




Efficacy of plastic shopping bag tax as a governance tool: Lessons for South Africa from Irish and Danish success stories



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Orientation: The negative environmental effects of single-use plastic shopping bags have prompted national governments to implement interventions to curtail their use. Plastic bag tax is gaining prominence as a single-use plastic shopping bag governance tool in several jurisdictions.

Research purpose: The primary objective of this study is to assess the efficacy of plastic shopping bag tax as a governance tool in South Africa by drawing lessons from Ireland and Denmark success stories.

Motivation for the study: This study contributes to the evolving debate on managing plastic bag litter with the objective of proffering long-term plastic bag litter management strategies.

Research design, approach and method: A quantitative case study methodology was employed in this study. South Africa, Ireland and Denmark qualified as units of analysis. A case study was appropriate for this study as it allowed for an in-depth, context specific analysis of the implementation of plastic bag tax. Document analysis in form of government and environmental reports was used to collect data. Thematic content analysis, which employed an inductive approach was used to analyse data.

Main findings: Stakeholder acceptance, importance of a baseline assessment, proper tax governance, the necessity of continuously monitoring and enforcing the tax emerged as critical success factors.

Practical/managerial implications: Consumer education, regular reviews, extended producer responsibility tax and improved transparency in the use of tax revenue are recommended as best practices to promote effective plastic bag tax implementation.

Contribution/value-add: Effectiveness of the plastic bag tax should be assessed based on changes on volumes of plastic bag consumed, environmental quality and acceptance of the tax by key stakeholders such as manufacturers, retailers and consumers. Promotion of a circular economy in which discarded plastic bags can be reused for energy generation is recommended as a sustainable option.

Keywords: single-use plastic bags; plastic bag tax; circular economy; prospect theory; extended producer responsibility; case analysis.

Introduction

Worldwide, litter emanating from irresponsibly disposed single-use, ultra-thin, plastic shopping bags made from high-density polyethylene is a growing environmental concern (Carman, Machain & Campagna 2015; Dikgang, Leiman & Visser 2012). The problems associated with single-use plastic bags (SUPBs) permeate all stages of the value chain, from production to consumption to disposal. The production of SUPBs results in the depletion of a non-renewable petroleum-derived polymer called high-density polyethylene (Muthu et al. 2013). Moreover, discarded SUPBs are easily carried away by wind, thereby causing air pollution (Wagner & Broadus 2016). Irresponsibly disposed SUPBs also accumulate in the natural environment often blocking water drainage systems and provide the breeding ground for malaria-causing mosquitoes, which is a threat to public health (Ong & Sovacool 2012). Moreover, discarded SUPBs also diminish the aesthetic and recreational value of coastal tourism (Oyake-Ombis, Van Vliet & Mol 2015). Single-use plastic bags disposed in landfills are known to resist degradation. It is estimated that SUPBs take between 500 and 1000 years to decompose (Ong & Sovacool 2012). The prolonged degradation time constrains the already limited landfill capacity (Karlaité 2016).

The environmental problems of SUPBs are worsened by their short lifespan as many are disposed after only single use (Yeow, Dean & Tucker 2014). Typical of a 'public bad', SUPBs litter equally affects polluters and non-polluters (Oosterhuis, Papyrakis & Boteler 2014). According to Morritt et al. (2014), the extent of the plastic bag litter that accumulates in seas and oceans is manifested by the Great Pacific Garbage Patch and the North Atlantic Sub-tropical Gyre. Upon entering the sea, plastics harm marine animals through ingestion (Wang et al. 2016). In 2017, the Statistic Brain Research Institute (2016) estimated that 46 000 plastic fragments were floating per each square mile of the ocean. In 2015, the global annual consumption of SUPBs was estimated at 1 trillion (Center for Biological Diversity 2015).

The pervasive use of SUPBs is spurred in part by the fact that they were traditionally given to shoppers free of charge at the point of purchase (Ohtomo & Ohnuma 2014). Plastic bag tax (PBT) is one of the tools widely used in efforts to curb the use of SUPBs (Homonoff 2013; Karlaitè 2016). The introduction of PBT has been a subject of contestations in several jurisdictions, and this explains its variations in effectiveness. Plastic bag tax was successfully implemented in Ireland, Belgium and Denmark (Convery, McDonnell & Ferreira 2007; Xanthos & Walker 2017). Conversely, in Bulgaria, China and South Africa, PBT failed to achieve the intended results (Dikgang et al. 2012; Larsen & Venkova 2014).

