Elite Framing and Carbon Pricing : An Experiment in Embracing Expert Consensus

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Abstract

Can conservatives be persuaded to support carbon pricing? This thesis leverages a policy pivot by the Conservative Party of Canada and asks if elite framing moved public sentiment towards a climate policy backed by expert consensus. Using an original survey experiment deployed throughout the 2021 federal election campaign, I test if the Conservative Leader's genuine endorsement of carbon pricing as cost-effective increased policy understanding and support levels. Results show limited ability for conservative partisans to be cued towards carbon pricing by their party leader and even a minor backfire among out-group respondents.

Résumé

Les conservateurs peuvent-ils être persuadés de soutenir la tarification du carbone ? Cette thèse exploite un pivot politique du Parti conservateur du Canada et demande si le cadrage utilisé par l'élite a déplacé le sentiment public vers une politique climatique soutenue par des experts consensus. À l'aide d'une enquête originale déployée tout au long de la campagne électorale fédérale de 2021, je teste si la déclaration réelle du chef conservateur soutenant la tarification du carbone est liée à une meilleure compréhension des politiques et niveaux de soutien pour la politique. Les résultats montrent une capacité limitée des partisans conservateurs à être dirigé vers la tarification du carbone par leur chef de parti et même un retour de flamme mineur parmi les répondants hors groupe.

Contents

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1 Introduction

The task of implementing effective policy to combat climate change is challenging and likely to be a political battleground for decades to come. Despite majorities supporting action (Leiserowitz et al. 2021), enacting policies that are associated with an increased cost of living can pose serious hurdles for politicians hoping to push a climate agenda (Beiser-McGrath and Bernauer 2019). If Canada is to meet the targets outlined by the Paris Agreement to keep the mean rise in global temperature within 1.5°C - 2°C, then increased policy ambition is necessary.

This thesis investigates if elite framing can shift public sentiment towards one viable approach to reduce emissions — carbon pricing. First, I test if being cued towards the policy by a conservative party leader increases understanding of the cost-efficacy of carbon pricing, a claim backed by economist consensus (Stiglitz et al. 2017; Boyce 2018). Second, I see if this same cue increases support levels for carbon pricing. While my analysis uses a representative sample of the Canadian public, I pay special attention to conservative respondents. Can this group — who have historically opposed climate action — be specifically cued to embrace carbon pricing as a tool to decrease emissions?

1.1 The Puzzle of Carbon Pricing in Canada

Economists commonly recommend carbon pricing, a policy that internalizes the cost of emitting carbon dioxide, as a means to address climate change. [1] In theory, the logic is simple: apply a cost proportional to the harm caused by carbon pollution and let markets resolve the problem. Carbon pricing's primary virtue is its cost-effectiveness. It allows polluters the flexibility to adopt abatement measures in a manner accordant with least-cost principles (Rosenbloom et al. 2020). In 2019, over 3,600 US-based economists, including 28 Nobel Laureates, signed an open letter endorsing this claim of cost effectiveness. [2] Even economists who oppose carbon pricing agree with this claim of cost-effectiveness (Rosenbloom et al. 2020), demonstrating a virtual consensus amongst experts in the discipline. This does not imply that carbon pricing is the correct way to address climate change. Which values should be prioritized when reducing emissions, such as speed, social justice, or cost, are a matter of preference. So while there is an open and ongoing debate over the how to tackle climate change, this thesis will narrowly investigate public opinion in relation to the expert consensus claim of carbon pricing's cost-effectiveness.

Despite carbon pricing's ubiquity and cost-effectiveness, using it as the primary tool to reduce emissions is a contentious approach in the climate community (Martinez Alvarez et al. 2022). Over the past decade, a coalition of social and behavioural

1. http://bit.ly/3ltjyAA
2. http://bit.ly/40jTLcM.

scientists have increasingly scrutinized the value of cost-effectiveness. Jenkins (2014) argues that despite pricing mechanisms being the most cost-effective — or as he refers to as "first-best" — approach to reducing carbon pollution, political economy constraints threaten the viability of these policies and should caution policymakers into considering alternative, "second-best" ones. For example, climate scientists have praised the passing of the Inflation Reduction Act (IRA) as the most successful climate legislation in US history. This legislation intentionally did not price carbon but instead included $369 billion in subsidies to promote cleaner forms of energy (Martinez Alvarez et al. 2022).

Mildenberger and Stokes (2020) argues that these "second-best" policies are easier to implement, given the history of carbon pricing being vociferously pushed back upon by opponents. This opposition has taken many forms, including electoral backlash and populist protest movements. One way to understand why the public so often opposes carbon pricing, despite its alleged economically optimal design, is that the costs are salient, individual, and front-loaded, whereas the benefits are collective and born over the long term (Mildenberger and Stokes 2020). Additionally, for carbon pricing to meet the scale of the problem posed by climate change, most carbon prices across the world today are far too low (Green 2021). And as Jenkins (2014) demonstrates, the projected ceiling for how high a carbon price can rise in the United States without incurring large public backlash is clearly not high enough to be effective. Given this

history and the misaligned political incentives involved with "first-best" approaches, it is understandable that politicians are wary of campaigning on carbon pricing. With the US decision to move forward with climate policy through subsidies and regulation, as seen in the IRA, it is possible that other climate-lagging countries will adopt this "second-best" path and reject the approach of direct pricing mechanisms.

Despite the clear political challenges involved, Canada implemented a successful carbon pricing program that has survived two consecutive federal elections. Achieving this policy stability is more difficult in Canada, as environmental issues have shared jurisdiction in Canada's federal system, making any environmental regulation a political battleground for the federal and provincial governments to navigate (K. J. Harrison 1993).

How then should we consider this apparent policy success given the political economy constraints outlined in the carbon pricing literature? An important caveat for the apparent success story of carbon pricing in Canada is that the policy has not yet been tested by the changing of governments. Support for carbon pricing in Canada is strongly conditioned by partisanship (Lepissier et al. 2022; Mildenberger et al. 2022) and Conservative Party partisans demonstrate far lower support levels than their Liberal counterparts. It is therefore unknown if carbon pricing, as a federal program implemented by the Liberal Party, would continue under a Conservative government whose voter base currently opposes the policy. Thus, studying if Conservative Party

partisans can change their opinions on carbon pricing is central to better understanding the political economy constraints of this "first best" climate policy's lifespan in Canada.

1.2 The Conservative Party's Window of Opportunity

During the spring of 2021, the Conservative Party of Canada announced a major plank in their environmental platform for the next federal election. Then-leader Erin O'Toole broke with the Conservative Party's precedent of opposing carbon pricing and decided to incorporate it into the party's platform. This pivot was particularly striking because the former leader, Andrew Scheer, strongly opposed carbon pricing. For example, in the 2019 election debate, he said, "The carbon tax is proven to fail. I don't know why anybody would support the policy. It's not a Conservative Party position, it's not my opinion".[3] In announcing the party's policy pivot, the newly elected leader, Erin O'Toole, packaged a form of carbon pricing within a rewards program where revenues generated would be returned to individual spending accounts.[4] These funds could then be spent on earmarked items which aligned with lower-emission-based technologies. For the first time, the Conservative Party's climate policy was independently confirmed to credibly be able to reach their stated emission reduction targets, a significant milestone in the Party's approach to climate

3. http://bit.ly/3K6GE9X
4. https://bit.ly/3Z4dc8C

policy.[5] During this policy announcement, Leader O'Toole stated, "We recognize that the most efficient way to reduce our emissions is to use pricing mechanisms". This particular endorsement of carbon pricing by the Conservative Leader is of note, as he explicitly appealed to the expert consensus claim of cost-effectiveness when pitching the policy in the run-up to the election.

However, In October 2021, Erin O'Toole and the Conservative Party lost the election to the Liberal Party, despite winning the popular vote. Within five months of losing the election, the Conservative Party backtracked on their temporary endorsement of carbon pricing. After Erin O'Toole subsequently lost a leadership review vote by caucus in early February 2022, the party formally renounced their support of carbon pricing, expunging it from their future campaign pledges.[6] The new Leader elected after O'Toole, Pierre Poilievre, has a long history of opposing carbon taxes and specifically ran on a mandate to "axe the tax" in respect to carbon pricing.[7]

This short window of the federal Conservatives in Canada embracing carbon pricing provides a valuable opportunity to research the impact of party elites and their capacity to shift public opinion. Additionally, better understanding real-world examples of the political economy of carbon pricing is critical to understanding the long-term political durability of the policy. This moment afforded by the Canadian

5. http://bit.ly/3z0CUA4
6. http://bit.ly/3yXJlnQ.
7. http://bit.ly/3JyO6Jo.

case study of carbon pricing is an excellent opportunity to analyze political constraints around "first-best" approaches to climate policy and whether divided partisan attitudes toward credible climate policy can be attenuated.

2 Background Literature

2.1 Environmental Issues and Motivated Reasoning

Political behaviour research has extensively examined message framing and climate change beliefs (Goldberg et al. 2020; Benegal and Scruggs 2018, e.g.,). Much of this research looks at correcting environmental misperceptions, largely leaning into the scientific consensus that human-caused climate change exists (Goldberg et al. 2020; Dixon et al. 2017; Wolsko et al. 2016). For this thesis, I will instead leverage the economist consensus around the cost-effectiveness of carbon pricing as a purchase into studying climate policy attitudes. This shift in focus is also better reflective of the current state of climate change politics in Canada, where all major party leaders accept the problem, yet disagree on the way forward.

