Environmental Taxes and the Double Dividend Hypothesis: A Case Study from Ireland

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**Abstract**

An environmental levy recently introduced in Ireland imposes a tax at the point of retail sale on lightweight plastic bags used by shoppers, previously supplied free of charge by retailers. This paper assesses the measure in terms of its environmental effectiveness and its ability to raise sufficient revenue net of collateral costs to reduce distortionary taxes. Post-implementation surveys of retailers and shoppers are presented, covering issues of implementation and attitudes to alternatives. Difficulties identified by respondents are analysed. Finally suggestions are made for modifications to the levy that would enhance its effectiveness if introduced in other jurisdictions.

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1. Introduction

This paper examines at a levy on plastic bags introduced in Ireland in 2002, and assesses its effectiveness as an environmental tax, in terms of the achievement of a double dividend for the economy. It analyses difficulties encountered in the introduction and implementation of the levy, and suggests refinements to improve its effectiveness if introduced in other jurisdictions.

General trends in taxation in Europe, according to the European Environment Agency, show that labour taxes are increasing, capital taxes are falling, and environmental tax revenue is relatively stable, while at the same time “green tax reforms” are being introduced in several European countries in an effort to use the new stream of revenue to reduce labour taxes. The agency contends that environmental taxes are an effective way of tackling pollution issues, and recommends an increase in their use, in part by expanding the tax base to target previously untaxed pollutants.

The lightweight plastic shopping bags commonly used in Ireland up to 2002 were neither biodegradable nor substantially reusable, and so the environmental threat they posed constituted a significant negative diseconomy, not associated with more durable, reusable bags. The levy introduced on 4th March 2002 sought to reassign the wider social cost of this environmental hazard to those taxpayers responsible for placing plastic bags in the waste stream. At the same time, the levy was intended to

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raise revenue, which could be used to reduce distortionary taxes on labour and capital. In effect, it aimed to achieve a double dividend for Irish society.

The implementation of the plastic bag levy is assessed in three ways: a survey of retailers highlights some difficulties with implementation, and assesses the cost to business of the introduction of the scheme; a survey of consumer reaction sheds light on the drivers of its success, and indicates possible improvements that could be implemented; finally, the achievement of the double dividend is measured by reference to revenue raised, net of costs of implementation.

The paper is set out as follows. Section two discusses research on the influence of taxes on taxpayer behaviour, to provide a framework within which to evaluate the levy. Section three reviews the theory on environmental taxes, describes the double dividend hypothesis, and briefly reviews studies in this area. Section four sets out the background to the introduction of the tax, the alternatives considered by the government at the time, and the details of the levy as introduced. Section five evaluates the implementation of the tax, reporting results of surveys of retailers and customers. Section six addresses the question of whether or not the double dividend was achieved. Section seven concludes, suggests refinements on the taxing mechanism and avenues for future research.

2. The Influence of Tax

A key question in tax research is whether or not taxes can influence behaviour. Proponents of tax neutrality would argue not alone that they do not, but also that they
should not. Tax neutrality is often cited as a goal of reform legislation, yet tax systems are rarely neutral. Mintz\(^2\) states:

 Governments rarely try to achieve [tax] neutrality … they purposely try to influence investment behaviour by giving special exemptions or deductions

Governments continue to use the tax system, not only as a source of revenue, but also as a tool to influence taxpayer behaviour, despite the associated costs. Norregaard and Owens\(^3\) observe:

 There has recently been a shift from interventionism to neutrality, in part reflecting a growing scepticism about the ability of governments to ‘pick winners’ and an increased awareness that the cost of incentives in terms of revenue foregone may exceed the extra investment generated by these subsidies. Nevertheless, governments continue to subsidise particular activities and sectors.

Scholes and Wolfson\(^4\) identified three non-neutral aims in the design of a tax system.

 “Among other things, taxes are designed to (1) finance public projects …(2) redistribute wealth … and (3) encourage a variety of economic activities that are deemed to be in the public interest.

Environmental taxes place a particular emphasis on the third of these objectives, seeking to change taxpayer behaviour so as to minimise activities deemed harmful to the environment. The reactions of taxpayers to tax changes, and the degree with which they conform to policy objectives, are therefore of particular interest for environmental taxation policy. Maydew\(^5\) notes that:

Empirical estimates of the extent to which various tax regimes affect behaviour is … central to understanding whether and how much those tax regimes generate deadweight costs.

Many environmental taxes are aimed at an output that is not directly measurable, such as carbon emissions, but are levied on a proxy, such as petroleum sales. The plastic bag levy is different, in that consumption of the product is measurable, and is close to the target of the tax, plastic bags entering the waste stream. This provides an interesting quasi-experimental setting in which to evaluate the effectiveness of this sort of tax.

3. Environmental Taxes and the Double Dividend

This section initially looks at environmental taxes, how they have been categorised, and the factors influencing their successful implementation, before going on to discuss in more detail the idea of the double dividend hypothesis.

3.1 Environmental Taxes

Environmental taxes may be categorised either by target or by purpose. For example, Ecotec (2001)\(^6\) identifies nine classes of environmental taxes, targeting respectively air emissions, water abstraction, waste water, pesticides, fertilizers, landfill, aggregates, packaging and batteries. By contrast, the European Environment Agency\(^7\) categorises environmental taxes into three main types by purpose:

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\(^7\) The European Environment Agency, n 1, at 2
* cost-covering charges - e.g. designed to cover the costs of environmental services and abatement measures, such as water treatment (user charges) and which may be used for related environmental expenditures (earmarked charges):
* incentive taxes - designed to change the behaviour of producers and/or consumers; and
* fiscal environmental taxes- designed primarily to raise revenues.

