



DEPARTMENT OF AGRICULTURAL ECONOMICS & RURAL SOCIOLOGY
The Ohio State University
2120 Fyffe Road
Columbus, Ohio 43210

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ON NATIONAL VS. LOCAL POLLUTION CONTROL

by

T. F. Glover

Department of Agricultural Economics and Rural Sociology
The Ohio State University
2120 Fyffe Road
Columbus, Ohio 43210

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The burden of the discussion of this workshop on pollution Control seems to be a critique of the 1971 Report of the President's Council of Economic Advisors on public policy directed to environmental quality.^{1/} The arguments thus far, particularly those addressed to jurisdictional control, indicate that the statement of policy by the CEA would lead to a policy of local autonomy whereby different pollution charges will exist. The lack of uniform pollution pricing leads to unequal marginal rates of substitution and transformation between environment and other goods. A conclusion which comes ringing through and is apparent in this discussion is that the pricing decision should devolve upon the Federal government.

It is implied that uniform pollution price setting (in the context of the discussion, the decision on pollution toleration) means a single and national agency has to make the pricing decision. This argument is not unlike that of Stein's critique of the CEA report on environmental policy.^{2/}

Allow me to give a word of caution and a contention about uniform pollution charges and optimality, but without implying a vested interest in the CEA analysis or decentralization. First, to jump from advocacy of uniform pricing to a Federal price setter has logical problems. The simplest competitive model of economic theory indicates no incompatibility

1/ See U. S. Council of Economic Advisors, Economic Report of the President, Washington, D. C., U. S. Government Printing Office, February, 1971, p. 121.

2/ Jerome L. Stein, "The 1971 Report of the President's Council of Economic Advisors: Micro-Economic Aspects of Public Policy," American Economic Review, Vol. 61, 770.4, September, 1971, pp. 531-537.

between a uniform price and decentralization of ownership of goods traded. Indeed, the rationale for decentralization is that such a system of ownership enables the optimum price to be established at lowest cost. This is, in fact, the environmental problem we face and the reason for finding a policy with which to resolve the problem. Simply, the present property rules or rights have resulted in too low a price for the use of the environment.

The disequilibrium can be eliminated once the equilibrium price is discovered. The discovery of the equilibrium price is not likely to come cheaply given the present ill-defined property rights for use of the environment. This seems to be the reason for the CEA recommendation for local control versus a single federal price mechanism for control.^{3/} The Council makes the point that the agency making the rules must be responsive to gainers and losers in property right specification and, such agency must be responsive to pressures stemming from localities bearing most of the benefits and costs of pollution. The CEA may be naive in supposing benefit and cost measures to be more accurate if pollution control becomes the responsibility of local agencies. However, the arguments expressed thus far, and by Stein for that matter, give us no reason that federal control, or measure of benefits and costs, will be superior to that of any other control hierarchy.

Now my second point deals with optimality and uniform pollution charges which are set nationally. Assume for simplicity of explanation two localities where, due to ill-defined property rights, a zero pollution price exists initially and other factor prices and production conditions are identical. Thus, marginal benefits from emitting effluents

^{3/} See Economic Report of the President, 1971, p. 121.

into the environment are the same for each locality. Assume the marginal pollution damage functions differ between localities and, further assume that the damage function in the second locality, D_2 , lies below and to the right of the damage function for the first locality, D_1 . These functions along with the common benefit function, B_c , are illustrated in Figure 1 below.

Net-benefit-maximizing local governments set different prices under these assumptions. The government in locality one would set P_1 as the

