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Working Paper

Voluntary environmental agreements and competition policy: The case of Germany's private system for packaging waste recycling

Nota di Lavoro, No. 78. 2000

Provided in Cooperation with:

Fondazione Eni Enrico Mattei (FEEM)

Suggested Citation: Lehmann, Markus A. (2000) : Voluntary environmental agreements and competition policy: The case of Germany's private system for packaging waste recycling, Nota di Lavoro, No. 78. 2000, Fondazione Eni Enrico Mattei (FEEM), Milano

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Fondazione Eni Enrico Mattei

**Voluntary Environmental
Agreements and Competition Policy
The Case of Germany's Private System
for Packaging Waste Recycling**

Markus A. Lehmann

NOTA DI LAVORO 78.2000

Voluntary Environmental Agreements and Competition Policy

The Case of Germany's Private System for Packaging Waste Recycling

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Abstract

By analyzing Germany's voluntary Dual Management System for Packaging Waste Collection and Recycling (*DSD*), the paper highlights two aspects crucial for assessing voluntary environmental agreements from an antitrust viewpoint. First, specific features of *DSD*'s governance structure are argued to mitigate anticompetitive effects stemming from centralization, and to improve management performance, aspects which have so far been neglected in the German discussion. Other features identified in the debate as hampering competition are shown to have an economic rationale from the viewpoint of the neoinstitutional theory of the firm. Hence, the institutional fine-tuning of a voluntary agreement matters when assessing its implications for market competition. Second, it is shown that the emergence of *DSD* is the result of a basic principle of German waste management policy. This principle formed the regulatory threat in the negotiations that ultimately led to the implementation of *DSD*. By presenting the British waste management regulation as a counter-example, it is demonstrated that this basic principle is not a precondition to meet the quantitative policy targets stipulated in the regulation. In conclusion, the design of the regulatory threat with respect to the instruments it prescribes is of crucial importance for the degree of centralization and the anti-competitive impact of the private institutions that subsequently emerge. An earlier involvement of antitrust authorities in the regulatory process, during the design of the regulatory threat, is therefore desirable.

Keywords: Voluntary Environmental Agreements, Antitrust, Theory of the Firm, Waste Management

JEL: D62, D78, L22, L44

*Earlier versions of this paper were presented at the 3rd Conference of the International Society for New Institutional Economics (ISNIE), Washington, D.C., USA, September 16-18, 1999, and the FEEM/CAVA workshop on Voluntary Approaches, Competition and Competitiveness in Milan, May 25-26, 2000. Comments by Uda Bastians, Fritz Flanderka, Matthieu Glachant, Elinor Ostrom and Martin Schonger are gratefully acknowledged.

Technical Abstract

The paper takes the viewpoint of the neoinstitutional theory of the firm to analyze Germany's voluntary Dual Management System for Packaging Waste Collection and Recycling (*DSD*); namely, its governance structure and its contractual relations with upstream and downstream firms. Two aspects crucial for assessing the antitrust implications of voluntary environmental agreements are highlighted. First, the institutional fine-tuning of a voluntary agreement matters when assessing its implications for market competition. Second, the design of the threat with respect to the instruments it prescribes is of crucial importance for the degree of centralization and the anti-competitive impact of the private institutions that subsequently emerge.

1. Introduction

In recent years, arrangements between regulatory authorities and whole industries as an alternative to mandatory legislative regulation have come under increased interest in the political arena as well as in the scientific community. In environmental policy, such arrangements have gained prominence under the heading of “voluntary agreements“ (see OECD 1999 and Lyon/Maxwell 1999 for overviews). Two features of these alternative policy means are usually highlighted. First, in order to explain industry’s incentive to take a more active role in such arrangements, reference is often made to the role of the regulatory threat: affected firms may wish to avoid harsher regulation via legislation (Segerson/Miceli 1998, 110). Secondly, it is typically left to the industry itself to implement aggregate policy goals stipulated in the arrangement and to solve subsequent coordination and free-riding problems between the participating firms. Hence, such arrangements give rise to more or less sophisticated institutional structures for self-governance between private actors.

Within the regulatory efforts to reduce the amount of waste produced by society and increase recycling volumes, the German system of packaging waste management is a prominent example of such a private institutional structure. This system, which is operated in addition to the usual garbage collection and disposal mostly undertaken by local communities, is operated by a private firm, *Duales System Deutschland AG (DSD AG, or DSD for short)*. This enterprise was founded in 1990 by firms affected by new waste management legislation. Under the basic principle of “product responsibility“ (*Produktverantwortung*), this regulation requires firms in the packaging and filling industries to individually take back and recycle the packaging waste related to their products (*Rücknahmeverpflichtung*). Upon political resistance by the affected firms against this very costly regulation, the legislation that was passed, however, granted an exemption to firms participating in a dual system of packaging waste collection and recycling. Political targets were specified for such a system (and hence, also for *DSD*¹), but its institutional fine-tuning was left to the private actors.

While this construction grants private actors greater involvement in waste management, it is also, as a matter of fact, a heavily centralized arrangement. Even today, *DSD* is the only firm authorized to engage in organizing such a dual system of waste collection and recycling. Consequently, this institutional solution has come under criticism from lawyers and economists since its very inception. Concerns are raised with respect to the requirements of German and European antitrust law. By its very position as the sole operator of a dual system, *DSD* is said to prevent competition, especially in the waste-recovery markets, with subsequent negative impacts on factor allocation.

The present paper has two objectives. First, it reconsiders these antitrust concerns by referring both to old insights into, as well as to recent contributions to, the economic theory of the firm. It argues that important features of *DSD*’s internal governance structure, as well as its contractual relations with firms, work against negative allocative impacts. In this respect, the co-integration of different market sides within *DSD*’s governance structure will be given particular consideration.

¹ To avoid confusion, it will be spoken of a *dual system* when alluding to a technical system of collecting and recycling waste as an alternative to the usual systems operated by local communities, whereas the acronym *DSD* refers to the company operating such a system in today’s Germany.

