THE POLITICAL ECONOMY AND INSTITUTIONAL CAPACITY OF INSTRUMENT CHOICE: LESSONS FROM A LATIN AMERICAN COUNTRY[1]

Marcelo Caffera[ξ]

Universidad de Montevideo

Abstract

In this paper I subject institutional and political economy arguments given to explain the choice of cost - ineffective instruments to empirical validation through a detailed case study of the legislative decision-making process and institutional capacities of industrial water pollution control in Montevideo, Uruguay. As a result, the paper stresses important factors explaining such a choice in less developed countries that are not adequately emphasized in the previous literature.

[1] I would like to thank Lesley Mc Allister, Benjamin van Rooij, Mónica González, Enrique Garino, Hernán Méndez , Alicia Raffaele, Alejandra Benítez, Gerardo Sequeira, Rodrigo Gorriarán, Marisol Mallo, Francisca Pérez, Gerardo Balero, Alejandro Cendón, John Stranlund, Marcelo J. Cousillas, Carlos Amorín Cáceres, Viviana Rocco, Juan Dubra and Fernando Borraz for their help, comments and advice at different steps of this research.

[ξ] *Correspondence address*: Departamento de Economía. Universidad de Montevideo. Prudencio de Pena 2440, CP 11600, Montevideo, Uruguay. E-mail: marcaffera@um.edu.uy. Phone: +598 2 7074461. Fax: 598 2 7083842,

1. INTRODUCTION

Environmental economists advocate the use of economic instruments as a cost-effective way to control pollution.[2] Accordingly, less developed countries should be interested in their implementation in order to save scarce resources and avoid further compromising economic development possibilities. However, the history of environmental policy in Latin America and other less developed countries does not validate this presumption. Pollution control regulation in Latin America has been based almost exclusively on conventional non incentive-based type of instruments (CEPAL, 2000). It is only in recent years that some countries have incorporated economic instruments into their legislation (see CEPAL, 2000 and 2001). This constitutes a puzzle for environmental economists and is the motivation for this paper, which aims to identify and weigh institutional and political economy factors that may help to explain the present choice of non incentive-based instruments, as opposed to more cost-effective economic instruments in the case of industrial water pollution control in Montevideo, Uruguay. This objective is pursued through a detailed study of the legislative history of water pollution control in Uruguay and its institutional framework. The findings in this paper are based on a field research done between the years 2001 and 2004. This field research included interviews with inspectors, heads of enforcement offices, policy makers, regulators' legal advisors, engineers in charge of industrial treatment plants, and former

[2] I here refer to economic instruments as those incentive-based instruments that are designed to control emissions directly, such as emission taxes and tradable discharge permits. There exists another category of economic instruments that may be called indirect economic instruments. These do not regulate emissions directly. Examples of the latter are taxes for polluting goods (e.g. gasoline) or subsidies to clean technology. Similarly, non - economic instruments may also be classified as direct and indirect. Among the first ones are emission standards, while the second ones include technology standards. The discussion in this paper centers on the comparison of direct instruments.

heads of environmental offices at the Municipal Government of Montevideo (Intendencia Municipal de Montevideo, IMM) and the National Environmental Office (Dirección Nacional de Medio Ambiente, DINAMA).

Before starting, it is convenient to clarify some concepts. I have restrained myself from using the classic "command and control" term to name the non economic instruments of conventional regulation. This is because both economic and non-economic-based types of instruments involve some sort of command and control. The problem with not conforming to the term command and control is that it is difficult to find a term that covers all non incentive-based instruments. Ellerman (2007) proposes the term *prescriptive regulation.* This term emphasizes one of the characteristics of the non incentive-based instruments that makes them cost – ineffective (prescription), but it does not necessarily cover the other one: uniformity. Uniform emissions standards, for example, are cost – ineffective because they fail to exploit the abatement cost differences between polluters, but they may not be prescriptive. The regulator, as in most environmental economics textbooks, may simply mandate every regulated firm not to exceed some level of pollution, without prescribing the way in which that emissions standard is to be achieved. On the other hand, a regulation may be prescriptive and non-uniform at the same time; allocating emissions responsibilities among firms according to differences in abatement costs. For these reasons, I use the term *prescriptive and uniform* instruments to refer to non incentive-based instruments where both attributes are present, such as it is the case with technology-based uniform emissions standards or simply non-economic instruments when this is not the case.

2. LITERATURE REVIEW AND ANALYTICAL FRAMEWORK

The issue that motivates this paper is that the instruments chosen by Uruguayan regulators do not rank well in terms of several criteria that can be used to judge environmental policy instruments. More precisely, what motivates this paper is the absence of economic instruments in the Uruguayan regulators tool-box. Nevertheless, the paper does not uncritically observe that economic instruments are always better and that it is therefore a puzzle that they are not being adopted in developing countries. Quite the contrary, this section reviews literature that cast some doubt on the premise of the superiority of economic instruments to help explain the actual instrument choice of Uruguayan water pollution regulators. The discussion below makes it obvious that "no policy ranks first among all dimensions of policy comparison" (Cole and Grossman, p. 890, citing Palmer et al., 1980) and consequently the analysis does not ignore that the most effective solution to the pollution problem at hand may imply the use of prescriptive and incentive-based types of instruments at the same time (Gunningham et al, 1998). Nevertheless, it will become apparent in the discussion that follows that this very conclusion in favor of the design of "smart regulation" is as challenged by the capacities of developing countries as the implementation of the economic instruments is. It is also important to note in the discussion that follows that the economic literature does not generally assumes that firms can reduce emissions and increase profits at the same time. In contrast, this assumption is present in part of the law literature on instrument choice (See Gunningham, et al., 1998, for example). This papers follows the economic literature in this sense.

2.1. A Critical Review of the Criteria for Choosing Instruments

What are the dimensions according to which environmental policy instruments can be judged? An early answer to this question was provided by Böhm and Russell (1985). Their list of criteria begins with it could be fairly argued that is the most important criterion on which environmental economists have based their advocacy for economic instruments: *static cost-effectiveness*. Does the instrument chosen achieve the targeted environmental quality goal at the lowest aggregate cost possible in the short run? According to environmental economists, economic instruments are cost – effective. As the argument goes, prescriptive technology–based regulation and uniform emissions standards are more costly because they fail to exploit *all* the abatement costs differences between firms. (Put it more formally, they fail to equalize marginal abatement costs between firms, as economic instruments do). The wider the difference of (marginal) abatement costs among sources, the more promising the relative gain from implementing economic instruments versus prescriptive and uniform instruments (Newell and Stavins, 2003).

Although cost – effectiveness is not the only criterion to select environmental policy instruments, environmental economists has frequently treated it as one of the most important criteria for selecting environmental policy instruments in their academic work, and have succeeded in position it as one of the most important criteria in the actual policy arena too. In this respect, it could be said that this criterion alone explains the movement towards economic instruments in US environmental policy over the last 30 years (particularly in air pollution control), and the similar movement in the EU climate change policy. This is remarkable because the empirical validation of the argument remained

very scarce until recently and it is still contentious (See Cole and Grossman, 1999, Stavins, 2007, Russell and Vaughan, 2003 and Harrington and Morgenstern, 2007).

Another important criterion is *information (and computation) intensity.* This dimension refers to the issue of how much data and modeling is required by the regulator to implement the proposed instrument, and the actual possibility of getting the data. This last issue is what makes this criterion a very important one. The argument of the cost – effectiveness of economic instruments is based on the fairly realistic assumption of *information asymmetry* between regulators and firms regarding abatement costs. Otherwise, the regulator could easily allocate emissions among sources so as to mimic the cost-effective allocation of emissions achieved by an emissions tax or a cap-and-trade program. Economists know from long ago that there is no informational advantage between setting emissions standards or emissions taxes (Weitzman, 1974). Perhaps the advocates of economic instruments did not put the desired emphasis on the information and computation intensity criterion, and maybe for that reason the advocacy for economic instruments in the beginning was on the basis of *efficiency* more than cost-effectiveness. But it became clear soon that estimating marginal benefits and marginal costs was not a possible task under realistic assumptions. This is why they have been advocating tradable permits more firmly recently. These instruments are cost-effective and do not require the regulator to obtain any information from the firms regarding abatement costs, as taxes do.

