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Abstract

Aim. This thesis analysed the relationship between the use of tax revenues and the social acceptability of a carbon tax. It investigated whether the information about the redistribution of the tax revenues back to the population had an effect on the social acceptability of a carbon tax in Austria.

Method. An experimental between-subject design with two treatment groups was used. The stimulus was varied via the scenario method. The data was collected online. To check the quality of the manipulation of the independent variable, two pre-tests were performed. The sample of the main study consisted of 254 respondents.

Findings. The results revealed the presence of an indirect effect between the redistribution of the tax revenues back to the population via a climate bonus (*Klimabonus*) on the acceptability of a carbon tax. The redistribution of the tax revenues back to the population positively affects the perceived fairness of a carbon tax which in turn affects its acceptability. Moreover, the analysis showed that the perceived effectiveness and the concern about climate change have a significant positive effect on acceptability. What also displayed a positive impact on acceptability is the financial incentive provided by the payment of the climate bonus.

Contribution. The findings of this study provide valuable theoretical as well as practical contributions. From a theoretical perspective, the present thesis contributes to the existing literature on society's perception of carbon taxes. Moreover, this study provides a meaningful practical contribution by pointing out what needs to be considered when designing and communicating a carbon tax to achieve a high level of acceptability among the population.

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List of Abbreviations

ACCEPT	Acceptability
CG	Control group
CONCLIMATE	Concern climate change
CO_2	Carbon dioxide
DV	Dependent variable
EAM	Emissions Assurance Mechanism
ECONMO	Economic motive
EFFECTIVE	Effectiveness
EG1	Experimental group 1
EG2	Experimental group 2
EPA	Environmental Protection Agency
EU ETS	European Union Emissions Trading System
FAIR	Fairness
GCC	Global Climate Coalition
GHG	Greenhouse gas
GSCC	Global social cost of carbon
HLCCP	High-Level Commission on Carbon Prices
IV	Independent variable
KP	Kyoto Protocol
M	Mean
NOx	Nitrogen oxides
OECD	Organisation for Economic Co-operation and Development
PM	Particulate matter
POLITRUST	Political trust
SCC	Social cost of carbon
SD	Standard deviation
SO2	Sulfur dioxide
tCO_2e	Ton CO_2 equivalent

UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
VOCs	Volatile organic compounds
WMG	World Meteorological Organisation

1 Introduction

The progressing climate change and the consequences it entails have been shaping the public debate for quite some time. Extreme weather events like heat waves, storms and droughts have been increasing in the last few decades as temperatures rise (OECD, 2021). This is due to greenhouse gas emissions, which are responsible for the greenhouse effect. As a result, our planet slowly but constantly overheats. In order to mitigate the consequences of climate change, it is necessary to substantially reduce and phase out greenhouse gas (GHG) emissions. This can stabilise the climate and also improve air and water quality (OECD, 2021).

The EU agreed upon the ambitious goals to cut emissions by 55% by 2030 and to become climate-neutral by 2050 (European Commission, n.d.-e). In view of the increase in climate targets set by the EU, and Austria's goal of becoming a climate neutral country by 2040, considering effective climate policy instruments becomes increasingly important. The pricing of CO_2 therefore attracts more and more attention in academic as well as economic and environmental policy discussions (Köppl & Schratzenstaller, 2021). The EU's most important tool for reducing GHG emissions is the EU Emissions Trading System (EU ETS). Companies located in an EU country or in Iceland, Liechtenstein or Norway can buy or receive emission allowances which entitle them to emit a certain amount of CO_2. These allowances can be traded with one another. The limit that is allowed to be emitted is gradually reduced so that overall emissions decrease (European Commission, n.d.-d).

Another effective tool for decarbonisation is a carbon tax, a policy instrument that intends to make GHG emissions more expensive. Thus, consumers have to reconsider their consumption behaviour, as emission-intensive behaviours become more expensive compared to lower-emission behaviours. With the introduction of the tax, GHG emissions could be so expensive that it would be worthwhile for consumers to take the train to commute to their work instead of the car. In a similar way, a carbon tax affects producers, who are encouraged to reduce the emissions from the production processes (Tölgyes, 2021). The sooner a carbon tax is implemented, the better. A timely implementation of a carbon tax is more cost-effective than drastically reducing emissions in the future (Metcalf, 2009). Sweden is a pioneer in this field, having already implemented carbon pricing in the 1990s. Currently, Sweden has the highest carbon tax in the world - EUR 114 /t CO_2 (Mattauch et al., 2020). In Austria, a carbon tax will be levied from 1 July 2022 as part of the *Ökosoziale Steuerreform* (in English: Eco-social Tax Reform). Austrian people shall be taxed 30 euros per tonne, increasing to 55 euros per tonne by

2025 (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2021b) (English translation: Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology).

The effectiveness of a carbon tax on carbon emissions mitigation has been frequently shown in previous empirical studies (Enevoldsen et al., 2009; Broin et al., 2021; Hájek et al., 2019; Runst & Thonipara, 2020; Sairinen, 2012). In the United States, carbon pricing is supported by nearly 4000 signatories, who signed the "Economists' Statement on Carbon Dividends" (Climate Leadership Council, n.d.-b). However, the implementation of carbon taxes is generally viewed critically by society. This is why many countries still hesitate to implement a carbon tax. There are various reasons, why people are against carbon taxes. Firstly, because of a general "Tax Aversion" (Mühlbacher & Zieser, 2018, p. 132), which means that the implementation of new taxes is viewed sceptically in general (Mattauch et al., 2020). Secondly, the positive impacts of carbon taxes occur only medium to long term, whereas the negative effects, such as increasing energy prices, are immediate. This draws the focus to the negative aspects of the tax (Dominioni & Heine, 2019). Moreover, carbon taxes are considered unfair since they affect the poorest groups relatively hard while they leave the rich more or less unaffected (McLaughlin et al., 2019).

Since a broad social consensus is essential for the implementation of a carbon tax (Kettner-Marx et al., 2018), researchers already dealt with the social acceptability in previous scientific literature (Bristow et al., 2010; McLaughlin et al., 2019). The perceived fairness is highlighted in numerous studies as an important factor explaining public support for carbon taxes (Clayton, 2018; Dreyer & Walker, 2013; Hammar & Jagers, 2006; Jagers et al., 2019). Furthermore, the use of the revenue plays a key role. A study by Jagers et al. (2019) shows that compensation measures have a positive effect on the perceived fairness of a carbon tax. Additionally, it is important to transparently communicate to the public about how the tax revenue is used (Mattauch et al., 2020). The results of a national survey conducted in the United States in October 2018 show that by far the most popular use of the carbon tax revenue is returning the money directly to all citizens in the form of dividends (Shultz & Halstead, 2018). Another determinant that crucially influences the social acceptability of carbon taxes is political trust. If citizens do not trust their politicians, they are less likely to trust government statements on carbon pricing policy (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018).