There is a body of evidence for the ability of political leaders to shape public opinion (Mendelberg 2017; Flores 2018; Clayton and Willer 2023). The incorporation of psychology's cognitive revolution has significantly advanced the study of cues within the political science discipline (Lau and Redlawsk 2001). Part of this incorporation

has been a result of explaining electoral choice given low political information levels (Howe 2007; Lau and Redlawsk 2001) and another part focuses on how incorrect beliefs can undermine the ability of citizens to reach accurate conclusions (Kuklinski et al. 2000). In the past decade, there has been increased attention towards whether partisan intermediaries can effectively "right" misperceptions (Nyhan 2021). Nyhan and Reifler (2010) accelerated the use of partisan frames through their influential 'backlash effect' findings. This effect has since been tested with replication results ranging from null to mixed results (Wood and Porter 2019; Nyhan 2021). I follow this trend and consider if a conservative elite can cue their respective partisans towards acknowledging the cost-effectiveness of carbon pricing.

Using partisan frames to cue individuals towards policy information (Brader et al. 2020) greatly overlaps with the literature on motivated reasoning. Motivated reasoning occurs when individuals reconcile new information within their prior value structures and identity groups (Kunda 1990; Bullock et al. 2013). In the context of the Conservative Party of Canada, much of their identity has been built around opposition to the Liberal government's carbon pricing program, often characterized as a carbon tax.[8] Therefore it was noteworthy when their leader broke from precedent and embraced carbon pricing for the 2021 election. This is of particular interest when considering motivated reasoning, as Conservative partisans' prior identity of opposing

8. Page 3, http://bit.ly/3JxF6Ec.

carbon pricing was put into conflict with the party's new direction of embracing it. This forced conservative voters to internally reconcile with a new partisan identity.

Building from this understanding of motivated reasoning, Kahan (2013) uses cultural cognition theory to posit that individual acknowledgment of expert consensus is shaped by their values in ways to maintain their group identities. Policy reversals are likely to surprise partisans as people typically expect leaders to express opinions which align with their party's prior views (Benegal and Scruggs 2018; Lupia et al. 1998). In the context of carbon pricing in Canada, this policy reversal by the Conservative party is particularly striking, as the change is towards policy alignment with the opposing Liberal Party. Research has demonstrated that framing climate policies as market-friendly improves conservative support for it (Campbell and Kay 2014), so it makes strategic sense that O'Toole chose to highlight the cost-effectiveness of carbon pricing when pitching his platform. Understanding if this market-oriented cue, framed by the Conservative Party leader, can be strong enough to push conservatives' opinions away from their prior identity is a narrow yet valuable opportunity to research motivated reasoning within a real-world case study. This question is also valuable as it looks at the ability of political parties to acquiesce to their rivals' policies and whether their supporters will follow. While political parties often change their platforms between elections, having the opposition party leader move their party platform closer to the sitting government's climate policy, in such a politically salient context, was an un-

expected choice by the Conservative Leader. These unique circumstances add to the research value for understanding the ability of a party leader to reverse the opinions of their partisan base

Conservative public opinion is unlikely to only be a function of in-group elites pushing their views downwards (Martinez Alvarez et al. 2022). US-based research shows that out-group aversion can push Republicans away from climate change action in an effort to avoid alignment with Democratic party elites (Merkley and Stecula 2018). Comparable Canadian research looking at the effect of Liberal Party cues on conservative partisans is limited (Merolla et al. 2008; Guntermann and Lachapelle 2020) but it is not a large leap to consider a similar effect existing north of the border. Despite all major parties in Canada pitching some form of carbon pricing in the 2021 federal election, when asked which parties include the policy in their platform, respondents strongly associated the policy with the Liberal party. [9] Given Canadian Conservatives' prior and strong opposition to carbon pricing, it is likely difficult for Conservative elites to significantly shift their supporters in favour of the policy as long as it is associated with the opposing Liberal Party identity. Overcoming this partisan association of carbon pricing with the Liberal Party presents a uniquely difficult task for the Leader of the Conservative Party. However, stressing the cost-effective nature of carbon pricing will likely help persuade conservative-leaning respondents of the

9. see figures 5

merits of the policy. Further, considering that the policy intricacies of carbon pricing are somewhat esoteric, the general public likely has low information levels regarding its design (Mildenberger et al. 2022). Both psychology and political science research shows that cues are more effective when respondents are less knowledgeable on the topic presented (Rinscheid et al. 2021). All of this evidence points to a confusing landscape for Conservative partisans to navigate when their party leader endorses a policy historically associated with Liberal Party. Despite what can be seen as a strategically framed pitch by O'Toole, it might be near impossible for the Conservative Leader to move his base's opinion towards carbon pricing.

2.2 Carbon Pricing and Partisanship

Goldberg et al. (2021) build on this literature of elite-framing within climate change communication, with a particular focus on how partisanship moderates elite cues towards climate action. Partisanship is highly relevant to climate change politics (Lepissier et al. 2022; Mildenberger et al. 2022). In the American context, citizens have been shown to form their opinions around climate change issues as a result of elite partisan cues (Merkley and Stecula 2018). For example, simply linking climate change to forest fires can cause Republicans to view politicians as less capable of addressing disaster events (Hai and Perlman 2022).

When leveraging the scientific consensus of the existence of human-induced cli-

mate change, many studies look at partisanship as the principal mechanism to explain differences in the effectiveness of cues (Benegal and Scruggs 2018). Partisan heuristics and targeting of conservative voting blocs have been a particular focus as conservatives are often the least concerned about climate change. For example, Baldwin and Lammers (2016) demonstrate that past-focused messages are more effective in promoting pro-environmental attitudes among conservatives. Through a campaign field experiment in competitive congressional districts, Goldberg et al. (2021) show that targeted advertising depicting the risks of climate change improves Republicans' understanding of the science. Goldberg et al. (2021)'s study is of particular relevance to this thesis, as it leverages spokespeople designed to specifically appeal to conservative voters. They use an evangelical Christian climate scientist and a retired Air Force general, and their results show modest shifts in opinions towards climate action-oriented beliefs.

In terms of specific climate policies, carbon pricing has often been a focus for political scientists (K. Harrison 2010; Mildenberger et al. 2022; Rabe 2018). Initially launching off of economists' preference for carbon taxes, political scientists evaluated ways to increase support for it (Bergquist et al. 2020), often focusing on how the revenues are used. Rebating the revenues generated from carbon pricing, a common call from progressively-minded policy advocates, seems to have a mixed effect on public support. Some research finds minor increases in levels of approval (Beiser-McGrath

and Bernauer 2019), while others in the Canadian context find limited change, with far greater differences in support found when conditioning on partisanship (Mildenberger et al. 2022). However, the Canadian example of rebates is still in its infancy. Revenue recycling has recently been changed to a front-loaded quarterly rebate.[10] The effect of this change in public opinion is unclear, but since it is likely to increase the salience of the financial benefits, support may also increase (Mildenberger et al. 2022). Directing revenues into public infrastructure funds can be popular but this depends on the level of trust individuals have in politicians (Hammar and Jagers 2006). Kotchen et al. (2017) find that instead of rebating the revenues, directing revenues to green infrastructure projects or even compensating the workers of fossil fuel industries garners the most support. A common conclusion is that effectiveness at emissions reductions seems to be less important than the perceived fairness of the revenue usage (Maestre-Andrés et al. 2021).

Other researchers have looked at more general predictors for carbon pricing. Using a random forest approach to machine learning and simulating twenty-eight conditions for opinion, Levi (2021) finds personal responsibility to be the most predictive of carbon pricing support. Fairbrother et al. (2019), in turn, find public trust in government to be a key predictor for similar programs. Hammar and Jagers (2006) separate respondents into high and low public trust levels and concludes that those with a car

10. http://bit.ly/3Z6ZUs3.

and low trust levels are most resistant to carbon pricing efforts. Lepissier et al. (2022) find that those who drive to work and spend more on transportation fuels are more likely to oppose carbon pricing. There are many ways to implement carbon pricing, and each variation has different coalitions of support (Bergquist et al. 2020).

3 Methods

3.1 Research Approach

It is clear that if we want to better understand the politics of climate change policies in Canada, partisan identity is fundamental to our research (Mildenberger et al. 2022; Lepissier et al. 2022; Guber 2013; Tesler 2018). However, analyzing partisan support for carbon pricing through a causal inference approach is difficult given the endogeneity of which parties espouse which policies. Parties will understandably refrain from campaigning on policies their supporters will not tolerate. Further, it is impossible to use experiments to test the true treatment of carbon pricing and its impact on voter behaviour. Mildenberger et al. (2022) experimentally uses customized tax returns to highlight individual household rebate amounts and their impact on policy support levels. However, despite showing causal conclusions, this experiment does not capture the true effect of carbon pricing, only the effect of information provision. Regardless, a key takeaway is that support is largely determined by partisan

identity rather than economic considerations such as rebate size.

The federal election in 2021 provides an opportunity to analyze partisan support for carbon pricing in a novel fashion. For the first time, the federal Conservatives ran on carbon pricing.[11] This policy shift provides a unique opportunity to better understand the public opinion consequences of elite partisan cues, especially within more conservative demographics. This thesis will leverage O'Toole's endorsement and measure if his framing shifts opinions through a survey experiment conducted during the election campaign. If any framing is to be effective for conservatives, I suspect that a message of support, championed by an in-group elite, which stresses market-oriented principles, will be best able to shift support towards carbon pricing (Goldberg et al. 2021; Campbell and Kay 2014).

To test my expectations of O'Toole's policy pivot, I leverage his endorsement and assign it randomly to survey respondents. He stressed the cost-effectiveness of carbon pricing in his speech.[12] This is convenient as it aligns with the expert consensus of economists. Thus, while the message is clearly framed by a partisan elite, it also provides factually correct information about the policy. Through this framing, I will be able to look at two key outcome variables; support for carbon pricing and policy understanding. In other words, because the frame serves as a cue of expert consensus,

11. https://www.thestar.com/politics/federal/2021/04/15/conservative-leader-erin-otooles-climate-plan-expected-to-include-a-price-on-carbon-also-known-as-a-carbon-tax.html
12. https://youtu.be/guqEWaY2Ju0?t=105

I will also be able to measure how much O'Toole's messaging improves respondents' understanding of the cost-effectiveness of carbon pricing. Through this disambiguation of policy knowledge and policy support, I will be able to better understand the political economy pressures which obscure the politics of carbon pricing. If people become more knowledgeable of the policy, yet do not support it more, this would lend credence to the argument advanced by Jenkins (2014) and Klenert et al. (2018) who call for a "second-best" approach to climate policy, which prioritizes more politically feasible approaches that conceal costs. If individuals, and especially conservatives, can be cued to increase their support for carbon pricing, than perhaps there is more political runway for "first-best" approaches and increased attention should be directed towards finding the most effective messengers.

