

Rapid Review of Charging for Disposable Coffee Cups and other Waste Minimisation Measure

Summary research findings

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1.0. Introduction

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In May 2018, an *Expert Panel on Environmental Charges and Other Measures* was established to provide advice to Scottish Ministers on environmental charges and other measures that could be adopted in Scotland to encourage long-term and sustainable changes in consumer and producer behaviours that were required to generate meaningful shifts towards a circular economy. The panel has asked for a rapid review of evidence that complements a knowledge account developed by the Scottish Government and Zero Waste Scotland. The previous review indicated strong evidence that applying a charge for DCCs would lead to a reduction in DCC usage and an increase in reusable cup usage. This was in contrast to the evidence on reusable cup discounts, which were found to be ineffective in changing behaviour. The previous review also considered evidence for other interventions, including recycling initiatives and reusable cup schemes. With specific reference to DCC charges, the evidence base reviewed was primarily based on local studies conducted on university campuses and in organisations. This leaves the question as to whether a DCC charge would be equally as effective in changing behaviour more widely in the high street if introduced through legislation at the national level.

1.2. Background

The practice of 'on-the-go' consumption of coffee and other hot drinks has increased substantially over the past two decades, and the use of disposable coffee cups (DCCs) has grown accordingly. It is estimated that each year 2.5-10 billion DCCs are used in the UK alone. In line with predicted growth in the coffee retail industry, demand for DCCs is set to increase further in the future, with serious environmental implications linked to the production, consumption and disposal of DCCs.

While the technical and infrastructural capacity to recycle DCCs exists, this can only be done at specialist waste-processing facilities and not through conventional facilities where other products are recycled. Recycling is therefore dependent on DCCs being directed to the correct waste stream so that they can be separated and transported to these specialist facilities. However, the material constituents of DCCs are high in volume and low in value making it economically unviable for businesses to collect and transport them over significant distances. The waste stream issue is compounded by the problem of disposal in the context of 'on-the-go' consumption, in which DCCs may be discarded in diverse locations over a widely dispersed geographical area.

Following an enquiry on the issue of disposable packaging, the House of Commons Environmental Audit Committee recommended a mandatory £0.25 charge, or 'latte levy', on all DCCs issued by retailers across the board. The size of the proposed charge was based on the magnitude of the discounts already offered by coffee retailers; research showing the effects of a similar-sized charge; and evidence showing that charges, as a behaviour change instrument, can be highly effective in reducing consumption of single-use plastic bags.

2.0. Aims and objectives

The overall aim of the rapid review was to synthesise all available evidence on the impacts of charges and other measures to reduce the use of DCCs, as well as the wider implications of introducing a charge. In particular, it considered the evidence around four key issues. The *primary aim* of the rapid review concerned **1) the effectiveness of DCC charges** (including the conditions under which charges are more or less likely to be effective in changing consumer behaviour). Three additional key issues related to *secondary aims* of the review, comprising **2) economic aspects of DCC charges** (including the optimal level of charge required to establish meaningful behavioural change); **3) the effectiveness of charges on other disposable products** (such as plastic bags and other single-use plastic items); and **4) other measures to reduce the consumption of DCCs** (including discounts, mugshare schemes, bans on single-use products, and initiatives to increase recycling).

3.0. Methods

The methodological approach for the rapid review was based on a *predefined standardised protocol for the production of quick scoping reviews and rapid evidence assessments*. We identified a set of keywords that stemmed from the primary and secondary aims of the rapid review; and included databases of scientific literature (*SCOPUS*, *Web of Science*, and *Google Scholar*), and relevant websites for grey literature and other sources of unpublished evidence of materials produced between 1995 and 2019. In addition, we sourced unpublished evidence through connections held by members of the review team. After the searches were completed, we screened the database and retained relevant documents based on their title and keywords. We then screened again, this time retaining documents based on their relevance from the content of the abstract and/or introduction. The screened sources were collated in an Excel file in preparation for evidence extraction to address the key issues outlined above. We then analysed the remaining literature base. A *narrative synthesis* approach (i.e. descriptive rather than systematic) was used to address the review questions.

