SOCIO-ECONOMIC ASPECTS OF AIR POLLUTION

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IT may be said that the central socio-economic problem posed by air pollution stems from the circumstance that the perpetrators are seldom the sufferers. Aggravating the problem is the fact that our knowledge of the quantitative behaviour of air pollutants is quite inadequate.

Thus pollution from vehicular exhausts affects the pedestrian and passengers in cars following the pollutant vehicle which speeds ahead immune to its own exhaust. The emission of smoke from industrial furnaces pollutes inhabitants living in the vicinity but not the people working in the air-conditioned guilty factory.

In such circumstances, the interplay between social and economic cost and benefit arising out of air pollution becomes unusually complex. It is rendered more intricate by the cumulative causality one notices in social life, whereby the combined interaction of given social and economic factors accelerates the movement of the socio-economic system from initial equilibrium towards ecological imbalance.

Taking location of industry as an example, one could argue that one could hardly speak of atmospheric contamination detrimental to human health caused by industrial grit and dust unless there were concentrations of residential areas in the vicinity of industrial zones. And yet experience has repeatedly shown that towns have sprung up in the wake of industry; and that the more unrestrained industrial growth has been, the greater the problem of social costs and benefits.

Qualitatively, therefore, the problem is twofold: firstly, the socio-economic costs and benefits of air pollution are borne by different groups of people, one's economic benefit becoming the other's social cost. Secondly, this transmission of costs and benefits is intrinsically a social phenomenon, caused by society and for which society is responsible.

Basically, of course, the problem arises out of industrial development itself, the economics of location favouring industries being close to their sources of manpower, of supply of raw materials and fuels, and of ultimate consumption. If the principles of economic feasibility apply positively to a given project, manpower – if it is not at hand – will follow, and so will, in many instances, several other industries. Furthermore, it is becoming commonplace in developing countries to have

industrial estates, often planned and built by the public authority; and such estates are either erected close to townships or townships are created for them.

This systematic polarization of industry of itself begets the complexity inherent in the socio-economic cost-benefit analysis of air pollution. Some would hold, however, that where this polarization is a major accelerator of economic growth – wider spread of overheads, contralized industrial and municipal services, better communications, lower marginal production costs – the problem of cost to society arising out of air pollution is negligible.

It is felt that to take such a stand is to ignore an important part of the social process which may be attributed to air pollution. Above all, there is the fundamental factor of the finality of industrial activity. Assuming that the concentration of industry produces the highest economic returns, does one then argue that no social price is too high, no air pollutant too detrimental?

In his excellent analysis of 'Social Costs of Business Enterprise', Karl William Kapp holds quite validly, in the view of the present writer, that 'by concentrating on the analysis of internal and external economies, and by stopping short of the introduction of the concept of social costs of unrestrained industrial concentration, traditional theory lends tacit support to the overall rationality of cumulative growth processes, no matter what their socially harmful effects may be. After all, what could be more "rational" than to exploit to the fullest extent the availability of internal and external economies? So long as social costs remain unrecognised and as long as we concentrate on costs that are internal to the firm or to the industry, we shall fail to arrive at socially relevant criteria'.[1]

Given the above considerations, it would not seem unreasonable to postulate that pressure against air pollutants might well derive greater significance and, hopefully, better results if the 'socially relevant criteria' referred to above are applied as rigorously and effectively as possible. Society might thus increasingly recognize – in a manner and to an extent which traditional economic analysis might ignore – that the cost to society of air pollutants is, even where prima facie negligible in relation to economic advantage, so far-readhing and of such a long-term nature that the whole structure of a given society might be imperilled in the process.

[1]Kapp, Karl William 'Social Costs of Business Enterprise' in 'Ecology and Economics' by Marshall I. Goldman, p. 129. (Prentice-Hall, 1972)

One or two examples might illustrate the situation. The presence of air pollutants in a locality may affect social mobility and social stratification. The first circumstance could trace its origins to the location of the polluting source. If a farmer felt that he would rather stay on his holding to inhale the pure country air than to move to an industrial air-polluted zone, the end-result would not simply be the impossibility of the farmer deriving potentially a higher income as a factory worker, nor would it just be a stark fact of geographical immobility. Wherever such a circumstance verified itself, it could well produce a significant measure of social stagnation in that, air pollution acting as a deterrent to physical mobility, the advance of society, of people moving upwards within the social system, might be thereby blunted.

