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Can information, compensation and party cues increase mass support for green taxes?

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ABSTRACT
The transition from fossil fuels to renewable energy presents a major challenge, with green taxes often seen as an efficient policy to promote environmentally friendly behaviour. However, these taxes are difficult to implement due to public concerns about immediate costs versus future environmental benefits. To address this, we conducted a survey experiment in Switzerland to investigate whether information on green tax effectiveness, compensation through revenue recycling, and party cues can make green taxes more attractive to citizens. Our findings indicate that information about compensation mechanisms and party cues can enhance support for green taxes, while single instances of information on green tax effectiveness do not significantly affect beliefs or policy support. Green tax proposals are more popular when compensation strategies address climate change or mitigate social risks and when there is broad party consensus providing clear cues to citizens. However, our findings also underscore the potential trade-off associated with a broad coalition of parties supporting green tax reform, which may lead to diminished support from the left. These insights have important implications for designing and communicating green taxes, highlighting the role of informed beliefs and political signals in shaping public attitudes toward environmental policies.

Introduction

Industrialised countries face a major challenge in transitioning from fossil fuels to renewable energy, requiring innovation and promotion of new

technologies to achieve rapid and substantial decarbonisation. Market-based steering policies, such as incentives and green taxes, are widely recognised as effective and economically efficient tools, providing continuous and long-term incentives for environmentally friendly innovation and practices (Carattini et al., 2017; Deroubaix & Lévèque, 2006; Jaffe et al., 2002; Parry & Williams, 1999). Even though market-based approaches alone are unlikely to achieve the necessary fundamental transition, they should be part of the climate policy toolkit and have been shown to produce economic benefits (Carattini et al., 2017; Cullenward & Victor, 2020; Rausch & Karplus, 2014).

Despite this, green taxes have proven difficult to implement politically, while conventional regulatory approaches seem more popular due to practical implementation (Felder & Schleiniger, 2002; Kirchgässner & Schneider, 2003). One compelling reason stems from the limited popularity of these policies (Stadelmann-Steffen & Dermont, 2018). The lack of widespread public support presents a formidable obstacle (Fremstad et al., 2022). Research on green taxes underscores that the perceived socioeconomic inequalities resulting from their implementation can render them politically risky for governing parties (Beiser-McGrath & Busemeyer, 2023) and even favour the electoral prospects of the radical right (Colantone et al., 2024; Voeten, 2024).

Scholars have extensively explored how to make 'carbon pricing work for citizens' (Klenert et al., 2018). Drawing on the public choice approach (Kirchgässner & Schneider, 2003), they highlight the pivotal role of cost perceptions for the unpopularity of incentive-based policy instruments. In the realm of environmental policy, voters often face a trade-off between a better environment in the future and higher income in the present, and they frequently prioritise the latter (see also Bornstein & Lanz, 2008). Furthermore, individual cost–benefit calculations may favour traditional regulatory policies, where costs are less visible to voters compared to incentive-based instruments. As Kirchgässner and Schneider (2003:, p. 375) observe, 'voters may have the impression that an improvement of the environment could be reached by means of regulations and prohibitions without costs'. This perception of cost illusion implies that traditional policies are often perceived as more equitable and fairer (Deroubaix & Lévèque, 2006). In contrast, the immediate visibility of costs for households in green tax proposals, coupled with less apparent benefits, has consistently resulted in reduced public support, irrespective of ideological background (Stadelmann-Steffen & Dermont, 2018). Consequently, the perception of cost plays a crucial role in determining the political viability of incentive-based environmental policy instruments.

It has been argued that the perceived reasonableness and effectiveness of a new or higher green tax could engender public support if citizens perceive it as beneficial to themselves or society at large (Stadelmann-Steffen & Dermont, 2018). However, many citizens do not comprehend or believe in the underlying mechanisms of green taxes and their effectiveness in

curbing energy consumption. Recent studies have therefore examined whether increased information and more visible policy benefits could enhance policy support (Beiser-McGrath & Bernauer, 2019; Fremstad et al., 2022; Klenert et al., 2018; Mildenberger et al., 2022).

In this article, our primary objective is to explore the determinants that shape citizens' support for green tax policies, with a particular and differentiated focus on the role of information. We investigate three types of information that could affect policy support: (1) general information concerning the effectiveness of green taxes, (2) specific information about the policy design of green taxes, particularly their potential benefits through revenue recycling, and (3) party cues, i.e., information about which political parties are in favour or against a reform proposal. Recent research has shown that the perceived costs and benefits of these policies are heavily influenced by their politicisation (Dermont & Stadelmann-Steffen, 2020; Fremstad et al., 2022; Mildenberger et al., 2022). However, most previous studies have largely analysed public preference towards green taxes without considering explicitly the role of political parties in shaping public opinion (Carattini et al., 2017). In this paper, we contribute to existing research by also integrating the often-neglected role of political parties in opinion formation.

While research on tax preferences has underscored the significance of party cues (Boudreau & MacKenzie, 2018), the applicability of these findings from the broader tax literature to the domain of green taxation remains uncertain. In contrast to general taxes, green taxes primarily seek to induce behavioural changes at the individual level. This demarcates a substantial departure in both rationale and design from conventional taxes. Consequently, the dynamics of preference formation and political competition surrounding green taxes may be influenced not only by the economic dimension but also by the green-libertarian- vs. traditional-authoritarian (GAL-TAN) dimension.

We conducted an original survey experiment in Switzerland in 2020, employing both a randomised information treatment and a conjoint experiment to study individual beliefs about the effectiveness of green taxes (hereafter effectiveness beliefs) and support for green taxes. Our findings suggest three key conclusions. First, providing information about how green taxes work does not significantly affect individual green tax effectiveness beliefs, questioning the expectation that informing the public about green taxes will readily lead to higher policy support. Second, designing the right form of compensation is key to increasing support for green taxes. Individuals prefer taxes that redistribute revenues to measures addressing the central problem of climate change and/or alleviating social risks. Third, individual support for green taxes is notably influenced by party politics and policy coalitions. Political allegiance plays a crucial role in shaping individuals' perspectives on policies, with citizens often diverging on policy stances when party elites exhibit discord over the instruments and objectives of

environmental policies. If leaders of different parties coalesce in policymaking, the support base among citizens has the potential to increase. However, our findings also underscore the potential trade-off associated with an excessive number of parties supporting green tax reform, leading to diminished support from the left. This trade-off is likely due to the perception among left-wing individuals that the coalition is overly expansive and consequently less likely to prioritise their environmental protection concerns.

Besides analyzing the support base for green taxes, this article contributes to the broader literature on public opinion formation in at least three respects. First, the experimental study of information effects provides new insights into the extent to which citizens are receptive to new arguments and how new information changes their previous political beliefs. Second, our analysis adds to the literature on policy trade-offs and compensation mechanisms that have been shown to influence reform potentials in public policy (Häusermann et al., 2019). Finally, our study informs about the relative explanatory power of arguments, interests, and party cues for citizens' approval of policy changes, and more specifically the role of elite consensus.