The ineffectiveness of PBT in some jurisdictions including South Africa has triggered several questions. For instance, Hagman et al. (2015) and Stephenson (2018) questioned whether PBT should be levied on consumers or plastic bag producers. There is also no consensus with regard to the determination of the optimum amount of PBT. In this regard, the debate revolves around the appropriateness of using the elasticity of demand and marginal costing as pricing models (Dikgang et al. 2012). The other concern is whether the administrative costs of PBT justify the return (Stephenson 2018). Some researchers (Dikgang et al. 2012; Minter 2015) also questioned whether the carbon footprint of SUPBs is significant enough to warrant such concerns. Other scholars (Klick & Wright 2012; Mangu-Ward 2015) also raised concerns over the environmental suitability of alternatives to SUPBs such as reusable shopping bags. On a more pessimistic note, Stephenson (2018) and Jory et al. (2019) cautioned about the possibility of the PBT to trigger unintended consequences, such as profiteering by retailers or tax evasion. Proponents of anti-PBT also argue that it is not justified as it is not backed up by a conclusive scientific environmental impact assessment (Karlaitè 2016). Another source of resistance is based on the concern that the PBT may precipitate massive job losses in the plastic manufacturing industry, especially in developing countries (Silva 2015). These divergent views have resulted in variations in the nature and scope of PBT implementation across the globe. For instance, the implementation of PBT varies in terms of the amount levied, how it is framed and the stage of the value chain where it is imposed.

The PBT debate is of significant importance to South Africa for two main reasons. In 2015, South Africa was ranked

amongst the top 20 countries with plastic-littered coastal areas (Jambeck et al. 2015). Also, the fact that the PBT has been in effect for almost two decades without a major noticeable difference in plastic bag litter is a matter of great concern to environmentalists and policymakers (Dikgang et al. 2012; McLellan 2014; O'Brien & Thondlana 2019). Against this backdrop, the questions that are central to this study are as follows: (1) 'what are the challenges associated with the implementation of PBT in South Africa?' and (2) 'what lessons can South Africa learn from Ireland and Denmark's PBT success stories?' In an attempt to answer the aforesaid questions, this study employs a multinational case analysis as an initial attempt to harmonise the best practices in PBT implementation. This study also notes that the majority of previous studies on PBT, such as Dikgang et al. (2012), Homonoff (2013), Martinho, Balaia and Pires (2017) and Wagner (2017), were focused on a single-country assessment. This study seeks to contribute to the extant literature by conducting a multiple-case analysis with the objective of suggesting policy directions for effective implementation of PBT.

Literature review

Conceptualisation of the plastic bag tax

Plastic bag tax is a market-based instrument used to discourage the use of SUPBs (Karlaitè 2016; Xanthos & Walker 2017). In its application, PBT is construed as part of environmental tax reforms aimed at mitigating the effects of pollution and climate change (Miller & Vela 2013). In some jurisdictions, PBT is framed as a levy, fee or charge (Muralidharan & Sheehan 2016). Thus, the terms 'tax', 'fee', 'levy' and 'charge' are interchangeably used in this discussion. The overriding objective of the PBT is to change the widespread behaviour of using SUPBs (Convery et al. 2007). From an economic perspective, the PBT is construed as a mechanism that compels polluters to bear the cost of environmental harm caused by SUPBs (Wagner 2017). From a consumer behaviour standpoint, PBT is aimed at disrupting the habitual use of SUPBs and fostering the performance of pro-environmental behaviour (Poortinga, Whitmarsh & Suffolk 2013).

In terms of implementation, PBT takes the form of either extended producer responsibility charge or indirect tax (Singh & Sharma 2016). Extended producer responsibility charge is imposed on producers whose activities are known to pose environmental harm (Bury 2010). It is an upstream charge internalised by the producer and is set at an amount that is as nearer as possible to the social cost of the negative externality to the society (Wagner 2017). This form of tax is regarded as effective because it compels corporates to engage in good environmental citizenship behaviours (Bury 2010).

Conversely, indirect tax is a downstream charge which is meant to be internalised by consumers at the point of purchase (Bury 2010; Eurostat 2016). Plastic bag tax in the form of indirect tax is criticised for being regressive because

it imposes the financial burden on consumers exempting corporates with large carbon footprints (Hagman et al. 2015). Indirect tax is also associated with high administrative costs such as collection costs and monitoring of retailer compliance. For instance, Convery et al. (2007) reported that initial PBT administrative costs in Ireland were more than €1.2 million. This administrative burden was also reported in Botswana where the government admitted its failure to fully track and collect PBT from retailers (Mogomotsi, Mogomotsi & Phonchi 2019).