Furthermore, it is well-known that features which have been traditionally interpreted as being anti-competitive, may actually have economic merits from the viewpoint of new institutional economics.² This observation is confirmed in the case of the German packaging waste management system. The general conclusion is that a detailed analysis of the institutional fine-tuning of a voluntary agreement, that is, its internal governance structure and the design of the contractual relations between the participating firms, is important for assessing whether and to what extent the agreement has negative allocative impacts.

Second, it is shown that the emergence of a single dual system is the result of a basic principle underlying German waste management policy, namely, the take-back obligation described above. As it is not argued that this centralized institutional solution can achieve the same degree of efficiency as a competitive environment, the relevant question, from the viewpoint of competition policy, is whether the specific design of the legislative threat was necessary to implement the aggregate environmental policy targets stipulated in the German and European waste management legislation. By briefly presenting the British packaging waste regulation as a counter-example, it is demonstrated that the take-back obligation is not necessary to achieve the policy objectives. Therefore, the ultimate judgement with respect to DSD is mixed. The general lesson is that the design of the regulatory threat with respect to the instruments it prescribes may have a crucial influence on the anti-competitive impact of the private institutions that subsequently emerge.

The paper proceeds as follows. Section 2 will spell out in greater detail the legal framework and the institutional structure of *DSD*, and presents the criticisms from an antitrust viewpoint. It also derives the necessity of a single institutional structure from the take-back obligation prominent in German waste management policy, and thus prepares the ground for the comparison with the British system undertaken in section 6. The following three sections analyze the possible distortions emerging from *DSD*'s dominant position. Section 3 addresses *DSD*'s role with respect to upstream firms, whereas section 4 considers *DSD*'s role with respect to the waste-recovery industry. Section 5 addresses the impact of *DSD*'s internal governance structure on managerial incentives. It argues that specific features referred to as being anti-competitive actually may have beneficial effects with respect to management control. Section 6 briefly presents the British system and shows that the threat of an individual take-back obligation was not necessary to fulfill the policy objectives. Section 7 summarizes the lessons to be learnt from this case for the analysis of voluntary agreements. As a policy conclusion, it presents the need for an extended role of competition authorities within the formulation of environmental policy.

2. Institutional Structure and Antitrust Criticism

Product Responsibility and Take-back Obligation. In German waste management legislation, the principle of product responsibility means that producers or sellers of goods must accept the return of their products after use and ensure their recycling or disposal (*Rücknahmeverpflichtung*³). This take-back obligation also plays a prominent role in other areas of

² See Williamson (1979) or, e.g., Ménard's recent studies on private standard-setting institutions (Ménard 1996, 1998).

³ See § 22,2 Kreislaufwirtschafts- und Abfallgesetz (KrW-/AbfG), the German Closed Substance Cycle and Waste Management Act.

waste management policy.⁴ In packaging waste regulation, it translates into interlinked obligations of the firms involved in the so-called packaging chain. Specifically, sellers are required to take back the packaging of products which they offer for sale. In the next step, producers are required to take back the packaging of their products which has already been collected by the sellers and organize the recycling or disposal of this material.⁵ Hence, the take-back obligation links the individual firm to its “own” packaging waste.

DSD. The implementation of a take-back obligation for every seller and every producer was opposed because of its high costs. When firms sell their products through specialized distribution channels (e.g., exclusive dealers for the sale of automobiles), a requirement to take back used products can be implemented without huge increases in handling costs. This is not the case, however, for packaging waste. Most producers ultimately rely on retailers instead of setting up their own distribution channels. Since most retailers offer a product spectrum from a multitude of producers, the take-back requirement would have led to high costs of collection and sorting, especially at the retail level. Hence, the planned regulation was intensely opposed especially by the large trading companies, and also by producers who feared that these high handling costs would be ultimately passed on to their sales contracts.

An intricate negotiation process resulted between the government and the representatives of the affected industries, in which the take-back obligation was used as a regulatory threat (Haverland 1999, 94). The authorities ultimately agreed to not apply this compulsory requirement to firms participating in a private collection system of packaging waste which attains blanket coverage (“*flächendeckend*”) and is easy for individual consumers to use (“*verbrauchernah*”).⁶ Importantly, the regulation fixed quantitative policy targets to be met by such a system, in the form of aggregate, material-specific quota for waste collection and recycling.⁷ However, the regulation remained silent with respect to the systems’ internal structure, thus leaving room for industry’s self-organization activities. When a system meets the requirements, it is formally recognized by the regulator, in which case participating firms are exempted from the individual take-back requirement.

Such a system was founded in 1990 by a coalition of 95 firms from the packaging and filling industries as well as packaging producers and trading companies under the name *Duales System Deutschland*. It is organized as a private company and started operations in 1992. Basically, *DSD* pools the individual take-back obligations of the participating firms and provides for a financing mechanism. Participating firms of the packaging and filling industries (approximately 19,000) are required to pay a license fee for a label, the so-called “green dot“, which is printed on the packaging used by the firms and signals to consumers that the packaging waste is viable for the dual collection system. The amount paid by a firm depends on its annual packaging use and is calculated according to a price scheme combining material-, weight- and volume-oriented criteria. Firms do not need to

⁴ For instance, several ordinances now under implementation require the taking back of used cars, of batteries and of used electronic appliances, by their respective producers.

⁵ See §§ 4-6 Verpackungsverordnung (VerpackV), the German Packaging Waste Ordinance.

⁶ Haverland (1999, 90-100) offers a detailed description and analysis of the political process that led to the Packaging Ordinance of 1991.

⁷ For instance, the recent amendment to the Packaging Waste Ordinance, in 1998, prescribes recycling quota between 60% and 75%, depending on the material (glass, paper, aluminum, steel, plastics, composites). See Flanderka (1999, 182).

own shares in *DSD* in order to be entitled to participate in the system. Revenues from the fees are used to finance collection and recycling activities. *DSD* does not provide these services itself, but has concluded contracts with more than 500 regionally-operating firms which collect packaging waste, sort it by material⁸ and, typically, deliver it to specialized recycling firms.⁹ A stylized organizational chart of the resulting institutional structure is given in figure 1.

