few life-years. A study by Tammy O. Tengs and others has become a widely cited source of information on what various agencies spend to save a statistical life-year. The Harvard Center for Risk Analysis features some estimates of the median value of cost per life-year saved for various regulatory agencies (Tengs and others 1995, 369–89):

Federal Aviation Administration	$23,000
Consumer Product Safety Commission	$68,000
National Highway Traffic Safety Administration	$78,000

Occupational Safety and Health Administration	$88,000
Environmental Protection Agency	$7,600,000

Indeed, the Clean Air Act seems to be one of the EPA's better bargains.

Gains in life expectancy from medical interventions are very similar, in principle, to the alleged gains from cleaner air. The Harvard Center for Risk Analysis refers readers of another issue of its newsletter to estimates of such gains (*Risk in Perspective,* November 1998, 2). If all smokers were to quit smoking, the life expectancy of the general population would increase by about nine months. Gains for smokers alone, as a group, are also listed. A thirty-five-year-old smoker gains only fourteen months of life expectancy by cutting smoking by 50 percent (Wright and Weinstein 1998, 383, table 2), whereas quitting altogether increases life expectancy only twenty-eight months. The EPA's alleged 45 percent reduction in outdoor particulate pollution would not seem likely to have a greater effect on an individual's life expectancy than quitting smoking.

About 90 percent of the benefits of the Clean Air Act supposedly come from reductions in mortality (75 percent) and chronic bronchitis (15 percent) that particulate matter (that is, dust and smoke) allegedly would otherwise have caused. Another 6 percent of the $22.2 trillion in benefits is related to preventing people from dying of lead poisoning. During 1990, in the "no-control scenario," the EPA figures that 184,000 additional people thirty years old and older would have died prematurely because of particulate matter suspended in the air (U.S. EPA 1997, ES-4). At $4.8 million per death, this life-saving adds $883.2 billion to the alleged benefits. Summing over the whole twenty-year period, particulate matter alone causes loss of life in the "no-control scenario" that the EPA tallies to be worth $16.632 trillion.

The EPA Science Advisory Board Council on Clean Air Act Compliance Analysis found fault. The council asked the EPA to provide an alternative estimate of benefits based on the value of statistical life-years lost rather than lives lost per se. In response, the EPA revised the value of particulate-matter mortality to $9.1 trillion and came up with a new central estimate of $14.3 trillion for the total benefits of the Clean Air Act (U.S. EPA 1997, ES-9). Although the Federal Aviation Administration mandates spending at $23,000 per life-year gained (Bolch and Pendley 1998, 2), the EPA valued a life-year lost at $293,000 (U.S. EPA 1997, 58). Whenever a moribund seventy-year-old dies, the EPA figured, the fourteen years remaining of actuarial life expectancy for an average seventy-year-old represents the life-years lost (37, 44). Indeed, the average alleged mortal victim of particulate matter was assumed to have lost fourteen years of life expectancy *because* the average victim was an elderly person (44). This means the seventy-year-old lost fourteen years times $293,000 per year, or $2.9 million worth of life-years (I-23). In fact, the EPA treated every dying elderly person as if he would have lived out the full number of years remaining for an average person of his age. The EPA acknowledges doubts about the validity of this procedure, conceding that L. Cifuentes and L. B. Lave had found that 37 to 87 percent of deaths from short-term exposure to air pollution could have been premature by only a few days (I-25).

In summary, one must suspect a pervasive EPA tendency to exaggerate. To arrive at its $9.1 trillion worth of life-years that allegedly would have been lost to particulate-matter mortality, the EPA figures that the average victim loses fourteen years of remaining life expectancy (I-25). If, in fact, the average victim really suffers death only three days prematurely, then the total would be reduced by a factor equal to three days divided by fourteen years. The EPA's $9.1 *trillion* figure drops to $5.3 *billion*. Reducing the estimated value of a life-year saved to the same order of magnitude presumed by other government agencies brings the total down below $1 billion. But we are still ignoring the deeper issue. Air pollution may never have caused those hypothetical deaths in the first place. The EPA Science Advisory Committee (nineteen of the committee's twenty-one members) believed that no causal mechanism linking mortality with particulate matter had been established (34).