Leaving the issue of the possibility of getting the data and turning to the issue of how much data is necessary to gather and compute to implement the instrument, it is important to mention that the cost-effectiveness argument in favor of economic instruments is made frequently on the basis of assuming uniformly mixed pollutants. As

some authors argue, when the locations of the sources matter, the argument may be valid no more. In this case, hot spots and environmental thresholds may be a concern. To avoid them, the regulator will not only have to estimate the transfer or impact coefficients of emissions at different locations into ambient quality at the regulated site, but also to keep track of trades and the corresponding change in emissions (Russell and Vaughan, 2003). According to these authors, economic instruments would be *information and computation intensive* relative to emissions standards in this case. It could be argued though, that the relative intensity of information and computation required by both types of instruments in the cost effective allocation of emissions does not differ much between this case and the case of uniformly mixed emissions. In both cases, what economic instruments add is the need of keeping track of permits trades (or taxes payments). And it is not clear whether this requirement is more costly to regulators than the gathering of the information on production and abatement processes and costs necessary in the case cost-effective emissions standards.

A third important criterion is the *ease of monitoring and enforcement.* This dimension refers to the issue of how costly is it to detect violations and to collect fines with one instrument relative to the other. Until very recently, this dimension was not considered by environmental economists. All the models on which the cost-effective arguments of economic instruments relied assumed perfect compliance explicitly. The economic theory behind the argument focused only on abatement costs.[3] More recently, environmental economists have started to pay attention to the validity of the argument

[3] This could be the reason why recent conclusions from the experience with market-based instruments surprisingly include the provision of "powerful reminders of the importance of monitoring and enforcement" (Stavins, 2007, p. 26).

stating the cost-effective superiority of economic instruments when monitoring and sanctioning costs are added to abatement costs (See Malik (1992), and Chavez, Villena and Stranlund (2008)). So far, these efforts show that the asymmetric information problem that an effective enforcement strategy faces in the case of uniform emissions standards gives economic instruments (tradable permits, more precisely) an advantage that has proven difficult to beat.

Another important dimension based on which environmental economists have advocated economic instruments is *dynamic incentives*. These refer to the question of whether the instruments create incentives to reduce emission levels in the long run, for example, by updating abatement technology. Prescriptive technology-based regulation almost by definition do not create incentives for the regulated sources to continuously look for ways to reduce emissions by incorporating newly available, and presumably cheaper technology. The same is valid for the case of emissions standards, assuming that abating emissions is costly. On the contrary, with emissions taxes and tradable permits firms have a continuous incentive to reduce emissions because reducing emissions implies a reduced tax receipt or a reduction in the number of permits to buy. It has been argued that the incentives are larger in the case emissions taxes than in the case of tradable permits. Taxes, if adjusted by inflation, will provide an increasing incentive to reduce emissions over time assuming a decreasing trend in abatement costs in time. With tradable permits, on the other hand, investment in clean technology produces a reduction in permits demand decreasing its price, but not the number of permits and emissions. For big firms, those with the ability of affecting the permits price, the effect on the price may also a decrease the profitability of the investment in abatement technology.

Closely related to the previous one, another criteria favoring economic instruments if *flexibility in the face of economic changes.* If variables such as production levels, demand, and technology change, does the instrument automatically adjust to meet the environmental quality targets or does the regulator have to obtain new information and perform new calculations to ensure that the targets are being achieved under the new conditions. The latter seems to be the case with prescriptive-and-uniform regulation and with emission taxes, but with not tradable permits because the latter are quantity based instruments.

The last criterion mentioned by Bhöm and Russell (1985) is *political impact.* This dimension refers to two issues: who bears the benefits and costs under each instrument and ethical arguments such as viewing economic instruments as buying licenses to pollute. Answers to these questions are given by the literature of the positive political economy of instrument choice that is analyzed in detail below.

More recent listings of dimensions to judge different policy instruments are given by Harrington et al., 2004 and Sterner, 2003. Apart from the previous criteria, they include other like: effectiveness (to achieve the policy environmental goal) or "dependability" (Gunningham et al. 1998), the possibility of creation of hot spots and spikes, interaction effects with other already existing taxes, and effects on altruism.

Of all the criteria reviewed above, it was mainly on the basis of their theoretical static cost – effectiveness that environmental economists have been advocating economic instruments over prescriptive and uniform regulation over the last 30 years. This could explain why the present instrument choice in Uruguay could at first result in a puzzle for environmental economists. To explain this apparent puzzle, economists have provided

two possible answers.[4] One is given by the positive political economy literature of regulatory instrument choice. The other one is given by a more recent literature on the "institutional capacities" of these countries. These two explanations are reviewed in the next section.

2.2. Institutional Capacity in Less Developed Countries

The puzzle of cost-ineffective instrument choice could be explained by the clash between the lack of institutional capacity of these countries and the burden that these instruments pose on regulatory institutions, making the implementation of these instruments impossible in the short run (Russell and Powell, 1996). Examples of what is meant exactly by lack of institutional capacity are: (a) overlapping jurisdictions between different uncoordinated offices in charge of environmental regulation; (b) understaffed environmental agencies; (d) inadequate monitoring technology; (c) slow legal processes and a small number of judges and attorneys qualified in environmental law; (d) lack of experience with economic instruments for environmental protection, and (e) tight public budgets. The main result of this lack of institutional capacity is the inability to implement monitoring and enforcement strategies to attain some "good" level of compliance when applying economic instruments. The cost of administering these programs may be a very high price to pay for less developed countries. The authors conclude that the choice of policy instruments must be *compatible* with a country's institutional capacity, implying "…an evolution from those instruments more easily defined and enforced, and the least closely connected to ambient quality goals, toward those involving more difficult definition tasks and closer connections to desired ambient results, aiming at tradable

[4] The same two answers are given in the law literature (See Cole and Grossman, 1999).

permits in the long run" (Russell and Powel, op.cit., p. 20). Bell (2002 and 2005) expresses a very similar idea. Several authors have agreed with this conclusion (Barbe, 1994; CEPAL, 2000 and 2001; Eskeland and Jimenez, 1992; O'Connor, 1998; Seroa da Motta, et al, 1999). Some have also proposed alternative indirect economic instruments. Examples of these include: taxes on consumption goods or production inputs (Eskeland and Devarajan, 1995), taxes on complements (or subsidies on substitutes) of polluting goods; combinations of indirect taxation and prescriptive and uniform instruments (Eskeland, 1994); import quotas on polluting goods or inputs (O'Connor, 1998), voluntary agreements on pollution abatement between the government and polluters (O'Connor, 1998), and public disclosure of the environmental performance of firms (Pargal and Wheeler, 1996; World Bank, 1999).[5]

Other authors in the intersection of the environmental law and economics literature have also provided similar institutional capacity arguments to explain the failure of economic instruments in developing countries (Bell, 2003, Russell and Bell, 2002, Bell, 2002, Russell and Vaughan, 2003). These authors point to institutions, like the legal system and human capital, as well as culture, traditions and habits.

