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**A social dilemma in green referendums:
How Tax Framing influences the Acceptance of Environmental
Taxes**

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Abstract

Environmental taxes are considered to be relatively easy to implement and effective to mitigate the consequences of climate change. Yet, attitudes towards environmental taxes are negative in the EU and policymakers face a general resistance from the public when introducing new environmental taxes (Carattini et al., 2018; Umit & Schaffler, 2020), which adds complexity towards overcoming the social dilemma of the climate change crisis. This thesis considers tax framing effects to have a crucial influence on the acceptance of environmental taxes. Utilising secondary data from an international survey conducted by the “Exploring Choices and Outcomes of Energy Policies from a Social Science Perspective” (ECHOES) Project (Reichl et al., 2019) with a substantial sample size ($N=18,037$) representing 31 European countries, a scenario where respondents were asked to vote on financing methods for enhancing their local public transportation system's environmental sustainability was analysed. The findings confirm tax framing to influence voting behaviour in the given referendums, as participants demonstrated a higher willingness-to-accept (WTA) a non-increase of monthly taxes compared to a non-increase of a per-trip tariff, even though both options would lead to the same outcomes regarding costs and revenues. Tax framing effects triggered contrast effects, indicating that the order in which the referendums were presented influenced respondents' choices. Additionally, factors such as higher education, policy acceptance, and moral obligation significantly raised individuals' WTA for both referendums. From a public goods dilemma perspective, it can be inferred that individuals who opt for referendums raising per-trip prices of public transport may engage in 'free-riding,' enjoying the benefits of reduced CO₂ emissions and diminished air pollution resulting from public transportation without contributing to these environmental advantages, as only users of public transport would finance such an upgrade. The thesis is concluded with a discussion of policy recommendations for governments and outlines potential approaches for future research, with a specific focus on revenue equivalence in environmental tax schedules.

Keywords: Environmental tax, tax framing, willingness-to-accept, tax acceptance, social dilemma, environmental psychology, climate change

Kurzzusammenfassung

Umweltsteuern gelten als relativ leicht umsetzbar und wirksam, um die Folgen des Klimawandels abzumildern. Dennoch ist die Einstellung zu Umweltsteuern in der EU ablehnen, und die politischen Entscheidungsträger sehen sich bei der Einführung neuer Umweltsteuern mit einem allgemeinen Widerstand der Öffentlichkeit konfrontiert (Carattini et al., 2018; Umit & Schaffler, 2020), was die Überwindung des sozialen Dilemmas der Klimakrise zusätzlich erschwert. Diese Arbeit geht davon aus, dass Steuer-Framing-Effekte einen entscheidenden Einfluss auf die Akzeptanz von Umweltsteuern haben. Unter Verwendung von Sekundärdaten aus einer internationalen Umfrage des „Exploring Choices and Outcomes of Energy Policies from a Social Science Perspective“, kurz ECHOES-Projekts (Reichl et al., 2019) mit einer großen Stichprobengröße ($N=18.037$), die 31 europäische Länder repräsentiert, wurde ein Szenario analysiert, in dem die Befragten gebeten wurden, über Finanzierungsmethoden zur Verbesserung der ökologischen Nachhaltigkeit ihres öffentlichen Personennahverkehrs (ÖPNV) abzustimmen. Die Ergebnisse bestätigen, dass das Steuer-Framing das Abstimmungsverhalten in den gegebenen Referenden beeinflusst, da die Teilnehmer:innen eine höhere Akzeptanzbereitschaft (willingness-to-accept, WTA) für eine Nichterhöhung der monatlichen Steuern im Vergleich zu keiner Tarifierhöhung pro Fahrt zeigten, obwohl beide Optionen zu den gleichen Ergebnissen führen würden. Die Effekte von Steuer-Framing lösten Kontrasteffekte aus, was darauf hindeutet, dass die Reihenfolge, in der die Referenden präsentiert wurden, das Entscheidungsverhalten der Befragten beeinflusste. Darüber hinaus erhöhten Faktoren wie höhere Bildung, politische Akzeptanz und moralische Verpflichtung die WTA der Befragten für beide Volksentscheide erheblich. Aus der Perspektive des Dilemmas öffentlicher Güter lässt sich ableiten, dass Personen, die sich für Volksentscheide zur Erhöhung der Preise pro Fahrt im öffentlichen Verkehr entscheiden, möglicherweise "Trittbrettfahrer:innen" sind, die die Vorteile reduzierter CO₂-Emissionen und geringerer Luftverschmutzung durch den öffentlichen Verkehr genießen, ohne zu diesen Umweltvorteilen beizutragen, da nur die Nutzer:innen des öffentlichen Verkehrs eine solche Verbesserung finanzieren würden. Die Arbeit schließt mit einer Diskussion politischer Empfehlungen für Regierungen und skizziert mögliche Ansätze für zukünftige Forschung, mit einem besonderen Fokus auf die Gleichwertigkeit der Einnahmen in Umweltsteuern.

Schlagwörter: Umweltsteuer, Steuer Framing, Akzeptanzbereitschaft, Steuerakzeptanz, soziales Dilemma, Umweltpsychologie, Klimawandel

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Introduction

With the United Nations calling it one of the defining problems of our time (United Nations, 2021), climate change and its consequences pose a threat to us all. There is an urgent need for policymakers to take action on a global level, and yet, such policies have to be accepted and complied with by the public. As German chancellor Olaf Scholz recently argued in a press conference, anyone who wants to pursue climate policy must have the trust that each individual legislative regulation would reach a majority in a respective referendum (German Federal Government, 2023). One of the many reasons why this is a complex and wide-ranging challenge is the fact that, in regards to society, climate change offers a social dilemma type of situation where individual interests may conflict with collective well-being. (Milinski et al., 2008). This means that while the benefit of using fossil fuels is personal, the environmental consequences of it are long term and distributed among the society (Ciscar et al., 2011).

Viewing climate change as a social dilemma leads to the conclusion that cooperation, which implies a collective response, is what is needed to successfully address the issue. According to Fritzsche et al. (2018), democratic procedures may help in effectively responding to global collective crises. One example of this would be the implementation of environmental taxes, e.g., by putting a price on carbon in the form of carbon taxes and by investing the revenues of such taxes in environmentally friendly projects. Several studies show that carbon taxes could have a relevant impact on reducing CO₂ emissions, which account for the majority of all anthropogenic greenhouse gas emissions (GHG) (Edenhofer & IPCC, 2014), and are relatively easy to implement into current systems of the state (Carattini et al. 2018). One way of implementing these taxes could be through referendums, thereby getting support from the society of a nation or the local levels of regions and states. Moreover, The World Bank and the International Monetary Fund recommend levying further environmental taxes (e.g., congestion tax; road pricing) on units that have a potentially damaging impact on the climate and using those revenues on upgrading housing, infrastructure, and transportation (Heine et al., 2012; Heine & Black, 2013). In essence, from the perspective of climate change being a social dilemma, it could stand to reason that implementing environmental taxes could serve as an effective solution to the problem. However, the situation seems to be more complex, as taxation itself may also fall under a social dilemma in which free-riders could try to avoid contributing their fair share of

resources by not paying taxes (Tavoni et al., 2011) or preventing the implementation of such from even happening.

While the implementation of environmental taxes is proven to be an effective measure to mitigate the effects of climate change in Europe (Morley, 2012), the acceptance of such taxes was shown to be negative in several democratic countries (Thalman, 2004; Dresner et al., 2006; Klok et al., 2006). Umit & Schaffer (2020) showed that attitudes towards carbon taxes across countries in the EU have been consistently negative. Another perspective on the negative attitudes towards carbon taxes can be the overall aversion of taxes in general. Sussman & Olivola (2011) showed that individuals dislike taxes more than equivalent costs and are willing to take even higher costs in order to avoid paying taxes because of tax aversion, and similar dislikes of taxes might also be the case for environmental taxes.

This study aims to investigate precisely this phenomenon. What impact does tax aversion have on the voting behaviour for energy policies and how does framing costs as taxes influence the willingness to accept policy instruments aiming at reducing CO₂? This thesis aims to explore tax framing effects in referendum situations by utilising secondary data from the international survey conducted as part of the ECHOES Project in 2018. The ECHOES Project is a comprehensive study that examines various aspects of individuals' attitudes, preferences, and behaviours concerning energy policies across different countries (Reichl et al., 2019). One part of the said survey covers an imaginary referendum situation in which individuals were asked to vote in favour or against financing methods in order to upgrade their local public transportation system towards being more environmentally friendly. Participants were offered two referendums, one would implement a monthly tax to finance the upgrade, and another one would implement a per-trip tariff in which people who were using the public transport would pay a higher price for every trip that they would take.

1. Theory

1.1 The Social Dilemmas of Climate Change and Taxation

In this hypothetical referendum situation on the topic of making the public transport system more environmentally friendly, several questions come to mind while making a decision: How should the financing of this upgrade be distributed among the citizens of that region? Who should carry the costs, the whole population of the region, as the outcome of less CO₂ emissions and air pollution benefits everyone, or only the users of the public transport

system, as they directly contribute to the system's environmental impact? Which financing method is fairer, a monthly tax on every citizen or a per-trip tax on the users, and which one would bring more revenue to finance the upgrade?

Both approaches have their merits and drawbacks, and the process of deciding for either of them could be considered a social dilemma (Schuitema & Bergstad, 2018), as the interests of different groups within the population diverge. Dawes (1980) defined a social dilemma as a decision problem in which individual interests are opposed to the goals of the community, creating a situation where an individual can gain by acting selfishly. However, if the majority of citizens maximise their own individual profits, the collective and ultimately the individuals themselves are harmed because the financing of public goods is not secured. In the given referendum situation, we could observe two distinctive types social dilemmas.

On the one hand, the offered referendums state the underlying purpose of reducing CO₂ emissions and air pollution in order to protect the climate. This challenge of maintaining a stable climate can be described as a common goods dilemma, also known as the tragedy of the commons (Milinski et al., 2008). It refers to a social dilemma that arises when individuals have access to a shared or common resource and face the decision of whether to exploit it for personal gain or conserve it for the collective benefit. The dilemma arises due to the conflict between individual self-interest and the long-term sustainability of the common resource (Hardin, 1968), e.g. benefiting from using combustion engines with high CO₂ emissions versus retaining a healthy air quality in the environment. Therefore, even though society at large would benefit from a global cooperation in reducing emissions, individuals can capitalise on simply not embracing climate-friendly behaviour, especially since this would imply additional effort (Irwin, 2009). On the other hand, in the situation of raising taxes to fund environmentally friendly public goods poses as a public good dilemma (Boun & Ouvrard, 2019), as individual interests to minimise tax payments lay in contrast to the long-term collective benefit of investing in environmentally friendly public goods (Gangl et al., 2015; Balliet & Van Lange, 2013).

1.1.1 Factors promoting collective action in social dilemmas

Voting in favour of the referendums and financing environmentally friendly upgrades for public transport could indeed have a positive influence on climate change, as public transportation can already by itself serve as a great way to travel environmentally friendly. As more people can fit on a bus, tram, subway, etc., it reduces the CO₂ emissions per person

compared to driving alone in a car. A well-functioning public transportation system can also effectively reduce traffic jams and relieve heavily trafficked roads as it could reduce demands for using a car (for a review, see Barros, 2021). Upgrading a public transportation system to be more environmentally friendly could therefore be beneficial in many ways. What could promote the intention to vote in favour of financing such a system? Or in general, what could promote overcoming social dilemmas? In the example of climate change, significant factors include group size and communication. Both of these are especially challenging when talking about a global issue, since smaller groups tend to find cooperation easier than bigger groups (Brewer & Kramer, 1986; Kerr, 1983), and discussing the dilemma in advance can lead to fewer defections (Dawes et al., 1977). Additionally, people's perception of their ability to influence a situation is another crucial element. Response efficacy reflects how much individuals believe their actions contribute to maintaining or creating common resources (Borgstede et al., 2018). Building up on response efficacy, the sense of *collective efficacy* refers to a group or community's shared belief in its collective ability to achieve specific goals and produce desired outcomes (Bandura, 1995). Accordingly, environmental uncertainty, i.e., uncertainty about the size of a common good, can decrease the level of cooperation (Wit & Wilke, 1998). This is particularly relevant for the context of climate change, where uncertainties about the timing and severity of crises, coupled with misinformation and intergenerational discounting, could further hinder collective action (Raihani & Aitken, 2011; Haring & Krockow, 2021).

Considering these insights, direct democracy methods such as referendums on local public transportation systems might enhance willingness to accept contributions, particularly in rural areas. Although communication isn't always essential (Buchan et al., 2000), referendums can serve as a useful democratic tool for raising public awareness and facilitating discussion. Bohnet & Frey (1994) further argue that public discussions can help to overcome social dilemmas and that referendums should be central in guiding the provision of public goods in Europe. Therefore, asking in a referendum on the local public transportation system might make the willingness to accept contributions easier, possibly even more for citizens living in rural rather than urban living areas. With this approach that involves the population on a local scale, the challenges of high anonymity and limited communication among a large population we face globally could more easily be avoided, and thereby promote cooperation (Borgstede et al., 2018)

1.1.2 Theory of planned behaviour, norm activation theory & SIMPEA

While challenges in communication, high anonymity and uncertainty can be common in social dilemmas, there is something that can offer a guideline for individuals to think how others may display appropriate behaviour in the given situation: *Social norms*. As explained by Schwartz (1977), social norms encompass both individual expectations regarding how one should behave in specific social situations. Social norms can be categorised into two types (Cialdini et al., 1990): Descriptive norms (that inform individuals about the typical behaviour of others), and injunctive norms (that convey what behaviours or attitudes are socially approved or disapproved). Through such normative and informational influence, social norms can greatly influence pro-environmental behaviour. According to the Theory of Planned Behaviour (Ajzen, 1991), behavioural intention and action can be predicted by one's attitude toward the behaviour, subjective (social) norms, and the perceived behavioural control. Although the Theory of Planned Behaviour provides a strong framework to identify promoting factors of pro-environmental behaviour, a recent review recommends additional variables such as self-efficacy (and response efficacy on a collective level), self-identity and moral norms to increase predictive power of the theory (Yuriev et al., 2020).