Discovering the Victims

The EPA claims to base its prevented-deaths estimates on a number of studies that attempted to correlate mortality rates with levels of particulate matter polluting the outdoor air. The EPA picked the best one (or so it claims), the study by C. A. Pope and others published in 1995. It also cites twelve studies that report finding significant relationships between daily PM10 (particles 10 microns or smaller) concentrations and daily mortality (EPA 1997, D-15). The main cause of daily variations in these particulate-matter levels, however, is the weather. On calm, hot, summer days, pollution levels outdoors tend to be high. Smog is almost exclusively a summer phenomenon. Is it a shocking surprise if statistical studies discover that the "dog days of summer" don't kill just old dogs?

The study by Pope and others (1995) compares death rates for the over-thirty population to annual median PM2.5 exposure in fifty cities (PM2.5 is particulate matter 2.5 microns or smaller). Temperature differences are ignored (Fumento 1997, 1). Pope and others found a 17 percent difference in death rates over eight years between the cleanest and dirtiest cities (Kaiser 1997, 468). The study did not control for wealth or lifestyle but did control for schooling and obesity (Merline 1997, 13). Differences in annual pollutant emissions accounted for far less of the measured ambient pollutant concentrations than did variations in meteorological conditions (Crandall, Rueter, and Steger 1996, 41–42). As a model for predicting mortality, the 1995 model of Pope and others was seriously misspecified. It omitted many important variables. This misspecification results in mistakenly crediting causality to any included variable (such as PM2.5) that happens to be correlated with an important left-out variable. For instance, towns where everyone works in steel mills might tend to be towns with more particulate-matter pollution. And the differential mortality may arise from working in the steel mill rather than from breathing the outdoor air. Maybe the steel-town residents all smoke high-tar cigarettes, get drunk on Saturday night, and fail to attend to church on Sunday. Likewise, towns where people drive older cars might tend to be smokier. Towns located in more densely populated industrial regions might tend to have above-average levels of fine particles. Particulate matter may blow onto places where beef is cheap and people eat too much fat. The possibilities are endless.

Recent studies do not consistently find a relationship between outdoor air pollution and mortality. The EPA cites a 1993, six-city study by Douglas Dockery and others. Yet three of the six cities showed no correlation between death and air pollution (Fumento 1997). A study that followed 6,000 Seventh-Day Adventists for ten years found no connection between particulate matter and mortality, nor between a variety of other air pollutants and mortality (Abbey and others 1993, 35, 45). Another study, by S. H. Moolgavkar, E. G. Luebeck, and E. L. Anderson (1997), adjusts for temperature and finds no correlation between air pollution and hospital admissions for lung problems in Birmingham, Alabama, although such a correlation was found in Minneapolis–St. Paul, Minnesota. In Athens, Greece, a study found mortality correlated with temperature but not with an air-pollution index (Katsouyanni 1994, 264). Another study in Belgium found temperature and ozone significant but not other pollutants (Sartor and others 1997, 116). Laurence S. Kalkstein (1993) evaluated the differential impact of stressful weather and air pollution in several cities and concluded that high pollution concentrations seemed a much less important predictor of acute mortality than stressful weather.

Why Do People Die?