4.0. Results

4.1. The effectiveness of DCC charges

The review identified eight interventions in which DCC charges were trialled (see **Table 1**). The review shows that all eight charges were cost neutral¹, and significantly increased the use of reusable cups. The size of the increase in reusable cup use varied substantially (from 4% to 42% across studies), and was linked to a number of factors, including **1) the use of clear messaging and social marketing tools; 2) the presence of other measures to promote the uptake of reusable alternatives; 3) the location where the charge is introduced; and 4) the size of the charge** (see **Section 4.2**). More specifically:

- Charges for DCCs are overall more effective in reducing DCC use than discounts for using a reusable cup, which had little impact in establishing behaviour change (see **Section 4.4**).
- Sufficient evidence exists that clear messaging and social marketing tools can help to boost the effectiveness of a DCC charge. In particular, interventions with

¹ A charge is cost-neutral when the charge is offset by a similar-sized reduction in the price of the coffee, so that the overall price remains the same.

environmental messages about the impacts of DCCs, and those highlighting social norms, were found to be the most successful in increasing reusable cup use/reducing DCC use.

- The two charge trials that were the most successful in increasing sales of drinks in reusable cups also distributed a substantial number of them for free among their customer bases, suggesting that the initial success of a charge is partly dependent upon the provision of free reusable alternatives to support behaviour change.
- Initiatives trialled in ‘closed’ locations, such as university campuses and workplace cafes, appear to be more successful than those conducted in ‘open’ high street locations. This may reflect differences in customer base and practices, whereby those in closed locations use outlets on a more routine basis and may also have greater capacity to store and clean their reusable cup. In addition, participants in these trials may feel more personally committed or a greater deal of social expectation to change their behaviour. The evidence is, however, limited as only one trial has been conducted in an open high street context, with a charge (£0.05) that is well below what most people are willing to pay for a DCC (also see **Section 4.2**).

4.2. Economic aspects of DCC charges

The review identified different methods that could be used to estimate the size of a charge needed to leverage significant behavioural change. This could be done using **1) evidence from intervention studies with different-sized charges; 2) calculating ‘break-even’ points between a DCC charge and the costs of a reusable cup**, whereby the economic or environmental costs of using DCCs are the same as for using a reusable cup; **3) using contingent valuation and associated techniques to determine consumers’ willingness to pay (WTP) for DCCs.**²

- While higher charges are generally more successful in increasing reusable cup use than lower charges, the evidence base is thin and confounded by other factors (see **Section 4.1**). There are indications from the evidence that a small charge of £0.05-£0.10 would be unlikely to lead to widespread behaviour change. Almost none of the interventions with a charge of this size increased the use of reusable cups by more than 10% (see **Figure 1**). It is, however, less clear whether and under what conditions higher charges would produce more substantial and widespread behaviour change.
- Evidence from break-even calculations and research using contingent valuation techniques suggest that larger charges would be required to leverage a significant behavioural shift away from DCCs.
- A charge would need to be a minimum of £0.06 for it to be economically rewarding for the average coffee shop consumer to use a reusable cup; and a minimum of £0.20 for it to reflect the environmental costs of a DCC in comparison to a reusable cup.

² Contingent valuation is a survey-based economic technique that estimates the price at or below which a person will buy that product; or, in other words, what a person is ‘willing to pay’ (WTP) for a product.

- Research conducted in the UK on willingness to pay (WTP) for DCCs shows that around 25% of respondents were willing to pay £0.05, 14% would pay £0.10, and another 10% would pay £0.15-£0.20 instead of using a reusable cup. This means that a minimum charge of £0.20 is needed in order to change the behaviour of 49% of the population.
- Students appear to have a lower WTP compared to other groups, which may explain the relative success of charges introduced at campus locations. It also has to be considered that the WTP estimates are derived from generic population samples, while the evidence suggests that groups characterised by higher on-the-go coffee consumption are less sensitive to charges.
- Any future implementation of a charge would benefit from a more detailed analysis of WTP among different consumer groups to provide more robust support for determining the optimal size of a charge to change behaviour across different groups.
- Charges are unlikely to substantially affect hot drink sales where they can be implemented in a cost-neutral way. None of the reviewed interventions reported reductions in hot drink sales that could be attributable to such a charge. Most high street coffee chains, and many independent coffee shops, already offer their customers sizeable discounts for using reusable cups. This suggests that a modest mandatory charge (e.g. of £0.25) can readily be absorbed by existing discounts. Higher charges (e.g. of £0.50) may affect sales due to likely price increases.
- Any future implementation of a charge would benefit from an independent cost-benefit analysis of its economic and environmental impacts, including a Life Cycle Analysis (LCA) of different cup types to indicate how a reduction in DCCs and an increase in reusable cup use might reduce resource use. While there are benefits associated with avoiding landfill and litter clean-up cost, there are also administrative and enforcement costs, as well as possible changes in costs and revenues to retailers and producers.