They note that very often a single tax can serve a mix of these three functions. Most green taxes include at least some element of incentive effect in their design, and so by definition are not neutral, as they seek not only to raise revenue, but also to directly influence taxpayer behaviour, to the benefit of the environment.

The European Environment Agency goes on to include a checklist for successful implementation of environmental taxes\(^8\). The principal points are: detailed advance studies on the likely impact of the tax; extensive consultation with fiscal authorities, stakeholders and the public; recycling of the revenues to taxpayers or related sectors; an increasing incentive effect over time and in-built evaluation measures. If these are met, the agency contends that the tax should reassign the cost of pollution from society as a whole to those responsible for the problem, bringing the private cost of negative externalities up to the level of the social cost. This is the essence of the “polluter pays” principle.

### 3.2 The Double Dividend

Arthur Pigou (1877-1959) developed the concept of a “national dividend” as a monetary measure of aggregate economic welfare\(^9\). He noted that an increase in

\(^8\) The European Environment Agency, n 1, at 10
\(^9\) His work in this area was based in part on that of Alfred Marshall (1842-1924) and Henry Sidgwick (1838-1900). See Y. Yoshino, “An Essay on Pigouvian Externality” (2001) University of Virginia Working Paper, for more discussion.
production of a given good can have effects external to the producer, and that these externalities can be negative or positive. Common examples are respectively a polluting factory, which damages the local environment, creating negative externalities in the surrounding community, or a lighthouse, which is useful to all ships, including those who have not paid for it, and so enjoy a positive externality at no cost. Pigou argues\textsuperscript{10} that positive externalities persist where there is no efficient way of charging the beneficiaries for the spill-over effect they enjoy, while negative externalities will persist as long as there is no impediment, since the cost accrues to a non-contracting party.

The national dividend is defined as being maximised when negative externalities are eliminated. Pigou proposes that this can be achieved by what has become known as a Pigouvian tax. This is a levy on products or transactions that produce negative externalities, calculated to bring the private cost up to the social cost, and to compensate wider society for the negative externality. This encapsulates the “polluter pays” principle, that the costs of environmental damage should be paid for by the polluter, rather than the taxpaying public.

Within this framework, a levy imposed only on those lightweight plastic bags that pose a pollution threat is a fair tax. The argument is that the tax removes a previous implicit subsidy by society for the environmental damage they cause, and levels the playing pitch for producers of competing, more socially responsible products. Such a levy also raises revenue for the government, which should allow it to reduce other taxes which create distortions. The most common examples of distortionary taxes

given in the literature are payroll taxes, which reduce the incentive to work, and
capital taxes, which dampen the incentive for enterprise. If a Pigouvian tax can raise
sufficient revenue to allow the government to reduce labour and capital taxes, the
argument goes that it will yield a “double dividend”: first by eliminating the negative externality, and secondly by allowing distortionary taxes to be reduced. The overall effect of the switch from labour or capital taxes to Pigouvian taxes may be revenue-neutral, but the improved efficiency of eco-taxes constitutes a “second” dividend, in addition to the improvement in the environment.

Recently considerable doubt has been cast on the validity of the double dividend hypothesis. Arguably, a Pigouvian tax will increase the cost of the product or service on which it is levied, and this cost will be passed on to the ultimate consumer, negating the effect of any increase in welfare arising from the removal of distortionary labour or capital taxes\textsuperscript{11}. This counter-argument has been challenged by researchers such as Schleiniger\textsuperscript{12} using newer models which incorporate the short-run public perception of tax savings as disproportionate to price changes.

A second counter argument says that for the second dividend of improved efficiency in the tax system to be achieved, the tax raised must be passed costlessly to government and back again to those who bear the social cost of the pollutant. This recycling must be achieved without contributing to tax distortions in labour or capital markets. Effectively, the revenue raised by the Pigouvian tax must be greater than any tax interaction effects. This is clearly problematic, but may be less of an issue where

the revenue raised from the Pigouvian tax is small relative to that raised by distortionary taxes it aims to replace. Kerr\(^\text{13}\) notes, “tax interactions are only really critical where the anticipated tax is large”

One difficulty with these discussions is that analysts have defined the second dividend in many different ways\(^\text{14}\), which has led to some confusion. There is broad agreement on the availability of the first dividend of environmental improvements. Goulder\(^\text{15}\) takes the view that the preoccupation with determining the extent of the second dividend arises from uncertainty about the magnitude of the first. He defines three forms of the double dividend as follows: for weak-form to be achieved, it must be shown that recycling the revenues from Pigouvian taxes is more efficient than returning them to taxpayers in cash. In the intermediate form, it is theoretically possible to identify a tax so distortionary that its substitution by Pigouvian taxes would improve the efficiency of the overall tax system. Finally, if the strong form holds, substituting most taxes by Pigouvian taxes would improve the efficiency of the tax system. Goulder reviews the literature and finds widespread evidence of the weak form, and mixed results for the stronger forms. He concludes that more research should be focused on the first environmental dividend\(^\text{16}\). This gap could be addressed in part by a study of the Irish levy on plastic shopping bags, since any reduction in the pollutant in response to the tax is directly measurable. This makes the tax an interesting case-study of the first part of the double dividend.


\(^{15}\) Goulder, n 14

\(^{16}\) Goulder, n 14, at 176 “Research that helps establish the environmental benefits associated with various environmental tax options will have considerable value to policy analysts”
4. **The Irish Situation**

This section sets out the background to the tax in Ireland, and gives details of how the levy was implemented.