Some people might have died from indoor pollution coming from indoor sources rather than from outdoor pollution coming from sources regulated by the EPA (Crandall, Rueter, and Steger 1996, 42). The same weather conditions that result in urban smog may impede the airing out of houses and buildings. Indoor pollution coming from indoor cooking, cleaners, dust, pets, mold, and other sources would then rise to high levels indoors. Pollution levels are much higher inside people's houses than outside, according to a recent article in *Scientific American* (Ott and Roberts 1998, 90). Americans spend 95 percent of their time indoors (91). Most of the people who die on high-pollution days are elderly and suffer from circulatory or lung diseases. They spend even more of their time indoors than other people. Outdoor pollution levels might be little more than an indicator of weather conditions promoting indoor pollution coming from indoor sources. Indeed, toxicological studies indicate that particulate matter, even at more than twenty times outdoor levels, causes no measurable effect on the breathing of people with chronic obstructive pulmonary disease (Crandall, Rueter, and Steger 1996, 43). Allergies to indoor pollutants do cause breathing problems for some people.

Most people, for whatever reason, die gradually over a period of several weeks or months (American Medical Association 1987, 768). In the end, breathing often becomes labored, partly because the lungs become waterlogged due to heart failure, partly because of saliva that trickles down the windpipe. Pneumonia is not so much the cause of death as the mode of dying from some disease of the heart, liver, or kidneys. The condition is exacerbated when the dying person ceases to rise from the bed. Life may be prolonged by helping such a person get up for a short walk or a ride in a wheelchair. Kenneth Chilton (1997), testifying before a Senate subcommittee, said: "It is curious, to say the least, that the statistical link that has been demonstrated is between fine particles and cardiopulmonary deaths, and not deaths due to respiratory disease or lung cancer alone" (4).

Particulate matter might be a killer largely because it is visible. People die as a result of averting behavior. The dying person's caregiver fears the "deadly pollution" on a hazy day and therefore refrains from getting Grandma up from the bed. Grandma dies of pulmonary edema exacerbated by her failure to get up. The death certificate reports cardiovascular disease as the cause of death because it is the underlying cause. In Israel, Iraqi missile attacks caused the deaths of several elderly people who, fearing poison gas, smothered themselves by wearing government-issued gas masks that had not been properly unpacked—the filter material was still sealed in its plastic wrapper! The missiles that struck Israel delivered no poison gas. Similarly, the EPA may have unwittingly encouraged people to, in effect, smother their dying relatives in an effort to keep them from breathing nearly harmless pollution.

Epidemiological studies that correlate asthma attacks or hospital admissions with particulate-matter pollution may actually be measuring a psychological phenomenon. People, having been persuaded that the haze in the air is deadly, then react accordingly. Children complain that they can't breathe; they put on a big show similar to the one some have now been taught to perform whenever they are exposed to secondhand cigarette smoke. Adults likewise rush to the hospital in fear that the pollution might be the last straw in their struggle against chronic bronchitis or some cardiopulmonary disorder. The environmental movement has encouraged phobic behavior by the more gullible segment of the population. Maybe some people just tend to close their windows to keep the pollution out and then are afflicted with asthma or bronchitis caused by the much more irritating indoor pollution coming from indoor sources.

Any correlation between daily ambient pollution levels and mortality may simply be a misidentification of modest timing effects. Caregivers may simply tend to neglect a dying elder when spring turns to summer and the windows must be closed and the air conditioner turned on. Grandma may get less attention simply because her room smells bad and is repugnant to enter. Maybe no one checked on Grandma after the windows were closed to keep the outdoor pollution from coming in.

Regressions to Save the World!

One must appreciate the questionable significance of weak statistical regression. Once a set of observations has been amassed, many experimental regression equations are typically calculated. By adding and deleting variables or observations, experimenting with transformations, and so forth, the analyst can often "find" a relationship between variables that are actually not related. The pressures to experiment until the desired or expected "fit" is obtained are considerable. The weaker the hypothesized relationship, the easier it is to find it spuriously.

Suppose we examine a sample of fifty-three cities, including New Orleans, Pasadena, Pittsburgh, and New York. Regression analysis reveals no statistically significant relationship between mortality and PM2.5 (Jones, Gough, and Van Doren 1997, 3). Next, we eliminate the four named cities from the sample and add Ashland, Kentucky, even though its PM2.5 measurements seem to be 50 percent above their actual values when we compare it with neighboring cities and look at its sulfate measurements. Voila! PM2.5 suddenly appears to cause a 17 percent increase in mortality in the dirtiest city, compared with the cleanest. We have arrived at the sample of Pope and others (1995) and found those analysts' result. We have found what we expected, and we publish that finding. We do not report our first finding, which showed no relationship.

