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Economic Analysis of Enforcement and Effectiveness of Ban on the Use of Plastic Bags: Evidence from Logit Model

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Abstract

This study investigates the effectiveness of the plastic bag ban in Pakistan's capital city. In both urban and rural regions of Islamabad, 200 KAP questionnaires were filled out by shopkeepers. In the questionnaires, knowledge, attitude, and practices of the people regarding the plastic bags were examined, and the results are shown on different graphs and tables. The logit model was used for estimation of the model. The study finds out that the people of Islamabad have good knowledge and attitude towards plastic bags and the ban imposed on them, but they are relatively poor in terms of practicality. The reason behind their weak practicality is the weak enforcement of the ban and their fearlessness of getting caught in violation of the ban. Those retailers who have fear of being caught have an 11.7% higher probability of following the ban as compared to those who do not have fear of being caught. Moreover, the retailers supporting the ban and those who knew the amount of fine to be charged if they violated the ban had 19.5% and 43.2% higher probability, respectively, as compared to those retailers who were not supporting or were unaware. The availability of alternatives to retailers also played a vital role in following the ban. Based on the results of the study, it is suggested that people of Islamabad are more likely to follow the ban if they have more fear of being caught in violation of the ban. The government should strictly enforce the ban by increasing punishment and by increasing the probability of sanctioning people for the violation.

Key Words: Plastic Bags; Logit Model; Islamabad

INTRODUCTION

Single-use plastic bags (SUPBs) are plastic bags that are typically used once and are given away for free in supermarkets and shopping malls. Because free plastic has no or very little economic value, people are unaware of how dangerous it is for the environment. According to Ghaffar et al. (2022), single-use plastic bags are well known for their CO_2 emissions, deteriorating sanitation, clogging sewers, polluting water supplies, and destroying the natural beauty of the surrounding area. Around 1.5 million tons of plastic were produced annually in 1950, but by 2015, that number had risen to 381 million tons, according to the trade association Plastics Europe. According to a United Nations study, around 300 million tons of plastic garbage are created each year, which is almost equivalent to the whole population of humans. Because of the high level of plastic pollution in the ocean, Norway has suggested that plastic waste be covered under the Basel Convention.

Pakistan Environmental Protection Agency (PEPA) estimates show that 55 billion plastic bags are produced annually, with that number predicted to rise by 15% yearly (Hussain, 2019; Zaheer et al., 2021). According to Pakistan Today (2015), 80 percent of the trash is made up of plastic bags, which causes over 80 percent of drainage overflow and blockages. Huge quantities of plastic bags have been created in Pakistan, and when they burn, they release harmful gasses and carbon dioxide into the atmosphere, which has a catastrophic impact on not only the lives of humans and animals but also the climate. They have an impact on animals as well since they occasionally consume them while eating.

Plastic bags are notorious for causing gutter overflows, as they block the gutters, leading to a bad odor and the spread of diseases. Plastic bags are also home to dangerous mosquitos, where they produce larvae and after that cause dengue and malaria. Plastic bags also cause allergies as they are made of copper and chromium, which can cause allergies. People associated with the business of plastic bags are at risk of dangerous diseases.

In the past, the ban imposed on plastic bags in Pakistan always remain ineffective. This study provides evidence of whether the ban on the use of plastic bags in Islamabad has been effective this time and will try to figure out gaps in its enforcement. This, in addition to the KAP results, will help policymakers to identify the key weakness in the enforcement of the ban and make better and effective policies in the future to help prevent the use of plastic bags.

EFFECTIVE STRATEGIES TO REDUCE PLASTIC USE: PRIOR EVIDENCE

He (2012) reported that regulations on the use of plastic bags were introduced by both China in 2008 and Taiwan in 2003. It was obligatory for retailers in both countries to price plastic bags. There was a roughly 49 percent decline in the use of newly manufactured plastic bags in China, and old bags were reused with the increased number. In Taiwan, two environmentalists, Innes

and Yang (2006), highlighted that among the masses, environmental awareness was created, which helped in the reduction of solid waste of all types generated by households. A similar conclusion was shown by Neilson et al. (2019) in a study conducted across the world.

According to some research, oxo-biodegradable plastic bags should take the place of traditional plastic bags since they biodegrade when exposed to air or water (Song et al., 2009; Gupta, 2011; Markowicz & Szymańska-Pulikowska, 2019). When it comes to alternatives, this research indicates that paper bags are likewise perceived to be a more environmentally friendly option. However, Nolan (2002) revealed that the production of paper bags takes ten times as much material as that of single-use plastic bags. Paper bags are also made from cellulose, which is found in plants and is considered to be a sucker of greenhouse gasses. In addition, the creation of a paper bag consumes more water than that of a plastic bag, and when it breaks down, it produces greenhouse gases. However, paper bags can be used for different foods like vegetables, and fruits.

Following the passage of plastic bag regulation in Botswana in 2007, Dikgang and Visser (2012) investigated its efficiency and efficacy. The researchers utilized primary data for estimates and conducted quantitative research. They discovered that, compared to pre-plastic bag regulation, overall plastic bag use decreased by 50 percent within 18 months. They claimed that the levy's partial success was due to the high price of the bags. Convery et al. (2007) calculated that the installation of a charge in Ireland reduced plastic bag consumption by around 90%. In addition, the country earned 196 million euros in money, which was used to support anti-litter operations. The charge resulted in a behavioral shift among customers, who were able to minimize their usage of plastic bags for an extended period of time.

Luís et al. (2010) analyzed customer behavior in two distinct Portuguese marketplaces. In Portugal, some businesses voluntarily charged 2 cents for each shopping bag, and it was determined that customers used fewer plastic bags in stores where the price was paid than in supermarkets where plastic bags were given for free. According to Hasson et al. (2007), in May 2003, the South African government proposed regulations to eliminate plastic bag litter. The regulation restricted the thickness of plastic bags and levied taxes on their usage. According to the 2002 legislation, 30 microns of thickness were permitted, with consumers required to pay 46 cents for each usage of a plastic bag. Following the introduction of this regulation, the usage of plastic bags decreased by 60 to 90 percent. However, when the per-bag charge was reduced to 17 cents, the usage of plastic bags increased significantly.

