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## Effluent Taxes and Economists: A Love Affair?<sup>1</sup>

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### Abstract

A survey among professional economists in five countries shows that economists (including full professors) are not convinced of the superiority of effluent taxes, and there is considerable support for direct controls of emission levels. This contrasts strongly with the alleged superiority of effluent taxes in textbooks. The lack of support for the effluent tax even among economists is not due to insufficient education or information. As a consequence, future research in environmental economics should be extended to integrate the possible effects of instruments on preferences.

### I. Theory and Policy of Effluent Taxes

There are very few areas in our field in which there is so much consensus in the literature<sup>2</sup> as is the case regarding the most suitable instrument of environmental policy. The "incentive approach" using the price system, and in particular *effluent taxes*, is taken to be the most efficient and thus the preferred instrument to use. The literature stresses the disadvantages of the alternative "regulatory approach" using direct controls of individual pollutants. Kelman (10, p. 108) writes for example:

"...as regards the...*methods* to achieve whatever environmental goals have been decided on, there has been unanimity within the economic profession. Economists reject the regulatory approach... Instead they favor setting charges on pollutants...".

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2 See e.g. the textbooks [6], [11], [12], [1], [2] for the American literature, and [7], [14], [16], [19], [20] for other countries and languages.

It should be noted that Kelman does not only speak of the literature on environmental economics, but on the "economic profession" in general.

In practical politics on the other hand, the „incentive approach" has had extremely little success. To quote again Kelman (10, p. 107) for the case of the United States:

"For a decade, economists have patiently and repeatedly been advocating such an 'economic incentive' approach... And for most of the decade, their impact on the political and policy debates has been minimal".

Such statements could be adduced for any number of countries undertaking environmental policies. The environmental textbook authors have found it difficult to illustrate the case for effluent taxes with examples. Rather exotic examples have been therefore resorted to, for example the case of the Navajo tribe who have established a sulfur emissions fee<sup>3</sup>.

The wide discrepancy between that suggested by environmental theory, and that which is undertaken in practice, should be a cause for concern to economists. There must be some major problem if what is thought to be efficient, and what is actually done, are (almost) exactly the contrary. This discrepancy could be, and often is, explained by the fact that non-economists, and in particular political and administrative decisionmakers, are insufficiently informed, untrained, or simply incapable, of understanding the advantages of emission taxes compared to direct controls. The solution to the problem is thus taken to be better information and education of the public and the decision-makers.

This paper shows, on the basis of an international survey, that *even among economists* we are far from having a consensus about the superiority of effluent taxes compared to direct controls. This even applies to full professors of economics. Assuming that professional economists are well trained and reasonably well informed about the properties of the effluent tax, the divergence from the textbook view presents a puzzle. We advance some suggestions of how this puzzle can be solved.

Section II of this paper describes the survey undertaken in five countries including the United States. Section III presents the views on effluent taxes as compared to pollution ceilings. The final section IV discusses possibilities for making the general economists' viewpoint compatible with the textbook view.

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3 See Kneese and Williams [13] who themselves stress: "It is the first example in the world of a sulfur regulatory emission fee to be enacted by any unit of government anywhere" [13, p. 202].

## II. The International Survey

A written and anonymous survey consisting of a set of propositions was undertaken in 1978 among United States economists, and in 1981 among Austrian, French, German (Federal Republic) and Swiss economists. The total number of professional economists contacted was 1638. The responses of 736 were able to be used, resulting in a response rate of 45 %<sup>4</sup>. Two of the propositions are directly relevant for environmental policy: One proposes that an effluent tax is superior to individual emission ceilings, the other (placed in a different part of the survey) proposes that individual emission controls should be used<sup>5</sup>. The two propositions are thus contradictory which makes it possible to cross-check the validity of the answers posed. Three response categories were explicitly allowed: "generally agree", "agree with provisions", and "generally disagree". Another possibility was, of course, not to respond to a specific proposition at all. In the case of the two propositions on the desirability of environmental policy instruments, the non-response rate was quite small, in the case of the effluent tax proposition 3 % overall, in the case of the individual controls proposition less than 1 % overall. Due to the small quantitative importance<sup>6</sup>, the non-response category will be disregarded in the following.