Establishing a true connection between PM2.5 and mortality may be impossible with regression analysis. Multicolinearity cannot be overcome because ambient levels of particulate matter correlate too strongly with other variables, such as temperature, other pollutants, day of the week, season, averting behavior, characteristics of the local economy, transportation patterns, and so forth. Researchers must cheat and misspecify the model by omitting some important variables; otherwise, the results fail to point to one specific culprit as the cause of differential mortality. Moolgavkar and Luebeck (1996), Edward Calthrop and David Maddison (1996), and others have testified to the unsuitability of regression analysis for testing the relationship between PM and mortality. A false positive result is, theoretically, almost assured for anyone who cares to seek it.

As a general rule, epidemiological evidence is rejected when it establishes a relative risk of less than three, or 300 percent (Taubes 1995, 167). Indeed, Marcia Angell, an editor of the *New England Journal of Medicine,* says that, as a rule of thumb, papers are not accepted for publication unless they find a relative risk of three or more, especially if a finding is biologically implausible or unprecedented (Taubes 1995, 167).

But, with regard to the PM–mortality link, the print media exhibit an exceptional bias in favor of the environmentalist agenda. The peer review process is driven by a sort of political correctness. Papers that support the established orthodoxy are more likely to be published. Special-interest groups trying to further an environmental agenda dominate the funding of such research. The EPA itself funds many studies. A great many zealots and hired-gun statisticians are getting grants, tenure, promotion, and fame for "proving" that pollution is destroying the earth. Zeal for the environment drives many investigators to pursue what would ordinarily be regarded as insignificant research. It increases the number of such studies published, and it magnifies the rewards of researchers such as Joel Schwartz, who received the MacArthur Fellowship—a no-strings-attached $275,000 grant—for his work on lead and particulate pollution (Skelton 1997, 29). Schwartz told an interviewer that his strategy was one of "working very hard to dump out a lot of papers very fast, on the ground that if I just kept on pounding this out in the literature, people could not ignore it" (30).

People seem to forget that regressions once "established" a connection between overhead power lines and leukemia. The electromagnetic field (EMF) findings were stronger than those for PM2.5 and mortality and yet were later disproved (Merline 1997, 12). The EMF threat lacked the bandwagon appeal that might have motivated researchers to construct a solid wall of scientific evidence such as the EPA and the environmentalist groups claim exists for PM2.5 and mortality (10). Many epidemics of anxiety have come and gone in recent years as a result of weak epidemiologic findings (Taubes 1995, 164). Radon gas and lung cancer were associated via mismeasurement of actual individual exposure; now the findings are doubted. Cancer and pesticide residues were linked; DDT and breast cancer were linked and then unlinked; electromagnetic fields from power lines seemed to cause brain cancer; hair dryers seemed to cause cancer; coffee seemed to cause cancer, so did saccharin. For particulate matter, so much "good" can be done by the "citizen of the world" statistician. He can "prove" that fossil fuels are killing people. For him, it may be a matter of the "earth in the balance." He can help fight global warming. He can prevent the collapse prophesied in that sensational book, *The Limits to Growth.*

Once, in the late nineteenth century, William Stanley Jevons became enthusiastic about a theoretical relationship between sunspots and the business cycle. He became convinced that a relationship existed, and the more he looked, the stronger seemed to be the correlation he believed he had discovered. Because his theory fell out of favor, it became disreputable for subsequent investigators to seek such correlation. Seemingly good correlations were subsequently found, however, and a few even gained publication. Jevons's sunspot theory might still make a comeback if the environmentalists discover that it somehow serves their cause.