The impact of non-price instruments and other potential pricing was investigated by Gupta (2011). The authors concluded that less enforcement and monitoring may be required to reduce the usage of plastic bags in the case of non-price instruments and other feasible pricing.

Field tests were conducted to determine the impact of these strategies in the semi-organized retail sector. The plans contained three treatments: (i) a reward system, (ii) consumer information, and (iii) plastic bag replacements. The findings of these interventions show that the proportion of customers who carried bags from home increased by 4.6 percent at the start of the treatment and 17.8 percent at the end. The average use of plastic bags was reduced from 80 percent to 58 percent. It has been claimed that because enforcement capability is limited, a blanket ban may not be a viable approach for poor countries. Instead, substituting plastic bags, offering incentives for reusable bags, and implementing low-cost education initiatives might maximize good policy.

The plastic bag tax, as an instrument for altering consumer behavior, should be combined with an awareness and education campaign. The MDTCC (Ministry of Domestic Trade, Cooperatives, and Consumerism) uses electronic media to spread the environmental message about the harmful impacts of plastic bag use across the country. The standard advertising materials, which are distributed to grocery stores and other outlets, continue to promote it. This component must be evaluated in order to identify the campaign message's deliverability in terms of consumer awareness, knowledge, and attitude, as well as the promotion of pro-environmental behavior. Consumer-supported plastic bag ban campaigns provide policymakers with the required knowledge (Sharp et al., 2010; Paul & Mironga, 2020).

Taiwan's government has efficiently achieved its zero-waste target, decreasing the average daily per capita MSW weight from 1.14 kg to 0.81 kg in 2002. According to Shu et al. (2006), the most important variables in MSW minimization are the government's policy, which combines MSW collection with recycling and reduction activities, and the extended producer responsibility plan. For example, trash recycling is mandated by law, and public education on the environment is being undertaken to promote waste recycling and reduction through public engagement. Furthermore, they restricted the usage of plastic bags.

Public awareness is also essential, especially as there is currently no understandable government policy or regulation governing individual garbage disposal practices. Troschinetz and Mihelcic (2009) conducted research on municipal solid waste management (MSWM) in 23 developing countries, including Malaysia. The study identifies twelve factors that influence MSWM recycling: household economics, household education, government finances, government policies, waste segregation and collection, waste characterization, MSWM plan, MSWM administration, personal education about MSWM, land availability, and human resources, including technology. It also emphasized the interdependence of these 12 components. Government policy, for example, can impact household trash characteristics

education. This report is similar to a previous Taiwan research study in which the government encourages and imposes public awareness and waste reduction strategies through legislation. Real problems have emerged as a direct result of plastic bag pollution in Bangladesh. In March 2007, the limitation was extended to the entire country. Evidence reveals that plastic bags obstructing drains contributed to the 1988 and 1989 floods, which buried up to two-thirds of the nation. In response to drainage concerns in Mumbai, the Indian government decided to restrict plastic bags (Ritch et al., 2009). Plastic bags were banned in Dhaka, Bangladesh's capital city, in 2002 after clogging municipal drains and causing two floods (Spivey, 2003). Because of the widespread flooding in metropolitan areas and the increased danger of water-borne disease, restrictions were selected over less harsh measures.

For the first time, a complete ban on the production of plastic bags was issued by the Lahore High Court in 1997, although the prohibition was never enforced. Following that, the Pakistani National Assembly adopted a resolution in 2008 to begin using biodegradable bags and to take steps to outlaw single-use plastic bags. The Ministry of Environment also came up with a two-pronged plan to reduce the usage of plastic bags. First, the "Say No to Plastic Bag" campaign was started to discourage the use of plastic bags and to lessen the habit of their excessive usage. Secondly, technology was invented that might make plastic bags biodegradable, which would eliminate the uncollected plastic garbage. Additionally, plastic bags weighing less than 30 microns were prohibited, but the government failed to enforce this rule (Shahid, 2011).

According to Jamal (2013), in order to reduce plastic bag use in Pakistan, the Pakistan Environmental Protection Agency (Pak-EPA) implemented a significant regulatory endeavor with the consent of the Ministry of Climate Change. A regulation was announced in April 2013 that restricts the manufacturing, use, sale, and import of non-biodegradable plastic bags inside the geographical boundaries of the Islamabad Capital Territory. This measure was made to meet international market demand for environmentally friendly packaging and to manage hazardous waste from plastic bags in the long run. Naeem (2013) stated that the action outlined above was taken after examining the international practice of using oxo-biodegradable plastic bags. Many nations in America, Europe, and Asia have successfully decreased plastic waste by deploying oxo-biodegradable plastic technology. He goes on to demonstrate the technology's simplicity by noting that there are no adjustments needed to the equipment or procedure. To provide biodegradable properties in plastic bags, a little amount of olefin-based additive, ranging from 1 to 3 percent, must be added with the basic material. When this procedure is used in the manufacturing of plastic bags, it helps to weaken the plastic's internal connection when exposed to water or open air. Biodegradable bags have been demanded by both government

and private groups. The ministry has also asked the Federal Board of Revenue (FBR) to cut the import tariff on oxo-biodegradable additives from 6% to 0%.

The Punjab government has implemented many initiatives to limit plastic bag manufacturing and usage. The Punjab Environment Protection Department issued its first ban on black polythene bags on June 5, 1995. Following that, the Punjab Prohibition Ordinance of 2002 made the sale, usage, and manufacture of plastic bags thinner than 15 microns unlawful. Thin bags break quickly, but larger bags do not; hence, the law will encourage bag reuse. In 2009, the Punjab government launched initiatives such as "Say-No-to-Plastic-Bags" to minimize the usage of plastic bags. Later, in 2015, the Punjab government issued an environmental policy that included a strategy for combating the usage of plastic bags. One of the suggested remedies is to prohibit the production of plastic bags and replace them with paper or biodegradable bags (Anwar, 2015).