4.3. Charges on other disposable products

The review identified a wide range of sources reporting on, and evaluating, **charges to discourage the usage of other disposable single-use products**, most notably single-use carrier bags. The available evidence, relating to ten local and national plastic bag charges, indicates that **plastic bag charges are highly effective in the short term**, and that even a **small charge can maintain large parts of that behaviour change in the long term**.

- It is unlikely that the impressive reductions in plastic bag consumption brought about by bag charge legislation could be reproduced with DCCs. Plastic bag charges act as a habit disrupter, by making people ‘stop and think’ about whether they need a single-use plastic bag or not, with consumers only having to make modest changes to their day-to-day practices to avoid paying for a bag. In contrast, changing on-the-go coffee consumption requires more advance planning on the part of the consumer. DCC use may therefore be more difficult to disrupt, especially when the purchase is impulsive and no viable alternatives exist.

- While a DCC charge may not engender the same level of change as for plastic bag charge legislation, the effect size is likely to be larger than the one observed in the sole high street trial – if implemented correctly. A nationwide charge would provide consistency across high street retailers. This would signal a norm to use reusable cups (also see **Section 4.4**), creating a social context more conducive to facilitating change within people’s day-to-day routines. If an individual anticipated a surcharge for a DCC whenever and wherever they purchased a cup of coffee this would potentially lead to more consistent and lasting behaviour change in the direction desired.

4.4. Other measures to reduce the consumption of DCCs

The review identified a range of other initiatives that have been applied in different countries to reduce the consumption and environmental burden of DCCs, including **discounts**, **mugshare schemes**, **bans**, and **initiatives to increase recycling**.

- It is clear that discounts, unlike charges on DCCs, are not particularly effective in establishing behaviour change. Evidence from intervention studies on DCCs (and other single-use products) shows that they do not work beyond a marginal degree and therefore will not create a significant impact on DCC consumption.
- The ineffectiveness of a discount can be explained by customers being less sensitive to the prospect of a gain than to a loss. Discounts also tacitly signal DCC as the default vessel from which consumers can diverge if they voluntarily choose, whereas a charge does more to reposition DCCs in a way that persuades against them as the default option.
- Several mugshare schemes have been introduced at the local, regional and national levels, in which customers can borrow a reusable cup for a deposit (similar to a deposit-return scheme); the deposit is returned once the customer has finished with the cup. German schemes like RECUP and Freiburg Cup appear successful given the number of retailers signing up to them; although no official evaluations exist showing how effective they actually are. Mugshare and other deposit-return initiatives may be beneficial in combination with a DCC charge, as they deal with the practicalities associated with on-the-go coffee consumption while providing an incentive to return reusable containers. Schemes have been well received by customers as they avoid the need to have to remember or carry around a cup, as well as removing the problem of having to clean and dry that cup.
- Bans, introduced either through legislation or through voluntary action by retailers, can be an effective way of reducing DCCs. However, they can affect take-away sales if they are imposed by individual retailers rather than by the industry across the board. In many cases, bans have been accompanied by a mugshare scheme, and sales of reusable cups have increased.
- There have been a number of initiatives at the local level to increase the recycling of DCCs. While the absolute number of cups recycled in these initiatives is impressive, as explained above, this still constitutes only a small proportion of the overall number of DCCs used and does little to address the wider problems of DCC consumption. In line with the Waste Hierarchy, prevention and reuse should be prioritised over

recycling and disposal. However, recycling and charge interventions could operate in concert, as they differ in their focus and impacts that are not easily substitutable.