The remainder of this paper is organised as follows. We first discuss the case of green taxes and introduce the three mechanisms that may increase support for green taxes. Afterward, we present the research design and discuss the empirical findings. Finally, we conclude with a discussion of the policy implications regarding the design of green taxes and the role of knowledge and beliefs in shaping environmental attitudes and behaviour.

Theory

The case for green taxes

While carbon pricing policies alone are unlikely to drive rapid and extensive decarbonisation and innovation (Cullenward & Victor, 2020; Tvinnereim & Mehling, 2018), and therefore need to be complemented by other policy instruments, such as regulations, industrial policies, and research and development initiatives, economists and policymakers widely recognise carbon pricing as a cost-effective approach to address negative externalities (Nordhaus, 2019). However, the implementation of green tax policies faces public opposition due to visible consumer costs, setting it apart from other instruments like subsidies or bans (Harrison, 2012; Mildenberger et al., 2016; Schaffer, 2021; Stadelmann-Steffen & Dermont, 2018).

Research on green taxes has focused on identifying the factors that hinder the acceptance of these policies and exploring ways to overcome these barriers. One approach is revenue recycling through dividends or lump-sum rebates. By making the benefit side of these taxes visible to citizens, advocates argue that it could render them politically feasible (Amdur et al.,

2014; Bachus et al., 2019; Beiser-McGrath & Bernauer, 2019; Carattini et al., 2019, 2017; Dolšak et al., 2020; Kallbekken et al., 2011; Klenert et al., 2018). Evidence from Canada and Switzerland, the only countries where such rebates have been implemented in practice, reveal that the relationship between dividends and public support for green taxes is not as straightforward as previously thought. Even after the schemes have been introduced, individuals often do not know about the benefits or misconceive the benefits (Mildenberger et al., 2022). This suggests that the effectiveness of revenue recycling in promoting public acceptance of green taxes depends on the communication strategy to highlight the subjectively perceived costs and benefits.

Thus, a critical mechanism behind public resistance to green taxes can be attributed to the limited understanding citizens have of how such instruments work and the benefits they can bring (Huber et al., 2020; Stadelmann-Steffen & Dermont, 2018). As Rhodes et al. (2014) and Stoutenborough and Vedlitz (2014) have pointed out, a knowledge deficit can be a significant barrier to public support for reform measures. In situations where citizens lack knowledge, political parties and their communication strategies can play a vital role in shaping public opinion (Dermont & Stadelmann-Steffen, 2020).

Building on the existing literature (for an extensive overview, see Schaffer, 2021), we focus on the role of three potential mechanisms to enhance support for green taxes (see Figure 1): arguments, interests, and cues. First, improving citizens' understanding of the effectiveness of green taxes through information can increase their support by addressing the knowledge deficit. Second, making the costs and benefits of green taxes more visible, in particular by informing citizens how the revenue generated from the taxes is used to compensate for costs, can increase their support. Third, leveraging party cues can play a vital role in influencing citizens' attitudes toward green taxes, particularly on a complex policy issue where citizens lack the knowledge and time to form an informed opinion. While information about compensation and party positions are linked to *specific* tax proposals, the mechanisms through effectiveness information and effectiveness beliefs
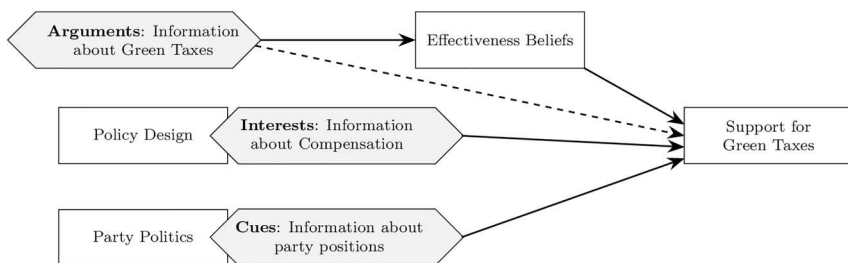

Figure 1. Theoretical mechanisms to increase support for green taxes.

concerns the perception of *this type of proposals in general*. Next, we will delve into these three mechanisms in greater detail.

Information about green tax effectiveness

A key tenet of democratic theory is the power of superior argumentation. Ideally, citizens in a democracy have access to enough information and diverse perspectives, enabling them to form 'enlightened' opinions (Dahl, 1998) on policy alternatives by pondering the different arguments (Zumofen et al., 2023). This principle underpins the knowledge deficit model, which suggests that a lack of relevant information often leads to policy rejection (Rhodes et al., 2014; Stoutenborough & Vedlitz, 2014).

Indeed, perceived effectiveness has been identified as a main driver for the acceptance of green taxes (Baranzini & Carattini, 2017), while a lack of effectiveness seems to be an important reason for the unpopularity of the instruments (Mildenberger et al., 2022; Umit & Schaffer, 2020). Moreover, there is some evidence that imparting information to citizens regarding the mechanics of tax systems or illuminating insights on income inequality shapes their taxation preferences (Boudreau & MacKenzie, 2018; Krupnikov et al., 2006). Taking these arguments together, by addressing the knowledge deficit, i.e., providing citizens with information regarding the mechanisms and benefits of green taxes, policymakers can create a more informed and engaged citizenry that recognises the effectiveness of green taxes in addressing environmental challenges. This in turn can be expected to elevate their levels of acceptance.

Despite its widespread use, the knowledge deficit model has faced criticism for its oversimplified nature, with several alternative views being proposed to conceptualise the link between knowledge and policy support (Armingeon & Bürgisser, 2021; Flynn et al., 2017; Nyhan & Reifler, 2010; Rhodes et al., 2014). According to the knowledge deficit model, the relationship between information and policy support is indirect: individuals who receive more or new information should develop a more accurate understanding of how the policy works, i.e., perceive the instrument as effective, leading to increased policy support. However, some scholars argue that providing information may only alter factual perceptions and not necessarily increase policy support (Flynn et al., 2017). Depending on the strength of prior beliefs, correct information on the workings of green taxes may lead to attitudinal backlash, resulting in a shift away from policy support, or polarisation, where group support moves in opposite directions (Druckman & McGrath, 2019).

Hence, we conclude that individual beliefs about the effectiveness of a policy are crucial for green taxes' public support. A promising mechanism for information provision to increased public support is if this information

increases the beliefs that green taxes are effective. To our knowledge, no study has tested the causal link from information provision to green tax effectiveness beliefs to policy support. According to the knowledge deficit model, we expect that providing information on green taxes will enhance policy support by strengthening effectiveness beliefs.

