Toward behavioural climate policy: Framing of carbon pricing policy has deep effects on Canadian attitudes and behaviours

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This study looked at the effects of framing and payment structure on the public reception of a carbon pricing policy. The study closely mirrored the design of the Federal backstop of the Pan-Canadian Framework, under which consumers receive a direct payment to offset the carbon taxes collected in their province.

There were four key findings. First, framing the payment as an “incentive” increased the likelihood of consumers spending their return on green renovations as opposed to everyday purchases. Alternatively, calling the payment a “rebate” pushed people towards spending the money on everyday expenses. Second, if the policy was designed so that payments were disbursed monthly in smaller amounts, they were more likely to be spent on everyday purchases. Conversely, annual lump sum payments were more likely to be allocated towards savings. Third, there was an interaction effect between framing the payment as a “dividend” and the lump sum annual payment structure; in this case, consumers were much more likely to put the money towards savings. Finally, in terms of public perception of the policy, framing it as an “incentive” led to the most positive response, notably in terms of how well the policy reflects on Canada’s image and its alignment with Canadian values.

These findings offer insight into how the use of different language to describe a carbon pricing policy, and the use of different payment schedules, can affect what consumers would spend their rebates on and their perception of the policy. How to frame public policy issues advantageously is an important part of political communication. These preliminary findings offer insight into how a carbon pricing policy can be framed and structured so as to promote the changes in consumption behaviour that the policy seeks to bring about.

I. INTRODUCTION

Concern about climate change, both domestically and abroad, has made carbon pricing one of the most salient policy topics in Canada. The Pan-Canadian Framework on Clean Growth and Climate Change was implemented as a measure intended to reduce greenhouse gas (GHG) emissions. Provinces are free to develop their own policies, but in provinces where no policy is developed (or the policy is deemed non-compliant with the federal Framework), the “backstop” component of the framework kicks in; in this case, the federal government applies a carbon tax and sends a rebate to Canadian consumers to redistribute carbon tax revenues within the province in which they were collected. This study is inspired by the federal backstop and seeks to understand how policy framing affects consumer attitudes and behaviour.

From a policy perspective, carbon-pricing is an effective way to reduce greenhouse gas emissions at an economy-wide level (Nordhaus 2011; Sterner and Köhlin 2019). GHGs, like other forms of air pollution, are a negative environmental externality. Pricing an externality is a mechanism to internalize the negative cost and consequently reduce the supply of the harmful good (Nordhaus 2011). Raising the market price of carbon therefore increases the incentives to reduce carbon emissions by offering producers economic benefits for using low-carbon energy sources and technologies

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In this study we are specifically interested in consumer responses to policy framing and policy design. Frames can be considered as “subtle alterations in the statement or presentation of judgement and choice problems” (Iyengar 1991, p.11). Framing triggers individual’s unconscious perception of information by the way in which information is provided—in this instance, information about a policy measure.

Drawing on framing theory, this study has three main objectives. First, we examine how framing a policy through the language of an incentive, a rebate, or a dividend influences consumer spending on green renovations projects, spending on everyday consumption goods, or putting the rebate towards savings. Second, we examine how the policy design related to disbursement schedule of either small monthly payments or annual lump-sum payments influences consumer spending and saving. Finally, we assess how framing affects how the public evaluates a policy. We define “public support” in this context along three dimensions: the extent to which the policy is seen as helping Canada’s image, supporting Canadian values and helping personal finances.

Our findings suggest that framing plays a significant role that is relevant for both policy-makers. Framing financial returns as an incentive increases public support and the likelihood that the money will be spent on green renovations rather than everyday purchases. Alternatively framing the return as a rebate or dividend does not affect public attitudes towards the policy in relation to Canada’s image or Canadian values. Additionally, if the financial return is disbursed as an annual lump-sum

payment, consumers are more likely to save the money instead of spending it on everyday purchases or green renovations.

In summary, these preliminary findings are consistent with previous research demonstrating that policy framing has significant effects on consumer attitudes and behaviours. These findings are relevant to all actors working to increase public engagement and support for carbon mitigating activities.

II. RESEARCH QUESTION AND HYPOTHESIS

This study sought to examine two ways in which the design of a carbon tax could influence consumer behaviour. First, we examine the framing effect of a policy on consumer attitudes and behaviour. Based on prior literature (Chong and Druckman 2007; Pleger et al. 2018; Hardisty et al., 2010), we expect that framing the policy as an incentive or dividend will have a greater impact on improving public support and positive feelings towards the policy than when the policy is framed as either a rebate or dividend. Based on former research on loss-aversion, we hypothesize that framing the financial return as a rebate (loss recuperation) will increase saving behaviour, as opposed to framing the return as financial gain through language of a dividend or incentive (Kahneman & Tversky, 2000). Furthermore, spending behaviour might be nudged towards environmentally-friendly spending if the reimbursement is framed explicitly as an eco-friendly incentive (Bennett et al. 2016).