Optimum amount of the plastic bag tax

There is no consensus on the best approach to determine the optimum level of PBT (Dikgang et al. 2012; Stephenson 2018). Extant literature is dominated by two approaches, that is, Pigouvian and price elasticity of demand. Pigouvian tax was popularised by Pigou (1960) who is regarded as the doyen of environmental tax. The Pigouvian approach sets the optimum level of tax by calculating the marginal external cost associated with a negative externality (Pigou 1960). The major failing of this approach is the inherent challenge associated with determining the optimum amount of tax that is commensurate with the respective environmental harm (Parry 2012; Stephenson 2018). With regard to PBT, Stephenson (2018) notes the challenge of determining the marginal damage caused by each discarded plastic bag. It is also reasonable to argue that the marginal external cost of plastic bag litter differs from land and coastal environments. In such instances, Dikgang et al. (2012) challenged the economic wisdom of using a blanket PBT rate.

Using the price elasticity of demand approach, the PBT is set based on the relationship between the price of the plastic bag and the quantity of plastic bags demanded at the point of purchase (Nolan-ITU 2002). Unlike, the Pigouvian approach, this approach considers the income distribution of consumers and allows for a customised PBT structure (Dikgang, Leiman & Visser 2010). However, this approach has its own limitations. In economic theory, price elasticity of cheap products is known to be low (Stigler 1996). As the plastic bag often contributes an insignificant portion of a consumer's grocery bill, the PBT often lacks a deterrent effect. Another challenge, which was reported by Dikgang et al. (2012), is the challenge of assessing accurate pre-tax and post-tax plastic bag consumption statistics from retailers. Because of the challenges described above, Stephenson (2018) argued that the majority of PBT amounts tend to be more arbitrary than objective.

Theoretical underpinnings of the plastic bag tax

The reason behind the use of PBT gains theoretical support from the prospect theory. The theory posits that individuals' trait of loss aversion predisposes them to engage in acts that translate in gains and avoid behaviours that are associated with losses (Kahneman & Tversky 1979). In this context, the desire to avoid a loss associated with a tax is expected to

motivate consumers not to use SUPBs. From a psychological perspective, the introduction of a tax on goods previously offered for free has the effect of inducing a shock reaction amongst consumers, which has the potential of constraining demand in the short-term (Kahneman, Knetsch & Thaler 1990).

The effect of a PBT is also assumed to be influenced by how it is framed. This view gains theoretical support from the framing theory, which posits that the framing of messages influences their effect in stimulating behavioural change (Goffman 1974). Consistent with the tenets of the framing theory, Borean (2013) observed that consumers perceive that the payment of a tax is mandatory whilst a fee or levy is voluntary. This view was also confirmed in a study by Muralidharan and Sheehan (2016), wherein a plastic bag charge labelled as a tax was found to be more effective than one framed as a levy or fee in changing behaviour related to the use of plastic shopping bags.

Materials and methods

This study utilised a case study methodology in the form of a comparative analysis of countries that have implemented PBT. This study was guided by a five-staged process of conducting case study research suggested by Creswell and Poth (2018) and Stake (1995). The process involved determining the appropriateness of a case study approach, case identification and sampling procedures; developing procedures for data collection; specifying data analysis techniques and reporting study findings.

Appropriateness of case study approach

A case study was deemed appropriate for this study because it is recommended for analysing context-dependent phenomenon with multiple sources of information (Creswell & Poth 2018; Stake 2005). There are differences in contextual factors that influence the implementation of PBT per each jurisdiction; and for this reason, the case study approach was considered appropriate. Also, the purpose of this study was to conduct a comparative analysis of identifiable countries that have implemented PBT. This was another key consideration for employing a case study design.

Identification of cases and sampling procedures

The case studies were drawn from a list of countries that have implemented PBT (Table 1-A1). The inclusion and exclusion criteria were as follows: the cases were only drawn from PBT implemented by national governments as it permitted researchers to draw policy implications. Voluntary plastic bag fee arrangements were not considered in this study. A period of more than 15 years after the implementation of the PBT was used as the appropriate time frame as it provided longitudinal data adequate to assess the effectiveness of PBT. Using purposeful maximal sampling, Denmark, Ireland and South Africa were selected. This sampling technique allowed for the selection of case studies that showed different perspectives on the research problem

(Creswell 2012; Yin 2009). Denmark and Ireland reported success with PBT albeit with different PBT structures, whilst South Africa achieved very limited success. The three countries selected are all committed to maintain the pristine environment of their coastal and land environments. Thus, the case studies were purposively sampled in order to illustrate distinct approaches in the implementation of PBT.

