

Consumer Choice and Environmental Taxation

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Introduction

Litter from plastic bags is a huge environmental issue worldwide and political leaders have been attempting to address the issue for a number of years now. The goal has always been to reduce the number of plastic bags consumed but the method of choice has been of much debate. Denmark implemented a tax on the producer of plastic bags and this is known as an “upstream” tax, Ireland implemented a levy on the consumer of the bags, known as a “downstream” tax, Ireland also led a public outreach campaign. South Africa took a different approach of banning thin, one use plastic bags and implemented a levy on thicker, more durable and supposedly reusable plastic bags. Botswana took a similar approach as South Africa by mandating a minimum thickness of plastic bags and taxing the retailers and allowing them to pass part of the tax burden on to the consumers.

Thesis statement

This thesis will evaluate the efficiency of types of environmental taxes aimed at reducing the consumption of single use plastic bags. The model used is aimed at predicting when a consumer will choose to purchase a plastic bag versus when they will choose to forgo a bag. This model will look at how bags are a part of the utility function of consumers.

Review of Literature

Convery, McDonnell, and Ferreira (2007) evaluated the effectiveness of the levy on plastic bags in Ireland. They found that the use of a levy on plastic bags resulted in a 94 percent drop in usage of plastic bags. They found that the Irish government was successful at reducing the usage because the levy was a targeted “downstream” tax. The Irish government issued willingness to pay surveys, and then set the levy at a price above the average willingness to pay. Convery, McDonnell and Ferreira believe that this knowledge of WTP was one reason Ireland saw so much success. The authors also issued their own survey in the Dublin regarding the levy and found that most people and businesses supported it. They found that people were more in support of the tax because the government included feedback from businesses and citizens before implementing it. ¹

In a study about South Africa’s levy on plastic bags and ban on the ultra-thin style bags by Dikgang, Leiman and Visser (2012) the authors found that South Africa had mixed results to the levy. South Africa initially saw success in reducing the usage of plastic bags by 74 percent after the levy was implemented. The authors note that there was no formal study conducted in South Africa about WTP for bags and that the levy was low compared to average income and compared to the actual value of the bag. The authors believe that because of loss aversion, rooted in the endowment effect, there was initial drop in use as people adjusted to plastic bags no longer being free at stores. Consumers were used to the bags always being free so they initially reacted by not purchasing them. But once they became accustomed to bags only being available

¹ Ferreira, Susana, Frank Convery, and Simon McDonnell. *The Most Popular Tax in Europe? Lessons from the Irish Plastic Bags Levy*. Environment and Resource Economics, Feb. 2007. Web. 1 Jan. 2015

for a small price the demand for plastic bags slowly rose back up to its original level. The South African government also did not have as much cooperation with the plastic bag industry and other businesses leaders as did the Irish government, resulting in an extremely low levy. In the authors' attempt to address the reason the demand for bags rose again after people adjusted to the levy they studied retail sales, they also addressed the huge disparity in income that South Africa faces by utilizing data from two major retailers. One that targets the upper middle class and the other that targets the middle to lower income bracket. One effect that they found was the tendency to increase the number of items placed in each bag immediately after the levy was implemented. The result was the initial decline in usage that they mentioned, but after lobbying from the plastic bag manufacturers the levy was reduced. Consumers across all income brackets adjusted to the new lowered levy and began to increase their consumption of the bags. The authors believe that the low elasticity of demand for plastic bags may have been due to the relative price of bags in terms of consumer incomes.²

Denmark has implemented a system of an upstream tax on plastic bags, one imposed on the producer. According Economists Henrik Jacobsen, Katja Birr-Pederson and Mettee Wier, Denmark has achieved a very high level of environmental taxation compared to most countries. Denmark implemented the tax very differently than both Ireland and South Africa, as it was included in a much larger policy of environmental taxation. Environmental taxation in Denmark is a set of taxes aimed at reducing carbon

² Dikgang, Johane, Anthony Leiman, and Martine Visser. "Elasticity of Demand, Price and Time: Lessons from South Africa's Plastic-bag Levy." *Applied Economics* 44 (2012): n. pag. Web. 1 Jan. 2015.

emission and limiting littering. It accounts for roughly 10 percent of revenue for the government as of 1999. The tax's scope is wide, it is not just focused on the typical single use plastic bag, and it is applied to packaging products such as pet food as well. Since implemented in 1999 the tax has been successful in reducing the use of plastic products by about 66 percent. Because it was an upstream tax the firms adsorbed the cost at first and eventually passed it down to the consumer if they chose to do so. At some stores the tax is not felt directly, at other stores the consumer pays for the bag. ³

