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Naleving van milieurecht. Toepassing van beleidsinstrumenten op de Nederlandse verfindustrie

Peppel, Robert Arjen van de

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Summary

Paint Industry and Environmental Policy

An inquiry into the determinants and effects of preventive policy measures directed at paint factories

1 Introduction

Prevention is one of the leading principles in current Dutch environmental policy. This study focuses on the effects of policy instruments that are aimed at prevention. The two main questions that we have raised were:

- how can differences between factories in success or failure of preventive policy measures be explained?
- how can differences between policy instruments in success or failure of preventive policy measures be explained?

The main focus of the analysis is on the concept of compliance to behavioural prescriptions concerning the environment and not, as might be expected, on the effectiveness or the change in environmental quality. Research on change in environmental quality, as caused by policy measures, poses a number of difficulties. First of all, there always is a great deal of uncertainty about whether the observed levels of environmental quality could have been reached without the policy measures. Secondly, it seldom is possible to attribute the change in environmental quality to the behaviour of individual factories. However, by assuming that there is a direct and linear relation between the level of compliance and the effectiveness of the instrument, it is possible to exclude the environmental quality from the analysis without losing too much information about the degree of success of a policy instrument.

2 Model

Our dependent variable is compliance, which can be defined as the behaviour by actors that conforms to the requirements of behavioural prescriptions (or policy instruments). The research model can be used to answer questions on

two levels. First of all, it identifies causes of differences in compliance levels between actors. Secondly it explains differences in compliance levels of actors between certain types of behavioural prescriptions and policy instruments. Variance in the dependent variable, compliance, is explained by four groups of variables: acceptance, implementation, characteristics of the firm and characteristics of the instrument. The last variable group is only used at the level of variance between policy instruments.

In order to explain differences in compliance levels between actors (factories), the model assumes that compliance is reached under three conditions. First, to reach compliance it is necessary the actor is aware of positive effects of compliance in terms of economic or technical feasibility of the behavioural prescriptions, audits or sanctions, the environmental quality, the company image, or the factories market position. Second, for compliance it is necessary the behavioural prescription is carried out properly. This means, for example, the target group must be informed about the content and the status of the behavioural prescription, and complying behaviour of the target group must be audited by the agency carrying out the instrument. Third, it is expected several firm characteristics, such as firm size, profitability and firm location can affect compliance levels. On the strength of the information available when the model was drawn up, the relationship between firm size and compliance level appeared ambiguous. On the one hand, there is evidence that big factories may have higher compliance levels because they have more resources available to comply. On the other hand, some authors stated these resources can also be used to successfully avoid compliance. Because of this inconclusiveness both expectations were tested: first, firm size has a positive relation with compliance; second and reverse, the relation between firm size and compliance is a negative one. Furthermore, it is expected profitability correlates positively with compliance. Profits create more opportunities for complying with behavioural rules: a firm can invest spare money for complying with behavioural rules. Location is also a difficult but important variable. A distinction was made between factories at safe sites (for instance in industrial zones) and factories at unsafe sites (for instance in cities). The main expectation was these types of firms may differ in compliance because of differences in environmental pressure. The direction of this relation was unclear, so we decided to test the null hypothesis. Thus, the main hypothesis states compliance, the dependent variable, is mediated by the degree of acceptance of the rule, the quality of implementation and firm characteristics.

The second main hypothesis focuses on the question whether instrument A is more effective than instrument B, when certain conditions are held constant.

Answering this type of question asks for experimental research. In this case that is impossible. Therefore a cross-case design has been chosen: a field study of the effectiveness of four policy instruments. By concentrating the case study on one specific target group it was possible to keep constant certain intervening variables such as structure of targetgroup, product- and process characteristics etc.

Three characteristics of policy instruments were tested: binding capability, the degree of norm-internalization and the quality of the policy-theory. It was expected that instruments with a high binding capability, a high degree of internalization and a good policy theory would give higher compliance levels than instruments with a low binding capability, a low degree of internalization and a bad policy theory. To test this hypothesis a distinction was made between compulsory and non-compulsory instruments. The former are directly or indirectly depending on a law, and the latter not. Non-compulsory instruments have a voluntary basis, compulsory instruments not. Compulsory instruments were expected to have relatively low binding capabilities and a lower degree of internalization. The quality of the policy theory was expected to be higher for instruments on voluntary basis.

3 The survey

The main survey focused on the compliance of paint factories with the behavioural prescriptions of four environmental policy instruments: the environmental permit, the environmental audit, the ban on the use of cadmium and the subsidy for a new kind of paint. The survey covered 69 of the 96 Dutch paint factories. The sample includes about 70 percent of all Dutch paint factories. This is a representative segment of the total population of paint factories. It must be stated the objective was not to take a sample representing the total population of Dutch industry. On the other hand, the Dutch economy is dominated by medium and small sized firms, of which the Dutch paint industry forms a good example.