Personal norms, or as *moral obligation*, offer another important factor for altruistic, pro-environmental behaviour (Farrow et al., 2017). In the context of climate change, the Norm Activation Theory (Schwartz, 1977) suggests that as individuals become more aware of environmental consequences and develop personal norms, like conserving energy or reducing carbon emissions, they feel a moral obligation towards future generations or the planet and are more likely to take proactive measures to combat climate change (Harland et al., 2007). Numerous meta-analyses have recognized moral obligation as a key predictor of intentions to engage in pro-environmental actions, which, in turn, influence actual pro-environmental behaviours (Bamberg & Möser, 2007; Klöckner, 2013) and policy acceptance (Carrus et al., 2019).

While, in essence, the Theory of Planned Behaviour emphasises on finding the optimal trade-off between costs and benefits, and the Norm Activation Theory underscores the significance of acting in accordance with one's moral values, recent psychological studies indicate that variables on the collective level, such as social identity, also play a crucial role in driving pro-environmental behaviours (Carrus et al., 2019). For example, Van der Werrf et al. (2013) illustrated that self-identity (in this case synonymous to environmental identity) plays

a crucial role in predicting pro-environmental behaviour and is related to personal norms. Social identity can be defined as the capacity of a human to define oneself as in terms of a collective which enables people to think and behave as collectives (Fritzsche et al., 2018). Fritzsche et al. (2018) introduced the Social Identity Model of Pro-Environmental Action (SIMPEA) to integrate these influences on the collective level and suggest that ingroup identification, ingroup norms and goals as well as collective efficacy beliefs are affecting environmental crisis appraisal and responses. SIMPEA was adopted to better understand appraisals and responses related to environmental crises and predict group-based environmental action, such as voting behaviour, which may be crucial considering the personal insufficiency to effectively respond to such crises.

In conclusion, by understanding how collective identities influence environmental appraisals and behaviours, policymakers and campaigners can tailor their communication strategies to foster pro-environmental action and overcome social dilemmas associated with climate challenges. In line with the tragedy of the commons (Hardin, 1968) and the considerations of SIMPEA (Fritzsche et al., 2018), a certain number of citizens would already appraise the potential consequences of an environmentally unfriendly transportation system, as long as this would be aligned with their ingroup identification, norms and collective efficacy beliefs, and they are likely to agree to maintain the resources of clean air and limited CO₂ emissions in their area.

1.2 Taxation as a Response to Climate Change

Returning to the hypothetical situation of making the local public transportation system more environmentally friendly: Let's assume that the voter is generally agreeing with the upgrades and is willing to finance them. Now, as the local authorities explain in the referendums that an upgrade for the sake of the environment would be costly and ask the citizens to contribute to this upgrade themselves, the circumstances of decisions in the referendum alter.

Environmental taxation can be defined as a range of fiscal instruments with the goal of raising revenue while promoting environmental goals (World Bank, 2005). Environmental taxes include charges (fees) and taxes (duties) which are based on a physical unit that has a proven negative impact on the environment, e.g., emissions of CO₂ and other pollutants, energy generation and consumption, transport, general waste and many more (Heine & Black,

2018). Implementing environmental taxes (either as monthly tax or per unit taxes, see Fullerton et al., 2008) could be relatively easy and effective (Carattini et al., 2018), therefore such taxes could, in theory, serve as a public good solution to a common good problem. However, to this day public perception of environmental taxes remains ambiguous (Muhammad et al., 2021; Umit & Schaffer, 2020), and the circumstances within the referendums need to be considered as well.

The question of how to finance the upgrade, whether through a monthly tax or a tax per unit, adds complexity to the dilemma, as each pricing method could have its own implications on revenue generation and perceived fairness, which in turn complicates the decision-making process. Even if both referendums would lead to equivalent outcome, it may be that the referendum that contains the word “tax” might be worse off, as environmental taxes did not receive a high popularity so far.

1.2.1 Attitudes towards environmental taxation

The opposition of the public towards environmental taxes can act as a significant barrier for policymakers to address the challenges of climate change (Cherry et al., 2012). The public acceptability of policy measures, which can also be referred to as an attitude towards such policies (Eriksson et al., 2006) can strongly influence the decision-making process of implementing environmental taxes, and since individual and collective consequences are at odds, the acceptability of such policy measures can also be described as a social dilemma (Schuitema & Bergstad, 2018). In detail, deciding in a referendum whether or not to pay environmental taxes could entail a public goods dilemma, which is defined as a situation where an individual action has costly consequences for oneself but would benefit all group members, if performed by enough people (Frank 2010; Van Lange et al., 2018).

The Greed-Efficiency-Fairness (GEF) hypothesis by Wilke (1991) can serve as a relevant theoretical framework to explain which factors could promote policy acceptance. It predicts that the greed to maximise individual outcomes is constrained by the desire to efficiently use resources and the desire of fair outcomes for all participants. Thus, Schuitema & Bergstad (2018) argue that environmental policy acceptance is related to individual and collective policy outcomes as well as the perceived fairness of how the policy outcomes are distributed. Recent reviews are coming to similar conclusions in alignment of the GEF hypothesis and the SIMPEA model. For instance, Drews & van den Berg (2015) divided environmental policy support into three categories: One being social-psychological factors

and climate change perception (e.g. egalitarian worldviews, environmental values, climate change knowledge, emotions such as interest and hope), the second being the perception of climate policy and its design (e.g. perceived policy effectiveness and perceived policy fairness) and the latter being contextual factors, among them the influence of social trust, norms and participation. Moreover, findings of a European Social Survey with responses from 23 countries reveal a widespread opposition to carbon taxes, where the level of opposition is influenced by perceived tax costs, with consumers heavily reliant on energy resources being more averse (Umit & Schaffer, 2020). However, political trust and external political efficacy positively impact attitudes towards carbon taxes, helping to alleviate uncertainties surrounding policy proposals. Furthermore, the findings of a systematic literature review (Muhammad et al. (2021) suggest that individuals have higher support for environmental policies when they a) possess comprehensive knowledge about the policy's efficacy, including how the revenue is utilised, b) exhibit a high level of trust in the government, c) maintain a positive attitude regarding the protection of the environment, d) view the policy as fair in terms of how costs are distributed and shared among society and e) have concerns about the issue of climate change.

It also occurs to be important for voters to know where the revenues of environmental taxes are being invested in (known as earmarking the tax). The findings of Carattini et al. (2018) suggest that the clearer it is where the revenue of the tax is flowing (earmarking), the more likely it is to accept them. For example, Nixon & Agrawal (2019) found from seven years of an American national survey data that popular taxes were likely to be those who dedicated the revenues to a better environment, better maintenance, and better safety, and Axsen & Wolinetz (2021) could find that higher environmental pricing dedicated to benefit air pollution was slightly more popular than those focused on congestion relief, investments in infrastructure or GHG emissions.

Carattini et al. (2018) argue that earmarking might be rooted in the lack of trust of voters in their government. As also seen in aforementioned findings, trust in policymakers can play a crucial role in environmental policy acceptance, and as Rothstein (2002) states, with the absence of norms of trust, the tragedy of the commons becomes unavoidable. Gangl et al. (2015) further argue that the dilemma of tax compliance can be solved by trust in tax authorities as well as power of tax authorities, which is outlined in the slippery-slope framework (Kirchler et al., 2008). The slippery-slope framework suggests that tax compliance is influenced by two motivations, namely voluntary and enforced compliance, wherein both

trust in and the power of tax authorities play a crucial role. High trust would thereby lead to voluntary tax compliance and commitment of taxpayers, who willingly pay their taxes and feel a moral obligation to contribute to their community (Wahl et al., 2010). The Slippery Slope Framework further states that tax knowledge as well as participation in using taxes (e.g., through direct democracy) have positive correlations with trust (Kirchler et al., 2008).

Last but not least, demographic factors may also influence the support for environmental policies. Lera-López et al. (2014) found that the willingness to pay taxes in rural areas of the Pyrenees to reduce noise and air pollution was higher the closer people live to streets (as they get more affected by the pollution) and was higher for younger, higher educated and environmentally conscious people. Willingness-to-pay can be defined as the highest amount that a person is willing to pay for a good or a service. Conversely, the willingness-to-accept describes the minimum amount that a person is willing to accept for giving up a service or a good (Gopavaram et al., 2021).

1.2.2 Tax framing in the context of climate policies

While it can be argued that in social dilemmas, the rational behaviour of individuals could lead to an irrational collective behaviour (Kollock, 1998), it should be acknowledged that such decision behaviour is influenced by heuristics and biases within their bounded rationality (Simon, 1964; March, 1978). The appropriateness framework from Weber et al. (2004) assumes that three basic factors drive decisions which include the recognition of a situation (e.g., recognising climate change as a cooperative challenge), one's identity (e.g., identifying with the group to solve the dilemma with) and the use of decision rules, heuristics or biases (for a review, see Van Lange et al., 2013). One example of such decision biases, the framing effect, as proposed by Kahneman and Tversky (1984), suggests that individuals are sensitive to how choices are being presented or framed. Moreover, Weber et al. (2004) argue that in structurally similar situations, subtle manipulations like framing may guide people towards different choices. The way a social dilemma is framed can influence individuals' risk preferences, cooperation levels, and willingness to contribute to the collective good (Brewer & Kramer, 1986). For example, individuals may exhibit different behaviour when a dilemma is framed as a public goods problem compared to a common good dilemma (De Dreu & McCusker, 1997).

Framing effects in social dilemmas and regarding pro-environmental behaviour have been researched in various situations. Orlove et al. (2020) argue that framing effects might be

among the most common factors in research approaches related to climate change-relevant decisions, with various types of frames being studied such as policy frames, public engagement frames, community frames and more to better grasp how people comprehend and respond to climate change.

1.2.3 Definition and typology of framing

The concept of Framing is rooted in prospect theory, developed by Kahneman & Tversky (1979), which posits that individuals often make decisions based on perceived gains and losses rather than the final outcome's objective value. The prospect theory suggests that people are risk-averse when facing gains but risk-seeking when facing potential losses, which can significantly influence their choices. Framing underscores how such a shift of the reference point can trigger different emotional and cognitive responses, ultimately shaping the decisions of individuals. Hence, within prospect theory, framing highlights the crucial role of context and perspective in shaping our choices and preferences. In their review about framing, Chong & Druckman (2007) highlight the premise that issues can be viewed from diverse perspectives, each with implications for various considerations or values. Furthermore, they highlight the difference between concepts of framing effects: Equivalency framing effects contain logically equivalent, but differently worded phrases that cause altered preferences in individuals, e.g., 40% of loss vs 60% of gain, where the positive outcome of 60% gain would be favoured (Florence et al., 2022; Tversky & Kahneman 1987). Next to that, emphasis or issue framing effects focus on considerations that are potentially relevant, yet qualitatively different, e.g., voting on allowing or prohibiting a hate group to hold a political rally, with the voting question frames either outlining the importance of “free speech” or the risk of “public violence” (Chong & Druckman, 2007; Sniderman & Theriault, 2018).

As over time, a variety of types for framing effects have been formulated in both sociological and psychological research settings (for reviews see Levin et al., 1998; Chong & Druckman, 2007; Florence et al., 2022), a precise classification for tax framing effects should be made for the current thesis. In one study, Lorenz et al. (2017) described their tax frame (in their example a tax rate versus a minimum income) as resulting in different perceptions, which would therefore influence the level of redistribution compared to a minimum income frame, thus leading to different outcomes by voters when presented a tax frame. Other studies (Traub, 1999; McCaffery & Baron, 2004) attended to replicate the Schelling effect, which will be described below, and related to their frames as different attributes of a tax-law design

(i.e., a rebate frame versus a surcharge frame), which would lead to the same outcome of the tax schedule yet bring independently attractive goals of the voters into conflict.

For tax framing in the current study, it is hypothesised that people evaluate the same outcome differently depending on the framing provided in two situations (one with a tax, one with a fee), and therefore favour the situation in which no taxes are raised due to tax aversion. Hence, equivalency framing effects are being researched (Levin et al., 1998; McCaffery & Baron, 2004). Therefore, a definition from Traub (1999) can be applied for framing effects: A framing effect occurs when the very same facts about a situation, event, or act (including the outcomes and conditions connected to it), are linked to different reference systems because of transmission of different instructions to interpretation. As a result, different judgements and decisions arise from essentially the same situation, event, or act.

1.2.4 Tax aversion and tax framing

How does the framing of taxes influence voting behaviour and the willingness to accept taxes in a referendum context? Early in the studies for framing effects, Schelling (1981) has observed tax-related framings that could influence voter's decision-making, as later discussed by Tversky & Kahneman (1986) and named Schelling Effect by Traub (1999). In propositions to his students, Schelling (1981) offered differently termed tax schedules for childless couples and families with children, and asked his students which schedule they would approve especially for rich people. When framed as a tax exemption for every child, the students rejected the idea of giving more benefits to the rich families than the poor. However, when the same tax schedule was framed as a premium for childless couples, they favoured the thought of charging the childless rich more than the poor, even though both frames of the tax schedule led to the same outcomes.

