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“Public Participation: Shaping a sustainable future”

Public Participation and Effectiveness of the No Plastic Bag Day Program in Malaysia

Shahariah Asmuni*, Nur Bashirah Hussin,
Jamaliah Mhd. Khalili, Zahariah Mohd Zain

Center of Economics and Finance, Faculty of Business Management, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

Abstract

In 2011, Malaysia introduced the No Plastic Bag Day program to discourage the use of plastic bags for carrying items purchased from shopping stores. In the country, most of them use plastic bags as carrier bags. However, their excessive use leads to a large amount of plastic waste. Plastic waste takes a long time to degrade and contributes to air, water and soil pollution. Aimed at reducing the environmental degradation from improper disposal of used plastic bags, the No Plastic Bag Day program applies a "market" instrument to discourage consumers from using plastic bags to carry items purchased. In the program, participating stores do not give out plastic bags. They charge a levy of MYR0.20 (USD0.06) for each new plastic bag requested by customers during the program. This paper reports the findings of an observatory study conducted during the middle of 2013. The study aims to identify the level of consumer participation in the program and analyze the effectiveness of the program.

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Keywords: Public participation; effectiveness; plastic bag; levy

1. Introduction

The plastic carrier bag, or simply known as plastic bags, is a popular means of carrying goods when making purchases in Malaysia. The retail business always use carrier bags or plastic bags as they are inexpensive, weightless but strong enough to carry bought items and clean when used the first time (Jalil,

* Corresponding author. Tel.: -

E-mail address: shaha154@salam.uitm.edu.my

Mian, & Rahman, 2013). They used trillion plastic bags as carrier bags everywhere in the world annually (Miller, R.M., 2012).

Used plastic bag improper disposal, however, also known to cause long-term damage to the ecosystem and the natural environment. Plastic waste takes a long time to degrade in soil and contributes to air, water and soil pollution. Plastic bags that end up in landfills bring significant environmental burden that relates to resource use (Musa, Hayes, Bradley, Clayson, & Gillibrand, 2013) When thrown into landfills, plastic waste takes from 400 to 1000 years to degrade (Musa et al., 2013 ; Bashir, 2013)

Plastic waste can also become a nuisance to the human sight. If they do not send used plastic bags to landfills or properly recycled amass as litter in public areas (Ayalon, Goldrath, Rosenthal, & Grossman, 2009). With their aerodynamic shape and low rate of recycling (Godman, 2013), used plastic bags pose a problem beyond their simple use.

Plastic bags thrown in rivers and waterways even have the potential to cause harm to aquatic animals. This occurs when these animals perceive the bags as food and digest them, causing harm to the digestive system and the possibility of death (Ayalon, Goldrath, Rosenthal, & Grossman, 2009; Godman, 2013). Death to animals from swallowing plastic bags is higher than from diseases in most African countries (Bashir, 2013). Plastic waste, when broken down, can also affect hormone levels of animals when it pass through the food chain, which can eventually affect humans too (Musa et al., 2013).

In the attempt to reduce the problems on the environment from the nonchalant use of plastic bags, some countries such as Australia, Italy, United States of America, Tanzania and Ireland have resorted to the imposition of tax or to a ban on the production and use of plastic bags for shopping or other purposes (Jalil et al., 2013).

Malaysians on average produce an estimate of 19,000 tonnes of solid waste annually and plastic waste represents 24% of total solid waste. In 2011, Malaysia introduced the No Plastic Bag Day (NPBD) program to discourage the use of plastic bags for carrying items purchased from shopping stores. Aimed at reducing the environmental degradation from improper disposal of used plastic bags, the NPBD program applies a "market" instrument to discourage consumers from using plastic bags to carry items purchased. In the program, participating stores do not give out free plastic bags. They charge a levy of MYR0.20 (USD0.06) for each new plastic bag requested by customers during the program.

The combined approach of the levy and a restriction on plastic bag use applied in the program is an attempt to educate the public and increase their awareness on the environmental hazards of using plastic bags. The use of regulations such as the requirement for retailers to restrict the use of plastic bags for only those who are willing to pay a levy is a method implemented to discourage the use of plastic bags. They described regulations as playing a significant role in inducing ethical commitment for manufacturers (Zaman, 2012). This ethical commitment can also be applied to pro-environmental behavior of the general public.

