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## **Mandatory deposits for non refillable beverage containers: Are they fixing the externalities? The German case.**

*The bottle bill began as an antilitter measure but became a hallmark of the recycling revolution. Expanding it now makes good environmental and fiscal sense.*

Editorial, March 11, 2003  
The Boston Globe

### I. Abstract

Mandatory deposits for beverage containers are considered in the light of externalities. It is found that in a completely unregulated market they can help to reduce externalities. In a close look at the properties of the German mandatory deposit law, we find that instead of living up to the theoretical possibilities it increases externalities – thus causing a government imposed non market failure.

### II. Introduction

Effective January 1, 2003 the so called *Dosenpfand* (mandatory deposit for non refillable containers for beverages) has been introduced in Germany. Since that a deposit of 0.25€ (0.30 US\$) per container has to be paid when purchasing beverages in non refillable containers. On returning the containers the deposit is handed back to the consumer.

In this paper we will talk about three types of beverage containers according to the definition of the German deposit law: 1. *Mehrweggetränkeverpackungen* are containers for beverages that are used several times. This means, having been used they are returned to producers of beverages, cleaned and refilled. Usually these bottles are standardized so that e.g. a beer bottle from a brewery in north Germany that is consumed in the south will not be sent to north Germany but will be refilled in a local south German brewery. These types of containers will henceforth be called refillable containers. On these containers a deposit has always been applied in Germany. This deposit was not established by law but voluntarily by the beverage industry. 2. *Ökologisch nicht vorteilhafte Einweggetränkeverpackungen* are containers for beverages that are only used

one time and that have been declared environmentally disadvantageous by studies by the *Bundesumweltamt* (Federal Office for the Environment). The mandatory deposit applies to this group of containers that include e.g. cans and single-use bottles. This group of containers will be called non refillable containers. 3. *Ökologisch vorteilhafte Einweggetränkerverpackungen* are containers for beverages that are only used one time but have been declared environmentally advantageous by the *Bundesumweltamt*. This type of container includes polyethylene tube bags (e.g. for milk) and beverage cardboard box containers (e.g. juice). They are not subject to the mandatory deposit. These containers will be called advantageous non refillable containers (ANC).

According to §4 of the German recycling law (*VerpackV*) anyone who sells any product to the consumer must take all packaging of the product back and must recycle it if recycling is possible. This obligation can be waived if the retailer participates in a system assuring nationwide recycling of the packaging sold in his store. The industry implemented such a system in the form of a joint stock company, the *Duales System Deutschland* (DSD). The DSD is a non profit monopoly (DSD, 2002). All companies participating in this system pay a certain amount per unit of packaging to the DSD which picks up packaging at every household in Germany. If a company does not want to participate it has still the choice to take back all packaging at its stores – or to set up a nationwide system itself. The DSD allows all participating companies to print its symbol *Der Grüne Punkt* (the green point) on their packaging so that consumers can identify which products are recycled by the DSD. Before the mandatory deposit came into force non refillable containers were recycled by the DSD.

The aim of the German mandatory deposit law is to reduce the use of non refillable containers and thus to foster the use of refillable containers and ANCs. A second but less important goal is to avoid that containers are thrown into the environment. It is not the intent of the mandatory deposit to promote recycling as a well functioning recycling system – the DSD – was already in place before the law became applicable.

- III. Can a deposit law theoretically reduce the externalities of the usage of non refillable beverage containers?


In a completely unregulated market there are likely to be externalities from the use of non refillable containers. Assuming that consumers prefer not buying refillable containers - because the private cost of collecting, sorting and returning them is higher than the price advantage of beverages in refillable containers (Crittenden, 2003) - certain externalities may arise from this behavior. Customers e.g. are unlikely to take the full cost to society of cleaning up for littering, burning or land filling, waste collection, exhausts from production and disposal into account since they are not incorporated in prices. These social costs are assumed to appear only to a limited extent with refillable containers and ANCs. Thus the unregulated market fails by causing externalities. Introducing a mandatory deposit for non refillable containers might fix some of these externalities since the private cost of buying them in respect of the hassle of bringing them to the recycling station will equal the private cost of bringing back refillable containers. If we consider this and the price advantage of beverages in refillable containers we would expect that lots of costumers switch to refillable or to ANCs while some will still buy non-refillable as they might value other properties such as weight and breaking resistance of e.g. cans over glass bottles. Even those still buying non refillable containers are less likely to litter now as they have an incentive to give their non refillable containers back. Thus externalities resulting from littering will decrease as littering will go down.