Within the Schelling Effect, it is apparent to the participants of these debates that both options involve tax options and schedules. Nevertheless, the mere term "tax" can by itself serve as a frame. Taxes are frequently viewed as representing a loss of financial freedom, spendings without fair returns, or money misused by inefficient politicians (Kirchler, 1998). Moreover, because of this, people tend to reject the introduction of new taxes, especially if they are affected by it (Kirchler, 1997). By some, taxes are furthermore viewed as a burden and even a punishment (Kasper et al., 2018) which also seems to be the case for carbon taxes (Lucas, 2017). Next to perceiving taxes as an economic burden, people may also dislike taxes for political, cultural, and moral reasons (Hardisty et al., 2010; Kirchler, 2007). Sussman &

Olivola (2011) documented the phenomenon of tax aversion and were able to demonstrate that the desire to avoid taxes extends beyond rational economic considerations and affects consumer preferences. Their experiments focused mostly on purchases of articles, taxes on bonds or choices of residence related to tax discounts or tax exemptions. Nevertheless, tax aversion in forms of tax framing was also observed in policy choices and voting:

When testing the importance of labels in surveys on taxation, one of the main findings of McCaffery & Baron (2004) was that labelling something a “tax” could already affect people’s attitude toward that. These attitudes were able to be predicted based on the characteristics of the service and the context labelled as tax. Similarly, Brannlund et al. (2010) showed in a large-scale choice experiment that Swedes greatly disliked policies with the label “tax” compared to “other” when choosing between policy instruments which reduce CO₂ emissions by the same amount, but with different labels. A dislike of the label “tax” also appears to be maintained for various concepts of environmental policies. For instance, Kallbekken et al. (2011) found that labelling Pigouvian instruments (designed to correct externalities by taxing harmful activities) as “tax” could significantly lower voter support. Similarly, Hardisty et al. (2010) observed a higher willingness to pay for equally sized environmental fees when labelled as carbon “offset” rather than carbon “taxes”. Furthermore, Cherry et al. (2012) were able to support these findings, as their market experiment replicates tax aversion in environmental policies with voters favouring “subsidies” over “taxes”, with Baranzini & Carattini (2017) presuming their framing effect of “carbon tax” compared to “climate contribution” to go beyond earmarking effects. In a field experiment comparing real Swiss referendums, Bütler & Maréchal (2007) found that framing effects (albeit no tax framing) had a significant influence on different approval rates of two referendums with virtually identical outcomes and, notably, since 2015 the Swiss government refers to “climate levies” instead of tax, widening the scope of their carbon tax policy (Baranzini & Carattini, 2017). A noteworthy finding in the experiment of Kallbekken et al. (2011) was that earmarking the policy could mitigate the effects of tax framing, while explaining the concept of Pigouvian taxes had no effect on voter support. However, Carattini et al. (2017) also argue that providing information on the effectiveness of environmental taxes may overcome the necessity of earmarking and addressing the limited information and concerns of the public can effectively avoid resistance towards cost-effective policy instruments to mitigate climate change.

Besides studies supporting aversion towards taxes, other researchers were not able to replicate some of the findings of tax aversion and of tax framing effects in environmental policies. As such, Olsen et al. (2019) were not able to replicate tax aversion in discounts (tax discounts versus customer rewards) in the UK and thus argued tax aversion to be a smaller phenomenon which could not be generalised to a value added tax system, as compared to a US sales tax system in which taxes are only added at the checkout, constituting an immediate loss and creating a larger salience for consumption taxes. For environmental policies, Villar & Krosnick (2009) did not find a significant difference after asking participants from the US whether they favoured higher “gasoline prices” over higher “gasoline taxes” and Hammerle et al. (2021) did not find that the term “carbon tax” had a significant effect on willingness to pay carbon tax design features when compared to the term “carbon prices” in an Australian survey.

Next to tax aversion, other biases could also come into play or even enhance the tax framing effects. The endowment effect states that individuals state to overvalue the possessions or goods which they own compared to those they don’t (Thaler, 1980). Thus, in the context of the referendums of the current study, the endowment effect could influence voters who infrequently use public transport or do not use it at all, as they might place a higher value on retaining their income (avoiding higher taxes) than on paying fees for public transport they seldom use. On the other hand, contrast effects could enhance framing effects; contrast effects refer to the phenomenon where the perception of something is influenced by the presence or prior experience of something similar, leading to an exaggeration of differences between the two, e.g. seeing an uncertain issue after a series of explicit threats could look more like an opportunity, whereas the same issue could look more like a threat when the viewer has previously been exposed to explicit opportunities (Highhouse et al., 1996). For the tax framing in the referred referendums, contrast effects could become active when people first see the tax referendum and, as they would perceive taxes as a threat because of the tax aversion bias, would have a higher probability to favour the trip referendum if seen as a second referendum.

To summarise, tax framing, particularly the use of the term "tax," can significantly influence voting behaviour and the willingness to accept taxes in a referendum context. People often view taxes as a loss of financial freedom and may hold cultural, political, or moral aversions to them, which can impact their choices. Studies have shown that labelling policies as "taxes" can affect public attitudes and support for those policies in environmental

and climate contexts. While there are indicators for a general aversion towards taxes in the population, such a tax aversion does not always seem to unfold in every context. As the label of “tax” does not always seem to have strong effects, people might differentiate between different forms of tax schedules, some of which they dislike more than others, especially in situations where the concept of a tax schedule stays the same and only the label ‘tax’ would change (e.g., carbon price vs. carbon tax).

1.2.5 Direct vs. indirect taxes & fiscal illusion

In different tax schedules that each would constitute the same outcome, voters might also perceive one schedule as more burdening than the other, especially if one is portrayed more visibly as a tax than the other. In the referendum of the present study, such two different tax schedules are being portrayed, since one referendum offers a monthly tax while the other is offering a per-trip tariff, meaning a higher fee for every trip that is taken with public transport. Both referendums differ in the way the costs for upgrading the public transportation system would affect how many and which people and in the amount of revenue itself. However, both options of the referendums can be categorised as taxes. More precisely, the monthly tax of one referendum can be described as a direct tax, and the per-trip tariff of the other as indirect tax.

Direct taxes can be defined as a tax that will be paid directly to the government or authority that imposes it, while indirect taxes can be defined as a tax that is being paid through part of the purchase price of goods or services, with an entity within the supply chain (e.g., a manufacturer or retailer collecting the tax and paying it to the government) (Atkinson, 1977). A common example for a direct tax is the income tax, and it can stand to reason that a raised monthly tax for an upgraded public transportation system could be collected directly through an income tax. Raising the per-trip fee on public transport can therefore be categorised as an indirect tax, as the revenue for the raised costs would be collected through the purchase of tickets for public transport. A parallel example for indirect taxes on tickets can be found in aviation, as Keen & Strand (2007) describe a trip tax in aviation (meaning a fixed charge for all trips within a broad category, imposed on passenger’s flight tickets at a standard rate per trip). Next to different methods of administration and how direct and indirect taxes are being collected, it is also important to mention that a direct tax can be progressive, meaning that the rate of taxation increases as a person's income or wealth increases (McCoy et al., 2017). Meanwhile, indirect taxation can only be proportional, meaning that they do not discriminate between rich and poor as they are based on anonymous transactions (Cremer et

al., 2001). Additionally, from a taxpayer perspective, direct taxes are more visible than indirect taxes (Gemmell et al., 1999). When it comes to tax compliance and tax framing, Watrin & Ullmann (2008) gathered experimental evidence which suggests that individuals are significantly less compliant under an indirect consumption tax structure compared to a direct income tax structure and that there is a significant difference in the perception of tax burden and enforcement depending on whether the tax is framed as consumption or income tax. Furthermore, Malicka (2021) observed in a European survey that taxpayers displayed less tax resistance for less visible and indirect taxes compared to direct taxes.

Since indirect taxes have been found to be less visible to the taxpayers compared to direct taxes, it could raise the question to which extent taxpayers understand how many costs they are actually carrying through indirect taxes, especially when they are less transparent than a value added tax (VAT) or a trip tax of a commonly purchased ticket for public transport. In fact, the Mill hypothesis of fiscal illusion refers to this systematic misperception of tax burden (Sausgruber & Tyran, 2005). It is rooted in John Stuart Mill's (1848) suggestion that if all taxes were visible and direct, people would notice and understand taxation much more than they do now. He further suggested that transparency would encourage more efficient use of public funds and less excessive government spending. In their experiment entailing a referendum of tax proposals, Sausgruber & Tyran (2005) observed that a tax burden within indirect taxes is underestimated compared to an equivalent direct tax and suggested tax framing as a cause of fiscal illusion. They further argue that their results indicate a distortion in democratic decision-making that could result in excessive redistribution, as participants in the role of buyers favoured introducing larger taxes on sellers compared to fewer taxes on themselves. Thus, fiscal illusion could facilitate a social dilemma in the form of a collective action problem, where the benefits would be shared by many, yet there the burden of the costs would be carried by a majority (Sanandaji & Wallace, 2011).

A similar misperception could occur for the referendums analysed in the current study, since favouring the referendum that raises a per-trip tariff on public transportation would mean that a smaller group of the population, namely only people using public transportation, would carry the burden of financing an upgrade that would reduce air pollution - an outcome of which the whole population in that area would benefit from.

While some studies could further find experimental evidence indicating fiscal illusion (Dell'Anno & Mourão, 2012; Baekgaard et al., 2016), others could neither confirm the Mill hypothesis (Malicka, 2021) nor the fiscal illusion hypothesis (Menges & Traub, 2009).

Sausgruber & Tyran (2005) argue that exploring tax framing effects in fiscal illusion would require a situation in which direct and indirect tax schedules would be identical in terms of tax burden. Even though it is difficult to find a natural experiment with these conditions (Sausgruber & Tyran, 2005), the design of the ECHOES project did include a condition in which the two referendums illustrate an identical tax burden. However, they further argue that in order to explore whether there is a fiscal illusion in an experimental context, the perception of a participant's tax burden needs to be measured. Since the secondary data that is being analysed in the current study and discussed in more detail in the next section did not measure such tax burden, the ongoing analysis will not be able to test the Mill hypothesis. Furthermore, for a clear and understandable terminology, the following analysis will proceed to differentiate the aforementioned referendums of the ECHOES project as “tax referendum” (referring to the referendum that offers a monthly tax to finance the upgrade of the public transportation system) and as “trip referendum” (referring to the referendum that offers a per-trip tariff).

1.3 The ECHOES Project

As mentioned before, the analysis will use secondary data that was collected under the ECHOES project (Reichl et al., 2019), which will be described in this section. ECHOES stands for “Exploring Choices and Outcomes of Energy Policies from a Social Science Perspective” and the goal of the project was providing a better understanding of individual and collective climate related decision-making and behaviour. The project received funding by the European Union's Horizon 2020 Research and Innovation Programme and contained, among others, a comprehensive international survey that examined various aspects of individuals' attitudes, preferences and behaviours concerning energy policies across European countries on areas of life such as housing, mobility and consumption paired with sociodemographic characteristics and items measuring social identity and emotional drivers of energy decisions (Pons-Seres de Brauwert et al., 2019; Reichl et al., 2019).

The focus of the survey covered a choice experiment regarding community renewable energy investments in Europe which has already been analysed in detail (Cohen et al., 2021). Nonetheless, the international survey also contained a section about public transportation systems in which the aforementioned referendums have been presented. This has not been analysed in full detail yet. The two referendums asked participants to vote in favour or against a raised monthly tax or a raised per-trip tariff (or both options) in order to finance an upgrade

of the local public transportation system to be more environmentally friendly in the region where the participants reside. Some results of the questionnaire regarding the referendums have already been analysed (Pons-Seres de Brauwer et al., 2019): The willingness to accept an upgrade of the public transport system is decreased with increasing price for taxes or per-trip tariffs and increased perceptions of the public transport system already being environmentally friendly, and the willingness to accept increases with higher satisfaction with and higher usage of the transport system, the latter of which shows similarities to the results of Lera-López et al. (2014).

What has not yet been analysed is whether a tax framing effect could have biased the participants in their choices in the referendums, which thus becomes the focus of the current analysis. The financing options of both referendums are not comparable with each other as soon as they are asking for a specific price increase, as the costs and revenues cannot be compared with a monthly price increase or an increased per-trip tariff. However, the referendums displayed one price treatment for the participants in which no price increase was offered for both referendums (asking the participants whether they would accept to pay zero € more per trip, respectively per month for an upgraded public transport). Within this condition, both financing options can be compared with each other, as the outcome of voting in favour either the tax per month or the per-trip tariff would effectively be the same. Furthermore, a price increase of zero versus a price increase above zero could be put into comparison when only analysing how the sheer implementation of a higher price could influence the willingness to accept per-trip tariffs and taxes compared to no price increase.

The referendums show features that could potentially promote environmentally friendly intentions in voting behaviour, as previously discussed: To start with, the referendums ask to finance environmental upgrades on the local level, which could facilitate the participants to relate more with their own community's public transport system, and find themselves in a hypothetical voting situation with less people, which could be helpful in terms of social dilemmas, since achieving cooperation is more difficult for larger than for smaller groups (Olson, 1973). Moreover, the referendums pose a very specific green/environmental tax implementation with the revenue being clearly dedicated to making the regional public transportation system more environmentally friendly, thereby displaying a choice between two clearly earmarked tax policies, again facilitating a choice in favour of environmental policies (Carattini et al., 2018). Yet, while the intended outcome of the referendums should be clear, with concrete descriptions of the aims of the revenue (updating the public transportation

system, reducing noise pollution) and the outreach (local systems, referendums initiated by local authorities), the referendums still show a form of framing in the sense of the two financing options presented, one being a clearly labelled monthly general tax and the other an unlabelled per-trip tariff that still works as a tax per trip (Keen & Strand, 2007).

Some concepts previously discussed, such as trust in government, perceived fairness and efficiency of environmental taxes or the understanding of direct or indirect taxes were not included in the design of the international survey and can therefore not be analysed.

Nevertheless, to the author's knowledge, tax framing with clearly earmarked tax policies that have the same outcome have not yet been researched in an environmental setting, and utilising the secondary data of the ECHOES project (Reichl et al., 2019) serves as useful to analyse tax framing effects on a European level. When it comes to the willingness to accept outcomes of referendums, understanding the processes of tax framing as a bias can be a crucial step to effectively implementing energy policies in a democratic way as a collective response to mitigate the effects of climate change.

1.4 Research Question and Hypotheses

Based on the reviewed research and the gap in the existing literature, the following research question can be stated for this thesis: How do the tax framing effects in the two referendums impact individuals' voting behaviours, if the outcome of both referendums would be the same? The hypotheses for the research question are formulated as follows:

- H 1a **Tax aversion:** There is a positive connection between the framing of the referendums and choice behaviour that refers to tax aversion. People are more likely to avoid paying higher taxes rather than avoiding a higher per-trip fare increase. Conversely, people are more likely to accept a non-increase of tax prices rather than a non-increase of prices per trip, even though both referendums would lead to the same outcome.
- H 1b **Order of seeing the referendum:** There is a positive connection between the order of the type of the referendums and choice behaviour because contrast effects become active. People who see the tax referendum first are more likely to vote in favour of the referendum compared to if they see the per-trip fare increases referendum first. Conversely, people who see the trip referendum first

are more likely to vote in favour of the tax referendum, when the cost increase is zero.