Apart from the investigation of the acceptability and the expected environmental effects of carbon taxes in previous studies, the possible designs of a carbon tax were also examined (Ismer et al., 2019; Ockenfels et al., 2019). Besides, the issue of taxation and social justice is also addressed in academic literature (Liebig & Mau, 2005; Thomas et al., 2019). However, there is a lack of studies, especially in German-speaking countries, which investigate a possible connection between the use of tax revenues, and here in particular, the redistribution of tax revenues back to the citizens, and the social acceptability of a carbon tax. In order to close this gap, it will be investigated to what extent the use of the revenue in the form of a so-called *Klimabonus* (English translation: climate bonus) favours social acceptability. As a theoretical basis for the study serves the "Carbon Dividends Plan", developed by the Climate Leadership Council (2019), which combines the introduction of a gradually rising carbon fee with returning the entire tax revenue to the population.

This Master's thesis aims to address the following research question: How does the information about the redistribution of the tax revenues back to the population affect the social acceptability of the introduction of a carbon tax in Austria? In order to answer the research question, an online experiment is conducted using a scenario-based approach. Besides the theoretical contribution to existing literature on the acceptability of carbon taxation, this study provides valuable information for policymakers and legislators. The findings shed light on what needs to be considered in the design and the communication of a carbon tax to achieve a high level of acceptability among the population.

After an introduction to the topic, basic terminology and concepts are defined, and it is presented where a carbon tax has already been implemented. Furthermore, the amount of the carbon tax and different revenue recycling options are discussed. In addition, an overview of climate protection measures already implemented as well as targets set at the global, European, and Austrian level is provided. This is followed by a discussion of tax acceptability - including the tax attitude in Austria, the reasons for the unpopularity of carbon taxes, possible undesired distributional effects associated with the implementation of a carbon tax, and factors that have an impact on the social acceptability of carbon taxes. The following subchapter is devoted to the emergence of the Climate Leadership Council and the Carbon Dividends Framework, which represents an important basis for the present empirical study. Besides, the benefits associated with a carbon fee that is designed according to this framework are presented. The theoretical background concludes with the development of the hypotheses and the presentation of the conceptual model. Chapter three contains a detailed description of the used methodology. First, the research design is illustrated. In the course of this, the study procedure, the data collection process and the sample are described. Furthermore, the used measures are illustrated. After the presentation of the analysis and the results in chapter four, they are discussed and placed in the context of prior research. At this point, theoretical and practical contributions of this research are also discussed. Finally, a conclusion follows, which includes the limitations of this study and the outlook for further research.

2 Theoretical Background

2.1 Carbon Taxation

2.1.1 Definition

Numerous methods exist that policymakers can use to decrease carbon emissions. Examples are regulations, voluntary agreements, and taxation (Hansford et al., 2004, as cited in McLaughlin et al., 2019). The most frequently used economic instruments are environmental taxes and charges (Clinch and Gooch, 2001, as cited in Dresner, Dunne, et al., 2006). Through taxes and charges users are obliged to pay for their use of environmental resources.

Already at the beginning of the 20th century, the economist Arthur Cecil Pigou addressed the negative consequences of air pollution. His concept is based on the idea to force actors that create harm to pay for the damage they cause. Pigou developed the concept of externalities and their correction through taxes or subsidies (Lambert, 2017). According to Pigou (1920, as cited in Jacobs & de Mooij, 2015, p. 90) "the optimal tax to address a negative environmental externality is equal to the marginal external damage from the polluting activity". Negative externalities are defined as all the costs which an actor causes (for uninvolved people) that are not compensated (Lambert, 2017). Pigous approach is highly relevant these days. If polluting activities got more expensive, actors would have a strong incentive to emit less CO_2 and to switch to environmentally and climate-friendly alternatives (Lambert, 2017). Such an incentive can be created by installing a carbon tax[1], which directly puts a price on carbon by setting an explicit tax rate on GHG emissions or - a more common option is - defining an explicit tax rate on the carbon content of fossil fuels, i.e., a price per ton of carbon dioxide equivalent (tCO_2e). In contrast to an Emissions Trading System the emissions reduction result of a carbon tax is not predetermined, but instead the carbon price is (World Bank, n.d.).

From an economic perspective, a carbon tax is intended to correct a market failure. The fundamental problem is that producers and consumers do not take into account the negative effects on their environment, because the costs of pollution are not reflected in the price paid e.g., per litre of diesel (Tölgyes, 2021). This results in too many GHGs being emitted, which is not only problematic for the environment, but also for society. A carbon tax is intended to counteract this by setting a price for GHG emissions. In concrete terms, a carbon makes GHG

[1] In academic literature there is no strict differentiation between the terms "carbon tax", "CO_2 tax", "carbon pricing" and "carbon fee", which is why the terms are used interchangeably in this paper.

emissions more expensive (Tölgyes, 2021). When the costs of pollution and climate change are internalized, producers and consumers will take these costs into account (Marten & Dender, 2019). This is a way to ensure that consumers reconsider their consumption patterns, as emission-intensive behaviours become more expensive relative to lower-emission behaviours (Tölgyes, 2021). When climate-damaging goods become more expensive, this leads to alternatives becoming economical. In addition, companies will develop new low-emission products and consumers will be able to act in a climate-friendly way because alternatives are cheaper in relative terms compared to climate-damaging goods. In this way, climate protection becomes part of a successful and competitive business model (Mattauch et al., 2020).

Baranzini et al. (2017) argue that the primary reason for carbon pricing is to achieve environmental objectives at a cost that is relatively low compared to other instruments. With a carbon pricing policy for fossil fuels, every price in the economy reflects the carbon content of the respective good or service. Industries that use more fuels with a high carbon intensity will have higher input costs and will thus demand higher output prices from their customers. Those sectors that use these outputs as inputs will also see their output prices rise. Eventually, consumers will also be confronted with increased prices. Since all these actors want to buy the cheaper input, good or service, there will be a switch to options with comparatively low emissions. The outcome of this is that no economic decision would escape the regulative effect of carbon pricing (Baranzini et al., 2017)

When designing a carbon tax, several factors need to be considered. It must be decided who should pay the tax, which goods or services should be taxed and how much a tonne of CO_2 equivalents should cost. It must also be decided when the tax should be levied, how the revenue should be used and how the tax should be realised. The experience of countries which have implemented a carbon tax, as well as studies that implement and model a hypothetical carbon tax, show that the design of a carbon tax system varies from country to country. As a rule, businesses and households are the taxpayers. However, there are also exceptions in which certain types of households and businesses are exempt from a direct tax. The tax base includes fossil fuels in primary as well as in secondary energy sources, but the majority of studies recommend just taxing primary energy to avoid double taxation (Wang et al., 2016).

Moreover, it must be decided whether the carbon tax should be introduced in addition to existing environmental taxes or instead of existing environmental taxes. If the tax is introduced in addition to existing environmental taxes, this would imply that in Austria, for example, carbon tax would have to be paid in addition to mineral oil tax or gas tax. In the case of a replacement, the mineral oil tax would be dropped, and one would have to pay carbon tax instead. The latter variant has the advantage that the emission intensity of the energy sources - i.e., the GHG emissions per quantity consumed of the respective energy sources - is more in focus. Existing taxes, such as the mineral oil tax, do not take the emission intensity into account, since the more GHG-intensive diesel is taxed lower than petrol (Tölgyes, 2021).