The book, *Nudge* by Richard H. Thaler and Cass R. Sunstein discuss “nudges” aka incentives to change behavior for environmental protection. They state that incentive based approaches are the best because they are the most effective, efficient and they allow the consumer the freedom of choice. While these authors do not specifically study plastic bag regulation, they study incentive based approaches for environmental regulation such as carbon. They find that even though incentive based approaches are effective, they are harder to pass politically because they make the cost of the environmental harm blatantly transparent. They suggest combining environmental taxation with another policy such as lowering income taxes because of the increased revenue collected from environmental taxation. ⁴

Consumer Choice Theory

³ Klinge Jacobsen, H., Birr-Pedersen, K. and Wier, M. (2003), Distributional Implications of Environmental Taxation in Denmark. *Fiscal Studies*, 24: 477–499. doi: 10.1111/j.1475-5890.2003.tb00092.x

⁴ Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven, CT: Yale UP, 2008. Print.

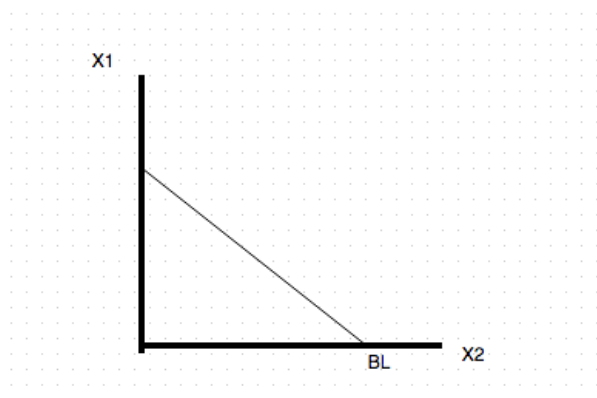
This section will provide an overview of the concept of consumer choice. Having an understanding of how people make decisions is extremely important before I write further about what changes consumers choices. Thus, this section will provide an overview of how consumers make choices. There are several ways to look at the theory, from a cognitive and from an economic point of view. I will provide both in the remainder of this section.

Economist Flemming Hansen, who specialized in cognitive consumer behavior as quoted by Gordon Foxall, defined choice as a complex form of behavior that individuals exhibit. Foxall states that

“when an individual is faced with the selection of a single course of action from among several ostensible options: a particular pattern of reactions can be observed: hesitation, inspection of alternatives, uncertainty. [C]onscious and unconscious brain processes occur, processes that may possibly be observed directly and are reflected in measurements such as electrocardiograms and galvanic skin response. These suggest that a conflict is present and that cognitive activities occur.”⁵

This definition of choice is much more complicated than most people think when they think about what consumer choice is and economists tend to define consumer choice theory as a way to explain how rational consumers make decisions. Economists Jonathan and Paul Milgrom from Stanford University define consumer choice theory as an idea that a consumer chooses a bundle of goods to maximize their utility subject to a budget constraint: $x=(x_1, \dots, x_n)$. The consumer must choose within their budget set (B), taking into consideration price of goods (p) and their wealth (w). This looks like: $B(p,w)= \{x \in R^{n+} : p \cdot x \leq w\}$. Consumers must make the best choice to maximize their utility given these constraints. This is illustrated by the simple model below.

⁵ Foxall, G. R. *Consumer Choice*. New York: St. Martin's, 1983. Print.

