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## Private institutions in waste management policy and their antitrust implications: The case of Germany's dual management system

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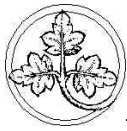
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# Private Institutions in Waste Management Policy and Their Antitrust Implications

The Case of Germany's Dual Management System

Markus Lehmann

November 1999

# **Private Institutions in Waste Management Policy and Their Antitrust Implications**

## **The Case of Germany's Dual Management System**

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### **Abstract**

The paper reconsiders arguments raised from the viewpoint of competition policy against Germany's centralized Dual Management System for Packaging Waste Collection and Recycling. It is argued that centralization is the result of a basic principle of German waste management policy, namely, the so-called taking-back obligation. Specific features of the system's governance structure are then shown to mitigate anticompetitive effects stemming from centralization, and to improve management performance. Furthermore, other features identified in the debate as hampering competition are argued as having an economic rationale from the viewpoint of the neoinstitutional theory of the firm. However, it is also argued that the above basic principle is not a precondition to reach policy targets. Hence, despite the above positive findings, the ultimate judgement with respect to this centralized, private structure is mixed.

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## 1. Introduction

In recent years, arrangements between regulatory authorities and industry 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 EC 1996 and Lyon/Maxwell 1999 for overviews). Two features of these alternative policy instruments are crucial. 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 legislative threats: affected firms may wish to avoid harsher regulation via legislation (Segerson/Miceli 1998, 110). Secondly, it is typically left to industry itself to implement aggregate policy goals stipulated in the arrangement and to solve subsequent coordination and free-riding problems. 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 heavy 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. While political targets are specified for such a system (and hence, also for *DSD*<sup>1</sup>), its institutional fine-tuning is 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 reconsiders these concerns by referring both to old insights into, as well as to recent contributions to, the economic theory of the firm. The analysis starts by showing that the emergence of a single dual system is the result of the basic principles underlying German waste management policy. Hence, any criticism from an antitrust

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<sup>1</sup> 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.

viewpoint should not address the system now in place, but the regulator's design of the legislative threat underlying *DSD*'s foundation. It argues then 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. 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.<sup>2</sup> This observation is confirmed in the case of the German packaging waste management system. However, it is not argued that this centralized institutional solution can achieve the same degree of efficiency as a competitive environment. From the viewpoint of competition policy, the relevant question is whether the specific design of the legislative threat was necessary to implement the aggregate environmental policy targets stipulated in the waste management legislation.

The paper proceeds as follows. Part 2 will spell out in greater detail the legal framework and the institutional structure of *DSD*. It also derives the necessity of a single institutional structure from the taking-back obligation prominent in German waste management policy and presents the criticisms from an antitrust viewpoint. Part 3 addresses *DSD*'s role with respect to upstream firms (especially the packaging and filling industries), whereas part 4 considers *DSD*'s role with respect to the waste-recovery industry. Part 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 have beneficial effects with respect to management control. Part 6 summarizes and elaborates on the question posed above, i.e., whether centralization was necessary to implement the environmental policy objective.

## 2. Institutional Structure and Antitrust Criticism

**Product Responsibility.** 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*<sup>3</sup>). In packaging waste regulation, this principle 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.<sup>4</sup>

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

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

<sup>4</sup> See §§ 4-6 Verpackungsverordnung (VerpackV), the German Packaging Waste Ordinance.

**DSD.** As a reaction to heavy political resistance against this planned regulation, the authorities agreed to not apply the compulsory requirement to take back packaging to firms participating in a private collection system of packaging waste which attains blanket coverage (“*flächendeckend*”) and is easily to be used by the single consumer (“*verbrauchernah*”). The policy targets, that is, aggregate, material-specific quota for waste collection and recycling, are also to be met by such systems.<sup>5</sup> However, the regulation remains 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 taking-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 title *Duales System Deutschland*. It is organized as a private company and started operations in 1992. Basically, *DSD* pools the individual taking-back obligations of the participating firms and provides for a financing mechanism. Participating firms of the packaging and filling industries (approximately 19,000) have 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 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 concludes contracts with regionally-operating firms which collect packaging waste, sort it by material<sup>6</sup> and, typically, deliver it to specialized recycling firms.<sup>7</sup> 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. As will be argued in the next paragraph, the explanation of this feature lies in a political generation of decreasing average costs.

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<sup>5</sup> For instance, the recent amendment to the Packaging Waste Ordinance prescribes recycling quota between 60% and 75%, depending on the material (glass, paper, aluminum, steel, plastics, composites). See Flanderka (1999, 182).

<sup>6</sup> For most materials, used packaging is collected in material-specific bins. Plastics and composites are collected together and sorted afterwards.

<sup>7</sup> 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.