4.1 **Background to the tax in Ireland**

Despite an international reputation as a rural country with a clean environment, Ireland remains largely dependent on landfill for waste disposal. This leads directly to problems such as water contamination and visual damage to the landscape.\(^{17}\)

The landfill problem is growing. Almost 2.3 million tonnes of household and commercial waste were produced in Ireland in 2000 – an increase in excess of 60 per cent in five years. In 2000, 87.8 per cent all household and commercial waste was disposed of by landfill, with only 12.2 per cent being recycled. At this time, plastic accounted for about 15 per cent (by weight) of landfill waste\(^{18}\). However lightweight plastic bags were identified as a particular problem, the plastic commonly used in lightweight shopping bags does not degrade in a natural environment even where it is disposed of in landfills, and produces toxic gas when incinerated. These bags are also prone to wind dispersal. This produces a danger to farm animals and wildlife, as well as visual pollution which threatens tourism. All of these factors led to lightweight plastic bags being identified as a priority for elimination.

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\(^{17}\) See [http://www.epa.ie](http://www.epa.ie) for an extensive discussion on the problems of landfill in Ireland

In 1999, the Irish government commissioned a study to examine use of plastic shopping bags in Ireland, and their effect on the environment. The report assumed that consumptions levels proxied litter levels, so a reduction in levels of use would result in a corresponding reduction in plastic bags entering the waste stream. It examined existing trends and initiatives designed to reduce plastic bag use, weighed the environmental cost of plastic and paper shopping bags, and evaluated a number of alternatives designed to reduce the number of plastic bags ending up in the waste stream.

Five categories of alternatives were put forward as possible solutions. These were levies at various points in the life cycle of bags, producer responsibility initiatives such as return schemes, other regulatory measures such as banning or public education, voluntary measures and increased resources for dealing with the problem of plastic litter after it occurs.

Table 1 from the Fehily report shows how the effectiveness of each category of measure was summarised:

19 Fehily, n 18
<table>
<thead>
<tr>
<th>Relative Importance of criteria</th>
<th>Reducing Bag Consumption</th>
<th>Reducing quantity of waste going to landfill</th>
<th>Reducing litter problems</th>
<th>Secondary Environmental Impacts</th>
<th>NET social cost of waste avoided</th>
<th>Relative change in employment</th>
<th>Practical Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fiscal Measures:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Levies on domestic production</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
</tr>
<tr>
<td>Levies on import</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Levies on wholesale supply</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium (2)</td>
<td>Low</td>
<td>(-) Low (3)</td>
<td>Low (4)</td>
</tr>
<tr>
<td>Levies at the point of sale</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Medium (2)</td>
<td>High (1)</td>
<td>(-) Low (3)</td>
<td>High (4)</td>
</tr>
<tr>
<td>2. Producer Responsibility:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Collection &amp; take back schemes</td>
<td>Low</td>
<td>Low</td>
<td>Low/High</td>
<td>High</td>
<td>High (5)</td>
<td>(+) Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Deposit / refund schemes</td>
<td>Low</td>
<td>Low</td>
<td>Low/High</td>
<td>High</td>
<td>High (6)</td>
<td>(+) Medium</td>
<td>High</td>
</tr>
<tr>
<td>3. Other regulatory measures:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prohibition on some types of bags</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/A</td>
</tr>
<tr>
<td>Public education</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Nil</td>
<td>Nil (7)</td>
<td>(-) Low (8)</td>
<td>Low</td>
</tr>
<tr>
<td>Controls on composition</td>
<td>Nil/Low</td>
<td>Nil/low</td>
<td>Medium (7)</td>
<td>Low</td>
<td>Medium (10)</td>
<td>Low/Medium (11)</td>
<td>Low</td>
</tr>
<tr>
<td>4. Voluntary measures</td>
<td>Low/medium</td>
<td>Low/medium</td>
<td>Nil/Low</td>
<td>Nil</td>
<td>Nil</td>
<td>(-) Low</td>
<td>Low</td>
</tr>
<tr>
<td>5. Street cleaning &amp; bin management</td>
<td>Nil</td>
<td>Low/medium (9)</td>
<td>Medium (10)</td>
<td>Medium (11)</td>
<td>High</td>
<td>(+) Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>

1. Assumes a high number of outlets covered by the regulation
2. Indirect impact of paper bags
3. Reduction in plastic bag output to some extent offset by increase in output of paper bag manufacturers
4. Assumes limited exemptions to retail outlets
5. Requires investment in collection facilities in stores as well as transportation of recovered materials
6. Same as for collection & take back schemes, except financed by consumer
7. Could lead to a slight increase in paper bag use with knock on environmental consequences
8. Most jobs likely to be generated outside Ireland – e.g. US
9. Depends if recovered material is recycled or not
10. Intuitive assessment
11. Additional energy consumed in collection vehicles.
At this time, the three major national supermarket chains offered incentives to customers to reduce plastic bag usage. Two offered a reasonably priced durable branded shopping bag with a lifetime guarantee while the third chain ran a return scheme, whereby 0.1p was donated to charity for each lightweight bag reused. The former scheme had very limited uptake, while the latter led to a reuse level of only 0.5 per cent of the chain’s annual plastic bag consumption. This is in line with experiences in the UK of voluntary reuse schemes. The lack of success was attributed by the Fehily report\textsuperscript{20} to consumer apathy and the free and convenient availability of lightweight plastic bags. Traditionally, Irish or UK supermarkets have not supplied paper shopping bags, and no charge was generally made for the lightweight plastic equivalent.

Based in part on this experience, the report concluded that a levy would be the optimum solution. This could have been imposed on production, import, wholesale, point of retail sale, or disposal of plastic bags. Levies on import were considered likely to fall foul of EU regulations\textsuperscript{21} prohibiting any internal tax on imports in excess of that levied on equivalent products produced domestically. This problem could have been circumvented by imposing an equivalent levy on Irish-made bags, or by collecting the tax at the point of supply to retailers. Such supply side solutions, while straightforward to administer, were expected to be less efficient in reducing plastic bag consumption, as it was anticipated that many retailers would opt to absorb or indirectly pass on the cost, and continue to supply free bags to customers. The point

\textsuperscript{20} Fehily, n 18
\textsuperscript{21}which call for imports from EU countries to have parity with domestically produced products
of sale levy has the advantage of overtly implementing the “polluter pays” principle, and this factor was thought to outweigh any complexities in administration.