Second, we assess how the design of the policy payment disbursement schedule impacts how consumers allocate the money. We predict that larger one-time annual disbursements are more salient than smaller monthly ones, and are less likely to be rolled back into everyday spending behaviour (although it is unclear if this will be allocated towards savings or large expenditures).

III. METHOD

A sample of 118 Canadians was recruited online using the online recruitment software Mechanical Turk. Participants were randomly assigned to each of the conditions of the experiment (Figure 1). Their participation took approximately 15 minutes to complete. The experimental design required participants to read a hypothetical scenario about a national carbon tax policy related to household tax rebates, and then to answer 12 related questions. Afterwards, participants filled out a series of demographics questionnaires, including questions about their age, gender, income, education, province of residence, marital status and living situation. They were also asked about their political attitudes and beliefs about issues including about climate change.

The study was inspired by the “backstop” measure of the Pan-Canadian Framework on Clean Growth and Climate Change; under this policy, carbon taxes collected in a province are returned to consumers through a direct repayment. The study design contained two independent variables affecting how the payment was described, and one independent variable about the underlying reason for the payment. The first variable looked at the schedule for the payment (referred to as Schedule) and the second variable focused on how the policy was framed (referred to as Framing). The policy scenario statement read: “Suppose that new carbon pricing legislation leads to some changes in how national tax policy affects you.” The participant was then provided with one of three frames for how the financial return was framed: an incentive, a dividend or a rebate. The participant was then provided with one of two disbursement schedules. Finally, the participant was provided with one of three explanations for why they were receiving the return.

After reading the scenario information, participants were asked to rate to what extent they agree with a series of statements about their likely spending behaviour and evaluation of the policy on a five-point likert scale (1 = strongly disagree, 5 = strongly agree).

Four multivariate analyses of variance (MANOVAs) were performed to analyze the participant’s responses. The effect of dispersal schedule and framing on spending behaviour were analyzed separately from the answers related to the statements about the policy contained in the questionnaire provided to the respondents. A 2×3 (Schedule $\times$ Framing) MANOVA was performed to determine the effect of dispersal schedule and framing on five dependent variables related to how the money was likely to be spent. Effect sizes were interpreted with Cohen’s (1988) conventions for partial eta squared (η^2_{part}) of small = .01, medium = .06, and large = .14. Follow-up univariate analyses using Bonferroni correction for multiple comparisons on the effect of Framing were applied to each of the dependent variables.

IV. RESULTS

The first findings relate to consumer spending and saving in response to framing (independent of schedule effects, which are discussed below). We found that framing the financial return as an incentive promotes spending on green renovations. By contrast, framing the return as a rebate or dividend promoted spending on everyday purchases.

The second finding related to spending resulted from the amount and disbursement included in the policy design (again, independent of framing effects). When the financial return was delivered as a larger lump sum payment (\$300 annually) there was decreased consumer spending and increased saving. Conversely, when the

Figure 1. All possible combinations of Frame, Schedule and Explanation conditions

financial return was in smaller, incremental payments (\$25 monthly), consumers were more likely to spend this money on everyday purchases.

Third, regarding the interaction between Schedule and Frame, there was one significant interaction effect: framing the payment as a dividend and scheduling it as an annual lump-sum payment increased the likelihood that consumers would put the money towards savings. This result was not observed in the smaller and monthly disbursement condition.

Finally, the framing of the payment affected consumer attitudes towards the policy. When it was framed as an incentive, respondents reported that the policy helps Canada’s image and supports Canadian values. However, respondents were the most likely to consider the rebate condition to help personal finances. For the policy evaluation component, there were no observed interactions between the frame and amount conditions.

V. DISCUSSION

Our findings demonstrate that Canadians responded more positively to carbon policy framed as an incentive compared to a rebate or dividend. Framing the tax policy as a carbon-action incentive increased consumer’s likelihood to spend on green appliances or renovations, and decreased their likelihood to spend on everyday purchases. A potential explanation for this behavioural response is that a policy explicitly framed as an environmental incentive can promote pro-environmental behaviour. This explanation would be consistent with previous work, which showed that communicating social norms about environmental behaviour reduced plastic bag use and buffet food waste (Hamann et al. 2015; Rubens et al. 2015).

The frame of an incentive also had significant results on how consumers evaluate the policy. This finding suggests that the language used in communicating a policy has implications for the level of public support it receives.

This findings corroborates other research on the relationship between environmental policy communication and public acceptability (Butler et al., 2015, Bennett et al. 2016). This relationship is relevant to policymakers who are framing and articulating policy aimed at behavioural and attitudinal change. These combined findings related to framing and policy design suggest that framing the policy as an incentive will more effectively promote green behaviour and garner public support than framing the policy as either a rebate or dividend.