The framing by O'Toole will form the basis of this thesis' treatment and control approach for data collection during the survey experiment. After randomly including the treatment frame of O'Toole's endorsement, I will then ask respondents about support levels for carbon pricing and a general understanding of its cost-effectiveness. Specifically, I will ask if they support continuing the carbon pricing program and if they agree that carbon pricing is the most cost-effective approach to reducing greenhouse gas emissions. The objective of this survey experiment is to see if conservative elite framing can change the public's opinion on a viable tool to reduce carbon emissions. I recognize that carbon pricing is simply one way to reduce emissions, and

despite being the most cost-effective approach, may not make sense in a given jurisdiction. Although this survey experiment took place during the federal election campaign, I also want to stress that the outcome variable is rooted in public opinion, and is not measuring voter behaviour. Lastly, as the current governments' carbon pricing policy is designed to increase in price until 2030, I will include a third outcome variable that asks if respondents would like the current price to decrease, increase or remain the same. The results for this question are in Appendix C.

3.2 Data

I will use data obtained through the Canadian Election Misinformation Project (CEMP). CEMP was a civil society and academic partnership led by McGill University's Media Ecosystem Observatory. Through my work on the project, I included several questions in the nationally representative survey for the purposes of this thesis. The sample size for my survey experiment is 2143 respondents and the data collected was from September 7th-20th, 2021. Half the respondents were randomly assigned the treatment and half were assigned to the control group. For more methodological information regarding the survey, please see Appendix A.

3.3 Treatment Framing and Survey Design

The following section details my experimental treatment and measurement strategy.

3.3.1 General prompt for all survey respondents

"During the 2015 Paris Agreement, Canada committed to deep greenhouse gas emission reductions. Canada's climate plan includes carbon pricing, which discourages carbon-intensive choices by making them more costly."

3.3.2 Treatment

The following was randomly added to the general prompt above (bolding was included in the survey):

"**Erin O'Toole, Leader of the Conservative Party of Canada**, announced his party's climate plan, which includes carbon pricing. He said: "We recognize that the most cost-effective way to reduce our emissions is to use carbon pricing"."

3.4 Hypotheses

I test five hypotheses included in a preregistration report before data collection.

Hypothesis 1 (H_1): Exposure to the treatment will increase understanding of the

cost-efficacy of carbon pricing.

Hypothesis 2 (H_2): Exposure to the treatment will increase individuals' support for continuing carbon pricing.

Hypothesis 3 (H_3): Exposure to the treatment will increase individuals' support to raise the current price on carbon.

Hypothesis 4 (H_4): The treatment effect will be stronger for conservative partisans.

Hypothesis 5 (H_5): The treatment effect will be stronger for more ideologically right-wing individuals.

3.5 Analysis Approach

To test my hypotheses, I use least squares regression models with HC2 robust standard errors. I will include a model using political ideology in H_5 as a different way to operationalize conservatism. Political ideology is measured in the survey as a scale from 0 to 10, representing far left to far right, respectively. To understand if the treatment is more effective for certain levels of conservatism, I will include an interaction model between treatment status and both operationalizations: Conservative Party identification and political ideology. For my model using an interaction with political ideology, I will test for linearity to evaluate whether a linear interaction is a reasonable assumption (Hainmueller et al. 2019).

The general regression equation when political identity is captured by Conservative partisan preference is:

$$Y_i = \beta_0 + \beta_1 Treatment_i + \beta_2 Partisanship_i + \mathbf{X}'\omega_i + \varepsilon_i$$

When using an interaction effect:

$$Y_i = \beta_0 + \beta_1\, Treatment_i + \beta_2\, Partisanship_i + \beta_3\, (Treatment_i \times Partisanship_i) + \mathbf{X}'\omega_i + \varepsilon_i$$

Where political identity is measured operationalized by ideology:

$$Y_i = \beta_0 + \beta_1\, Treatment_i + \beta_2\, Ideology_i + \mathbf{X}'\omega_i + \varepsilon_i$$

When using an interaction effect:

$$Y_i = \beta_0 + \beta_1\, Treatment_i + \beta_2\, Ideology_i + \beta_3\, (Treatment_i \times Ideology_i) + \mathbf{X}'\omega_i + \varepsilon_i$$

These models use $\mathbf{X}$ as a battery of variables commonly used in demographics such as gender, rural identity and income. Because the survey employed automatic randomization of the treatment, I expect the results to be robust to any bias. For each outcome variable, I will control for basic demographic features, as shown in a balance table in Appendix E. Controlling for these covariates will help make the results more

precise but is likely unnecessary (Mutz et al. 2019).

4 Results

4.1 Outcome Variable: Policy Understanding

Table 1 – Policy Understanding

	Carbon pricing is ... most cost-effective?					
	Not at all accurate (0) - Very accurate (3)					
	Bivariate	Controls	Conservative Partisanship	Partisanship Interaction	Conservative Ideology	Ideology Interaction
Treatment	−0.123***	−0.135***	−0.136***	−0.216***	−0.141***	−0.366***
	(0.040)	(0.042)	(0.042)	(0.046)	(0.044)	(0.107)
Woman		−0.167***	−0.174***	−0.177***	−0.032	−0.032
		(0.043)	(0.042)	(0.042)	(0.046)	(0.045)
>90K income		0.395***	0.394***	0.392***	0.284***	0.283***
		(0.044)	(0.044)	(0.044)	(0.048)	(0.048)
Rural		0.008	0.023	0.022	−0.028	−0.028
		(0.052)	(0.052)	(0.052)	(0.055)	(0.055)
Conservative Identification			−0.171***	−0.351***		
			(0.053)	(0.075)		
Conservative Interaction				0.363***		
				(0.105)		
Ideology					0.100***	0.081***
					(0.009)	(0.013)
Ideology Interaction						0.038**
						(0.017)
Constant	1.704***	1.663***	1.702***	1.744***	1.102***	1.215***
	(0.028)	(0.044)	(0.044)	(0.045)	(0.070)	(0.086)
Observations	2,135	1,891	1,891	1,891	1,630	1,630
R^2	0.004	0.062	0.067	0.074	0.126	0.129
Adjusted R^2	0.004	0.060	0.065	0.071	0.123	0.125
Note:						*p<0.1; **p<0.05; ***p<0.01

For the first set of results related to policy understanding, the treatment actually

lowers perceptions of carbon pricing's cost-effectiveness. This is notable as it is the opposite direction of effect I expected in H_1. On a scale of 0 to 3, where 0 represents "not accurate at all" and 3 represents "very accurate", O'Toole's framing slightly lowered respondents' belief that carbon pricing is the "most cost-effective way for Canada to lower greenhouse gas emissions", from 1.7 to 1.58. This effect is statistically significant at an alpha level of 0.05. However, the aggregate effect masks heterogeneous effects by Conservative Party status. When conditioned by identification with the Conservative Party, the treatment frame does increase Conservative Party identifiers' understanding of the policy's cost-effectiveness. As seen in figure 1, the marginal effect is 0.11, although it is not statistically distinguishable from zero. This positive effect for Conservative Party partisans supports H_4, where I hypothesized that the treatment effect would be stronger for Conservative partisans. Non-Conservative Party identifiers experience a statistically significant backlash to O'Toole's endorsement with a marginal effect of -0.18. These results can also be viewed in figure 1.

When operationalizing conservatism in the form of ideology on a scale from left to right, right-wing respondents are more likely to recognize that carbon pricing is cost-effective. A one unit change rightward on the political ideology spectrum is associated with an increase in policy understanding by 0.10 units.

When considering the interaction of ideology and O'Toole's framing, left-wing respondents experience a modest backlash to the treatment, whereas there is no

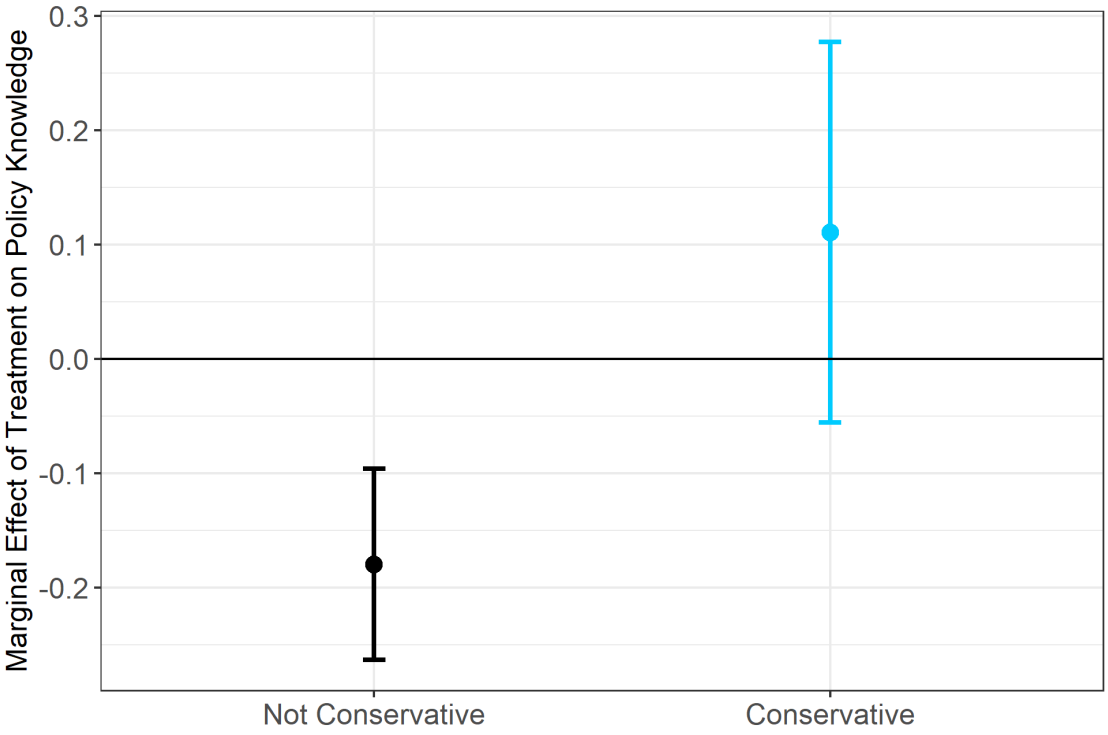

Figure 1 – Marginal effect plot of treatment on belief in carbon pricing's cost-effectiveness, by Conservative Party identification. The model includes demographic covariates.