One is, of course, aware that where real economic straits are encountered, or where overriding economic advantage is perceived, such considerations as are indicated above are usually ignored. But the argument is advanced as a hypothetical illustration of the longer term impact of widespread air pollution, and could well be applied to the whole process of social stratification itself.

Thus, to take a different approach, air pollution might, at the other end of the scale, produce an unrestrained social mobility leading to a lop-sided structure in a given society. If we assume that the main incentive for a group of wealthy people to move from one country, or from one region, to another were air pollution, then one could say that air pollution were directly responsible for the social effects this type of mobility produced on the stratification of, on the one hand, the society they left and, on the other hand, of the one they joined.

While it may be easy to state that the level of air pollution in many countries justifies central planning, it may be more difficult to identify a yardstick or an instrument which would measure and control the pollutants and their effects. Direct controls constitute usually the main remedy applied by central authorities; but such an approach is somewhat crude and haphazard.

As already indicated at the opening of this paper, one of the major aspects of the air pollution problem is created by our inadequate knowledge of the quantitative behaviour of pollutants. In consequence, it is not at all easy to determine what cost-benefit yardstick to apply to pollutants as a more objective alternative to direct control. In theory, naturally, there is no problem in enunciating a principle governing the level of socially acceptable pollution, as Edwin S. Mills has done, as follows: 'Any given pollution level should be reached by the least cost-

ly combination of means available; the level of pollution should be achieved at which the cost of a further reduction would exceed the benefits'.[2]

In the absence of the requisite quantitative data, Mills identifies the basic characteristics of an objective scheme of air pollution control: de-centralized decision machinery, which should be experimental and flexible and based, as far as possible, on cost-benefit evaluations of air pollution abatement.

The first two characteristics are clearly commendable in any system of sound administration. The third, however, seems to be begging the question, although Mills rightly says that 'our present ignorance of benefit and costs should not be used as an excuse for doing nothing'.

Ideally, the economist would like to apply to air pollution his usual yardstick of viability obtaining in situations where discounted net benefits exceed the present expenditure to be incurred in the project. But apart from the problem of measurement alluded to before, there exists also – in the cost-benefit approach – an obvious possibility of bias in figures supplied, on the one hand, by organizations that have to bear the cost of environmental improvement due to air pollution and by those clamouring for such improvement.

Generally speaking, it would appear that the former tend to over-estimate benefits. Thus, in the sphere of air pollution, the cost of smoke nuisance – in terms, for example, of additional cleaning of clothes, house maintenance, extra lighting – is to be assessed also in relation to the effects of air pollutants on human beings, and on animal and plant life generally.

It is, therefore, of great importance to the cost-benefit analyst of air pollution to ensure that he covers, on both sides of his balance sheet, the whole spectrum of advantages and disadvantages, and should be careful not to limit himself to physical damages which, although quite complex in themselves, are a bit more amenable to measurement than other types of damages.

Crocker and Anderson have shown, for example, the utility of marginal cost analysis applied to air pollution some of the effects of which were demonstrably present in property values. The two professors found that in St. Louis Washington and Kansas City the incidence of air pollution variables (sulphur trioxide and suspended particulates) and property values were inversely related to a significant degree, such that

[2]Mills, E.S., 'Economic incentives in air pollution control', in op. cit., p. 143.

about 1% increase in either of the air pollutants produced a fall of about 0.08% in the value of the property concerned.

If damage to economic values can be demonstrated in this way, it would not appear to be too difficult to exercise air pollution abatement through market forces. It can be reasonably submitted that the economic argument, taking *all* economic aspects into consideration, would provide a clear-cut case, on economic grounds alone, for control of air pollutants.

A similar approach to the harm brought about by air pollution to human health could bear fruit. Damage to health through bronchitis, emphysema, heart and circulatry troubles, irritation of the air passages and other diseases can be assessed to fairly reliable levels.

