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Pricing L.A.'s Pollution

Los Angeles ranks as the city with the worst air quality in the U.S. To address this problem, the South Coast Air Quality Management District recently released its plan to bring the air quality in the Los Angeles Basin into compliance with the standards of the Clean Air Act by the year 2007. The prescriptions set forth in the plan will require significant changes in the lifestyles and behavior of L.A. residents and businesses.

Market-based solutions to air pollution are curiously absent in the plan. In nearly all cases, the plan calls for restricting various practices by law and regulation, rather than emphasizing fees related to the cost burden imposed by polluting activities. This *Letter* discusses the economics of the air pollution problem and suggests that market-based solutions likely would achieve the desired improvement in air quality at considerably lower cost and with less disruption to the L.A. economy.

The extent of the problem

The Air Quality Management Plan (AQMP) identifies seven major categories of air pollution: carbon monoxide, lead, nitrogen dioxide, ozone, sulfate, sulfur dioxide, and PM10 (suspended particulate matter less than 10 microns in diameter). In 1987, Los Angeles exceeded federal and state standards for ozone, carbon monoxide, PM10, and nitrogen dioxide. The maximum concentrations of ozone, carbon monoxide, and PM10 were between 1.8 and three times the amount permitted by federal and state air quality standards.

Moreover, the situation is expected to worsen. L.A.'s population is expected to expand at an annual rate of 1.3 percent between 1985 and 2010, increasing from 11.3 million to 15.5 million people. Although existing restrictions are expected to reduce several types of pollution from current levels by as much as nine percent, population growth likely will contribute to an increase in other types of pollution. For example, sulfur oxides and PM10 concentrations are projected to rise by 16 and 47 percent, respectively, between 1985 and 2010. Clearly, additional measures are needed if L.A. is to accommodate the increased population and still control air pollution.

The AQM plan

The South Coast AQMP represents a comprehensive effort to curb pollution-generating practices by all residents of the L.A. basin—businesses, as well as households. The plan relies primarily on regulatory solutions. It establishes three tiers of regulations based on: (1) existing technology, (2) technology that is about to be implemented, and (3) technology that is believed to be possible by the turn of the century.

Detailed restrictions are left to local jurisdictions, but the plan makes recommendations for such restrictions. Recommended regulations governing individuals include restrictions on the use of aerosol products and lighter fluid for outdoor grilling, the types of paints and coatings that can be used, and eventually, the types of vehicles that can be operated. Restrictions on businesses include limits on bakeries, dry cleaning establishments, and manufacturers and users of paints, along with requirements aimed at increasing car pooling and changing work hours.

The economics of pollution

As an alternative to the regulatory approach taken by the AQMP, economists have argued that pollution can be controlled through economic incentives. They suggest that the pollution problem arises because private parties currently do not have any inducement to consider the "social" costs of activities that cause pollution. The social cost of an activity is the sum of all the costs imposed on everyone who is affected by that activity.

For example, a person driving a car emitting carbon monoxide may alter his or her driving habits based on personal concerns about the increased health risk associated with the emission. However, the social cost in this case is much larger than the increased risk to the driver because other people also are affected by that

emission. Since these larger social costs are not factored into the driver's decision, the driver may use the car more than is desirable from society's perspective.

When social and private costs diverge like this, the problem can be solved by charging the polluter for the costs imposed on others or by having those affected by the pollution pay the polluter to reduce pollution. Either way, polluters will have incentives to find the least-cost means of reducing the pollution created by their activities.

In some cases, market forces will generate institutions, such as private contracts and lawsuits, to bring about a more socially desirable solution. Such private arrangements arise when the information about the social costs of individual actions is readily available, polluters are easily identified, and property rights are clearly defined and protected by law. For example, problems with noise pollution often meet these requirements and can be resolved through private arrangements.

For most types of pollution, however, neither the polluters nor the costs to all affected parties can be easily or costlessly identified. Moreover, property rights frequently are poorly defined and therefore not well protected by the law. Air pollution is a case in point on all three counts. As a result, without assistance, private markets are less able to devise arrangements to achieve the desired solution.

Public solutions

In practice, then, pollution abatement decisions often are delegated to public agencies because the cost of getting all affected individuals to enter into private contracts is prohibitive. To address the problem, these agencies typically begin by establishing allowable limits for pollutants based on scientific evidence or expert testimony. They then design policies to bring pollution levels within these standards.

In most cases, policy makers and planners favor a regulatory approach to pollution abatement, as is evident in the AQMP. The advantage of this approach is that it has the appearance of being even-handed. Activities can be restricted by law without regard to the personal characteristics of those engaged in that activity; all persons are equally restricted. Moreover, the regulatory approach appeals because it is direct.