Green tax design and the role of compensation

The implementation of green taxes generates visible and short-term costs for households and firms, while the primary benefit of a better climate will only be achieved after several years or even decades. Thus, green taxes are an exemplary case study of what Jacobs (2016) described as 'intertemporal trade-offs between maximising social welfare in the present and investing in the future' (p. 434). In addition, green taxes are often regressive (Baranzini & Carattini, 2017; Kallbekken & Sælen, 2011), leading to concerns about unjust distributional effects (Cullenward & Victor, 2020) and potential political backlash (Tatham & Peters, 2023).

To address potential distributive conflicts, revenue recycling has been proposed as a compensation mechanism (Beiser-McGrath & Bernauer, 2019; Kallbekken et al., 2011). Green taxes can offer both long-term immaterial benefits and immediate material gains through revenue redistribution, especially benefiting low-income households. However, even where such mechanisms exist (like in Canada or Switzerland), they are often not very visible in public debates (Mildenberger et al., 2022). Moreover, the preferred type of revenue recycling remains uncertain, with existing studies focused mainly on rebates showing inconsistent results (Amdur et al., 2014; Bachus et al., 2019; Beiser-McGrath & Bernauer, 2019; Carattini et al., 2019, 2017; Dolšak et al., 2020; Kallbekken et al., 2011; Klenert et al., 2018).

We expect that the specific policy design, especially regarding revenue recycling, affects public support (Beiser-McGrath & Bernauer, 2019; Dermont & Stadelmann-Steffen, 2020). Theoretically, different forms of revenue recycling may yield varying success. From a rational choice perspective, ego-tropic cost–benefit considerations (Armingeon & Bürgisser, 2021; Kirchgässner & Schneider, 2003; Stadelmann-Steffen & Dermont, 2018) suggest that information on personal material benefits is most effective in gaining support. Consequently, redistributing tax revenues is often highlighted as a key strategy to enhance the acceptability of green taxes, especially for lower-income groups (Bachus et al., 2019; Beiser-McGrath & Bernauer, 2019; Carattini et al., 2019, 2017; Dolšak et al., 2020; Fremstad et al., 2022; Klenert et al., 2018).

An alternative view posits that citizens are not solely driven by ego-tropic cost–benefit analyses but are more supportive of policies when revenues are earmarked for specific goals (Huber et al., 2020), known as hypothecation in

public finance (Bachus et al., 2019). Unlike ego-tropic motivations focused on direct material gains, this socio-tropic mechanism implies that revenue recycling for collective issues – such as climate change, renewable energy, and pensions – can garner more support. In contrast, channeling revenues into the general budget without hypothecation fails to constitute revenue recycling and is unlikely to boost support (Bachus et al., 2019). Thus, implementing either ego-tropic or socio-tropic revenue recycling is expected to boost support for green taxes compared to scenarios without recycling or those benefiting only a narrow subset of the population.

Party cues

There is ample evidence that many citizens have limited political knowledge (Achen & Bartels, 2017) and may lack the time, knowledge, and experience to develop informed opinions on complex policy issues (De Vries et al., 2011; Hobolt, 2007). In this context, party cues from elite politicians can help citizens make inferences about policies that they otherwise would be unable to make (Boudreau & MacKenzie, 2014). Reviewing the literature on cues, Colombo and Steenbergen (2020) report that using heuristic shortcuts is pervasive in political decision-making and enables citizens to make reasonable, if not always unbiased, decisions.

However, these cues may also lead to mindless support for policies (Bullock, 2020) and empower political elites to influence or even manipulate citizens' policy positions (Hobolt & De Vries, 2016; Slothuus & Bisgaard, 2021; Stoeckel & Kuhn, 2018; Zaller, 1992). The mere presence of party-political information can influence how individuals process policy-related information (Fremstad et al., 2022).

Drawing from dual-process models of persuasion (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986), we can distinguish between two modes of information processing employed by individuals. While information on green tax effectiveness and cost-benefits of specific policy designs elicits systematic thinking and reasoning, information on party positions likely activates a more heuristic mode of information processing (Zaller, 1992). In this vein, party cues serve as timesaving and cost-reducing cognitive shortcuts for individuals navigating an otherwise complex decision-making process.

We expect that by using information on party positions towards green tax proposals, citizens can adjust their level of support based on their affinity (in-party cues) or opposition (out-party cues) towards a given political party (Boudreau & MacKenzie, 2018). Overall, the provision of information on broad-party coalitions is expected to boost support for green taxes among large parts of the population. However, the potential influence of out-party cues may dampen policy support (Ahn et al., 2021).

Research design

Case selection

Switzerland has implemented a CO2 levy since 2008, which serves as an incentive tax on fossil fuels such as heating oil and natural gas (see Appendix A.1 for more detailed information about the history of the Swiss CO2 levy). This tax aims to increase the cost of fossil fuels and encourage the utilisation of more carbon-neutral energy sources. Roughly two-thirds of the revenue generated by the CO2 levy is redistributed to the population and economy, regardless of the amount of energy consumed. The population receives its share through the health insurance system, specifically as a monthly per capita deduction on the mandatory fee for health insurance. The design of the scheme ensures that individuals with below-average CO2 emissions, typically low-income groups, pay less in taxes than they receive as a dividend. However, a significant portion of the population remains unaware of this mechanism (Mildenberger et al., 2022). The remaining one-third, up to a maximum of CHF 450 million, is invested in programmes that promote CO2-effective measures, including energy-efficient renovations or renewable energies. In addition, CHF 25 million is allocated to a technology fund. Operators of greenhouse gas-intensive installations may receive an exemption from the CO2 levy if they agree to reduce their emissions. Operators of large greenhouse gas-intensive installations are required to participate in the emissions trading scheme and may also receive an exemption from the CO2 levy.

The case of Switzerland provides favourable conditions for investigating citizens' opinion formation. Due to the country's strong reliance on direct-democratic decisions (Leemann & Stadelmann-Steffen, 2022), citizens are frequently confronted with popular initiatives and government proposals on a variety of issues and different levels of government. Therefore, they are accustomed to expressing their opinions on complex issues (Linder & Mueller, 2017). In the context of energy and climate policy, recent examples are the vote on the new energy law in 2017 (Dermont & Stadelmann-Steffen, 2020) or on the new CO2 law in June 2021. These public votes share significant similarities with hypothetical proposals generated in the conjoint experiment. Both proposals involved specific policy mixes and a multidimensional decision context and took place in a highly politicised context, characterised by significant polarisation along party lines.

The experimental setup employed in our study closely resembles the decision-making process that occurs in direct-democratic Switzerland, specifically when the government presents a counterproposal to a popular initiative. In this scenario, citizens are asked two questions: (1) whether they support each of the presented policy proposals individually, and (2) which of the two policy proposals they prefer if both receive a majority of votes. In such cases, the

proposal that receives the most votes is implemented. Since direct-democratic ballots are relatively frequent in Switzerland – about eight times per year at the federal level alone in the last decade – the respondents in our study are likely familiar with the decision-making situation of a conjoint experiment. This familiarity can be expected to enhance the validity and consistency of their responses.[1] Although we contend that the high level of realism in our experimental set-up improves both internal and external validity, we acknowledge that caution is required when generalising our findings to other contexts.