distinguishable effect on more right-wing respondents. The marginal effect of this interaction is visualized in figure 2. Since there is a null result for more right-wing respondents, H_5 is not supported. While these findings are certainly interesting, using a linear model may overly coarsen the relationship between ideology and the treatment. In Appendix D, I present non-linear marginal effect plots and linearity test results for all three outcome variables. For an understanding of carbon pricing's cost-effectiveness, O'Toole's framing only has a statistically significant effect

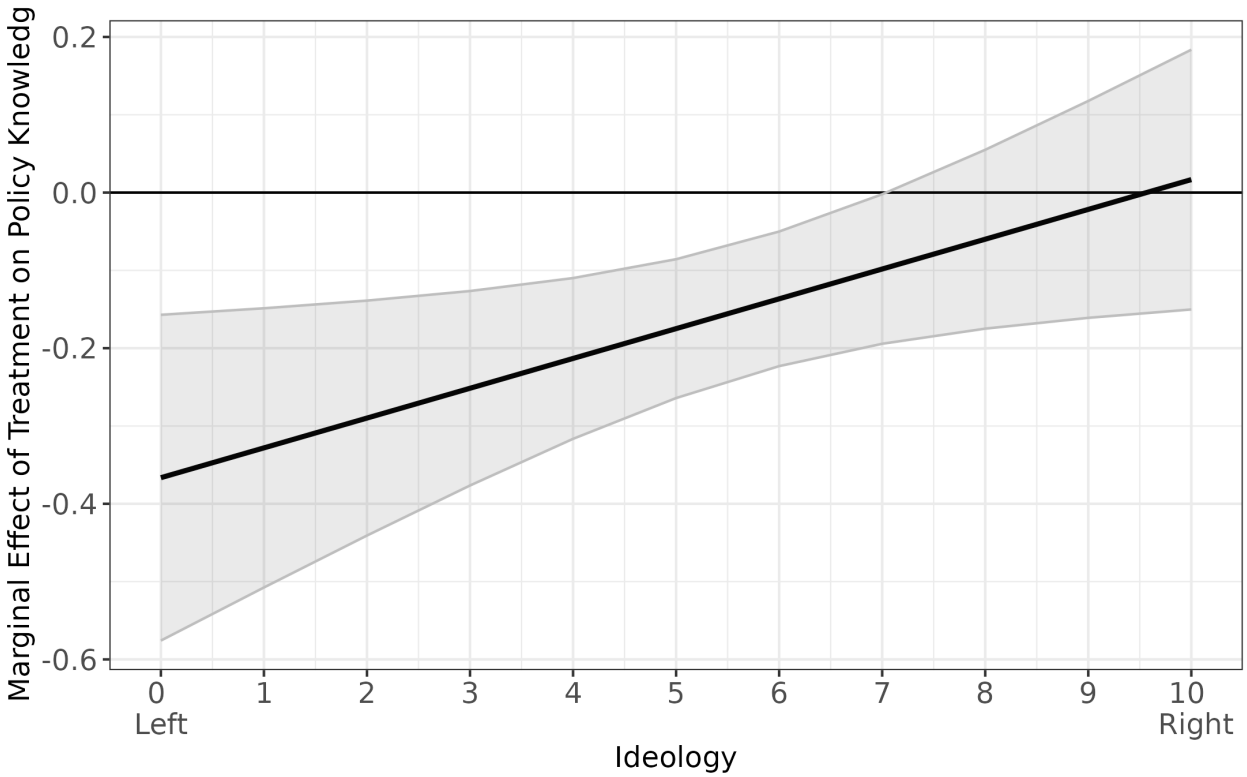

Figure 2 – Marginal effect plot of treatment on belief in carbon pricing's cost-effectiveness, by political ideology. The model includes demographic covariates.

for respondents who identify on the political ideology spectrum as a 3 or less. This demonstrates that O'Toole's framing pushed politically left to far left respondents away from his expert consensus-supported claim that carbon pricing is cost-effective. When comparing the difference in treatment effect estimates across the 25^{th}, 50^{th}, and 75^{th} percentiles of the moderator, which corresponds to respondents who identify as a 4, 6, or 8 on the 0-10 political ideology spectrum, there is an inconsistent difference of effect between 0.13 and 0.16 units. These results demonstrate that the linearity assumption in OLS is an imperfect choice to model political ideology and its

interaction with the treatment.

When considering both operationalizations of conservatism, the interaction results do generally align with the Conservative identification model. Non-Conservatives, who typically align as more left-wing respondents, also experience a minor backlash to the treatment. Further, more ideological right-wing respondents did not experience a statistically distinguishable effect from the control frame, similar to Conservative Party identifiers. For either model, the most meaningful response to the treatment is found among out-group respondents, people that the Leader of the Conservative Party would not be targeting with his climate policy proposal.

4.2 Outcome Variable: Policy Support

Turning to the second set of results, the outcome variable is now support for continuing carbon pricing. When asked if the federal government should continue carbon pricing, 0 represents "Strongly Disagree" and 4 represents "Strongly Agree". Despite the direction of the treatment effect again being negative, which is counter my expectations in H_2, it is now statistically indistinguishable from zero in the regression results. While the treatment frame moves Conservative Party identifiers towards carbon pricing support and non-Conservatives away, as shown in figure 3, neither effect is statistically significant. However, the point estimates align with my expectations that the treatment would be stronger for Conservative partisans in H_4. Broadly speak-

Table 2 – Policy Continuance

	Should the federal government continue carbon pricing?					
	Strongly Disagree (0) - Strongly Agree (4)					
	Bivariate	Controls	Conservative Partisanship	Partisanship Interaction	Conservative Ideology	Ideology Interaction
Treatment	−0.046	−0.035	−0.036	−0.091	−0.009	−0.114
	(0.054)	(0.057)	(0.055)	(0.062)	(0.062)	(0.152)
Woman		−0.084	−0.114**	−0.116**	−0.003	−0.003
		(0.058)	(0.056)	(0.056)	(0.064)	(0.064)
>90K income		0.401***	0.400***	0.398***	0.400***	0.399***
		(0.058)	(0.057)	(0.057)	(0.065)	(0.065)
Rural		−0.220***	−0.159**	−0.159**	−0.221***	−0.221***
		(0.068)	(0.067)	(0.067)	(0.075)	(0.075)
Conservative Identification			−0.713***	−0.836***		
			(0.067)	(0.093)		
Conservative Interaction				0.249*		
				(0.132)		
Ideology					0.022*	0.013
					(0.012)	(0.017)
Ideology Interaction						0.018
						(0.024)
Constant	2.356***	2.305***	2.465***	2.494***	2.180***	2.233***
	(0.038)	(0.058)	(0.058)	(0.060)	(0.094)	(0.117)
Observations	2,135	1,891	1,891	1,891	1,630	1,630
R^2	0.0003	0.034	0.089	0.091	0.035	0.035
Adjusted R^2	−0.0001	0.032	0.087	0.088	0.032	0.032

Note: *p<0.1; **p<0.05; ***p<0.01

ing, regression results show that Conservative Party identification predicts support in close likeness to the first outcome variable. This similarity might indicate that respondents are expressing general favourability to the policy compared to having a firm understanding or opinion about how it works.

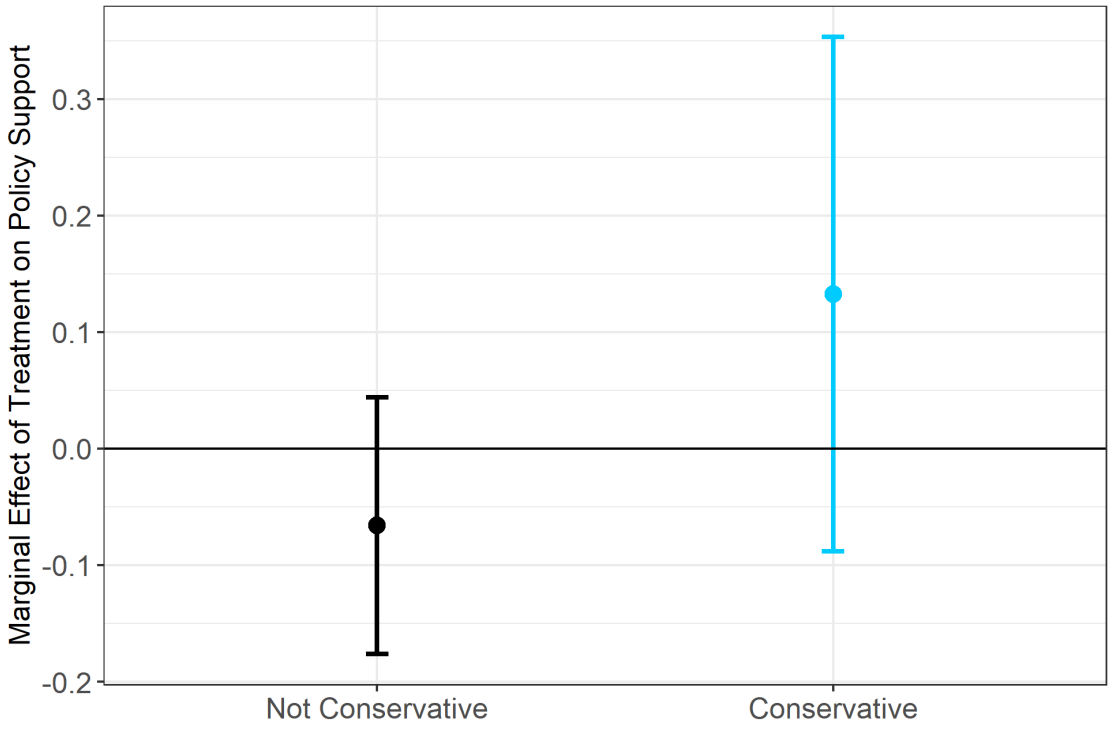

Figure 3 – Marginal effect plot of treatment on support for carbon pricing, by Conservative Party identification. The model includes demographic covariates.