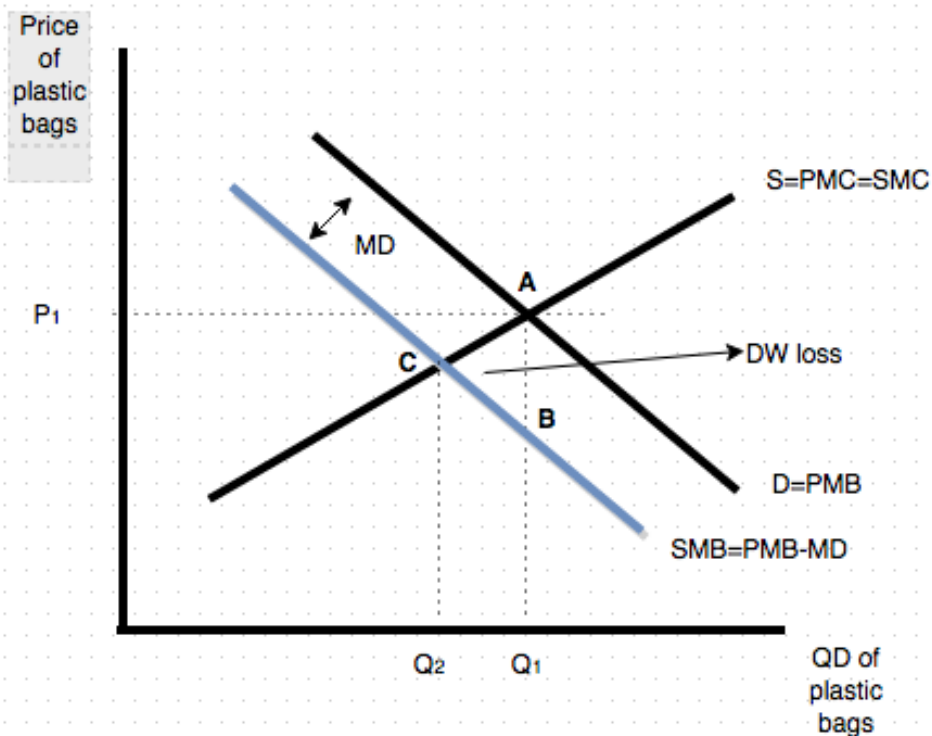


Discussion of Externalities

The primary motivation for limiting the consumption of plastic bags is because of the negative externality that they produce. This section will briefly explain what an externality is, the difference of a supply and demand side externality and how plastic bag taxation fits into solving the externality problem. Plastic bags are generally considered a negative consumption externality. Meaning, that the more bags that are used, the worse off society is as a whole. Jonathan Gruber provides another example of a negative consumption externality by stating “In a restaurant that allows smoking, your consumption of cigarettes may have a negative effect on my enjoyment of a restaurant meal. Yet you do not in any way pay for this negative effect on me”. (Gruber) ⁶ This is a good comparison with plastic bags because a consumer of a plastic bag which may end up as litter in their community may not be personally affected by it nor are they paying a price for their negative externality.

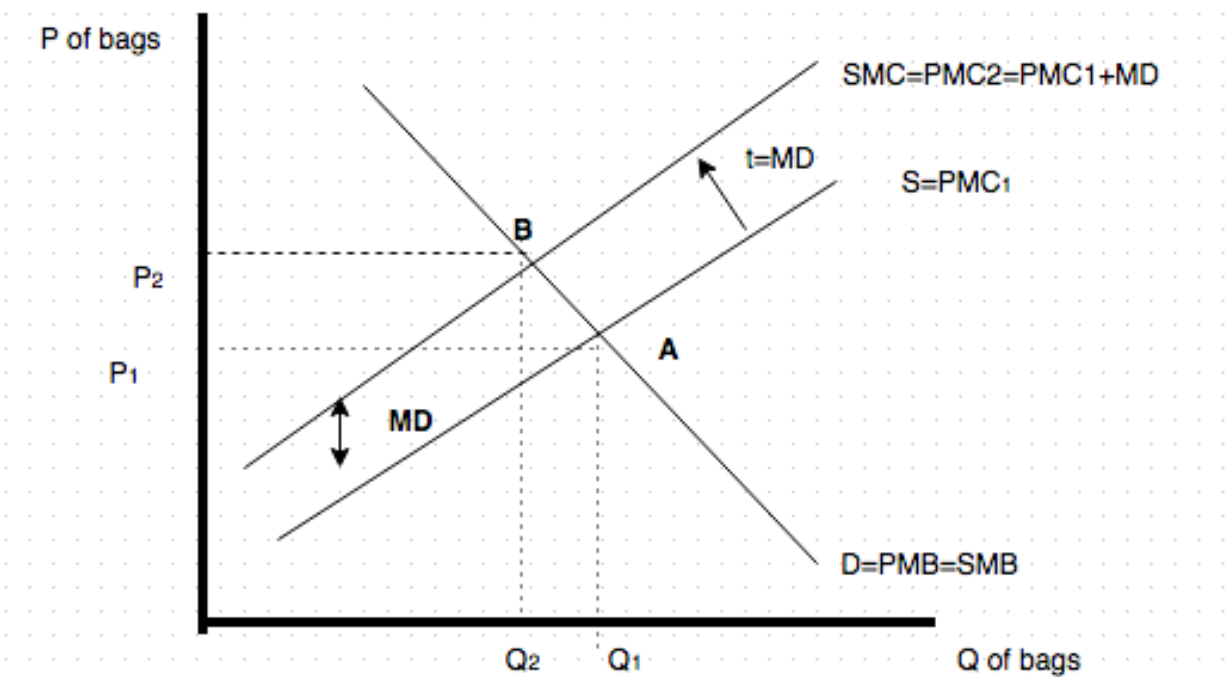
⁶ Gruber, Jonathan. *Public Finance and Public Policy*. New York: Worth, 2011. Print.

The figure below illustrates the market failure as a result of a negative consumption externality.