The final impact, that a carbon tax has on emissions, depends on the tax base. Based on what exactly is taxed, Baranzini et al. (2000) distinguish between different types of emission taxes:

- When a country imposes a "carbon tax", citizens have to pay a charge "on each fossil fuel, proportional to the quantity of carbon emitted when it is burned" (Baranzini et al., 2000, p. 396).
- With the implementation of a "CO_2 tax", citizens must pay per ton of CO_2 emitted (Baranzini et al., 2000, p. 396). CO_2 is quantitatively the most important GHG, but there exist various other GHGs[2]. In the agricultural sector, for example, not only CO_2 but also nitrous oxide (N_2O) is released during agricultural land use, and methane is emitted through livestock farming (Mattauch et al., 2020).
- There also exists an "energy tax", which depends on how much energy citizens consume (Baranzini et al., 2000, p. 397). It is specified in some common unit, as for instance, in barrels of oil equivalent. Unlike a carbon or CO_2 tax, an energy tax also includes nuclear and renewable energy. As the link between achieving emissions abatement and the tax base is more direct when implementing carbon or CO_2 taxes, these types of taxes are more cost-effective than energy taxes (Baranzini et al., 2000).

However, there are also taxes that have an impact on energy products and emissions, even though that is not their intent. Emissions are already implicitly taxed in all countries. These so-called implicit carbon taxes comprise the sum of all energy taxes, including taxes on the sale of energy, i.e., excise duties (Baranzini et al., 2000).

At this point, it must be noted that the success of a carbon tax depends on the creation of alternatives. Public space must be redesigned, and city and village centres should be revitalized (Tölgyes, 2021). Furthermore, the infrastructure of public transport and cycle paths needs to be improved, as the development of infrastructure plays a key role in shaping people's

[2] For comparability with CO_2, the emissions of different gases can be converted into CO_2e and can then be subject to a uniform price on GHGs (Mattauch et al., 2020).

consumption patterns. Providing the population with access to low-carbon mobility options should go hand in hand with a carbon tax (Feng et al., 2010). Existing subsidies for building refurbishment and replacement of heating systems should also be expanded, especially for lower-income households, so as not to place an additional burden on them (Tölgyes, 2021).

2.1.2 Carbon Pricing in Selected Countries

Carbon taxes have been introduced in numerous countries before. As the map (Figure 1) shows, there are already several countries in Europe that have implemented different systems of carbon pricing. However, the pace has been relatively slow given the challenges posed by the effects of climate change (Schlegelmilch, 2014). The current prices cover only about 20% of global GHG emissions (Ramstein et al., 2019). In most cases, carbon prices are too low, and another problem is that fossil fuels are still heavily subsidised in many countries (Mattauch et al., 2020).

Globally, carbon prices exist in 45 countries and in 28 countries at a sub-national level, including Chile, California, New Zealand, Norway, South Korea, and South Africa. The EU is the most relevant world region of a carbon pricing with set reduction targets. For energy-intensive industry and power generation, these reductions are realised with the EU ETS. However, every member country can decide individually on how to achieve the targets in the economic sectors that are not covered by the EU ETS, i.e., agriculture, transport and buildings (Mattauch et al., 2020).

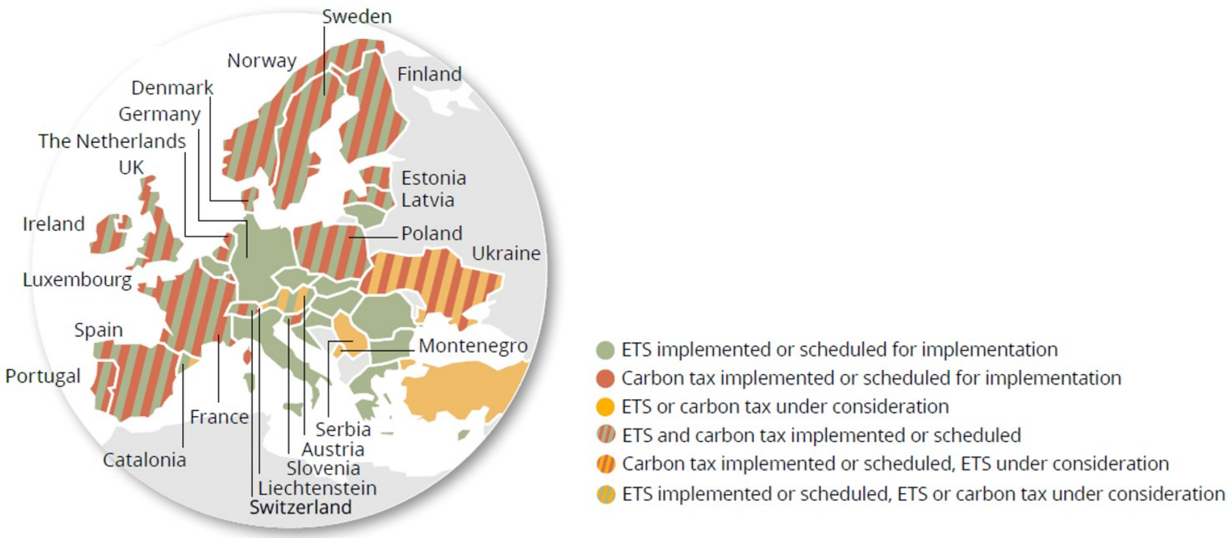

Figure 1: Carbon pricing in Europe (World Bank, 2021, p. 10)

Sweden is currently the country with the highest carbon tax rate in the world at 114 euros per tonne of CO_2 (Mattauch et al., 2020). The tax level was raised gradually since the implementation in 1991 to give the population and the economy the opportunity to adapt, i.e., to take measures to increase efficiency or to switch to renewable energy sources. In order not to increase the overall tax burden, the tax on labour, among other things, has been lowered (Global 2000, n.d.).

The first country to implement a carbon tax was Finland, which adopted one in 1990. Finland has the third highest carbon tax rate in the world after Sweden and Switzerland. The tax rate has been continuously increased since 1990. Currently, this is 53 euros per tonne of CO_2 for heating fuels and fuels for work machines and 62 euros per tonne of CO_2 for motor fuels. Unlike Sweden and Switzerland, Finland does not base the amount of the tax on the carbon content, but on the calculated CO_2 emissions of a fuel over its entire life cycle (Global 2000, n.d.).

A carbon price was introduced in Germany on 1 January 2021. It works as follows: Companies that put fossil fuels on the market must buy emission rights in the form of certificates. These costs are passed on by the companies to the end consumers. In 2021, a tonne of CO_2 will cost 25 euros. This corresponds to less than 10 cents per litre of fuel or heating oil. The levy will be gradually increased up to 55 euros per tonne of CO_2 until 2025 (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, 2020) (English translation: Federal Ministry for the Environment, Nature Conversation, Nuclear Safety and Consumer Protection).