In an effort to improve environmental conditions and control damage caused by the widespread use of plastic bags, the Punjab Environment Protection Department (EPD) increased the standard weight of a plastic bag, raising its cost and reducing demand from retailers and wholesalers. The standard weight of a plastic bag was set to 15 microns. Similarly, a widespread crackdown on the use of underweight and black plastic bags was carried out throughout the province. To end the practice of providing free plastic bags at supermarkets when shopping, the Punjab government sought to raise plastic bag pricing. The legislation prohibits the use of black plastic bags with a thickness of less than 15 microns, yet despite the restriction, their use is at an all-time high. To restrict the free distribution of plastic bags, the price of plastic bags should be raised by raising their thickness to 30 microns (kakakhel, 2015).

In July 2019, the Pakistan Environmental Protection Agency (PEPA) and the Ministry of Climate Change announced an important regulatory initiative to reduce plastic bag waste in the Capital Territory of Islamabad, which will take effect on August 14, 2019. The initiative completely prohibits the manufacturing, purchase, sale, import, usage, and storage of polythene bags in the Islamabad Capital Territory. If found in violation of the restriction, manufacturers, importers, wholesalers, shopkeepers, hawkers, and stallholders may face fines ranging from 100,000 to 500,000 rupees, while consumers will face a punishment of 5000 rupees (MoCC July 25, 2019).

DATA AND METHODOLOGY

The study location is Islamabad, which is regarded as the world's second most beautiful capital, yet single-use plastic bags have harmed its magnificent vista to such an extent that the government has decided to ban them. Islamabad is located at longitude 72° 24' east and latitude 33° 49' north, at an elevation of 457 to 610 meters above sea level. According to the most recent census (2017), Islamabad has a total population of 2.006572 million and covers an

area of 906.50 square kilometers. The Specified Area covers an additional 3626 square kilometers and includes the Margala Hills to the north and northeast.

Islamabad is divided into five main zones: Zones I, II, III, IV, and V. Zone IV is the biggest in the area, while Zone I is the most developed residential sector. Zone 1 is divided by sectors. Residential sectors are distinguished by a letter of the alphabet and a number, covering an area of around 2 km x 2 km. We obtained data from zones 1 and 4. Zone 1 is an urban region, whereas zone 4 is a rural area. Zone 1 spans 54,958 acres. It is the most organized and picturesque portion of Islamabad, comprising the major sectors I-8 to I-13, H-8 to H-13, G-5 to G-14, F-6 to F-14, and the undeveloped rural region of Golra village. Zone 4 is Islamabad's biggest zone, with a total of 69,814 acres. Zone 4 is home to several well-known residential developments, including Shahzad Town, Bani Gala, and Bahria Enclave. Rawal Lake and Simli Dam Lake are also found nearby.

RESEARCH DESIGN

The study is based on primary data. We conducted exploratory data analysis and used a logistic model to analyze the ban's drivers. A total of 200 questionnaires were filled out by retailers, with a confidence interval of 5% and a confidence level of 95%. The questions are based on the Knowledge, Attitude, and Practices (KAP) survey. We attempted to assess people's understanding of the plastic bag ban in Islamabad, as well as their attitudes regarding the restriction, and then investigated what they were doing in practice. Various outcomes are displayed on graphs, charts, and tables. Shops are randomly picked from both zones.

ECONOMETRICS MODELLING

The information regarding KAP is analyzed using descriptive analysis and infographics. The determinants of the effectiveness of a ban are examined using the following equation.

$$Ban_i = \beta_0 + \beta KAP_i + \gamma X_i + e_i \qquad (1)$$

Where Ban_i represents whether the ban is being followed by retailers. It has taken the value 1 if the ban is being followed and 0 otherwise. Whereas KAP_i is a vector of the knowledge, attitude, and practices, and X_i is a vector of characteristics of retailers. The logit model is used to estimate the equation.

CONSTRUCT OF VARIABLES FOR THE MODEL

DEPENDENT VARIABLE

BAN

The dependent variable is dummy, taking the value 0 if the ban is not being followed; otherwise, 1. For constructing the dependent variable, either the ban is being followed or not, a question from retailers was asked: What bags do they provide to the customer? For choices, plastic bags,

cloth bags, biodegradable plastic bags, reusable bags, and paper bags are given to them. If the retailers have selected plastic bags, then we assigned the value 0 and 1 otherwise.

CONSTRUCT OF INDEPENDENT VARIABLES

AGE

Age is a continuous variable, representing the number of years of respondents.

EDUCATION

Education is also a continuous variable and represents the completed years of education of respondents/retailors.

LOCATION

To check out whether the ban is followed more in the urban area or rural area, the location of shops of respondents is taken as an independent variable. If their shops were in rural areas of Islamabad, it is assigned the value 1; otherwise, 0.

FEAR OF BEING CAUGHT

Fear of being caught is one of the main and important variables in our model. The enforcement of the ban depends upon the fear of being caught. If the fear of being caught is high, then the probability of following the ban will be high. The variable is constructed from a question: "On the range from 1 to 5, how much do you think you will be caught if you violate the ban?" If they have chosen from 1 to 3, we assigned the value 1 and 0 otherwise.

KNOWLEDGE OF VIOLATION FEE

Enforcement of the ban also depends upon knowledge of the fine imposed due to violation of the ban. Retailers were asked a question if they know the amount of fines to be charged if they violate the ban. If their answer was yes, then this variable has taken the value of 1 and 0 otherwise.

SUPPORT OF BAN

There are two types of people: those who support the ban and those who do not support it. The more people are in favor of a ban, the more probability of following the ban. To construct this variable, we have asked a question of respondents about what they think the government should do about single-use plastic bags. From the given options, if they have chosen the government should ban it, then it has taken the value of 1; otherwise, 0.