Even though this thesis focuses on the public sector solution to the negative externalities that plastic bags produce, it is important to briefly mention how the private sector might solve this issue. The logic behind a private sector solution is called the Coase Theorem. In order for a private Coasian solution to be possible, property rights must be well defined, costless bargaining and then negotiations between the party creating the externality and the party affected by it. Because a Coasian solution can only happen when these specific criteria are met, it is not possible in the case of plastic bag externalities. Thus, the need for public sector remedies such as taxation or

regulation. The model below illustrates how a tax can fix the market failure caused by a negative consumption externality.



Discussion of Model

The model I am using for the purpose of this paper, explains how financial incentives alter consumer behavior regarding plastic bag use, and thus consumer choice. Usually financial incentives such as taxes or subsidies both reward “good” behavior or punish “bad” behavior with a fee such as a tax imposed by the government. Theory suggests that individuals should respond the same to bonuses or fees. However, some behavioral economic research suggests that individuals are more likely to respond more strongly to loss rather than gain. (Kahneman and Tversky 1979)

⁷Assuming consumers are loss averse, they will adjust their behavior more as a response to a loss, in the context of my paper, to a tax on a plastic bag.

My model will look at a consumer's utility function with and without a plastic bag:

$U=F(X_1, X_2)$ where X_1 represents a bag and X_2 represents no bag. The indifference curve must be less than or equal to the total price of all goods, thus forming the budget constraint. The tax pushes the budget constraint in, while a bonus will push the constraint out. This can be illustrated in the following way:

$PX_1=PX_1+bcost$ (tax) this is a type of "downstream" tax where the tax is the burden of the consumer, and they have the choice whether or not to buy a bag. In this case the bag tax can be looked at as a transportation cost: Px_1+TCx_1 . If the store chooses to adsorb the cost and not give the customer the choice of buying a bag or not, it is considered an upstream tax and is represented in a model of the a shift in of the indifference curve because the price of goods will just raise in general.

In order to evaluate data from other countries, specifically, Ireland, Botswana, and South Africa, this thesis evaluate whether or not the incentive they provided will cause the consumer to bring a bag or not. This will be measured in "happiness" such as the good feeling of helping the environment. It is important to try to measure this because it will help explain whether or not the change in behavior is truly a change in preferences or just a response to a tax. Ireland, for example has been raising the levy in order to keep bag usage low, whereas in Botswana, some research has suggested that there is more emphasis on environmentalism. This can be measured in another utility function where the consumer has $U_i(W_i, b_i)$ where W_i =wealth, B_i =binary choice, where

⁷ Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." N.p., n.d. Web. 1 Nov. 2014.

=1 if bag is brought and 0 if otherwise, C_i = utility cost, positive if remember to bring bag, and negative, if consumer gets good feeling such as helping the environment. When we assume the consumer is subject to the tax of x it looks like:

$U_{Ni}(W_i, b_i) = U(w_i) - b_i C_i$, thus an individual's utility bundle becomes : $U_{Ti}(w_i, b_i) = U(W_i - (1 - b_i)X) - b_i, c_i$.⁸

I will also outline conditions that are needed in order for a customer to bring their own bag. If there is no incentive (no tax or bonus) customers will only bring a bag if they get personal benefit from bringing a bag (such as happy feelings from protecting the environment): $O > C_i$. If there is an incentive such as a tax, customers will only bring bag if the decrease in utility is greater than the cost of bringing a bag: $U(W_i) - U(W_i - X) > C_i$

Analysis

To analyze whether or not this model holds true, I will look at results from environmental taxation in Ireland, Botswana, and South Africa. This section will be broken down by country.

Ireland

Ireland has long been regarded as one of the world's success stories regarding the steep decline in use of plastic bags, but why? Did the levy on plastic bags implemented by the government actually change consumer's preferences or did it change their utility bundle. It is logical to assume that when a price of a good increases the demand will decrease, but in Ireland the demand for the plastic bag dropped by 94% with a 15 cent (euro) per bag levy that was originally introduced in 2002. According to