It is worth mentioning in the end that there is another type of institutional capacity not mentioned in the previously cited works that nevertheless may be as important as the capacity of the regulators: the capacity of firms. Putting a price on it, economic instruments transform pollution into another costly input or a costly by-product whose level of use or production must be strategically decided by the firm in order to maximize

[5] On the issue of the lack of enforcement capacity of regulators, Tietenberg (1996) has suggested creating mechanisms to ease what he called the private enforcement of environmental regulations.

profits. This is not the case under prescriptive instruments, under which the firm's manager basically hires an engineer whose job is to incorporate the regulators guidelines and proposed technology to comply with emissions standards. In contrast, under economic instruments it is the firm that has to decide how much to emit and how much permits to buy, or taxes to pay. This may require a change in the organizational structure that many firms may not have the wherewithal to do. As far as I know, the environmental economics literature has not emphasized this issue adequately (As an exception, see Stavins (2007), pg. 27). The implicit assumption has been that the new resources that economic instruments demand from the firm are freely available within the firm or they can be easily bought in the market. But even for bigger firms, the necessary re-structuring may take time since it may include changing organizational and production or abatement processes over which they may have built expertise. If this is the case, the capacity of the firms to respond cost-effectively to economic instruments may also threaten the successful implementation of these instruments. In the cases of small and medium enterprises, with its lack of resources and shortage of technical expertise and environmental awareness, even integrating the environment into their business practices may be relatively costly to the alternative of doing nothing given the low probability of being inspected that this type of firms have (Gunningham and Sinclair, 2002). Let alone incorporating the strategic decisions regarding pollution that the economic instruments demand. It may also be another factor that may explain the opposition of firms to economic instruments. Precisely, the political economy of instrument choice is the topic of next section.

2.3. The Political Economy of Instrument Choice

Why have prescriptive or uniform instruments been used more frequently than incentive-based instruments despite the cost-effective advantage of the latter? Why have incentive-based instruments begun to gain acceptance in recent years? Drawing from the US experience, Keohane, et al. (1998) provide plausible answers for these two questions, based on the political economy of instrument choice. It is useful to summarize these answers in order to later analyze their relevance for Uruguay.[6]

According to the positive political economy, the instrument choice is an equilibrium result of the interaction of the different groups of stakeholders and their relative power through the given institutional mechanisms. The demand side of the "political market" includes several interest groups: polluting firms, environmental organizations, workers and consumers.[7] The supply side of the market is assumed to be composed of legislators, who seek to assure re-election and are therefore willing to trade some effective support for a given environmental policy instrument in exchange for votes or monetary contributions. Using this model, the question of why non economic instruments are more commonly used can be answered by examining the incentives of each of the aforementioned interest groups. Profit maximizing firms will demand those policy instruments that minimize their costs of compliance. Therefore, firms will prefer to emit a certain level of a pollutant under an emission standard than to emit the same level under the corresponding emissions tax. Under the former they only incur in abatement

[6] It is interesting to note that in these two aspects the US experience does not differ from Uruguay's, or other less developed countries, for that matter.

[7] These are not mutually exclusive categories, of course. Every worker is a consumer, for example.

costs, while under the latter firms also pay a certain amount for every unit emitted. This is true for every level of required abatement, assuming increasing marginal abatement costs and that the regulator is able to induce perfect compliance with the tax by tying the marginal penalty to the tax.

On the other hand, preferences over tradable permits are firm specific; they depend on how many permits a firm is allocated, if any, its abatement costs and the permit price. In other words, it depends on the firm being a net seller or a net buyer of permits. They depend also on the process by which permits are allocated. Would-be net sellers firms may prefer grandfathered permits to emissions standards. Auctioned permits will generally be opposed by most firms when compared to emissions standards. This may the reason why in almost all marketable permits programs actually implemented the vast majority of the permits were allocated for free. In a second level of the argument, existing firms may prefer prescriptive standards to economic instruments because with the former they could lobby for special treatments relative to new incumbents, something that economic instruments do not allow, except maybe for the case of grandfathered tradable permits granted in perpetuity.

With respect to labor unions, because environmental regulations create costs that firm managers and owners use to pressure governments with the possibility of lost jobs, and because unions tend to defend jobs, they will probably be on the side of their employers in the case of pollution control, particularly when it does not affect their safety at work. Also, environmental regulations can threat the production of dirty inputs or technologies and resisted by unions in these sectors of the economy. A famous example in the literature is the opposition of the United Mine Workers to the SO_2 allowance

trading program because of their fear that will induce a change to from high-sulfur coal of the east (where most union workers where from) to low-sulfur coal of non-unionized mines of Montana and Wyoming (Stavins, 2007).

Environmental organizations, a third stakeholder, may also prefer standards to taxes or tradable permits if they see the latter as licenses to pollute. With respect to citizens and consumers broadly, even if they not prefer to maintain themselves "rationally ignorant" about the pros and cons of the different instruments for pollution regulation, a very large number of potential beneficiaries may opt to free ride on the lobbying efforts of others. Even if this is not the case, the number of people involved precludes a degree of coordination as effective as that of polluting firms. Therefore, in general theory predicts that one should not expect consumers or citizens to lobby on the issue of instrument choice.

From the supply side of the "political market", some of the explanations the literature has proposed for the prevalence of non economic instruments are the following. First, politicians may prefer instruments for which the costs of regulation and possible exemptions are less visible. This is not the case for charges and tradable permits. Second, politicians often engage in "symbolic politics" and non economic instruments may be seen as stronger "statements of support for environmental protection" than emission charges or tradable permits (Keohane, et al, 1998, p. 360). Third, politicians may be more interested in the distribution of costs than in their minimization, the main advantage of incentive – based instruments. In other words, politicians may be reluctant to implement instruments that may cause some firms to close, re-locate or lose jobs. As a result, they may have a bias toward favoring existing standards.

The positive political economy allows an analysis of the incentives of regulatory staff members also, not only legislators. Reasons for policy makers or bureaucrats to oppose economic instruments are that economic instruments may not require the same technical expertise than prescriptive, technology – based instruments do. Also, economic instruments shift control decisions from regulatory staff to polluting firms. Both issues may affect their prestige and job security.

3. THE URUGUAYAN CASE: WATER POLLUTION CONTROL IN MONTEVIDEO

Does the analytical framework to analyze the issue of instruments choice fits the Uruguayan experience so as to explain reasonably the absence of economic instruments in the Uruguayan regulators tool-box? The purpose of this section is to answer this question for the case of water pollution control.

3.1. Institutional Framework, Legislation and Results

Uruguay has had a relatively high level of economic development among Latin American countries, but its environmental legislation is comparatively underdeveloped. For example, air pollution is not formally regulated and the first protected natural area was designated in 2008. Nevertheless, water pollution legislation is an exception. It has a history of more than 30 years of prescriptive, well-developed technology-based uniform emissions standards.

Jurisdiction over industrial water pollution in Montevideo is shared by the National Office of the Environment (Dirección Nacional de Medio Ambiente, DINAMA), of the Ministry of Housing, Zoning and the Environment (Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, MVOTMA) and the Department

of Environmental Development (Departamento de Desarrollo Ambiental), of the Municipal Government of Montevideo (Intendencia Municipal de Montevideo, IMM). The Department of Environmental Development, through its Industrial Effluents Unit, is responsible for monitoring industrial effluents and for enforcing effluent emissions standards and the correct operation of effluent treatment plants. This unit is also the regulatory office to which the plants report. The task of the National Office of the Environment (DINAMA) is to confer permits for industrial discharges when they determine that a firm has a treatment plant that enables it to comply with the emission standards. In other words, the National Office of the Environment is in charge of ascertaining initial compliance, while the Municipal Government is in charge of ascertaining that compliance is maintained.

