Economics of the Iowa Bottle Bill

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Introduction

This document summarizes a detailed analysis of the cash flows and economic incentives created by the Iowa Beverage Container Deposit Law (The Bottle Bill). The Law was first proposed for reasons of litter control. It was implemented for beer and soft drinks on May 1, 1979 and for wine and liquor on July 1, 1979. The law has been effective in its primary task and has resulted in an approximately 86% return rate. This contrasts to the 26% recovery rate for beverage containers not included in the law.

Implementation of the Law

Retail consumers in Iowa pay a five cent deposit on all carbonated beverage containers and on wine and liquor bottles; this money goes immediately to the distributor. This deposit is returned to the consumer - if and when they return the container. When the retailer returns the container to the distributor they are reimbursed for the five cents they paid the consumer plus an additional one cent handling fee. The distributor keeps the five cents on all containers that are not returned and also regains the value of the recycled material.

When the law was originally developed it was assumed that a five cent reward would be sufficient to encourage the return of all containers. The one cent handling fee paid to the retailers, as well as the additional handling costs the distributors incur was expected to come from the value of the recycled material. This flow of funds is shown in Figure 1. This “follow the nickel” diagram was originally developed by the Iowa DNR.

Recent Developments

In the years since the law was first implemented, some of the underlying forces have changed. First, the return rate has fallen as inflation has reduced the value of five cents to consumers. In 2000, the return rate was 93%; it is currently 86%. The money that would otherwise have been returned to consumers on these containers now accrues to the distributors. Second, the cost incurred by retailers has grown relative to the one cent handling fee that they earn. This has turned many retailers against the system. Third, the value of the raw materials has grown as energy and aluminum prices have increased.

Figure 2 shows the money flows in the current system. Note that the money flows in opposite direction to the cans. Start with the consumers in the bottom panel. They pay almost $98.7 million in deposits and collect $85.1 million in redemptions. The retailers are represented on the right hand side of the panel when they sell to consumers and on the left hand side when they collect recycled containers. The distributors are represented in the top panel.

The distributors receive all of the $98.7 million collected by the retailers and they return $102.2 million for the recycled material. This trade is almost a wash because the extra cent they pay for handling fees just about compensates for the fewer returns on which they pay six cents. But the distributors also get all of the value of the recycled material. This is worth $36.9 million at current prices.

The retailer gets six cents per can for all redeemed containers but pays the consumer five cents for these containers. They collect $102.2 million and pay $85.2 million, the difference being the one penny per can handling fee.

Adjusting for Costs

The money flows shown above would seem to indicate that the retailers and distributors are making money from the law, but we need to include their costs. It was possible to get data on the costs incurred by distributors because some of these farm this work out to third parties. This estimate of full cost for distributors is about nine tenths of a cent per container. If we subtract this cost, then distributors make approximately $19 million under the current system. It was not possible to obtain costs for retailers.

Summary of the Current System

Iowa has in place a self-driven, self-funded recycling system that employs approximately 871 full time employees and which keeps containers out of landfills and roadside ditches. This system is essentially funded by the consumers who buy the 14% of the containers that are not redeemed. Distributors receive the raw material in these containers at essentially zero cost. After allowing for distributor's full handling costs, this sector makes about $19 million from the current system. Retailers are paid a one cent handling fee on all returned containers and there is anecdotal evidence that they are losing money at this level.

What if the System were Expanded?

The system described above excludes containers used for non-carbonated soft drinks, sports drinks, and water. The recycling rate on these containers is only 26%. These non-recycled containers end up in landfills or as litter, and the value of the raw material in these containers is lost to society.

The second scenario in Table 1 shows what would happen if these containers were included in the law, and if no other change were made. This table assumes that the redemption rates for the newly included containers would rise to the same rate as for the containers currently included. It does allow for the slightly different weights of the non-carbonated containers relative to carbonated containers.

Distributor's profits under the expanded system increase from $19 million to $25 million. Distributors make more money because there are more raw materials and more unredeemed containers.

The number of full time positions increases from 871 to 1207 an increase of 336. Of the additional positions under the expanded bill, 71% are in collection, 5.4 % in material recovery, 3.9% in glass processing, 19.4% in PET, and the remainder are in aggregation.