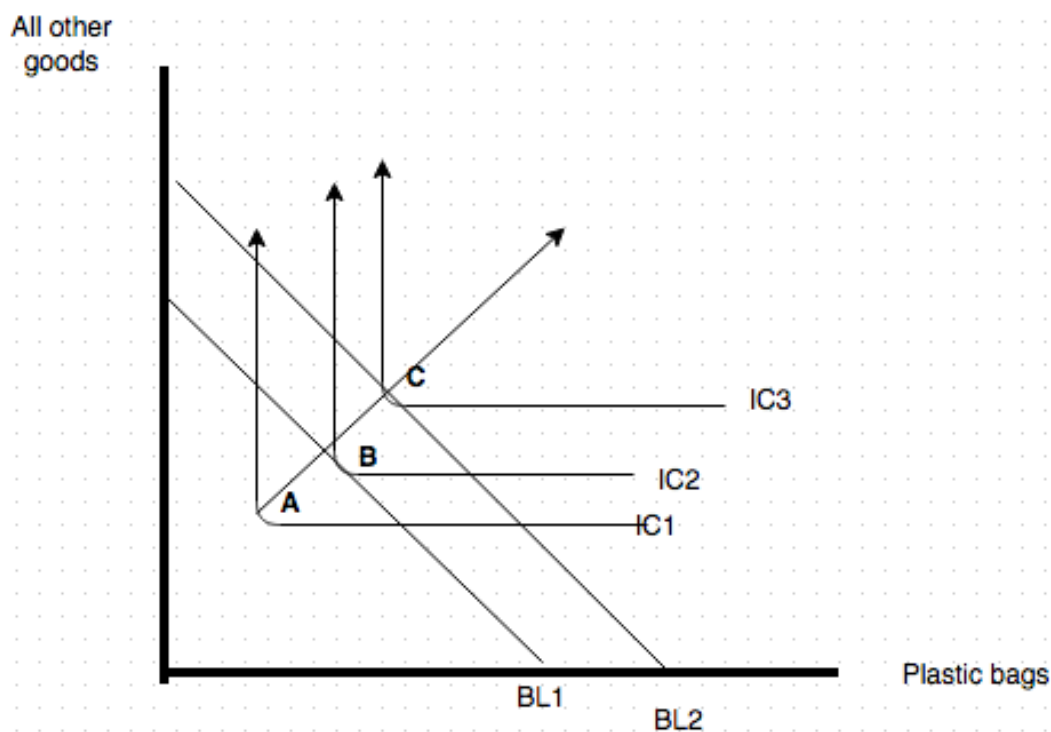
⁸ Homonoff, Tatiana Alexandra, A. Dissertation, Presented To The Faculty, and Of Princeton University. "ESSAYS IN BEHAVIORAL ECONOMICS AND PUBLIC POLICY." (n.d.): n. pag. Princeton University, Sept. 2013. Web.

researchers at University College Dublin the success can be attributed to the government's environmental economics research prior to implementing the levy. Rather than following Denmark's lead and taxing the producers of plastic bags, which Denmark did in 1993, officials in Ireland wanted to tax the consumers directly, in an attempt to follow the logic of a Pigovian tax. Prior to implementing the tax, the Department of the Environment, Heritage and Local Government conducted a willingness to pay survey to determine how much the average Irish resident was willing to pay for a single use plastic bag if they were given the option to do so. The results from a survey conducted between the 26th of November and the 8th of December 1999 with a sample of 1,003 Irish adults aged 18 and over is summarized below.

Amount	% Willing to pay
Nothing-would not pay	40
1-2 pennies (€ 0.0127-0.0254)	27
3-5 pennies (€ 0.0381-0.0635)	25
6 pennies+ (€ 0.0762+)	8

The Irish Government implemented a € 0.15 per plastic bag levy in March of 2002. This levy is about 6 times the average WTP of € 0.024. The usage of plastic bags dropped by 94 percent, this suggests that the decrease in utility as a result of the tax is greater than the cost of bringing a reusable bag. However, by 2006 the use of bags rose to 31 bags per capita, above the goal of 21 bags per capita. As a response, the government raised the levy to € 0.22 and has seen a reduction below the 21 bag per capita goal. It is important to keep in mind that the increase in usage of bags from 2003 to 2006 was

during a time of relatively significant economic growth in Ireland. GDP per capita was at \$29,600 in 2003 but by 2006 it was at \$44,500. As income increases, utility functions push outward and thus an increase in bundles of goods consumed, including plastic bags is normal. The graph below illustrates this concept:



Shift in income pushes the budget line out from BL1 to BL2. Consumers will move out to bundle C, because it maximizes their utility.

Besides the fact that willingness to pay surveys were included in the crafting of the policy why else was the levy so successful in reducing use of plastic bags? According to Convery, McDonnell and Ferreira, the involvement of stakeholders from the beginning of the process and a public advocacy campaign were instrumental in the success. The retail sector was especially worried that the public would see the levy as the stores being greedy by charging per bag, so the government agreed to enact a publicly campaign to explain who was enacting it and why. They also explained that the revenue would go directly into an environmental protection fund. Convery, McDonnell and Ferreira researched the implications of the tax on stakeholders in their paper that was published in 2007. They found that retailers overwhelming responded to the levy as having either a neutral or positive effect on their wellbeing. They also found that implementation of the levy was generally cheaper than the administrative costs for enacting it. When they researched the effects on the wellbeing of consumers they found that most respondents were in favor of the levy. The survey results from Convery, McDonnell and Ferreira is included below.