Lead Phobia

Lead is assumed to have been causing many deaths. The EPA's mean estimate for lead-related mortality prevented by the Clean Air Act is $1.339 trillion (1990 dollars)

(U.S. EPA 1997, ES-7). The EPA relied on published estimates of a relationship between blood lead levels and high blood pressure (G-9). It then multiplied by other published coefficients distilled from degrees of correlation between high blood pressure and mortality (G-13). The result is a far cry from making inferences based on death certificates that list lead poisoning as the cause of death. Applying the EPA's reasoning, we could save even more lives by eliminating final exams from all colleges and universities. Final exams also tend to elevate blood pressure, and elevated blood pressure is correlated with mortality. The fallacy of such reasoning lies in the source of the correlation between blood pressure and mortality. As Crandall, Rueter, and Steger (1996, 44) have observed, high blood pressure is a predictor of mortality because it indicates heart disease. Heart disease has been the leading cause of death in recent years. Moderately elevated blood pressure itself does not cause nearly the amount of mortality with which it is statistically associated via its connection with heart disease. Maybe getting the lead out of gasoline was worth only a few billion dollars or even less. In any event, the EPA's method results in a huge exaggeration.

Although preventing mortality and chronic bronchitis generates 96 percent of the benefits claimed by the EPA, the largest part of the remainder is attributed to preventing IQ reductions that the EPA says lead would have caused. Drawing on amalgamated regression studies (Schwartz 1993), the EPA relies on a statistical correlation between blood-lead levels in children and low IQ (U.S. EPA 1997, G-2). Supposing that lead is reducing IQs, the EPA values the loss at $3,000 per IQ point per child.

But the EPA might be getting it backward (Juberg, Kleiman, and Kwon 1997, 13). Cross-sectional studies are confounded by the fact that children with lower IQs tend to descend from parents with lower IQs. Stupid parents tend to expose their children to more opportunities for ingesting lead, and the stupid children contribute by eating more dirt. Stupid parents tend to achieve lower socioeconomic status and live in residential areas where lead is more prevalent. Moreover, they tend to fail to provide good diets for their children. Iron-deficient children will actually absorb more of a given amount of ingested lead, and the iron deficiency will further contribute to lower IQ measurements.

Longitudinal studies, tracking the same children over time, persuade some otherwise skeptical scientists of a lead–IQ connection (Powell 1999, 166). However, the relationship between iron deficiency, IQ loss, and lead uptake illustrates the problem of confounding factors that are not evaded by switching from cross-sectional to longitudinal studies. Children living under conditions that expose them to more lead may seem to suffer IQ loss from lead when the loss is actually due to other problems associated with low socioeconomic surroundings. IQ test results are supposedly influenced by the cultural deprivation common to children in low socioeconomic surroundings. The same children who are exposed to more lead may also be exposed to illegal drug use, domestic violence, poor schools, bad diets, and a large number of other factors detrimental to the enhancement of their intellect. Combining many regression studies is almost sure to pick up a false relationship if confounding factors can produce one. Maybe moderate blood lead levels don't really reduce IQ after all, but IQ is just a good predictor of lead ingestion and absorption (Juberg, Kleiman, and Kwon 1997, 13). It seems likely, at least, that the EPA's estimate of the benefits from lead control is exaggerated.

The possibility of synthesizing epidemiological findings has long plagued the lead-IQ controversy. In 1979 Herbert Needleman and his collaborators reported finding a three- or four-point IQ drop associated with modestly elevated lead levels measured in children's teeth (Needleman and others 1979, 689–95). Mark Powell (1999, 163) reports that Claire Ernhart and her co-authors discredited Needleman's research by charging that confounding variables had been inadequately controlled and that Needleman had performed so many regression comparisons that a few statistically significant outcomes were assured by chance alone (Ernhart, Landa, and Schell 1981, 911–19). Later, in a 1990 Superfund court case, Needleman served as an expert witness. Sandra Wood Scarr, a Virginia psychologist who had been an EPA panelist reviewing Needleman's work, testified against Needleman (Powell 1999, 164). Scarr explained that Needleman's first set of analyses found no lead–IQ relationship and that only by eliminating other IQ-affecting variables did Needleman finally get the results he sought (165). Unfortunately, Scarr and Ernhart were condemning practices probably hidden in most of the epidemiological evidence underlying the EPA's claims of benefits of every kind from the Clean Air Act.