Data collection procedures

Data were collected in South Africa, Denmark and Ireland. The three countries were selected for their difference in the manner they implemented PBT. Data were collected using document analysis because it is regarded as a key source of data in case studies that focus on public policy (Nielsen, Homberg & Stripple 2019; Yin 2014). Consistent with this view, policy documents, government reports, environmental organisation reports and peer-reviewed literature were used as data sources. Following the approach of Xanthos and Walker (2017), electronic databases such as SCOPUS, ProQuest, Web Science and EBSCO were searched systematically to gather data using keywords such as 'PBT', 'levy' or 'charge'. Data were collected for a period of 4 months, from February to May 2018. The following subsections provide the case study description.

Case study 1: Plastic bag tax in Denmark

Denmark is a Nordic country situated in Northern Europe. To maintain the aesthetic value of its islands and Baltic Sea

TABLE 1: Revenue from plastic bag tax.

Period	Amount (€)
1995	21 564 000
2000	23 179 000
2005	25 723 000
2010	26 818 000
2014	24 547 000

Source: The Danish Ecological Council, 2015, *Fact sheet: Tax on plastic bags*, viewed 23 November 2018, from <https://green-budget.eu/wp-content/uploads/tax-on-plastic-bags>

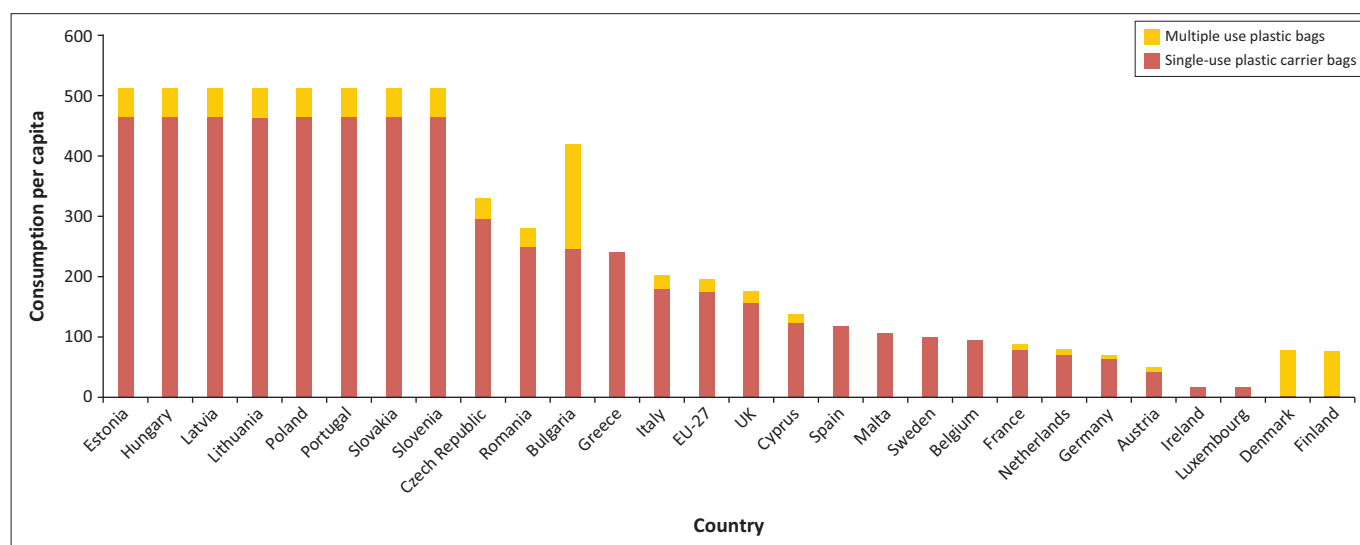
beaches, Denmark became the first country to implement a PBT in 1994 (Xanthos & Walker 2017). The tax, which was managed by the Danish Ecological Council, was in the form of an indirect tax imposed on manufacturers and importers of plastic bags. The tax was calculated based on the weight of the plastic bag (Newman et al. 2015). A weight-based PBT was aimed at reducing the amount of plastic material used during the manufacturing process (Convery et al. 2007). The tax was estimated to equate to the social cost of litter posed by SUPBs (Kasidoni, Moustakas & Malamis 2015; Wagner 2017). It was also designed in a manner that allowed manufacturers to pass the PBT to retailers who then used their discretion to charge consumers (The Danish Ecological Council 2015). A manufacturer or import tax was preferred in Denmark as opposed to a consumer-level point of purchase charge because of high administrative costs associated with the later (The Danish Ecological Council 2015).