The Italian study, 'Economic Costs and Benefits of on Antipollution Project in Italy' just published by E.N.I. for the U.N. Conference on the Human Environment at Stockholm, gives a breakdown of the field of enquiry which the cost-benefit analyst may employ to reach an estimate of the effect of air pollution on health. The researchers enlist the following areas: employees' wage losses and less domestic work in the home by housewives due to diseases that may be attributed to air pollution; increased expenditure for medical treatment; prevention expenses; losses in efficiency at work, including nervous conditions arising out of air pollution.

A further cost included in this study is that due to premature deaths, and the calculation is based on the capitalization of the present value of the presumable future incomes of workers who died from diseases associable with pollution and considering their survival probability at the age of death. While this cost is a real one, it would seem to be of too nobulous a nature to be amenable to satisfactory computation.

The E.N.I. researchers applied the same methodology to assess the damage caused by air pollutants to cultural assets. They assumed that the expenditure to be incurred on restoration and preventive conservation was at least equal to the damage that might be wrought if that expenditure were not carried out. On that basis, they drew up a hypothetical budget which the authorities would require to implement an adequate programme for the restoration and preventive conservation of archaelogical remains, medieval and modern works of art, monuments, records and books. Against these estimates, the Italian study produced an alternative budget – much smaller than the previous one – which would be needed to protect adequately cultural assets in a hypothetical situation of non-pollution in Italy.

In concluding their report, the researchers confirmed the view expressed earlier in this paper, namely that on economic grounds alone, fighting air pollution is a worthwhile task. They write: 'Bearing in mind the cautious criteria and restrictions that characterized our direct benefits estimate, and our failure to quantify the indirect or secondary (derived, induced) benefits and some tangible effects, which are certainly most important in the field of "indirectly productive" or infrastructural investment programmes, it is quite certain (in spite of the omission from the calculation of the "associated costs") that the analysis made (despite its orientative and very rough character) justifies public action in the field of depollution on strictly economic grounds'.

It is therefore apparent that, in spite of conceptual (e.g. finding an appropriate discount rate to give present value of costs and benefits, the subjectivity induced by a range of value judgments) and measurement problems, the cost-benefit methodology remains a useful tool for air pollution control. It is still an unrefined instrument; and although the economist still has a lot to contribute to its eventual sophistication, yet he cannot proceed as rapidly as he might wish until the problems of scientific measurement of the physical effects of air pollutants are adequately solved.

On the macro level, the economics of environmental control would seem to suggest that as air pollution decreases, the national income increases. Improvements in productivity and in overall industrial efficiency would produce a higher gross national product. But there are many resulting benefits which G.N.P. tends to ignore (e.g. increases in property values which would only appear as imputed higher rents for national accounting purposes). Sanford Rose[3] has proposed that, in order to assess validly the effect of the absence of air pollutants on national income, we should introduce a new economic yardstick – G.N.E., or Gross National Effluent. 'G.N.E. would be a statistical basket for all those negative goods and services produced in the cause of, or as a result of, the production of positive goods and services. Negative goods and services in this sense include additional transportation to escape the effects of environmental impairments, additional cleaning, additional medical services, goods prematurely replaced because of soiling, or corrosion, and, of course, pollution-control equipment. If we subtracted

[3]Rose Sanford 'The economics of environmental quality' in Goldman, Ecology and Economics: Controlling Pollution in the 70's Prentice-Hall, Inc. 1972. p. 164.

G.N.E. from G.N.P., the remainder would be a better measure than G.N.P. of what the economy has done for us in any year'.

Naturally, neither G.N.E. nor cost-benefit ratios can establish with any scientific precision that air pollution control must, on economic grounds, command the highest priority in the investment hierarchy of public authorities. However refined its economic methodology, society must decide for itself its order of values. The economist might observe that affluence reduces effluence, but society has to determine whether it is willing to go through the exercise, as it spends billions of dollars on exploring outer space and extinguishing inner lands, of finding out that it is only one earth, only one air.