- H 2 The following **control variables** are expected to correlate positively with the willingness to accept either per-trip fares and taxes in the referendums: Higher scores in satisfaction and use of the public transport, social norms, collective efficacy, moral obligation, beliefs in climate change, environmental identity, and policy acceptance. Moreover, demographic variables correlate with the acceptance in a way that: Younger, higher educated and higher-income individuals are more likely to vote in favour of either of the referendums.

In order to answer the research question, the referendum questions of the ECHOES international survey will be used. The details of the survey and the used measures will be discussed in the methods section. In short, two referendums were presented, in which participants could vote to (a) pay higher *monthly taxes* or (b) pay more for every trip with public transit they would take (*per-trip tariff*) to support an upgraded transportation system to be more environmentally friendly. The referendums offered various price increases for the two forms of taxes, leading to different amounts of potential revenues, and therefore making the outcomes of the referendums hard to compare. However, in one condition of the referendums a price increase of zero was offered, which would lead to equivalent outcomes of both referendums. Making use of this condition, it can be analysed whether the willingness to accept a non-increase of taxes to finance environmentally friendly upgrades would be higher if the label of taxes is explicitly mentioned in one referendum compared to not mentioning it.

2. Methods

In order to investigate the research questions, secondary data was used that was collected by the international survey of the ECHOES project (Reichl et al., 2019) that contains responses from 31 countries (the EU-28 countries plus Norway, Turkey and Switzerland). The survey covered a comprehensive questionnaire focusing on individuals' energy related behaviours, attitudes and choices on areas of life such as housing, mobility and consumption paired with sociodemographic characteristics and items measuring social identity and emotional drivers of energy decisions (Pons-Seres de Brauwer et al., 2019). The data is publicly available on the ECHOES project database website as well as on open-source platforms (Reichl et al., 2019)

2.1 Sample

Data was collected over a four-month period in 2018 and administered over all 31 countries by the market research firm Ipsos (Pons-Seres de Brauwer et al., 2019; Cohen et al., 2021). Respondents received the survey online and in their native language. Additionally, all monetary values were converted from Euros to the national currency of the individual respondents. Quota sampling methods considering income, age and gender ensured to receive a representative sample from each nation's population. The survey took around 20 minutes to complete and a compensation of five € was offered to respondents upon completion of the survey, for which respondents were subsequently offered to donate a part or the full amount of the compensation to fundings to reduce future effects of climate change. A total sample of $N=18,037$ completed surveys was collected, with about 600 respondents per country (with exceptions being Cyprus ($n=251$) and Malta ($n=263$)).

2.2. Measures

2.2.1 Willingness to accept (the dependent variable)

After participating in the key element of the survey, the choice experiment section regarding renewable energy investments, respondents were asked about attitudes towards the public transportation system in their area, described in the next section. Following that, participants were asked to imagine an upgrade of the current public transportation system in their area. The upgrade would improve the current vehicles to be more environmentally friendly and specifically, the vehicles would decrease the air pollution within the respondent's area and lower the carbon emissions from the public transportation sector. These upgrades, however, would induce higher costs, and so participants were asked to vote in this hypothetical scenario whether this change should take place and how the costs should be carried. For this voting, two referendums were presented, in which participants could vote to (a) pay higher *monthly taxes* or (b) pay more for every trip with public transit they would take (*per-trip tariff*) in order to finance the upgraded transportation system. Figure 1 represents the exact wording of the introduction to the referendum and the two referendum questions. Participants were able to vote via "yes" or "no" responses, thereby illustrating their *willingness to accept (WTA)* for the public transportation system to be more environmentally friendly.

A few characteristics of the referendum questions will be highlighted here. First, the order in which participants viewed the referendums was randomised, so that half of the participants saw the referendum for higher trip costs first and the higher taxes referendum second, while the other half saw the referendums in the reverse order. Second, the formulation of both referendums varied slightly, yet notably. While the “tax referendum” explicitly called out the price increase to be a tax and claimed that this would also affect the participants even if they would never use public transport, the “trip referendum” only referred to a higher price for every trip that they would take, regardless of the purchased ticket. Hence, even though both referendums by definition portrayed the implementation of a tax, the term “tax” was only explicitly mentioned in one of the referendums. Lastly, the increase of costs or *price* of the referendums varied for each respondent, not only because the price was converted to their national currency, but also through various increments that were shown to each participant. The price for the trip referendum ranged from 0€ to 5.72€ with 64 distinct increments and a median of 0.54€ ($M=1.68$, $SD=1.86$), while the price for the tax referendum ranged from 0€ to 22.89€ with 65 distinct increments and a median of 4.73€ ($M=7.78$, $SD=7.19$).

The two referendums in combination constitute a social dilemma in two ways. On a broader level, a public goods dilemma is being presented to the participants, as they are being asked to cast a vote on paying higher costs to an upgrade that would benefit everyone (less air pollution and carbon emissions in the area) through a medium which is accessible to, yet not necessarily used by everyone (public transport).

Figure 1.

Public transport referendum questions. Text in bold form and squared brackets was retrospectively edited.

<p>Imagine that the current fleet of public transportation vehicles in your area will be upgraded to be more environmentally friendly.</p> <p>The new vehicles will decrease air pollution within your area and will lower the carbon emissions from the public transportation sector. However, the new vehicles will be more costly to run.</p> <p>Therefore, local politicians ask all residents in the area in a referendum whether this change to environmentally friendly vehicles shall take place:</p> <p>21. [50% of sample should receive question I first, and 50% should receive question II first]</p>
<p>21.1. Imagine you would be required to pay xxx [= <i>randomly assigned national bid price</i>] more for every trip with public transit you take, no matter what kind of ticket you usually buy. How would you vote in the referendum?</p> <p>(1) I would vote “YES” to support the new public transportation system (2) I would vote “NO” and not support the new public transportation system</p>
<p>21.2. How would you vote on the referendum if you would be required to pay xxx [= <i>randomly assigned national bid price</i>] more per month in taxes? You would have to pay this fee even if you never use public transport.</p> <p>(1) I would vote “YES” to support the new public transportation system (2) I would vote “NO” and not support the new public transportation system</p>

2.2.2. Attitudes and use of public transport systems

Prior to filling out the referendum questions, participants were asked about their attitudes and use of public transport systems existing in their individual area. Public transportation systems were specifically described to include any buses, trams, trains, subways, or other public vehicles that can be used around the participants’ areas. *Satisfaction* of the current public transportation system was measured using a Likert-type scale in which participants could rate their satisfaction ranging from 1 (very dissatisfied) to 5 (very satisfied). Similarly, considerations about the *environmentally friendliness* of the public transport systems in their area could be rated ranging from 1 (strongly disagree) to 5 (strongly agree). Furthermore, the *average weekly use* of the public transport system was measured on a Likert-type scale ranging from 1 (“I rarely use public transportation”) until 5 (“More than 12 trips [per week]”). As an example, travelling from and to work was described to take two trips in total.

2.2.3 Climate change beliefs

Climate change beliefs was measured with one item asking participants about their beliefs regarding the primary causes of rising global temperatures. Participants were given three response options to attribute the causes of climate change to be “mostly by natural causes”; “about equally by natural causes and human activity”; or “mostly by human activities”. Of interest was the belief that the rising global temperatures are due to anthropogenic climate change, meaning that they are caused mostly by human activities. The item was thus transformed to a binary variable, with the outcomes 0 (“mostly by natural causes” and “about equally by natural causes and human activity” and 1 (“mostly by human activities” (Cohen et al., 2021).

2.2.4 Social norms

According to Carrus et al. (2019), the survey adopted seven items for the measurement of *social norms* from Cialdini et al. (1990). For the current research, four of those items have been selected which focus on the norms of reducing energy consumption and supporting energy policies (Cronbach’s $\alpha=.78$), two of which measure descriptive norms (e.g., “a growing number of people in my region try to save energy”) and two of which measure injunctive norms (e.g., “many people would support it if I used less energy”). Participants rated these items on Likert-type scales ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”). Table 2 highlights selected items and descriptive outcomes while outlining the questions asked for each item.

2.2.5 Collective efficacy

Collective efficacy was measured with one item asking about how strongly the respondent believes that the people in the EU/their country/their municipality can act together to achieve the energy transition. Participants rated collective efficacy on a Likert-type scale ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”).

2.2.6 Moral obligation

Moral obligation was measured with two items which inquired whether participants feel a personal obligation to (1) be energy efficient and (2) support energy policies, which could be rated on a Likert-type scale ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”). Originally, Carrus et al. (2019) measured moral obligation within this survey with a

third variable (“I feel a personal obligation to decrease my current energy consumption for heating and cooling my dwelling.”). However, since a majority of participants did not fill out this item (missing $N=12150$), the content of the item is not related to the topic of public transport and the Cronbach’s alpha for including just two items is still acceptably high (Cronbach’s alpha=.77; compared to Cronbach’s alpha=.84 including all three items), this item has been excluded for this analysis.

2.2.7 Environmental identity

Environmental identity is measured using one item adopted by Leach et al. (2008) which is supposed to capture the centrality component of in-group identification in the context of acting pro-environmentally. Participants could rate environmental identity on a Likert-type scale ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”).

2.2.8 Policy acceptance

Two items have been used to measure *policy acceptance* (Cronbach’s alpha=.87). Notably, both items inquired the willingness to accept of energy policies (in particular, policies that protect the environment and policies that create new jobs) despite higher costs that would be induced through such policies. This is analogous towards the aforementioned referendums as dependent variables, which are more specifically asking for the willingness to pay higher costs for a more environmentally friendly public transportation system. Participants rated the items for policy acceptance on a Likert-type scale ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”).

3. Results

3.1 Descriptive Analysis

In total, $N=18,037$ participants from 31 European countries, 9,099 male and 8,930 female, were included in the study. Table 1 shows the sociodemographic characteristics of the respondents of the survey. Appendix A illustrates descriptives of sociodemographic data for all 31 countries. Table 2 shows a summary of descriptive statistics of the selected items included in this analysis. For the items 19 and 20, asking about the perceived environmental friendliness and the frequency of using the regional public transportation system, answers of 273 respondents were missing. The reason for the missing data is not clear, although one

might be that for question 18, there was an option to answer with “my area has no public transit” which would lead the survey to skip question 19, 20 and the referendum questions, even though the latter did not have any missing values. For further analysis in which the questions 18 and 19 are contained, the missing data will be eliminated and only the fully filled questions with $n=17,764$ considered.

Table 1

Sociodemographic Characteristics of Participants

Characteristic	Full sample	
	<i>n</i>	%
Included cases	18,037	
Gender		
Female	8,930	49.5
Male	9,099	50.4
Other	8	.0004
Age		
18-34	6,276	34.8
35-44	4,108	22.8
45-54	3,567	19.8
55+	4,086	22.7
Living area ^a		
Urban	12,535	69.5
Rural	5,502	30.5
Highest educational level		
Elementary/secondary school	2,053	11.4
Professional training	3,057	16.9
A-Levels	3,909	21.7
University/College	8,651	48.0
Other	367	2.0
Income ^b		
0€ - 500€	4842	26.8
501€ - 1000€	5315	29.5
1001€ - 2000€	4338	24.1
2001€ - 3000€	2404	13.3
> 3000€	1138	6.3

Note. ^a Based on number of inhabitants of the living area, with urban describing a town/city with more than 10,000 inhabitants, and rural describing a village/small town with <10,000 inhabitants. ^b Reflects on the total net income per equivalised household member in €/month.

Table 2

Selected survey question list and descriptives

Item	<i>M</i>	<i>SD</i>	<i>N</i>
Attitudes & Use of Public Transportation System			
18. How satisfied are you with the current public transportation system in your area?	3.13	1.17	18,037
19. I consider the public transportation system in my area to be environmentally-friendly.	2.74	.98	17,764
20. How many trips do you take per week using public transportation on average? By "trip" we mean one instance of travel from one place to another. Traveling to and from work would be two trips.	1.90	1.26	17,764
Climate Change Beliefs			
34. Assuming that the world's temperature is rising, do you think this is caused mostly by natural causes, about equally by natural causes and human activity, or mostly by human activity? (= 1 for mostly by human activity)	0.55		
Social Norms			
36. Many people in would support it if I used less energy (e.g., using public transport instead of a personal car [...]).	3.37	.77	18,037
37. Many people would support it if I favored energy policies for energy transition.	3.59	1.00	
38. A growing number of people try to save energy (e.g., using public transport instead of a personal car [...]).	3.16	1.04	
39. A growing number of people favour policies that support the energy transition.	3.37	1.02	
Collective Efficacy			
48. We as people in the EU /my country /my municipality can act together to achieve energy transition.	3.37	.92	
Moral Obligation			
53. I feel a personal obligation to be energy efficient (e.g. using public transport, turning off lights, using energy saving appliances).	3.69	.99	18,037
54. I feel a personal obligation to support energy policies that support the energy transition.	3.78	.91	18,037
Environmental Identity			
61. Acting pro-environmentally is an important part of who I am.	3.90	1.00	
Policy Acceptance			
64. I would accept energy policies that protect the environment even when these induce higher costs.	3.75	1.05	18,037
66. I would accept energy policies that create new jobs in even when these induce higher costs.	3.30	1.13	
	3.38	1.10	

Note. Climate change belief was transformed to a binary variable. Ratings for all other listed items were made on 5-point Likert scales.

Scores for the sub dimensions of social norms, moral obligation and policy acceptance were calculated using the mean scores of the respective construct items which were discussed

in the Measures section above. Items 36, 37, 38 and 39 were calculated for social norms ($M=3.37$; $SD=.77$), items 53 and 54 for moral obligation ($M=3.78$; $SD=.91$) and items 64 and 66 for policy acceptance ($M=3.30$, $SD=1.13$). Collective efficacy resulted in $M=3.69$, $SD=.99$ and environmental identity in $M=3.75$, $SD=1.00$. Satisfaction with the current public transportation system (PTS) resulted in $M=3.13$, $SD=1.17$, perception of the environmentally friendliness of the PTS in their area resulted in $M=2.74$, $SD=.98$ and the average weekly use of PTS showed $M=1.90$, $SD=1.26$. The results for climate change beliefs show that 55% of the participants believe that currently rising temperatures worldwide are mostly caused by human activities.