The PBT was initially charged at 20 Danish Krone (DKK) per kilogram in 1994 and was later revised to 22 DKK per kilogram in 1998 (Larsen & Venkova 2014). The introduction of PBT significantly reduced the consumption of plastic bags from an estimated pre-tax level of 800 million bags in 1994 to 400 million bags in 2014 per year (The Danish Ecological Council 2015). Table 1 summarises the amount of tax collected from the sales of plastic bags.

The effectiveness of the PBT is shown by Denmark's low plastic bag consumption per capita as compared to other European countries as illustrated in Figure 1.

Case study 2: Plastic bag tax in Ireland

During the 1990s, plastic bag litter was a major concern in Ireland, contributing almost 5% of the national litter (The Litter Monitoring Body 2005). Litter from plastic bags was so ubiquitous around coastlines and was commonly referred to as 'witch's knickers' (Ritch, Brennan & MacLeod 2009). In



Source: Euro-Commerce, 2014, *Lightweight plastic carrier bags: Position paper on European Parliament Amendments to Directive 94/62/EC*, viewed 10 February 2017, from https://www.eurocommerce.eu/media/86311/EuroCommerce%20position_lightweight%20plastic%20carrier%20bags_.pdf

FIGURE 1: Consumption of plastic shopping bags.

1998, the Department of Environment, Heritage and Local Governance commissioned a study to assess the magnitude of plastic bag litter as well as to determine the amount consumers were prepared to pay for each plastic bag. The study found that retailers were distributing 1.26 billion plastic bags per year, which translated to a per capita consumption of 328 bags (Convery et al. 2007; Oosterhuis et al. 2014). The study also revealed that consumers were willing to pay an average of €0.024 tax per bag (UNEP 2018). The study culminated in the promulgation of the Waste Management Regulations 2001 (Statutory Instrument 605 of 2001) which ushered in the PBT named 'PlasTax'.

The tax amount was set by first estimating the amount consumers were willing to pay for a plastic bag and an amount six times the amount was set (Convery et al. 2007). Reusable shopping bags were exempted from tax subject to a retail charge of €0.70 per bag at the point of purchase (Xanthos & Walker 2017). Before the tax was implemented, the Irish government consulted and secured the cooperation of manufacturers, retail outlets and consumers (Earth Policy Institute 2014). The Irish government also educated the general public about the benefits that accrue to the natural environment when the levy is implemented (Muralidharan & Sheehan 2016). The PBT was introduced in 2002 and was pegged at €0.15 per bag and was imposed on consumers of ultra-thin SUPBs (National Litter Pollution Monitoring System 2013).

From 2002 to 2005, a significant drop of about 94% was reported in the use of SUPBs (Muralidharan & Sheehan 2016). In per capita terms, the annual consumption of plastic bags dropped from an estimated 330 bags to 21 bags per capita (Newman et al. 2015). In 2007, an upward trend in the use of SUPBs estimated at 9% was reported (WRAP 2013). In what was dubbed the 'rebound effect', this increase was attributed to the erosion of the deterrent effect of the tax because of inflation (He 2012). This led to the upward review of the plastic bag levy from €0.15 to €0.22 in 2007 and further increase to €0.44 in 2009 (Xanthos & Walker 2017). The increase in PBT resulted in a further decrease in per capita consumption to 18 bags in 2010. In 2011, the Irish government recommended an annual review of the plastic bag fee within a ceiling of €0.70 per bag (National Litter Pollution Monitoring System 2013). In 2012, plastic bag litter was estimated at 0.3% as compared to 5% in 2001 before the tax (National Litter Pollution Monitoring System 2013). In 2014, as shown in Figure 1, Ireland was ranked in the top five as the lowest in the consumption of SUPBs in Europe (Euro-Commerce 2014).