	Impact at checkout	Convenience	Expense	Environmental Impact
Positive	27%	31%	14%	90%
Neutral	60%	45%	60%	10%
Negative	13%	24%	26%	0%

Perhaps the most important conclusion drawn from this data is the environmental impact, if we measure it as part of the consumer's utility. Even though they had to incur

a cost of either paying the levy for the bags or for the reusable bag, 90 percent of the respondents found that the levy had a positive impact on the environment.⁹

Botswana

Botswana's approach to plastic bag regulation originated with a different motive than Ireland's. I was fortunate to interview Mr. Sehenyi Tlotlego of Kwando Safaris. He is the Practitioner in Residence at the University of Puget Sound. In Botswana, he was trained as an Environmental Scientist at the University of Botswana and worked in the public and nonprofit sector focusing on community based conservation. He is now in the private sector with Kwando Safaris and offered deep insight on the motivation for legislation in Botswana. According to Mr. Tlotlego and researchers Johane Dikgang and Martine Visser from University of Johannesburg and University of Cape Town the primary drive for the government enacting a regulation on plastic bags was because of the Botswanan economy, which is primarily made up of diamond exports, agriculture and tourism. Litter from plastic bag directly affects the agriculture and tourism sector which is why Botswana has taken a unique approach for regulation.¹⁰ In 2007 Botswana implemented regulations on the thickness of the plastic bags, any bag thinner than 24 microns was banned. The intent was for the ultra-thin bags to be phased out, as they cause the most environmental damage because they are not reusable and they are easily blown away into sensitive habitat. The government also issued an "upstream" levy on

⁹ Ferreira, Susana, Frank Convery, and Simon McDonnell. *The Most Popular Tax in Europe? Lessons from the Irish Plastic Bags Levy*. Environment and Resource Economics, Feb. 2007. Web. 1 Jan. 2015.

¹⁰ Tlotlego, Sehenyi. "Plastic Bag Regulation in Botswana." Personal Interview. Nov 2014

producers of bags with the intent of the revenue to go towards environmental issues. As a response to the levy, retailers began to charge per bag levies. As a response to the levies, bag use dropped amongst all levels of retail, with low income retailers seeing a decline of 42% and high income retailers seeing a 39 percent reduction just 3 weeks after the implementation. 18 months later the overall reduction stabilized at 50 percent.

Botswana is an interesting case because of the disparity of rural vs. urban households and their income level and types of retailers they shop at. Wealthier people tend to reside in the capital city, Gaborone and the poorer populations are in the rural areas. Studies about the impact of the plastic bag legislation in Botswana have divided up the results by type of retailer in order to obtain a more accurate picture of how people at different income levels responded to the levy. Below is a chart of the four different tiers of retailers in Botswana and the percentage of the market share.

Retailer type	Market share
High income	4%
Upper middle income	20%
Lower middle income	7.5%
Low income	40%

Because retailers were not forced to apply a certain amount of taxation, the market determined the new equilibrium price for the thicker bags. After 18 months of fluctuation, the bag prices averaged out of a price increase of 31% from the varying

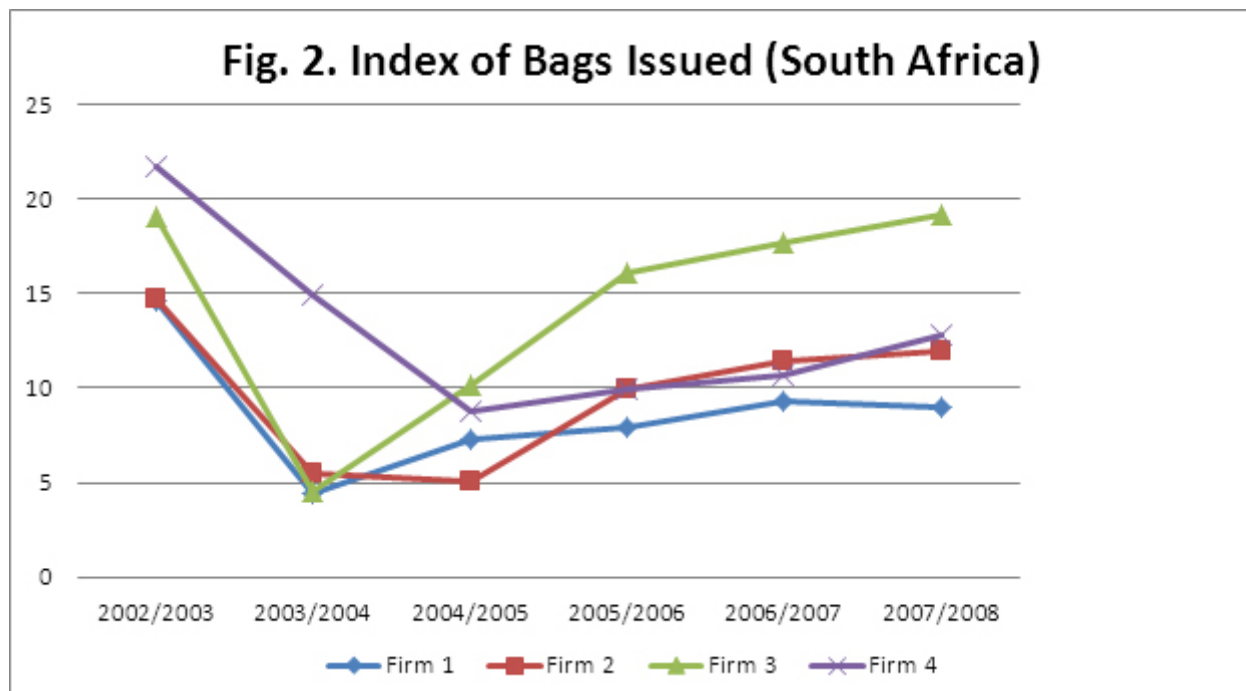
initial levy introduced by retailers after they faced the increased cost. The high income retailers raised the price the most, by 72% compared to the low income retailers by 44%.