Overall, we consider Switzerland a most likely case in two respects. First, it is in settings like Switzerland, with a strong participatory political system, where public opinion is likely most important for the implementation of green taxes. Second, as the conjoint analysis mimics real decision situations, a conjoint analysis should 'work' particularly well, with survey respondents providing differentiated responses to the varying conjoint tasks (Stadelmann-Steffen, 2019). Put differently, if we do not find systematic information effects in a Swiss survey context, it is rather unlikely that such effects would materialise in real-world processes and other countries.

Survey

We rely on an original survey experiment that was embedded in the Swiss version of the 2020 International Social Survey Programme (ISSP), which had a thematic focus on environmental issues.[2] The survey questionnaire was internationally harmonised and supplemented by a module comprising questions specific to Switzerland.[3] The survey sample was drawn from a probabilistic sample that represented the Swiss population from the age of 18, with individuals randomly selected from the Swiss Federal Statistical Office's sampling register.

Due to the survey's comprehensive coverage and length, it was fielded in two parts. The first wave contained the ISSP module and background information on the respondents, while the second wave contained the experimental design used in this study. The two parts were administered in sequential order, with only respondents who completed Part 1 being invited to complete Part 2. Wave 1 was conducted from February to April 2020 and had a response rate of 42.3 per cent ($N = 4281$). Wave 2 was conducted between April and July 2020 and had a response rate of 30.4 per cent ($N = 3083$), representing an attrition rate of 27.7 per cent. Of the 3083 respondents, 2445 completed the survey online and were therefore exposed to our experimental design, which was not included in the paper version. The sampling method used in this study was designed to match the demographic margins of the Swiss population aged 18 and above, and thus, the findings from this study can be largely generalised to the population. Moreover, the high response rates and low attrition rates bolster the quality of this survey.[4]

We focus on three components of the survey. First, an information treatment was randomly assigned to 50 per cent of the respondents, which provided information on how green taxes operate. Second, a battery of questions captured the extent to which respondents believed in the effectiveness of green taxes. Finally, a conjoint experiment was conducted to elicit support for specific green tax proposals, with a primary interest in how visible compensation strategies and party elite cues influence support. The information treatment, the effectiveness beliefs and the conjoint experiment allow for a comprehensive examination of the factors that influence support for green taxes as illustrated in Figure 1.

Information treatment

To test the effect of information about policy effectiveness on the evaluation of green taxes, we randomly assigned 50 per cent of the respondents to receive an information treatment. The treatment consisted of a short overview of how green taxes are intended to influence people's behaviour and what environmental economists think about these instruments: *Environmental taxes are intended to influence the behaviour of the population. By imposing a tax on electricity, the cost of electricity increases. Then we use less electricity because it becomes more expensive. The revenue generated from an electricity tax can be used to promote renewable energy sources like hydropower, solar energy, and wind energy. Some scientists say: 'It's beneficial to distribute the revenue generated from an electricity tax back to the population. By doing so, people who consume less electricity will be rewarded, and there are no additional costs for the state'.*

Given that previous studies from Switzerland indicate a lack of understanding or belief in the effectiveness of green taxes among large portions of the population (Stadelmann-Steffen & Dermont, 2018), we expect that the information treatment would provide new information for most respondents. Therefore, the treatment should enable us to analyze the effect of new knowledge on the evaluation of different green tax designs and their support, as measured in the conjoint analysis. Additionally, we seek to investigate the link between information provision and individual beliefs in the effectiveness of green taxes to test the assumptions of the knowledge deficit model. If we observe that the treatment group not only exhibits higher support for green taxes but is also more likely to rate the effectiveness belief items in line with the economic model assumptions, this would corroborate the suggested theoretical mechanism: Information provision increases the knowledge about green tax models as well as the acceptance of their intended benefits, leading to higher policy support. Conversely, if we observe a treatment effect on effectiveness beliefs but not on policy support, this would indicate that more knowledge and information do not necessarily translate into higher policy support.

Beliefs in the effectiveness of green taxes

To measure the effectiveness evaluation of green taxes, we asked respondents to what extent they agree on a five-point Likert scale (from absolutely true to absolutely false) with the five statements meant to emphasise different aspects of green tax effectiveness:

(1) Even if electricity becomes more expensive due to a new electricity tax, people will still consume the same amount of electricity.
(2) A new electricity tax will reduce electricity consumption, even if the state redistributes the tax revenue to the population.
(3) A tax on electricity is a way to impose higher costs on those who consume greater amounts of electricity.
(4) Redistributing the revenue from a new electricity tax to the population may place additional strain on public finances.
(5) The revenue from a new electricity tax could be used to lower employers' contributions to old-age insurance (AHV). This offers a double benefit: reduced electricity consumption due to the tax and increased job creation or preservation thanks to lower employers contributions.

These effectiveness beliefs embody the core mechanisms by which green taxes, as per economic theory, influence behaviour. Many environmental economists would argue these statements are objective truths, not matters of belief. However, citizens may disagree not out of misunderstanding but due to criticisms of mainstream economic theory. In reality, only statement 3 is factually correct, while agreement with the others depends on the validity of economic assumptions. Thus, these statements capture belief in a tax's ability to influence behaviour per economic theory. As outlined in our theoretical section, this belief is key to perceived tax effectiveness and policy support. Crucially, whether low effectiveness beliefs stem from misunderstanding or skepticism, the central factor for policy acceptance – perceived effectiveness – is missing in both cases.

Conjoint experiment

Conjoint analysis has become increasingly important for studying individual preferences for green taxes, particularly for different variants of green taxes that involve more or less visible cost compensation. This approach is preferred over unidimensional questions – such as whether one would support a tax to reduce energy consumption – as it mimics a more realistic decision for which not a single attribute, but a combination of multiple factors is relevant to the overall assessment (Bremer & Bürgisser, 2023). The approach recognises that opinion formation on green taxes is a multidimensional process, where a specific reform proposal consists of various elements out of which a citizen

may like some while rejecting others. Thus, an individual decision is a result of balancing the pros and cons of a specific green tax proposal.

Table 1 shows the conjoint attributes of interest and their levels. The experimental manipulation encompasses five attributes of policy design, coupled with an additional attribute related to party cues. Each attribute and its levels were carefully selected to closely mimic the real-world discussion in Switzerland regarding the implementation of such a tax. The initial attribute pertains to the subject of taxation, whereas the second and third attributes elucidate the net costs associated with the policy for both an average household and an energy-efficient household. The fourth attribute scrutinizes the provision of tax exemptions for energy-intensive industries. Subsequently, the fifth attribute delves into the nuanced aspect of revenue recycling, distinguishing between ego-tropic compensation (entailing a reduction in health insurance premiums), socio-tropic compensation (encompassing subsidies for renewable energy or augmentation of the overall pension budget), absence of direct compensation (leading to an increase in the government budget), or compensation tailored for employers (involving a reduction in employer contributions to pension systems).