## III. Views on Effluent Taxes

The first proposition is:

"Effluent taxes represent a better approach to pollution control than imposition of pollution ceilings".

Table 1 shows the results.

**Table 1:** Response to the Proposition that an Effluent Tax is Superior to Pollution Ceilings, Total Sample (N = 711)

	Generally Agree (%)	Agree with Provisions (%)	Generally Disagree (%)
All Economists	31	32	37

4 The number of economists responding (and the rate of response) in the individual countries was: United States 131 (34 %), Austria 72 (65 %), France 134 (36 %), Germany 223 (57 %), Switzerland 176 (49 %). Details are given in the individual country studies [9], [17], [3], [18], [8].

5 The first proposition was included in all five countries, the second in Austria, France, Germany and Switzerland.

6 The analysis of the reasons sometimes given for not responding to a particular proposition does not indicate any systematic bias in any direction.

While two thirds of the economists at least agree with this proposition, it is still surprising that more than one third generally disagrees. Less than one third is really convinced that effluent taxes are superior to pollution ceilings, i. e. to imposing direct controls on polluters.

One might expect that at least the full professors of economics would be more in support than the rest of the economists who are perhaps less well trained and informed about the characteristics of the incentive approach. Table 2 suggests that this hypothesis is not correct.

**Table 2:** Response to the Proposition that an Effluent Tax is Superior to Pollution Ceilings, by Occupations

Occupations	Generally Agree (%)	Agree with Provisions (%)	Generally Disagree (%)
Full Professors of Economics (N = 214)	32	33	35
Economists in Public Administration (N = 230)	29	30	41
Economists in Private Employment (N = 267)	31	32	37

A glance at this table immediately shows that there is no significant difference in the responses between full professors and professional economists in the other occupations distinguished, i. e. in the public administration and in private employment<sup>7</sup>. We conclude from this that the low degree of enthusiasm for the effluent tax should not be attributed to the degree and sophistication of the knowledge in economic theory.

While there is no significant difference in the response between occupations, table 3 shows that economists in the five countries differ strongly in their opinions with respect to effluent taxes.

The incentive approach receives by far the highest support in the United States where near to half of the economists "generally agree" with the proposition, and less than every fifth "generally disagrees". The level of support is considerably lower in Austria, France, Germany and Switzerland (19 % - 36 % "generally agree"). The effluent tax is rejected by a clear majority of Austrian economists (57 % disagree). This finding suggests that the setting in which the effluent tax is

<sup>7</sup> According to the  $\chi^2$ -test the null-hypothesis is not rejected at the 99 % confidence level.

**Table 3:** Response to the Proposition that an Effluent Tax is Superior to Pollution Ceilings, by Countries\*

Countries	Generally Agree (%)	Agree with Provisions (%)	Generally Disagree (%)
United States (N = 126)	45	33	22
Austria (N = 70)	19	24	57
France (N = 128)	27	31	42
Germany (N = 215)	36	31	33
Switzerland (N = 172)	21	36	43
All European Countries (N = 585)	27	32	41

\* The responses by countries statistically differ at the 95 % level according to the  $\chi^2$ -test.

applied, and the general view about the usefulness of transferring the price system to new areas, differ between countries.

The proposition so far discussed explicitly undertakes a comparison between effluent taxes and pollution ceilings. In order to make a crosscheck, the respondents in the European countries were asked to state their view about the desirability of direct controls of individual emission levels. The proposition is

"The maximum emission of pollutants should be prescribed to the individual enterprises".

Table 4 presents the overall results, and the breakdown according to the four countries.