The Cost

The EPA provides an estimate of the cumulative costs of twenty years of compliance with the Clean Air Act—roughly half a trillion dollars. This estimate is not very far from the total one gets by adding up the relevant figures in the EPA's previous (1990) study. After all, the previous study was the EPA's prime source of data for the current cost study. However, the EPA has now added its own version of a general equilibrium analysis. The EPA undercuts previous findings by Michael Hazilla and Raymond J. Kopp by concluding that ripple effects reduced annual GDP by about 1 percent, or $55 billion 1990 dollars by 1990 (U.S. EPA 1997, 9). Calculating the present value of the GDP reductions, the EPA concludes that the aggregate impact of clean-air regulation on production was $1,005 billion 1990 dollars. Hazilla and Kopp had found that, by 1990, environmental regulation of all kinds reduced GNP by 5.85 percent. The Clean Air Act, accounting for 30.46 percent of pollution spending, would, therefore, presumably have reduced 1990 GDP by 1.78 percent, according to Hazilla and Kopp. The EPA concedes that some economists identify a stifling effect of environmental regulation on technological innovation, which hinders productivity growth (U.S. EPA 1997, 11). The agency concedes missing some of that effect, although it claims that its general equilibrium model incorporated "endogenous productivity growth" that results from factor-price changes within the model. These are internal ripple effects, however, and do not represent the aggregate changes in multifactor productivity (or total factor productivity) that economists equate with technological advance.

Focusing on the best private study of the productivity effects of the whole of environmental regulation—the study by James Robinson (1995)—leads one to quite a different conclusion. Robinson, whose work was supported by a grant from the Office of Technology Assessment, concludes: "Overall, the U.S. manufacturing sector attained a level of multifactor productivity in 1986 that was 11.4 percent lower than it would have attained, absent the growth in environmental and occupational health regulation since 1974" (414). Moreover, the contribution of occupational health regulation was negligible, leaving the EPA as the sole cause of this entire effect (411). Robinson's finding that actual manufacturing output was 11.4 percent lower than its potential means that, by 1986, potential manufacturing output was 12.86 percent higher than actual output. This implies that, over the twelve years from 1974 to 1986, manufacturing output would have grown by a factor of 1.01 percent per year in addition to its actual growth, had environmental regulations not existed. Had the manufacturing sector enjoyed this addition to annual growth from 1970 to 1990, then manufacturing output in 1990 would have been 22.35 percent higher than it actually was in 1990.

Michael Hazilla and Raymond J. Kopp (1990) developed a model that ignores technological progress but emphasizes the ripple effects produced as disturbances of production in one sector alter factor inputs into other sectors. In their computable general equilibrium model, environmental regulation reduced manufacturing output about 6.33 percent by 1990, largely by reducing capital accumulation and diverting other inputs. (The figure of 6.33 percent is approximate and is obtained by averaging all sectors of the manufacturing industry from Hazilla and Kopp 1990, table 4, 868–69.) The ripple effects from manufacturing and several other directly affected sectors resulted in a reduction of real GNP of 5.85 percent by 1990 (Hazilla and Kopp 1990, 867). In other words, Hazilla and Kopp found that, by 1990, environmental regulation reduced real GNP (and, therefore, real GDP) by 92.41 percent as much as it reduced manufacturing output alone. If manufacturing output would have been 22.35 percent higher in 1990 without EPA regulation, then real GDP probably could have been 20.65 percent higher than it actually was in 1990. Annual growth of real GDP from 1970 to 1990 appears to have suffered; the absence of environmental regulation would have added 0.94 percent to the annual growth rate of real GDP from 1970 to 1990. This figure is consistent with conclusions reached by Richard Vedder (1996, 16), who concluded that annual productivity growth would have averaged one percentage point higher had regulation in general remained at 1963 levels. Thomas Gale Moore (1997, 2) also infers a reduction in total factor productivity in the neighborhood of $2 trillion, based on findings by Gray and Shadbegian (1993) that every dollar spent on compliance costs in the paper, oil, and steel industries reduced total factor productivity by $3 to $4. Moore applies this ratio to Hopkins's $667 billion estimate of overall regulatory compliance cost. (For a discussion of the EPA's role in causing post-1970 American wage stagnation, see Marxsen 1999.)