Although the underlying legislation does not place any restrictions on the possible number of such private management systems, the system operated by *DSD* has remained the only one to have received formal recognition by the regulatory authorities. Moreover, its national predominance since its foundation has never been seriously challenged by alternative systems.

The Reason for a Single System. The key to understanding the system's uniqueness is the use of the take-back obligation as the regulatory threat in the negotiations between the government and the industry representatives. As it is the basic principle of German waste management policy, the linkage of the individual firm to its "own" products was to be taken as a political fact.¹⁰ The only viable way for producers and sellers to save collection and sorting costs is then to pool the individual take-back requirements in a common collection system, whose financing is assured by a specific cost-sharing rule. Packaging can then be collected outside stores and on the basis of materials rather than producers. Hence, the average collection and sorting costs decrease in pooling effort (Rutkowski/Tegner 1996, 516). The question is, to what extent this feature generates pressure for a single system on the national level.

⁸ For most materials, used packaging is collected in material-specific bins. Plastics and composites are collected together and sorted afterwards.

⁹ See Flanderka (1999, 118). This picture is somewhat stylized. In reality, there are also specialized companies in which *DSD* is the majority shareholder, which guarantee the recycling of packaging of a specific material. Until recently, collected and sorted packaging waste has to be delivered free of charge to these firms, which commissioned recycling tasks to individual recycling firms via long-term contracts. A recent amendment to the regulation allowed collection and sorting firms, for reasons of competition policy, to contract directly with recyclers.

¹⁰ As will be shown in section six, such a linkage is by no means necessary to reach specific quantitative policy targets.

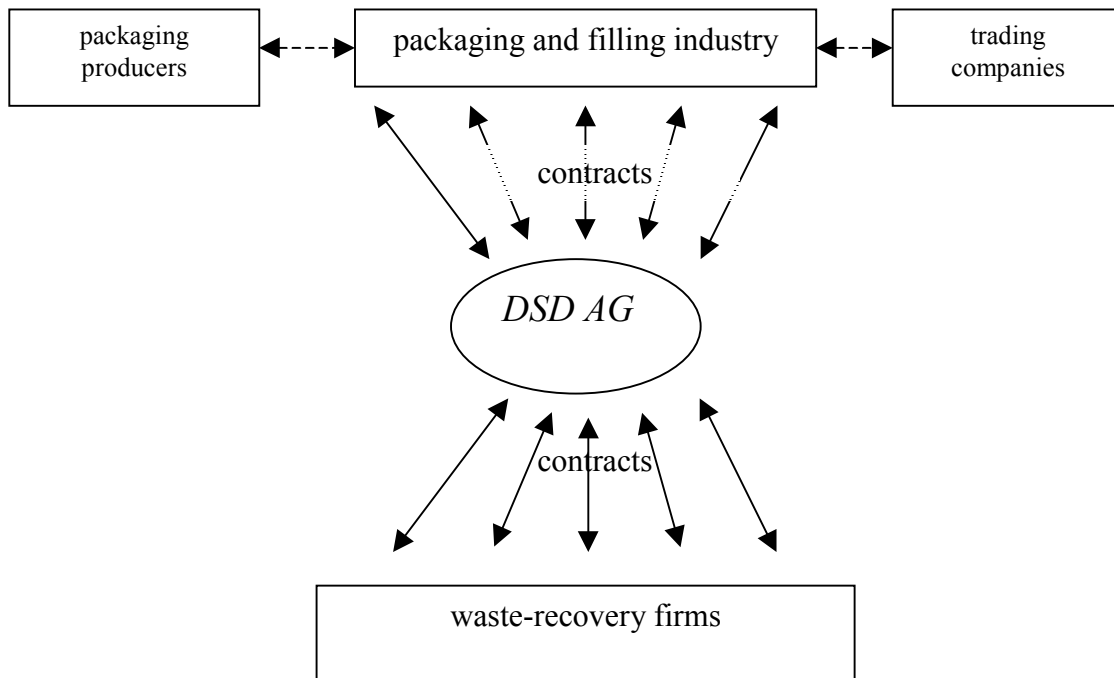


Fig. 1: Stylized Structure of the German Dual System

Note first that several pooling systems covering the same geographical area are not viable because such an arrangement would require consumers to sort packaging by material *and* by system operator. This argument alone does not preclude the existence of multiple regional system operators and benchmark competition. However, under the auspices of the take-back obligation, firms of the packaging and filling industry which cover inter-regional markets would then have to enter into contractual relations with several regional system operators. Those who cover the national market would even have to contract with all operators. In consequence, individual firms would have to reveal to *each* operator the packaging quantities and materials they delivered to the region covered by the specific system. In addition, it would be necessary to establish a clearing mechanism for inter-regional, trans-boundary packaging flows. Alternatively, each operator would have to assign collected packaging waste to single producers. Both solutions would imply high accounting and monitoring costs, which would need to be borne either by the firms themselves or by the system operators. Such costs are avoided to a large extent under a single system.

In the German discussion, the above-mentioned requirement of blanket coverage was often identified as being a significant impediment to a more competitive structure (see, e.g., Benzler et al. 1995, 59).¹¹ Any system of packaging waste recovery must at least be accessible to consumers over the entire area of a German federal state (*Bundesland*). However, the analysis presented here shows that the abolishment of the blanket coverage requirement would not automatically lead to multiple

¹¹ Another impediment was that the material-specific recycling quota to be met by a dual system initially referred to *total* German packaging waste per year. As quota were set well above 50 %, the emergence of additional systems was then technically impossible. This flaw was corrected by the recent amendment to the Packaging Waste Ordinance: the quota to be met by a specific system now refer to total packaging waste only of those firms participating in the system (§ 6 Abs. 3 Verpackungsverordnung).

waste recovery systems. It would rather lead the DSD to minimize overcompliance by retreating from sparsely-populated regions, but would not lead to additional system operators.¹² Abolishment of the blanket coverage requirement is a necessary, but not a sufficient condition to generate multiple systems of packaging waste recovery.