The pricing approach

The alternative approach to pollution abatement attempts to "internalize" the social costs associated with pollution-producing activity through fees, taxes and/or subsidies. This pricing approach relies on decentralized decisions. Rather than applying restrictions across the board, it encourages individuals and firms to minimize their polluting activities selectively, taking into account differences in the cost of compliance, such as higher production costs, lower production, and/or reduced employment.

Because these compliance costs can vary significantly across individuals and firms, strategies that change economic incentives usually are less costly to society than regulatory strategies. By requiring the same diminution in pollution from all, the regulatory approach has the potential to impose tremendous costs on certain individuals and firms. Pricing mechanisms, in contrast, allow individuals and firms to choose the least-cost strategies: either paying the fee or adjusting behavior so as to reduce pollution and avoid the fee. Pricing also encourages the individuals and firms that can reduce pollution cheaply to do even more than their "share."

Another advantage is that pricing solutions tend to be easier to link directly to the problem. New charges can be levied on the basis of actual emissions and, in fact, should be linked to the best estimates of the costs of the pollution. In contrast, regulations often rely on existing technological links to the final emissions and ban or require certain processes. For example, scrubbers may be required for smokestacks, even though the firm may be able to reduce emissions at lower cost by changing fuels or other production processes.

Pollution-fee approaches also have the advantage that they generate revenue. Regulatory strategies may involve the imposition of fines for noncompliance, but such fines by definition are employed only in extraordinary circumstances, and neither serve a pricing function nor generate much revenue. These fee revenues can be used for direct investment in pollution abatement, or as compensation to persons continuing to suffer from the pollution.

This gives the fee approach the potential to be not only more efficient, but also more equitable than regulations. Although fees often are considered unfair to the poor (because wealthy persons can pay to continue polluting while the poor cannot afford to do so), that need not be the case. Revenues can be redistributed to offset undesirable income effects. For example, when automobile registration fees are tied to exhaust emissions, older cars, which tend to have higher emissions, face higher fees. Although this could lead to a disproportionate burden on some low-income drivers, the burden can be offset by using the revenues raised by the emission fees to finance emission-system upgrades, transit service improvements, or even an offsetting tax credit.

It is important to note that regulations generate virtually no revenues to facilitate such adjustments. Indeed, the regulatory approach often calls for more taxes on top of the regulations to achieve such ends.

Finally, pollution-fee approaches actually are *more* equitable when viewed properly. The fees simply force the polluter to pay the full social cost of a particular action. In the absence of a fee, the cost is implicitly imposed on those not causing the pollution.

A role for prices in the AQMP

As noted above, price incentives and market-oriented inducements virtually are ignored in the AQM plan. The plan does include fees for downtown parking which may discourage driving; however, planners usually opted for regulations.

The analysis presented in this *Letter* suggests that this regulatory orientation will increase the social and economic costs of compliance. In nearly all cases, more cost-effective economic incentives could be devised as substitutes for the regulations. Two examples illustrate this point. The AQMP restricts the types of paints and coatings that can be applied. Alternatively, a series of fees could be imposed to increase the cost of using coatings that create excessive pollution relative to the cost of using other, less polluting types of coatings. In this way, the use of pollution-causing coatings would be discouraged, and those that continue to use such coatings for lack of a substitute coating would pay for the pollution they generate. Moreover, the higher after-tax price paid by those that cannot switch would encourage coatings manufacturers to generate non-polluting substitutes.

In the case of automobile emissions, the AQMP calls for a wide variety of regulatory changes that include switching to alternative fuels, establishing high occupancy vehicle lanes, and requiring firms to increase the average occupancy of cars parking in their lots. Many of the technologies necessary for this transition currently are not feasible, and the economic incentives to encourage their development are minimal.

In contrast, fees based on a vehicle's emissions and mileage offer immediate incentives to drivers to reduce unnecessary driving and to operate less polluting vehicles. By linking the amount of pollution to the cost of driving, drivers are encouraged to reduce their driving. Moreover, because pollution-based registration fees would be higher for cars that cause more pollution (in contrast to the current approach of higher fees for newer, less polluting cars), these fees would encourage a transition to less-polluting vehicles. Importantly, the fees would provide a source of revenues to administer and finance the program.

A lot at stake

Pricing strategies will not eliminate the cost burden of pollution abatement, but they will ensure that pollution abatement is achieved in the most cost-effective way. Choosing the right fee or subsidy to achieve this goal is difficult, but so is determining the appropriate regulation. In either case, some lack of compliance can be expected. Consumers can avoid a gas tax by buying outside the jurisdiction, for example. But the problems with compliance probably would be considerably less under pricing than under a regulatory approach.

Because the burden of meeting the standards of the Clean Air Act will be large and requires many changes in the behavior of individuals and firms, choosing least-cost strategies will be important. Economic theory suggests that the least-cost solution relies on market-based incentives. Final decisions regarding the proposed AQM plan, therefore, should carefully consider the inclusion of pricing strategies as a means of reducing the burden of compliance.

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