The first recommendation was for a point of sale levy of at least 3p, just under 4c. It was accepted at the time that the availability of alternatives was critical to the success of the measure. The use of any alternative to the lightweight freely supplied plastic bag would require a shift in consumer behaviour; at very least a degree of pre-planning which had previously been absent. This was considered difficult to achieve, as a previous government report\(^\text{22}\) had found that a significant majority (69 per cent) of all Irish shoppers reported that they never brought their own shopping bag on shopping trips. It was anticipated that the success of any policy to reduce plastic bag consumption would hinge on the availability of substitutes for lightweight plastic bags, their cost and efficiency.

Not all of the alternatives are obviously preferable from an environmental perspective. Life Cycle Assessment (LCA) challenges the assumption that paper bags provide an environmentally preferable alternative to plastic. LCA analysis considers all emissions generated from activities over the entire life cycle of a product, starting from the procurement of raw materials, through manufacture, utilisation and disposal. While paper biodegrades easily, it is more expensive to produce, transport and store. Many studies\(^\text{23}\) conclude that a switch from plastic to paper bags would not result in any environmental benefit. However, in general LCA does not take into account visual pollution or the long life of plastic in landfill. These are difficult factors to

\(^{22}\) Report on Attitudes to the Environment (ESRI, 1994)
\(^{23}\) Examples of studies comparing the LCA of paper and plastic bags include The University of Winnipeg 1991, Fankling Associates 1990 and Pre Consultants 1996, all of which are referenced in Fehily, n 14.
model, absent direct information on how packaging actually enters the waste stream, but they are significant in the case of lightweight plastic bags.

From a retailer’s point of view, the free supply of paper bags was found to be twice as expensive as plastic bags. For the user, various factors, including ease of use, strength, and reusability are also compromised in the switch to paper. These factors were noted by the Fehily report, but largely not addressed by the regulations subsequently introduced. The report also noted that:

> The objective of the point of sale levy is to reduce the use of plastic bags. The costs of these measures will be shared by consumers who still wish to pay the higher price for the plastic bags, and the plastic bag supply industry. To the extent that the reduction in plastic bags is compensated by an increase in paper bags, some of this reduction will be offset by benefits of increased output in the paper bag industry.

Fullerton et al note that many environmental taxes are, for ease of administration, levied on an input or output which is highly correlated with pollution, rather than on the pollutant itself. For example, US taxes, which aim to reduce vehicle emissions, are levied instead on the purchase of gasoline, because it is unfeasible to tax the emissions themselves. They note that a true Pigouvian tax is strictly a tax on the pollution itself, and that the degree to which such taxes “miss the target” reduces their efficiency.

24 From Fehily, n 18. This is particularly notable where small amounts are purchased. Strong paper bags without handles were found to be more expensive than the ordinary paper bags and those with a handle cost anything between 25-50 per cent more.
25 Fehily, n 18, at 59
As Oates\textsuperscript{27} observed:

A tax on the output or profits of a polluting industry is not, in general, a good substitute for a tax on the offending activity itself.

The inefficiency in the levy on plastic bags is relatively slight. It is levied directly on the offending material (lightweight plastic bags), although imposed at the point of sale rather than the point of entry into the waste stream. It aims to reduce the inappropriate disposal of bags by reducing overall usage.

4.2 The Levy in detail

\textit{The Waste Management (Environment Levy) (Plastic Bag): Regulations, 2001} were signed into law in December, 2001, introducing a levy of €0.15 at the point of retail supply of most lightweight plastic shopping bags. At the time, the stated purpose was less to generate revenue, than to change consumer behaviour. However, shortly after its introduction, revenues were found to be high, and the potential to achieve a double dividend became clear. At the time of the introduction, an intense advertising campaign was also undertaken, concentrating on the promotion of reusable bags. The date for implementation was set for 4\textsuperscript{th} March 2002, to follow by two months the introduction of the Euro, allowing retailers sufficient time to prepare. Money raised from the Levy was allocated to an Environment Fund, to be used to support appropriate waste management, litter and other environmental issues.

The Levy applies to all plastic bags appropriate for use by customers at the point of retail sale, subject to certain exemptions. These are:

\textsuperscript{27} W. Oates, “Green Taxes: Can We Protect the Environment and Improve the Tax System at the Same Time?” (1994) address to the 64th Annual Meeting of the Southern Economic Association, Orlando, Florida, at 919
i.) Plastic bags used exclusively to contain fresh food products such as meat, fish, poultry, fruits, nuts or vegetables, confectionary, dairy products, cooked food and ice, provided that they conform to certain size guidelines.

ii.) Plastic bags used in duty free shops.

iii.) Durable plastic bags designed for reuse, which are sold to customers for at least 70 cent each.

Retailers are obliged under law to pass on the full amount of the Levy to the customer as a specific charge, and to remit the tax collected by them to the Revenue Commissioners every three months. No VAT is charged on the levy, and it must therefore be itemised separately on any receipt issued to the customer. Retailers are obliged to keep records of the numbers of exempt and taxable plastic bags in stock on the 4\textsuperscript{th} of March, and those in each category bought and sold in each accounting period.