4.5. Other considerations: on-the-go consumption

- The introduction of a mandatory charge is likely to be effective in shifting demand away from DCCs, although there is still significant uncertainty as to the nature and the degree of change that would be brought about by charge legislation, as well as public receptiveness to the charge.
- Due to the on-the-go nature of coffee consumption, relatively little is known about consumers' ability and willingness to adapt to a charge. However, limited evidence suggests that responses to interventions designed to curb DCC use are generally favourable.
- The use of DCCs can symbolise unnecessary waste, but it also communicates other, more positive qualities associated with the identity of the consumer and cosmopolitan lifestyles. Such qualities potentially make DCC consumption more resistant to change than, for example, plastic bags.
- Policies aimed at changing DCC consumption therefore should take account of the cultural significance of DCCs. This highlights the importance of messaging and social marketing. Other measures (e.g. mugshare schemes) are also required to construct a portfolio approach, which can help support the desired behaviour change by both altering meanings and dealing with the more practical issues associated with sustainable consumer behaviour change.

5.0 Conclusions

The evidence surveyed in this rapid review indicates support for a DCC charge to alter consumer behaviour in a way that effectively reduces the environmental impact of coffee consumption. The charge should be of a sufficient size to leverage behaviour change, but ideally not exceed existing discounts to avoid any potential negative economic impacts. We have also pointed out that the evidence base for DCC charges is small and gaps in the literature exist, but that there are some learnings from other disposable products and interventions, such as the plastic bag charge, that may be transferable to DCCs.

Other interventions, principally discounts, mugshare and recycling schemes, while leveraging behaviour change, fail to do so on a scale needed to deal with the problem of DCC waste; but could be considered alongside a charge to minimise the consumption and overall environmental burden of DCCs.

The decision to implement a charge would benefit from an independent cost-benefit analysis of its economic and environmental impacts, including a Life Cycle Analysis (LCA) to indicate whether possible costs associated with a charge are commensurate with the environmental benefits. Alternative options, including initiatives that facilitate use of reusable cups and those that aim to increase recycling of DCCs, should be part of such cost-benefit analyses, given that these also have infrastructure, maintenance and management costs associated with them.

Finally, despite the significance of the size of a charge in affecting both consumers' receptiveness and behavioural responses to that charge, the charge-setting rationale would benefit from a greater understanding of perceptual and behavioural responses to differently-sized charges in different contexts, and would help to address gaps in the existing literature. Moreover, this would facilitate the implementation of future policy to change behaviour in relation to other disposable items and environmentally unsustainable practices.

Table 1. Results from eight interventions involving a DCC charge

Study	Location	Year	Charge	Where	Reusable cups before (%)	Reusable cups after (%)	Increase
Poortinga	UK (Winchester)	2016	£0.25	Campus	5.1	17.4 (28.5)	23.4
Sidhu (overall)	Canada (UBC)	2018	\$0.25 (£0.15)	Campus	4.8	23.7	18.9
site 1	Canada (UBC)	2018	\$0.25 (£0.15)	Campus	5.6	19.0	13.4
site 2	Canada (UBC)	2018	\$0.25 (£0.15)	Campus	3.9	18.2	14.3
site 3	Canada (UBC)	2018	\$0.25 (£0.15)	Campus	6.0	17.5	11.5
site 4	Canada (UBC)	2018	\$0.25 (£0.15)	Campus	2.6	58.8	56.2
Tufts	US (Tufts, MA)	2008	\$0.17 (£0.13)	Campus	3.1	8.1	5.0
Berkeley	US (Berkeley, CA)	2016	\$0.15 (£0.11)	Campus	0.8	6.2	5.4
ZWS2 (overall)	Scotland	2018	£0.10	Organisation	3.4	10.5	7.1
site 1	Scotland	2018	£0.10	Organisation	1.3	5.2	3.9
site 2	Scotland	2018	£0.10	Organisation	4.7	7.7	3.0
site 3	Scotland	2018	£0.10	Organisation	4.1	18.5	14.4
NHS Scotland	Scotland	2018	£0.10	Organisation	1.0	43.0	42.0
ZWS1	Scotland	2018	£0.05	Organisation	69.8	86.9	17.1
Starbucks (overall)	UK (London)	2018	£0.05	High street	2.2	5.8	3.6
site 1 (Retail/Tourism)	UK (London)	2018	£0.05	High street	1.6	4.2	2.6
site 2 (Offices)	UK (London)	2018	£0.05	High street	2.2	6.0	3.8
site 3 (Neighbourhood)	UK (London)	2018	£0.05	High street	2.8	6.5	3.7