This institutional organization may be in part the result of the historical evolution of water pollution legislation. It was at the municipal level that the first regulations concerning industrial water pollution appeared in the sixties, almost twenty-five years before the creation of the Ministry of the Environment. Further considering that the Ministry of the Environment suffers important budget constraints that prevent the complete swapping of responsibilities, it is very easy to understand why the Municipal Government of Montevideo (hereinafter IMM) continues to play a role as significant as the National Office of the Environment (hereinafter DINAMA) with respect to industrial water pollution in the city of Montevideo. Perhaps because of this historical evolution and the lack of public funds, coordination between these two offices has been historically poor.

The roots of the present national legislation of industrial water pollution can be traced back to the 1967 and 1968 Municipal Norms on the Disposition of Waste Waters by Industrial Firms.[8] These norms are a landmark in national water pollution regulation. They were the first to establish uniform emissions standards in terms of concentration levels for industrial plants emitting to waterways and the sewage system. The norms established that all industrial plants were required to have an effluent treatment plant that, according to engineers at the regulatory offices, would allow them to comply with the emission standards and by this way obtain the Industrial Discharge Authorization permit.

In order to apply and get the Industrial Discharge Authorization, firms needed to supply the following remarkably large amount of information to regulators: maximum daily level of production, average water consumption, daily quantities of inputs used, a description of the characteristics of effluents and solid wastes generated, information on conditions of receptor bodies at the point of discharge, time schedules for the construction of the treatment plant, and a description of its operation and maintenance. Moreover, changes in the production process needed to be informed because it may needed to be accompanied by reforms in the treatment plant in order to maintain the permit. The rationale for asking for all this information is that regulators needed it to be able to tell if the treatment plant that a firm planned to build was capable of treating the firm's effluents. Once built, the information was also needed to control the correct functioning of the treatment plant.

---

[8] Ordenanza sobre la Disposición de Aguas Residuales de los Establecimientos Industriales del Departamento de Montevideo, Decreto N° 13.982 de la Junta Departamental de Montevideo, 1967, and Reglamentación de la Ordenanza sobre la Disposición de Aguas Residuales de los Establecimientos Industriales del Departamento de Montevideo, Resolución N° 16.277 del Intendente Municipal de Montevideo, 1968.

The regulatory approach implemented by the municipal norms of 1967 and 1968 continues to be the national regulatory approach to industrial water pollution control today. Except for the types of pollutants covered and the values of the emission standards, which have been redefined, the rest of the provisions just described have been identically incorporated in 1979 into the National Decree 253/79, which presently regulates water bodies' pollution in the entire country.[9] The Decree 253/79 also transferred the Industrial Discharge Authorization process from the municipal government to the national government, and it determined ambient standards for waterways according to its predominant use (although these were never put into practice).

Given this institutional and regulatory framework just described, how is water pollution control implemented in practice in Uruguay? The system is based on self-reports that the firms send to the Industrial Effluents Unit of the IMM. These reports include information on monthly levels of (1) production, (2) tap and underground water consumed, (3) energy consumed (electricity, wood, fuels), (4) number of employees and days worked, and (5) volumes of emissions and their concentrations of pollutants. Failing to send a report on time and in the correct form could lead to fines to the industry. In theory, the plants have to send the reports within the two weeks that follow each reporting period. But this requirement is not perfectly enforced.

[9] "Decreto 253/79, Normas para prevenir la contaminación ambiental mediante el control de contaminación de aguas, 1979", with amendments in 1988, 1989 and 1991.

Two types of regular inspections exist, with and without effluent sampling. Possible reasons for not sampling may be that the plant is not working at the time of the inspection, or that the plant is not discharging at the time of the inspection.[10]

Central in the analysis that follow, during the years 1997 and 2001 the IMM undertook the third stage of the Urban Sanitation Plan for the city of Montevideo with funds from the Inter-American Development Bank.[11] Apart from the works on the city sewage system, the objectives included: (1) the development of a Monitoring Program for controlling industrial pollution and the quality of the city's water bodies, and (2) the increase of the institutional capacity of municipal units in charge of the enforcement of industrial emissions standards. (I.M.M., 2001; Multiservice – Seinco – Tahal, 2001). As part of the condition to access the credit, the Uruguayan authorities had to commit to increase the compliance levels with industry emission standards (Multiservice *et al*., 2001).[12] With this objective, the IMM implemented the "Industrial Pollution Reduction Plan" in March 1997.[13] The Plan relaxed some of the emissions standards set by the National Decree 253/79 and established a time schedule by which they would converge again to the original levels. The Plan gave the firms almost two years to implement changes in abatement technology. The municipal government seems to have developed

[10] This discontinuity of discharges presents a problem for the DINAMA inspectors, who have very rigid time schedules for inspections in Montevideo because they also have to inspect firms in the rest of the country.

[11] Contract signed in November 1996, Loan 948/OC-UR

[12] In July 1997, 76% of the levels of BOD_5 reported by the firms were above the emissions standards.

[13] Resolución Municipal Nº 761/96, Plan de Reducción de la Contaminación de Origen Industrial, February 26th, 1996.

the Plan as a way to comply with the IADB loan requirement while at the same time accommodating the economic situation of the city's industrial sector.

The IADB's funding affected the inspection strategy of the IMM. On one hand, the number of inspections performed by the IMM on industrial plants peaked in months of 1997 and 1998 because of IADB-financed monitoring campaigns. On the other hand, a private consulting firm was hired with funds from the IADB between 1999 and 2001 to carry out the Monitoring Program. The private consulting firm crowded out IMM inspections.

What were the results?[14] As measured by kilograms of BOD_5, the average discharge decreased 57% between December 1996 and November 2001 but only 20% with respect to November 1997. Even more, in July 1999 they reached levels 53% higher than those in November 1997. The evolution of the average discharge of Chromium shows a larger percentage decrease (76%) and a clearer downward trend during the same period. Emissions of BOD_5 and chromium also appear to bear a relation to inspections. In particular, they decreased in 1997 when the number of plants monitored by the IMM increased, they increased in 1999 when inspections decreased, and they decreased again in 2000 when the IMM increased the number of inspected plants. Violations to emissions standards during this period of available data were frequent. Nevertheless, although in excess of the emissions standards, the average reported level of BOD_5 concentration in emissions concentrations has tended to decrease and the plants' emissions have tended to cluster around the standard. This evolution is consistent with the actual objective of regulators, which according to interviews held, was not necessarily to increase

[14] This section is based on Caffera (2004), Chapter 3, where a detailed illustration of the results commented here and a more detailed explanation of the data sources are provided.

compliance by getting the plants to emit below the standards, but to decrease the extent of violations.

From the perspective of classical environmental economics, the choice of prescriptive and uniform emissions standards to control industrial water pollution made by Uruguayan regulators is puzzling. From a theoretical point of view, these instruments are abatement-cost-ineffective. In addition, it may be argued that they are also *information and computation intensive.* Both the uniform concentration emission standards and the obligatory adoption of abatement technology impose large information gathering and computation requirements for regulators. They are not among the less *costly* instruments in terms of *monitoring and enforcement*, either. Regulators need to monitor emissions on a relatively continuous basis to assess the degree of compliance with the standards, and at the same time collect information on the effluent treatment and the production processes of the firms also on a relatively continuous basis in order to ensure that the treatment plant is being correctly operated and the conditions under which the emission permit has been issued are being maintained. In particular, Uruguayan uniform effluent concentration standards may require more monitoring resources than the conventional economic instruments because they not only target end-of-pipe emissions, as direct economic instruments do, but also the presence and correct operation of the abatement technology.

Another problem with the Uruguayan norms is that they are *not flexible in the face of economic changes*. If production levels, technology or the number of firms change, the instrument does not automatically adjust to meet the environmental quality targets. Instead, the regulator needs to obtain new information and perform new

calculations to ensure that the targets are being achieved under the new conditions. Another disadvantage of uniform emission standards operating in Uruguay is that they *do not create incentives to abate emissions beyond the standards*. Quite the contrary, concentration standards induce the dilution of effluents in clean water, paradoxically leading to an inefficient use of the resource being protected by the legislation. They do not provide *incentives to reduce emission levels in the long run* either, for example by updating abatement technology. Regulators must adjust standards as the only way to improve environmental quality in the long run.

