



Research article

Using nudges to reduce waste? The case of Toronto's plastic bag levy

Nicholas Rivers^a, Sarah Shenstone-Harris^b, Nathan Young^{c,*}^a Graduate School of Public and International Affairs, Institute of the Environment, University of Ottawa, Canada^b Institute of the Environment, University of Ottawa, Canada^c School of Sociological and Anthropological Studies, University of Ottawa, Canada

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ABSTRACT

The overuse of disposable plastic bags is a major environmental problem across the globe. In recent years, numerous jurisdictions have sought to curb disposable bag use by implementing a levy or fee at the point of purchase. These levies are typically small and symbolic (around \$0.05 per bag), but serve as a highly-visible and continuous reminder to consumers. As such, they are consistent with nudging policies that seek to encourage broad changes in behaviour through small, non-coercive measures that influence people's thinking about an issue. While existing empirical evidence suggests that nudges are highly effective in reducing disposable bag use, we argue that many of these studies are flawed because they lack adequate temporal and geographic controls. We use longitudinal data from four waves of a major Canadian survey to analyze the effect of a disposable bag levy in the City of Toronto. Controlling for demographics and changes in social norms over time, we find that the levy increased the use of reusable shopping bags by 3.4 percentage points. Moreover, we find that the impact of the policy was highly variable across behavioural and demographic groups. The levy was highly effective in encouraging people who already used reusable bags to use them more frequently, while having no effect on infrequent users. We also find that the effects are limited to households with high socio-economic status (as measured by income, educational attainment, and housing situation). This suggests important limitations for nudging policy more generally, as people with lower socio-economic status appear to have been unaffected by this behavioural prompt.

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1. Introduction

Disposable plastic shopping bags are both a staple of modern consumer culture and an emblem of its environmental challenges (Ritch et al., 2009). First introduced in the late 1970s, thin, low-cost disposable plastic shopping bags were quickly adopted by retailers and embraced by consumers for their convenience and utility. Today, the United States uses around 100 billion disposable bags annually (USITC, 2009), and rough estimates suggest that the world uses between 500 billion and 1.5 trillion such bags every year (Clapp and Swanston, 2009). Rates of recycling for plastic bags are low, and because they do not degrade quickly, there is concern about the impact of plastic bags on wildlife, landfill, local landscapes, and water and storm sewer systems (Barnes et al., 2009). Given that they are made from petrochemicals, plastic bags also raise concerns about climate change and non-renewable resource

usage. For all these reasons, a number of jurisdictions around the world have adopted programs aimed at reducing the use of disposable plastic bags (Sharp et al., 2010).

Consumer waste is a vexing environmental problem, because its impacts stem from the aggregated choices of millions of people engaged in everyday activities. Environmental concerns are not always top of mind at the point of consumption, and mitigation actions – such as using reusable shopping bags instead of disposable ones – take effort on behalf of the consumer. Existing literature suggests that there are four major policy options for dealing with problems of consumer waste, each of which has been used in various jurisdictions – sometimes in combination – in attempts to reduce the use of disposable plastic bags: (1) prohibition or restriction, which involves a ban or heavy curtailment; (2) an attempt to change behavioural norms, typically via public education, persuasion, or appeals to emotion; (3) market-based mechanisms, such as a tax or a subsidy, intended to either substantially increase or decrease the cost of a behaviour; and (4) nudging, which involves the deployment of subtle prompts to encourage but not

* Corresponding author.

E-mail address: nyoung@uottawa.ca (N. Young).

compel alternative behaviours (Gunningham et al., 1998; Monroe, 2003; Thaler and Sunstein, 2008).

In this article, we examine the impact of a mandatory fee levied on plastic bags in the Canadian city of Toronto. We argue that the fee was sufficiently small (\$0.05 per bag), and was not collected by any government, to constitute a nudging policy rather than a classic market-based mechanism. According to Thaler and Sunstein (2008), nudging policies attempt to change the “choice architecture” that surrounds a decision in order to promote a desired outcome. Many nudging policies are non-economic, such as requiring school cafeterias to place healthy foods near the check-out counter where most impulse purchasing decisions are made. Some ethicists have criticized this type of nudging policy because it is meant to be unnoticed, and as such could be seen as a form of behavioural manipulation (e.g., Selinger and Whyte, 2011). Economic nudges are preferable in this respect, because they are intended to be highly visible. An economic nudge is not meant to impose a hardship or substantially increase the cost of a good or service, but rather to deliver a reminder to the consumer that there is indeed a choice being made (Thaler and Sunstein, 2008: 4). In the case of Toronto's levy, what had previously been a default outcome – receiving a disposable bag at point of purchase – is now recast as a choice in the hands of the consumer.