Dikgang and Visser credit the type of policy that Botswana implemented with allowing for the market to form the equilibrium. It prevented the market share from becoming too distorted of the levy from becoming too regressive, allowing individuals to choose whether or not to purchase a bag for the market determined price. The additional policy about bag thickness also helped prevent the policy from being too regressive because it allowed for the purchased bags to be reused multiple times. ¹¹

South Africa

The impact of the plastic bag levy in South Africa have been less clear compared to Botswana and Ireland. In South Africa, consumers initially declined in their demand for plastic bags but adjusted to the levy rather quickly and have been purchasing the bags instead of using reusable bags. Associate Professor of Environmental and Resource Economics at the University of Cape Town Anthony Leiman provides this figure showing the response to plastic bag legislation in South Africa:

¹¹ Visser, Martine, and Johane Dikgang. "Behavioral REsponse to Plastic Bag Legislation in Botswana." *South African Journal of Economics*, 2012. Web. 1 Nov. 2014.



South Africa distinguishes firms by the market share that they target. Firm 1 targets the highest income consumers, while firm 4 targets the lowest income consumers and firm 2 and 3 are in the middle. Similar to Botswana, the lowest income market share did not respond as much to the levy as the higher two, and then started to demand more once they adjusted to the levy. This is extremely interesting because it goes against the economic logic of an increase in a price causing a decrease in demand. Possible reasons for this response to the levy is the fact that the low income bracket is less likely to have cars and less likely to buy in bulk compared to higher income customers. Therefore, the bags are more of a necessity as they walk to and from the store, and the bags can be re used for other household purposes such as trash disposal and storage.

Another reason is that when the low income customers buys items in the same quantity as higher income customers, they are more likely to buy the cheaper items.¹²

Another factor that could distinguish South Africa from Ireland's high rate of success and Botswana's moderate success in reducing the consumption of plastic bags is the retailer's response to the demands of plastic bag manufacturers. At first, there was an average of a 76 percent drop in usage, but after the three month trial period the average price of each bag declined by 22-63 percent and the individual retailer adsorbed the difference of the tax burden. After the individual retailers adjusted to their customer's needs, the rate of consumption stabilized close to pre tax rates. This suggests that in South Africa, the elasticity for plastic bags is relatively low. The elasticity could be explained by the low price consumers pay relative to income, a lack of a public outreach campaign explaining the tax and the function that plastic bags themselves have.

Conclusion

After analyzing the plastic bag levies in Ireland, Botswana and South Africa, as well as theories about consumer choice and what changes consumer behavior there is some evidence that a levy is effective at reducing the consumption of plastic bags. There are multiple factors that influence whether or not the levy is successful. If a government wants to reduce the usage, first a willingness to pay survey must be conducted at a national level in order to gather the proper information before setting the rate of the levy. Ireland is a good example of this, as the Irish government conducted a

¹² Leiman, Anthony. "Taxation and Regulation of Plastic Shopping Bags in Botswana and South Africa." *Taxation and Regulation of Plastic Shopping Bags in Botswana and South Africa*. Resources for the Future, 2011. Web. 06 Mar. 2015.