**Antitrust Concerns.** The key to understanding the system's uniqueness is the underlying basic principle of German waste management policy that obliges individual firms to take back the products they have brought into circulation. This rule, which also plays a prominent role in other areas of waste management policy,<sup>8</sup> links the individual firm to its "own" packaging waste. 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 taking-back requirement would have led to high handling costs, especially at the retail level. This is why the planned regulation was so 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 sale contracts. If the linkage of the individual firm to its "own" products is to be taken as a political fact, the only viable way for producers and sellers to save handling costs is then to pool taking-back requirements in a common collection system, whose financing is assured by a specific cost-sharing rule.

In the German discussion, the above-mentioned requirement of blanket coverage was often identified as being an important impediment to a more competitive structure (see, e.g., Benzler 1995, 59). Any system of packaging waste recovery must at least be accessible for consumers on the entire area of a German federal state (*Bundesland*). Given that collecting systems have cost-characteristics of a regional natural monopoly, such a requirement clearly generates strong pressure for a unified system at least on the level of a federal state. Moreover, geographical market segmentation, when existing in the first place, is not identical across products and does surely not occur along the frontiers of the federal states, which explains the emergence of a single system on the entire national territory.

Note that the blanket coverage requirement puts an additional and superfluous restriction on potential waste recovery systems. As any system has to meet the recycling quota of its member-firms in the first place, such a requirement is not a precondition to meet the underlying political targets of packaging waste recovery and recycling. However, because cross-product regional market segmentation is improbable, abolishment of the blanket coverage requirement would not automatically lead to multiple systems. Under the auspices of the taking-back obligation, firms operating at the interregional level would then have to enter into contractual relations with several regionally-operating system suppliers. In consequence, the single firm would either have to reveal to each system the packaging quantities and materials it delivered to the region covered by this system. Alternatively, each system would have to assign collected packaging waste to single producers. Both solutions would imply costly

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<sup>8</sup> For instance, several ordinances now under implementation require the taking back of used cars and of used electronic appliances by their respective producers.

problems of accountancy and contract design. Hence, abolishment of the blanket coverage requirement would rather the DSD lead to minimize overcompliance by retreating from sparsely-populated regions, but would not lead to additional system suppliers. Abolishment of the blanket coverage requirement is a necessary, but not a sufficient condition to generate multiple systems of packaging waste recovery.

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, have nevertheless to rely on *DSD*'s services?<sup>9</sup>
- 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.<sup>10</sup>

Note that these criticisms, from an efficiency viewpoint, translate into the questions to what extent *DSD*'s objectives are different from minimizing the costs of complying with the overall policy targets,<sup>11</sup> and who reaps the subsequent rents.

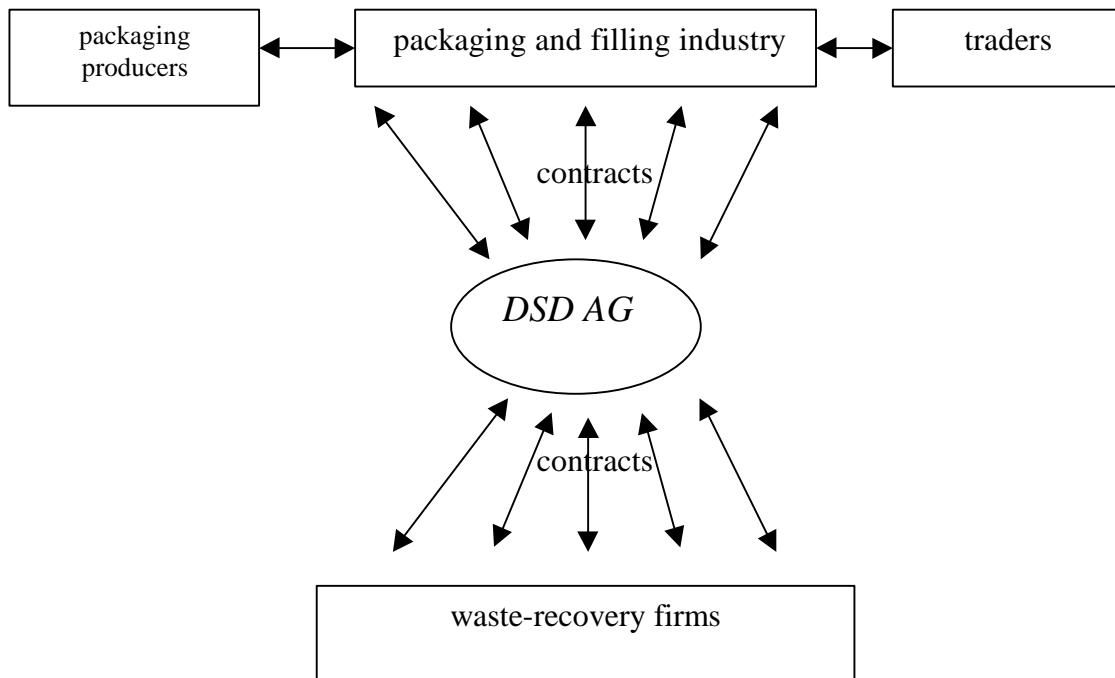
The following two parts will explore these questions by analyzing in greater detail *DSD*'s ownership structure and the contractual arrangements it has concluded with upstream firms in the packaging and filling industries and with downstream firms in the collection and recycling branches. The part that subsequently follows will focus on the impact of *DSD*'s ownership structure on management incentives. In doing so, it focuses on an aspect neglected so far 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.*"