The revenue is collected by commissioners who also audit and monitor retailer compliance. The revenue generated from the PBT is channelled to the Environmental Fund, which is under the auspices of the Department of Environment, Heritage and Local Governance. The Environmental Fund is used to finance environment-enhancing programmes such as landfill clean-ups and recycling centres as well as financing the costs of revenue

TABLE 2: Environmental levy on plastic bags.

Period	Amount (€)
2002	10 428 413
2003	12 883 408
2004	15 278 107
2005	17 484 551
2006	19 947 315
2007	22 577 535
2008	26 664 513
2009	23 466 133
2010	17 457 667
2011	15 725 008
2012	13 863 176
2013	14 768 533
2014	12 714 544
2015	11 727 772
2016	8 733 834
2017	7 280 045

Source: Environment Fund, 2017, *Accounts 2002–2017*, Department of Communications, Climate Action & Environment, Dublin

collection (Convery et al. 2007; Larsen & Venkova 2014). Table 2 summaries the revenue generated from PBT.

Case study 3: Plastic bag tax in South Africa

Before the introduction of the tax, litter from discarded plastic bags was so rampant that it earned the moniker 'the new national flower' (Ritch et al. 2009). Before the tax, it was estimated that South African consumers were using 8 billion plastic bags per year (Dikgang et al. 2012). The PBT was introduced on 09 May 2002 governed by Section 24(d) of the *Environmental Conservation Act No. 73 of 1989*. Plastic bag tax is part of environmental taxes that include tyre levy, electricity levy, incandescent light bulb levy and carbon tax. The PBT was accompanied by conditions for manufacturers and retailers (Dikgang et al. 2012). Retailers were mandated to charge a fixed fee of 46 cents per plastic bag along with 3 cents levy (Larsen & Venkova 2014). The conditions for manufacturers included the regulation of the type of ink used for printing plastic bags, production of plastic bags with a minimum thickness level of 24 microns, transparency regarding disclosure of the costs of plastic shopping bags and prohibition of plastic bag imports (Dikgang et al. 2012).

The government collects PBT from retailers through the South African Revenue Service (SARS) and manages the disbursement of funds with a portion directed to environmental projects. In 2009, Nahman (2010) reported that only 13% of the revenue was directed to 'Buyisa e-Bag' a company which was dedicated to the recycling of plastic bags. For this reason, questions were raised in parliament pertaining to how the revenue is being used (Nahman 2010). During the first 3 months of implementation, an estimated 76% reduction in the consumption of plastic bags was reported (Hasson, Leiman & Visser 2007). Thereafter, an increase in the use of plastic bags was reported (Dikgang et al. 2012). In 2008, following pressure from manufacturers wherein they argue that the PBT will result in job losses, the PBT was relaxed resulting in a 46% decrease in the price of plastic bags (Knowler 2008). Around 2010, as consumers got

TABLE 3: South Africa plastic bag tax revenue.

Period	Plastic bag tax (in ZAR)	Amount collected (ZAR) [†]
2007–2008	0.03	86 000 000
2008–2009	0.03	79 000 000
2009–2010	0.04	111 000 000
2010–2011	0.04	150 000 000
2011–2012	0.04	161 000 000
2012–2013	0.04	151 000 000
2013–2014	0.06	169 000 000
2014–2015	0.06	174 000 000
2015–2016	0.06	183 000 000
2016–2017	0.08	232 000 000
2017–2018	0.08	241 000 000

Source: South African Revenue Service, 2007–2019, *Tax statistics 2019*, Department National Treasury, Republic of South Africa, Pretoria

[†], Net amount after administrative deduction costs; 1USD = 14.50 ZAR (ZAR = South Africa Rand).

accustomed to paying the tax and its deterrent effect was eroded (Dikgang et al. 2010) and an upward trend in the use of SUPBs was noted (Larsen & Venkova 2014). Overall, Dikgang et al. (2012) noted that the drop in the use of SUPBs was not sustained in the long term. Table 3 summarises the PBT revenue.

Data analysis

A two-staged process recommended by Creswell and Poth (2018) was followed to conduct data analysis. The first stage involved a within-case analysis in which a detailed description of each case was given. The second step involved a cross-case analysis which encompassed across-the-case analysis, theme identification, theme refinement and integration (Guba & Lincoln 1994; Yin 2009). Results of the comparison of three cases with regard to the implementation of PBT are discussed as follows:

Ethical consideration

This article followed all ethical standards for research without direct contact with human or animal subjects. Reference number: FOM2017.