It is also a method to change the behavior of consumers in depending on the use of plastic bags to carry purchased items and to reduce amounts of plastic waste in the country. As for shopping stores, their role is to carry out the implementation of the program. Both consumers and store operators constitute the public. The participation of the public in carrying out NPBD program is crucial in ensuring success of the program.

The several state governments and federal government have implemented the "No Plastic Bag Day". In other countries, they carried similar initiatives such as a ban in the use of plastic bags and the use of plastic bag tax or levy. The use of product tax or levy as a price signal can be an important instrument to change consumer behavior and the level of consumer acceptance to its implementation are crucial to its success (Convery, McDonnell, & Ferreira, 2007). However, while there have been many attempts and plans to reduce the use of plastic bags as carrier bags, not many of them have been assessed in terms of their success or effectiveness (Poortinga, Whitmarsh, & Suffolk, 2013).

The purpose of this study is to evaluate on whether the NPBD program is successful in reducing the use of plastic bags in shopping stores in Malaysia. The result of study is useful in assisting policymakers to evaluate the success of the program objectively. Specifically, the study aims to achieve two objectives. The first objective is to identify the level of consumer and store operator participation in the NPBD program. The second objective is to determine the effectiveness of the program through analyzing consumer response on the levy charged on plastic bags.

2. No plastic bag day program in Malaysia

Malaysia's effort to the effort to reduce the use of plastic bags began when the Penang state in 2009 banned the use of plastic bags from shopping stores on Mondays. In 2010, Selangor state followed to ban the use of plastic bags for customers on Saturdays. The Penang state government ultimately imposes the ban on the use of plastic bags on any day.

The federal government through the Ministry of Domestic Trade, Cooperative and Consumerism (MDTCC) in 2011 launched the No Plastic Bag Day (NPBD) Campaign throughout Malaysia for each Saturday. The objective is to reduce the use of plastic bags in order to reduce its negative impact on the environment. All retail outlets, supermarkets, and hypermarkets followed to impose the ban. They allowed the use of new plastic bags for wet markets, restaurants and night markets for hygiene purposes when carrying wet groceries and food (Zen, Ahamad, & Omar, 2013).

The stores that do not provide the plastic bags they encouraged customers to bring their own carrier bags, or they may purchase eco-friendly bags. Some stores provide paper bags or synthetic fiber carrier bags that can be reused a number of times. They reinforced the ban of plastic bags with a charge or levy of MYR0.20 or 20 cents, which is equivalent to USD0.06 for very plastic bag requested by a retail store customer. The use of the environmental tax as a disincentive to deter from certain behavior that may lead to environmental degradation. The tax collection money is either channeled to charity (Hong, 2011) or the stores used to implement environmental conservation activities.

3. Literature review

Environmental initiatives by the government will not be effective unless accompanied by public participation (Eden, 1996). Public participation in environmental management brings numerous benefits and people are aware of them (Lim, 2012). A number of studies have dealt with participation of the public in pro-environmental behavior. A large number has focused on recycling behavior (Asmuni, Khalili, & Zain, 2012; Singhirunnusorn et al., 2012).

In order to allow for the development of pro-environmental behavior, a change of habit towards more environmental-friendly practices can be taught through incentive or disincentive through mechanisms such as levy on potentially-polluting products such as a levy on the use of plastic bags. The right exposure of consumers to these practices, they can easily change their habits of environmentally unsustainable purchasing practices with more sustainable ones. Consumers with prior experience to pro-environmental practices can easily adopt a lifestyle that is pro-environment than those without the experience (Azeem, Hassan, & Kouser, 2013).

There are a few studies that analyze the participation level of the public on programs to reduce the use of plastic bags and the effectiveness of levy on plastic bags. One study investigated the correlation of attitude-behavior in supporting the use of plastic bag levy for Malaysia using survey questionnaire. They found that there were no significant correlation of certain attitude-behavior (Zen et al., 2013).

The effectiveness of plastic bag charge usually associated with change in behavior of users. One study concluded that the plastic bag levy has not been effective as consumers continue to forget to bring their

own plastic bags for shopping (Zen et al., 2013). Poortinga et al. (2013) described the effectiveness of the charge similarly, which is through the habit change of consumers towards consciously bringing their own carrier bags. The consideration of the use of a levy consequence of not bringing own bags and it is taking a utilitarian approach, which can be effective in promoting a change of habit (Chan, Wong, & Leung, 2007).