Finally, the last attribute introduces variability concerning the parties advocating for the proposed policy. We have deliberately chosen not to include the SVP (far-right Swiss People's Party) as a potential supporter for

Table 1. Attributes and levels of the conjoint experiment.

Attribute	Levels
What is taxed	Tax on CO2
	Tax on electricity
	Tax on gas
	Tax on kerosene
	Tax on heating oil
Net cost for average household	As until now
	CHF 8 more per month
	CHF 15 more per month
	CHF 23 more per month
	CHF 30 more per month
Net cost for low-energy household	CHF 15 less per month
	CHF 8 less per month
	As until now
	CHF 8 more per month
	CHF 15 more per month
Tax exceptions	No exceptions
	Exceptions for energy-intensive industries
Use of tax revenues	Subsidies for renewable electricity
	Reduction in health insurance premiums
	Into the old-age pension insurance (AHV) budget
	Reduction of employer contribution to the AHV
	Into the federal government budget
Parties in favour	Greens & Social Democratic Party (SP)
	Greens, SP & Green Liberal Party (GLP)
	Greens, SP, GLP & Christian Democratic People's Party (CVP)
	Greens, SP, GLP, CVP & Free Democratic Party (FDP)

any conjoint proposal to avoid highly unrealistic scenarios that may confuse respondents. However, we refrain from imposing further restrictions on the party positions. The fact that we can create scenarios, which are to date less realistic or hypothetical is a strength of the design. It is particularly relevant to learn more about whether people would accept more far-reaching tax proposals if party support increased. The position of the GLP (green liberals), CVP (Christian Democrats, since 2021 merged to the new Center party), and the FDP (liberals) towards taxes may vary across proposals and over time, and therefore we let the positions of these parties vary.

To implement the conjoint experiment, we follow the fully randomised approach proposed by Bechtel and Scheve (2013) and Hainmueller et al. (2014) except for a few logically implausible profile combinations. Profiles with higher costs for a cost-saving household than for an average household are excluded. The sequence of attributes was randomised, except for party positions, which always appeared at the bottom of the conjoint table, as it does not describe the tax design but rather its degree of political support.

Respondents were asked to indicate which of the two proposals they would prefer if they had to choose (choice answer) and to what extent they would support or reject each proposal on a scale from 0 (fully against) to 10 (fully supportive) (rating answer).[5] The rating captures support *levels*, while the choice reveals *relative* preferences. We primarily use the rating question to analyze how information affects effectiveness beliefs and support for green taxes, aligning with the idea that information influences effectiveness beliefs and overall support. For policy design and party cue effects, we focus on the choice question. Results for both variables are included in the appendix to ensure robustness.[6]

Each respondent was exposed to five paired policy proposals, generating 24,010 observations. By randomly combining different attribute levels, the conjoint experiment includes almost 5,000 possible policy proposals. The causal quantities of interest are the average marginal component effect (AMCE) and the marginal means, which represent the marginal effect and marginal mean of an attribute level averaged over the joint distribution of the remaining attributes. Due to the virtue of the random assignment of attributes and the resulting orthogonality of each attribute to every other, we can nonparametrically identify and estimate the causal effects of multiple treatment components simultaneously.

Results

As shown in Figure 1, we discuss three mechanisms behind policy support. First, we examine the impact of information on effectiveness beliefs and support for policies. Subsequently, two sections analyze how various forms of compensation and party cues shape policy support.

Effectiveness beliefs and the role of information

In the first stage of our study, we examine the effectiveness beliefs of citizens concerning five statements on green taxes, and we investigate the extent to which an information treatment can alter these beliefs. Figure 2 illustrates the distribution of effectiveness beliefs among our respondents. A clear majority of 70 per cent correctly agree with the basic mechanism that a tax on electricity is a means of making those who consume a lot of electricity pay even more. However, most respondents do not understand or believe in the effectiveness of green taxes, especially if tax revenues are redistributed to the population. For example, 67 per cent of the respondents believe that a tax on electricity does *not* reduce electricity consumption. This means that a two-thirds majority does not believe in the central mechanism on which the introduction of green taxes is based. Moreover, only 30 per cent of the respondents believe that a tax on electricity would decrease consumption if tax revenues were redistributed and only 25 per cent believe in a double dividend, i.e., that the tax can reduce electricity consumption and, thanks to lower pension contributions, employers can create jobs.[7]

The relatively low levels of effectiveness beliefs suggest the possibility of observing an information effect. Panel A in Figure 3 displays the distribution of effectiveness beliefs among respondents who were exposed to our information treatment on the working of green taxes compared to those who were not. Panel B shows the treatment and control group's predicted mean support in effectiveness beliefs. It is evident from the distribution and predicted means that there is hardly any difference between the
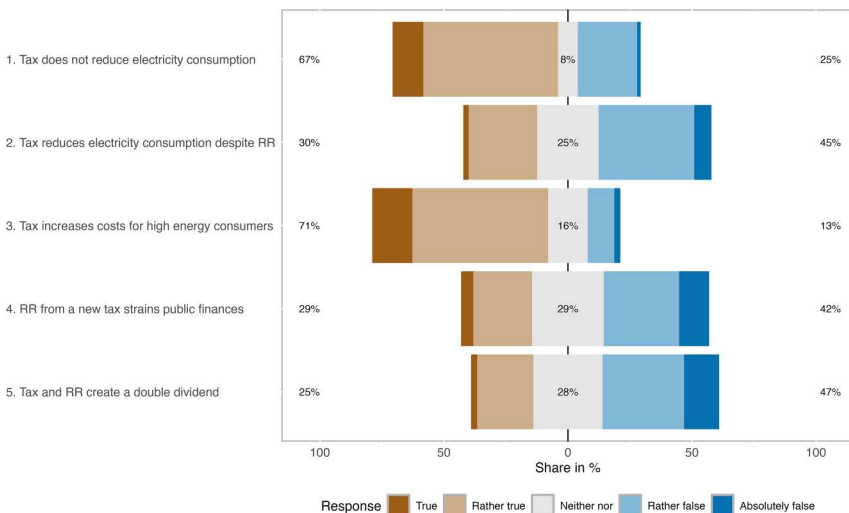