Antitrust Concerns. The highly-centralized German institutional structure was criticized by economists and lawyers right from the outset because of its alleged anti-competitive impact on the markets for waste-recovery and subsequent allocative distortions. Concerns were especially raised

- with respect to *DSD*'s position towards upstream firms in the packaging and filling industries. Would *DSD* not serve as a cartel of the firms owning it, by discriminating against non-owners who, given the cost advantages of a pooling system, must nevertheless rely on *DSD*'s services?¹³
- with respect to *DSD*'s position towards downstream firms supplying collection, sorting and recycling services. Here, specific institutional arrangements between *DSD* and waste-recovery firms, detailed below, were identified as being anti-competitive. The suspicion is that waste-recovery firms may use *DSD* to limit competition between each other and to reap rents from upstream firms (and, ultimately, from consumers), and/or from excluded rivals.¹⁴

Note that these criticisms, from an efficiency viewpoint, translate into the following question: To what extent are *DSD*'s objectives different from minimizing the costs of complying with the overall policy targets,¹⁵ and who reaps the subsequent rents?

The following two parts will explore this question by analyzing in greater detail *DSD*'s ownership structure and the contractual arrangements it has concluded with upstream firms in the packaging and filling industries and with downstream firms in the collection and recycling branches. The part that subsequently follows will focus on the impact of *DSD*'s ownership structure on management incentives. In doing so, it focuses on an aspect that has so far been neglected in the German discussion, namely, that *DSD*'s dominant position with respect to upstream and downstream firms may also lead to a problem of management control. Hence, rents may also accrue to *DSD*'s management, for instance in the sense of Hicks's (1935) famous verdict that the "*best of all monopoly profits is a quiet life.*"

3. *DSD* and Upstream Firms

As described above, *DSD* was founded as a joint enterprise by firms in the packaging and filling industries, several trading companies and packaging-producers. Given that most firms in the packaging and filling industries are not co-owners of *DSD*, the first question that arises from this ownership structure is whether institutional mechanisms exist that prevent formal or informal discrimination between customers that are co-owners and customers that are not.

¹² It is often criticized that the blanket coverage requirement puts an additional and superfluous restriction on potential waste recovery systems. As any system must initially meet the recycling quota of its member-firms, such a requirement is not a precondition to meet the underlying political targets of packaging waste recovery and recycling.

¹³ Selmayr 1998, 100; Thomé-Kozmiensky 1994, 106ff.; Sagia 1996, 423, 426, 429f, 437f.

¹⁴ Benzler et al. 1995, 59, 61-2; Selmayr 1998, 101; Michaelis 1998, 214, 216.

¹⁵ It was a widespread criticism of environmental economists that the material-specific recycling quotas stipulated as policy targets do not reflect the shadow prices of packaging use and disposal (see, e.g., Michaelis 1998, 215). The present paper, by taking these policy targets as given, does not reiterate this argument.

The second question is to what extent the individual owner has an incentive to strive for minimization of - largely material-specific - collection and recycling costs, for instance, via management control.¹⁶ Remember that the license fees for the "green dot" which are intended to cover the bills from the waste-recovery firms, are paid for by the firms of the packaging and filling industries. When firms competing in the product market are technically bound to use the same type of packaging, the individual firm's market position would not be improved by a lower license fee for this packaging. Hence, the firm would have no incentive to invest effort in such activities. When competing firms rely on different packaging strategies, however, an individual firm using a different packaging material than its competitors will have an interest in low license fees for this material. Furthermore, inter-material competition in the packaging markets will lead the packaging producers relying on a specific material to have at least a collective interest in low license fees for packaging consisting of this material. Hence, the question is whether and to what extent *DSD*'s pricing policy can be influenced by a special-interest fraction of owners, that is, by producers of high-cost packaging and possibly those users who, for technical reasons, cannot substitute packaging types. Are there mechanisms that work against the usurping of *DSD* by such a fraction and subsequent cross-subsidizations of high-cost packaging?

Several features implemented in *DSD*'s statute provide for such mechanisms. Indeed, while formally organized like a shareholder company, *DSD* actually bears strong similarities to a consumer cooperative. First, upon agreement of the majority at the shareholder meeting, firms coming from the industry groups mentioned above can become co-owners of *DSD* at any time. Today, *DSD* is collectively owned by 584 firms (*DSD* annual report 1997) and continues to remain open for new co-owners. Shares held by a single firm are restricted by statute to exactly DM 5,000 (approx. \$ 2,300). Shares are issued to the specific owner and, by statute, cannot be transferred without the prior consent of the shareholders' meeting (*vinkulierte Namensaktien*). They are not traded on the stock market. Second, by statute, *DSD* does not pay dividends. The same pricing scheme for the "green dot" applies to owners and non-owners. Also, owners do not enjoy any other economic privileges.

Given this background, the two questions can readily be answered. As *DSD* cannot pay dividends, any surplus must either be passed on by decreasing fees for the "green dot", or must remain within the firm as a reserve.¹⁷ Note that retained profits cannot be liquidated via a higher stock value, because the firms shares are not traded and new shares can always be acquired for their nominal value. In consequence, the formal discrimination of customers between owners and non-owners is not possible. However, informal discriminatory practices cannot be ruled out (e.g., one can imagine that shareholders of *DSD* belonging to the packaging and filling industries are treated more leniently with respect to overdue license fees). But since any firm is entitled to become an owner for a relatively small amount and thus claim equal treatment, the economic advantage of such practices will be restricted.

¹⁶ The focus here is on the cost-minimization objective. Whether the individual owner will have an incentive to take a free ride on the effort to monitor the management, and will therefore not mobilize adequate effort to ensure cost-minimization, is still another question, which will be discussed below.

¹⁷ Any surplus could also (partly) dissipate within the firm as a result of poor managerial performance. This point will be discussed in section 5.