Switzerland has an emissions trading system for large CO_2-intensive companies. Since the beginning of 2020, this has been linked to the EU ETS. A carbon tax of 96 Swiss francs (approximately 86 euros) per tonne of CO_2 on fuels, i.e., heating oil and natural gas, is additionally levied. Energy-intensive companies can be exempted in exchange for reduction commitments. Around two thirds of the levy is refunded directly to the population via health insurance and to companies via social contributions (Mattauch et al., 2020).

Outside Europe, Canada, South Korea, and California are among the pioneers in carbon pricing. However, there also exist examples of failed attempts to introduce carbon prices as for instance, in Australia and in the US state of Washington. In France, the government's attempt to further increase the carbon tax, partly led to the so-called yellow vests protests in 2018 (Mattauch et al., 2020).

2.1.3 Tax Rate

When introducing a carbon tax, it must be decided on how much a tonne of CO_2e should cost. From an economic perspective, a carbon tax should reflect the costs of GHG emissions. However, it should not be left out of sight that it should also be high enough to encourage consumers and producers to switch technologies. This means that the required level depends not only on the cost of the emissions caused, but also on the switching possibilities and costs (Tölgyes, 2021). Depending on the goal to be achieved by carbon pricing, two approaches can be distinguished according to Mattauch et al. (2020): First, the costs incurred by the general public due to CO_2 emissions can be priced. The second option is to set emission reduction targets or a temperature target to limit global warming.

In the first approach, the price should directly reflect the social costs of additional emissions. The prices offered are then the damages to society expressed in real monetary units, which are caused by further emissions and have not yet been borne by the polluter (Mattauch et al., 2020). This approach is based on Pigou's idea that actors that create harm need to be forced to pay for the damage they cause (Lambert, 2017). The pricing of external costs ensures that any decision made by private actors takes into account not only the private costs and benefits but also the additional social costs of CO_2 emissions. However, it is difficult to estimate the cost of a destroyed forest or an extinct animal species. Estimates in this regard are always linked to an ethical evaluation. In addition, the damage to future generations must be set in relation to today's damage using a so-called discount rate depending on whether the well-being of the current generation should count more than that of future generations or not (Mattauch et al., 2020).

A metric that is commonly used to indicate the expected economic damages that result "from the emission of an additional tonne of carbon dioxide (tCO_2)", is the so-called social cost of carbon (SCC) (Ricke et al., 2018, p. 895). Pricing carbon at its full social cost, as for instance, through a carbon tax, requires estimations of the SCC. Various estimates have been calculated in academic literature (Pindyck, 2019). The derived recommendations for an optimal carbon price vary widely (Mattauch et al., 2020). Pindyck (2019) determines SCC in the amount of 150-300 US$. Ricke et al. (2018) initially calculate country-level SCC that contribute to the global SCC (GSCC). They estimate a median GSCC of US$417 per t$CO_2$ (66% confidence Intervals, US$177-805 per t$CO_2$) (Ricke et al., 2018).

The second approach is based on the 2015 Paris Climate Agreement, in which the global community set the goal of keeping global warming "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C" (High-Level Commission on Carbon Prices, 2017, p. 1). A carbon price can be chosen in such a way that this given target is achieved at the lowest possible cost. Such cost-effectiveness analyses are carried out with various integrated models of the environmental and economic system. To achieve the goals of the Paris Agreement, the "High-Level Commission on Carbon Prices" (HLCCP) recommends the following carbon-price levels: "at least US$40–80/t$CO_2$ by 2020 and US$50–100/t$CO_2$ by 2030" (High-Level Commission on Carbon Prices, 2017, p. 50). However, carbon pricing should be complemented by other policies as e.g., improving public transportation infrastructure, creating the prerequisites for renewable-based power generation and introducing efficiency standards (High-Level Commission on Carbon Prices, 2017).

Many scientists point out that the current globally observed carbon prices are too low to significantly reduce GHG emissions and meet the targets of the Paris Climate Agreement (Kemfert et al., 2019; Mattauch et al., 2020; Ramstein et al., 2019). Furthermore, carbon prices need to be increased gradually to achieve a complete, cost-effective decarbonization of the global economy (Edenhofer et al., 2018).

2.1.4 Revenue Use

In many OECD and G20 countries, carbon tax revenues currently exceed one percent of GDP (Marten & Dender, 2019). The revenue raised by the taxes can be recycled in different ways. Revenue recycling can be explained as "channelling the tax proceeds back to taxpayers" (Drews & van den Bergh, 2016, p. 863). In academic literature three revenue recycling strategies have been explored in particular (Carattini et al., 2018):

Tax reform/Revenue neutrality

In this approach, the revenues are used to decrease other taxes. This means that the government's budgetary position and the overall tax burden remain the same. The general rationale is to shift taxation from labour, income, or property to e.g., pollution (Dresner, Dunne, et al., 2006). In this way, full or partial revenue neutrality can be ensured (Carattini et al., 2018). This option is the least popular strategy for the use of the tax revenue, which is shown by several empirical studies (Beuermann & Santarius, 2006; Dresner, Jackson, et al., 2006; Klok et al., 2006).

Earmarking

As another option, revenues can be allocated in advance for funding specific environmental programmes such as environmental funds, environmental projects, education or outreach, and research activities (Dresner, Dunne, et al., 2006). The popularity of earmarking (Baranzini & Carattini, 2017; Bristow et al., 2010; Carattini et al., 2017) is based on two doubts that prevail among the population. Firstly, the population does not trust the government to use the revenues wisely (Carattini et al., 2018). A survey conducted in Denmark revealed that subjects suspected the government to introduce a carbon tax not to reduce GHGs, but to raise new tax revenues (Klok et al., 2006). Secondly, people question the effectiveness of carbon taxes (Carattini et al., 2018). Earmarking can counteract this doubt, because by using the revenues for environmental purposes, people can be convinced that the tax will be effective and that the environmental goal will be achieved (Baranzini & Carattini, 2017).

Funding of compensation measures

Revenues can be used to compensate for the hardship that people with lower incomes face due to the implementation of the carbon tax. A compensation option are lump-sum transfers. A lump-sum redistribution to the population could offset a part of the negative impact on low-income households (Dresner, Dunne, et al., 2006). This type of compensation is progressive because fixed compensation amounts represent a larger share of income in low-income households. As low-income households tend to spend less on energy consumption in absolute terms compared to high-income households, carbon taxes with lump-sum transfers are progressive overall. This means that low-income households are likely to receive compensation that is greater than the increase in costs they suffer. If the whole amount of the tax revenue is redistributed back to the citizens, a carbon tax with lump-sum transfers is a revenue-neutral reform. Another compensation option is social cushioning, which is intentionally designed to be progressive by returning lower-income households a higher share of the tax revenue (Carattini et al., 2018). This can be realized e.g. “through an especially generous income tax rebate or through targeted lump sum transfers” (Carattini et al., 2018, p. 7).