AVAILABILITY OF ALTERNATIVE

This variable is constructed by asking respondents if they think the alternative to plastic bags is available to buy in stock. Because the more alternatives to plastic bags are available, the more chance there is to go for alternatives rather than violating the ban. If respondents thought that alternatives were available, it has taken a value of 1 and 0 otherwise.

BAN AFFECTING SALES

If the ban on plastic bags affects sales of retailers on a large scale, they may violate the ban. Therefore, retailers were asked whether single-use plastic bags affect their sales or not; if they said yes, it was given the value of 1 and 0 otherwise.

RESULTS AND DISCUSSION

TYPE OF BAGS PROVIDED BY RETAILERS

Figure 1 shows data of 200 retailers who were asked a question regarding the type of bag they provide to customers when they come for shopping. Among them, 59.50 percent of retailers selected the option of plastic bag, 18 percent reusable bag, and 15 percent biodegradable plastic bag, while only 7.50 believed that they provide cloth bags to the customer. Figure 1 clearly shows that the practices of the retailers are against the ban. A larger number of retailers, that is, 59.50 percent, still provide plastic bags to the customers, which is a clear violation of the ban.
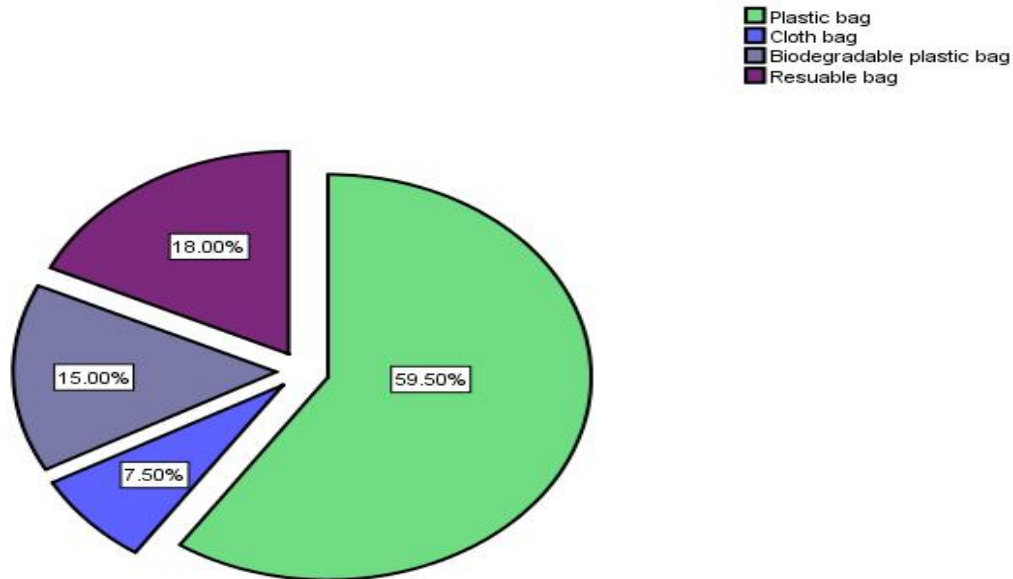

Figure 1: Type of bag provided by retailers

RETAILERS' ATTITUDE ABOUT GETTING CAUGHT IF VIOLATE THE BAN

In figure 2, retailers were asked the question of how much they are sure they will be caught if they violate the ban. Out of 200 respondents, 36.50 percent remained neutral while 29 percent

were sure that they would be caught if they violated the ban. Among the respondents, 24 percent were not sure that they would be caught while 5.50 percent selected the option never, and only 5 percent were very sure that they would be caught by the authorities if they violated the ban. Figure 2 also shows that above-average people, which is 34 percent, have in their minds that if they sell plastic bags, they will be caught by the government, and below-average people, which is 29.50 percent, are not sure. This shows the weakness of the authority in implementing the ban across the capital city. The high number of people, which is 36.50 percent, were unable to say whether they would be caught or not, which could also be a cause of violation of the ban.
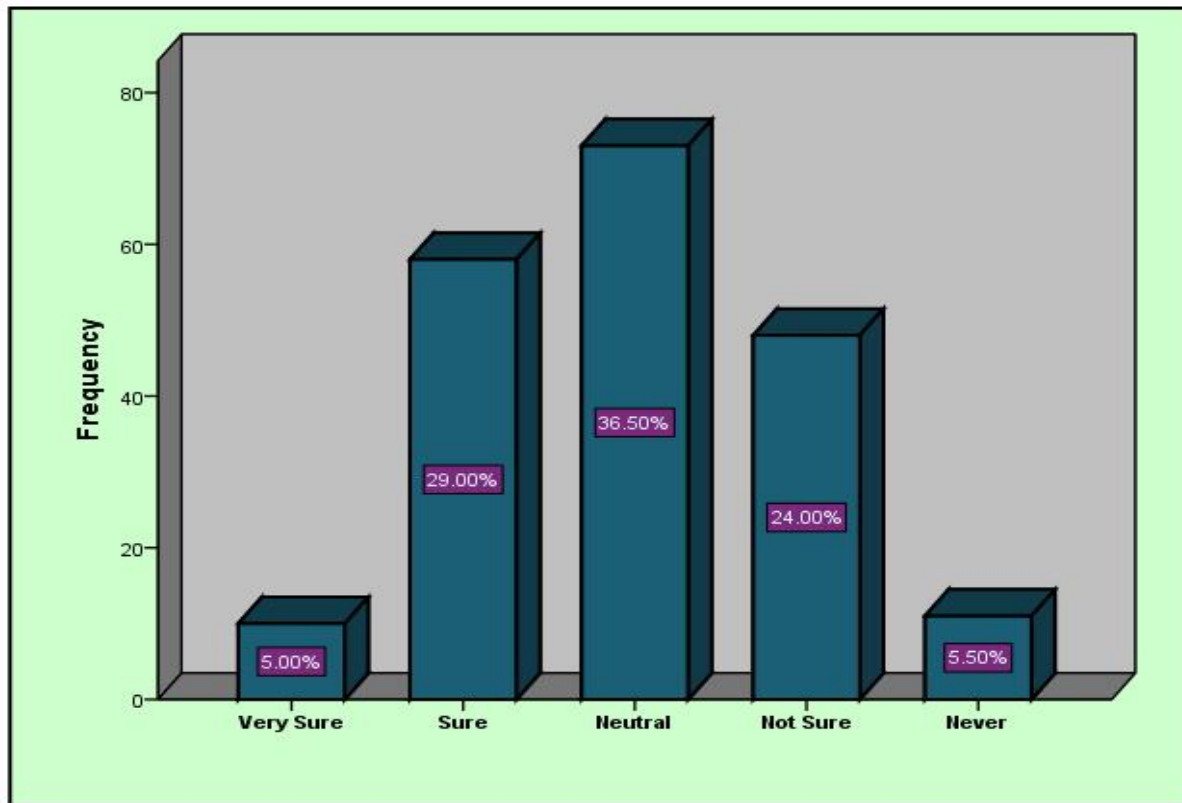