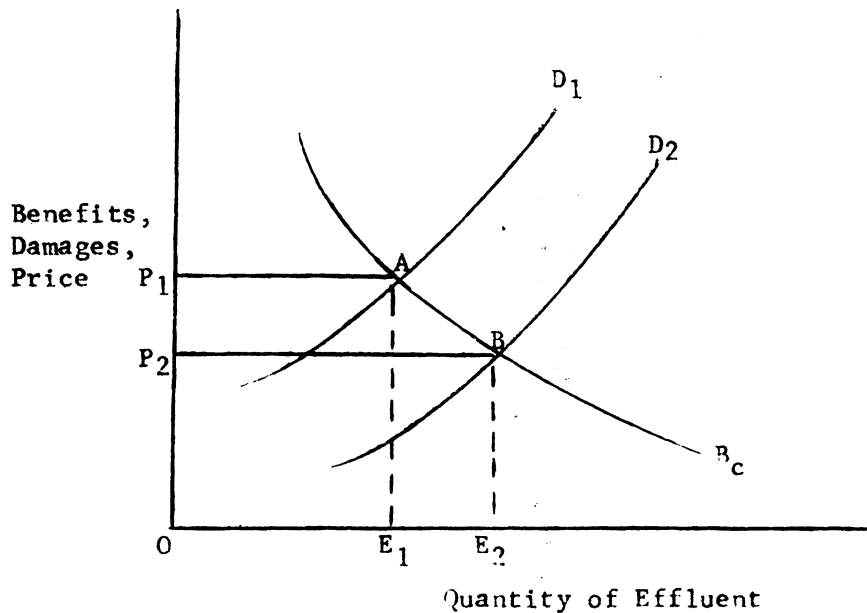


Figure 1.

pollution price while P_2 would be set in locality two. Under the above assumptions, and so long as it is sufficiently costly for relocation of resources committed to effluent-generating production, a net-benefit maximizing central government agency would set the same prices for the localities. That is, local price differences will be required for efficiency unless zero short run costs of resource movement exist.

The fact that the marginal rate of substitution between the environment and other goods between localities differs is of no relevance until the cost of relocating pollution activity is low enough to allow gains from interlocality trade in such activity. Net gains from trade will be exploited once the equilibrium (short run) prices, P_1 and P_2 , have been established long enough for relocation costs to become sufficiently small. A response to the difference in price between localities will result in pollution activity relocation from locality one to locality two since $P_1 > P_2$. The marginal benefit functions in the two localities will no longer be identical. The marginal benefit function in locality one will shift leftward while the function of locality two will shift rightward. These shifts are illustrated by B_1 and B_2 in Figure 2.

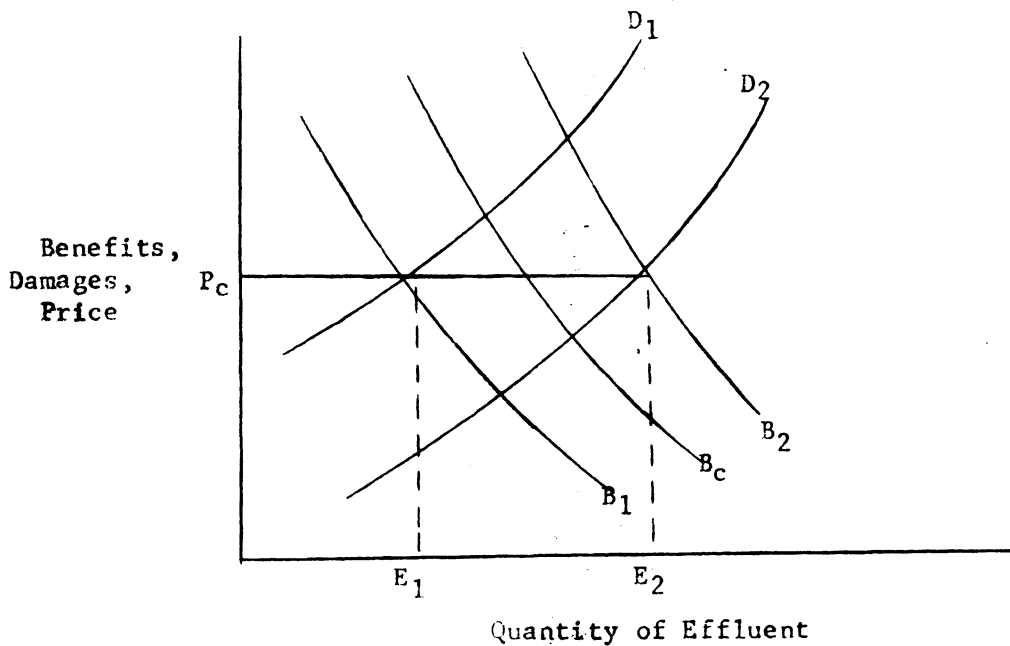


Figure 2.