It is often assumed that if the revenue from the carbon tax is returned to the citizens, the tax will have no positive effects on the climate. However, one should be aware that this is a fallacy. The effect of the carbon price for climate protection is that climate-damaging products become more expensive and thus less attractive compared to less harmful alternatives. This effect exists regardless of how the revenue is invested (Mattauch et al., 2020).

2.2 Climate Policy at Global, European, and Austrian Level

2.2.1 Climate Protection Measures and Targets at Global and EU Level

At the first climate conference of the World Meteorological Organisation (WMG) in Geneva in 1979, it was stated that global action against climate change is necessary. In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was signed in Rio de Janeiro, which established responsibilities for reducing GHGs for participating countries. However, the measures were neither quantified nor binding. Therefore, in 1997, the Kyoto Protocol (KP) established quantified and binding reduction targets for GHG emissions for industrialised countries. Developing countries, however, are exempt from the obligation. However, the largest increase in GHG emissions in the last decade has come from developing countries. After several years of intense negotiations, the international community agreed on the Paris Agreement in December 2015. Among other things, the agreement stipulates that the increase in the average global temperature should be limited to a maximum of 2°C compared to pre-industrial levels. Global GHG emissions must reach their maximum as soon as possible and have to be reduced to (net) zero by the middle of the 21st century (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2022a).

In order to reduce GHG emissions, a legal framework of measures has been created by the EU. The ambitious goal is to reduce emissions by at least 55% by 2030 and to make the EU the first climate-neutral continent by 2050 (European Commission, n.d.-e). Climate neutrality refers to the idea of cutting GHG emissions as much as possible and compensating for the remaining emissions, e.g., by carbon sequestration (European Council, 2021), a technology for capturing and storing atmospheric CO_2 (Climate Leadership Council, n.d.-e). To reach these ambitious targets, the so-called Green Deal, which is an ambitious package of measures consisting of several climate protection initiatives, was adopted (European Commission, n.d.-e).

One of these measures is the European Climate Law, which intends to realise the goal formulated in the European Green Deal. In order to achieve the EU's goal of becoming climate neutral by 2050, it is necessary to ensure that EU member states achieve net zero GHG emissions through emission reductions, investments in green technologies and the protection of the natural environment (European Commission, n.d.-b). As a further measure, the European Climate Pact was launched to promote social engagement for climate protection and to directly involve citizens, communities and organisations in climate protection measures. The Commission emphasises that the above-mentioned groups play an important role in the transition to a climate-neutral society. Platforms will be set up to promote exchange between people who want to share their ideas and solutions on climate action and on adaptation to the impacts of climate change. In this way, citizens are offered the opportunity to actively participate in climate action (European Commission, n.d.-c).

The EU's most important tool for reducing GHG emissions is the EU Emissions Trading System. It is the world's first significant and largest carbon market. The EU ETS is a system that follows the principle of "cap and trade". Companies located in a EU country or Iceland, Liechtenstein and Norway, can buy or receive emission allowances that entitle them to emit a certain amount of CO_2. The allowances can be traded with one another. The cap on GHGs that is allowed to be emitted is gradually reduced so that overall emissions decrease (European Commission, n.d.-d). Besides the EU ETS, there exists the so-called Effort Sharing legislation that sets binding annual GHG emission reduction targets for Member States for the periods 2013-2020 and 2021-2030. These targets cover emissions from several sectors that are not covered by the EU ETS e.g., the sectors transports, buildings, and agriculture (European Commission, n.d.-a).

2.2.2 Climate Protection Measures and Targets at the Austrian Level

A reduction in GHG emissions is urgently needed, as the effects of climate change are already becoming visible in many areas and are already leading to economic losses in Austria. Expected future consequences include the fact that average temperatures will continue to rise until the middle of this century. It is expected that there will be hotter, drier summers with about twice as many days above 30 degrees Celsius as before. Winters are expected to become less cold on average and thus less snowy. One field of activity that is significantly affected by climate change is agriculture. Increasing drought and climate variability will lead to harvest and quality losses and decreasing harvest security (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2022b).

Negative consequences are also predicted for tourism. Due to the rise in temperature and the changed precipitation situation, the Alpine glaciers have lost about 50 percent of their ice in the last 100 years. The attractiveness of the mountain regions is significantly decreasing due to the visible retreat of the glaciers in the Alps, which leads to a recession in tourism. Winter tourism is particularly affected, as mild winters without sufficient natural snow will increase (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und

Technologie, 2022b). This development is particularly alarming for a country like Austria, where one in five full-time jobs is secured by the tourism and leisure industry, especially in rural regions (Bundesregierung, 2020) (English translation: Federal Government). Climate change also poses risks to human health due to direct heat stress in summer and changes in the spread of pathogens (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2022b).

To achieve climate neutrality for Austria by 2040 at the latest, the Austrian government programme envisages various steps. The federal government sets the focus on the expansion of all forms of domestic renewable energy sources. It is planned to completely transform the energy system. All sectors, in particular the energy system and infrastructure, are to be transformed in a climate-friendly manner by considering the costs for households and businesses. The Climate Protection Act (*Klimaschutzgesetz*) that includes clear GHG reduction paths, timetables, and corresponding resources ensures that Austria does not exceed its CO_2 budget (Bundesregierung, 2020) . This law intends to facilitate the coordinated implementation of effective climate protection measures (Bundesgesetz zur Einhaltung von Höchstmengen von Treibhausgasemissionen und zur Erarbeitung von wirksamen Maßnahmen zum Klimaschutz (Klimaschutzgesetz – KSG), 2022).

In this context, transport and infrastructure are key aspects, as mobility is a basic human need, and the transport of goods is a prerequisite for the economy. The federal government (2020) plans to implement measures to avoid traffic, shift traffic, and improve traffic. In addition, the amount of walking and cycling paths, public transport and shared mobility is to be significantly increased. It is planned to improve and expand environmentally friendly mobility, such as an extensive hourly, all-day offer for public transport, especially in rural areas (Bundesregierung, 2020). To enhance the attractiveness of using public transport, the so-called *KlimaTicket* (English translation: climate ticket) was introduced on 26 October 2021. With this ticket, all public transport throughout Austria can be used. At the beginning, the *KlimaTicket* was offered at a reduced price of 949 euros. The regular price now is 1095 euros (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2021a).

To internalise the costs of GHG emissions, a carbon tax is implemented on 1 July 2022 (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2021b) . A task force (*Taskforce ökosoziale Steuerreform*) has been employed to work on an implementation roadmap for this tax reform (Bundesregierung, 2020). The tax rate will be 30 euros per tonne, rising to 55 euros per tonne by 2025 (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2021b). In addition, a price stabilisation mechanism will be introduced to reduce fluctuations in energy prices. If in one year energy prices rise by more than 12.5% in the first three quarters, the carbon price in the following year will only be raised by 50% of the planned increase. If energy prices fall, an analogous adjustment is made. The carbon tax only covers the sectors not covered by the EU ETS. Most of the industry and the production of heat and electricity are therefore not affected. This means that for almost half of the current emission volume, hardly any additional emission reductions can be achieved through the carbon tax (Köppl et al., 2021).