Figure 2: Retailers' attitude about getting caught if violate the ban

KNOWLEDGE ABOUT THE FINE IF A RETAILER VIOLATES THE BAN

Figure 3 shows the percentage distribution of the people among 200 retailers who know the fees charged to them due to violation of the ban on the use of plastic bags in the Islamabad Capital Territory. 78.50 percent of them did not know the amount to be charged if they violate the ban, while only 21.50 percent claimed that they knew the amount. The percentage clearly

shows the weak knowledge of retailers about the fine if someone violates the plastic bag ban and the government's failure to provide the knowledge about the plastic bag ban.
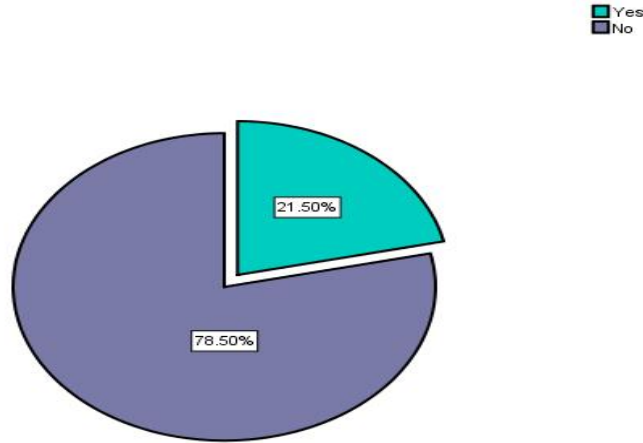

Figure 3: Knowledge about the fine if a retailer violates the ban

KNOWLEDGE ABOUT SUPBB IN ISLAMABAD

We asked a question to know how much of the respondents know about the ban imposed on a single-use plastic bag in Islamabad's capital territory. From the total of 200 respondents, about 72.50 percent of people knew about the ban, and only 27.50 people said they were unaware. The data presented in figure 4 clearly shows that a big number of people know about the ban, but still they do not follow it. It may be due to the unawareness of the fine imposed on the violator of the ban or maybe very little fear of being caught. The 27.50 percent of people who are unaware are enough number to point out government failure regarding giving awareness about the ban imposed on SUPB in Islamabad but overall most of the people know about the ban.
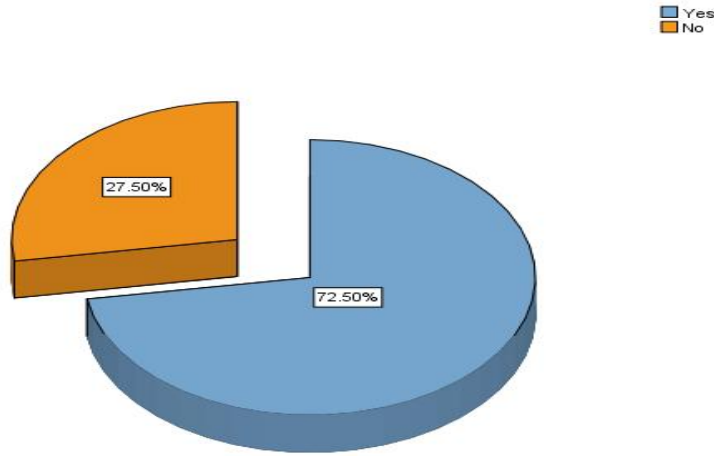
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Figure 4: Knowledge about SUPBB in Islamabad

DETERMINANTS OF BAN COMPLIANCE AMONG RETAILERS: (MARGINAL EFFECTS)

We have reported both the coefficients and marginal effects of logistic regression (Table 1).

$$Ban = age + edu + loc + a_{2\_D} + k_{5\_d} + k_{4\_d} + g_{i5\_d} + a_{1\_D}$$

The dependent variable is enforcement of the ban, while the independent variables included in the regression are age, education, location of a shop, fear of being caught, knowledge of violation fee, support of the ban, availability of alternatives, and ban affecting sales. Along with the coefficients and marginal impacts, the standard errors, level of significance, and t-values are also reported. The positive signs of the coefficient show direct relations, while the negative sign shows an inverse relation with dependent variables. Age, education, and location of shops are insignificant, which means that there is no relationship between these variables and enforcement of the ban.

Table 1: Determinants of Ban Compliance among Retailers

Variables	Coefficient (dy/dx)	T-value
Age	-0.002	-0.66
(Years)	(0.003)	
Education	0.005	0.45
(No of Years)	(0.011)	

Location of Shop	0.004	0.081
	(0.049)	
Fear of being caught	0.117**	2.387
	(0.049)	
Knowledge of Violation Fee	0.452***	4.10
	(0.110)	
Support of Ban	0.195*	1.741
	(0.112)	
Availability of Alternative	0.459***	4.135
	(0.111)	
Ban Affecting Sales	-0.051	-0.772
	(0.066)	

The seller of the plastic bags will follow the ban if they have fear of being caught while selling plastic bags. The sign of the coefficient of fear of being caught is positive and significant at a 5% level of significance, which means that there is a direct relationship between the fear of being caught and the enforcement of the ban. Those retailers who have fear of being caught have an 11.7% higher probability of following the ban as compared to those who do not have fear of being caught.