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<sup>9</sup> Selmayr 1998, 100; Thomé-Kozmiensky 1994, 106ff.; Sagia 1996, 423, 426, 429f, 437f.

<sup>10</sup> See the literature in footnotes 15 and 16.

<sup>11</sup> 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.



**Fig. 1: Stylized Structure of the German Dual System**

### 3. *DSD* and Upstream Firms

Remember that *DSD* was founded as a joint enterprise by firms in the packaging and filling industries, by several trading companies and by packaging-producers. Note that, while only firms of the packaging and filling industries pay license fees for the "green dot", all firms possessing an ownership stake in *DSD* have similar objectives to minimize the amount of fees paid, because they are at least partially passed on. However, collection and recycling costs are, to a large extent, material-specific. In this respect, trading companies have less an incentive to prevent the cross-subsidization of high-cost packaging within *DSD*'s pricing scheme for the "green dot". Hence, two questions arise from the ownership structure:

- Given that most firms in the packaging and filling industries are not co-owners of *DSD*, do institutional mechanisms exist that prevent formal or informal discrimination between customers that are co-owners and customers that are not?
- To what extent can *DSD*'s pricing policy be influenced by a special-interest fraction of owners, e.g., by users and producers of high-cost packaging? Are there mechanisms that prevent the usurping of *DSD* by such a fraction and subsequent cross-subsidizations of high-cost packaging, or by trading companies that have less of an incentive to prevent cross-subsidization?

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.<sup>12</sup> First, upon agreement of the majority of 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. \$ 2,850). 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.<sup>13</sup> 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 may imagine that shareholders of *DSD* belonging to the packaging and filling industries are treated more leniently with respect to overdue license fees). However, 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.
- 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<sup>14</sup>. But then, it is improbable that a coalition 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 accumulation of shares by a single company or by a specific coalition of firms can be ruled out. The same, of course, holds true for a takeover by trading companies.

With respect to the latter point, the history of the pricing scheme since *DSD*'s foundation is quite instructive. 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. In general, the history of the *DSD* pricing scheme for the "green dot" is one of increased differentiation and material-

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<sup>12</sup> The following analysis is an informal application of the reasoning in Hart/Moore 1996.

<sup>13</sup> Any surplus could also (partly) dissipate within the firm as a result of poor managerial performance. This point will be discussed in part 5.

<sup>14</sup> Unfortunately, there is no disaggregated data relating to *DSD*'s ownership structure in this respect.

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 coalition, *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. This problem of management control will be addressed in part 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:

- First, 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.<sup>15</sup>
- Second, the waste-recovery industry has some 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) are 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 at 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 boards is suspected to have anti-competitive effects.<sup>16</sup>

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 triangle welfare losses. This concern played a major role within the German debate. Nevertheless, its validity has to be questioned for two reasons:

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<sup>15</sup> Benzler et al. 1995, 59; Selmayr 1998, 101; Michaelis 1998, 216.

<sup>16</sup> Benzler et al. 1995, 61-2; Michaelis 1998, 214, 216.

- Under the solution now in place, in order to push through excessive prices, the industry's representatives would have to outvote the huge majority in the management and supervisory boards and, moreover, get the associated policy accommodated by the shareholder assembly. Given the improbability of such a scenario, control rights stemming from the industry's participation appear rather weak. One may suspect that the industry's participation is primarily for monitoring and control purposes.
- *DSD* has a strong market position in for large segments of 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).<sup>17</sup> For other materials, recycling markets do not exclusively rely on packaging recycling; here, *DSD*'s market position may be less dominant. 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 necessary 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. 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, rather than creating allocative distortions in the first place.

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 obligation to take back packaging waste 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 taking-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 where relationship-specific assets are built up will suffer from opportunistic behavior *ex post*, which will prevent efficient

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<sup>17</sup> 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 from member-states of the European Union to meet specific recycling targets. Hence, German recyclers may have rising opportunities to find customers at the European level.