In Wales, England, they considered the levy (charge) very effective as the habit of bringing own bag rises from 62% to 82% when they introduced the charge (Poortinga et al., 2013). In one study (Convery et al., 2007), they conducted questionnaire interviews in order to assess the effect of a plastic bag levy. For retailers interviewed, the impact is either natural or positive as costs of implementing levy is lower than savings from not needing to buy plastic bags. In the same study, they conducted a survey on respondents who are consumers. The majority of respondents described the levy as adding to their shopping expenditure.

A study for South Africa measures the price elasticity of demand for plastic bags in order to determine the effectiveness of the levy on these bags (Dikgang, Leiman, & Visser, 2012). They found the elasticity value to be very low and can be positive. The conclusion of this study is the levy is not effective as consumers are unaware of changes in price of plastic bags and plastic bag substitutes are very few and do not serve all purposes.

In a study on the effectiveness of levy on plastic bags in Israel, they asked surveyed participants about their rate of usage of plastic bags at different levies (Ayalon et al., 2009). In this study, they estimated the levy of NIS1, the usage rate of plastic bags to reduce to 12% than it were before the levy. As level increases, usage rate falls. However, at NIS4, consumption of plastic bags remains unchanged at 6%. This may represent plastic bags that are the best carrier options for trash or to carry wet items used for outdoor activities such as picnicking. The issue of plastic bag in Israel is on 'flying bags' in public open spaces, which create a nuisance in the form of unsightly litter. If a large portion of the 'flying bags' is represented by this 6% use of plastic bags, then the levy of NIS4 can be ineffective. In the long-run, supposed plastic bag levy that to provide financial disincentive and education to consumers may not be effective when the actual people who create the problem of this litter in open spaces are not the ones who pay for the tax (Ayalon et al., 2009).

While there are a number of studies that investigate the effectiveness of the plastic bag levy, none of these studies using an actual observation on consumers' purchase decision and buying behavior. This study extends the examination in the literature by focusing on consumer's pro-environmental behavior and decision in the presence of a plastic bag levy through the use of direct observation during purchases. Thus, it recorded actual decision and analyzed during the observation.

4. Methodology

4.1. Study instrument and sampling technique

This study involves carrying out of observations to obtain data on consumer behavior and the level of store participation during the No Plastic Bag Day of the week. Trained observers gather information on participation during program day on 3 consecutive days in October of 2013. Using convenient sampling technique, we have taken samples of observations from retail, minimarket and supermarket stores that located close to the area of residence of observers. We recruited 45 observers to make the observations at randomly selected stores.

During observation, an observer observes the behavior of consumer and his or her interaction with the cashier of the store during purchase transaction. We recorded the observation information on a structured

form that allows ease and standardization of documenting of the information. During the observation, each observer stands or sits very close to the counter or store cashier. He or she then observes the communication and behavior of the store cashier and consumer during transaction of merchandise purchased. An observation began when a consumer approached the counter and ended when the consumer left the counter after they purchased the goods. The observers completed the observation form by filling it in based on what he or she observed. Prior to the observation task, we reminded observers to avoid any communication with consumers so as to ensure that data collection came strictly from observers' observations.

4.2. Variables and methods

The observation is a collection of data on store participation and consumer behavior during payment on retail items purchased during a No Plastic Bag Day. The study aims to identify the level of consumer participation in the program and analyze the effectiveness of the program. Data collected includes characteristics of consumers and information on the use of carrier bags by each observed consumer. The study aims to determine the level of public participation in the program through information collected from the observation. The study also aims to determine the level of effectiveness of the tax on plastic bag in reducing the use of plastic bags among consumers.

Public participation refers to involvement of consumers and store in the program. Level of dependence of consumers on plastic bags reflects the level of consumer participation in the program. Variables such as the dependence of consumers on plastic bag and the readiness of consumers to use alternative carrier options reflect consumer participation. The study includes correlation analysis to identify any link (dependence) between personal attributes of consumers with the level of consumer participation in the program. Store participation is indicated by the availability of in-store PBD program information and the involvement of store cashiers in informing and reminding customers on the store's participation in the program. Also analyzed is the correlation between the availability of in-store PBD program information with the level of consumer participation in the program. Rigorous awareness raising plans and display are an effective tool of participation (Peerapun, 2012). Thus, the study includes the analysis of whether consumer participation is dependent on in-store NPBD program information. We conducted the correlation analysis using Pearson chi-square test of dependence.