3.2 Empirical Analysis

Table 3 shows a frequency table of the outcomes of the two referendum votes. Chi^2 tests were calculated as well as *Odds ratios*, which were interpreted as small (≤ 1.5), medium (>1.5 and <5) and large (≥ 5) (Chen et al., 2010). In total, a slight majority in both referendums voted in favour of either of the referendums. A small yet significant increase of willingness to accept (WTA) was observed for the per-trip tariff (53.89% in-favour votes) compared to a monthly tax (52.89%) as financing method ($Chi^2=4.11$, $p=.04$, $OR=1.04$).

Table 3

Voting behaviour for in-favour votes of referendums in total^a

Referendum Type	Willingness to Accept		
	<i>n</i> (%)		Total
	“Yes”	“No”	
Monthly Tax	9529 (52.83%)	8508 (47.17%)	18037 (100%)
Per-Trip Tariff	9721 (53.89%)	8316 (46.11%)	18037 (100%)

Note. ^a $N=18,037$; $Chi^2=4.11$; $p=.04$; *Odds Ratio*=1.04.

Table 4 illustrates two further frequency tables, separated into the different conditions for the Price increase (zero, above zero) for a more differentiated view. In the condition of paying no higher costs for the upgrades, a vast majority of the respondents in this condition would vote in favour of either referendum. Notably, if only the condition of the price being above zero was considered, neither the referendum for raised monthly taxes nor the referendum for higher per-trip tariffs received a majority of the votes. Chi^2 tests were again

calculated for both price conditions regarding the type of referendum and the voting behaviour. For the price condition of zero, where the outcome of the referendums is the same, the WTA for monthly taxes was with 90.23% in-favour votes significantly higher than the WTA for per-trip tariffs with 86.08% ($Chi^2=25.01$, $p<.001$, $OR=.67$). Conversely, if the price for financing the upgrades was above zero, the WTA for per-trip tariffs was with 47.37% in-favour votes slightly yet significantly higher than the WTA for monthly taxes with 45.25% ($Chi^2=13.56$, $p<.001$, $OR=1.09$).

Table 4

Voting behaviour for in-favour votes of referendums per price condition

Referendum Type	Willingness to Accept <i>n</i> (%)					
	Zero (Price=0) ^b			Not Zero (Price>0) ^c		
	“Yes”	“No”	Total	“Yes”	“No”	Total
Monthly Tax	2742 (90.23%)	297 (9.77%)	3039 (100%)	6787 (45.25%)	8211 (54.75%)	14998 (100%)
Per-Trip Tariff	2616 (86.08%)	423 (13.92%)	3039 (100%)	7105 (47.37%)	7893 (52.63%)	14998 (100%)

Note. ^b $n=3,039$; $Chi^2=25.01$; $p<.001$; Odds Ratio=.67.

^c $n=14,998$; $Chi^2=13.56$; $p<.001$; Odds Ratio=1.09.

3.2.1 Between-subjects analysis

Two logistic regressions were performed to test the effects of tax framing on analysing the willingness to accept (WTA) either referendum compared to both price conditions (zero, above zero). This was done to compare how the sheer implementation of a higher price (Model 2) could influence the willingness to accept taxes in the referendums compared to no price increase (Model 1). The dependent variable for both Models was WTA for either referendum, taking together the voting outcomes of both referendums from every participant. Comparing the two logistic regression models followed a between-subjects design, as participants were exposed to either one condition (price condition=zero) or another condition (price condition>zero). The results are shown in Table 5 and both models were statistically significant, with χ^2 (19, $N=5994$)=544.07, $p<.001$ for Model 1 and with χ^2 (19, $N=14767$)=3511.23, $p<.001$ for Model 2. Model 1 explained 11.1% (Tjur's R^2) of the variance in WTA for either referendum, while Model 2 explained 11.3% (Tjur's R^2) of the variance in WTA for either referendum. Tax framing was a significant predictor in both

models: In Model 1, when the Price increase was zero, participants were 1.58 times more likely to vote in favour of the referendum when the word “tax” was included in the referendum ($B=.46$, $SE=.09$, $OR=1.58$, 95% CI [1.33, 1.87], $p<.001$), indicating a moderate tax framing effect and a preference for the monthly tax referendum in Model 1. Conversely in Model 2, when the Price increase was above zero, participants were significantly less likely to vote in favour of a referendum that included the word tax ($B=-.11$, $SE=.03$, $OR=.90$, 95% CI [.86, .94], $p<.001$), indicating a preference for the per-trip tariff referendum. As tax framing was able to predict a higher WTA for Model 1, hypothesis H1a can already be confirmed, and as tax framing was also able to predict a lower WTA for Model 2, the findings also suggest a tax framing there, while keeping in mind that the outcomes of the referendums in Model 2 are not equal. Contrast effects related to the order of which referendum was seen first could not be observed in Model 1 but could be observed in Model 2: When the Price increase was above zero, participants were slightly, yet significantly, more likely to vote in favour of either referendum when they saw the monthly tax referendum first ($B=.07$, $SE=.03$, $OR=1.08$, 95% CI [1.03, 1.13], $p<.01$), indicating partial support for yet not fully confirming H 1b. In regard to the control variables of the second hypothesis, a few variables were significant predictors in both models: Participants who had a university or college degree were more likely to vote in favour of either referendum, both in Model 1 ($B=.61$, $SE=.12$, $OR=1.83$, 95% CI [1.43, 2.34], $p<.001$) and Model 2 ($B=.09$, $SE=.04$, $OR=1.09$, 95% CI [1.01, 1.19], $p=.035$). Additionally, high scores in both moral obligation (Model 1: $B=.41$, $SE=.06$, $OR=1.50$, 95% CI [1.33, 1.70], $p<.001$; Model 2: $OR=1.17$, 95% CI [1.12, 1.21], $p<.001$) and policy acceptance (Model 1: $B=.42$, $SE=.05$, $OR=1.41$, 95% CI [1.28, 1.55], $p<.001$; Model 2: $B=.60$, $SE=.02$, $OR=1.84$, 95% CI [1.78, 1.89], $p<.001$) predicted a higher WTA for either referendum. The Living Area of participants showed opposing effects on both Models: Participants who lived in urban areas had a slightly and significantly higher WTA for either referendum in Model 1 ($B=.20$, $SE=.09$, $OR=1.22$, 95% CI [1.02, 1.46], $p=.03$), yet a significantly lower WTA in Model 2 ($B=-.07$, $SE=.03$, $OR=.93$, 95% CI [.88, .98], $p=.012$). Some predictors were only significant for Model 1: Male participants 1 ($B=.21$, $SE=.09$, $OR=1.24$, 95% CI [1.04, 1.47], $p=.014$), participants with a professional training degree 1 ($B=.60$, $SE=.14$, $OR=1.81$, 95% CI [1.38, 2.39], $p<.001$), and participants who believed in anthropogenic climate change 1 ($B=-.40$, $SE=.09$, $OR=1.49$, 95% CI [1.25, 1.78], $p<.001$), each were moderately more likely to vote in favour of either referendum. Other predictors were only significant for Model 2: Participants that states their educational degree to be “other” ($B=.25$, $SE=.03$, $OR=1.28$, 95% CI [1.06, 1.55], $p<.01$) and who were more satisfied with the current PTS ($OR=1.08$, 95% CI [1.05, 1.11]) each were

slightly more likely to vote in favour of either referendum, yet the higher the local PTS was perceived to be environmentally friendly, the lower was the WTA for either referendum ($B=-.09$, $SE=.02$, $OR=.92$, 95% CI [.89, .95], $p<.001$).

Table 5

Logistic Regression Analysis of WTA for both Price Conditions (Price=0 and Price>0)

<i>Predictors</i>	Model 1: WTA (Price=0)				Model 2: WTA (Price>0)			
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>
(Intercept)	-1.92 (.28)	0.14	.08 – .25	<.001	-3.0 (.09)	.05	.04 – .06	<.001
Framing: Tax Vote	.46 (.09)	1.58	1.33 – 1.87	<.001	-.11 (.03)	.90	.86 – .94	<.001
Order: Tax Vote first	.03 (.09)	1.03	.87 – 1.21	.761	.07 (.03)	1.08	1.03 – 1.13	.003
Age	-.05 (.04)	0.95	.88 – 1.03	.222	.06 (.04)	1.01	.99 – 1.03	.538
Gender: Male	.21 (.09)	1.24	1.04 – 1.47	.014	.02 (.03)	1.02	.97 – 1.07	.403
Education: Elementary/Secondary	.12 (.13)	1.13	.87 – 1.47	.370	-.06 (.05)	.94	.86 – 1.03	.208
Education: Professional Training	.60 (.14)	1.81	1.38 – 2.39	<.001	.02 (.05)	1.02	.93 – 1.12	.636
Education: University/College	.61 (.12)	1.83	1.43 – 2.34	<.001	.09 (.04)	1.09	1.01 – 1.19	.035
Education: Other	-.07 (.27)	0.93	.56 – 1.61	.802	.25 (.03)	1.28	1.06 – 1.55	.009
Living Area: Urban	.20 (.09)	1.22	1.02 – 1.46	.030	-.07 (.03)	.93	.88 – .98	.012
Income	.00 (.00)	1.00	1.00 – 1.00	.481	.00 (.00)	1.00	1.00 – 1.00	<.001
PTS Satisfaction	.07 (.04)	1.07	.99 – 1.17	.103	.07 (.01)	1.08	1.05 – 1.11	<.001
PTS Usage	.06 (.04)	1.06	.99 – 1.14	.122	.01 (.01)	1.01	.99 – 1.03	.489
PTS: Environmental	-.08 (.05)	0.93	.84 – 1.02	.131	-.09 (.02)	.92	.89 – .95	<.001
Climate Change Beliefs	-.40 (.09)	1.49	1.25 – 1.78	<.001	-.03 (.03)	.97	.92 – 1.02	.226
Social Norms	.07 (.07)	1.08	.93 – 1.24	.311	.02 (.02)	1.02	.98 – 1.06	.430

Collective Efficacy	.08 (.05)	1.08	.98 – 1.19	.138	.03 (.02)	1.03	1.00 – 1.06	.051
Moral Obligation	.41 (.06)	1.50	1.33 – 1.70	<.001	.16 (.02)	1.17	1.12 – 1.21	<.001
Environmental Identity	-.01 (.05)	0.99	.89 – 1.10	.823	.00 (.02)	1.00	.97 – 1.04	.823
Policy Acceptance	.42 (.05)	1.41	1.28 – 1.55	<.001	.60 (.02)	1.84	1.78 – 1.89	<.001
<hr/>								
Model χ^2 (df)	544.07 (19), p <.001			3511.23 (19), p <.001				
Pseudo R^2 (Tjur) =	.111			.113				
N (Observations)=	2997 (5994)			14767 (29534)				

Note. The dependent variable in this analysis is voter support (willingness to accept) coded so that 0=did not vote in favour (not willing to pay) and 1=voted in favour (willing to pay). Climate Change Belief was coded so that 1=believed in causes of climate change to be mostly of human activity. WTA=Willingness to accept; OR=Odds ratios; CI=Confidence intervals.

To summarise, the results for the logistic regressions in Table 5 confirmed hypothesis H1a (tax framing) and indicated partial support for the hypotheses H1b (contrast effects) and for H2 for a part of the controlling variables. However, hypotheses H1b and H2 cannot be fully confirmed, as the regression models compared imply different outcomes for the referendums instead of the same. Nevertheless, comparing the two price conditions with each other could confirm that when there is no price increase, a higher support for monthly taxes as financing option can be predicted, and that with a price increase above zero the support can be predicted to alter towards per-trip tariffs.

3.2.2 Within-subjects regression (price=0)

In order to test the hypotheses with the necessary condition that the outcomes of both monthly tax and per-trip tariff referendums would be the same, two further logistic regressions were performed. This time it was analysed which predictors influenced the decision of participants to vote for the monthly tax or the per-trip tariff referendum when both referendums had equal outcomes. Two regression models were calculated for the price condition of zero and analysing predictive effects for the WTA for each of the two referendums, following a within-subject design as now the voting outcomes from participants for each referendum they voted for were compared. Thus, the dependent variables were WTA

for the monthly tax referendum in Model A and WTA for the per-trip referendum in Model B. The results can be viewed in Table 6. Appendix B shows the same logistic regression models with each country included as predictor. Additionally, both models were statistically significant, with $\chi^2(19, N=2997)=722.77, p<.001$ for Model A and with $\chi^2(19, N=2997)=706.07, p<.001$ for Model B. Model A explained 37.2% (Tjur's R^2) of the variance in WTA for the monthly tax referendum, while Model B explained 33.5% (Tjur's R^2) of the variance in WTA for the per-trip tariff referendum. The order of the referendums now played a role: Contrast effects were observed to be significant predictors of moderate effect size for both models, as participants who saw the per-trip tariff referendum first were 1.76 times more likely to vote for the monthly tax referendum ($B=.57, SE=.16, OR=1.76, 95\% CI [1.29, 2.42], p<.001$), however those same participants who saw the per-trip tariff referendum first were less likely to vote for the per-trip tariff referendum ($B=-.47, SE=.13, OR=.63, 95\% CI [.48, .81], p<.001$), confirming hypothesis H1b. For the controlling variables, higher scores in moral obligation predicted a higher WTA for both the monthly tax referendum ($B=.35, SE=.12, OR=1.41, 95\% CI [1.13, 1.78], p<.01$) and the per-trip tariff referendum ($B=.20, SE=.10, OR=1.22, 95\% CI [1.01, 1.49], p=0.044$). Furthermore, participants who had a professional training degree ($B=.62, SE=.26, OR=1.86, 95\% CI [1.11, 3.12], p=.018$) and participants who believed in anthropogenic climate change ($B=.58, SE=.17, OR=1.78, 95\% CI [1.28, 2.48], p<.001$) were each significantly more likely to vote in favour of the tax referendum. A higher WTA for per-trip tariffs by higher scores in policy acceptance ($B=.31, SE=.08, OR=1.36, 95\% CI [1.17, 1.58], p<.001$) and people who had a university or college degree ($B=.42, SE=.20, OR=1.51, 95\% CI [1.02, 2.22], p=.036$), however a higher age predicted a significantly lower WTA for per-trip tariffs ($B=-.12, SE=.06, OR=.89, 95\% CI [.79, .99], p=.038$).