Figure 2. Effectiveness beliefs about green taxes and revenue recycling (RR).
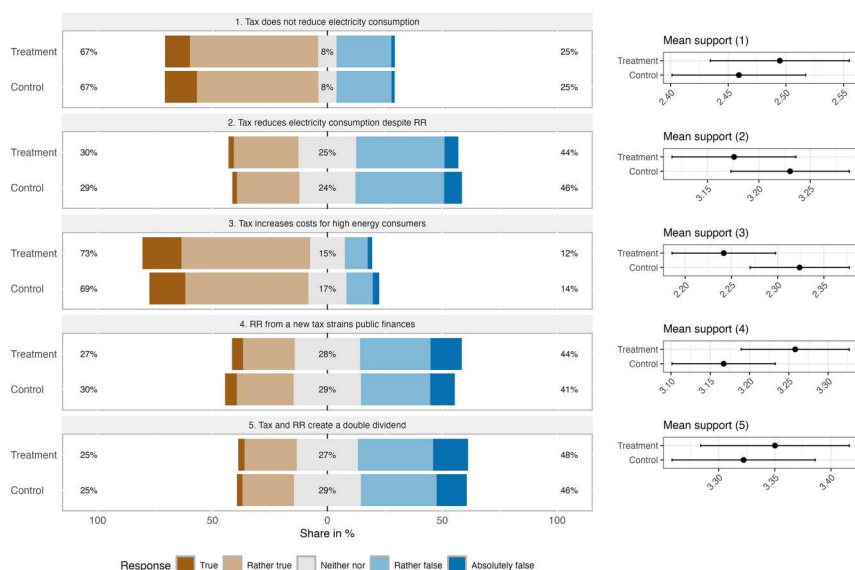
Figure 3. Distribution (left) and predicted means (right) of effectiveness beliefs by treatment and control group.

treatment and control groups. Both MannWhitney-Wilcoxon tests and t-tests show that there are no statistically significant differences in effectiveness beliefs in items 1, 2, and 5. Although there are some significant differences for items 3 and 4, they are not substantial (see de Winter & Dodou, 2010).[8]

Moreover, as documented in Figures A.3 and A.4 in the appendix, the information treatment does also not significantly influence respondents' assessment of green tax proposals. This lack of impact is consistent across all measured conjoint attributes, indicating that brief, one-time exposure to information through a survey fails to shift respondents' effectiveness beliefs and boost their support for green tax policies.

The theorised relationship between beliefs in the effectiveness of green taxes and support for green tax proposals is strongly supported. We computed the average level of perceived effectiveness across the five items capturing effectiveness beliefs (see Figure A.5 in the Appendix). Then we divided the sample into three equally sized terciles: low, middle, and high levels of effectiveness beliefs. Figure 4 illustrates the average rating of a green tax conjoint proposal across these three levels. The results clearly demonstrate a strong association between perceived effectiveness and support for green taxes. In addition, Figures A.6, A.7, A.8, A.9, A.10, and A.11 show how strongly the effectiveness beliefs are associated with the conjoint attributes. Overall, this indicates that when respondents believe in the effectiveness of green taxes across multiple dimensions, their level of support for such policies rises substantially.[9]
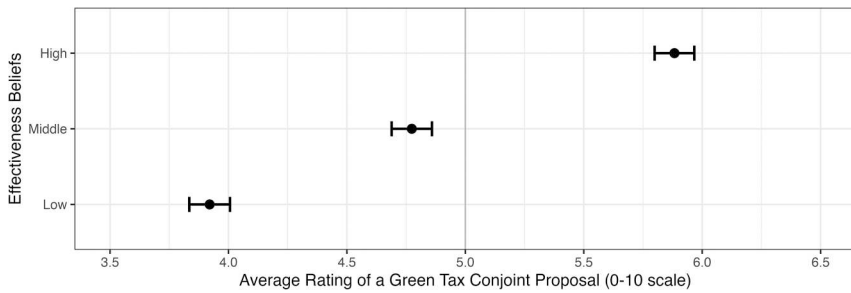
Figure 4. Average rating of a green tax conjoint proposal, by effectiveness belief.

The role of compensation

Figure 5 presents the marginal means obtained from the conjoint experiment conducted to elicit respondents' relative support patterns. We exposed respondents to information on the specific policy design of green taxes and also informed them about which parties supported the proposal. The average marginal component effects (AMCEs) can be found in Figure A.11 in the Appendix. Moreover, using the rating instead of the choice variable yields largely identical results (see Figure A.13 and A.14 in the Appendix).

The level of endorsement for a green tax is intricately tied to the specific nature of the taxed commodity. Notably, proposals to levy taxes on Kerosene and CO_2 command the highest degree of approval, contrasting starkly with the diminished enthusiasm for an electricity tax, which emerges as the least favoured option among survey participants. Similarly, endeavours to impose taxes on heating oil and gas encounter resistance. Furthermore, our findings underscore the pervasive unpopularity of tax exemptions for energy-intensive industries, a prevailing feature of the current regulatory landscape.

Moreover, our study reveals a notable effect of the net cost implications associated with the proposed policies. Aligned with a straightforward material self-interest mechanism, we observe a modest rise in support when the net costs for an average household experience a marginal increase. However, this favourable disposition diminishes considerably when confronted with substantial cost escalations. Additionally, the results demonstrate a pronounced aversion to heightened net costs for low-energy households, whereas a reduction in costs enjoys more widespread support.

In line with our theoretical expectations, our study highlights the critical role of compensation through revenue recycling in shaping public support for green tax proposals. As anticipated, both ego-tropic recycling mechanisms, aimed at reducing individual healthcare costs, and socio-tropic recycling mechanisms, directing funds towards renewable energy subsidies or the public pension budget, emerge as highly favoured among respondents.
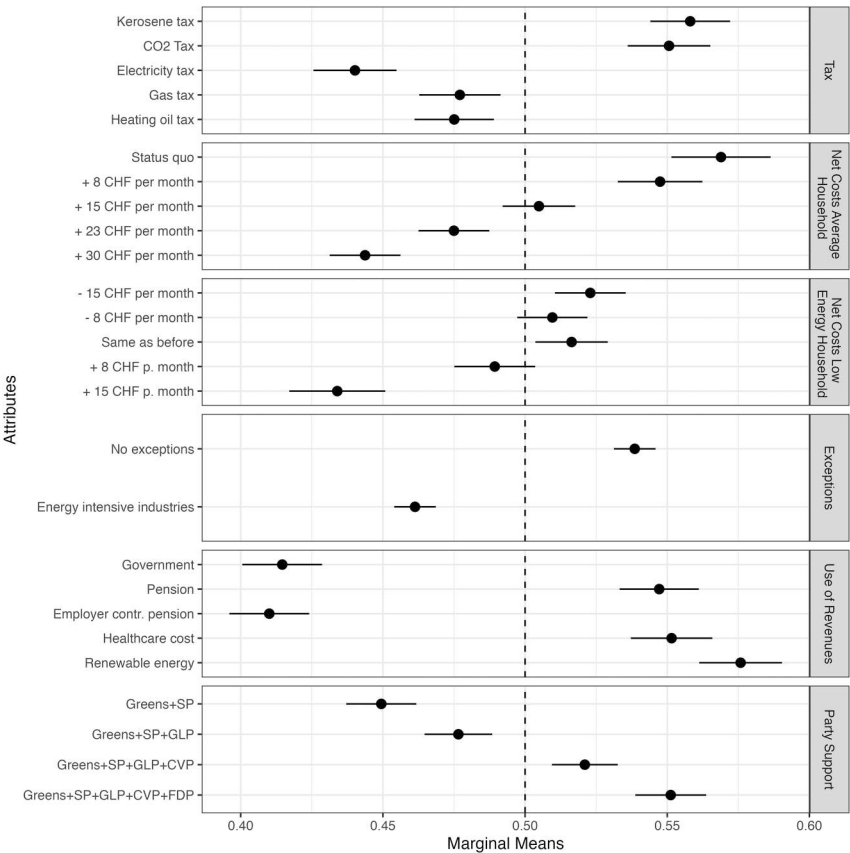
Figure 5. Marginal means of choice variable, full sample.