Results and discussion

Acceptance of PBT, the importance of baseline assessment, governance of PBT, extended producer responsibility and necessity of monitoring and review emerged as major lessons for South Africa and are discussed in the following.

Acceptance of plastic bag tax

One of the critical factors for the success of any policy instrument, including PBT, is acceptance by key stakeholders. The Irish case demonstrates the importance of stakeholder mapping. The Irish government consulted key role-players such as manufacturers, retailers and consumer groups. Plastic bag tax awareness campaigns were also conducted to educate all stakeholders on the benefits of PBT. This resulted in a broader acceptance of PBT, smooth implementation and enforcement. Turning to

South Africa, Hasson et al. (2007) reckoned that consultation was not comprehensively conducted in South Africa, and it resulted in resistance from manufacturers which led to the reduction of the tax in 2008. Similarly, Dikgang et al. (2012) attributed the poor support of the PBT in South Africa to limited pre-emptive advocacy campaigns aimed at consumer education. If the introduction of PBT reflects stakeholders' will as in the Irish case, the possibility of success is high. Conversely, PBT is bound to fail if it is used as a tool to coercive reluctant value chain stakeholders to change behaviour.

Importance of baseline assessment

The Ireland case demonstrated the importance of conducting a baseline assessment before PBT implementation. An analysis of the magnitude of the plastic bag litter problem and concerns of manufacturers and retailers was performed before tax roll-out. More importantly, an assessment of the amount consumers were willing to pay for a plastic bag enabled Ireland authorities to set a PBT amount that had a deterrent effect. A baseline assessment could have assisted South Africa to implement a PBT structure appropriate for a developing country. For instance, the current blanket rate is being criticised for being regressive (Dikgang et al. 2012; UNEP 2018). This is because as observed by UNEP (2018), in developing countries such as South Africa, plastic bags remain the most affordable means of carrying merchandise by low-income earners. As such, efforts to prohibit its use without affordable alternatives are likely to achieve limited success.

Governance of plastic bag tax

The Irish and Danish cases demonstrated that good governance is central to the success of PBT implementation. Plastic bag tax is an environmental issue and should be managed by environmental departments as is the case in Ireland and Denmark. In South Africa, the role of the Department of Environment Affairs in the implementation of PBT is not clear. To provide an independent oversight, the Environmental Fund and the Danish Ecological Council monitor the implementation of PBT in Ireland and Denmark, respectively. In Ireland, commissioners who manage the Environmental Fund are responsible for PBT revenue collection including monitoring retailer compliance (O'Neil 2016). In Ireland and Denmark, there is transparency and full disclosure of the revenue generated from PBT (Convery et al. 2007). Moreover, revenue from PBT is ring-fenced and is used to finance environment-enhancing projects. Conversely, in South Africa there is a veil of secrecy about how PBT revenue is utilised (McLellan 2014). In addition, critics of the plastic bag levy in South Africa argue that it is being used as a revenue generation scheme by the government to fund fiscal deficits with little being devoted to environmental sustainability projects (O'Brien & Thondlana 2019). Again, in Ireland, the roles of the Department of Environment and Commissioners are clearly defined. This

form of transparency, according to Baranzini and Carattini (2017), is critical for the acceptance of PBT as a policy instrument.

Necessity of monitoring and review

The Irish case also points to the importance of continuously reviewing PBT in order to maintain its deterrent effect. Ireland reviewed its PBT from €0.15 to €0.22 in 2007 and to €0.44 in 2009 and in this way the deterrent effect of the tax was sustained (Xanthos & Walker 2017). Although South Africa now reviews PBT almost every 2 years, the rate of ZAR0.08 as of 2017 was too little to enhance any behavioural change amongst consumers. This could be one of the most plausible reasons why the use of SUPBs is escalating. Dikgang et al. (2010) concurred that a small amount of PBT often constitutes a negligible amount of the household budget which often goes unnoticed. In its current form, the PBT in South Africa can be best described as a nudge, not a tax. In order to set an optimum and effective amount of PBT, Dikgang et al. (2010) stressed the importance of evaluating the effect of the PBT on the elasticity of plastic bag demand. This approach, according to Poortinga et al. (2013), has the potential of setting a tax amount that has a restraining effect on the use of SUPBs.