The resulting shifts will cause the net-benefit maximizing pollution prices in localities one and two to converge to a uniform price, P_c . If other factor prices vary between the localities and offset the price differentials for pollution, this convergence may not occur even in the

long run. Land prices, for example, are likely to vary between any two localities. Some goods and services will only be produced in the urbanized locations and the division of labor and extent of the market may tie in certain production activity despite higher land prices in these areas. The equilibrium price differentials in other factor prices will not provide a force for equalization of pollution prices between localities.

There also is likely to be some long-run costs to relocating production from location two in our case to location one. This could be due to the foregone productivity of an urban or major market area location. In the long run, optimal pollution prices will converge up to the point where they differ by these relocation costs. Further convergence in the long run would mean the environmental gain of relocation would not exceed the relocation costs.

In the case where no long-run relocation costs exist, equilibrium in the long run would be accomplished with a uniform pollution charge, P_c , and the new short-run marginal benefit functions in localities one and two would be B_1 and B_2 respectively. So long as each locality is concerned solely with maximizing its own benefits, pollution will shift from location one to location two. The pollution price in location one will fall and the pollution price in location two will rise until a long-run Pareto-efficient equilibrium is attained. Neither locality need be concerned with the pollution price in the other locality, and each only react to the resource shifts in each locality. A national-net-benefit-maximizing federal agency would wish to encourage pollution to shift from location one to two and would not want to impose a different temporal pattern even with knowledge of the long-run equilibrium pollution price. The Pareto-efficient pricing of the use of the environ-

ment is consistent with either local or federal control.

The CEA report assumes local control is likely to give a more accurate account of benefits and damages. This assumption relies on a notion of presumed information-cost advantages in the exercise of self interest in local control. Now, following Stein's argument against local control, it is true that firms may exercise monopsony power and prevent localities from even optimizing. Also, the environment may be a public good depending on the particular aspect of environment as a good that is at issue. Certain scenic or irreplaceable environments would come under this definition such as Hells Canyon (excuse my begging a controversial issue). The exercise of monopsony power and the fact that the environment is often a public good may cause inaccurate information about benefits and damages generated under local pollution control.

However, governments are always monopoly sellers of pollution rights within the jurisdiction they govern. As the sale of pollution rights becomes more centralized, fewer location alternatives become available to firms (given costs of alternative location exist). As this occurs prices for pollution rights will become inefficiently higher.

The public good argument points out the fact that the enjoyment of an environment by any one person does not preclude enjoyment of that environment by any other person (unless crowding externalities occur). No one locality in its autonomy then is consistent with a Pareto optimum if it makes a decision to price the use of the environment to gain higher local income. The social marginal rate of substitution between such an environment and other goods is equal to the sum of the goods which the nation gives up (or is willing to give up) to protect the environment. This sum is greater than the same marginal rate of substitution of the locality since many people may enjoy the environment without paying its value to the local people (merchants, local public

fee systems, etc.). The appropriate rate of substitution then becomes the maximum sum in taxes that the voters of the nation are willing to impose on themselves to protect the environment. It seems, in the public good case, that such a policy conclusion cannot be entertained without knowledge of the importance of the externality in the use of the environment. Further, a democratic process must have voting power distributed in the same manner as the consequence at issue to avoid bias; i.e., discrepancy between marginal costs and marginal benefits shared in the process of public good provision must converge to zero. If the externality from environmental use in a locality is sufficiently large as to cause the electorate to bear equal or at least a large fraction of the consequences the national electorate would probably set appropriate pollution prices for a locality. If the reverse were true, then inappropriate prices would be set for the locality. There may be a case for a tax on localities allowing pollution, but there seems to be no general argument for national price setting or control.

To summarize my discussion, national pollution price setting is not a requirement for a Pareto optimum, and may not be so even in the long run. Decentralized control is not inconsistent with the attainment of efficient pollution prices so long as each locality maximizes its own net benefits. The resulting temporal price pattern, in our example above, of high and falling prices in location one and low and rising prices in location two, emerges to be a dynamically efficient pattern. The real issue of national vs. local control then is whether national or local control will yield more accurate information about pollution damages and benefits. Local control creates monopsony power for firms. National control converts the monopsony power problem

to a national monopoly problem. National control to express concern about a local environment on the part of the national public may produce inappropriate pollution prices depending on the extent of the externality in the use of the local environment.