Information on payments made for plastic bag levy measures the effectiveness of this "market" instrument in reducing the use of plastic bags. The analysis includes an investigation into how much the consumers paid for the levy. The study assumes its own criteria in deciding effectiveness of the NPBD program. If the people who take plastic bags and pay the levy is 75% or more, then the program can be considered as effective. If the percentage is 50% or only slightly more than 50%, we considered the tax was not very effective. If it is below 50%, the tax is not efficient.

4.3. Limitation of study

Analysis of study limited to variables that can only be observed by observers during a purchase transaction. In this analysis, we did not get to capture motives of consumers in their participations in the program of, "No plastic Bag". However, the selection of the method of observation reflects actual behavior of consumers in making purchases and thus actual decision involving the use of plastic bags can be directly observed.

The study has its limitations. As the method of obtaining data is through observation, some variables represent actual behavior of consumers and store workers (cashiers) while some others are information recorded based on observation. Thus, information such as race and age group obtained on consumers are

subjective to what the observers view and consider as correct. While this information is subjective, the items that are observed are easy to identify and differentiate, based on knowledge and experience of observers.

5. Findings and discussions

5.1. Descriptive summary of variables

They carried the observations on 3 consecutive Saturdays during October 2013. From a total of 560 observations collected, the bulk of observations (we carry 68.8 percent or 385 observations in supermarkets or hypermarkets, and the remaining are carried out in specialized stores (17.%), minimarkets (9.5%) and convenience stores (4.3%). Among the stores visited during the study are Jusco, Giant, Tesco, Cold Storage, Mydin, Ikea, Guardian, MPH Bookstore, Speedmart and 7-Eleven. The convenience of observers is the criteria to select the stores. They conducted the observations (95% or 535 observations) in urban areas of the Malaysian Peninsular.

As the student observers make their observations during the university’s 2-weekend mid-semester break, they made the composition of observation regions that the observers went to during the holiday. Most of the observers reside in the Klang Valley, which located in the central region. Thus, most of the observations (60.4%) come from the central region while 16.8%, 11.8% and 11.1% come from the southern, east coast and northern regions of the Malaysian Peninsular, respectively. They conducted most observations (70.9%) during the evening, and the remaining,during the morning (12.5%) and at night (16.6%).

5.2. Public participation

Public participation in the study involves participation of both consumers and suppliers of goods and services. From the side of retailers, public participation refers to cashiers’ role in informing or reminding the public on the existence or working of the NPBD program. From the total of 560 observations on the interaction of store cashiers with consumers during selling and buying transactions, 72.9% of store cashiers ask customers if he/she wants plastic bag. While, 53.9% of cashiers inform they are not giving customers the plastic bag, or customers have to pay to get a plastic bag from the store during that particular day, which is a No Plastic Bag Day. This reflects that after most cashiers during the observations do remind the consumers about the NPBD program. This also means that the awareness of the sales people of the stores (represented by the cashiers) is relatively high. This awareness may have derived from their habit of reminding the consumers every Saturday or the reminder could be a requirement by the store. From this aspect, the store participation can be regarded as fairly high, given that it exceeds 50%.

Table 1. Descriptive summary on public participation in the NPBD program

	Frequency			
	(N=560)		Valid Percent (100%)	
	yes	no	yes	No
Store participation:				
Does cashier ask customer if he/she wants plastic bag?	408	152	72.9	27.1

Does the cashier inform the customer that 'no plastic bag is given'/ 'customer has to pay 20 cents for a bag'?	302	258	53.9	46.1
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Consumer participation:

Does customer bring his/her own bag to put items bought from store?	161	399	28.75	71.25
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	Frequency	Valid percent
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Customer's reaction when asked to pay 20 cents for a plastic bag:

Not relevant (brings own bag)	161	28.74
Do not pay for a bag and leave without a bag	107	19.1
Customer pays for the plastic bag (tax)	267	47.7
Customer buys eco-friendly bag from the store	25	4.5