In sum, the instrument chosen by Uruguayan policy makers ranks very poorly in terms of cost-effectiveness, it has high information requirements for regulators, it is not relatively easy to monitor and enforce, and it provides no incentive to abate emissions beyond the standard, neither in the short run nor in the long run. Given this, the present instrument choice becomes a puzzle. The next section takes the analytical framework on institutional capacities as a barrier to the adoption of economic instruments that was developed in Section 2, and evaluates its explanatory power for this puzzle. The emphasis is in the case of industrial water pollution control in Montevideo because this is the only well developed system of pollution control of the country, with reliable data and a long regulatory history. Nevertheless, the conclusions could apply to other areas also because Uruguay has not yet relied on economic instruments to control pollution.

3.2. Regulatory Capacity and Instrument Choice

In some aspects, the institutional capacity of Uruguay with respect to environmental policy in the late sixties or the beginning of the seventies, when the Uruguayan municipal norms controlling industrial effluents were born, was not very

different from other developed countries like the U.S. The capacity and the technology required for economic instruments were simply not there at that time. Moreover, the absence of a technology to monitor emissions on a continuous basis may explain why municipal regulators in Uruguay in 1968 and federal regulators in the U.S. in 1972 (with the Water Pollution Control Act Amendments) set technology-based effluent standards, but focused the enforcement of the legislation on the presence and correct operation of the treatment plant or abatement technology. Lastly, federal and state offices in the US were under-staffed (see references in Cole and Grossman, 1999), and so was the Industrial Effluents unit of the municipal government of Montevideo at that time, with just two persons in charge.[15]

But Uruguay was not like the US in other more fundamental aspects beyond these similarities, and these differences may help explain the radically different evolution of environmental policy in the two countries since 1970. First, the U.S. created the EPA in 1970, while Uruguay did not create a similar office until 1990. Second, the U.S. was already a developed country in 1970. This means, among other several things, that the federal government had more budget to, for example, provide "sizeable training grants to academic institutions during the late 1960s and into the 1970s" to meet the demand for environmental protection agents (Cole and Grossman (1999), pg.920). Third, while there is no evidence that Uruguayans regulators were aware of economic instruments at the beginning of the 1970s, such evidence exists for the case of the U.S. Congress (Cole and

[15] It is important to note that under-staffing is difficult to determine beyond some basic administrative personnel. This is so because the number of inspections (and inspectors) necessary to enforce a norm depend on the size of the penalties relative to the cost of compliance, at least in theory.

Grossman, 1999). Furthermore, the EPA began to introduce economic instruments as soon as 1972, according to the same authors.

Finally, and perhaps most important, what happened in Uruguay in the following years was much more dramatic than what happened in the U.S. Between 1955 and 1968 Uruguay experienced what is generally called the collapse of the economic model based on import substitutions. Between those years, the GDP per capita decreased 13.2%, after 55 years of modest but steady increase. The purchasing power of salaries decreased 13.9% during the same period. (Prices for consumers increased forty-eight-fold). In December 1967 the inflation rate reached 136%. In 1968 the government froze salaries and prices, and started to regulate them heavily. This measure increased the already present social unrest. Because of this, the government issued special internal security measures. These were maintained until the fall of the democratic institutions in 1973 and throughout the dictatorship that lasted until 1985.

In the light of these dramatic events of the political and economic history of Uruguay between the late sixties and the middle eighties, it is not very difficult to understand why Uruguayan environmental policy stagnated while the U.S., for example, invested heavily in its monitoring capacity (both in ambient quality and point-source emissions technology) and staffing, both at the EPA and state and local governments between 1970 and 1977. With some previous experiences in emission permits trading with mixed successes (see Hahn (1989)), the U.S. ended up implementing the first federal cap-and-trade emissions control program in 1990 (with the Clean Air Act Amendments of that year), five years after Uruguay recovered democracy. In the same year, Uruguay

created its Ministry of the Environment and its DINAMA, the Uruguayan counterpart of the USEPA.[16]

It is true though that, at least in theory, the military regime could have developed environmental institutions. In fact, the Water Code (Decree – Law # 14859 of 1978), the Superficial Waters and Soils Conservation Law (# 15239 of 1981), and the above mentioned decree establishing effluents and ambient standards nationwide (Decree 253/79 of 1979), were all passed during the military regime. But the institutional innovation with respect to pollution control did not go beyond these norms. It did not move toward economic instruments, for certain.

Several hypotheses can be elaborated on the issue of why the Uruguayan environmental policy did not develop during that period. First, for obvious reasons, people were more interested in obtaining back lost basic rights than in environmental degradation. Second, even if ordinary people could have been interested in environmental issues, they could not vote or express their preferences; the government had zero accountability. Third, the environmental quality was not as bad as in the U.S. The population density in Uruguay is relatively low and the economy was not growing. Fourth, the military government did not perceive or, most probably did not know, that the environmental problems on which they legislated could be a matter for economists.

---

[16] Although the argument is more general, it is a valid caveat to say that the U.S. experience with water pollution has also clashed with barriers when trying to apply economic instruments. According to the international experience, tradable permits seem to perform better with air pollution than with water pollution. Part of the problem could be that in the case of water pollution the point of emissions matters. Although this is also true with air pollution (this is why we have trading zones in the case of the RECLAIM program in Los Angeles, for example), the problem seems to impose more regulatory burden (implementation costs) in the case of water pollution (See for example Hahn, 1989).

As a final hypothesis, while in the US economists in the academia and other think tanks continued to produce papers and reports whose conclusions favored the implementation of economic instruments, which could have influenced the view of the Congress and the increasing number of economists and others working at the EPA, the Uruguayan economics academia did not follow that path. The University of the Republic, the only university until 1975, was intervened by the military government in 1973. Professors identified with the left were incarcerated and/or fired, and an unknown but large number migrated to other countries. None of the remaining economists developed the field of environmental economics during those years. As a result, there were no environmental economists in Uruguay at the end of the sixties and this situation did not change in the seventies and early eighties.

The lack of a well developed field of environmental economics may be an important factor to explain differences in instrument choice among countries. Chile is a country that has characterized for giving (pro free-market) economists a prominent role in the government during the Pinochet regime. The issue has not been studied, but maybe not as a coincidence Chile was one of the first, if not the first, among the less developed countries, to implement a cap-and-trade program to control air pollution. The program, named the Emissions Compensation Program, was designed to control total suspended particles emissions from fixed industrial sources in Santiago. It is worth noting that the norm establishing the Program is from March 1992 (Supreme Decree No. 4) and the program started in 1993 (See Palacios and Chavez, 2005, and the citations therein for references). That is, the Chilean cap and trade program is contemporaneous to the U.S. 1990 amendments to the Clean Air Act that established the Sulfur Dioxide ($S0_2$)

Allowance Trading Program, who's Phase I started in 1995, and to the Regional Clean Air Incentives program (RECLAIM), which started in 1993.