On the other hand, the argument that using refillable instead of non-refillable containers generally reduces externalities does not hold for all situations. Whether it holds highly depends from which packaging alternatives are considered and which products shall be packed and from further properties. For example RDC (2003, pp. 122-123.) shows in its study for the European Commission when comparing different packaging types for 330ml bottles that “neither refillable nor non refillable may be considered generally preferable”. Which of the two systems does a better job depends on parameters such as distance to market, the number of uses and the internal costs of processing. If these factors impose high cost and environmental disadvantages to refillable containers they may offset environmental advantages of reuse. Thus using refillable instead of non refillable would actually increase negative externalities. Whether a mandatory deposit reduces externalities also highly depends on whether non refillable containers are recycled without the deposit or not. If they are already recycled before the introduction of the deposit the potential of decreasing externalities by introducing mandatory deposit shrinks.

Concluding, a deposit law can reduce externalities under certain circumstances.

#### IV. Does the German deposit law live up to these possibilities?

Already at the first glance, the way the German deposit law works seems to limit the possible reductions of externalities if it doesn't offset them completely thus producing a government imposed non market failure. The following points provide indications for the assumption of an increase of externalities through the deposit law to be true.

1. According to the deposit law, non refillable containers must be collected and then recycled. Before January 1, 2003 this was done by Duales System Deutschland (DSD) that collects all packaging bearing the *Grüner Punkt* in Germany and recycles them. The DSD system can be compared to curbside container recycling in some cities in the US (e.g. Boulder, CO) while DSD works nationwide and is obliged to collect all types of packaging (not only type 1 and 2 containers – paper and biological waste is recycled separately in Germany) at all households in Germany. Thus, a well working recycling system for non refillable containers already existed before 01/01/2003. It follows that a decrease in externalities caused by switching from non recycling of containers to increased recycling by the means of the mandatory deposits cannot be observed except for a little expected increase in the recycling quota by avoided littering due to the deposit.
2. The new “bring-in” collection system imposes new costs for consumers (and shops) that have to bring the containers back instead of recycling them through DSD bags collected at the costumers' homes  follows that new externalities arise for the part of non refillable containers that are still bought with the new deposit law.
3. The most important possible decrease in externalities through the mandatory deposit stems from a reduction of excessive use of non refillable containers in the pre-deposit state – given we assume that refillable containers cause less externalities (see III.). Since this assumption does not always have to hold (RDC, 2003, pp. 122-123), the possible decrease

in externalities stemming from reduced use of non refillable containers caused by the German deposit law thus becomes questionable too.<sup>1</sup>


4. The deposit law requires a mandatory deposit to be introduced on all “environmentally non-advantageous” or - as we call them in this paper - non refillable containers as soon as the *Mehrwegquote* (percentage of returned and reused containers to all sold containers for a certain sector of the beverage market, e.g. bottled mineral water or beer) drops below 72%. The quota of 72% is a completely arbitrary choice. No indication is provided why 72% represent an externality minimizing level.
5. The definition of ecologically non-advantageous containers is problematic and inflexible. Non-advantageous means that the mandatory deposit will be introduced for all types of containers that are worse or equal from an environmental position as existing refillable containers. In the case where a non refillable container has equal properties from an environmental perspective as existing refillable containers an unnecessary, efficiency decreasing burden is imposed on these types of packaging by applying the mandatory deposit on them. Which types of packaging are advantageous is decided by the government. If a new type is considered to be advantageous the whole bill has to be passed again which makes the process extremely inflexible and delays the abolishment of the deposits. Thus a non marked failure is created for a certain period of time
6. Another relevant point is the actual system of recollection of the single-use deposited containers. The bill calls for a recollection system that is flexible, i.e. consumers can return their containers in every single shop in Germany and not only in the one they bought it in. Since the industry hoped to prevent the law from being applied by lawsuits prior to 01/01/2003 it did not prepare for such a system. In order to prevent a complete chaos and failure of the whole system the German government allowed a bring-back-where-bought-