A national poster and leaflet advertising campaign was undertaken by the government in early 2002 to heighten awareness of the aims of the levy. A more detailed document was later issued to the retailers, informing them of their obligations. In interviews with the author, retailers reported that the advertising was extremely effective and achieved what it set out to do. The public was well informed and aware of the levy before its introduction, and retailers had relatively little explaining to do. They were in general less happy with the information provided to them on how to implement the levy.
Revenues from the levy are paid into an environmental fund to be managed and
controlled by the Minister for the Environment and Local Government. The fund may
only be applied for designated purposes, selected on environmental grounds. This
practice of designating a stream of tax revenue to specific purposes is known as
earmarking, and is generally good way of generating support for a new tax. In some
situations, as pointed out by Markandya\textsuperscript{28}, earmarking can effectively be the price of
public acceptance of and compliance with a new levy. Earmarking also ties in with
the strictest interpretation of the “polluter pays” idea, in that the cost of rectifying
environmental damage is literally met by taxes raised directly from the process of
pollution. However opponents of the practice\textsuperscript{29} argue that by siphoning off the income
from a Pigouvian tax for environmental spending, the opportunity to realise the
welfare gains from revenue recycling is lost. However, if the environmental projects
funded by the new levy would otherwise have been financed from the general pool of
tax revenue, there may still be scope for a reduction in distortionary taxes, which in
turn would generate a second dividend.

5. Evaluating the implementation

In order to assess the implementation of the levy, a survey of retailers and customers
was conducted in late 2002, 10 months after its introduction. The surveys took the
form of short structured interviews, and were conducted in person. In order to
differentiate socio-geographic issues in a countrywide implementation, two
contrasting locations were selected for study: a small town serving a very rural


\textsuperscript{29} Opposition to earmarking is also widespread. See Oates, n 27, at 920 or Markandya, n 28, at 8 for discussions
hinterland in County Leitrim, and in the urban setting of Limerick, Ireland’s third city. Retailers were selected with the aim of including as wide a variety as possible, in terms of size, specialism and organisational structure. The sample is necessarily limited to those who agreed to the short interview. In the rural location of Leitrim, 90% of retailers approached agreed. In the city of Limerick, the response rate was lower at 70%. Table 2 gives basic descriptive statistics on the data collected.

### Table 2: Descriptive Statistics on Survey Data

<table>
<thead>
<tr>
<th></th>
<th>Limerick</th>
<th>Leitrim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of retailers</td>
<td>21</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>Number of customers</td>
<td>57</td>
<td>116</td>
<td>173</td>
</tr>
<tr>
<td>Female-male customer ratio</td>
<td>2.8 : 1</td>
<td>1.5 : 1</td>
<td>1.8 : 1</td>
</tr>
<tr>
<td>Average customer age</td>
<td>30</td>
<td>42</td>
<td>38</td>
</tr>
</tbody>
</table>

The older age profile in the rural survey is in line with the general population dynamic of the region. The customers surveyed were chosen at random in a wide variety of shops in both locations. The questionnaires used a mixture of factual and perceptual questions, and in the case of the retailer survey, were followed up with informal interviews in many cases. Retailers were asked about the burdens of introducing the tax, details of the alternatives provided to customers, the level of plastic bag use before and after the introduction of the levy and the ongoing administration of the tax. Customers were asked about their attitude to the levy, its effect on their behaviour, and their experiences of its implementation. These questions are important, inter alia, in assessing the viability of introducing a similar levy in other jurisdictions. In both cases, there was an opportunity for the respondent to expand on areas they felt were of particular interest, and some of these qualitative comments were very enlightening.
5.1: Retailer Responses

Over 85 per cent of retailers surveyed reported some administrative or financial burdens in its implementation. Foremost among these were staff costs, covering training and wages for longer hours dealing with the increased workload, closely followed by the actual cost of providing alternatives. Almost 25 per cent of respondents, mainly smaller retailers, also cited a tendency for customers with no shopping bag to purchase fewer items, difficulty in monitoring shoplifting, loss of shopping baskets and trolleys and for large outlets, difficulty in continuing to provide a grocery packing service.

Table 3 summarises retailer responses on implementation of the levy. The results for retailers in urban and rural locations are shown separately in columns (2) and (3). Columns (4) and (5) show the breakdown between large and small retailers. While most of those surveyed in the rural location were small retailers, this apparent representation is necessary in order to separate the effects of size and location.

Responses are grouped by the nature of questions asked. Group (1) looks at the alternatives to plastic bags supplied by the respondents before and after introduction of the levy. Group (2) shows the change in the number of shopping bags of various sorts purchased by the retailers for supply or resale to customers. Finally, group (3) assesses attitudes to the levy on a policy level, and where applicable, attitudes to alternative solutions.

The Pearson Chi-square test is used to test for significant differences in mean responses between urban and rural, and again between large and small businesses.
The table highlights differences that were significant at the 10%, 5% and 1% probability levels.

Table 3: Retailer responses

<table>
<thead>
<tr>
<th></th>
<th>Total (1)</th>
<th>Urban (2)</th>
<th>Rural (3)</th>
<th>Large (4)</th>
<th>Small (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide alternatives (1)</td>
<td>92.86%</td>
<td>85.7%*</td>
<td>100.0%*</td>
<td>77.8%**</td>
<td>97.0%**</td>
</tr>
<tr>
<td>- paper bags</td>
<td>57.14%</td>
<td>71.4%*</td>
<td>42.9%*</td>
<td>55.60%</td>
<td>57.60%</td>
</tr>
<tr>
<td>- cardboard boxes (1)</td>
<td>45.24%</td>
<td>9.5%***</td>
<td>81.0%***</td>
<td>22.20%</td>
<td>51.50%</td>
</tr>
<tr>
<td>Provided alternatives pre-levy (1)</td>
<td>35.71%</td>
<td>23.80%</td>
<td>47.60%</td>
<td>22.2%**</td>
<td>39.4%**</td>
</tr>
<tr>
<td>Free alternatives provided (1)</td>
<td>61.90%</td>
<td>47.60%</td>
<td>76.20%</td>
<td>33.30%</td>
<td>69.70%</td>
</tr>
<tr>
<td>Mean reduction in plastic bags (2)</td>
<td>67.00%</td>
<td>73.77%</td>
<td>60.30%</td>
<td>78.39%</td>
<td>63.94%</td>
</tr>
<tr>
<td>Mean increase in durables (2)</td>
<td>51.80%</td>
<td>57.89%</td>
<td>45.37%</td>
<td>49.28%</td>
<td>52.39%</td>
</tr>
<tr>
<td>Should receive part of levy (3)</td>
<td>45.24%</td>
<td>33.30%</td>
<td>57.10%</td>
<td>77.8%**</td>
<td>36.4%**</td>
</tr>
<tr>
<td>favour a ban (3)</td>
<td>52.38%</td>
<td>38.10%*</td>
<td>66.67%*</td>
<td>22.22%*</td>
<td>60.60%*</td>
</tr>
</tbody>
</table>