Furthermore, given the large number of owner-firms, it seems reasonable to assume that the shareholder assembly is representative for the entire industry with respect to the packaging material used or produced. But in that case it is improbable that a group of firms using or producing high-cost packaging can outvote the other owner-firms in the shareholder assembly. As stock transfers are restricted and subject to the prior consent of the shareholders' majority, the takeover by such a group can be ruled out. Hence, these features work against the excessive cross-subsidization of high-cost packaging.¹⁸

It is not argued that cross-subsidization will be completely absent under these provisions. The price scheme and the resulting cross-subsidization between packaging materials will be the result of a complicated process of coalition formation between the shareholder groups producing or using specific packaging materials. A theoretical analysis by means of cooperative game theory is beyond the scope of this case study. Nevertheless, it can be concluded that, under the presented features, it is very improbable that a single group controls *DSD*, which puts a limit on the extent of cross-subsidization.

The history of the pricing scheme since *DSD*'s foundation gives empirical support. The first price scheme from 1992 did not differentiate between materials, but relied exclusively on weight and volume, thus subsidizing (light) plastic packaging. Upon intense discussion within *DSD*, the price scheme was modified in 1993 to differentiate between packaging materials (see also Michaelis 1998, 213). In general, the history of the *DSD* pricing scheme for the "green dot" is one of increased differentiation and material-specific price corrections, where high-cost materials (especially plastics) have been subject to several price increases.

While it thus seems improbable that *DSD*'s shareholder assembly is dominated by a material-specific fraction of owners, *DSD*'s owners may face the typical management control problem of companies whose shares are held by many small owners. As management control presumes costly information and monitoring activities, free-rider problems may become rampant under dispersed ownership. Hence, even while the struggle against material-specific cross-subsidization may also have a positive effect on the level of the license fees, the pressure for cost-minimization may be suboptimal under dispersed ownership, the more so when, like in *DSD*'s case, competition is absent from the outset. Then, rents may either accrue to the suppliers of waste management services, or to *DSD*'s management itself. The relationship between *DSD* and downstream firms will be analyzed now, while the problem of management control will be addressed in section 5.

4. *DSD* and Downstream Firms

It was the relationship between *DSD* and the waste-recovery firms that came under special criticism from the viewpoint of competition policy. Several features were identified as hampering competition:

¹⁸ As cross-subsidization leads to inefficiencies, this argument relates to Hart/Moore's 1996 result that members' cooperatives become less efficient under a more skewed distribution of members. However, their theoretical analysis cannot directly be applied to the present case, because they confine their attention to uniform pricing policies.

- First, waste-recovery firms were usually awarded long-term contracts, without having to regularly bid for new ones. Hence, competition between existing firms was said to be curbed, and the entry of more efficient firms, by inflicting waiting costs, may also be prevented.¹⁹
- Second, the waste-recovery industry has some degree of direct influence on *DSD*'s management. In 1993, shortly after its creation, *DSD* ran into a deep liquidity crisis, primarily provoked by a miscalculation of the then-valid pricing schedule, by consumers' participation that was much higher than expected, and by lax payment morale on the part of *DSD*'s customers. As a reaction, the overdue bills of the waste-recovery firms were converted into long-term debt, and three seats on *DSD*'s supervisory board (out of twelve) were reserved for representatives of this industry. However, no formal co-ownership exists (Flanderka 1998, 116). The initial plan to solve the liquidity crisis was to transform *DSD*'s debt with the waste-recovery firms into equity; specifically, one third of total shares. Realization of this project was prohibited by the German antitrust agency. Nevertheless, representation of the industry on *DSD*'s supervisory board is suspected to have anti-competitive effects.²⁰

It was especially the latter point which gave rise to the suspicion that *DSD* might actually be captured by the waste-recovery industry, which might use its influence to charge excessive prices (Michaelis 1998, 214) and, hence, generate monopoly-like welfare losses. This concern played a major role within the German debate. Nevertheless, its validity has to be questioned for two reasons:

- Under the solution now in place, in order to push through excessive prices, the industry's representatives would not only have to capture the majority on the supervisory board, but, moreover, get the associated policy accommodated by the shareholder assembly. The first point presupposes that the majority of shareholders regularly elects supervisors open to collusion; hence, considerations with respect to the personal integrity or reputation of a potential supervisor either do not play a role within his/her election or the assembly is systematically deceived. The second point presupposes that taking a free ride on the monitoring effort is a dominant strategy for each individual shareholder, such that control of the supervisors by the assembly is completely absent in equilibrium. Even while free-riding incentives exist, such scenarios are arguably rather improbable. As a result, control rights stemming from the industry's participation appear rather weak.
- *DSD* has a strong market position in large segments of the waste-recovery markets, and comes close to a demand monopoly in some segments. This is especially true in those segments in which recycling markets were almost non-existent prior to the German packaging waste regulation (plastics and composite materials).²¹ For other materials, recycling markets do not exclusively rely on packaging recycling; *DSD*'s market position may be less dominant here. But even for those materials, the introduction of the dual system led to a huge increase in the recycling volume; hence, *DSD* is still an important customer with respect to the requisite

¹⁹ Benzler et al. 1995, 59; Selmayr 1998, 101; Michaelis 1998, 216.

²⁰ Benzler et al. 1995, 61-2; Michaelis 1998, 214, 216.

²¹ Note that *DSD*'s market power can be expected to be more restricted in the future. The European packaging waste regulation, issued in 1994, requires member states of the European Union to meet specific recycling targets. Hence, German recyclers may have growing opportunities to find customers at the European level.

collecting and recycling activities. Also, *DSD* has a demand monopoly with respect to the sorting of plastics and composite packaging waste. For those segments, one should rather expect that *DSD* exercises market power over firms operating in these market segments (remember that *DSD* maintains contractual relations with over 500 waste-recovery firms operating at the regional level). In this sense, one may wonder whether the institutional features described above are not a means to mitigate the negative impacts of *DSD*'s market power.

The latter point can be spelled out in more detail with respect to an allocative distortion which is potentially very important in the case of *DSD*. Note that there are no technical reasons for waste-recovery services to be demanded by only one firm. This can readily be seen from the fact that substantial recycling markets did already exist for some materials prior to the packaging regulation and, hence, prior to *DSD*'s creation. Instead, as was argued above, it is the take-back obligation contained in the German waste management regulation which generates strong incentives to implement a single alternative system, and this obligation is thus the ultimate reason for *DSD*'s demand monopoly position.