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<sup>1</sup> Even if we assumed a decrease in externalities through an increased use of refillable containers we have to take into account that the increase of the *Mehrwegquote* through the mandatory deposit has been quite small so far. The *Mehrwegquote* had fallen to 50% in December 2002 and was up 9.2% to 59.2% in September 2003 (Government, 09/12/2003). . It thus remains a question whether the benefits from this gain would be significant enough to offset the cost caused by the law in a benefits-costs analysis.

policy for a certain period of time. This policy caused discontent among consumers since one had to keep the receipt of every purchase involving containers to be able to get the deposit back which was only possible at the same store. One can easily imagine that a lot of containers were not returned for this reason. Either the customer cannot find the receipt any more or the opportunity cost of going back to the same store is too high. It is pretty likely that the industry did not take the big disadvantages for the consumers into account when not preparing for the mandatory deposit. It follows that the system of recollection implemented January 1, 2003 causes unnecessary externalities.

Summing up, it is highly probable that the *Dosenpfand* reduces negative externalities to a smaller extent than it causes externalities and thus produces a government imposed non-market failure.

I would like to extend the scope of this paper for two paragraphs from whether the mandatory deposit fixes externalities to whether it is efficiency increasing or not. This allows me to consider one more interesting aspect. I have just concluded that the German mandatory deposit increases negative externalities. But from an efficiency perspective these new negative externalities could be evened out by another effect of the mandatory deposit that we have not taken into account so far: By the non-use values people in Germany assign to the existence of a mandatory deposit law. The Government imposed deposit may cause negative externalities that make people worse off but they may at the same time get non-use values from the law as they believe that their country now behaves in an environmentally more friendly way (which may not be true but they believe it).  These nonuse values are likely to reduce or cancel out the externalities caused by the deposit law from an efficiency perspective. Unfortunately the scope of this paper makes it impossible to measure neither the externalities caused by the law nor the non use values drawn from it but I can provide some evidence that such values may exist.

According to a Forsa survey administered 10/15/03-10/16/03 among 2,001 inhabitants of Germany, 75% were generally in favor of a mandatory deposit. This implies positive nonuse values for 75% of the German population. Of course, whether their sum of compensating variations is bigger than the sum of those opposing a mandatory deposit cannot be inferred but seems to be probable. The same survey implies that the system before October 1 was extremely inefficient since only 22% of the population were content with the way the system worked

opposed to 70% who were content thus implying a negative sum of nonuse values for the whole population.

#### V. Alternatives to deposit laws from the externality perspective

The proclaimed aim of reducing the use of non refillable containers can also be achieved by means different from a mandatory deposit. Tradable permits for non refillable containers could be issued. A tradable permit system could be e.g. introduced on the producer-importer level. For example ten million permits to sell cans on the German market could be emitted by the Government. Another possibility would be a Pigouvian<sup>2</sup> tax on non refillable containers to reduce their use. If the desirable amount of non refillable containers is considered to be zero they could be banned. From a perspective of externalities reduction these means seem to be a better choice as all of the above described social costs of carrying out the deposit law will not apply. Thus, desired container usage patterns could be obtained by imposing less cost to society.