Table 6

Logistic Regression Analysis of WTA in Tax Referendum (A) and Trip Referendum (B) for Price Condition of no cost increase (Price=0)

<i>Predictors</i>	Model A				Model B			
	WTA: Tax				WTA: Trip			
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>
(Intercept)	-3.41 (.52)	.03	.01 – .09	<.001	-2.39 (.43)	.04	.01 – .09	<.001

Order: Trip Vote first	.57 (.16)	1.76	1.29 – 2.42	<.001	-.47 (.13)	.63	.48 – .81	<.001
Age	.08 (.07)	1.09	.95 – 1.25	.246	-.12 (.06)	.89	.79 – .99	.038
Gender: Male	.19 (.16)	1.22	.89 – 1.67	.216	.14 (.13)	1.15	.89 – 1.49	.288
Education: Elementary/Sec ondary	.25 (.25)	1.29	.79 – 2.11	.309	-.09 (.22)	.92	.60 – 1.40	.689
Education: Professional Training	.62 (.26)	1.86	1.11 – 3.12	.018	.27 (.22)	1.31	.85 – 2.00	.217
Education: University/Coll ege	.38 (.23)	1.46	.93 – 2.28	.095	.42 (.20)	1.51	1.02 – 2.22	.036
Education: Other	.39 (.52)	1.47	.55 – 4.16	.456	-.21 (.45)	.81	.35 – 2.03	.643
Living Area: Urban	.06 (.17)	1.06	.76 – 1.48	.740	.22 (.14)	1.24	.94 – 1.64	.127
Income	.00 (.00)	1.00	1.00 – 1.00	.068	.00 (.00)	1.00	1.00 – 1.00	.158
PTS Satisfaction	.11 (.08)	1.12	.96 – 1.31	.158	.00 (.07)	1.00	.88 – 1.13	.969
PTS Usage	.00 (.07)	1.00	.87 – 1.14	.964	.07 (.06)	1.07	.96 – 1.20	.216
PTS: Environmental	-.03 (.09)	.97	.81 – 1.17	.770	-.07 (.08)	.93	.80 – 1.09	.383
Climate Change Beliefs	.58 (.17)	1.78	1.28 – 2.48	.001	.02 (.14)	1.02	.78 – 1.34	.890
Social Norms	.06 (.13)	1.06	.82 – 1.37	.649	.05 (.11)	1.05	.85 – 1.29	.650
Collective Efficacy	.06 (.10)	1.06	.88 – 1.28	.511	.01 (.08)	1.01	.86 – 1.18	.887
Moral Obligation	.35 (.12)	1.41	1.13 – 1.78	.003	.20 (.10)	1.22	1.01 – 1.49	.044

Environmental Identity	.06 (.10)	1.06	.88 – 1.28	.539	-.06 (.08)	.94	.80 – 1.11	.461
Policy Acceptance	.14 (.09)	1.15	.97 – 1.37	.115	.31 (.08)	1.36	1.17 – 1.58	<.001

Model χ^2 (df)	722.77 (19), $p < .001$	706.07 (19), $p < .001$
Pseudo R^2 (Tjur)=	.372	.335
N=	2997	2997

Note. The dependent variable in this analysis is voter support (willingness to accept) coded so that 0=did not vote in favour (not willing to pay) and 1=voted in favour (willing to pay). Climate change belief was coded so that 1=believed in causes of climate change to be mostly of human activity. WTA=Willingness to accept; OR=Odds ratios; CI=Confidence intervals.

3.3 Explorative Analysis: Price Sensitivity for the Referendums

In the explorative analysis, a form of Price Elasticity analysis was performed for both referendums each to identify the price sensitivity at which participants became less likely to vote in favour. For this, two logistic regression analyses were performed, one with WTA for the monthly tax referendum as dependent variable and the Price increase for monthly taxes as predictor (Model P1) and the other with WTA for the per-trip tariff referendum as dependent variable and the Price increase for per-trip tariffs as predictor (Model P2). Both models were statistically significant, with χ^2 (1, N=18037)=3338.36, $p < .001$ for Model P1 and explaining 17.7% (Tjur's R^2) of the variance in WTA for the monthly tax referendum, and with χ^2 (1, N=18037)=1285.01, $p < .001$ for Model P1, explaining 7% (Tjur's R^2) of the variance in WTA for the per-trip tariff referendum. Table 7 shows the results of the regression models.

Table 7

Logistic Regression Analysis of WTA in Tax Referendum (P1) with Price increase (≥ 0) per tax as predictor and Trip Referendum (P2) with Price increase (≥ 0) per trip as predictor.

<i>Predictors</i>	Model P1 WTA: Tax				Model P2 WTA: Trip			
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>
(Intercept)	1.11 (.02)	3.04	2.90 – 3.19	<.001	.65 (.02)	1.92	1.84 – 2.00	<.001
Price: Increased Tax costs	-.13 (.00)	.88	.87 – .88	<.001				
Price: Increased Trip costs					-.30 (.01)	.74	.73 – .76	<.001
Model χ^2 (df)	3338.36 (1), $p < .001$				1285.01 (1), $p < .001$			
Pseudo R^2 (Tjur)=	.177				.070			
<i>N</i> =	18037				18037			

Note. The dependent variable in this analysis is voter support (willingness to accept) coded so that 0=did not vote in favour (not willing to pay) and 1=voted in favour (willing to pay).

WTA=Willingness to accept; OR=Odds ratios; CI=Confidence intervals

As already reported before by Pons-Seres de Brauwer et al. (2019), an increase in price for taxes significantly lowers the WTA for monthly taxes ($B=-.13$, $SE=.00$, $OR=.88$, 95% CI [.87, .88], $p<.001$), and an increase in price per trip significantly lowers the WTA for per-trip tariffs as well ($B=-.30$, $SE=.01$, $OR=.74$, 95% CI [.73, .76], $p<.001$). Visual representations were made for the voting behaviour predicted by price for the monthly tax referendum (Figure 2) and the per-trip tariff referendum (Figure 3).

Figure 2

Voting behaviour predicted by Price: Probability to vote for tax referendum compared to price increase per tax (in €).

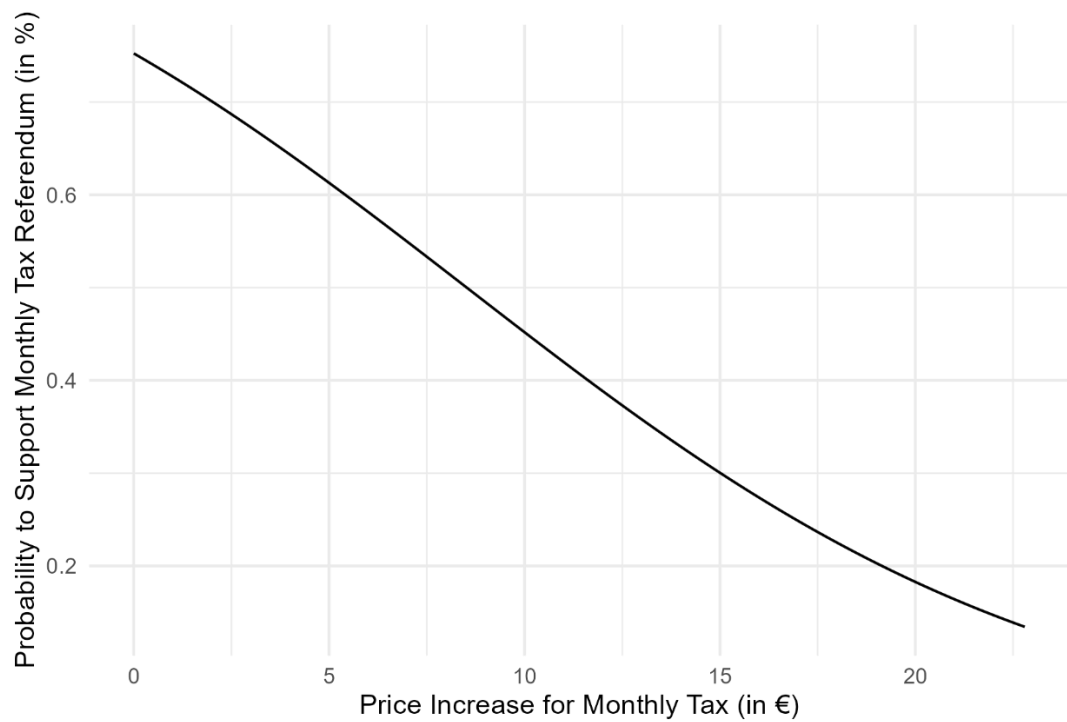
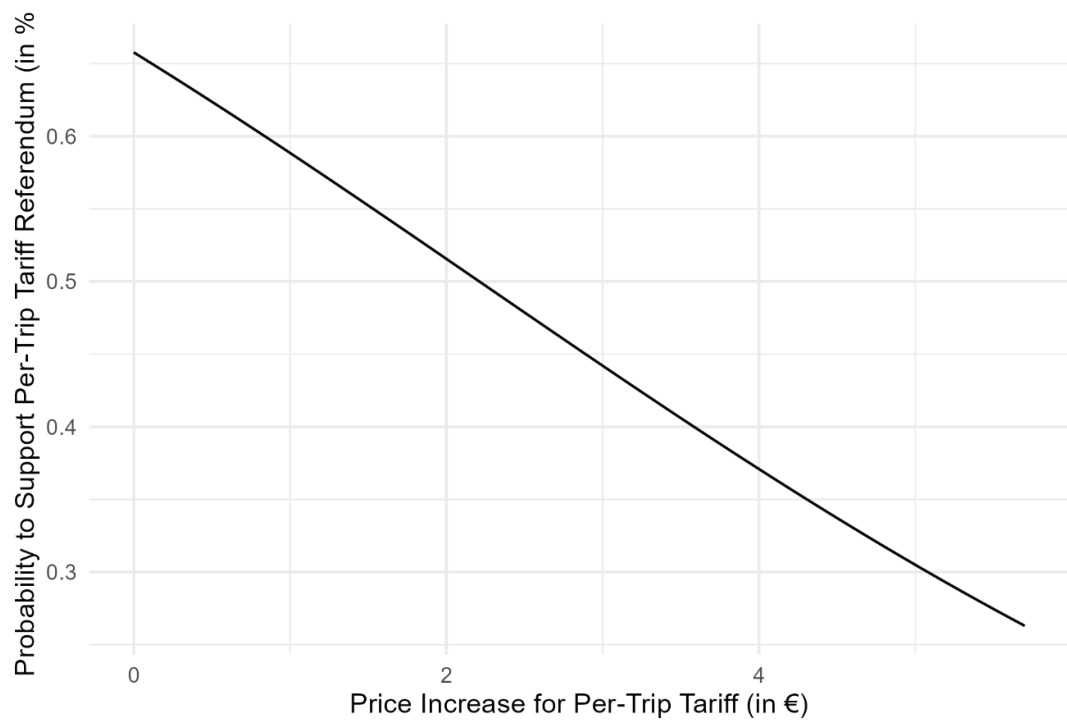


Figure 3

Voting behaviour predicted by Price: Probability to vote for trip referendum compared to price increase per trip (in €).



In a second step of the sensitivity analysis, the specific price point was identified at which participants' willingness to accept (WTA) in each referendum fell below 50%. For this, the estimated probability of participants voting in favor of each referendum was calculated based on the logistic regressions and then the price points were calculated at which the probability of voting in favour would fall below 50% in each referendum. For the Monthly Tax Referendum, the probability of participants voting in favor of the referendum decreases below 50% when the price increase reaches approximately 8.6€, indicating that, on average, when the price increase exceeds this amount, a majority to support the monthly tax referendum would not be reached. Similarly, for the Per-Trip Tariff Referendum, the analysis identified a price sensitivity of approximately 2.3€ at which the probability of voting in favor falls below 50%, indicating that when the cost exceeds this level, a majority to support the trip tariff would not be reached.

4. Discussion

The aim of this study was to analyse the influence of tax aversion on the voting behaviour for energy policies and how framing taxes influences the willingness to accept environmental taxes in referendums. Secondary data was analysed, in which participants from 31 European countries were offered referendums to vote in favour or against an increased monthly tax or per-trip tariff to finance an environmentally friendly upgrade of their local public transportation system. The results show that tax framing and contrast effects appear to play a crucial role in the voting behaviour for environmental tax policies. Environmental taxes represent cost-effective ways to mitigate the consequences of anthropogenic climate change (citation). Nevertheless, the application of environmental taxes has so far been limited as the public has often demonstrated a resistance towards environmental taxes (Carattini et al., 2018), resulting in governments not implementing or revoking them, or designing them in ineffective ways to retain public acceptability. Mitigating the consequences of climate change can be described as a common goods social dilemma (Milinski et al., 2008), while the acceptability of policies poses a public goods social dilemma (Schuitema & Bergstad, 2018). Generally, taxes are often being viewed as financial loss or even as burden and punishment (Kirchler, 1998; Kasper et al., 2018). Tax aversion can lead people to take even higher costs to avoid paying a tax (Sussman & Olivola, 2011), and only labelling environmental policies with the term 'tax' can already negatively influence the acceptability of such policies (Brannlund et al, 2010; Kallbekken et al., 2011). However, researchers have argued that

earmarking, or specifying how tax revenue will be used, could mitigate the tax aversion (Baranzini & Carattini, 2017), while other researchers could not replicate effects of tax aversion (Olsen et al., 2019) or of tax framing in environmental policies (Villar & Krosnick, 2009; Hammerle et al., 2021). The findings of this thesis pose as an addition to the existing literature by examining tax framing effects with the addition of contrast effects on referendums for environmental policies with clearly earmarked revenues.