As the regulation's time schedule was tight with respect to the deadlines for meeting the recycling quota by the dual system, and as recovery capacities for some materials had to be built up virtually from scratch, it was especially important for *DSD* to generate appropriate investment incentives. In this respect, the take-back obligation, by the subsequent emergence of a single alternative system, had a crucial consequence: *it politically transformed market-specific investments into transaction-specific ones*. But it is well known that a contractual relationship in which relationship-specific assets are built up will suffer from opportunistic behavior *ex post*, which will prevent efficient investment decisions *ex ante* (Klein et al 1978, Williamson 1979). In the present context, this means that *DSD* could hold up waste-recovery firms after they had made investments specific to their relationship with *DSD*, and force renegotiations whereby gains from trade are divided more in favor of *DSD*. This threat, in turn, would lead to suboptimal investments into recycling and recovery capacities at a moment when they were of utmost importance. Viewed from this angle, the allegedly anti-competitive features mentioned above can readily be interpreted as attempts to mitigate this hold-up problem and subsequent under-investment.

Long-term Contracts and Hold-up. It is well known that the periodical re-auctioning of contracts may actually impede efficient investment behavior by the incumbent firm when investments are transaction-specific. While a long-term contract avoids re-auctioning, this advantage is a limited one when the contract is necessarily incomplete and, hence, open to renegotiations (Williamson 1976, 79-90). *DSD*'s relationship with the waste-recovery firms fits the incomplete-contract framework especially well. First, in the markets that were newly-created by the regulation, both sides lacked experience, which increased the probability that mutually beneficial contractual modifications could be made during the learning process. Second, as the packaging regulation itself was highly innovative from the viewpoint of the regulator, it was foreseeable that regulatory corrections would occur. Indeed, the Packaging Ordinance has been amended twice since 1990. Such changes in the legal framework, however, cannot be covered *ex ante* by contractual stipulations and will therefore often imply contractual modifications.

As a consequence, from the outset of the relationship, contracts stipulated explicit renegotiation clauses. For instance, the contracts concluded by *DSD* with firms collecting and sorting packaging waste have been renegotiated four times since 1990. Hence, one could conclude that asset-specificities are not adequately protected by these contracts: in contractual renegotiations, *DSD* could hold-up an individual firm by threatening to end the relationship. However, a closer inspection of the contractual relationship and the re-negotiations at least qualifies this conclusion.

The contractual relationship between *DSD* and collection and sorting firms is constituted on two levels. First, there is a general agreement (*Rahmenvertrag*) negotiated between *DSD* and representatives of the waste-recovery industry's association (*Bundesverband der deutschen Entsorgungswirtschaft*). At this level, one may speak of collective bargaining between the firms producing and using packaging (represented by *DSD*) and firms collecting and sorting packaging waste (represented by their branch association). This general agreement covers general aspects of the waste collection service, especially those that are relevant for meeting the legal requirements of blanket coverage and user-friendliness. They also contain automatic price adjustments upon cost increases and the aforementioned renegotiation clauses. At the second level, agreement is reached on material-specific prices between *DSD* and individual firms in a specification of the general agreement.

Contractual renegotiations took place on the first level and particularly concerned the introduction of (more and more) sophisticated price schemes. For instance, prices were differentiated according to the population density in a region, because the parties realized that the political requirement of consumer-friendliness is more expensive to achieve in sparsely populated regions. Importantly, this differentiation was achieved by stipulating differentiated rate adjustments based on the respective price the individual firm had agreed on with *DSD*. This price, however, was not affected by the renegotiations.

In principle, *DSD* could also appropriate rents via the rate adjustments negotiated with the industry's representatives. However, the potential of a hold-up is much weaker at the collective-bargaining level, because a threat to end the relationship with the entire industry is less credible than a threat to end the relationship with an individual firm in this industry. As a consequence, this two-level construction of the contractual relationship, despite renegotiations, defuses the hold-up problem and, hence, contributes to efficient investment decisions.

Long-term Contracts and Entry Deterrence. It may be wondered whether the long-term contracts between *DSD* and the incumbent waste-recovery firms prevent the entry of more cost-efficient waste-recovery firms, in the spirit of Aghion/Bolton (1987). In their model, both the buyer and the incumbent seller can extract some of the entrant's rent by stipulating specific damages to be paid for breach of contract. When the buyer commits to a high damage level, its reservation price for the entrant's product is lowered, and the entrant has to lower its price in order to sell its product.²² In equilibrium, the probability of entry, albeit positive, will be inefficiently low.

A crucial assumption of this theoretical framework is that the incumbent seller commits himself not to deal with the entrant. Unless the entrant possesses all the bargaining power, the

²² While the commitment power of such a provision may be lost when renegotiations are possible (Masten/Snyder 1989), the introduction of relationship-specific investments restores Aghion/Bolton's result (Spier/Whinston 1995); hence, the theoretical framework can be applied to the present case.

seller, by way of a subcontract, can reap part of the efficiency gains to be realized by an entrant with lower costs. Thus, the incentive to agree with the buyer on high stipulated damages will be lower, and the likelihood of entry closer to the social optimum (Masten/Snyder 1989, 71). It is for this reason that the negative impact of long-term contracts – via entry deterrence – will be restricted in the present case. Right from the outset of the relationship between *DSD* and the waste-recovery industry, subcontracting between waste-recovery firms was explicitly allowed in the general agreement; the corresponding provision was never the subject of renegotiations.

Information Rights. Given the potential for hold-up because of relation-specific investments, the fact that the waste-recovery industry is represented on *DSD*'s management and supervisory boards may also improve the industry's bargaining position in regard to renegotiation of the general agreement, especially with respect to information privately held by *DSD*'s management. In this sense, representation amounts to information rights.²³ Industry representation within *DSD*'s internal governance structure will serve as a check on *DSD*'s management to realize informational rents within bargaining. This co-integration of different market sides will also play a role in the next section.