#### VI. Why was the *Dosenpfand* chosen to reduce the use of one-way beverage containers: Political Economy and Public Choice

When the *Verpackungsverordnung* (the bill establishing the recycling rules for all types of packaging) established the mandatory deposit regulation in 1991 the basic idea behind the *Mehrwegquote* was to establish a threat to the beverage industry. The Christian-Democrats hoped that the industry would fear the cost of introducing the deposit system so much that they would make sure that the quota remained high (Rülicke, 2003). This threat worked for some years but the law makers could not foresee that the structure of the German food retail market would change. While in the early 1990s most consumers bought their food in traditional supermarket featuring a wide range of different products and facilities to take back refillable bottles, they gradually switched to a type of supermarkets called discounters (e.g. Aldi, Lidl) usually selling only one or two types of the same products and only non refillable containers and ANCs. Thus the *Mehrwegquote* fell to under 72% in 1997. In the following year the new government was

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<sup>2</sup> Some would argue that the mandatory deposit is a Pigouvian tax in the sense that if you do not return the container you forfeit the deposit. This would be a Pigouvian tax on littering only and not on the use of non refillable containers. Whether the mandatory deposit can be considered as a Pigouvian tax also highly depends on how we define a tax in general. Wouldn't it be a reasonable assumption to require for a payment to be a tax that its revenues go to the Government and not to a private company?

elected – a coalition of the social-democrats (SPD) and the Green Party (Grüne) that became part of the federal government for the first time. Highly discredited at the beginning of the 1998 term for the Green Party's aim to rise the price for one liter of standard gas to 5 DM (about \$3 per liter -> \$11.50 per gallon) and the introduction of a new tax on energy (*Ökosteuer*) the government felt uncomfortable introducing another environmental tax and kept the mandatory deposit law. They could always argue that it had been introduced by the old government.

## VII. Reference/Bibliography

Comptroller General of the United States (1977) *Potential Effects of a National Mandatory Deposit on Beverage Containers*. Washington: U. S. General Accounting Office.

Crittenden, G. (2003, October/November) Costs and Benefits of Established Refilling Systems. *Solid Waste and Recycling Magazine*. Retrieved November 14, 2003, from <http://www.solidwastemag.com>

Duales System Deutschland. (2002). *Pressemappe zur Bilanz 2002*. Cologne, Germany.

Forsa, Gesellschaft für Sozialforschung mbH (2003) *Meinungen zum Pfand auf Getränkedosen und Einwegflaschen*. Berlin, Germany.

Government of the Federal Republic of Germany. (2003, April 7). *Bundestag stimmt Novellierung der Verpackungsverordnung zu*. (Press Release). Berlin, Germany. Retrieved October 30, 2003 from <http://www.bundesregierung.de/themen-a-z/umwelt-,9937/novellierung-der-verpackungsve.htm>

Government of the Federal Republic of Germany. (2003, June 18). *Begründung zur dritten Verordnung zur Änderung der Verpackungsverordnung*. (BMU-WA-II 3). Berlin, Germany

Government of the Federal Republic of Germany. (2003, September 12). *Bundesumweltminister Trittin: Pfand wirkt*. (Press release). Berlin, Germany. Retrieved October 30, 2003 from <http://www.bundesregierung.de/Themen-A-Z/Umwelt-,9994/Zwischenbilanz-zum-Dosenpfand.htm>

Morey, E. (2003). *Lecture Notes for Econ 4848*. Retrieved November 30, 2003 from <http://www.colorado.edu/Economics/morey/4545/4545lnts.html>

RDC Environment & Pira International (2003). *Evaluation of costs and benefits for the achievement of reuse and recycling targets for the different packaging materials in the frame of the packaging and packaging waste directive 94/62/E*. Brussels, Belgium.

Rülicke, O. (2003). *Wettbewerblicher Reformbedarf in der deutschen Abfallwirtschaft? Volkswirtschaftliche Würdigung der Verpackungsverordnung*. Wirtschafts- und

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Sozialwissenschaftliche Fakultät, Universität Potsdam, Potsdam, Germany. Retrieved November 10, 2003 from <http://www.uni-potsdam.de/u/wipo/sem/abfall3.pdf>

Verordnung über die Vermeidung und Verwertung von Verpackungsabfällen (VerpackV) (1998). Berlin, Germany: BGBl I 1998, 2379