Looking at policy support levels across political ideology levels, right-wing respondents are more supportive of continuing the federal carbon pricing program. When interacting the treatment with ideology, there is no statistically significant effect, as seen in figure 4. Again, Appendix D includes a non-linear marginal effect plot and

linearity test. Since there is a null result for more right-wing respondents, H_5 is similarly not supported for the second outcome variable. While the general trend is non-linear in similar fashion to before, here the more left-wing respondents' marginal effect is smaller and not statistically significant.

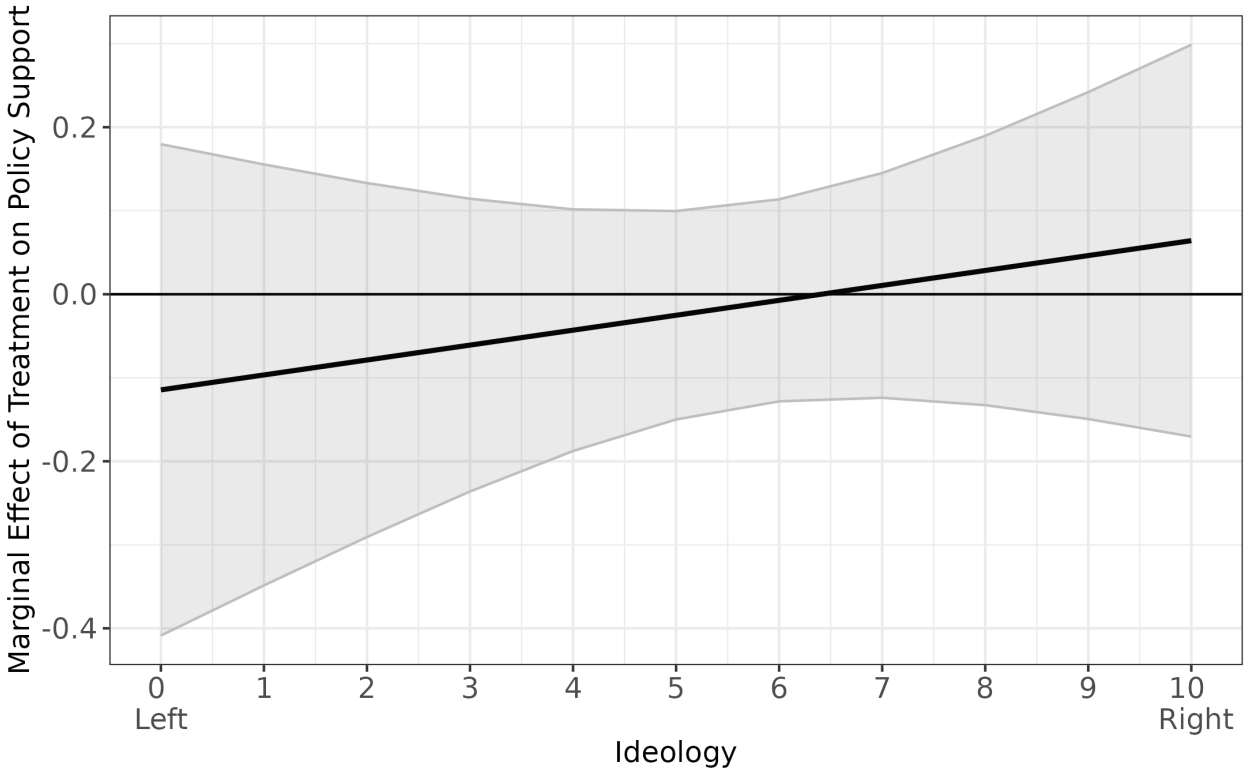

Figure 4 – Marginal effect plot of treatment on support for carbon pricing, by political ideology. The model includes demographic covariates.

Finally, I have included the regression results and marginal effect plots related to my third outcome variable, whether to increase or decrease the current price on carbon, in Appendix C. In either operationalization of conservatism, party identification or ideology, results strongly mirror those of the second outcome variable. Respondents' opinions on whether to change the current price on carbon completely map onto whether or not they believe the current policy should continue and O'Toole's framing does not statistically impact their views when conditioning on either model of conservatism.

4.3 Limitations

One significant limitation of this survey design is that the true announcement of the Conservative party's carbon pricing proposal occurred five months prior to the election. Perhaps this policy information was common knowledge at the time of the election campaign and the survey's treatment frame presented no new information to respondents. Further, through my survey experiment design, I prime all respondents that the current federal approach to climate change includes carbon pricing. While policy knowledge of how carbon pricing works is likely not common, the policy debate over it has certainly been salient. Respondents might appropriately consider the current plan as Liberal Party-coded because the current federal government is run by the Liberal Party. While I did not include a question which asks if respondents

attribute carbon pricing to a particular political party, I suspect that Conservatives will be less likely to support a policy that is coded as Liberal. If so, this might lead to a dampening of the treatment effect for Conservative Party supporters and more ideological right-wing identifiers as they could be resistant to embracing a policy championed by their political opponents. Future research could better identify this issue and the degree to which issue ownership surrounds carbon pricing in Canada.

In regards to if respondents knew that the Conservative Party included carbon pricing in their election platform, the effect of this policy salience on framing experiments is nuanced. As Rivard and Merkley (2021) explain in detail in their article on supply management in Canada, the impact of issue salience on framing experiments might depend on political knowledge levels. There is evidence that the effectiveness of treatment frames ca be moderated through political knowledge levels (Haider-Markel and Joslyn 2001). As well, strongly salient issues can lead to weaker framing effects (Druckman and Nelson 2003).

In an attempt to measure information exposure levels, I included a question which explicitly asked respondents which policies were proposed by which parties. I asked this in the survey before the experiment. Results, as shown in figure 7, show that people were more than twice as likely to say that the Liberals proposed carbon pricing as compared to the Conservatives. Despite all major parties including carbon pricing in their election platforms, less than 20 percent of respondents said the Conservatives

proposed carbon pricing.

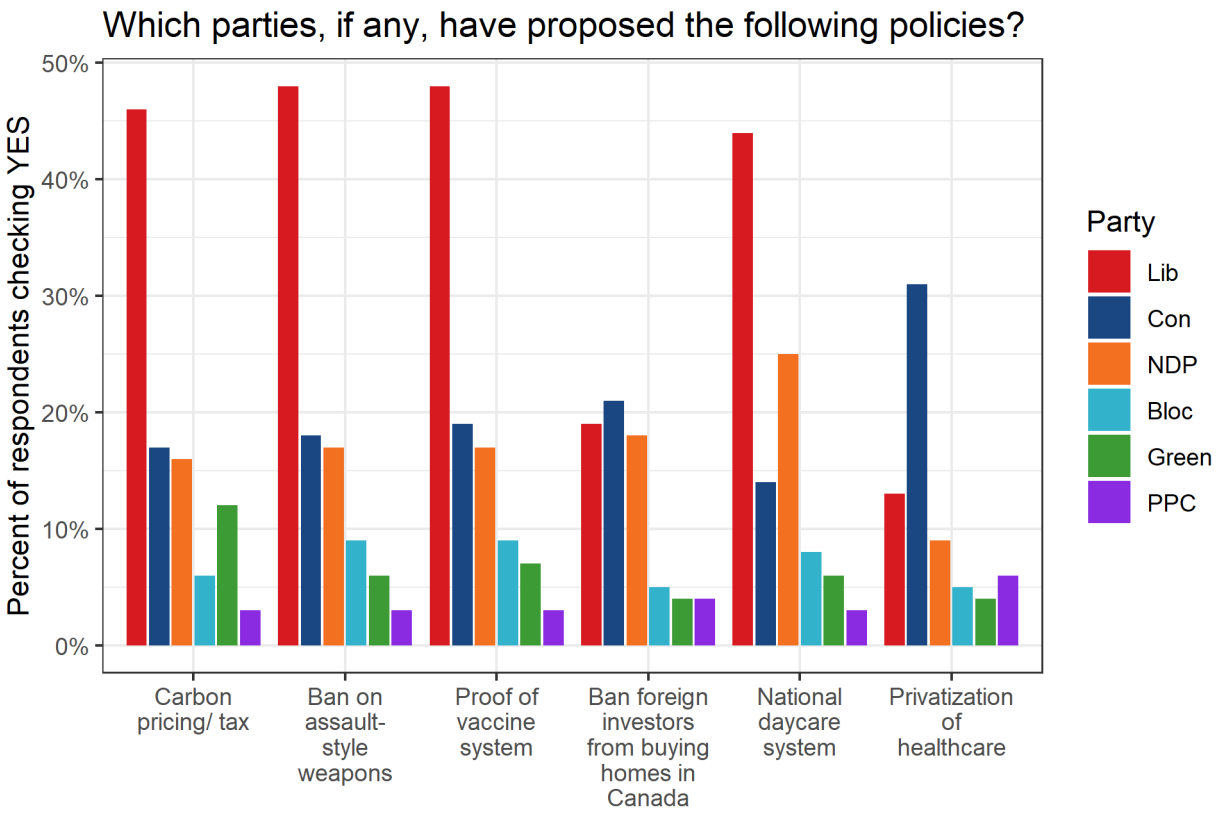

Figure 5 – Respondents' knowledge of party platforms

This suggests that the treatment frame did provide novel information to most respondents, but it is certainly possible that a non-trivial amount of respondents already knew of O'Toole's position. To model prior platform knowledge of the Conservative party, below are regressions that include a dummy variable for whether respondents accurately identified the Conservative Party platform included carbon pricing. I have done this for each outcome variable: agreement with cost-effectiveness, support for

policy continuance, and preference to increase or decrease the current price on carbon.