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 where gains from trade are divided more in favor of *DSD*. 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 long-term contracts, in principle, can protect asset specificities, and that the periodical re-auctioning of contracts may actually impede efficient investment behavior by the incumbent firm when investments are transaction-specific (Williamson 1976). This function of long-term contracts, however, is limited when they are necessarily incomplete and, hence, open to renegotiation. *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 increases the probability that mutually-beneficial contractual modifications can 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 was 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, material-specific prices are agreed on between *DSD* and the 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 waste-recovery firms prevent the entry of more cost-efficient rivals, in the spirit of Aghion/Bolton (1987). In their model, both the seller and the buyer 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 the price to sell its product<sup>18</sup>. In equilibrium, the probability of entry, albeit positive, will be inefficiently low.

A crucial assumption of this theoretical framework is that the seller commits himself not to deal with the entrant. Unless the entrant possesses all the bargaining power, the 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 was explicitly allowed in the general agreement; the corresponding provision was never subject to renegotiations.

**Control 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, the representation

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<sup>18</sup> 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.

amounts to information rights.<sup>19</sup> Industry representation within *DSD*'s internal governance structure will serve as a check on *DSD*'s management to realize informational rents. This co-integration of different market sides will also play a role in the next part.

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 would clearly be hampered.

## 5. Controlling *DSD*'s Managers

Remember from part 3 that, as *DSD* is owned by many firms with equal shares, owners face a problem of management control because strong 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 competitors do not exist and the disciplining effect of a takeover threat on the management's performance is also absent on account of the shares' design.

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

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<sup>19</sup> 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. Their theoretical framework does not easily carry over to the present setting where a long-term contract exists in the first place, 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.

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 and 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 from *DSD*-owning packaging and filling firms, e.g., with respect to their career plans. Such a person will be less inclined to yield to pressure from owners to get 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 overcharging *DSD*'s customers and maintaining 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 directors or to the executive management. As excess liquidity can easily be detected (at least when exceeding a specific level), these other directors, under the threat of being punished by the *DSD*'s owners, will not accommodate such a policy.

Clearly, good management performance is more than assuring prompt payment of the bills. Hence, one may wonder whether an extension of control rights may not enable improvements of 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). In their model, security holders decide whether or not to replace a manager after observing his performance for a specific period of time. Cash flow during this period is the performance indicator; it 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 cash flow, 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 shareholders. 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 debtors should be given 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 long-term debtors' control rights within *DSD*'s governance structure. As this capital structure crucially hinges on parameter specifications within the model, it is not argued that such an extension should 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. Conclusions: Competition and Environmental Policy

The present study reiterated the arguments put forward against the centralized institutional solution to the German packaging waste regulation. It 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 which have so far been neglected in the German debate.

Note, however, that both problems of asset-specificities and 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. Hence, the paper did not argue that the German solution performs as well as a hypothetical competitive environment. Interestingly, centralization was shown to be the necessary consequence of the so-called taking-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. The crucial question for environmental policy is whether the objectives stated in the legislation could exclusively be achieved by the taking-back obligation and the subsequent centralized

arrangement. In this respect, recent experiences from Great Britain give rise to scepticism.

Remember that aggregate policy targets of the German regulation are formulated in the form of material-specific recycling quotas. A similar approach was chosen by the European Union's 1994 Packaging Waste Guideline, which every member state must adopt. Here, the British regulation issued in 1997 is especially interesting (see Bastians (forthcoming), DoE 1997).<sup>20</sup> 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, based on the packaging material and volume it brought into circulation. 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. To mitigate the additional inefficiencies that will arise from these individual obligations, that is, from quotas that are even firm-specific, these confirmations, so-called packaging recovery notes, are tradable. Hence, firms can also simply purchase these recovery notes in order to discharge their responsibility.

Presently, a more competitive market structure results from this alternative arrangement: to-day, there are 18 compliance schemes, and, in addition, 20% of all firms affected by the regulation (approximately 4000) have chosen to take the 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 presented here.

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, *DSD* is a good example of a corporatist solution so prominent in the German political landscape, even well before the emergence of voluntary agreements in environmental policy. Hence, the question arises whether Germany's corporatist tradition framed the institutional solutions to be found in waste management policy. To seriously address this question, however, is beyond the scope of this paper.

Despite the positive repercussions of DSD's governance structure and of its contractual relations for market competition, the comparison with the British system leads to a somewhat skeptical judgement with respect to the German solution. The more

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<sup>20</sup> Bastians provides a thorough comparison of the German and the British systems from a legal perspective.

general lesson to be learnt from the study, however, it that the institutional fine-tuning of a voluntary agreement has substantial, and not necessarily negative, implications for antitrust and competition policy, which can be fruitfully studied with the tools of new institutional economics. This lesson is all the more important in the cases where voluntary agreements give birth to sophisticated structures of self-governance between the participating firms.

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