In conclusion, characteristics of the relationship between *DSD* and the waste-recovery firms that were traditionally interpreted in the German discussion as being anti-competitive, have their economic merits in protecting relationship-specific investments. To generate appropriate investment incentives is a problem of special significance in this case, because the packaging waste regulation required the build-up of huge collection, sorting and recycling capacities within a short timeframe. However, it is not argued that the mechanism of collective bargaining and the design of *DSD*'s governance structure described above perform as efficiently as a hypothetical structure in competitive markets. For instance, both features involve the typical delegation problem of controlling the industry's representatives. As these representatives are, typically, managers of specific waste-recovery firms, they may possess incentives to not protect the "collective" interest of the industry they represent, but to collude with *DSD* in exchange for privileged treatment of their own firms. Were this the case, competition between waste-recovery firms would clearly be hampered.

5. Controlling *DSD*'s Managers

Remember from part 3 that, as *DSD* is owned by many firms with equal shares, its owners face a problem of management control because incentives exist to take a free ride on monitoring effort. This typical control problem of shareholder companies with dispersed ownership is even more important in the case of *DSD*, where the disciplining effects of competition and of takeover threats on the management's performance is absent, the latter on account of the shares' design.

²³ Note that this argument does not rely on the theoretical analyses of the hold-up problem by Grossman/Hart (1986) and Hart/Moore (1988), where control rights are allocated via ownership. In general, their theoretical framework does not easily carry over to the present setting where a long-term contract initially exists which remains valid when renegotiations fail. Then, it is not clear that vertical integration dominates non-integration even when assets are strictly complementary, because they retain economic value when renegotiations break down. See Hart (1995), 49.

Consider the management task of assuring prompt payment by customers. Under *DSD*'s special construction, where its owners are simultaneously customers, incentives to control manager performance in this respect are especially weak. An individual shareholder belonging to the packaging and filling industries not only possesses the usual incentive to take a free ride on monitoring effort. It may actually profit by the managers' poor performance by delayed payment of its bill for use of the "green dot", which yields an additional incentive to keep silent and not engage in controlling activities. Viewed from this angle, it is not surprising that *DSD*'s liquidity crisis in 1992 was also provoked by overdue customer bills. Moreover, *DSD*'s managers may find it more difficult to urge customers to pay their bills when these are also owners and thus have better opportunities to punish the managers, than when they are not. This feature generates pressure to informally discriminate between owners and non-owners.

In contrast with the upstream firms of the packaging and filling industries, waste-recovery firms have both an individual and a collective interest in *DSD*'s financial liquidity and, hence, will have bigger incentives to control *DSD*'s management performance in this respect. This presupposes, of course, that these industries possess control rights. But, as part of the agreement to solve the liquidity crisis, they were entitled to appoint their own representatives to *DSD*'s supervisory board, representatives whom they have the right to control by definition. Beyond control of an installed supervisor, they may also choose persons who are more independent of *DSD*-owning packaging and filling firms, e.g., with respect to their career plans. Such persons will be less inclined to yield to pressure from owners to obtain preferential treatment with respect to payment schedules. In consequence, the presence of such a representative from these industries on *DSD*'s board may improve its performance in this respect.

Were liquidity the only performance indicator, giving the waste recovery industry control rights could also lead the management to overcharge *DSD*'s customers and maintain excess liquidity. However, even while waste recovery firms control their representatives, control rights are also restricted to the representatives and do not extend to the other supervisors or to the executive management. As excess liquidity can easily be detected (at least when exceeding a specific level), these other supervisors, under the threat of punishment by the owners of *DSD*, will not accommodate such a policy.

Clearly, good management performance amounts to more than assuring prompt payment of bills. Hence, one may wonder whether an extension of control rights may not enable improvements in general management performance. Indeed, the idea that beneficial effects on managerial performance are the result of giving control to principals with different objectives, is confirmed by a recent theoretical analysis from Berkovitch/Israel (1996), which shall be summarized now in brief. To understand the following reasoning, it is important to remember that the waste-recovery industry is also *DSD*'s long-term debtor: *DSD*'s liquidity crisis was solved by converting the overdue bills of the waste-recovery firms into debt.

In Berkovitch/Israel's model, security holders decide whether or not to replace a manager after observing his performance for a specific period of time. The performance indicator is a noisy signal about the manager's unknown quality. On the one hand, the decision to replace him determines the future manager's relative quality. The replacement rule maximizing expected manager quality *ex post*, after observing the signal, is to replace a manager whose quality is below the average of

alternative managers, and to retain an above-average manager. However, the replacement rule also affects the effort of the present manager. In consequence, the replacement rule maximizing expected manager quality is not efficient *ex ante*, which generates a problem of credible commitment in regard to the optimal replacement policy. Berkovitch/Israel argue that this commitment problem can be solved by a specific capital structure. Their argument is that replacing the manager will affect the riskiness of future performance, about which security holders will have different attitudes. Specifically, additional uncertainty will benefit residual claimholders (shareholders) at the expense of fixed claimholders (debtors) because of the different shapes of their payoff functions. When replacement of a manager increases the riskiness of the cash flow, shareholders will be more aggressive in replacing him than debtors. In consequence, a firm's capital structure influences the replacement policy. Specifically, the capital structure implementing the optimal replacement rule may be to give shareholders control, but give debtors veto power over their decision (Berkovitch/Israel 1996, 222).

Notwithstanding the general *caveat* with respect to the applicability of theoretical, model-driven results to empirical cases, it is worth noting that this latter constellation would correspond to an extension of the control rights of long-term debtors, that is, of the waste-recovery industry, within *DSD*'s governance structure. As the optimal capital structure crucially hinges on parameter specifications within the model, it is not argued that such an extension should indeed take place. The point to be made here is more general; namely, to show that the special features of *DSD*'s governance structure also have their economic merits. Hence, to derive overall welfare decreases from these features by exclusively pointing to their potentially anti-competitive effects means jumping to conclusions too quickly.

6. The Role of the Regulatory Threat

The present study so far showed that institutional features of *DSD*'s ownership structure serve as checks against the use of market power or against the emergence of discrimination with respect to upstream firms. Furthermore, it argued that specific institutional and contractual arrangements, traditionally interpreted as being anti-competitive, serve to protect relationship-specific investments and to improve managerial performance, aspects that have so far been neglected in the German debate.