Table 3 – Controlling for Platform Knowledge

	Dependent variable:		
	Cost-Effective	Policy Support	Price Change
Treatment	-0.157^{***}	-0.072	-0.013
	(0.054)	(0.056)	(0.055)
Platform Knowledge	0.120	-0.029	0.138
Platform Knowledge Interaction	0.170	0.147	-0.078
Constant	1.685^{***}	2.361^{***}	2.229^{***}
	(0.038)	(0.058)	(0.057)
Observations	2,135	2,135	2,135
R^2	0.013	0.001	0.001
Adjusted R^2	0.011	-0.0004	-0.0003
Note:			*p<0.1; **p<0.05; ***p<0.01

When including platform knowledge of the Conservative Party's inclusion of carbon pricing, the treatment effect is slightly larger but does not substantially change. Again, for the first outcome variable of cost-effectiveness, the effect is negative and statistically significant. For preference to continue the policy or to increase the current price, the effects are negative but not statistically significant. It is interesting that the effects do not substantially change when controlling for policy knowledge, as some of the literature on framing effects suggests effects may be moderated through policy knowledge levels. I theorize that due to the salience of the carbon tax as a political issue in Canada, platform knowledge levels become a much smaller explanatory fac-

tor compared to partisanship. Priming survey respondents about carbon pricing and using O'Toole's endorsement as a treatment frame is a small manipulation compared to several years of heated public debate over a carbon tax in Canada.

Lastly, attention checks have been demonstrated as a way to reduce statistical noise in analyses but in some cases, also introduce bias (Berinsky et al. 2014; Berinsky et al. 2021). While Berinsky et al. (2021) have identified four attention checks to be sufficient in reducing noise, I am limited that the survey only included one attention check after the experiment section. To avoid conditioning on post-treatment variables, I will leverage Read et al. (2021)'s work that identifies response time as an effective proxy for attentiveness.

The following regression results are filtered by survey completion time and if they "straight-lined" the survey. In other words, only respondents who are between the 5^{th} and 95^{nd} quantiles for survey completion time and who did not straight-line the questions are included. Results indicate no meaningful change in treatment effect magnitude or statistical significance levels across all outcome variables.

Table 4 – Bivariate Models Filtered by Attention

	Dependent variable:		
	Cost-Effective	Policy Support	Price Change
Treatment	-0.139^{***}	-0.049	-0.029
	(0.054)	(0.056)	(0.055)
Constant	1.655^{***}	2.301^{***}	2.187^{***}
	(0.038)	(0.058)	(0.057)
Observations	1,834	1,834	1,834
R^2	0.006	0.0004	0.0001
Adjusted R^2	0.005	-0.0002	-0.0004
Note:		*p<0.1; **p<0.05; ***p<0.01	

5 Discussion

These results demonstrate a limited ability for the Leader of the Conservative Party of Canada to impact understanding of and support levels for carbon pricing. When aggregating results, O'Toole's endorsement of carbon pricing actually lowered people's understanding of the policy's cost-effectiveness (H_1) and decreased support levels for the federal government's price on carbon (H_2), with only the former being a statistically significant effect. While Conservative partisans were moved in the intended direction by O'Toole's frame for all outcome variables, these results are statistically indistinguishable from a null result. Therefore my hypotheses, H_4 and H_5, which focus on Conservative Party identifiers and ideological right-wing respondents, are partially confirmed. Though right-wing respondents are most receptive to the treatment, the results are statistically insignificant so I am unable to confirm whether the O'Toole's frame had any effect.

These results also add to the literature discussing political economy constraints surrounding carbon pricing. While this thesis uses a survey experiment to test the ability of an in-group elite heuristic to cue conservatives, the most notable result is a backfire among out-group respondents. When testing a strategic message to persuade opponents towards carbon pricing, no meaningful movement towards the policy is registered. The only statistically significant effect is a backfire among out-group partisans in regards to policy understanding. Simply put, O'Toole's carbon

pricing pitch is more effective at pushing others away than moving his supporters towards the policy. These findings point towards the importance of the messenger and out-group effects. Political communication is often consumed by an audience larger than the target demographic, so considering the effects in both the in and out-groups is of value. I am unable to determine the exact mechanism to explain this particular example of backfire amongst the out-group respondents but future research might include measurements of polarization in the public. Rather than a failure of the Conservative Leader in crafting a persuasive endorsement of carbon pricing, dislike for anything associated with the Liberal party may present an insurmountable barrier for Canadian conservatives to embrace carbon pricing. While the message framing did statistically shift perceptions of the policy's cost-effectiveness, it was unable to move support levels in any substantial way. This comparative stickiness of support levels might indicate that respondents are simply unwilling to change their general support of the policy. More research is needed to better understand carbon pricing support in Canada. Message framing from other actors, such as economists or other intermediaries, can play a role in this. Survey experiments certainly add value, but real-world experiments and other forms of analysis must clearly be a significant factor in this research.

Without a shift towards favouring carbon pricing, these results lend credence to the argument proposed by Jenkins (2014) and Mildenberger and Stokes (2020). Carbon

pricing, while being the economically "first-best" approach to reducing emissions, clearly suffers from political viability concerns. The lower support for carbon pricing that Conservatives express, and the limited ability for their party leader to shift their opinions, provide evidence that other climate policy approaches are likely needed. If the Conservative Party wishes to run on climate policy that is both supported by their voters and credibly able to lower emissions, other tools besides carbon pricing should be considered. Carbon pricing is certainly not the only way to lower emissions and parties are understandably receptive to their supporters' policy preferences.

More generally, this research shows that political elites do not always have the runway to shift their base's opinions. Party leaders must often balance competing interests and in the process, gamble on the malleability of the partisans they represent. When Leader O'Toole incorporated carbon pricing into his party's election platform, he prioritized the cost-effectiveness of emission reductions. This choice, despite being a credible approach to reaching Canada's initial Paris targets, was not popular to Conservative Party supporters. His endorsement did not increase Conservative partisans' support levels of carbon pricing. For sustainable emission reductions to occur in Canada, politically popular policies that meaningfully address climate change need to be available to the Conservative Party. While this thesis considers a small window in the Conservative Party's relationship with climate change policy, the importance of Canada moving forward with meaningful emission reductions will only increase in

the years to come.

6 Conclusion

To respond to the challenge of climate change, politicians are faced with the choice of "first-best" or "second-best" policy approaches (Jenkins 2014). "First-best" policies are the most cost-effective way to reduce emissions and include direct pricing mechanisms like carbon pricing. However, their costs are individual, upfront, and salient whereas the benefits are long-term and collective. This makes alternative, "second-best", options more attractive to elected politicians (Mildenberger and Stokes 2020). When costs are hidden and benefits are front-loaded, climate policy can be a boon in election campaigns, rather than a disservice. For these reasons, social scientists are justifiably skeptical of the political constraints surrounding carbon pricing (Martinez Alvarez et al. 2022).

This makes the current federal carbon pricing program in Canada of research interest. The federal Liberal Party have successfully been re-elected, twice, since implementing this "first-best" approach to reducing emissions. However, given the main opposition party's hostility to carbon pricing, there is a degree of uncertainty over its durability going forward. This thesis aims to better account for the political economy constraints surrounding carbon pricing in Canada and if Conservative Party partisans can be persuaded to support it.

In his brief tenure as Leader of the Conservative Party, Erin O'Toole embraced carbon pricing. I leveraged his framing around the cost-effectiveness of the policy to test if conservatives can be persuaded to support it. The results demonstrate a limited ability for conservatives in Canada, measured through ideology or partisanship, to be cued towards carbon pricing. Rather than move Conservative partisans respondents toward carbon pricing, O'Toole's endorsement shows stronger evidence of pushing non-Conservatives away from it. While one window for the Conservative Party in Canada embracing this "first-best" policy has passed, carbon pricing is still an active case study in Canada.

In conclusion, this thesis supports the argument that there are strong political economy constraints around carbon pricing. It is difficult to persuade opponents towards the policy. Long-term climate change responses should consider the consequences of how much partisanship structures support levels. While cost-effectiveness is undoubtedly an important factor, political support should not be taken for granted. If governments are to keep the mean rise in global temperature within 1.5°C - 2°C, then the real constraints of politics must be incorporated into policy.

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Appendices

A CEMP Survey Methodology

Further Survey Methodology information:

"The survey was designed on Qualtrics and administered by Dynata. Respondents could take the survey in French or English. Respondents had to be Canadian citizens aged over 18 years old to be able to take the survey. Sampling for the campaign period survey occurred from August 23 to September 20th. The post-election survey was administered from September 30th to October 14th. 6910 respondents answered the pre-election survey, and 2576 respondents answered the post-election survey. We had aimed for samples of 8500 respondents during the campaign and 3000 respondents in the post-election period."[1]

1. http://bit.ly/3Z3Cwvp.

B Survey Question Phrasing

Exact question phrasings from the survey (all outcome variables were recoded so that higher values indicate more support):

In your view, how accurate is this claim: "carbon pricing [commonly referred to as the carbon tax] is the most cost-effective way for Canada to lower greenhouse gas emissions."?