* Significantly different at the 1% level
** Significantly different at the 5% level
*** Significantly different at the 10% level

Over 90 per cent of retailers currently provide their customers with alternatives to the lightweight plastic bags, with most providing a free alternative. In rural areas, this is more likely to be a cardboard box than a paper bag. For smaller rural operators with ample storage space, whose wholesale purchases are packed in cardboard boxes, this is a cheap alternative. It is not an option for city traders with limited space. Nylon reusable bags are provided by less than 10 per cent of those surveyed, but their use by customers was more widely reported. These are the favoured alternative, with over 70 per cent of complaints reported from customers concerning paper bags not being strong enough. 35 per cent of traders provided some alternatives to customers before the introduction of the levy, and this is spread evenly across all categories of alternatives provided. Overall reported compliance with the levy was high. Less than
5 per cent of traders said that they continued to supply their customers with free plastic bags in breach of the regulations.

The average percentage reduction in plastic bags purchased by retailers was 67 per cent, with a slightly higher\textsuperscript{30} reduction in urban areas. Again, it is worth noting that this is an aggregate figure, and includes those categories of plastic bag not subject to the levy. There was a 50 per cent increase in the number of durable bags purchased by traders for resale to their customers. Only 11 per cent of those surveyed had been subject to any independent audit of their compliance with the levy, and in all cases this audit was primarily concerned with VAT or with the annual audit of the accounts, rather than compliance with or implementation of the levy.

Despite the increased costs, almost half of retailers surveyed rejected the idea of being allowed to retain part of the levy, to cover these expenses. Large firms were more likely to favour some retention. Retailers interviewed explained that it was easier for them to apply the levy when they were seen not to profit from it directly themselves. 53 per cent of retailers surveyed would have preferred an outright ban on the use of plastic bags, which would not have resulted in such an administrative burden for them, smaller, rural traders being most in favour of a ban.

Those retailers who gave additional comments on this issue\textsuperscript{31} overwhelmingly favoured an outright ban, citing the administrative burden as the main factor. As a second-best alternative, they would have preferred the levy to be imposed at the

\textsuperscript{30} This difference was not statistically significant
\textsuperscript{31} to a certain extent a self-selecting group
supplier level, although some accepted that this would not have affected consumer behaviour to the same extent. Most retailers interviewed reported that some of their competitors were not imposing the levy on all customers, which put them under additional pressure not to charge the levy to regular valued customers.

**5.2: Customer Responses**

173 customers were surveyed in a wide range of shops. Results are shown in table four, broken down by location in columns (2) and (3), gender in columns (4) and 5), and age group in columns (6), (7) and (8). As before, the chi-square test is used to test for significant difference across location and gender, while the Phi and Cramer’s V tests are used to test across the three-category age variable.

As above, table 4 shows responses grouped by the nature of the questions asked. Group (1) establishes attitude to the levy, and the level of implementation experienced by customers. The percentages show the number of respondents who agree that the levy is a good idea, and that there is universal implementation by retailers. Group (2) gives consumer perceptions of the alternatives provided by their local shops. The percentages show those agree that sufficient alternatives to lightweight plastic bags are available, who have been charged for these alternatives, and who feel that the charge is fair. Group (3) gives factual information on the level of re-use or recycling by individual shoppers before the levy was implemented, and the alternatives they now use. The percentages indicate those who had recycled or reused plastic bags prior to the implementation of the levy, and those who now use paper bags or cardboard boxes. Group (4) shows shoppers’ attitudes to alternative solutions such as a ban or a higher levy, showing the percentage that would favour such measures. Group (5)
reports the percentage of shoppers in each age, gender or location group who view the
levy as a deterrent, or sometimes still use plastic bags.