The first hypothesis, H1a, stated the influence of tax framing on the referendums if the outcomes of both were the same. This hypothesis was confirmed for the condition that the price increase for both referendums was zero. Thus, people are more likely to accept a non increase of tax prices rather than a non increase of prices per trip, even though both referendums would lead to the same outcome. Notably, this preference for the monthly tax referendum reversed when the price increase was above zero, as participants then favoured the per-trip tariff referendum. Even though in that condition it could not be guaranteed that both referendums would lead to the same revenue and therefore the same outcome, it is a compelling observation that once money would come into play, the participants more likely avoided paying a higher tax and would rather have the users of public transportation finance an environmentally friendly upgrade that would benefit everyone. It does also raise the question whether this observation could be replicated in a situation where both referendums would lead to the same outcome where the price increase would be above zero. In regards to H1b, it was hypothesised that due to the framing effects in H1a, contrast effects would become active and the order of the referendum would therefore influence the choice behaviour towards the referendums. The design of the survey made it possible to test for contrast effects as the participants saw the two referendums in a randomised order. This hypothesis was confirmed as well, as people who saw the trip referendum first were more likely to vote in favour of the tax referendum, when the price increase is zero. Again, a reversion of the contrast effect was observed once the price increase was above zero, even though then the referendums did not have equal outcomes.

The findings of Hypothesis 1a and 1b point to a social dilemma. Even though a majority of participants voted in favour of both referendums in total (with a decreasing acceptance along higher price increases), the referendum of monthly taxes was only preferred above the per-trip tariff when the monthly taxes had no or a very low price increase. From the perspective of a public good dilemma, it can be argued that when opting for the referendum that offers an increased price per trip, the people who are not using the local public

transportation system may enjoy the possibility of ‘free-riding’, as they can enjoy the benefits of fewer CO₂ emissions and less air pollution cause from public transport without contributing to that cause. The findings of this thesis indicate that tax framing effects would promote such collective irrational behaviour in a social dilemma, given that the outcome of both referendums would be equal. In the theoretical section of this thesis, the phenomenon of fiscal illusion (Sausgruber & Tyran, 2005) was described and it was argued that both referendums, in fact, pose as tax schedules (the monthly tax referendum being a direct tax and the per-trip tariff an indirect tax). The results and the design of the survey cannot definitely determine whether fiscal illusion played a role in the voting behaviour of the participants. Within this study, it could not be ruled out whether the participants interpreted both referendums as a form of taxation, and preferred indirect taxation, or whether they did not interpret them and were generally tax averse, or whether they understood both referendums to present a tax schedule and preferred indirect taxation and the salience of the tax framing facilitated their decision. It can however be noted, in other words, that even though indirect taxes are generally perceived as more burdening than direct taxes (Watrín & Ullmann, 2008), the results indicate that voters would rather favour such indirect taxes as long as they are not framed as such, or, as long as they are not aware of a raised per-trip tariff being an indirect tax. Despite the notion that fiscal illusion might have had an influence on the results, this does not diminish the effects for tax framing that was found, especially since Sausgruber & Tyran (2005) argue tax framing to be a cause of fiscal illusion. To conclude, the results of this thesis point to the argument that voters may be biased against policies imposing direct taxes and that voters would vote against them even though they could help overcoming social dilemmas, and that they would even support policies that might create social dilemmas, e.g. creating a higher tax burden for public transport users (Bó et al., 2018).

The second hypothesis could only be partially confirmed. It predicted controlling effects both of demographic variables and factors that would promote pro-environmental behaviour, which were hypothesised to influence the choice behaviour as well. The results might indicate that higher educated people who scored high on policy acceptance and moral obligation were more likely to vote in favour of either of the referendums. As the items for policy acceptance asked participants whether they would accept environmentally friendly energy policies, it stands to reason that similar environmental policies would also be accepted by participants with high scores on those items, especially since Policy Acceptance can be described as attitudes towards certain kinds of policies (Schuitema & Bergstad, 2019). Similarly, one item of moral obligation inquired about the personal obligation to support

energy policies. However, people scoring high on moral obligation are also aware of the consequences of climate change and feel obliged to contribute to their community, to future generations or the planet, and moral obligation as a predictor of pro-environmental behaviour aligns with previous findings (Bamberg & Möser, 2007; Klöckner, 2013; Carrus et al., 2019). An intriguing remark can also be made on the topic of voluntary tax compliance, as committed taxpayers too feel a moral obligation to contribute to their community (Wahl et al., 2010), albeit their means are through diligently paying taxes instead of pro-environmental action. Nevertheless, it would be interesting to further analyse the interactions between trust in government, moral obligation (e.g. towards the community and the planet) and environmental tax acceptance.

Furthermore, living in urban areas predicted a higher WTA on both referendums with no price increase, however living in urban areas predicted a lower WTA on both referendums once there was a price increase. For the case of the price increase being above zero, a high satisfaction with the local public transportation system predicted a higher WTA on both referendums, while the perception of a high environmental friendliness of the current public transportation system predicted a lower WTA on both referendums. These findings can be viewed as in line with the Greed-Efficiency-Fairness (GEF) hypothesis (Wilke, 1991). First, as people in rural areas often have to rely on private cars and face mobility problems (Mounce et al., 2020), an environmental upgrade might also mean a more efficient and accessible public transportation system for them, while people living in urban areas might already be satisfied with how the public transportation system works, even though it cannot be examined how participants understood or imagined such upgrades to look like. Second, another constraint for the voting behaviour in the referendums might be how satisfied voters are with the current state of the public transportation system and how much they perceive it as environmentally friendly. Depending on these attitudes towards the current system, voters might find it more or less efficient to contribute to a more environmentally friendly public transport system. That is, if a voter would be very dissatisfied with the current system for whatever reason or find it already to be very environmentally friendly, according to the GEF hypothesis it would be unlikely for that person to vote in favour of increased costs a referendum asking to contribute more money into this very system, as resources would not be efficiently used from this perspective.

The explorative results displayed the price sensitivity for each referendum. Once the monthly tax referendum exceeded a price increase of 8.6€ more to be paid each month, the

referendum would lose the majority of the participating voters. For the per-trip tariff referendum, this threshold was reached when an increase of 2.3€ per trip was exceeded.

4.1 Limitations and Future Research

The exploratory results can only be treated with caution, due to the design of the study, as mentioned throughout the whole analysis, it does not offer a comparability of the referendums regarding its revenues. I.e., it is not possible to determine whether a monthly price increase of 8.6€ would be a higher burden for the general population compared to an increase of 2.3€ per trip, or whether the revenues of one would be higher than the other, as the usage of public transport can differ from one region to the other, to name one reason. Future research should attempt to replicate the findings of this study and add conditions in which the costs of direct taxes and per-trip tariffs should be above zero and still comparable. One way to still keep the outcomes of both direct and indirect schedules the same would be to present the voters with threshold-based policy, which could state that either tax schedule would be capped by a specific amount and once that revenue would be reached, either tax would be repealed again. Moreover, in order to examine whether the phenomenon of fiscal illusion could be confirmed for environmental policies, a question after presenting such referendums could ask whether participants understood both referendums to imply a tax schedule, even though one referendum would not be clearly labelled as such. Furthermore, the theoretical section clarified that one variable, trust in the government or in tax authorities, was not included in the survey of the ECHOES Project (Reichl et al., 2019). Rothstein (2000) came as far as to argue that without the norms of trust, a tragedy of the commons could not be avoided. Thus, trust should be included as an important variable for future research of this kind. As an example, Senwicki (2022) did analyse trust together with risk perception as influences on climate tax acceptance, for which tax framing effects could add further influences to that. Last but not least, it may be questionable whether the design of the referendums were suitable to simulate real-life scenarios, as push and pull factors of policies should be acknowledged (Schuitema & Bergstad, 2018): Taxing public transport can rather pull people away from using it as it would get more expensive. Designing tax policies should keep in mind the behavioural effect it might have on citizens. Just as taxes on tobacco or alcohol try to pull people away from unhealthy behaviour, environmental taxes could do the same to either try to pull people away from environmentally unfriendly behaviour (e.g. aviation tax) or push them towards environmentally friendly behaviour (e.g. lower public transport prices financed by aviation tax). Therefore, other contexts of environmental taxes,

such as aviation tax, congestion tax, CO₂ taxes, etc. should be used to investigate whether tax framing effects persist through different situations of environmental taxes, also to widen the scope towards researching tax framing effects in different environmental tax concepts.

Creating an economic game that would involve the possible effects of tax framing on solving a social dilemma situation can also further increase the understanding the use of heuristics in the choice behaviour in social dilemmas and simulate real-life scenarios even more.

4.2 Implications and Recommendations for Policymakers

The results of this European survey imply some recommendations for policymakers when designing environmental policies. First and foremost, the effects of tax framing should be kept in mind when designing policies that should have the goal of being cost-effective in mitigating the consequences of climate change. The causes of anthropogenic climate change have been widely researched and recommendations for actions to mitigate the effects of an ongoing climate crisis to humankind are constantly being updated and discussed with policymakers (IPCC, 2023). Yet, scientists and policymakers should bear in mind how collective action also needs to overcome the tragedy of the commons of climate change, in which potentially every state, corporation or even individual is free to overuse the public resource of the Earth's climate (Milinski et al., 2006). Bisaro & Hinkel (2016) argue that understanding how to overcome social dilemmas can be of crucial help for adapting governance. Furthermore, the public good dilemma that the implementation of environmental taxes carries should also be kept in mind, as it negatively affects tax acceptance. It should be clearly mentioned that simply avoiding using the term "taxes" when introducing environmental tax schedules may not be a sustainable solution, as other findings can confirm (Villar & Krosnick, 2009; Hammerle et al., 2021). Instead, the effectiveness and the benefits of environmental policies need to be more clearly communicated (Carattini et al., 2017), and active public debate can help to inform people about the issues of frames and opinions that can be generated, educating citizens to balance strong opinions with open-mindedness (Chong & Druckmann, 2007). Some people seem to interpret carbon taxes as punishment for not behaving environmentally friendly, and indeed, carbon taxes could be framed and communicated like that (Lucas, 2017). Instead, the promotion of environmentally friendly behaviour, appreciating and calling to people's and organisation's moral obligation to act and highlighting the benefits for society as a whole should stay in focus when communicating environmental policies. Keeping push and pull factors in mind: Lowering VAT rates on public transport fares and increasing tax rates on vehicle ownership can increase the market

share for public transport and make it more attractive (Barros, 2021). As McCoy et al. (2017) argue, the regressivity of indirect taxation can be minimised by aiming such taxes at luxury goods, e.g. implementing a trip tax on private jets or other luxury transportation systems and using the revenues to upgrade public transportation systems. As this could have a higher probability to find agreeableness for voters, it could also have a more effective redistribution effect on public goods. Finally, the design of the referendums showed already some strengths in policy design, such as clearly stating where the revenues of environmental taxes would be invested in, and performing a small-scaled approach towards upgrading the local public transport, inviting the voters to think about how such a local upgrade could benefit their familiar community. Therefore, campaigns could target groups and communities on a smaller scale. For example, the EU is increasingly using a participatory approach to implement environmental policies on mostly subnational and local levels (Newig & Koontz, 2014), as it will be more tangible to collaborate on such topics on a local or communal level, and easier to communicate issues, benefits and the effectiveness of environmental taxes. In conclusion, tax framing effects can be limiting for the acceptability of environmental taxes, yet, understanding framing effects can help to successfully implement effective environmental policies.

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Appendix

Appendix A

Sociodemographic characteristics of participants by countries

Characteristic	Austria (n=604)	Belgium (n=604)	Bulgaria (n=605)	Croatia (n=603)	Cyprus (n=251)	Czech Republic (n=602)
	%	%	%	%	%	%
Included cases	3.35	3.35	3.35	3.34	1.39	3.33
Gender						
Female	46.52	50.00	49.92	49.75	49.00	50.00
Male	53.48	50.00	50.08	50.25	51.00	50.00
Other	0.00	0.00	0.00	0.00	0.00	0.00
Age						
18-34	34.77	36.92	35.54	35.66	36.65	35.55
35-44	23.01	22.68	22.48	22.55	22.71	22.43
45-54	19.37	19.54	19.17	19.24	18.73	19.10
55+	22.85	20.86	22.81	22.55	21.91	22.92
Living area ^a						
Urban	54.30	57.95	88.76	67.66	79.68	61.96
Rural	45.70	42.05	11.24	32.34	20.32	38.04
Highest educational level						
Elementary/secondary school	11.92	23.34	11.40	19.73	13.55	2.16
Professional training	37.25	14.57	15.87	15.26	12.35	14.12
A-Levels	31.29	16.23	7.11	24.38	13.94	49.67
University/College	18.05	44.37	64.96	39.80	58.17	34.05
Other	1.49	1.49	0.66	0.83	1.99	0.00
Income ^b						
0€ - 500€	3.64	4.30	96.20	57.38	16.73	20.93
501€ - 1000€	28.97	20.86	3.80	41.46	37.45	74.09
1001€ - 2000€	46.19	49.17	0.00	1.16	44.22	4.98
2001€ - 3000€	20.03	25.33	0.00	0.00	1.59	0.00
> 3000€	1.16	0.33	0.00	0.00	0.00	0.00

Note. ^a Based on number of inhabitants of the living area, with urban describing a town/city with more than 10,000 inhabitants, and rural describing a village/small town with <10,000 inhabitants. ^b Reflects on the total net income per equivalised household member in €/month.