- Very accurate (1)
- Somewhat accurate (2)
- Not very accurate (3)
- Not at all accurate (4)

To help reduce greenhouse gas emissions, the federal government should continue carbon pricing (commonly referred to as the carbon tax).

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

To help reduce greenhouse gas emissions, the federal government should (blank) the current price on carbon (commonly referred to as the carbon tax).

- Significantly increase (1)
- Moderately increase (2)
- Keep the same (3)
- Moderately decrease (4)
- Significantly decrease (5)

In federal politics, do you usually think of yourself as a(n):

- Liberal (1)
- Conservative (2)
- NDP (3)
- Bloc Québécois (4)
- Green (5)
- People's Party (10)
- Another party (please specify) (7)
- Don't know/Prefer not to answer (8)

Ideology: In politics people sometimes talk of left and right. Where would you place yourself on a scale from 0 to 10 where 0 means the left and 10 means the right?

gender Are you...?

- A man (1)
- A woman (2)
- Non-binary (3)
- Another gender (please specify) (4)

Income What was your total household income, before taxes, for the year 2020?

- No income (1)
- $1 to 30,000 (2)
- $30,001 to $60,000 (3)
- $60,001 to $90,000 (4)
- $90,001 to $110,000 (5)
- $110,001 to $150,000 (6)
- $150,001 to $200,000 (7)
- More than $200,001 (8)
- Don't know/Prefer not to answer (9)

Do you consider yourself to be any of the following? (Select all that apply)

- Rural Canadian (3)

Which parties, if any, have proposed the following policies? Carbon pricing/tax:

Conservative Party (2)

C Third Outcome Variable

Table C-1 – Policy Change

	Should the federal government decrease/increase the current price on carbon?					
	Significantly Decrease (0) - Significantly Increase (4)					
	Bivariate	Controls	Conservative Partisanship	Partisanship Interaction	Conservative Ideology	Ideology Interaction
Treatment	−0.024	−0.012	−0.014	−0.037	−0.013	0.019
	(0.054)	(0.056)	(0.055)	(0.062)	(0.061)	(0.151)
Woman		−0.117**	−0.147***	−0.147***	−0.058	−0.058
		(0.057)	(0.056)	(0.056)	(0.063)	(0.063)
>90K income		0.364***	0.364***	0.363***	0.384***	0.384***
		(0.058)	(0.056)	(0.056)	(0.064)	(0.064)
Rural		−0.129*	−0.068	−0.068	−0.111	−0.111
		(0.068)	(0.066)	(0.066)	(0.075)	(0.075)
Conservative Identification			−0.709***	−0.761***		
			(0.066)	(0.093)		
Conservative Interaction				0.106		
				(0.131)		
Ideology					0.014	0.017
					(0.012)	(0.017)
Ideology Interaction						−0.005
						(0.024)
Constant	2.250***	2.197***	2.356***	2.368***	2.114***	2.098***
	(0.038)	(0.058)	(0.058)	(0.060)	(0.094)	(0.117)
Observations	2,135	1,891	1,891	1,891	1,630	1,630
R^2	0.0001	0.028	0.084	0.084	0.029	0.029
Adjusted R^2	−0.0004	0.026	0.081	0.081	0.026	0.026
Note:						*p<0.1; **p<0.05; ***p<0.01

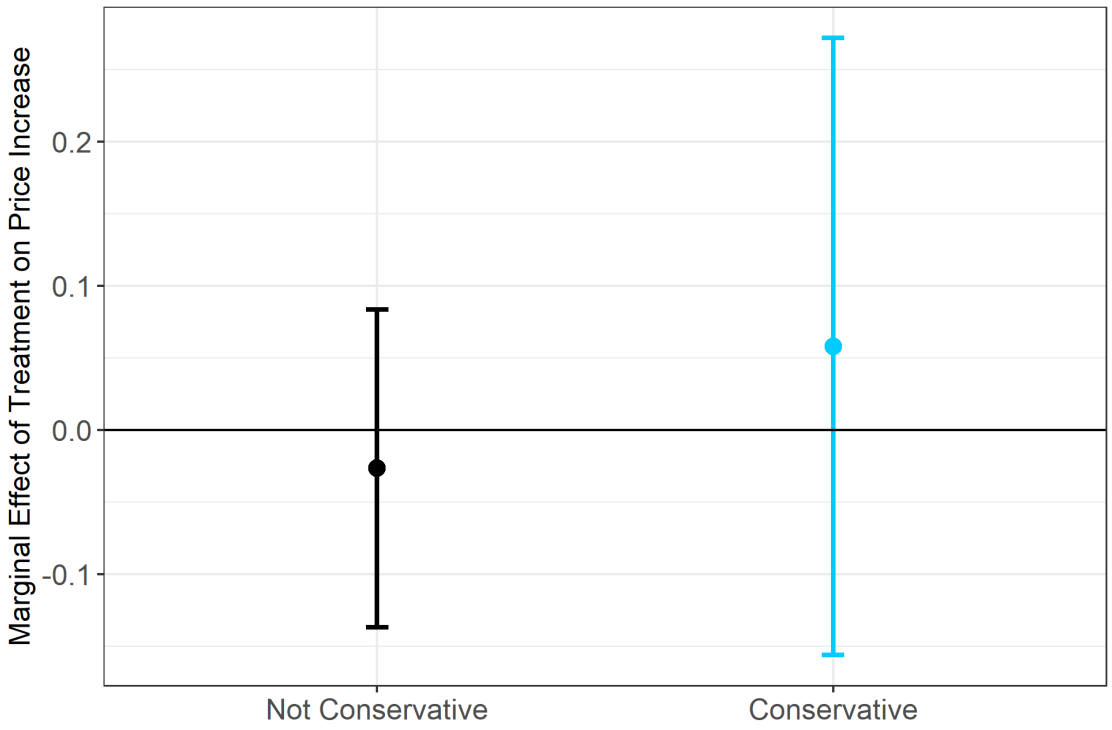

Figure C-1 – Marginal effect plot of treatment on support for increasing or decreasing the carbon price, by Conservative Party identification. The model includes demographic covariates.

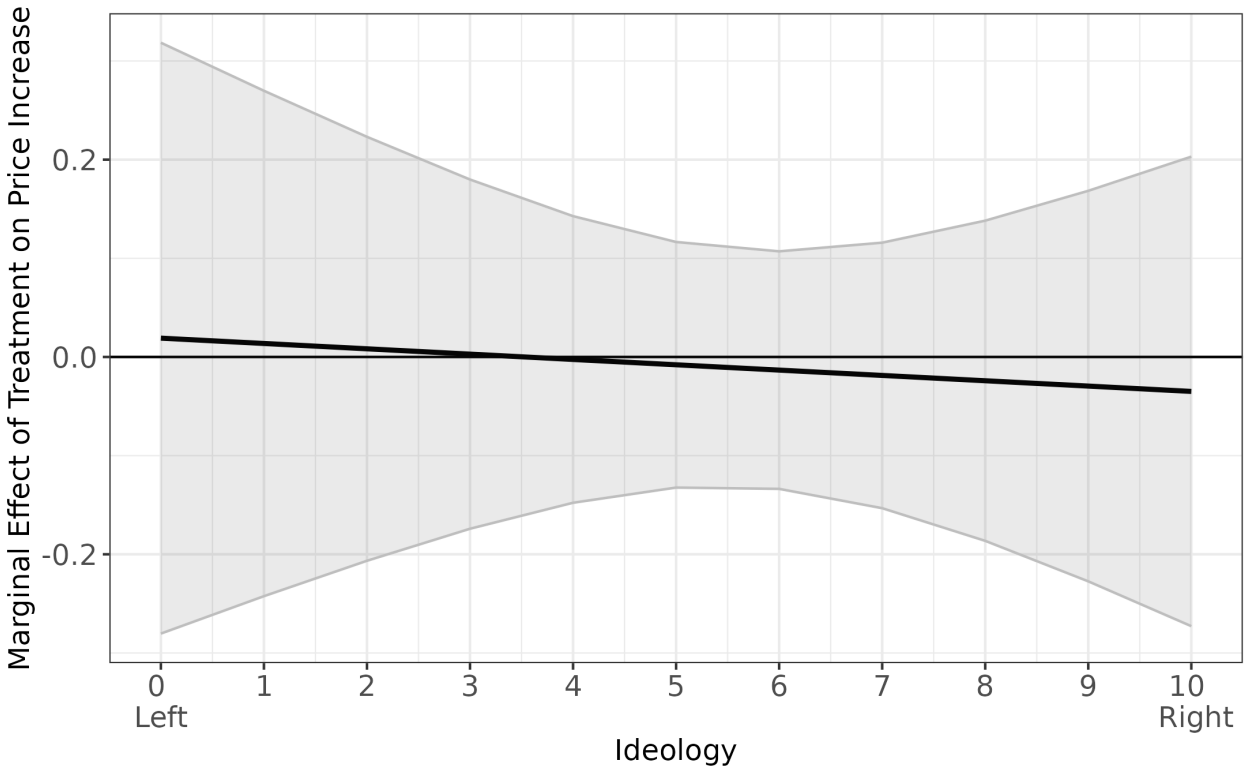

Figure C-2 – Marginal effect plot of treatment on support for increasing or decreasing the carbon price, by political ideology. The model includes demographic covariates.