Finally, the interaction effects between framing and payment schedule need to be considered as well in policy design. Labelling the policy as a dividend encouraged spending on everyday purchases instead of saving, with the effect particularly strong when the disbursement was \$25 per month. However, when the dividend frame was combined with the larger, lump-sum, annual disbursement, saving was encouraged. The implications for this result depend on the aim of the policy. For example, if the primary goal of the policy is to encourage consumers to spend on green retrofits, our findings suggest that framing the payment as a dividend will actually nudge consumers *away* from the intended behaviour.

Several caveats should be kept in mind when considering these results. First, the sample population is representatively more liberal and higher income than the Canadian population at large. These observations align with the characteristics of typical MTurk participants, who tend to be younger (about 30 years old), more educated, underemployed, less religious, and more liberal than the general population (Berinsky et al. 2012; Paolacci and Chandler 2014; Shapiro et al. 2013). Second, the sample size for this study was small. Accordingly the findings may not be representative of patterns within the wider Canadian population. We suggest that future research should increase the sample size and use stratified random sampling to ensure representativeness of the Canadian population as well as to enable disaggrega-

tion to be able to understand subgroups within the population, such as differences across provinces or income groups.

Finally, the study relied on self-reported intentions about behaviour rather than direct measurements of that behaviour itself; accordingly, this study should be interpreted as elucidating the effects of framing and policy design on *attitudes* rather than on *behaviours*. However, other research has found that the theory of planned behaviour (TPB) is very useful to explain individuals' behaviours and intentions in a variety of settings (Godin and Kok 1996, Godin et al. 2008), a systematic review of social theories applying the methodology concludes that the TPB is very useful to explain health-care professionals' behaviours and intentions (Godin et al. 2008). This research suggests that the results obtained here are likely to be informative about behavioural outcomes, even while noting that a direct measurement of those outcomes would provide more robust evidence than self-reported attitudes.

In summary, our combined findings suggest how the positive effects of carbon policy can be optimized. Public policymakers must take into account how the framing of carbon pricing policies as either an incentive, a rebate or a dividend, influences consumer spending and attitudes towards the policy.

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Appendix

Table I. Questions for Participants

Spending Questions	
1)	I would invest this money in energy-efficient home renovations or appliances.
2)	I would put this money toward my savings.
3)	I would use this money for everyday purchases.
4)	I would use this money to treat myself.
5)	I would donate this money for climate action causes.
Policy Questions	
1)	I think this is a fair policy.
2)	I would support a political party that implements this policy.
3)	I think this policy will help the environment.
4)	I think this policy affects the image of Canada positively.
5)	I think this policy reflects Canadian values.
6)	I think this policy helps the economy.
7)	I think this policy helps my personal finances.

Table II. Univariate effects of amount and frame on individual dependent variables

Effect	Dependent Variable	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2_{part}	Observed power
Amount	Everyday purchases	9.038	1	9.038	7.206	.008	.060	.758
Frame	Green renovations	9.736	2	4.868	3.362	.038	.057	.624
Frame	Everyday purchases	8.353	2	4.176	3.330	.039	.056	.620
Amount* Frame	Savings	9.093	2	4.547	3.794	.025	.063	.681

Table III. Multivariate effects of amount, frame, and their interaction on attitudes towards a tax policy

Effect	Wilks' Lambda	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>p</i>	η^2_{part}	Observed Power
Amount	.919	1.329b	7.000	106.000	.244	.081	.544
Frame	.787	1.931b	14.000	212.000	.025	.113	.934
Amount * Frame	.887	.939 ^b	14.000	212.000	.518	.058	.588

Table IV. Univariate effects of frame on attitudes towards a tax policy

Dependent Variable	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2_{part}	Observed Power
Helps Canada's image	9.633	2	4.817	4.698	.011	.077	.778
Canada values	7.043	2	3.522	4.410	.014	.073	.750
Helps personal finances	18.934	2	9.467	6.738	.002	.107	.911

Table V. Demographic Information of Participants

Gender		
	Frequency	Percent
Female	44	37.3
Male	74	62.7
Total	118	100
Marital status		
	Frequency	Percent
Common Law	14	11.9
Divorced	4	3.4
Married	38	32.2
Single	61	51.7
Widowed	1	0.8
Total	118	100
Age		
	Frequency	Percent
18-20	12	10.2
21-30	51	43.2
31-40	34	28.8
41-50	13	11
51-60	5	4.2
61-70	3	2.5
Total	118	100
Income (CAD \$)		
	Frequency	Percent
< 10000CAD	5	4.2
10000-20 000	7	5.9
20000-30 000	12	10.2
30000-40 000	15	12.7
40000-50 000	7	5.9
50000-60 000	8	6.8
60000-70 000	11	9.3
70000+	39	33.1
Not Sure / Prefer not to answer	14	11.9
Total	118	100