**Table 4:** Response to the Proposition on Individual Controls of the Maximum Emission of Pollutants, by Countries

Countries	Generally Agree (%)	Agree with Provisions (%)	Generally Disagree (%)
All european countries (N = 600)	61	27	12
Austria (N = 71)	72	24	4
France (N = 133)	75	17	8
Germany (N = 221)	52	31	17
Switzerland (N = 175)	58	30	12

More than 60 % of all European respondents fully support the use of direct individual controls, and only a little more than 10 % reject it. This result should be com-

pared to table 3 showing that more than 40 % of the same sample explicitly favored pollution ceilings over effluent taxes. The results of the two propositions are in line with each other. The same holds in general for the individual countries: In Austria and France three-quarters, and in Germany and Switzerland more than one-half, of the respondents "generally agree" with direct controls as a suitable instrument of environmental policy.

#### IV. Towards Solving the Puzzle

We have shown that there exists a wide divergence in the evaluation of the effluent tax as compared to direct controls between the textbook view and the responses given by the professional economists in our survey: Textbooks strongly favor the incentives approach, economists favor direct regulations.

One possible explanation to this puzzle has already been discussed. The divergence in views is hardly due to differences in professional competence because it turns out that the full professors of economics proffer the same opinions as the economists in other occupations (see table 2).

We would like to suggest another explanation<sup>8</sup>, transcending the narrow limits of existing economic theory. The application of the price system in new areas, in particular the use of effluent taxes, may destroy or at least weaken the intrinsic motivation to protect the environment. It is thus argued that the extrinsic motivation of refraining from pollution induced by the monetary rewards may negatively affect the individuals' preferences to preserve the environment: The intrinsic motivation is substituted (or crowded out) by the extrinsic (monetary) motivation. These so-called "hidden costs of reward" have been carefully documented in a great number of laboratory experiments (see e.g. [4] and for a survey of the theory and of the experimental findings [15]). The experiments usually proceed in three steps: First the actions of individuals solely on the basis of their intrinsic motivation are studied, i.e. their preferences are analyzed. Then, the same task which would anyway have been undertaken is rewarded (extrinsic motivation). Finally, the reward is deleted again. It can be shown under a wide set of conditions that the individuals are less inclined to undertake the task after they have experienced that one can be externally rewarded for it. The intrinsic value of undertaking a certain activity has been partly or totally destroyed.

These experimental findings can be applied to the case of effluent taxes. They constitute a special case of monetary rewards. According to the "hidden costs of

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<sup>8</sup> We do not claim that this exhausts the set of possible (and reasonable) explanations.

reward" hypothesis, when protecting the environment is rewarded in such monetary terms, individuals' preferences for the protection of the environment are impaired. It must be expected that when the effluent taxes are deleted, the individuals *behave* in a way which is less favorable to the environment than before. The same effect must be expected in those areas in which the effluent tax is never introduced: As the general environmental preferences are impaired, the individuals behave in a less environmentally protective way. These "hidden costs of reward" may well be the reason why people (including economists, as we have shown) are generally rather averse to the introduction of the price system as an instrument of environmental policy. It would be worthwhile for environmental economists to inquire precisely under what conditions these "hidden costs of reward" are relevant.

### Zusammenfassung

Eine Umfrage unter Wirtschaftswissenschaftlern in 5 Ländern zeigt, daß selbst die Vertreter dieser Disziplin (eingeschlossen die Wissenschaftler unter ihnen) von der Überlegenheit von Emissionsgebühren im Umweltbereich nicht überzeugt sind. Konsequenterweise findet sich auch eine beträchtliche Unterstützung direkter Emissionskontrollen. Dies steht in deutlichem Widerspruch zur oft behaupteten Überlegenheit fiskalischer Lösungen in wirtschaftswissenschaftlichen Lehrbüchern. Dieser Mangel an Unterstützung ökonomischer Lösungen im Umweltschutz sogar unter Ökonomen hängt nicht mit unzureichender Ausbildung oder Information zusammen. Es ist daher zu folgern, daß die künftige Forschung in der Umweltökonomie ausgeweitet wird und die möglichen Rückwirkungen umweltökonomischer Instrumente auf die Präferenzen einbezieht.

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