It is worthwhile to observe, however, that Chile's Emissions Compensation Program was not a complete success. The program was characterized by a reduced number of transactions and by significant percentages of non-compliant sources during its first 4 years (1993 – 1996), although noncompliance decreased significantly in the following three years (1997 – 1999). It is hypothesized that the latter was the result of the availability of cleaner natural gas in the Santiago area in 1997, more than the result of an effective monitoring and enforcement strategy from the part of regulators (Palacios and Chavez, 2005). This experience contrasts drastically with the historical almost 100% compliance rate of the US Acid Rain Program (See EPA (2005), for example). It has been acknowledged that this success was due to the availability of continuous monitoring technology and a rigorous tracking of allowance trading. The differences between both experiences are more remarkable because the Chilean program was not defined on the basis of actual emissions but on the basis of emissions capacity of sources. That is, the program demanded less enforcement efforts from the part of regulators because it did not demand continuous emissions monitoring, but characteristics of the plants that are easier to monitor, like the plant size and the fuel type. In spite of this difference, the program was characterized by significant percentages of non-compliance. In this sense, it can be said that only the presence of environmental economists to advise willing-to-listen governments does not assure a successful implementation of economic instruments. Obvious as it may seem, this reflection points to the possibility that the results observed in Chile could be the consequence of a government following the advice of

environmental economists who in turn may have being following a literature that at that time did not pay attention to enforcement issues when elaborating its policy recommendations.

But perhaps what is more surprising with respect to the Uruguayan institutional capacity and its (lack of) experience with economic instruments is not the past situation but the present one. First, there is the lack of resources in the new Ministry of the Environment. Gudynas (1996) points out that in 1995 the Ministry of the Environment suffered budget cuts and the DINAMA had to suspend inspections due to "lack of vehicles and gasoline" (pg. 8). Recent interviews with professionals at the enforcement division of the DINAMA revealed that the present situation is not substantially different. Another expression of the lack of "institutional-capacity" is staffing at both offices. Seven people work at the Industrial Effluents Unit of the municipal government, including the Director. All of them participate in inspections in one way or another. These same people are the ones that enter the data with the results of sample inspections and the reported levels of pollution by firms. The rest of the information (production, inputs used, orders, and fines) is left on paper. Furthermore, all of these persons have another job apart from the one at the IMM to complement their wages. All of these factors severely hinder long run planning and analysis. Worse circumstances prevail in the DINAMA. Only five persons work in the enforcement office, which are not only in charge of the monitoring and enforcement of water pollution legislation, but all national environmental legislation.

With respect to the institutional capacity outside the government sphere, the Justice system is still "immature" (M. Cousillas, legal advisor for the DINAMA, personal

conversation). The number of precedents on environmental issues is very low. This is due basically to a general culture of very low litigation (for reasons that go beyond the scope of this research) and the fact that the environmental issue is new. Attorneys did not receive formal education in environmental law, because this discipline has only recently been incorporated in law school programs. In fact, there are very few attorneys qualified in environmental law in Uruguay. The number could be estimated between four and ten.

What is more important in terms of enforcement, data on emissions and compliance, when existent, as in the case of industrial water pollution, it is not publicly available as it is in the U.S. for example, what prevents that "self-appointed watchdogs in the form of the press and the non-governmental organization (NGO) community" (Bell, 2005, p. 642) privately enforce environmental legislation. Also, there are no clear legal mechanisms through which citizens can get the Uruguayan regulators to court and force them to enforce environmental laws. Lastly, legal processes may last for years.

It is difficult to weigh which of these institutional constraints is more important to explain why Uruguay has not yet experimented with economic instruments to protect the environment. Several of these constraints prevent not only the implementation of economic instruments but also the correct functioning of other type of instruments. Particularly those that, like the emissions standards applied in Uruguay, target end-of-pipe emissions levels, as tradable permits or emissions taxes do. Nevertheless, one institutional constraint that explains instrument choices and has not been emphasized in the literature is a very basic one: the presence of environmental economists. Perhaps not the result of a coincidence, the most prominent regulatory approaches based on economic instruments of South America (the Emissions Compensated Program in Santiago, Chile,

and Colombia's Discharge Fee Program are hosted in the same two countries that are the only ones hosting academic programs in environmental economics. The need of environmental economists in universities, regulatory staffs and other key areas of environmental policy seem to be an obvious necessary requirement, although not sufficient, for the successful implementation of economic instruments. According to Hahn and Stavins (1991), an increase in the understanding of how economic instruments work among legislators, policy makers and regulatory staff was one of the reasons behind the move toward economic instruments in the U.S. This was achieved through the inclusion of economics training in law schools and the proliferation of public policy programs in universities. Environmental economists played an obvious prominent role in this training. In contrast to the U.S. and other Latin American countries, Uruguay has only one environmental economist working in the academia and a few other economists (from two to four, at present) occasionally working on environmental issues, although they were not trained in environmental economics. To put it in perspective, the environmental engineers in the country are around 250 (personal conversation with the association's president). Furthermore, there is no undergrad course in environmental economics at any of the universities and only one course at the master's level. It is fairly clear that the number of economists in the field and the number of programs at universities in Uruguay is not enough to increase the understanding of how economic instruments work among legislators, policy makers and regulatory staff, an issue that is at the heart of the evolution of air pollution federal regulation from prescriptive to economic instruments (Cole and Grossman, 1999).

Assuming that the solution to this lack of environmental economists could come from outside the country, the number of environmental economists is also insufficient to act as "in-country partners" (Bell, 2003, p.9) of those at multilateral financial institutions and development banks, so as to help to implement even well designed regulatory tools that incorporate economic instruments. Nevertheless, for some authors economists at multilateral aid agencies without experience in the real-world implementation of policies are to blame for the failed implementations of these instruments in developing countries that were not yet prepared to implement them (Russell and Vaughan, 2003). As I show below, they may be right.

3.3. The Political Economy of Instrument Choice

The only regulatory experience with direct economic instruments that Uruguay has had to date is its proposed 1995 effluent charges.[17] I use this case as a concrete example based on which I assess the validity of the political economy arguments as barriers to prevent the implementation of economic instruments in Uruguay.

In 1995 the IMM approved the creation of emissions charges for those industries with effluent concentration levels larger than the emissions standards. In fact, this was not an emissions charge in the classical sense but rather what is called an emission charge with threshold. Under an emission charge with threshold the polluting firm pays $t \times (e - e_0)$, where t is the tax, e is the level of emissions and e_0 is the emissions standard. The norms distinguished industries that were emitting to municipal sewages and watercourses. The former would pay an Additional Charge (Tasa Adicional) and the latter would pay a Special Charge (Tasa Especial). But despite the difference in name, they were both very

[17] Articles 42 to 45 of the "Decreto de la Junta Departamental N° 26.949", December 14th, 1995.

similar. Both would be calculated by multiplying the Basic Charge (Tasa Básica, a linear function of the cubic meters of tap water consumed) by a factor larger than one but less than fifteen. The final factor would be determined as a function of the number of pollutants with concentration levels above the standards and the extent of these violations.

These charges were never implemented because the Chamber of Representatives (Cámara de Diputados) repealed them in the following year through a mechanism in the Uruguayan Constitution, by which (at least a thousand) citizens can present a petition for such a repeal before the Chamber. The arguments behind the repeal were mainly two. One was the political economy argument behind any tax: it would raise costs to the industrial community. A second argument was that the charge was unconstitutional. Municipal governments in Uruguay can only create charges ("*tasas"*) if these are directly related to a service provided by the municipality. In this case the service was the sewage system, but the legal argument of the opposition in the Chamber of Representatives was that since the charge was based on cubic meters of tap water consumption and not on cubic meters of effluents discharged to the sewage system the charge was not really a "charge" but a *"tax" (impuesto)*, which only the national government can create, according to the Constitution. The issue was exacerbated by the charge imposed on industrial plants emitting directly to watercourses because in these cases there was no sewage service involved.