To make the carbon pricing socially acceptable, a climate bonus will be paid to Austrian residents. The amount of the climate bonus will be differentiated regionally depending on the availability of public transport. In 2022, it will be a basic amount of 100 €/year for level 1 (best availability of public transport) and will be increased by 33% for level 2 (133 €), 67% for level 3 (167 €) and 100% for level 4 (200€). Children up to the age of 18 are entitled to half of the amount of the climate bonus. The climate bonus will be adjusted annually, taking into account the increase in the carbon price as well as the actual revenues from the carbon tax (Köppl et al., 2021).

Compensation payments are also planned for companies. Similar to Germany, companies and sectors that are particularly CO_2-intensive are to be relieved. Furthermore, hardship regulations are planned for highly affected companies (WKO, n.d.). These measures are intended to prevent the risk of carbon leakage, i.e., that companies relocate their production sites and thus their emissions to countries where there are less strict or no restrictions on GHG emissions. In agriculture, for example, a rebate of the costs arising from the carbon tax will ensure that the price increase for diesel does not represent an additional burden for farmers. It should be noted that the expenses for the envisaged compensation payments for both households and companies as well as other measures exceed the revenues from carbon pricing (Köppl et al., 2021).

With the Eco-social Tax Reform, the federal government is taking a first national step towards introducing the environmental economic instrument of carbon pricing. Although the introduction of carbon pricing represents an important milestone, the tax rates are far below the current price for emission allowances in the EU ETS (Köppl et al., 2021) and the price levels recommended by experts (High-Level Commission on Carbon Prices, 2017). To increase the financial incentive of the carbon tax, a higher tax rate based on the current carbon price in EU

ETS would be necessary. In addition, further climate policy measures, such as the abolition of existing climate-damaging subsidies, are necessary to achieve significant emission reductions (Köppl et al., 2021).

However, other influences besides the carbon price are currently already having an effect that could potentially have a major impact on emission reductions. Promising examples are the expansion of public transport, the *KlimaTicket* or the promotion of e-mobility. Changes in work organisation, supported by digitisation, also have great savings potential as they reduce transport need. In the buildings sector, innovative building technologies are used that can significantly contribute to CO_2 reduction. Furthermore, the supply of renewable energy sources has increased, although the shift towards renewables has diminished in recent years (Köppl et al., 2021). This is to be counteracted by the *Erneuerbaren-Ausbau-Gesetz* (English translation: Renewable Energy Expansion Act), which aims to convert the electricity supply in Austria to 100% (national balance) to green electricity by 2030 (Bundesregierung, 2020). In concrete terms, this means that annual electricity generation from renewables will be increased by 27 TWh by 2030. Out of this, among others, 11 TWh will be obtained from photovoltaics, 10 TWh from wind and 5 TWh from hydropower. The focus of the legislative package lays on the introduction of market premiums to encourage the generation of electricity from hydropower, wind power and photovoltaics, for example. In addition, the construction and expansion of photovoltaic plants, electricity storage systems and wind power plants are to be promoted through investment subsidies (Erneuerbaren-Ausbau-Gesetzespaket – EAG-Paket, 2021).

2.3 Tax Acceptability

2.3.1 Tax Attitude in Austria

First, the terminology used in chapter 2.3 should be clarified. The terms "acceptability", "acceptance" and "support" of environmental policies are not used consistently in academic literature. Acceptance and acceptability are often used synonymously with support (Gross, 2007; Swim et al., 2009; Wegener & Kelly, 2008). In the present study, acceptability and support are also used interchangeably. As for the terms acceptance and acceptability, they differ in terms of timing (Dreyer & Walker, 2013). A*cceptability* refers to the "prospective judgment" (Schade & Schlag, 2003, p. 47) of a policy that will be implemented in the future. The respondents have not experienced the policy which makes acceptability an attitude construct (Schade & Schlag, 2003). Eagly and Chaiken (2007, p. 598) define attitude as a "psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor”. *Acceptance* refers to respondents' attitudes after the introduction of a policy, i.e., after people have already experienced the measure. This construct does not only refer to attitudes, but also includes behavioural reactions (Schade & Schlag, 2003). The construct relevant for this thesis is social acceptability, or more precisely the acceptability of a carbon tax of Austrian inhabitants.

The willingness of citizens to pay taxes to the state depends on income, tax rate, audit probability and penalty rate. In addition to those economic factors, psychological factors such as knowledge, subjective concepts about taxes and attitudes towards the state as well as justice perceptions also play a role. Subjective perceptions about taxes develop based on personal experience, media coverage and social exchange. They refer to opinions about whether taxes are collected in a fair manner and whether tax money is used efficiently. Moreover, the following aspects determine subjective perceptions about taxes: These are the fair distribution of public goods and the opinion on whether cooperation with the state is desirable (Rechberger, 2009).

Mostly, associations with taxes are negative among the population (Kirchler, 1998; Rechberger, 2009). The importance of contributing to the public budget is generally recognized by the citizens, however, taxes are often considered a loss of personal freedom concerning the investment of their own money. Furthermore, taxes are perceived as contributions without a fair return, or as requests from the government to improve the state finances (Kirchler & Braithwaite, 2007). Another factor contributing to a critical attitude towards taxes is the prevailing opinion among the population in many countries that the government spends tax revenues inefficiently. One reason for this are various tax scandals that have been reported in the media and which have underpinned the assumption that politicians are more interested in personal benefits than in those of society (Kirchler, 1998). These negative attitudes of taxpayers towards taxes can lead to tax evasion or avoidance, delaying the filing of tax returns and complaints to the tax authorities (Mühlbacher & Zieser, 2018).

Kirchler (1998) conducted a study about attitudes towards taxation in five employment groups in Austria where he found that spontaneous associations with taxes tend to be negative in all subsamples. However, the word "tax" triggered different associations between the employment groups. Entrepreneurs were those who most often mentioned terms like “punishment, disincentive, constraint” (Kirchler, 1998, p. 128). They associate taxes with a hindrance to their work. Furthermore, they criticise the complexity of bureaucratic rules and the lack of clarity in fiscal policy. Unlike entrepreneurs, white collar workers and civil servants hold associations linked to the ideas of exchange and fairness. White collar workers associate taxes with social security and social welfare. A general dissatisfaction with politicians was expressed in the blue collars group. Students, the group not paying taxes, did not get emotional when asked to indicate their feelings towards taxes. The study also provides evidence that tax evasion is perceived as a minor offense rather than a crime (Kirchler, 1998).