survey and then set the levy above the average willingness to pay. Botswana and South Africa, on the other hand did not conduct a willingness to pay survey and allowed the firms in the market to set the price. Ireland saw a significantly higher reduction in plastic bags (94 percent) compared to Botswana at 50 percent, and South Africa which has yet to see a stabilized reduction in usage. The other important factor is support from businesses and understanding from citizens. The Irish government made it clear that they were intent on passing this levy, but were willing to work with businesses to educate the public about the reason for the levy. They funded a public outreach campaign in order to educate the population and allowed retail to give their input on the policy. In Botswana, business leaders in the tourism sector were involved in shaping the policy because they viewed a reduction in litter as essential to the sustainability and profitability of their business. South Africa, on the other hand did not work extensively with corporate leaders, and the businesses ending up absorbing more of the cost of the levy rather than charging customers. These three different countries and outcomes again shows the relationship between government involvement with business and community leaders and the effectiveness of the levy. With Ireland seeing the most success and South Africa seeing the least. The third factor influencing the effectiveness of a levy is whether or not the levy is adjusted to keep up with a rise in income or people's adjustment to the levy. This factor is trickier to analyze using Ireland, Botswana and South Africa because of the different policies each country enacted. However, it is still interesting to note that as the GDP per capita rose in Ireland, consumption of plastic bags began to increase after they initially dropped. The government responded by raising the levy to return to the 94 percent reduction rate and

were successful in doing so. Neither governments in Botswana or South Africa have the ability to raise the levy because they tax the retailers and allow the market to set the price. As the graphs in the analysis section showed, each retailer by income bracket has been charging a different amount and has seen varying degrees of reduction. The levy has tended to be more significant in Botswana compared to South Africa which is why Botswana has seen moderate success compared to South Africa. A final factor to consider would be the different levels of wealth as well as culture in each country and how that factors into the usage of the plastic bags. According to the World Bank, the GDP per capita for the 2010-2014 time period for Ireland, Botswana and South Africa are as follows (In U.S. dollars).¹³

Country	GDP per capita
Ireland	50,503.4
Botswana	7,315.0
South Africa	6,617.9

These numbers are important to keep in mind, especially with the different cultures of each country. Botswana and South Africa also have a significantly lower rate of car ownership compared to Ireland. Ireland has a car ownership rate per 1000 people of 491, Botswana has 168 and South Africa has 165.¹⁴ This is necessary to know, because residents in Botswana and South Africa might find the plastic bags more

¹³ "GDP per Capita (current US Dollars)." World Bank. World Bank, n.d. Web. 6 Mar. 2015. <<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>>.

¹⁴ "Motor Vehicles (per 1000 People)." World Bank. World Bank, n.d. Web. 6 Mar. 2015. <<http://data.worldbank.org/indicator/FIS.NVEH.P3>>.

useful because they rely on walking and biking to and from the store and do not necessarily have the luxury of using a car to transport goods.

Works Cited

Dikgang, Johane, Anthony Leiman, and Martine Visser. "Elasticity of Demand, Price and Time: Lessons from South Africa's Plastic-bag Levy." *Applied Economics* 44 (2012): n. pag. Web. 1 Jan. 2015.

Ferreira, Susana, Frank Convery, and Simon McDonnell. *The Most Popular Tax in Europe? Lessons from the Irish Plastic Bags Levy*. Environment and Resource Economics, Feb. 2007. Web. 1 Jan. 2015.

Foxall, G. R. *Consumer Choice*. New York: St. Martin's, 1983. Print.

"GDP per Capita (current US Dollars)." *World Bank*. World Bank, n.d. Web. 6 Mar. 2015. <<http://data.worldbank.org/indicator/FY.GDP.PCAP.CD>>.

Gruber, Jonathan. *Public Finance and Public Policy*. New York: Worth, 2011. Print.

Homonoff, Tatiana Alexandra, A. Dissertation, Presented To The Faculty, and Of Princeton University. "ESSAYS IN BEHAVIORAL ECONOMICS AND PUBLIC POLICY." (n.d.): n. pag. Princeton University, Sept. 2013. Web.

Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." N.p., n.d. Web. 1 Nov. 2014.

Leiman, Anthony. "Taxation and Regulation of Plastic Shopping Bags in Botswana and South Africa." *Taxation and Regulation of Plastic Shopping Bags in Botswana and South Africa*. Resources for the Future, 2011. Web. 06 Mar. 2015.

"Motor Vehicles (per 1000 People)." *World Bank*. World Bank, n.d. Web. 6 Mar. 2015.

<<http%3A%2F%2Fdata.worldbank.org%2Findicator%2FIS.VEH.NVEH.P3>>.

Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving Decisions about Health,*

Wealth, and Happiness. New Haven, CT: Yale UP, 2008. Print.

Tlotego, Sehenyi. "Plastic Bag Regulation in Botswana." Personal Interview. Nov 2014

Visser, Martine, and Johane Dikgang. "Behavioral REsponse to Plastic Bag Legislation

in Botswana." *South African Journal of Economics*, 2012. Web. 1 Nov. 2014.