A One Third Cent Increase in the Handling Fee Paid to Retailers on all Returned Containers

The expansion described above would achieve the twin goals of employment creation and litter reduction, but it would also result in a windfall of more than $6 million for distributors.

Here we ask what would happen if this windfall were returned to retailers in the form of a one third of one cent increase in the handling fee on each container. Retailers would pay consumers 5 cents for each container and receive 6.33 cents for each container they return to distributors. This one third cent increase in the handling fee for retailers would leave the profits of distributors as a group exactly where they are today.

The third scenario in the table shows the net positions of each group under this scenario.

The handling fees earned by the retailer sector increases from $17 million today to $28 million under the expanded bill. This additional amount comes from two sources; the extra containers that are covered under the bill, and the extra handling fee they earn on all containers.

By design, distributors break even under this alternative and make exactly as much as a group as they do today.

One Cent Increase in the Handling Fee for Plastic Containers

The expanded bill results in a major increase in returns of plastic containers with no significant change in returns for glass or aluminum. This means that distributors who use only aluminum or glass will need to pay additional return fees without an offsetting increase in recycled material or in non-returns. Even though the third scenario was designed so that distributors as a group would be unaffected, there are some distributors who would lose and some who would win.

In the fourth scenario we make no change in the redemption systems for glass or aluminum, but we provide a one cent bonus to retailers when they handle plastic containers. This one cent increase in the handling fee is designed to absorb the windfall that the distributors of plastic containers would otherwise receive due to the expanded bill.

The profits made by distributors of plastic containers under this scenario are, by design, exactly equal to those earned by this group today. Distributors of aluminum make slightly more, and distributors of glass make slightly less under this expanded system because there are some non-carbonated glass and aluminum containers that would be included in the expanded bill.

The penalty that non-compliant consumers pay into the system increases from $13.5 million today to $20.3 million. This increase plus the additional value of returned material effectively funds the bonus penny on returned plastic containers.

Total handling fees paid to retailers increases from $17 million today to $28.3 million as more containers are returned and in response to the additional handling fee on plastic containers.

Table 1 Impact on Recovery Rate, Costs and Revenues under Varying Bottle Bill Scenarios

Scenario	Container Type	Number of Refundable Containers Sold	Amount Collected from Consumers in Deposits	Proportion Returned	Number Returned for Deposit	Consumer Loss from Unreturned Containers	Consumer Receipts from Returned Containers
1. Current System	Glass	246,739,130	$12,336,957	0.92	227,000,000	$986,957	$11,350,000
	Plastic	361,842,105	$18,092,105	0.76	275,000,000	$4,342,105	$13,750,000
	Aluminum	1,364,772,727	$68,238,636	0.88	1,201,000,000	$8,188,636	$60,050,000
	Total	1,973,353,963	$98,667,698		1,703,000,000	$13,517,698	$85,150,000
2. Expanded Bill	Glass	321,366,275	$16,068,314	0.92	295,656,973	$1,285,465	$14,782,849
	Plastic	875,824,470	$43,791,223	0.76	665,626,597	$10,509,894	$33,281,330
	Aluminum	1,418,341,561	$70,917,078	0.88	1,248,140,574	$8,510,049	$62,407,029
	Total	2,615,532,306	$130,776,615		2,209,424,144	$20,305,408	$110,471,207
3. Expanded Bill with a One and One Third Cent (1.0275) Handling Fee for Retailers	Glass	321,366,275	$16,068,314	0.92	295,656,973	$1,285,465	$14,782,849
	Plastic	875,824,470	$43,791,223	0.76	665,626,597	$10,509,894	$33,281,330
	Aluminum	1,418,341,561	$70,917,078	0.88	1,248,140,574	$8,510,049	$62,407,029
	Total	2,615,532,306	$130,776,615		2,209,424,144	$20,305,408	$110,471,207
4. Expanded Bill with a Two Cent (2.0193) Handling fee on Plastic Only	Glass	321,366,275	$16,068,314	0.92	295,656,973	$1,285,465	$14,782,849
	Plastic	875,824,470	$43,791,223	0.76	665,626,597	$10,509,894	$33,281,330
	Aluminum	1,418,341,561	$70,917,078	0.88	1,248,140,574	$8,510,049	$62,407,029
	Total	2,615,532,306	$130,776,615		2,209,424,144	$20,305,408	$110,471,207