It is interesting to note that a law or a presidential decree would have probably solved the problem. But, the right-wing government at that time apparently did not show the will to solve the political problem of the left-wing municipal government. In fact, the

opposite may be true. It was a group of right-wing legislators, belonging to the coalition of the right-wing parties that promoted the repeal of the municipal charge. Supported by the industry sector, they succeeded.[18]

From a political economy perspective, the fate of the proposed effluent charge in Uruguay was similar to what could have been the fate of similar initiatives in more advanced countries: the industry opposed the charge, legislators maximized votes, and workers and consumers did not participate much in the debate. With respect to the former, I am not aware of any document stating the position of the national labor union with respect to the proposed emissions charges or economic instruments in general. With some exceptions, NGOs did not participate much in the debate either. This lack of participation could have been related with their lack of understanding of basic environmental economics concepts (See Gudynas (1996), the head of the main and most developed and involved environmental NGO in the country on the concept of externalities or emissions charges) or the absence of formal mechanisms. In spite of this, they supported the charges as complements to prescriptive instruments and as revenue generating instruments (Gudynas, 1996 and 1999). Gudynas (2001) hypothesizes that the lack of participation from the citizens could be the result of the Uruguayan political system, in which citizens' movements are captured and absorbed by political parties. On the other hand, the movements outside the political system are monopolized by NGOs with weak capacities so as to generate compelling arguments.

[18] Even more interesting, the political group to which the Uruguayan President at that time and several of the legislators behind the initiative to repeal the effluent charges belonged had a program proposing economic instruments and more specifically charges to control pollution (See Gudynas (1996), footnote 16).

Nevertheless, to completely understand what happened in the Uruguayan experience with effluent charges, it is essential to bring into the picture the role of the Inter American Development Bank during the process. Although there is no formal evidence, personal interviews held during my field research point to the hypothesis that the idea of implementing effluents charges in 1995 originated within the Inter American Development Bank, and not within the municipal government of Montevideo. There is no proof that the support for economic instruments had grown inside the municipal government or the national congress. In fact, neither the municipal government nor the legislators that favored them defended the effluent charges in terms of an economically sound instrument to internalize an externality. Moreover, almost none of the inspectors, regulators, and professionals interviewed were aware of the advantages of economic instruments over the existing ones. With respect to legislators, the discussion during the session of the Chamber of Representatives that ended with the repeal of these charges reveals their lack of understanding of the basic economic principles behind these instruments (see República Oriental del Uruguay, 1996).[19]

The hypothesis that the idea of implementing effluents charges in 1995 originated within the Inter American Development Bank and not within the Uruguayan government is consistent also with the view that the OECD and other Washington, D.C. international

[19] This is clearly illustrated by two of the three short interventions of legislators that marginally touched the issue of incentives. Rep. D. García Pintos (Partido Colorado), arguing on the illegitimacy of the charge, said: "…(the charge) converts environmental degradation, pollution and the risk of public health in a source of revenues: "The more you pollute, the more you pay", instead of preventing more pollution" (p. 97). Finally, Rep. E. Rubio (Frente Amplio) said: "We have been talking here of an eco-tax and that this affects employment. But gentlemen, the ecological component is central in a modern conception of international competitiveness! … who is in touch with what happens in the world knows that those perverse industry men that do not invest ecologically won't succeed." (p. 110).

financial institutions promoted economic instruments for protecting the environment in other less developed and transitioning countries during the nineties (Bell, 2003).

What this suggests is that the failure of effluent taxes may have not been a result of the political economy forces working through the given institutional framework as much as it may have been the result of the lack of institutional capacities that emerged as barriers to the implementation of this instruments as a consequence of the imposition of the policy recommendation from the IADB. The observed result could have been the consequence of putting the cart before the horse; the IADB could have forgotten to evaluate the institutional support for the effluents charges before promoting its implementation in Uruguay. This is a story that has been seen in other countries also (Bell and Russell, 2002). What the story tells is that it may be difficult to build the "domestic resolve, will and readiness" (Bell, 2003, p. 5) to implement economic instruments from outside the country in the short time. This enterprise might require time and domestic investment in human capital, particularly with respect to the understanding of environmental economics. The task is not easy, although there have been some changes.[20] The DINAMA has recruited three economists in part-time positions for specials programs funded by multilateral aid agencies (although they are not formally educated in environmental economics or graduate level economics). Although NGOs remain weak in general, there are some exceptions who dominate the scene and that favor

[20] One thing that may play a role on the issue of instrument choice and that was not mentioned in this paper is ideology. Right-wing legislators could tend to favor economic instruments because they are market or incentive - based, and left-wing legislators could tend to disregard them for the same reason, irrespective of their understanding of how they work. As the 1990s pro – market reforms tend to foster economic instruments in several countries of Latin America in the past (Seroa, et al (1998)), the contrary could be happening in the 2000s with the new political scenario.

the implementation of economic instruments, although not necessarily for the correct reasons (Gudynas, 2001). The main problem remains at the regulatory offices and congress.

4. CONCLUSIONS

The absence of economic instruments in the Uruguayan environmental regulators tool-box may be seen at first as a puzzle for environmental economics. Nevertheless, the growing economic and law literature on political economy and institutional factors behind instrument choice give answers to this apparent puzzle. What the Uruguayan experience shows is that although political economy issues may be behind it, they are not the distinctive explanation. As it is the case in other countries, legislators in Uruguay are resistant to impose costs on employment generating industries, these oppose emission taxes, citizens may prefer to remain "rationally ignorant" on the subject and the most strong environmental NGOs are beginning to support economic instruments. As an exception, there is no evidence of what was (or is) the position of the national labor union with respect to these instruments. The political economy issues may be exacerbated by the fact that Uruguay is a developing country, with a significant part of the population not covering basic needs (around 20%). Nevertheless, they are not a distinctive factor as the institutional capacity to explain the present situation. Uruguay suffers understaffed environmental agencies; inadequate monitoring technology; slow legal processes, a small number of judges and attorneys qualified in environmental law and tight public budgets. However, it is an aspect of institutional capacity that hasn't been emphasized in the literature that seems to explain the lack of experience with economic instruments for environmental protection in Uruguay. This is the absence of human capital trained in

environmental economics, particularly environmental economists that could train lawyers, policy makers and legislators at law schools or public policy programs in universities on the merits of economic instruments and their understanding of them. This is an institutional capacity deficit in the design of environmental policy rather than in its execution, the type of deficit that has been emphasized in the literature. Alternative ways to introduce economic instruments in the design of environmental policy could be through international aid or advice, particularly from multilateral agencies. But the Uruguayan experience has shown that this could fail, because not taking into account these same institutional capacities.

Finally, it is interesting to point out that the conclusion of the lack human capital trained in environmental economics challenges not only the successful implementation of economic instruments but the very design of "smarter" regulation (Gunningham et al, 1998), not necessarily based only on economic instruments.

5. REFERENCES

Barbe, J. P. (1994). "Economic Instruments in Environmental Policy an their relevance to Developing Economies". Technical Paper No. 92. OECD.

Bell, R.G. (2002). "Are Market-Based Instruments the Right Choice for Countries in Transition?" *Resources*, 146, 10 14.

Bell, R.G. (2003). "Choosing Environmental Policy Instruments in the Real World." Paper prepared for the Concerted Action on Tradable Emissions Permits Country Forum, Paris. OCDE.

Bell, R.G. (2005). "Culture and History Count: Chossing Environmental Tools to Fit Available Institutions and Experience". *Indiana Law Review* 38, 637 – 669.

Bell, R.G. and C. Russell (2002). "Environmental Policies for Developing Countries", *Issues in Science and Technology.*

Blackman, A. and W. Harrington. (2000). "The Use of Economic Incentives in Developing Countries: Lessons from International Experience with Industrial Air Pollution". *Journal of Environment and Development,* 9 (1), 5 – 44.

Böhm, P. and C. S. Russell. (1985). "Comparative analysis of alternative policy instruments", in Handbook of Natural Resource and Energy Economics, Vol. I, A.V. Kneese and J.L. Sweeney. (Eds.), Elsevier.