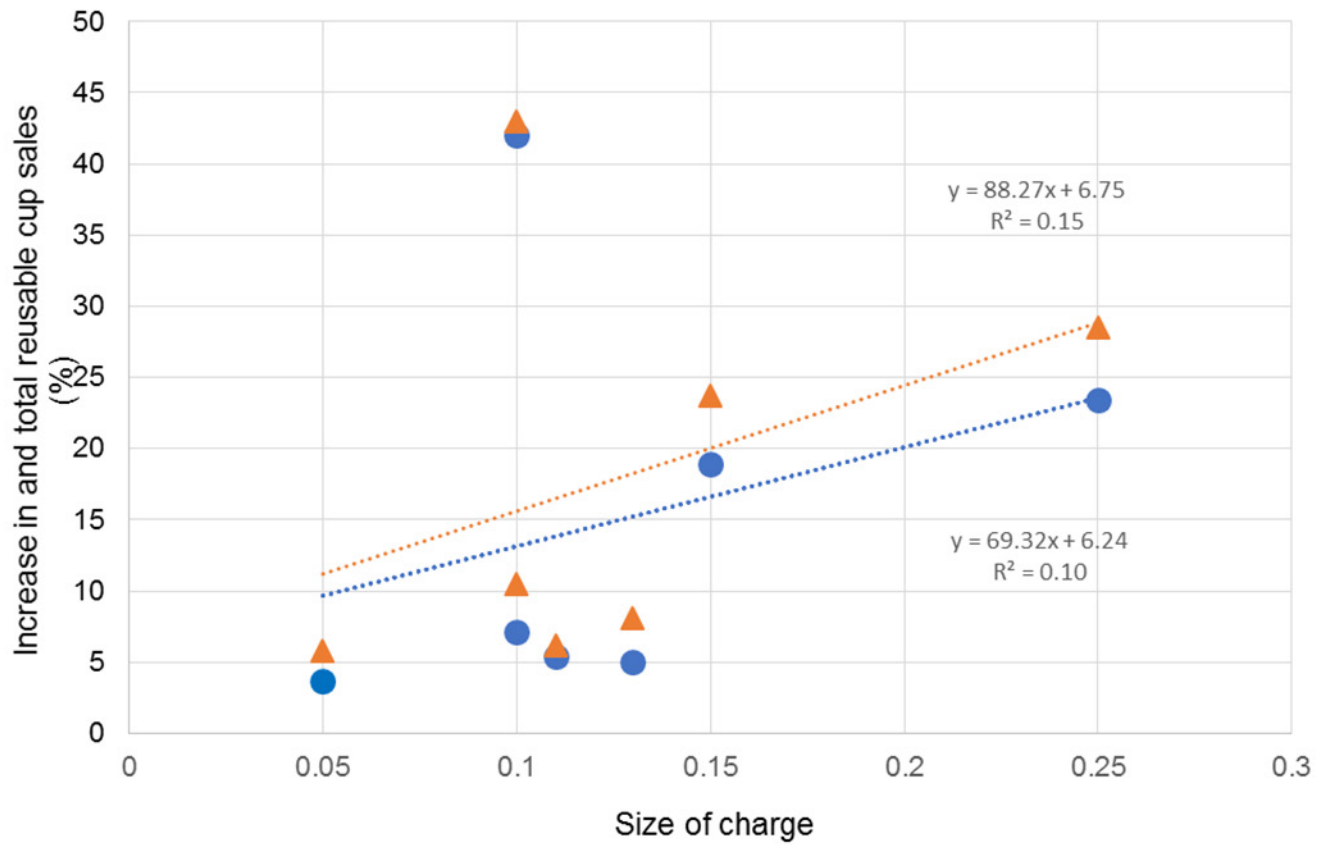


Figure 1. Association between the size of a DCC charge and increase in (in blue) and total (in orange) reusable cup sales (in %)