When citizens are asked about their attitudes towards the tax system, concerns about the lack of justice and fairness of the system are often expressed. Nevertheless, opinions on what is considered fair vary widely. Fairness and justice are mostly used interchangeably in the literature which is why the two terms are also used synonymously in this paper. However, some authors differentiate the concepts and define justice as the adherence to rules and fairness as the subjective assessment of whether the rules should have been applied at all in a specific case (Mühlbacher & Zieser, 2018). In other words, justice refers to behaviour that is morally required, while fairness is an evaluative judgement about whether that behaviour is morally praiseworthy (Goldman & Cropanzano, 2015). A study on the tax behaviour of self-employed people in Austria by Schwarzenberger et al. (n.d.) provides evidence that especially the level of income and the political orientation are related to the perceived tax justice. It also demonstrates that the tax justice in Vienna tends to be lower compared to the rest of Austria. The findings show that the perceived justice of the tax system decreases with the amount of taxes. Regarding the relation between political attitudes and justice, the study found that the political centre tends to perceive tax justice in Austria lower than both the left and the right side of the political spectrum (Schwarzenberger et al., n.d.).

Alm and Torgler (2011) emphasise that trust plays a crucial role in enhancing tax compliance. The term tax compliance indicates the degree to which citizens and companies comply with tax laws (Ranyard, 2017). To strengthen the trust of Austrian companies in the tax authorities, "Horizontal Monitoring" was launched by the Austrian Ministry of Finance (Enachescu et al., 2019, p. 75). In this pilot project, the cooperation between large enterprises and the tax administration was strengthened (Enachescu et al., 2019). In concrete terms, "Horizontal Monitoring" refers to an increased exchange between companies and the tax authorities. It enables accompanied controls instead of large-scale tax audits, but the company must commit to a higher disclosure obligation in the process. A study by the Austrian Ministry of Finance showed that despite organisational challenges, the increased cooperation resulted in advantages for all parties involved. Hence, companies benefit from legal security, and tax authorities, from timely collection of the correct amount of levies (Bundesministerium für Finanzen, 2016) (English translation: Federal Ministry of Finance).

2.3.2 Why Carbon Taxes are Unpopular

The implementation of carbon pricing mechanisms is mostly viewed critically by society. According to a survey conducted in Germany in 2019, the majority of the German population (62%) is against a carbon tax. The survey also found that the support for a national carbon tax is greater among younger than among older respondents (Suhr, 2019). The first hurdle to gain public approval for carbon pricing policies, arises from the lack of social popularity concerning the introduction of new taxes and the resulting price increases (Mühlbacher & Zieser, 2018). According to Carattini et al. (2018), voters tend to reject sudden changes in taxation. The aversion to higher tax rates is even present when the revenue is redistributed to the population (Carattini et al., 2018).

Many observers are generally critical of carbon pricing, often without being well informed about the benefits (Baranzini et al., 2017). Another problem is that many benefits from carbon taxes occur medium to long term. On the other hand, the negative aspects, such as the rapid increase in energy prices after the introduction of the tax, are immediate. This leads to individuals disregarding a greater share of the benefits than the costs of carbon taxes and can thus lead to a significant reduction of support for carbon pricing (Dominioni & Heine, 2019).

Another obstacle for the public acceptability of carbon taxes is the perceived environmental ineffectiveness. Economists do not question the beneficial effects a carbon tax has on the environment. However, the effectiveness is not always internalized by the general public. The expectation of environmental effects and the perception of local co-benefits have a crucial impact on the acceptability of a carbon tax (Baranzini & Carattini, 2017). Baranzini and Carattini (2017) point out that it is essential to communicate primary and ancillary benefits in order to enhance acceptability.

Furthermore, the levying of environmental taxes is perceived as incompatible with social justice. Many citizens feel generally unfairly treated by the tax system (Mühlbacher & Zieser, 2018). In a study by Rechberger (2009) it was proven that social justice displays a key factor when it comes to people's attitude towards taxes. Justice refers to an ideal state of balanced interests in which neither individuals nor groups are discriminated (Schmitt, 2014, as cited in

Mühlbacher & Zieser, 2018). The justice of a tax system can be divided into the following three components: Firstly, the fairness of how the tax burden is distributed and what benefits the tax-funded goods have in society ("distributive justice"), secondly, the fairness of authorities' decision-making processes ("procedural justice"), and thirdly, the fairness of the control and punishment system ("retributive justice") (Mühlbacher & Zieser, 2018, p. 92). In the design of environmental policies, particularly distributive justice and procedural justice need to be considered regarding public acceptability (Gross, 2007; Kim et al., 2014).

2.3.3 Distributional Effects and Social Justice

In academic literature, carbon taxes are considered a highly effective tool for reducing GHGs (Enevoldsen et al., 2009; Broin et al., 2021; Hájek et al., 2019). However, there is a huge amount of criticism when it comes to distributional effects and social justice. Much of the resistance towards carbon pricing is based on the fear that poorer people could be disadvantaged, as low-income groups spend a higher amount of their income on energy-intensive products to satisfy their fundamental needs compared to wealthier people. They also have limited substitution possibilities which entails that they have to carry a relatively higher carbon tax burden (Wang et al., 2016).

Moreover, an additional societal injustice is that the carbon footprints of the world's richest people are significantly higher than the ones of the poorest half of the world population. We live in an age of extreme carbon inequality, which means that the carbon footprints of people from different income groups vary significantly. The share of total global emissions from the richest 1% has risen steadily in recent decades and is expected to continue to increase "from 13% in 1990, to 15% in 2015 and 16% in 2030" (Oxfam, 2021, p. 2). An Oxfam (2021) study estimates that the per capita emissions of the richest 10% of the word population will be almost ten times higher than the global 1.5ºC-compatible per capita level in 2030. In contrast, the per capita emissions of the poorest 50% will continue to be far below this level.

Academic literature distinguishes between two different strategies to counteract undesired distributional effects of carbon taxes: ex-ante and ex-post measures (Speck, 1999). These approaches are sometimes combined (Wang et al., 2016). To reduce the effects ex ante, "mitigation measures" can be implemented (Speck, 1999, p. 665), as e.g., lower tax rates or exemptions for vulnerable groups (Wang et al., 2016). In this way, the impacts do not arise at all. Compensatory measures can be introduced ex post to compensate the most affected groups

(Speck, 1999). Carbon tax revenues can be recycled to households/production sectors e.g., in the form of transfer payments and subsidies (Wang et al., 2016).

Metcalf (2009) proposes a carbon tax reform in the United States that takes the distributional concern of the public into account and that ideally increases social welfare. The designed carbon tax starts with a modest carbon price and is to increase gradually. This issue will be reviewed by the U.S. Congress, which will adjust the tax rate as needed. The revenue would be used primarily to finance an environmental earned income tax credit that is linked to the payroll tax. This draft of a distribution- and revenue-neutral reform addresses some concerns raised by opponents of carbon taxes as e.g. the negative impact on low-income households (Metcalf, 2009).

Furthermore, the distribution of the environmental co-benefits, which a carbon tax implies, is rarely addressed in literature. Most studies only focus on the distribution of the cost of carbon taxes and do not take the positive side-effects into consideration of mitigation actions. Especially poor households may benefit from an improved quality of the environment, as they tend to be exposed to pollutants even more than wealthy households (Wang et al., 2016).