Proponents of nudging policy see it as a highly effective way of influencing behaviours without resorting to coercion or potentially regressive taxation (e.g., Hagman et al., 2015). In the case of disposable plastic bags, some research suggests that very small levies can have an enormous impact, reducing their use by 50% and more (see next section). If these findings are accurate, they suggest that this type of economic nudging can be extraordinarily impactful and ought to be expanded to other consumer waste problems. There are reasons, however, to be skeptical. Most studies of disposable bag policy interventions use a “simple difference” approach – comparing levels of plastic bag use (or alternatively, of reusable bag use) before and after the policy intervention. This approach fails to account for cultural-normative changes that may also be affecting consumer behaviours (Clapp and Swanston, 2009). This is what makes the Toronto case compelling, because it is nested in a larger control group (the rest of Canada, in which the mandatory fee is absent), and because the Toronto levy was legislated in 2009 and then *repealed* in early 2013, which allows us to use a “difference-in-difference” analysis (Greenstone and Gayer, 2009).¹

The data for our study come from the national Households and the Environment Survey (HES), which is conducted periodically by Statistics Canada. The HES asks respondents to self-report the frequency of using reusable bags while shopping. We use the 2006, 2009, 2011, and 2013 waves of the survey, which span the period prior to the introduction of the disposable bag levy, the period while the fee is in place, and the period following its elimination. We also have data from the rest of Canada, thus a giving us a control (Toronto was the only municipality in the country to implement a disposable bag policy during the study period). The data also allow us to control for a number of demographic characteristics, other environmental behaviours such as composting and energy use, and overall trends in bag use over time, thus establishing the causal effect of the disposable bag levy.

The article proceeds as follows. In the next section, we briefly discuss international experiences with disposable bag regulation as

points of comparison for the Toronto case. We focus in particular on how the impacts of policy interventions have been measured, and note that many such evaluations likely overestimate the causal effects of policies. In Section 3, we describe the particulars of the Toronto case. Section 4 outlines the strengths and limitations of the data source. Section 5 gives details of our methodology, and key findings are presented and discussed in Section 6, followed by our conclusions in Section 7.

2. The mixed bag of policy responses to the disposable bag problem: a review

As is frequently the case in waste reduction efforts, disposable plastic bag regulation has involved all four of the policy approaches mentioned previously, sometimes in combination. Table 1 summarizes some of the key national and sub-national initiatives that have been empirically studied in the literature to date. While we subsequently argue that measures of the effectiveness of these policies are often suspect, we report these figures as they appear in the published literature. We also note that there are numerous other cases around the world in which retailers have decided to impose a fee in the absence of government action. Given that these are not government policies, however, we exclude them from our literature review.

Table 1 shows that most efforts have involved the imposition of a cost via a tax or fee directly on the consumer. In the majority of cases, this cost is negligible enough to be described as an economic nudge, although there are a few cases that highlight the fuzzy boundary between nudging and market-based policies. For instance, Ireland was one of the first jurisdictions to implement a disposable plastic bag tax of €0.15 per bag in 2002 (Nolan-ITU, 2002). Following its implementation, the Irish Government reported a 95% reduction in bag use (Department of Environment, Community and Local Government, 2007). After disposable bag consumption increased slightly in 2006, however, the government raised the tax to €0.22, which stabilized the overall reduction at around 90% (Department of Environment, Community and Local Government, 2016). In our view, the Irish example is more consistent with a market-based approach, because the goal has been to create a sufficient economic disincentive to disposable bag use, rather than simply remind consumers of the choice facing them at the check-out counter. We also note that the Irish Government engaged in an extensive public education campaign related to the tax as part of its policy mix (Convery et al., 2007).

Prohibitions have also been deployed in efforts to curb disposable bag use. For instance, China banned the production, distribution, and use of plastic bags less than 25 μm thick in 2008, while simultaneously imposing a fee on other disposable plastic bags (Zhu, 2011). Retailers, however, were permitted to set the fee, so long as it exceeded the cost of production. He (2010) interviewed 3074 shoppers before after these regulations were implemented, finding that disposable plastic bag use had decreased by 49% in four months. Women, the elderly, more highly educated people, and those who approved of the policy appeared to be more responsive to the disposable bag charge. Compliance has been a challenge, however, particularly in open-air markets in China's smaller centres (He, 2010). Similarly, South Africa banned plastic bags less than 30 μm thick in 2003, alongside a 46 rand cents levy for other disposable plastic bags. Major retailers reported that plastic bag use decreased by 70% within the first three months (Dikgang et al., 2012a). However, the universal bag charge was rescinded after three months following pressure from the plastics industry, and retailers began charging differing amounts. The absence of a universal fee appears to have hampered conservation, as overall consumption is reported to have increased in recent years (Dikgang et al., 2012a).

¹ What we call “simple difference” research designs are sometimes referred to as “before-after” research designs. What we call “difference-in-difference” research designs are sometimes referred to as “before-after-control-treatment” (BACT) research designs in the natural sciences.

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