

# The Intended and Unintended Consequences of Disposable Bag Regulation

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**M**any recent government and corporate policies aimed at reducing a variety of negative externalities include regulations that ban the provision of externality-generating products. However, these policies often ban only a narrow subset of products associated with the underlying externality. For example, the U.S. Department of Justice banned bump stocks, which assist in rapid-fire shooting, after a Las Vegas mass shooting rather than placing stricter regulations on all assault weapons. Similarly, Starbucks recently banned the distribution of plastic straws at its stores to reduce environmental waste, and New York City attempted to pass a restaurant ban on sugar-sweetened beverages over 16 ounces to curb obesity.

But do these policies achieve their intended goal? One concern with narrowly defined bans is that they may leave

similar but undesirable substitutes unregulated, creating unintended consequences of the policies. In the case of assault weapon bans, gun manufacturers devised several adaptations to comply with the ban while still providing consumers with a nearly identical product. Along with the plastic straw ban, Starbucks introduced a new strawless cold-cup lid, which required *more* plastic than the original lid and straw combined.

One potential reason for the relatively narrow scope of these types of regulations is that, in many cases, it is politically infeasible to ban a broader class of products, such as a ban on all sugar-sweetened beverages. However, there are several cases of governments passing incentive-based policies, such as a tax or a fee, on a wider range of products. For example, many state and local governments levy taxes on sugar-sweetened beverages (of all sizes and sold



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in all establishments). These policies are less strict, since all affected products are still available for consumption, but may nonetheless be more effective, as they leave fewer substitutes unregulated.

We examine the relative effectiveness of these two policy designs—a narrowly defined ban versus a tax—on a broader base of products in the context of recent regulations on the use of disposable shopping bags. Disposable bag regulations were first introduced in the United States only a little more than a decade ago but have experienced rapid growth in this short period: as of 2017, one out of six people lived in a jurisdiction covered by a state or local government ordinance regulating plastic bags. Regulations of disposable bags commonly take two forms: a ban on plastic bags (a subset of all disposable bags) or a tax on all disposable bags. To date, no regulations have considered an outright ban on all disposable shopping bags.

In our work, we examine the effect of two such regulations in the city of Chicago. In 2015, Chicago passed an ordinance banning all single-use plastic bags less than 2.25 mils thick—the most common design of disposable bag regulations in the United States—leaving all other types of disposable bags unregulated. This policy was repealed starting in 2017 and replaced with a seven cent tax on all disposable bags (both plastic and paper bags of all thicknesses) one month later.

To estimate the effect of these policies on disposable bag use, we collected a unique individual-level data set on bag use for 24,002 shoppers by observing customers at grocery stores in the city of Chicago and in the surrounding suburbs that were not regulated by either policy from November 2016 to March 2018. This sample period spans three policy regimes: the Chicago plastic bag ban, a period of no regulation, and the Chicago tax on all disposable bags, allowing us to estimate the relative effectiveness of the two regulation designs as well as the impact of the repeal of the ban and the implementation of the tax using a difference-in-differences design.

We find that disposable bag use in Chicago remained high during the plastic bag ban: 82 percent of customers in Chicago used an unregulated disposable bag—either a paper bag or a plastic bag thicker than 2.25 mils—which continued to be distributed for free during the ban. Additionally, we observe no change in the proportion of customers using a disposable bag after the repeal of the ban. In contrast, we find that

the implementation of the tax in the subsequent months led to a large decrease in disposable bag use. When comparing the relative effectiveness of the two policies, we find that the proportion of customers using a disposable bag decreased by 33 percentage points during the tax relative to during the ban, leading to a decrease of just over one disposable bag per trip. This effect appears largely persistent: the reduction in the share of customers using a disposable bag remained large and statistically significant throughout the first year of the tax's implementation, though we do observe a rebound effect equivalent to roughly one-quarter of the initial impact of the tax by the end of the sample period.

The results on overall disposable bag use suggest that the tax was significantly more effective than the ban at reducing disposable bag use. Moreover, these results mask an important unintended consequence of the plastic bag ban. When we consider the effects of the two policies on the type of disposable bag used, we find that the ban eliminated lightweight plastic bag use (as designed). However, it led retailers to provide free plastic bags with a thickness roughly just over the 2.25 mils defined in the ban, five times the amount of plastic in a standard plastic grocery bag. During the ban, over 4 percent of customers shopping in Chicago used a free thick plastic bag while the remaining disposable bag users took a paper bag. These thick plastic bags were then phased out once the ban was repealed.

Taking the composition of bags used into account, we find that during the tax policy, customers used significantly less plastic and paper than during the ban—a decrease equivalent to roughly four thin plastic bags and one paper bag per trip. As a result, analyses that account for the composition of bags used (rather than just the number of disposable bags used), including those considering the life-cycle environmental impact of the different types of bags used, substantially increase our estimate of the relative effectiveness of the tax compared with the ban.

While we do not have data on bag reuse, our estimates decrease only slightly if we assume that thick plastic bags and paper bags are reused, for example, as bin liner—in fact, customers must reuse these bags at least six times as often as thin plastic bags for the ban to be statistically more effective than the tax, far more often than suggested in the literature.

Our research contributes to the recent literature on the effect of disposable bag regulations on consumer behavior

by comparing the relative effectiveness of two of the most common regulation designs. To our knowledge, we are the first to rigorously study the effect of a standalone ban on plastic bags in the United States. Importantly, we can compare the two competing policy designs within the same city rather than relying on cross-state comparisons, which may be biased due to differences in the populations. We find that plastic bag bans—strict but narrowly defined regulations that leave close substitutes unregulated—are significantly less effective at reducing the use of disposable bags than disposable bag taxes and, in fact, may increase

overall environmental costs by changing the composition of types of bags used.

## NOTE

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