Two secondary surveys were carried out. The first survey was conducted among local agencies issuing environmental permits for 89 of the 96 paint factories (the response was approximately 90 percent). Although it was not our purpose to draw a representative sample of all local agencies that carry out the permit, there is evidence that on two of the three indicators the sample meets the characteristics of the total population. Nevertheless, the findings for the sample of local agencies cannot be generalized to the population as a whole. In

In addition a second survey was held amongst a sample of Dutch painting firms. The purpose was to gather evidence about the use of environmental friendly paints. When we take the distribution of the firm size as an indicator, it can be concluded the sample deviates only little from the total population of painting factories.

The analysis of empirical data has been carried out with two main methods: cross tabulation and regression-analysis. The former was used to analyze relations between two variables. The latter was applied to track relations between more than two variables.

4 The paint industry

The Dutch paint industry is an important sector of chemical industry. It produces a large number of paints, lacquers, varnishes and other paint-related products. Environmental problems rise due to the production-process (producing paints) and the products (painting).

The main environmental problems caused by the production of paints can be divided in water-, air-, and soil pollution and chemical waste. Water pollution results from emission of polluted rinsing water used for the cleaning of pipes and drums. Air pollution is the result of emission of VOC's (Volatile Organic Compounds) in solvents and emission of pigment powder. Accidental spill overs of solvents and resins can cause serious local soil contamination. The disposal of packaging materials, such as drums and tins, generates chemical waste. Preventive strategies used to decrease environmental problems include substitution of raw devices, materials, good housekeeping, vapour recycling systems, liquid-tight floors, filter devices and regeneration of contaminated solvents.

A prime environmental problem of paint application is air pollution. VOC's in paints can cause health risks and photochemical pollution. Both can be prevented by using VOC-poor paints. There is however evidence that paints give rise to other environmental problems, especially water pollution.

5 The Environmental Permit

The environmental permit is a compulsory kind of instrument that focuses mainly on the production process. Every paint factory is obliged to have a permit. The permit itself may contain dozens of behavioural prescriptions concerning a variety of subjects and hazards such as preventing fire, explosions, excessive noise, soil contamination, air emissions and water pollution. Environmental permits for paint factories are mostly issued by local authorities.

Our conclusions about the effectiveness of the permit can be summarized in four statements. First, compliance. Almost every paint factory has a permit. The problem is, only about 60 percent of the factories complies with all the behavioural prescriptions in the permit. A substantial group of factories only partially complies with the permit. Furthermore, a large number of factories is not very active in reporting changes in the permit-situation. This causes difficulties in enforcing and updating the permits. Second, firm decisions concerning compliance center strongly on economic and technical feasibility of the behavioural prescriptions and the possibility of controls and sanctions. Firms seldom take into account the environmental impact of their behaviour. Third, the implementation of the permit. About 20 percent of the paint factories had out of date permits, that were not to be renewed in the near future. Furthermore, many factories are not being audited regularly. In a substantial part of the paint industry, the permit is not implemented and enforced properly. This is partly a result of the passive attitude of the factories. Our fourth conclusion is, a good permit is the best guarantee for a high level of compliance.

The general conclusion is, more than half of the paint factories comply with the permit. Firm size, acceptance and the quality of the permit are the most important variables influencing the degree of compliance.

6 The Environmental Audit

The environmental audit is a non-compulsory instrument. Just like the permit, it is directed toward the environmental aspects of the individual production processes. Because of its features (voluntary, elective) it can be seen as a counterpart of the permit. The purpose of an environmental audit is to give factories a more active role in preventing environmental problems. Most of the paint factories are expected to have an environmental audit system implemented in 1995. If not, the environmental audit system, or certain parts of it, shall be

required by law. The branch organization of paint factories strongly promotes the use of environmental audit systems and has therefore conducted an intensive information campaign. The national government supports the implementation of environmental audit systems with a subsidy.

The research shows, a large proportion of the paint industry participates in the implementation of the policy. Many factories are familiar with the publications of the branch organization concerning the environmental audit system. Nevertheless, there is no evidence that the information campaign of the branch organization had any major impact on firm attitudes toward implementing environmental audit systems. Most of the factories only made the first steps. A small minority of the paint factories has an operational environmental audit system. Their decision to respond positively to the appeal to implement the system, was affected by the firms' expectations concerning the effects of the environmental audit system on the environment. It may indicate that environmentally conscious firms prefer environmental audits. The most important variable for explaining variance in compliance is firm size. Big factories have far more experience with environmental audit systems than smaller ones. This was to be expected because the former are more pushed to implement audit systems. In addition, large factories have more environmental expertise, in the form of environmental officials. These big firms are supposed to be committed to environmental matters. Firm size should therefore have a positive impact on compliance levels.

The main conclusion is, the environmental audit system holds a lot of promise but has not yet lived up to its promises. There is, as a result of a low degree of compliance, still very little evidence as to environmental effects of the environmental audit system.