Table 4: Customer responses

<table>
<thead>
<tr>
<th>Questions</th>
<th>N</th>
<th>Total (1)</th>
<th>Urban (2)</th>
<th>Rural (3)</th>
<th>Male (4)</th>
<th>Female (5)</th>
<th>&lt;30 (6)</th>
<th>30-50 (7)</th>
<th>&gt;50 (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Good idea&quot;</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Implementation</td>
<td>172</td>
<td>80.7%</td>
<td>76.8%</td>
<td>82.6%</td>
<td>86.9%</td>
<td>77.3%</td>
<td>75.0%</td>
<td>88.9%</td>
<td>74.3%</td>
</tr>
<tr>
<td>Sufficient alternatives</td>
<td>172</td>
<td>68.0%</td>
<td>58.9%*</td>
<td>72.4%*</td>
<td>70.5%</td>
<td>66.7%</td>
<td>69.2%</td>
<td>62.5%</td>
<td>77.1%</td>
</tr>
<tr>
<td>Charged for alternatives</td>
<td>162</td>
<td>46.9%</td>
<td>56.0%</td>
<td>42.9%</td>
<td>46.4%</td>
<td>47.2%</td>
<td>42.1%</td>
<td>50.0%</td>
<td>48.5%</td>
</tr>
<tr>
<td>Charge is fair</td>
<td>113</td>
<td>86.7%</td>
<td>81.6%</td>
<td>89.3%</td>
<td>91.7%</td>
<td>84.4%</td>
<td>87.8%</td>
<td>85.2%</td>
<td>88.9%</td>
</tr>
<tr>
<td>Recycled/reused before levy?</td>
<td>173</td>
<td>69.9%</td>
<td>64.9%</td>
<td>72.4%</td>
<td>60.7%</td>
<td>75%</td>
<td>40.0%</td>
<td>24.7%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Use paper bags</td>
<td>173</td>
<td>38.2%</td>
<td>64.9%***</td>
<td>25%***</td>
<td>39.3%</td>
<td>37.5%</td>
<td>49.2%</td>
<td>30.1%</td>
<td>34.3%</td>
</tr>
<tr>
<td>Use boxes</td>
<td>173</td>
<td>42.2%</td>
<td>14%***</td>
<td>56%***</td>
<td>50.8%</td>
<td>37.5%</td>
<td>23.1%</td>
<td>49.3%***</td>
<td>62.9%***</td>
</tr>
<tr>
<td>Prefer a higher levy</td>
<td>167</td>
<td>26.9%</td>
<td>31.5%</td>
<td>24.8%</td>
<td>34.5%</td>
<td>22.9%</td>
<td>25.8%</td>
<td>29.6%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Prefer a ban</td>
<td>169</td>
<td>47.3%</td>
<td>53.7%</td>
<td>44.3%</td>
<td>42.6%</td>
<td>50.0%</td>
<td>46.0%</td>
<td>54.8%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Levy a deterrent</td>
<td>171</td>
<td>69.0%</td>
<td>85.7%***</td>
<td>60.9%***</td>
<td>70.0%</td>
<td>68.5%</td>
<td>75.0%</td>
<td>66.7%</td>
<td>62.9%</td>
</tr>
<tr>
<td>Sometimes pay levy</td>
<td>173</td>
<td>64.2%</td>
<td>71.9%</td>
<td>60.3%</td>
<td>60.7%</td>
<td>66.1%</td>
<td>61.5%</td>
<td>69.9%</td>
<td>57.1%</td>
</tr>
</tbody>
</table>

*** Significantly different at the 10% level
** Significantly different at the 5% level
* Significantly different at the 1% level

Most customers report a high level of satisfaction with the levy, particularly in the
middle age group. Income levels and environmental awareness may drive this. Those
in rural areas are more likely to feel the levy was a good idea, report higher levels of
compliance by traders, and happier with the alternatives offered by traders.

Interestingly, they are far more likely to use cardboard boxes than paper bags, though
this latter finding may be in part driven by age. Respondents to the rural survey,
tended to be older, in line with the overall population profiles of Leitrim and
Limerick.

While 95% of retailers report implementing the levy in full, customers surveyed
reported that over 30 per cent of retail outlets were not applying the levy. It is
noteworthy, however, that they tended to include in this number the supply of bags by exempt traders, such as duty-free shops or butchers. The true level of non-compliance is therefore likely to lie between 5% and 30%.

An overwhelming majority of respondents said charges made for substitutes for lightweight plastic bags were fair, and report being happy with the alternatives available. Rural shoppers were more likely to report sufficient alternatives.

Apart from a slight gender difference, respondents are consistent in opposing a higher levy, and providing limited support for a total ban. Urban shoppers are more likely to report finding the levy to be a deterrent. Almost two thirds of those surveyed still occasionally use lightweight plastic bags. This was most commonly reported in small grocery outlets, where unplanned purchases are likely.

Those who reported reuse and recycling prior to the ban are significantly\(^{32}\) more likely to use paper bags as an alternative now. This may be in part an age effect, as respondents in the youngest age group are more likely to have reused plastic bags before the introduction of the levy, and are now more likely to choose paper bags rather than cardboard boxes. Urban shoppers also favour paper bags over cardboard boxes.

Those who report that following the implementation of the levy they never use lightweight plastic bags are significantly\(^{33}\) more likely to use durable bags or paper

\(^{32}\) Chi-square test shows a difference significant at the 1% level.

\(^{33}\) Chi-square test shows a difference significant at the 1% level.
bags as an alternative now. Interestingly, they are significantly\(^{34}\) less likely to report finding the 15c levy to be a deterrent, suggesting that they are responding to an increased awareness of environmental concerns rather than a desire to pay less tax.

All in all, customer satisfaction with the levy is high, particularly in rural areas where free durable alternatives are more likely to be available. The level of the tax does not appear to be an issue with shoppers. While a substantial minority would favour an outright ban on lightweight plastic shopping bags, over 80 per cent regard the levy as “a good idea”, and report high levels of compliance by retailers.

The next section considers whether or not a double dividend was achieved, given the findings of the surveys above.

**6. Was there a double dividend?**

This section separately evaluates the achievement of the first, environmental dividend, and the secondary benefit in terms of reducing the cost to society as a whole of distortionary taxes.

**6.1 Achieving the first dividend**

For the first dividend to be achieved there must be a reduction in the numbers of lightweight plastic bags entering the waste stream, and no increase in use of environmentally damaging alternatives. The Fehily report\(^{35}\) assumed that any reduction in use would result in a reduction in bags entering the waste stream. If this

\(^{34}\) Chi-square test shows a difference significant at the 5\% level.

\(^{35}\) Fehily, n 18.
is accepted, then the levy certainly achieved a significant reduction in lightweight plastic bag waste. The levy generated income of €9.6 million in the ten month period following implementation. This represents a levy charged on 65 million plastic bags, or an annualise figure of 75 million. Since previous annual consumption of plastic bags was estimated at 1.26 billion36, this represents a reduction in consumption of 94%. Perhaps equally importantly, the surveys show an attitude shift on behalf of users, with most consumers and retailers reported a dramatic reduction in use.