Caffera, M. (2004). "The Implementation and Enforcement of Environmental Regulations in a Less Developed market economy: evidence from Uruguay", Ph.D. Dissertation, Department of Resource Economics, University of Massachusetts – Amherst.

Caffera, M (2007). "The effectiveness of the enforcement of industrial effluent standards in Montevideo, Uruguay". Unpublished manuscript.

CEPAL (Comisión Económica para América Latina y el Caribe). (2000). "Instrumentos económicos para el control de la contaminación del agua: condiciones y casos de aplicación" (Versión preliminar), LC/IN. 137.

CEPAL (2001). "Aplicación de Instrumentos Económicos en la Gestión Ambiental en América latina y el Caribe: desafíos y factores condicionantes", *Serie Medio Ambiente y Desarrollo* **31**, Santiago de Chile.

Chávez, C., M. Villena y J. Stranlund. (2008). "The Choice of Policy Instruments to Control Pollution under Costly Enforcement and Incomplete Information". Unpublished working paper.

Cole, D. H. and P. Z. Grossman. (1999). "When is Command and Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection". *Wisconsin Law Review* 1999, 887 – 938.

Dwyer, John P. (1990). "The Pathology of Symbolic Legislation". *Ecology Law Quarterly* **17**, 233 - 281.

Ellerman, E. D. (2007). "Are Cap-and-Trade Programs more Environmentally Effective than Conventional Regulation", in "Moving to Markets in Environmental Regulation", Freeman, J. and C. D. Kolstad, eds. Oxford University Press.

Eskeland, G. S. and E. Jimenez (1992). "Policy Instruments for Pollution Control in Developing Countries". *The World Bank Research Observer*, **7** (2), 145-169.

Eskeland, G. S. (1994). "A Presumptive Pigouvian Tax: Complementing Regulation to Mimic an Emission Fee". *The World Bank Economic Review*, **8** (3), 373-394.

Eskeland, G. S. and S. Devarajan. (1995). "Taxing bads by taxing goods: toward efficient pollution control with presumptive charges", in "Public Economics and the Environment in an Imperfect World", Bovenberg, L. and S. Cnossen, eds., Kluwer.

Funk, P. (2004). "Is there an expressive function of law? Unpublished working paper.

Gudynas, E. (1996). "Economía Política de la Tasa de Saneamiento". *Temas Clave* Nº 3, Junio, Centro Latinoamericano de Ecología Social.

Gudynas, E. (1999). "Economía, Procesos Productivos e Instrumentos Económicos en el Desarrollo Sustentable". *Temas Clave* Nº 8, Octubre, Centro Latinoamericano de Ecología Social.

Gudynas, E. (2001). "Tensiones y Posibilidades de la Ecología Política en Uruguay", in "Políticas Ambientales en Uruguay", E. Gudynas (ed.), Coscoroba, Montevideo.

Gunningham, N., P. Grabosky and D. Sinclair (1998). "Smart Regulation, Designing Environmental Policy." Oxford. Oxford University Press.

Gunningham, N. and D. Sinclair (2002). "Leaders and Laggards: Next Generation Environmental Regulation", Greenleaf, UK.

Hahn, Robert. (1989). "Economic Prescriptions for Environmental Problems: How the Patient Followed the Doctor's Orders". *Journal of Economic Perspectives*, 3 (2) 95 – 114.

Harrington, W. and R.D. Morgenstern (2007). "International Experience with Competing Approaches to Environmental Policy: Result from Six Paired Cases", in "Moving to Markets in Environmental Regulation", Freeman, J. and C. D. Kolstad, eds. Oxford University Press.

Harrington, W., R.D. Morgenstern and T. Sterner, eds. (2004). "Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe." Washington, D.C. RFF Press.

Intendencia Municipal de Montevideo. (2000). "Agenda Ambiental Montevideo 2000". (http://www.montevideo.gub.uy/ambiente/documentos/agenda2000.pdf)

Intendencia Municipal de Montevideo. (2002). "Segundo Informe Ambiental". (http://www.montevideo.gub.uy/ambiente/documentos/agenda2002.pdf)

Intendencia Municipal de Montevideo. (2002). "Informe Ambiental 2003" (http://www.montevideo.gub.uy/ambiente/documentos/agenda2003.pdf)

Instituto Nacional de Estadística. (2003). "Estimaciones de Pobreza por el Método del Ingreso. Año 2002", (http://www.ine.gub.uy/biblioteca/pobreza/ECH%202002-Pobreza.pdf)

Keohane, N. O., R. L. Revesz and R. N. Stavins (1998). "The Choice of Regulatory Instruments in Environmental Policy". *Harvard Environmental Law Review*, **22** (2), 313-367

Keohane, N. O., R. L. Revesz and R. N. Stavins (1997). "The Positive Political Economy of Instrument Choice in Environmental Policy". *Resources for the Future Discussion Paper 97-25*, Resources for the Future, Washington, DC.

Malik A. (1992). "Enforcement Costs and the Choice of Policy Instruments for Controlling Pollution". *Economic Inquiry* 30, 714-721.

Multiservice – Seinco – Tahal. (2001). "Informe Resumen sobre la Calidad de los Cuerpos de Agua de Montevideo". Unpublished report.

Newell, R.G. and R. N. Stavins (2003). "Cost Heterogeneity and the Potential Savings from Market-Based Policies, *Journal of Regulatory Economics*, **23**:1, 43 – 59.

Palacios, Milagros y Carlos Chávez. (2005). "Determinants of Compliance in the Emissions Compensation Program in Santiago, Chile", *Environment and Development Economics*, 10 (4), 453-483.

Pargal, S. and D. Wheeler. (1996). "Informal regulation of industrial pollution in developing countries: evidence from Indonesia". *Journal of Political* Economy, **6** (104), 1314 - 1327.

O'Connor, D. (1998). "Applying economic instruments in developing countries: from theory to implementation". *Environment and Development Economics*, **4**, 91 – 100.

República Oriental del Uruguay (1996). Diario de Sesiones de la Cámara de Diputados.

Russell, C. S. and P. T. Powell. (1996). "Choosing Environmental Policy Tools, Theoretical Cautions and Practical Considerations", IADB No. ENV-102, Washington D.C.

Russell, C.S. and J.W. Vaughan (2003), "The Choice of Pollution Control Policy Instruments in Developing Countries: Arguments, Evidence and Suggestions", in H. Folmer and T. Tietenberg, The International Yearbook of Environment and Resource Economics 2003/2004, Cheltenham, UK and Northampton, Ma., USA; Edward Elgar, pp. 331 – 70.

Seroa da Motta, R., R. M. Huber and H. J. Ruitenbeek. (1999). "Market based instruments for environmental policy making in Latin America and the Caribbean: lessons from eleven countries". *Environment and Development Economics,* 4; 177-201.

Stavins, R. (2007). "Market-Based Environmental Policies: What Can We Learn from the U. S. Experience (and Related Research), in "Moving to Markets in Environmental Regulation", Freeman, J. and C. D. Kolstad, eds. Oxford University Press.

Sterner, T. (2003). "Policy Instruments for Environmental and natural Resource Management". Washington, D.C. RFF Press

Tietenberg, T. (1996). "Private Enforcement of Environmental Regulations in Latin America and the Caribbean. An Effective Instrument for Environmental Management?" No. ENV – 101, IADB, Washington, D.C.

USEPA. (2005). Acid Rain Program 2005 Progress Report. (http://www.epa.gov/airmarkt/progress/arp05.html)

Weitzman, M. (1974) "Prices vs. Quantities", *Review of Economic Studies,* **XLI**, October, 477-91.

World Bank (1999). "Greening Industry: New Roles for Communities, Markets and Governments", Washington D. C.