By comparing actual real GDP each year with estimated potential real GDP (which would have grown larger than actual real GDP by an annually compounding factor of 1.009), we find a difference that totals $9,951.7 billion (1990 dollars) over the period from 1970 to 1990. Because compliance costs for air-pollution control alone constituted 30.46 percent of total 1970–1990 pollution-control compliance costs (U.S. EPA 1990, 8–20, 8–21), the lost GDP attributable to air pollution control would total $3.03 trillion (1990 dollars). This figure needs to be added to the EPA-estimated half a trillion dollars of direct compliance cost because the compliance cost represents a sinkhole for some of the GDP that actually was produced. To put the figures into perspective, the entire U.S. stock of residential structures in 1990 was worth roughly $6 trillion; the stock of consumer durables (all the durable goods you own besides your house) was worth almost $2 trillion. The implied cost of the Clean Air Act from 1970 to 1990 is more than six times larger than the EPA's official compliance cost estimate. It seems reasonable to suppose that the true cost must be somewhere between $1.5 trillion (the EPA's total, including the EPA-estimated lost GDP due to productivity effects) and $3.5 trillion ($0.5 trillion plus $3 trillion, inferred from Robinson's findings plus those of Hazilla and Kopp). The most likely value is probably near $3.5 trillion because, unlike the EPA, Robinson, Hazilla, and Kopp had little to gain by inflating their estimate. Apart from the dubious health benefits, mean EPA-estimated benefits from visibility, soiling damage avoided, and agriculture add up to just $151 billion and are probably also exaggerated. Quite opposite to the conclusion reached by the EPA, it seems very unlikely that the benefits of the Clean Air Act exceeded the costs.

Conclusion

The EPA's cost-benefit study appears to be a bureaucratic cover-up. In reality, the EPA has probably squandered a substantial portion of America's resources. The stifling effect on productivity may account for a big part of America's post-1973 wage stagnation (Marxsen 1999). Without the illusory benefit of all the lives saved, the actual benefits of the Clean Air Act were very modest and probably could have been achieved nearly as well with far less sacrifice. The Clean Air Act and its amendments force the EPA to mandate reduction of air pollution to levels that would have no adverse health effects on even the most sensitive person in the population (Powell 1999, 91). The EPA relentlessly presses forward in its absurd quest, like a madman setting fire to his house in an insane determination to eliminate the last of the insects infesting it.

The EPA has very recently issued a new study in which it attempts to measure the benefits and costs of the Clean Air Act Amendments of 1990 (U.S. EPA 1999). The EPA projects that annual benefits will total $110 billion by the year 2010, $100 billion of which will allegedly come from a 5 to 10 percent reduction in fine particulate matter (iv, 75). Without the amendments, PM10 and PM2.5 supposedly would kill 23,000 people, based on the mid-1990s study by Pope and others (U.S. EPA 1999, 60). The EPA once again has valued each of these fatalities at $4.8 million (1990 dollars) (71). The total comes up short of the product of 23,000 times $4.8 because the EPA decided to add a five-year lag structure to death after exposure to particulates and it used discounting in its calculations (75). Estimating costs to be just $27 billion per year by 2010, the EPA arrives at a four to one ratio of benefits to costs (71). Needless to say, the agency continues to exaggerate.

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