The impact on the environment of the alternatives used also needs to be considered. Where cardboard boxes are passed on to customers, this re-use of a product that would otherwise immediately enter the waste stream has no adverse environmental impact. By contrast, Life Cycle Assessment of paper bags shows them to be only marginally more eco-friendly than the lightweight bags they replace. Durable bags have a low environmental impact, provided they are reused often, but there is no satisfactory way of measuring the degree of reuse. Nevertheless, a switch has been made from lightweight plastic bags to a range of alternatives, most of which have lower impact on the environment, and none of which have greater. It follows therefore that the first environmental dividend has been achieved.

6.2 Achieving the second dividend

For the second dividend to be achieved, the net revenue from the levy must be sufficient to permit reduction of distortionary taxes. The Revenue Commissioners incurred costs of €1.56 million in setting up and advertising the levy, and collected €9.6 million by the end of 2002. On the first anniversary of the introduction of the

36 Fehily, n 18, at 6
levy, the Department of the Environment estimated that the annual receipts net of
ongoing administration costs would amount to €8m\(^7\). Arguably, future revenue may
be lower, due to the change in consumer behaviour. In that respect, the levy may
represent something of a windfall gain for the exchequer. Clearly, however, revenue
is raised which could be used to reduce distortionary taxes.

A second condition for achievement of the second dividend is the recycling of these
revenues, so as to permit a reduction in taxes on labour and enterprise. The revenue
from the plastic bag levy goes to an “Environment Fund” under the control of the
Minister for the Environment. Of the €8 million net revenue raised in 2002, two thirds
was allocated for the establishment of four new government boards\(^8\). It is not clear
that these would have been funded from general tax revenue if the Environment Fund
had not been available, and so the second dividend of a potential reduction in other
taxes cannot be demonstrated.

A third condition for the second dividend to be achieved is that the revenue from the
tax must outweigh costs incurred in its collection. This study shows that both
consumers and retailers suffer an ongoing welfare cost as a result of the levy.
Employment has also been lost in the domestic plastic bag manufacturing industry.
Immediately prior to the introduction of the levy, the Fehily report\(^9\) identified three
major domestic manufacturers of plastic bags. One firm\(^10\) was forced to close with the
loss of 23 jobs, citing a reduction in orders following the announcement of the levy in

\(^8\) €5.27 million went to establish the National Waste Management Board, the Recycling Consultative
Forum, the Core Prevention Team and the Market Development Group.
\(^9\) Fehily, n 18.
\(^10\) The Donegal firm EPI Teo
One has since closed for unrelated reasons, while the third, Shabra Ltd, has had no loss of employment. There has, of course, been a corresponding increase in the consumption of paper bags, although since production is spread among many smaller firms, the effect of the increased output on domestic employment is unclear. These costs are difficult to quantify, and make the achievement of the double dividend questionable, regardless of the amount of revenue raised, or the use to which it is put. Given these costs, and the fact that the revenue is ring-fenced for an environment fund, it is difficult to argue that the double dividend was achieved in this case.

7. Conclusion and avenues for future research

There are several limitations to this study. Initially it must be acknowledged that it is primarily a case study on the effectiveness of the levy, with a view to establishing whether it could be implemented, possibly with improvements, in other jurisdictions. In common with all survey results, the data is derived from those willing to complete questionnaires and give interviews on the subject. In that respect, the sample could be self-selecting and prone to bias. This is to some extent mitigated by the way in which the questionnaires were administered. Gender differences on attitudes to the levy may be driven by dissimilar shopping patterns, though again, this effect is mitigated by the way in which the questionnaires were administered. A wider survey would provide a more complete picture.

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41 Sunday Business Post report, December, 2002
42 Paclene Ltd.
43 In an interview with the author in January 2002 Shabra Ltd said they had reduced production of lightweight plastic bags by approximately approx 50 per cent, adapted to the market, and now supply “re-usable green bags”.
Nonetheless, the surveys show that the levy has achieved a high level of public acceptance, in both rural and urban locations, and across age and gender barriers. There is a high degree of compliance in a wide range of retailers, despite the low level of audit and inspection. The advertising campaign around the introduction of the levy was critical to its success, and made the implementation easier for traders. The fact that the retailers were seen not to benefit directly from the levy also eased implementation. The use of lightweight plastic bags has fallen dramatically, and so it is clear that the first dividend has been achieved.

Some things could have been done more effectively. Of the points on the checklist for successful implementation of environmental taxes referred to earlier, the plastic bag levy fails on early consultation with stakeholders, built-in evaluation measures and, arguably, recycling of revenues\textsuperscript{44}. Retailers bear most of the burden of implementing the levy, and suffer a substantial, if unquantified welfare cost in the process. They were not involved in designing the levy, or in drawing up the information pack that was sent to shops. Monitoring of implementation has been minimal. Most retailers would have preferred a total ban. Relatively little analysis has been done on the environmental damage caused by alternatives to the lightweight plastic bag, and there is little public awareness that paper bags could be equally costly to the environment in the long run. The ring-fencing of the tax into the environmental find effectively limits the achievement of a double dividend.

\textsuperscript{44} The European Environment Agency, n 1 at page 10. The principal points are: detailed advance studies on the likely impact of the tax; extensive consultation with fiscal authorities, stakeholders and the public; recycling of the revenues to taxpayers or related sectors; an increasing incentive effect and in-built evaluation measures.
However, while the second dividend was not achieved, it may have been achievable.

Had the revenue raised not been ring-fenced, it could have been used to reduce slightly the distortionary taxes present in the Irish system. If the use of environment fund can reduce the need for other taxes to be raised, it is possible that these distortions can be reduced. The applications of this fund will be critical in determining if the some degree of the second dividend can be achieved in the future.