Characteristic	Denmark (n=604)	Estonia (n=605)	Finland (n=604)	France (n=604)	Germany (n=603)	Greece (n=604)
	%	%	%	%	%	%
Included cases	3.35	3.35	3.35	3.35	3.34	3.35
Gender						
Female	49.17	45.12	49.34	49.01	50.75	49.83
Male	50.83	54.88	50.00	50.99	49.25	50.17
Other	0.00	0.00	0.66	0.00	0.00	0.00
Age						
18-34	22.35	47.27	35.26	35.26	34.83	35.26
35-44	21.85	16.03	22.52	22.52	22.89	23.68
45-54	20.70	16.53	19.21	19.21	19.40	19.54
55+	35.10	20.17	23.01	23.01	22.89	21.52
Living area ^a						
Urban	68.05	71.07	82.95	56.95	69.98	87.42
Rural	31.95	28.93	17.05	43.05	30.02	12.58
Highest educational level						
Elementary/secondary school	20.86	17.36	4.97	2.98	6.80	9.44
Professional training	32.62	15.54	22.68	18.05	39.14	6.79
A-Levels	22.35	13.72	16.39	20.03	18.24	19.21
University/College	22.52	49.75	52.65	57.78	35.49	60.60
Other	1.66	3.64	3.31	1.16	0.33	3.97
Income ^b						
0€ - 500€	0.50	24.63	1.49	2.48	4.48	42.05
501€ - 1000€	7.62	45.45	25.50	15.73	23.22	53.81
1001€ - 2000€	38.91	29.92	38.58	49.83	42.95	4.14
2001€ - 3000€	34.77	0.00	32.78	30.63	27.03	0.00
> 3000€	18.21	0.00	1.66	1.32	2.32	0.00

Characteristic	Hungary (n=600)	Ireland (n=624)	Italy (n=602)	Latvia (n=600)	Lithuania (n=601)	Luxem- bourg (n=605)
	%	%	%	%	%	%
Included cases	3.33	3.46	3.34	3.33	3.33	3.35
Gender						
Female	52.50	50.00	50.17	47.00	44.93	47.11
Male	47.50	50.00	49.83	53.00	55.07	52.89
Other	0.00	0.00	0.00	0.00	0.00	0.00
Age						
18-34	34.50	34.78	35.22	40.83	34.28	24.46
35-44	22.83	22.60	22.59	20.67	22.46	21.16
45-54	19.50	19.87	19.27	18.83	19.97	24.79
55+	23.17	22.76	22.92	19.67	23.29	29.59
Living area ^a						
Urban	62.50	63.62	76.58	68.50	71.38	28.76
Rural	37.50	36.38	23.42	31.50	28.62	71.24
Highest educational level						
Elementary/secondary school	3.83	16.03	6.81	10.00	5.32	10.25
Professional training	15.17	8.97	4.65	15.00	7.49	25.12
A-Levels	43.00	12.50	47.67	12.67	9.98	25.79
University/College	37.00	57.05	39.53	60.33	75.04	36.53
Other	1.00	5.45	1.33	2.00	2.16	2.31
Income ^b						
0€ - 500€	80.67	6.41	17.61	35.67	47.25	0.50
501€ - 1000€	19.33	16.99	27.91	63.00	50.75	3.14
1001€ - 2000€	0.00	41.67	45.35	1.33	2.00	16.69
2001€ - 3000€	0.00	33.81	8.64	0.00	0.00	30.25
> 3000€	0.00	1.12	0.50	0.00	0.00	49.42

Characteristic	Malta (n=263)	Norway (n=603)	Poland (n=602)	Portugal (n=603)	Romania (n=603)	Slovakia (n=603)
	%	%	%	%	%	%
Included cases	1.46	3.34	3.34	3.34	3.34	3.34
Gender						
Female	52.09	50.08	50.50	50.08	49.75	50.08
Male	47.91	49.75	49.50	49.92	50.25	49.92
Other	0.00	0.17	0.00	0.00	0.00	0.00
Age						
18-34	37.26	35.16	34.88	40.96	31.51	35.49
35-44	23.19	22.72	22.76	25.21	23.71	22.55
45-54	17.11	19.24	19.27	21.06	20.23	19.07
55+	22.43	22.89	23.09	12.77	24.54	22.89
Living area ^a						
Urban	53.99	65.34	74.09	81.43	87.56	65.51
Rural	46.01	34.66	25.91	18.57	12.44	34.49
Highest educational level						
Elementary/secondary school	0.00	24.21	0.33	16.75	1.49	1.66
Professional training	0.00	13.76	6.15	14.26	5.47	5.97
A-Levels	17.11	34.16	40.20	13.27	15.26	47.76
University/College	82.51	25.21	52.49	55.22	72.97	44.61
Other	0.38	2.65	0.83	0.50	4.81	0.00
Income ^b						
0€ - 500€	9.51	0.00	48.84	29.19	100.00	45.11
501€ - 1000€	33.08	3.15	49.67	44.44	0.00	52.74
1001€ - 2000€	55.51	24.38	1.50	25.54	0.00	2.16
2001€ - 3000€	1.90	31.34	0.00	0.83	0.00	0.00
> 3000€	0.00	41.13	0.00	0.00	0.00	0.00

Characteristic	Slovenia (n=606)	Spain (n=600)	Sweden (n=603)	Switzerland (n=605)	The Netherlands (n=604)
	%	%	%	%	%
Included cases	3.36	3.33	3.34	3.35	3.35
Gender					
Female	49.83	50.17	50.25	53.72	50.17
Male	50.17	49.83	49.25	46.28	49.83
Other	0.00	0.00	0.50	0.00	0.00
Age					
18-34	35.81	35.17	35.32	22.98	35.43
35-44	22.28	22.50	22.55	21.16	22.52
45-54	19.14	19.33	19.24	24.30	19.21
55+	22.77	23.00	22.89	31.57	22.85
Living area ^a					
Urban	51.98	88.00	74.30	47.44	71.85
Rural	48.02	12.00	25.70	52.56	28.15
Highest educational level					
Elementary/secondary school	17.99	9.67	34.00	6.45	16.06
Professional training	14.69	20.00	15.59	46.78	34.44
A-Levels	16.01	13.00	10.28	15.21	10.10
University/College	48.02	53.17	39.14	28.10	37.91
Other	3.30	4.17	1.00	3.47	1.49
Income ^b					
0€ - 500€	20.30	15.83	3.32	0.00	4.64
501€ - 1000€	58.09	31.67	21.39	2.15	20.86
1001€ - 2000€	21.62	41.33	37.15	23.31	43.21
2001€ - 3000€	0.00	10.83	32.67	26.28	27.81
> 3000€	0.00	0.33	5.47	48.26	3.48

Characteristic	Turkey (<i>n</i> =594)	United Kingdom (<i>n</i> =623)	Total (<i>n</i> =18037)
	%	%	%
Included cases	3.29	3.45	100.00
Gender			
Female	48.48	50.56	49.5
Male	51.52	49.44	50.4
Other	0.00	0.00	.0004
Age			
18-34	37.21	34.67	34.8
35-44	35.19	22.47	22.8
45-54	22.22	19.58	19.8
55+	5.39	23.27	22.7
Living area ^a			
Urban	98.32	74.48	69.5
Rural	1.68	25.52	30.5
Highest educational level			
Elementary/secondary school	6.57	15.25	11.4
Professional training	6.90	8.67	16.9
A-Levels	9.76	18.94	21.7
University/College	74.58	54.74	48.0
Other	2.19	2.41	2.0
Income ^b			
0€ - 500€	68.69	10.59	26.8
501€ - 1000€	29.80	15.41	29.5
1001€ - 2000€	1.52	39.00	24.1
2001€ - 3000€	0.00	21.83	13.3
> 3000€	0.00	13.16	6.3

Note. ^a Based on number of inhabitants of the living area, with urban describing a town/city with more than 10,000 inhabitants, and rural describing a village/small town with <10,000 inhabitants. ^b Reflects on the total net income per equivalised household member in €/month.

Appendix B

Logistic regression analysis of willingness to accept in tax referendum (1) and trip referendum (2) under the condition of price=0 including countries as predictors.

<i>Predictors</i>	WTA: Tax				WTA: Trip			
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>
(Intercept)	-2.37 (.72)	.09	.02 – .29	.001	-3.59 (.61)	.03	.01 – .09	<.001
WTA: Trip	3.21 (.16)	24.88	18.19 – 34.34	<.001				
WTA: Tax					3.22 (.16)	24.90	18.21 – 34.37	<.001
Order: Tax Vote first	-.54 (.16)	.58	.43 – .79	.001	.47 (.13)	1.59	1.23 – 2.08	<.001
Age	.05 (.07)	1.06	.92 – 1.21	.435	-.12 (.06)	.88	.79 – .99	.034
Gender: Male	.17 (.16)	1.19	.87 – 1.63	.282	.14 (.13)	1.15	.89 – 1.49	.289
Education: Elementary/Secondary	.21 (.25)	1.24	.76 – 2.02	.393	-.09 (.22)	.92	.60 – 1.40	.686
Education: Professional Training	.57 (.26)	1.76	1.06 – 2.95	.030	.27 (.22)	1.31	.85 – 2.00	.219
Education: University/College	.35 (.23)	1.42	.91 – 2.22	.121	.41 (.20)	1.51	1.02 – 2.22	.036
Education: Other	.31 (.51)	1.37	.51 – 3.85	.545	-.21 (.44)	.81	.35 – 2.02	.640
Living Area: Urban	.08 (.17)	1.08	.78 – 1.51	.636	.22 (.14)	1.24	.94 – 1.64	.125
Income	-.00 (.00)	1.00	1.00 – 1.00	.089	.00 (.00)	1.00	1.00 – 1.00	.156
PTS Satisfaction	.11 (.08)	1.11	.95 – 1.30	.178	-.00 (.07)	1.00	.88 – 1.13	.965
PTS Usage	-.01 (.08)	.99	.87 – 1.13	.854	.07 (.06)	1.07	.96 – 1.20	.217
PTS: Environmental	-.03 (.09)	.97	.81 – 1.17	.785	-.07 (.08)	.93	.80 – 1.09	.380
Social Norms	.06 (.13)	1.07	.82 – 1.38	.626	.05 (.11)	1.05	.85 – 1.29	.649
Collective Efficacy	.08 (.09)	1.08	.90 – 1.30	.399	.01 (.08)	1.01	.87 – 1.18	.881
Moral Obligation	.39 (.12)	1.48	1.18 – 1.86	.001	.20 (.10)	1.23	1.01 – 1.49	.042
Environmental Identity	.08 (.10)	1.08	.90 – 1.31	.399	-.06 (.08)	.94	.80 – 1.11	.464
Policy Acceptance	.16 (.09)	1.18	.99 – 1.40	.068	.31 (.08)	1.36	1.17 – 1.58	<.001
Belgium	-.28 (.84)	.75	.25 – 2.22	.610	.44 (.47)	1.55	.62 – 3.91	.352
Bulgaria	.27 (.85)	1.32	.35 – 5.21	.688	-.15 (.50)	.86	.33 – 2.32	.768
Croatia	1.67 (.81)	5.24	1.16 – 3.08	.042	.11 (.50)	1.11	.42 – 3.03	.832
Cyprus	-.23 (.85)	.79	.17 – 4.96	.785	1.75 (.92)	5.73	1.13 – 46.44	.058

<i>Predictors</i>	WTA: Tax				WTA: Trip			
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>
Czech Republic	.17 (.65)	1.19	.34 – 4.42	.793	.75 (.52)	2.12	.78 – 6.00	.147
Denmark	-.25 (.65)	.78	.25 – 2.40	.661	.13 (.46)	1.14	.46 – 2.82	.781
Estonia	-.84 (.55)	.43	.14 – 1.25	.126	.50 (.49)	1.65	.64 – 4.28	.301
Finland	.54 (.68)	.58	.16 – 2.29	.421	.67 (.57)	1.96	.67 – 6.30	.236
France	-.11 (.57)	.89	.29 – 2.76	.839	.51 (.48)	1.67	.66 – 4.30	.283
Germany	-.24 (.58)	.78	.25 – 2.45	.674	.78 (.49)	2.17	.84 – 5.79	.115
Greece	.36 (.68)	1.43	.39 – 5.66	.597	.23 (.51)	1.25	.47 – 3.44	.654
Hungary	.77 (.88)	2.16	.45 – 16.23	.379	.94 (.61)	2.55	.81 – 9.29	.127
Ireland	-1.03 (.58)	.36	.11 – 1.12	.074	1.23 (.59)	3.43	1.11 – 11.13	.036
Italy	-.34 (.66)	.71	.20 – 2.69	.602	.61 (.57)	1.84	.62 – 5.91	.286
Latvia	-.24 (.59)	.79	.25 – 2.50	.686	.68 (.48)	1.07	.42 – 2.75	.887
Lithuania	.26 (.61)	1.29	.39 – 4.34	.673	-.25 (.47)	.78	.31 – 1.93	.585
Luxembourg	-.49 (.62)	.61	.18 – 2.08	.431	.37 (.51)	1.45	.54 – 3.96	.466
Malta	-.07 (.80)	.93	.21 – 4.90	.930	-.23 (.61)	.80	.25 – 2.80	.711
Norway	-.72 (.57)	.49	.16 – 1.45	.201	.26 (.48)	1.30	.50 – 3.36	.584
Poland	.43 (.61)	1.54	.46 – 5.19	.481	-.16 (.45)	.85	.35 – 2.07	.727
Portugal	14.69 (381.3)	>100	>100 – >100	.969	.37 (.58)	1.45	.49 – 4.91	.522
Romania	.12 (.70)	1.12	.29 – 4.68	.869	.37 (.58)	1.45	.50 – 4.36	.497
Slovakia	-.78 (.61)	.46	.14 – 1.53	.200	.83 (.56)	2.30	.78 – 7.21	.138
Slovenia	.63 (.58)	1.88	.60 – 5.87	.274	-.76 (.42)	.47	.20 – 1.06	.072
Spain	1.43 (1.16)	4.18	.60 – 86.75	.219	1.83 (.85)	6.24	1.45 – 45.83	.031
Sweden	-.44 (.52)	.65	.23 – 1.76	.400	-.33 (.43)	.72	.30 – 1.65	.438
Switzerland	-.54 (.60)	.58	.18 – 1.90	.367	.80 (.50)	2.23	.84 – 6.04	.110
The Netherlands	-.14 (.53)	.24	.08 – .67	.007	.96 (.48)	2.61	1.01 – 6.69	.046
Turkey	-.18 (.66)	.83	.23 – 3.12	.784	.60 (.57)	1.82	.61 – 5.78	.294
United Kingdom	-.92 (.65)	.91	.26 – 3.37	.887	1.01 (.56)	2.73	.94 – 8.65	.074

<i>Predictors</i>	WTA: Tax				WTA: Trip				
	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	<i>B (SE)</i>	<i>OR</i>	<i>CI</i>	<i>p</i>	
Model χ^2 (df)		765.66 (48), p <.001					765.82 (48), p <.001		
Pseudo R^2 (Tjur)=		.390					.349		
N =		2997					2997		

Note. The dependent variable in this analysis is voter support (willingness to accept) coded so that 0=did not vote in favour (not willing to pay) and 1=voted in favour (willing to pay). Climate change belief was coded so that 1=believed in causes of climate change to be mostly of human activity.

WTA=Willingness to accept; OR=Odds ratios; CI=Confidence intervals.