Notes: SP (Social Democrats), GLP (Green Liberals), CVP (Christian Democrats), FDP (Liberals).

In stark contrast, proposals that neglect revenue recycling, opting to provide funds solely to the government or benefiting employers exclusively, face considerable disapproval.

These findings imply that tax revenues, which not only address individual concerns but also contribute to collective benefits linked to the core issue of climate change or the mitigation of widespread social risks such as old-age poverty, are instrumental in garnering public support for green taxes. Relative support levels rise when individuals recognise that the proposed policy specifically targets the central challenge of climate change or aids in alleviating social risks. Conversely, support diminishes when funds are perceived as not directly benefiting individuals or society at large but rather contributing to the general public budget or employers without tangible returns. Notably, the impact of revenue recycling appears to outweigh that of net costs, irrespective of the respondent's income level (see Figure A.15 in the Appendix).

The role of party cues

The last attribute in the conjoint experiment sheds light on the relevance of elite party cues in shaping public opinion regarding green taxes. The left panel of Figure 6 presents the average marginal means of elite party cues. A green tax proposal exclusively endorsed by left-wing parties (Social Democrats (SP) and the Greens) or a coalition that also includes the Green Liberals (GLP) has a much lower chance of being supported. To garner broader support, a green tax proposal needs a broader coalition that encompasses not only left-wing parties but also Christian Democrats (CVP) and Liberals (FDP). This finding aligns with research on mainstream effects in attitude formation (Zaller, 1992, pp. 97–117). Support for green taxes increases with elite consensus. When environmental policies face minimal elite contention, many citizens adopt cues from ideologically unified parties. However, if only left-green parties promote these policies, it is likely that skepticism intensifies among center-right voters, while left-green voters show stronger support.

To assess whether the results are driven by increased coalition size or the inclusion of specific parties, the right panel of Figure 6 presents the marginal means of party cues for ideological subgroups based on vote choice. We classified parties into three broader political camps: left, center-right and far-right.[10] This reveals how voters react to party cues. Our analysis shows that the policy support among center-right and far-right voters increases almost linearly with the expansion of the reform coalition and center-right
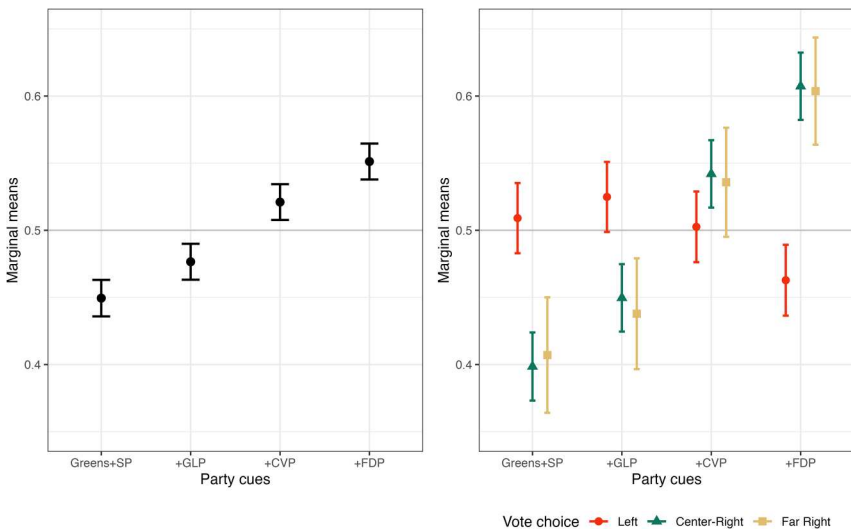

Figure 6. Marginal means of elite party cues (choice variable), overall and by vote choice.

Notes: SP (Social Democrats), GLP (Green Liberals), CVP (Christian Democrats), FDP (Liberals).

party cues. Intriguingly, however, a broader coalition reduces the probability of left-wing voters endorsing the green tax proposal. When the Christian Democrats (CVP) join the reform coalition, left-wing support decreases slightly compared to policies supported solely by left or green parties. The inclusion of the market-liberal FDP in the coalition significantly decreases their support.

The near-linear increase in support from center-right and far-right voters, contrasted with the lack of a similar response from left voters, suggests that left voters react more to the specific parties included in the coalition than to its size. This likely reflects an out-party cue effect, as the coalition size explanation cannot account for the decline in left-wing support when the CVP and FDP is added to the coalition. This suggests a trade-off between broad coalitions and left-wing support. Given their preference for robust environmental policies, left voters may perceive proposals backed by center-right parties as less effective than those supported solely by left-green parties. Thus, our findings also emphasise the relevance of out-party cues, where their impact is not restricted to sources they trust (in-party cues) but also extends to sources they distrust (out-party cues). It is important to note that this trade-off emerges only in choice-based settings. As shown in Figure A.16 in the Appendix, left-wing voters consistently support all green tax proposals regardless of the coalition, while far-right voters uniformly oppose them.

Ideology not only influences how citizens respond to party cues but also significantly shapes their evaluations of other conjoint attributes. As shown in Figure A.17 in the Appendix, the far-right is more supportive of a kerosene tax but opposes a gas or CO_2 tax. Conversely, the left is more firmly against a heating oil or electricity tax. Regarding net costs, the far-right is more sensitive to higher net costs for an average household, while net costs for a low-energy household generate few partisan differences. The left also strongly opposes exempting energy-intensive industries from green tax proposals, an issue of less concern for center-right and far-right respondents. On revenue recycling, far-right voters resist investments in renewable energy, while the left opposes reductions in employers' pension contributions.

Conclusion

This study aimed to investigate whether and under what conditions mass support for green taxes can be increased. We differentiated between three types of mechanisms: general information on green tax effectiveness, compensation, and party cues.

First, we found no empirical support for the expectation that information on policy mechanisms enhances effectiveness beliefs and increases policy support. Our information treatment, which can be considered a highly

probable scenario for discovering an information effect, showed no impact on effectiveness beliefs or policy evaluations. Unlike real-world scenarios where individuals selectively engage with information or encounter opposing views, our respondents were exposed to a clear and unambiguous treatment. Yet, even under these controlled conditions, the information failed to influence beliefs or evaluations, with no evidence of heterogeneous treatment effects. These results, consistent with findings from Canada and Switzerland (Mildenberger et al., 2022), suggest that one-shot information is insufficient to shift beliefs and preferences on complex issues like green taxes.