Extended producer responsibility

The Danish case also illustrates the importance of adopting an integrated value chain approach in implementing PBT. The Danish PBT was shared by manufacturers, retailers and consumers. This addresses perceptions, which were raised about selective application of the PBT in South Africa. In particular, the PBT structure in South Africa is regarded as against the principles of environmental justice as it places the burden on consumers, yet exempting manufactures with significant carbon footprints (McLellan 2014). Thus, South Africa should consider adopting the extended producer responsibility approach as it provides an incentive for producers to incorporate environmental considerations in the design of plastic shopping bags.

Implications of the study

The study findings have important implications for policymakers intending to use PBT as a policy instrument. In order to set an optimum amount of PBT with a prohibitive effect, it is important to evaluate the elasticity of plastic bag demand. An understanding of elasticity of demand allows policymakers to set a PBT amount that has a restraining effect. In addition, PBT for manufacturers, retailers and consumers is recommended as it permits externalities related to SUPBs to be internalised at each stage of the value chain. In developing economies such as South Africa, there is also a need to move away from a regressive PBT as it disadvantages low-income earners.

Transparency on the utilisation of revenue generated from PBT is central to the acceptability of SUPBs tax. In this regard, South Africa's Department of Environmental Affairs

needs to play a key role in directing the PBT revenue to finance environment-enhancing projects. Another key lesson for policymakers is to refrain from evaluating the effectiveness of the tax during the initial stages of implementation as a reduction in plastic bag use may be a result of the level of environmental awareness that accompanies the tax or loss aversion perceived by consumers. Policymakers in developing countries should also consider implementing a direct tax as opposed to indirect consumer-level tax. This is because the latter has huge administrative costs that may put a strain on the collection of revenues.

As the use of PBT and alternatives of SUPBs proliferates, there is also a need by policymakers to guide against unintended consequences. For instance, there are growing perceptions that some retailers are 'bagging' the PBT. Another worrying trend is the emerging of unscrupulous predatory entrepreneurs who are keen to cash on the green shopping bag mantra. For example, in South Africa, manufacturers of reusable shopping bags are being accused of exaggerating the environmental benefits of such bags (Department of Environmental Affairs 2017). This study acknowledges that promoting a circular economy in which discarded plastic bags can be reused for energy generation is the sustainable option.

Conclusion

The objective of this study was to assess the effectiveness of PBT as a mechanism to curb the use of SUPBs. Three case studies of countries that have implemented PBT were analysed. The study found that PBT can be effective as a plastic bag governance tool based on its success in Ireland and Denmark. The engagement of stakeholders, such as manufacturers, retailers and consumers, and enforcement are necessary for effective implementation. There is a need for transparency on how the revenue generated from PBT is utilised. There is also a need to continuously monitor and review the PBT in order to safeguard its deterrent effect as failure to do so results in a rebound effect on the use of SUPBs. This study concludes that the effectiveness of the tax should be assessed based on not only changes in the volume of plastic bags consumed but also on the environmental quality and acceptance of the tax by the public. In the long term, this study recommends an integrated framework for plastic bag litter management that encompasses both regulation and normative-based strategies. To achieve this, future studies may also evaluate the effectiveness of other interventions such as bans, recycling and voluntary initiatives using more case studies in order to develop an integrated framework to manage plastic bag litter.

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The authors confirm that the data supporting the findings of this study are available within the article.

Disclaimer

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Appendix 1

Plastic Bag Tax/Levy global picture

TABLE 1-A1: Plastic bag tax/Levy per country.

Country	Year	Policy type	Scope
Belgium	2007	Tax/levy	National
Botswana	2007	Levy	National
Bulgaria	2011	Levy	National
Croatia	2017	Levy	National
Cyprus	2018	Tax	National
Denmark	1994	Tax	National
Estonia	2017	Tax	National
Fiji	2017	Levy	National
Greece	2018	Levy	National
Hungary	2012	Levy	National
Ireland	2002	Levy	National
Israel	2017	Levy	National
Latvia	2009	Levy	National
Lithuania	2016	Tax	National
Malta	2009	Tax/levy	National
Netherlands	2016	Levy	National
Poland	2017	Levy	National
Portugal	2017	Levy	National
Romania	2009	Tax/levy	National
Slovakia	2018	Levy	National
South Africa	2003	Tax/levy	National
Taiwan	2003	Levy	National
Tunisia	2017	Levy	National
Uruguay	2017	Levy	National
Wales	2011	Tax/levy	National

Source: United Nations Environmental Programme (UNEP), 2018, *Single-use plastics: A road to sustainability*, United Nations Environmental Programme, Nairobi