Knowledge of violation fees is also an important variable in our model. The more retailers know about the fine imposed on the violator of the ban, the more there is the chance of following the ban. The fine imposed on the violator of the ban is from 100,000 to 500,000, which is a huge amount for a retailer to pay; therefore, the retailers who know violation fees will not go against the ban. The coefficient of the variable knowledge of violation fee is 0.452, and its sign is positive, which means that those retailers who know about the violation fee have a 45.2% higher probability of following the ban as compared to those who do not know about the violation fee.

Support of the ban has a direct relation with the ban. Those who support the ban will also follow the ban. The variable is significant, and its sign is positive, which means that those

retailers who support the ban have a 19.5% higher probability of following the ban as compared to those who do not support the ban.

The sign of the availability of alternatives to shopkeepers is positive and significant. Its coefficient is 0.459, which means that the availability of an alternative to shopkeepers has a 45.9% higher probability of effecting the ban as compared to the non-availability of alternatives to shopkeepers.

Our last variable is a ban affecting sales of retailers, which is insignificant and has no relationship with the dependent variable.

CONCLUSION AND RECOMMENDATIONS

In July 2019, the Pakistan Environmental Protection Agency and the Ministry of Climate Change took an important regulatory initiative to reduce plastic bag waste in the Capital Territory of Islamabad, effective from 14 August 2019, which completely bans the manufacturing, purchase, sale, imports, usage, and storage of polythene bags in the Islamabad Capital Territory.

This study finds out the enforcement and effectiveness of the ban across the city. We conduct a KAP survey in which 200 questionnaires in total were filled out by the retailers in both urban and rural areas of Islamabad. To meet the objectives, the study is divided into two broad categories. The first part of the study examines the graphical representation of the KAP responses of the retailers, which shows the knowledge, attitude, and practices of people of Islamabad regarding plastic bags and the ban imposed on their use. The second part of the study estimates the logit model for retailers in which enforcement of the ban is found out.

The infographic part of the KAP survey shows that the people of Islamabad have good knowledge about the composition of plastic bags and their bad effects on the environment. They know how plastic bags destroy the scenic view and block drainages. They know about environmentally friendly and unfriendly shopping bags. Their attitude regarding the ban is good too. Most of the retailers want to reduce their consumption of plastic bags, and many of the retailers think that the ban does not affect their sales. Most of the respondents consider the ban their duty to follow, while many of them declared it a good initiative to save the environment. But when we come to the practical part of the KAP survey, people are very reluctant to follow the ban. About 60% of the retailers still provide plastic bags, and 62% of them do not keep substitutes for plastic bags at their shops. Retailers blame consumers for demanding plastic bags rather than reusable bags (Appendix).

The second part of the study shows that enforcement of the ban depends upon the fear of being caught and the knowledge about the fee if someone violates the ban. There was an 11.7% higher probability of following the ban of those retailers who think they will be caught if they violate the ban as compared to those who do not think so. The probability of following the

ban of those retailers who know violation fees was 45.2% higher than that of those who do not know. The availability of alternatives also plays a significant role in following the ban. Retailers who think the alternative to plastic bags is available to buy in stock were more in favor of the ban, and those retailers who were in favor of the ban were also following the ban.

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APPENDIX

We have asked a question of 200 respondents to check their knowledge about plastic bag composition. Figure 5 presents the percentage distribution of the retailers regarding this

question. It can be seen that 55.50 percent of people believe that plastic bags are made of polythene, 44 percent do not know the answer, while only 0.50 percent of people said that it is made of cotton. Based on the below figure, we can say that more than 50 percent of people are aware and have knowledge about the composition of plastic bags, and 44 percent of people, which is comparatively less, do not know the material used in plastic bags that could be the reason behind the ignorance and violation of the ban. The percentage of people who know about the composition of plastic bags is also not big but a little above average.
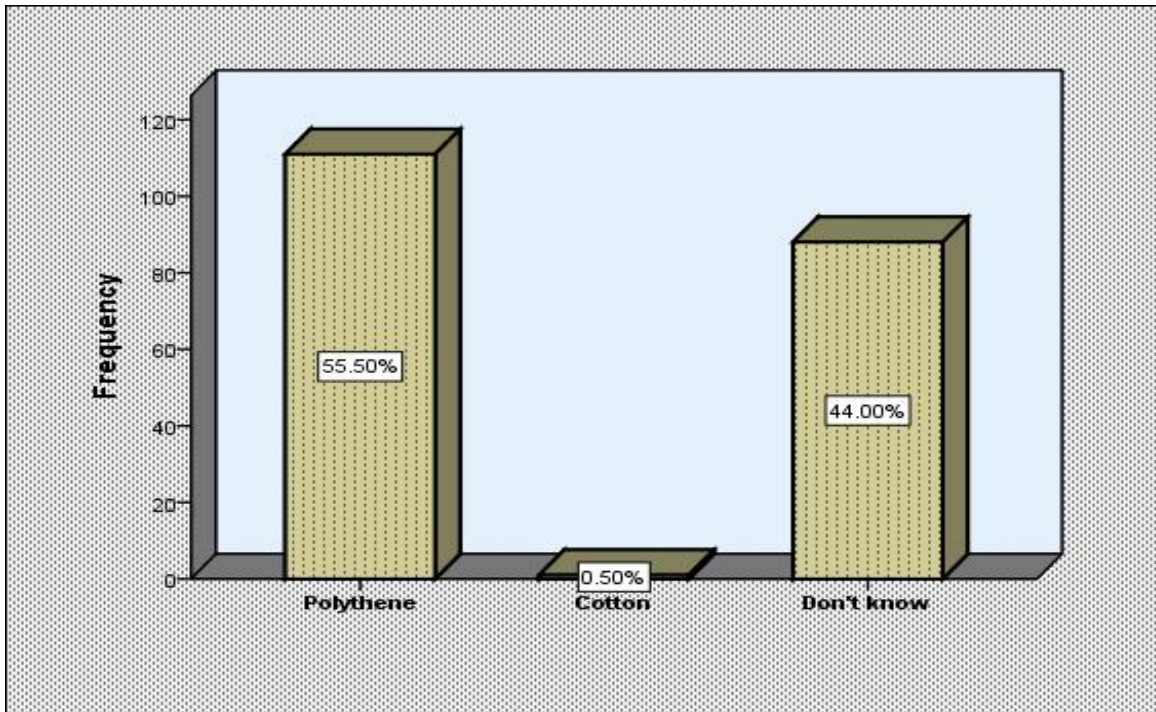
Figure 5: Knowledge about the material from which plastic bags are made