Our results show that effectiveness beliefs are closely tied to policy support and that party affiliation strongly influences beliefs about policy effectiveness. This suggests a high level of stability in individual policy preferences, as citizens are unlikely to alter their views in response to new information due to entrenched effectiveness beliefs. Our conjoint analysis further indicates that party information reinforces ideology-based opinions. Similarly, Fremstad et al. (2022) found that while informing respondents about household dividends increased support for carbon taxes, this effect vanished when party divisions were emphasised (see also Aitor Marcos & Hartmann, 2023). These findings underscore the need for a deeper understanding of how individuals process information and why it often fails to change effectiveness beliefs and policy support as anticipated.

Second, we provide evidence that public support for green taxes is shaped by the specific green tax design, particularly its net cost implications to households and the nature of revenue recycling. Our results indicate that the negative impact of higher net costs can be mitigated by effective revenue recycling. Individuals are more likely to support green tax if the recycled revenues address both ego-tropic and socio-tropic concerns, such as tackling climate change or reducing social risks. In contrast, support is low when revenues are directed to the public budget or employers without clear benefits. Therefore, our research underscores the importance of considering collective benefits and social risks, which are just as critical as individual material ones, when designing effective green tax policies that can garner public support. Thus, policymakers must carefully consider the net cost implications of green taxes and the types of compensation offered through revenue recycling.

Finally, highlights a critical but understudied factor in the literature on public preferences for green taxation: the role of political parties and the cues they provide. While previous research has largely focused on the cost–benefit design of green taxes, our findings underscore the central role of parties in shaping public opinion and determining the success or failure of such policies. We show that the polarisation of climate and energy issues significantly impedes the implementation of green taxes. Without broad party consensus and consistent cues, advancing green tax proposals

is unlikely. However, we also identify a trade-off in coalition building: inclusive coalitions, particularly with market-liberal parties, may provoke criticism from the left. This aligns with recent studies showing polarisation's negative impact on carbon tax acceptance (Aitor Marcos & Hartmann, 2023; Fremstad et al., 2022). Further research is needed to understand whether this resistance stems from general party system polarisation or specific left-wing concerns about suboptimal reform outcomes. A nuanced understanding of party dynamics and cues is crucial for designing green taxes that gain public support. Policymakers must weigh coalition-building trade-offs while striving for a consensus that offers clear, consistent cues to citizens.

Moving beyond the case of green taxes, we offer three insights: First, even when arguments are presented with simplicity and clarity within a highly conducive setting for information dissemination, such as a survey context where respondents are compelled to engage with the information, these arguments often fail to alter the underlying preference structures. This observation aligns with a substantial body of recent empirical research (see Achen & Bartels, 2017). However, our article does not delve into the reasons behind citizens' general reluctance to adopt clear and logically consistent arguments. The examination of motivated reasoning, as explored by (Lodge & Taber, 2013), may offer insights into resolving this puzzle. Second, when citizens perceive potential losses due to a policy, their support for such policy hinges on two interdependent conditions: On the one hand, the policy must be impeccably designed to achieve its objectives, for instance, through tax revenue utilisation that reinforces the policy's goals, thereby compensating for the perceived losses. On the other hand, the policy should provide compensation aligned with the either ego-tropic or broader socio-tropic interests of the respondents. Third, our findings concerning party cues indicate that in the current climate of increasing polarisation observed across various countries and policy issues (Aitor Marcos & Hartmann, 2023; Grumbach, 2018; Hacker & Pierson, 2019), partisan cues may simultaneously exert a 'mainstream effect' and a 'polarisation effect' (Zaller, 1992). While substantial policy change is likely unattainable without a unified elite triggering a 'mainstream effect' and garnering cross-party popular support, cues from the out-party possess the potential to incite polarisation among voters at the ideological extremes. Consequently, achieving widespread support for significant reform initiatives necessitates more than a tactical and temporary alliance; it is contingent upon sustained efforts aimed at reducing polarisation over the long term.

Notes

1. Not all citizens participate equally in ballot decisions, though most engage occasionally. The high visibility of direct democratic votes and campaigns

ensures that even non-voters have some familiarity with the process. However, citizens' opinions on green tax proposals vary, and it remains unclear in the survey whether they are imagining hypothetical scenarios, comparing them to the current system, or are unfamiliar with certain taxes.

2. Data, codebook and additional information is available at: https://doi.org/10.23662/FORS-DS-1232-1.

3. As our experiment was only included in the Swiss version of the ISSP survey, our study cannot be comparative but will focus on the Swiss case.

4. Table A.1 in the Appendix shows that respondents from both survey waves (W2-all) are broadly similar to those who participated only in the first wave (W1-all) in terms of gender, age, income, place of residence, education, and vote choice. While wave 2 web respondents (those in the experimental part) tend to be slightly younger, more likely male, have higher incomes, and are marginally more educated compared to W1-all and W2-all, these differences are minor.

5. Respondents could also opt out of answering the question. As shown in the Figure A.1 in the Appendix, lower educated, far-right, and politically disinterested individuals were slightly more likely to skip the question, a common trend in surveys, though the differences are minimal.

6. All respondents completed the conjoint module after the effectiveness belief questions. While reflecting on effectiveness beliefs might have influenced responses, our focus is mainly on differences between tax designs, not absolute support levels. Since the effectiveness items address general tax mechanisms rather than specific designs, there is little theoretical basis to suggest they would impact these choice settings.

7. Arguably, the link between reducing employers' pension contribution and job creation is not necessarily true if employers do not invest the saved resources for job creation.

8. In addition, Figure A.2 in the Appendix illustrates that effectiveness beliefs exhibit clear partisan patterns, while the treatment effect does not.

9. While our findings indicate that one-time information treatments may be ineffective, long-term strategies to build or reinforce effectiveness beliefs remain vital for boosting public support for green taxes. Recent evidence by Ruprecht (2023) also shows that the same information treatment significantly increased the willingness of less-educated individuals to pay higher environmental taxes, but not among the more educated. We conclude that the information treatment can influence less-educated individuals by raising awareness of green taxes, but it fails to shift underlying belief structures.

10. The Left includes the Social Democrats (SP) and the Greens; the center-right encompasses the Green Liberals (GLP), Christian Democrats (CVP), Conservatives (BDP), and Liberals (FDP); and the far-right comprises the Swiss Peoples Party (SVP), the Federal Democratic Union (EDU), and the Lega. Combining vote choice with a measure of party closeness to reduce missing values yields identical results (see Figure A.18 in the Appendix).

Disclosure statement

Funding

Data availability

The data and replication files are available at https://doi.org/10.23662/FORS-DS-1232-1 and the corresponding author's Harvard Dataverse.

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