From the side of the consumers, several observation variables reflect their level of participation in the program. 28.75% of all consumers bring their own carrier bags to the retail store. For those who do not bring bags, 107 customers (19.1% of all 560 customers) leave without a bag. These customers carry purchase items in their own hands put them in handbags or pockets or use store trolleys to carry their purchases. 267 of consumers (47.7% of all consumers) willingly pay for plastic bags, which they charged for the use of it during a No Plastic Bag day. The remaining 25 consumers (4.5%) who do not bring their own bags but needs them purchase eco-friendly bags from the store. Some stores, especially supermarkets and hypermarkets sell these reusable bags, which made of wool, canvas or woven synthetic fiber.

Based on the above findings, it can be said that participation of consumers in the NPBD program is moderate, given that almost 50% of all consumers willingly paid the charges (tax) for plastic bags. Consumers who decline to pay for the plastic bags are those who, either bring their own bags, purchase reusable grocery bags from the retail store or leave the store without a plastic bag. They represent 293 (52.3%) of all consumers in the observation. Those who are not using any carriers to carry their purchases may do so for many reasons. Such as they forgot to bring reusable bags from home or they do not have access to these bags. 19.1% did not use any bags (handbags excluded) and 47.7% decided to purchase plastic bags and paid the levy. 25 consumers (4.5%) purchase reusable grocery bags sold by the store. If the store can assist in providing more reusable bags or carriers for free or at minimum price and place them very close to transaction counters to make them more accessible to the consumers, then the number of consumers who will purchase this bag and reduce their purchase of plastic bags. They provided more facilities for consumers to carry out pro-environmental behavior, more convenience can be enjoyed, and more participation can be expected (Latif, Omar, Bidin, & Awang, 2012).

5.3. Chi-square dependency test

The study of public participation in the NPBD program includes the chi-square dependency test to identify if participation level depends on personal attributes and availability of program information in the store. This test, which is a test of probability of independence of a distribution of data, will determine if

there is a significant association between two categorical variables. The null hypothesis is that the relationship of the tested variables occurs by chance.

The chi square test used to see if there is an association between consumer participation in the NPBD program and personal attributes observed such as gender, race and age group of consumers and regional location of the retail store. Also carried out is the test for association between consumer participation in the program with in-store NPBD program information in the form of posters, flyers or announcement. For association with gender and race, the probability value (0.001 for gender and 0.006 for the race) is less than the value of 0.05 of significance level. The null hypothesis can thus be rejected for these 2 associations. This means that whether or not a consumer brings a bag or not depends on gender and race.

From table 2, those who bring their own bags are mostly female consumers, where 2.8% of consumers who bring their own bags are females compared to 5.4% for males. In terms of the race, there is also significant association between this variable and whether or not consumers bring their own bags. The percentage of Malays and Chinese who bring their own bags are the same at 7.7%. However, the percentage for those who do not bring their bags are more than double for Malays (47.9%) than for Chinese (20.7%). It cannot be concluded that the Chinese are more likely to bring bags as the number of Malay consumers observed are double that of the Chinese, and within the population, there are more Malays than Chinese. However, when we observed among the Chinese, the rate of those who bring the bags are 27% while for Malays' rate is 13.8% among the Malays. For the Indians, who are the smallest group among the 3 major races in the population, the percentage who bring bags are 19.6% of all Indian consumers observed. It can be concluded that the Chinese are the most likely to bring bag, followed by the Indian and the Malay.

The chi-square dependency test does not show any significant dependence between the age group of a consumer, region of store location and availability of in-store NPBD program information with whether or not consumers bring their own bag when going shopping.