D Marginal Effect Plots

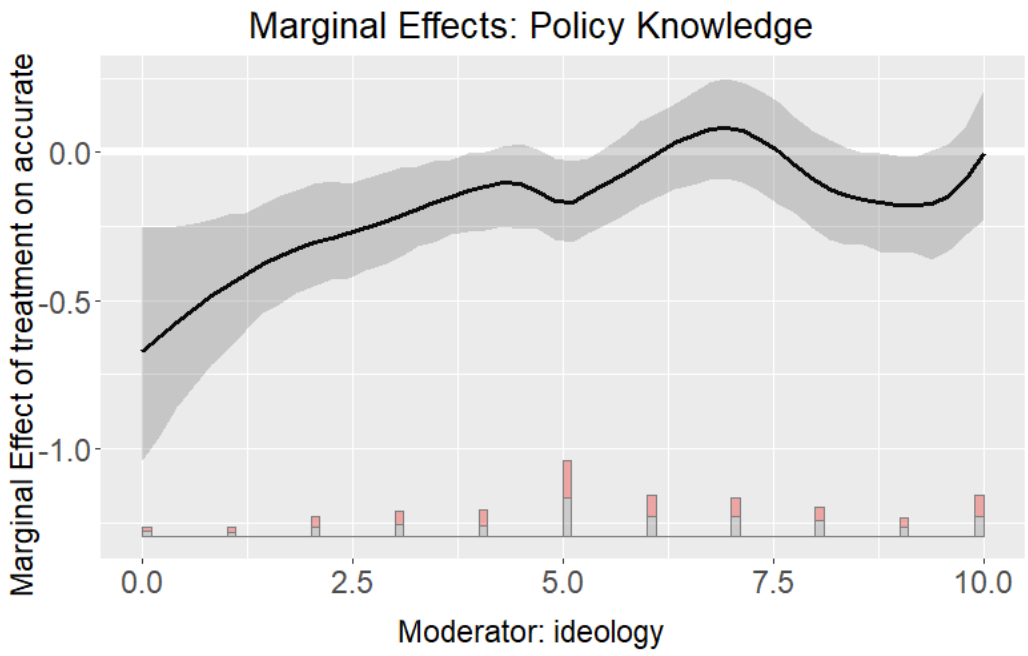

Figure D-3 – Kernel marginal effect plot for policy knowledge

Table D-2 – Policy Knowledge: Comparing Treatment Effect Across Moderator

diff.estimate	sd	z_value	p_value	Lower_CI	Upper_CI
6 vs 4 0.046	0.137	0.333	0.739	-0.223	0.314
8 vs 6 -0.088	0.159	-0.554	0.580	-0.399	0.223
8 vs 4 -0.042	0.149	-0.285	0.776	-0.334	0.249

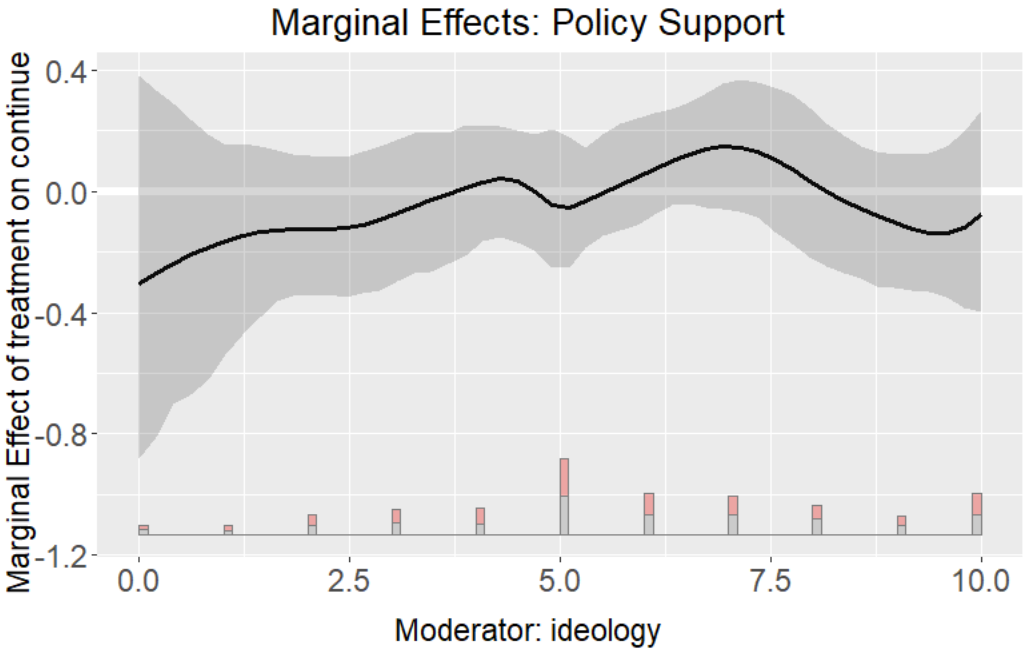

Figure D-4 – Kernel marginal effect plot for policy support

Table D-3 – Policy Support: Comparing Treatment Effect Across Moderator

diff.estimate	sd	z_value	p_value	Lower_CI	Upper_CI
6 vs 4 0.035	0.141	0.249	0.803	-0.241	0.311
8 vs 6 -0.040	0.150	-0.269	0.788	-0.335	0.254
8 vs 4 -0.005	0.155	-0.034	0.973	-0.308	0.298

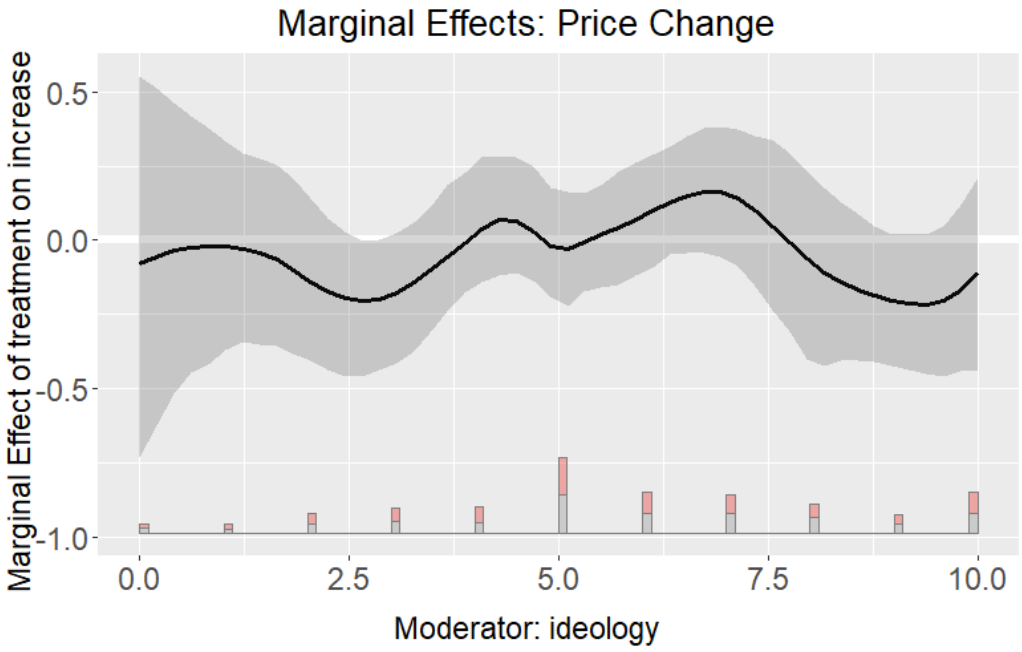

Figure D-5 – Kernel marginal effect plot for price change

Table D-4 – Price Change: Comparing Treatment Effect Across Moderator

diff.estimate	**sd**	**z_value**	**p_value**	**Lower_CI**	**Upper_CI**
6 vs 4 0.087	0.138	0.628	0.530	-0.183	0.356
8 vs 6 -0.154	0.155	-0.996	0.319	-0.457	0.149
8 vs 4 -0.068	0.152	-0.445	0.656	-0.365	0.230

E Covariate Balance Table

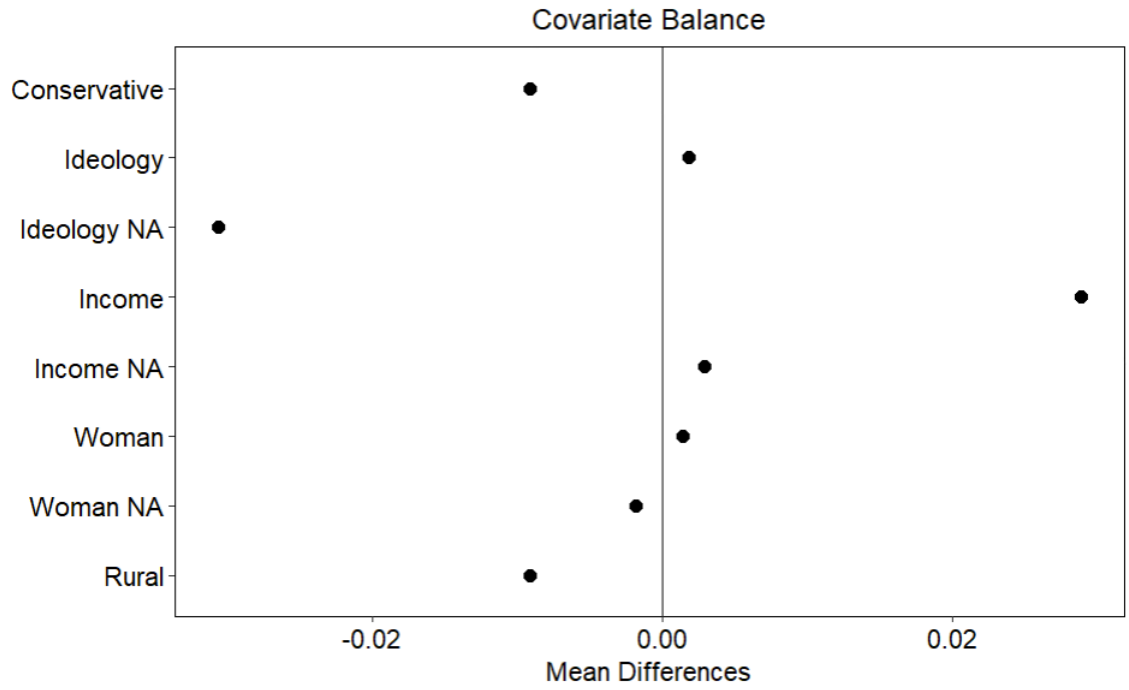

Figure E-6 – Balance Table