Figure 6 shows the knowledge of the people about environmentally unfriendly bags. Out of 200 respondents, 74.50 percent of people were of the opinion that plastic bags cause more damage to the environment as compared to other bags. 11 percent think that cloth bags are responsible for the bad effect of shopping bags on the environment, while only 1.50 percent chose cloth bags as a culprit for environmental degradation. The rest, 13 percent, were unable to answer the question. As plastic bags are bad for the environment, health, and scenic views, and most of the people have selected the plastic bag option, therefore, based on the above data, we can say that most of the people are aware of the illness and bad effects of plastic bags.
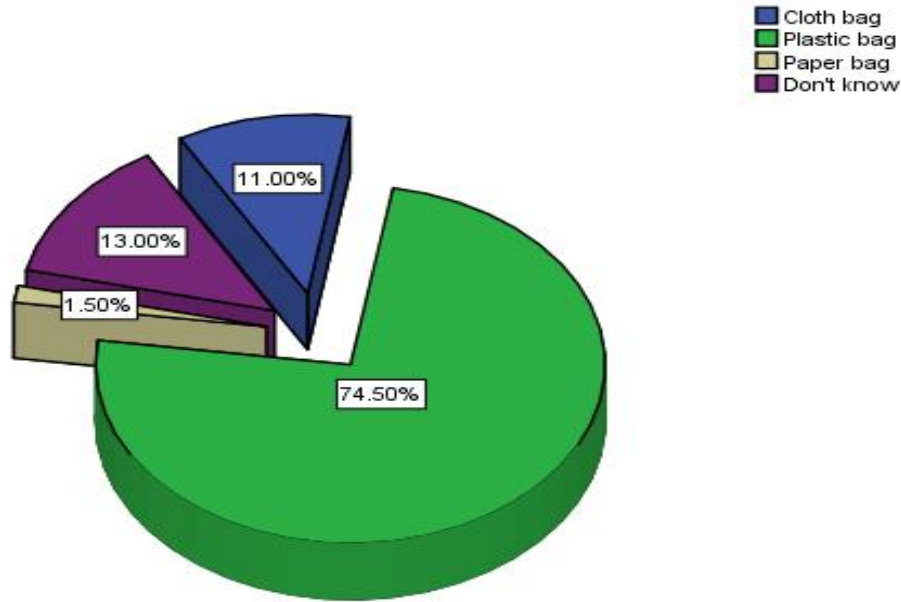
Figure 6: Retailers' knowledge about bags bad for the environment

The figure 7 shows the percentage distribution of the people among 200 retailers who know the fees charged on them due to violation of the ban on the use of plastic bags in the Islamabad Capital Territory. 78.50 percent of them did not know the amount to be charged if they violate the ban, while only 21.50 percent claimed that they knew the amount. The percentage clearly shows the weak knowledge of retailers about the fine if someone violates the plastic bag ban and the government's failure by providing the knowledge about the plastic bag ban.
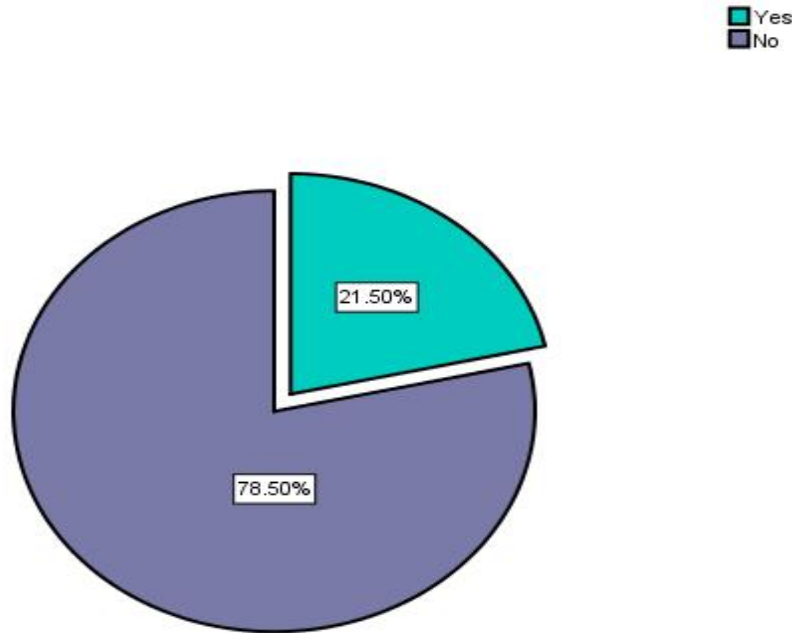
Figure 7: Knowledge about the fine if a retailer violates the ban

The 4 slices of the pie chart in figure 8 show the percentage distribution of retailers giving their opinion on the question, "Why do you obey the plastic bag ban?" asked of 200 retailers in the Islamabad Capital Territory? 36 percent of the shopkeepers consider it their duty to follow the ban, 27 percent said that it is a good decision, while 19 percent believed that the ban is good for the environment and the fine on violation of the single-use plastic bag ban compels 17 percent of the retailers to obey the ban.