Table 2. Chi-square dependency test between bringing own bags and socio-demography and in-store program information

	Does consumer bring own bag? (N=560)*		Pearson Chi-Square	Significance level
	Yes response	No response		
Gender				
Female	72 (12.8)	238 (42.5)	11.707	0.001
Male	30 (5.4)	220 (39.3)		
Race				
Malay	43 (7.7)	268 (47.9)	12.617	0.006
Chinese	43 (7.7)	116 (20.7)		
Indian	10 (1.8)	41 (7.3)		
Others	6	33		
Age group				
Children	3	18	4.540	0.209
Young adult	37	215		
Middle age	57	207		
Elderly	5	18		
Region of store				
Central	70	268	4.952	0.175
South	16	78		

North	6	56		
East-coast	10	56		
In-store NPBD program information				
Available	52	204	1.394	0.238
Not available	50	254		

Note: * Percentage in parenthesis

Chi-square test of dependence is also carried out to determine if the amount the consumers pay for plastic bag levy is dependent on socio-demography, location of store and the availability of in-store NPBD program information. Program information is one way pro-environmental behavior can be encouraged (Laurens, 2012). Information on the NPBD program may generate awareness of the plastic waste problem and in turn can affect people’s behavior towards being more cooperative to the program. In the NPBD program, stores can display posters to show that the NPBD program is being implemented.

If the probability value (significance level) is lower than 0.05, the null hypothesis that association of variables occurs by chance will be rejected. Significance level below 0.05 is illustrated among association of plastic bag levy consumers pay with race, age group and region of store location.

Amount of plastic bag levy paid is dependent on race of consumers. The Malays are the largest number of consumers observed in this study. This is due to the fact that the majority of people in the population are Malays. The racial group most associated with not willing to pay any amount of plastic bag levy is the Chinese at 59% from the Chinese race. For the Malay and Indian, association is slightly lower at 51% from all Malay consumers and 45% from all Indian consumers. 43% of all Indian consumers paid for one bag (MYR 0.20) for one visit to the retail store, while for Malays and Chinese, it is 27% and 23% respectively for each racial group. For more levy paid (greater than or equal to RM0.40, which is equivalent to 2 or more bags), the Malays and Chinese are more likely to pay for the levy than the Indians.

Age group is significantly associated with the amount of plastic bag levy consumers pay. Children, which refer to school age consumers, tend not to pay the levy. This is understood as the levy may be considered too expensive for them to pay. Young adults (which include college students and young working people) may either pay or not pay for the levy. Table 3 shows that 50% of young adults pay for levy while the other 50% avoids the levy. For the middle age people and the elderly, there is a tendency to avoid the levy. However, as the amount of levy rises (due to purchase of more plastic bags), lesser number of people is likely to pay for it.

We found a significant association between the amount the consumers pay for the plastic bag levy and location of the store. For stores in the central region (consisting of Selangor state and the federal territories of Putrajaya and Kuala Lumpur), half of consumers (50% or 169 consumers) choose not to pay the levy. This region represents the wealthiest regions in the Peninsular as Selangor is the richest state and Kuala Lumpur and Putrajaya are the centers of operation for the federal government. While consumer income maybe high and allows then to pay for the levy, consumers may have chosen not to pay due to their awareness of the NPBD program. Another reason could be due to proximity of store locations with parking areas. Thus, consumers may not need bags as they can carry their purchase items using store trolleys. However, half of consumers in the central region paid for the levy, with the largest paying for one bag (MYR0.20).

In the northern region (Penang and Kedah), the number of those who pay for levy exceeds those who do not pay. For the southern region (consisting of Johor, Malacca and Negeri Sembilan states) and east-coast region (Kelantan), the number of those not paying for the levy is higher than those who pay at least MYR0.20. This finding shows that while these states are relatively poorer than some other states,

consumers are willing to pay for the tax. The amount of levy (MYR0.20) per plastic bag) may be regarded as too low to consumers in this region, resulting in consumers paying for plastic bags instead of bringing their own bags or leave the store without paying for the levy.

There is no significant association found between in-store NPBD program information with how much the consumers pay the levy (or how much that consumers are going to pay to use plastic bags).

Table 3. Chi-square dependency test between the amount of plastic bag levy with socio-demography

	Amount of plastic bag tax consumer is paying (N=560)				Pearson Chi-Square	Sig.
	None	MYR0.20	MYR0.40	> MYR0.40		
Gender						
Female	164	81	39	26	0.362	0.948
Male	129	70	29	22		
Race						
Malay	157 (51%)	83 (27%)	46 (15%)	25 (8%)	17.502	0.041
Chinese	94 (59%)	36 (23%)	16 (10.%)	13 (8%)		
Indian	23 (45%)	22 (43%)	3 (6%)	3 (6%)		
Others	19	10	3	7		
Age group						
Children	16	4	0	1	18.499	0.030
Young adult	126	83	29	14		
Middle age	137	60	36	31		
Elderly	14	4	3	2		
Region of store location						
Central	169	94	41	34	17.816	0.037
South	58	21	9	6		
North	23	25	10	4		
East-coast	43	11	8	4		
In-store NPBD program information						
Available	128	68	30	30	6.034	0.110
Not available	165	83	38	18		