Note, however, that both the problem of asset-specificities and that of management control were shown to be derived from centralization in the first place. It was the centralized arrangement that transformed market-specific investments by the waste-recovery firms into relation-specific ones. Also, management control problems were argued to be especially severe under *DSD*'s dispersed ownership, where owners are also customers and the disciplining effects of market competition and takeover threats is absent. Hence, the paper did not argue that the German solution performs as well as a hypothetical competitive environment. Interestingly, centralization under the voluntary solution was shown to be the necessary consequence of the take-back obligation, which, as a result of the German "product responsibility" principle, relies on individual firms' performance and thus, at a first glance, rather seems to be a decentralized approach. Hence, any criticism from an

antitrust viewpoint should not address the system now in place, but the regulator's design of the legislative threat underlying *DSD*'s foundation.

The crucial question for environmental policy is whether the policy targets stated in the legislation could exclusively be achieved by such a design, that is, by a regulatory threat involving the individual take-back obligation, and the subsequent centralized arrangement. If this were the case, policy-makers would face a trade-off between environmental and antitrust policy objectives. They would have to decide whether or not the attainment of the environmental policy goal is worth the allocative distortions stemming from reduced competition.

The formulation of the European Union's 1994 Packaging Waste Guideline and the subsequent adoption by Great Britain is very instructive in this respect, because it gives rise to skepticism whether the above description of the policy-makers' decision-problem is correct. Remember that the German regulation – implemented as a result of a political bargaining process under the threat of the take-back obligation – sets the aggregate policy targets in the form of material-specific recycling quotas. A similar approach was chosen by the Union's Guideline, with the crucial difference, however, that take-back obligations do not play a role in this regulation. In contrast, considerable leeway is given to the member states which instruments they use to meet the quantitative requirements of the Guideline. Take-back obligations were part of the first drafts, but were dropped later (Haverland 1999, 197).

To adopt the Guideline, Great Britain issued, in 1997, the *Producer Responsibility Obligations (Packaging Waste) Regulations* (see Bastians (forthcoming), DoE 1997, Haverland 1999, 215-17).²⁴ In contrast to Germany, single producers do not have to take back their "own" packaging waste: the underlying rationale is one of "producer responsibility" and not of "product responsibility". Under the British system, every firm is allocated a specific obligation to recover packaging waste: a calculated contingent for each packaging material, based on the volume it brought into circulation. All material-specific contingents on the firm level add up to the aggregate policy target for this material.

Importantly, firms are free on how to discharge their responsibility. They can collect packaging waste themselves and conclude individual contracts with recyclers, or can participate in so-called compliance schemes, which organize collection and recycling. Proof of discharged responsibilities is furnished by a written confirmation issued by recyclers.

The individual obligations amount to quotas that are even firm-specific and, hence, would give rise to additional inefficiencies. To mitigate these inefficiencies, these confirmations, so-called packaging recovery notes, are tradable. Hence, as a third possibility, firms can also simply purchase these recovery notes in order to discharge their responsibility.

As the link between the individual producer and its "own" packaging waste is cut in the British system, a more competitive market structure results from this alternative arrangement: today, there are 18 compliance schemes. In addition, 20% of all firms affected by the regulation (approximately 4000) have chosen to take an individual course (DoE 1998). Because of possible concentration processes, it may be premature to draw definitive conclusions with respect to competitiveness. Still, these figures underline the theoretical reasoning that it was the take-back obligation that gave rise to the heavily centralized German solution. Despite the positive repercussions of *DSD*'s governance

²⁴ Bastians provides a thorough comparison of the German and the British systems from a legal perspective.

structure and of its contractual relations that were derived in sections three to five, the comparison with the British system leads to a skeptical overall judgement with respect to the German solution: it suggests that the German regulator could have met the quantitative policy targets without giving rise to a single private system.

7. Conclusions

Beyond the assessment of the German waste management system, two general lessons can be learnt from the study. First, the institutional fine-tuning of a voluntary agreement has substantial, and not necessarily negative, implications for antitrust and competition policy; implications which can be fruitfully studied with the tools of new institutional economics. This lesson is all the more important in cases where voluntary agreements give birth to sophisticated structures of self-governance between the participating firms. Second, the design of the regulatory threat is of crucial importance for the degree of centralization of the private institutions that come into being, possibly as the result of negotiations. When intended regulation commits industry to use specific instruments (like in the German case), a voluntary agreement may result that involves the cooperation of whole industries in a centralized institution. When such a commitment is absent (like in Great Britain), more decentralized institutions (compliance schemes) acting in a competitive environment may emerge.

Given the superiority of the British system with respect to market competition, one may wonder how the design of the German solution can be explained. Clearly, a lack of institutional imagination is a possible explanation. Also, given the fact that British regulators were able to learn from the shortcomings of the German system, it could be argued that the German regulation suffered from first-mover disadvantages. However, one may also wonder whether traditions in political style had an influence. After all, the case of *DSD* is a good example of the cooperative relationship between public authorities and organized industrial interests, prominent in the German regulatory landscape even well before the emergence of voluntary agreements in environmental policy. Hence, the question arises whether Germany's corporatist tradition framed the institutional solution to be found in waste management policy.

To seriously address this positive question is beyond the scope of the paper.²⁵ A normative policy conclusion can, however, be drawn with respect to the role of advocates of market competition (like competition and antitrust authorities) during the formulation and implementation of environmental policy. The conclusion concerns the point of time chosen for the involvement of these authorities. The analysis made clear that it may be too late to raise competition policy issues only upon implementation of a voluntary agreement, when the involved private actors look for an appropriate institutional fine-tuning. This is so, because the design of the regulatory threat will influence whether centralized solutions in the form of voluntary agreements will become an issue in the first place. As voluntary agreements are becoming an increasingly attractive regulatory means, a stronger involvement of competition advocates during the earlier stages of the political process, when the regulatory threat is designed, is desirable.

²⁵ See Haverland (1999, 147-64) for a discussion. With respect to cooperative decision-making, see especially 157-60.

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