7 The ban on cadmium

The Cadmiumbesluit is a compulsory instrument. It's main purpose is to prevent cadmium emissions from products, such as paints, by prohibiting the use of cadmium in paints. It prohibits the use of cadmium in most paints. Therefore it can also be viewed as a product-centered instrument. The Cadmiumbesluit is carried out by the National government. The main implementation tasks involve informing target groups and monitoring compliance.

The Cadmiumbesluit was launched in 1991. For the paint industry it meant that most paint formulations had to be cadmiumfree. The research shows that in

1992 only very few firms still produced cadmium containing paints. Furthermore, there is evidence only very small amounts of these paints were produced. Therefore the Cadmiumbesluit can be called a big success. What factors caused this success?

Firstly, long before the Cadmiumbesluit was launched, paint producers were aware of the negative aspects of cadmium in paint. Secondly, in an early stage, the paint industry succeeded in developing technically reliable alternatives for cadmium containing paints. Launching the Cadmiumbesluit can be seen as the last stage of a process of persuasion that began with the first preparatory talks about the ban on cadmium eight years earlier. Therefore, the industry had been given plenty of time to change their paint-formulations.

8 The covenant on environmental friendly paints

KWS 2000 deals with the environmental problems caused by VOC's in paints. Its main purpose is to decrease the VOC's in paint with 50 percent in 2000, by means of a shift to VOC-poor paints. KWS 2000 is a 'covenant' between the industry and national government. Covenants can be seen as alternate solutions to regulation for solving environmental problems. KWS 2000 falls in the category of non-compulsory instruments. Financial aid in sponsoring research, gives paint producers additional incentives to develop VOC-poor paints.

The main conclusion that can be drawn from our research is, KWS 2000 is not much of a success. This is not because paint producers are not capable of making VOC-poor paints, but merely because the market sales of those paints are too low to reach policy targets.

There are a number of reasons why sales of VOC-poor paints don't meet the expectations. First of all, questions were raised concerning the quality of VOC-poor paints. The quality of VOC-poor paints varies strongly with the use and with the circumstances under which these paints are applied. The product is still in a developing phase. As a result, professional paint applicators, who in general don't want to take big risks with new products, take on an attitude of 'wait and see'. Secondly, the contractors also stick to the old fashioned paints, merely because they are not well informed, or because the VOC-rich paints are less expensive. A third reason for the low sales of VOC-poor paints are questions about their environmental consequences. There is discussion about the degree to which the new paints pose new environmental problems. Under some circumstances VOC-poor paints can cause water pollution. Others say the VOC-

emissions of these paints are not substantially lower when the total product lifecycle is taken into account. These questions strengthen the distrust among buyers concerning VOC-poor paints.

Although it must be taken into account that KWS 2000 has been important to develop alternatives for VOC-rich paints, it did so far, not succeed in furthering the sales of VOC-poor paints. To reach that target stronger measures seem to be necessary.

9 Comparing instruments

The final topics we raised were firstly, the influence of instrument characteristics on mean compliance levels and, secondly, instrument and target group characteristics that, given the circumstances in the paint industry, most strongly boost compliance

The first objective of comparing instruments is identifying instrument characteristics relating to compliance by the target group. We did so by comparing mean compliance levels of the four instruments we discussed earlier. The main conclusion must be the targetgroup complies better to compulsory instruments. We found two explanations. First, the compulsory instruments have stronger binding capabilities than the non-compulsory instruments, mainly caused by the weak juridical status of the non-compulsory instruments. Second, compulsory instruments are older than non-compulsory instruments. Therefore the target group is more used to, and aware of, the behavioural prescriptions in compulsory instruments.

The second question is answered by comparing three of the four instruments as to their effects on compliance. We used an index of compliance based on the compliance of four instruments and studied the effects of three instruments on this proxy. The main conclusion is the environmental permit and information campaigns induce more compliant behaviour than financial aid sponsoring research. This finding can be specified by taking firm size into account. Small factories tend to comply whatever the instrument, even though the permit and the information campaign are most effective. Big factories, on the other hand, seem uncontrollable. None of the three policy instruments have a significant effect on compliance. Compliance seems to be an autonomous process. When profitability is taken into account, it turns out that for low-profitable factories, the permit is the most suitable instrument for generating compliance. When looking at high-profitable factories, none of the instruments has significant

effects on compliance levels. The location of companies was also introduced as an intermediate variable. For factories within cities the permit does not pose sufficient incentive to comply. Information-campaigns are also needed. Factories in relatively safe industrial zones profit most from good permits. This analysis shows that no single policy instrument is most effective under all circumstances. Firm characteristics, especially firm size and profitability strongly moderate the outcomes. Therefore it is very important policymakers, when choosing policy instruments, take into account the characteristics of the target group and are aware of the interactions detected in this study.