Table 1 Impact on Recovery Rate, Costs and Revenues under Varying Bottle Bill Scenarios (continued)

Scenario	Container Type	Distributor's Income from Deposits	Distributor's Payment of Deposits Plus Handling Fee	Amount Paid to Retailers to Cover Their Handling Costs	Distributor's Balance before Adding Value of Recovered Material	Tons Recycled*	Value of Recycled Material **	Distributor's Profit before Distributor Handling Cost	Distributor's Profit Allowing for Handling Costs
1. Current System	Glass	$12,336,957	$13,620,000	$2,270,000	-$1,283,043	56,750	$3,121,250	$1,838,207	-$2,701,793
	Plastic	$18,092,105	$16,500,000	$2,750,000	$1,592,105	10,375	$6,432,749	$8,024,854	$4,367,354
	Aluminum	$68,238,636	$72,060,000	$12,010,000	-$3,821,364	17,553	$27,383,221	$23,561,858	$17,556,858
	Total	$98,667,698	$102,180,000	$17,030,000	-$3,512,302	84,679	$36,937,220	$33,424,918	$19,222,418
2. Expanded Bill	Glass	$16,068,314	$17,739,418	$2,956,570	-$1,671,105	73,914	$4,065,283	$2,394,179	-$3,518,961
	Plastic	$43,791,223	$39,937,596	$6,656,266	$3,853,628	25,113	$15,570,213	$19,423,840	$10,571,007
	Aluminum	$70,917,078	$74,888,434	$12,481,406	-$3,971,356	18,242	$28,458,043	$24,486,687	$18,245,984
	Total	$130,776,615	$132,565,449	$22,094,241	-$1,788,833	117,270	$48,093,539	$46,304,706	$25,298,030
3. Expanded Bill with a One and One Third Cent (1.0275) Handling Fee for Retailers	Glass	$16,068,314	$18,552,434	$3,769,586	-$2,484,121	73,914	$4,065,283	$1,581,163	-$4,331,977
	Plastic	$43,791,223	$41,767,977	$8,486,647	$2,023,246	25,113	$15,570,213	$17,593,459	$8,740,625
	Aluminum	$70,917,078	$78,320,649	$15,913,620	-$7,403,571	18,242	$28,458,043	$21,054,472	$14,813,769
	Total	$130,776,615	$138,641,060	$28,169,853	-$7,864,445	117,270	$48,093,539	$40,229,094	$19,222,418
4. Expanded Bill with a Two Cent (2.0193) Handling Fee on Plastic Only	Glass	$16,068,314	$17,739,418	$2,956,570	-$1,671,105	73,914	$4,065,283	$2,394,179	-$3,518,961
	Plastic	$43,791,223	$46,141,249	$12,859,919	-$2,350,025	25,113	$15,570,213	$13,220,188	$4,367,354
	Aluminum	$70,917,078	$74,888,434	$12,481,406	-$3,971,356	18,242	$28,458,043	$24,486,687	$18,245,984
	Total	$130,776,615	$138,769,101	$28,297,894	-$7,992,486	117,270	$48,093,539	$40,101,053	$19,094,377

* CRI Weights per Container

Glass 4,000 Plastic 26,505 Aluminum 68,420

** Value of Recycled Material per Ton

Glass $55 Plastic $620 Aluminum $1,560

The empties are picked up by the distributor who pays 5 cents plus a 1 cent handling fee for each container

The distributor charges 5 cents for each container delivered to the retailer

FOLLOW THE NICKEL

The consumer gets 5 cents back from the redemption center or retailer when they redeem empty containers

The retailer charges the consumer 5 cents when the beverage is purchased

FIGURE 1

Current Bottle Bill

Flow of the Money

$36,937,220

$102,180,000

$98,667,698

The Flow of Money

$85,150,000

$98,667,698

FIGURE 2