Keeping the below figure 8 in mind, we can say that most of the people have a good attitude towards the ban, and they have good reasons to follow it. Only 17.50 percent of retailers chose fine as a reason for following the ban, which shows that only 17.50 percent of people do not care about the other illness of plastic bags.
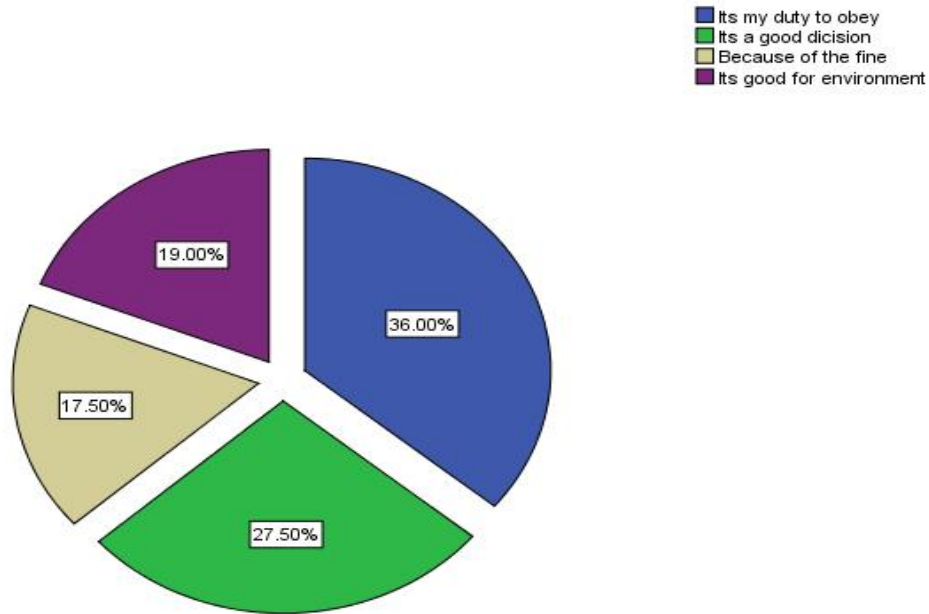
Figure 8: Reason for following the ban

Figure 9 shows the reasons why retailers disobey the SUPBB (single-use plastic bag ban). 61 percent of the retailers said that customers prefer plastic bags; that's why they sell plastic bags. 16.50 percent said that their sales are affected by it, while 12.50 percent of the retailers expressed their views by saying that an alternative to plastic bags is not available and therefore, they are compelled to sell plastic bags. From 200 respondents, only 5.50 percent considered the ban a worthless thing while 4.50 percent selected the other reasons.

The attitude of retailers towards the SUPBB is good. They blame consumers that they prefer plastic bags instead of the alternative available to them; that's why they would disobey the ban.
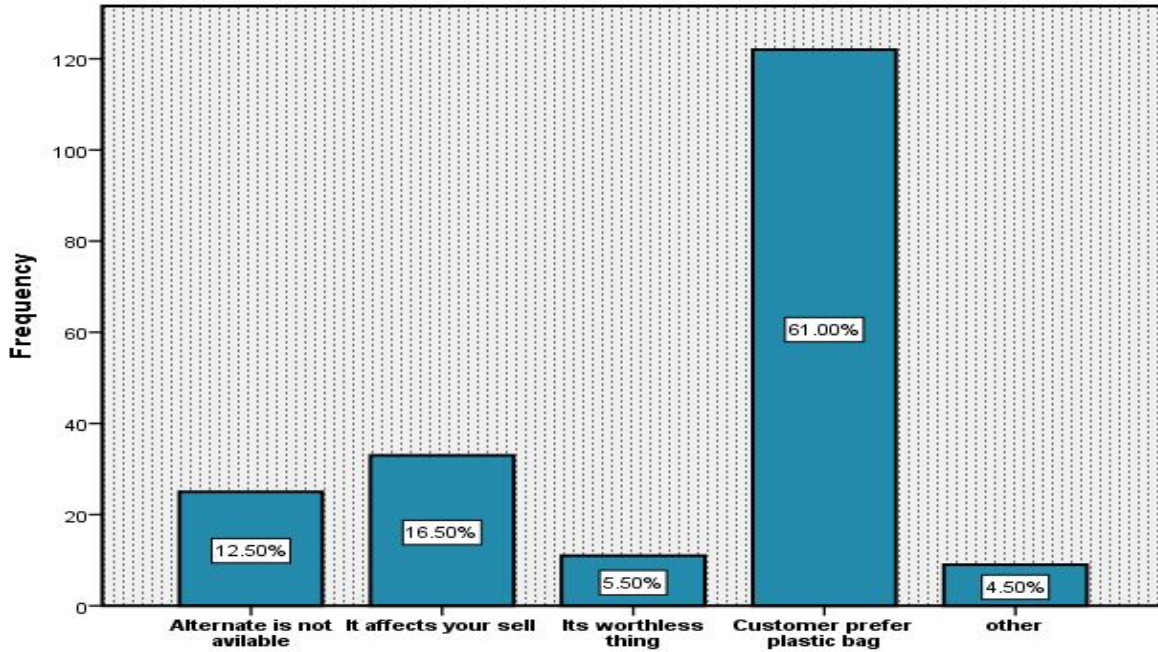
Figure 9: Reason for not following SUPBB

200 retailers were asked a question if they have ever been caught while providing plastic bags to the consumer. Surprisingly, only 9.50 percent of them were caught while having or providing plastic bags, and 90.50 percent said they are not caught yet. The graph below (Figure 10) clearly shows the weak enforcement of the ban across the city of Islamabad. The 9.50 percent caught ratio is a big question mark on government credibility regarding implementing the ban.

Figure 10: Retailers caught while providing plastic bag