5.4. Effectiveness of plastic bag tax

Whether or not consumers paid for the plastic bag levy measures the level of effectiveness of this "market" instrument in reducing the use of plastic bags. However, consideration should be given to those who purchase plastic bags for carrying wet grocery items such as poultry, seafood and beef. The implementation of NPBD program only in supermarkets, hypermarkets and retail stores. It is excluding wet, night or day markets and restaurants from the program. The reason for the exclusion is that these outlets sell prepared food and wet grocery items. They do not encourage the use of reusable grocery bags due to health safety and hygiene reasons. Consumers in stores participating in the NPBD program might also be purchasing wet groceries. Thus, if the use of plastic bags is for carrying wet groceries, then the

use of at least a single plastic bag by a customer for this reason should not be regarded as contributing to the ineffectiveness of the NPBD program.

Table 2 depicts how much consumers paid for the plastic bag levy. From 560 consumers observed, 293 consumers (52.3%) avoided paying the levy. These are consumers who decided that they either did not need bags and carry purchase items using hands, pockets, handbags, trolleys, baskets, boxes, paper bags supplied by the store, or they used reusable bags brought from the store or from home. From those who paid for the plastic bag levy, 151 consumers (27%) made the payment for a single plastic bag. As the price of the bag is constant at MYR0.20 per bag, extra levy paid means extra bags requested. 12.1% of consumers paid for 2 plastic bags (MYR0.40) and 8.7% of consumers paid for MYR0.60 or more.

Based on the premise that the program is effective if consumers resort to other ways of handling and carrying their purchase items and avoids using plastic bags at all from stores, the NPBD program analysis in this study is 52.3% effective. However, they allow if the use of a single plastic to represent wet groceries, then the effectiveness of the program can be increased. For this study, we observed 438 consumers (78.3%) while making their purchases in supermarkets and minimarkets. Assuming 78.3% of those paying RM0.20 of levy (equivalent to 118 consumers) represent those paying the charge to carry wet groceries, then the effectiveness of policy when ignoring the purchase of the first plastic bag is relatively high at 79.3%. This covers 52.3% of consumers who avoids paying the levy and 27% of those paying levy for MYR0.20.

Table 4. Descriptive summary of plastic bag levy

Total levy paid (MYR)	Frequency of consumers (N=560)	Valid percent (100%)
0.00	293	52.3
0.20	151	27.0
0.40	68	12.1
0.60	19	3.4
0.80	14	2.5
1.00	9	1.6
Above 1.00	6	1.2

6. Conclusion

The initiation of the NPBD program throughout Malaysia in 2011 to reduce the use of plastic bags as carrier bags during shopping at retail stores. Based on findings of study, the program has been 52.3% effective in making consumers avoid the use of plastic bags as this percentage represents those who resort to using reusable grocery bags or other means of carrying purchase items.

To increase the level of effectiveness and participation of the public in the NPBD program, awareness of the program for the public can be increased. One way is to generate a culture of bringing own bags when shopping and making the practice more convenient, especially to males as they are less likely to bring bags when shopping. As the behavior of bringing own bags is not likely to depend on program information brought by in-store posters and flyers, social media can be used to inform and educate the public on the importance of a change of habit towards using less plastic bags.

In order to discourage the use of plastic bags during shopping, the government may need to reconsider the amount of levy charged on consumers. From the study, 47.7% of consumers paid for the levy in

exchange for the plastic bag that they need for carrying their purchases. As the amount of levy depends on race, location and age group, some of these factors can be considered when determining the effective amount of levy. For a wealthier region in the country such as the central region, higher levy may be considered.

To extend the conclusion of this study, future research can also look into reasons for bringing own bags when shopping to be dependent on ethnic or race. It will also be interesting to find out if the NPBD program has managed to instill the pro-environmental habit of using less plastic bags through observing purchase habits during days other than the NPB day program.

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