2.3.4 Determinants of Social Acceptability

Since taxes are generally not popular, it is important to create social acceptability for a carbon tax. In recently published literature, several determinants of the social acceptability of a carbon tax have been identified. According to Baranzini and Carattini (2017) communicating the benefits of carbon taxes is crucial for increasing acceptability. For greater acceptability, it is essential that reservations and misunderstandings on the part of citizens are refuted by politicians. Additionally, the high steering effect of a carbon tax has to be emphasised (Mattauch et al., 2020). A survey on society's acceptability of carbon taxes conducted in Scotland (McLaughlin et al., 2019) revealed that information on how carbon taxes can have a positive environmental impact and help to combat climate change, positively influence the study participants' opinions.

Carbon pricing is often presented as a political response to climate change. However, whether it makes sense to present it this way depends on the awareness of the citizens of the respective country about climate change. In a country where there is a high level of public concern about climate change, this can work well. In countries where awareness of climate change is weak or the topic is politically polarised, communications should focus on other benefits of carbon pricing, as for instance, reduced air pollution, a more secure energy supply or the creation of jobs in clean energy. Climate change must always be included in the discussion, but how it is addressed should be based on the concerns and priorities of the different audiences (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018).

Another factor that crucially influences acceptability is political trust. If the citizens of a country exhibit low political trust in their government, the public is less likely to trust government statements on carbon pricing policy (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018). In a study conducted in Germany, participants expressed their doubt that the government would keep its promises regarding the use of revenues. For example, respondents suspected that the revenue was used for the overall budget and not really being recycled (Beuermann & Santarius, 2006). Klenert et al. (2018) and Rafaty (2018) show that there is a connection between public political trust and the strength of national climate policies. Their empirical studies provide evidence that countries where the population has a higher level of distrust towards their politicians, have weaker climate policies and higher GHG emissions (Klenert et al., 2018; Rafaty, 2018).

Furthermore, the revenue use is an integral part of the strategy which should receive particular attention. The public support for carbon pricing strongly increases if the revenue use is clearly communicated (Marten & Dender, 2019). A carbon price is more likely to be accepted if the revenues are invested in projects that are in line with environmental goals, are of high public interest or are recycled to the public in the form of rebates or tax breaks (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018). For a high level of public acceptability, it is also important to make it clear that the revenues will be distributed fairly (Mattauch et al., 2020). What has worked in framing carbon pricing so far is to include fairness as the basis of communications (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018). Research suggests that the perceived fairness of a tax plays a key role in building public support (Clayton, 2018; Dreyer & Walker, 2013; Hammar & Jagers, 2006). In communications, fairness can be emphasised by a reasonable carbon pricing that shares responsibility for carbon pollution and rewards those that pollute the least (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018).

When a government seeks to build public support, it must develop a communications strategy. It is necessary to explain to stakeholders how carbon pricing works, address their concerns and give reasons why it is desirable. From the beginning, communication experts should be involved. Specialists need to be consulted for key decisions as the naming of the policy is crucial (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018). Baranzini & Carattini's (2017) findings show that the use of a different label such as ''climate contribution'' rather than ''carbon tax'' can positively affect acceptability (Baranzini & Carattini, 2017, p. 199). However, communications are not a substitute for effective policy making and cannot compensate for incoherent regulations. It is only possible to effectively communicate a carbon pricing policy if the policy itself is effective. Moreover, it is essential that the government does not impart unrealistic expectations and outcomes of carbon pricing (Partnership for Market Readiness & Carbon Pricing Leadership Coalition, 2018) .

2.4 The Carbon Dividends Plan

2.4.1 The Origins of the Climate Leadership Council

Although there are many reasons for climate change, the burning of fossil fuels is one of the largest sources causing CO_2 emissions. In the past, climate change was denied by many oil and gas companies. In the 1980s and the 1990s fossil fuel companies including Exxon Mobil and Shell publicly attacked scientifically proven facts about climate change (The Climate Reality Project, 2019). The existence of a greenhouse problem was often questioned at the time (Bader, 2021). The Global Climate Coalition (GCC), a former anti-environmental front group opposing action to reduce GHG emissions (Park & Allaby, 2017) aimed to confuse the American public by doubting scientific findings regarding climate change. The GCC included some of the world's most powerful corporations and associations trading in fossil fuels among its members (Brown, 2000). By launching huge advertising campaigns, the lobbying organization delayed several climate protection measures such as the Kyoto Protocol and questioned the role of human-induced GHGs on climate (DeSmog, n.d.).

However, there has been a recent turnaround. For example, the KPMG Global Energy Institute, an energy company networking organization, claimed that climate change was a major concern in the oil and gas industry. Opinions in the scientific community differ about whether oil and gas companies are working to reduce their CO_2 emissions or not. Some scientists believe that they are indeed curbing their carbon emissions (Blazek, 2021). According to Pickl (2019) renewable energies are playing an increasingly important role in the energy industry. His analysis shows that five out of eight oil majors studied, including Royal Dutch Shell and Total, have invested significantly in renewable energies (Pickl, 2019). On the contrary, Prechel (2021) points out that although scientific evidence confirms that a substantial part of climate change is caused by human behaviour, many fossil fuel companies still refuse to change their strategy and structure to reduce their GHG emissions. According to McCright & Dunlap (2003) the Kyoto Conference in 1997 represented a turning point. Prior to the Kyoto conference, the necessity of reducing GHG emissions and the reality of global warning was nearly unanimously denied by the fossil fuel industry. After the conference, however, leading companies recognized that challenging climate change was no longer a productive strategy and began to reduce their GHG emissions and invested in renewable energy. McCright & Dunlap (2003) state that in this shift the motives can be interpreted as the following: either the new positioning was a public relations move or a move for competitive advantage.

In any case, public and political pressure as well as pressure from investors on oil and gas companies to reduce their emissions has risen over the years. As a response to the increasing pressure a network of researchers and business leaders from the United States formed the "Climate Leadership Council", to develop a plan to address the climate crisis – the so-called Carbon Dividends Plan in 2017 (Blazek, 2021). The founder, president and CEO of this council is Ted Halstead. The Climate Leadership Council's goal is to mobilize opinion leaders to implement effective, popular, and equitable climate policies. It currently operates in Washington and London and will further expand to Berlin, Beijing and New Delhi (Baker et al., 2017). The Council developed a solution to combat climate change that creates added value for the population. To put a price on the carbon content of fossil fuels would discourage carbon emissions in every economic action and thus rapidly decrease carbon emissions. The "Carbon Dividends Solution" is based on four pillars, and two of them will be crucial for this master's thesis. The first pillar is a gradually rising nationwide carbon tax. The second pillar suggests returning the money raised to the citizens via equal monthly dividends. This could increase the popularity of the tax as every citizen gains a tangible benefit from it (Climate Leadership Council, 2021a).

2.4.2 The Carbon Dividends Framework

The Carbon Dividends Framework consists of the following four pillars:

1. A gradually rising carbon tax

The first pillar is a gradually rising nationwide carbon tax that can be levied "at the refinery or the first point where fossil fuels enter the economy" (Baker et al., 2017, p. 1), such as at the mine or the port. By pricing carbon dioxide emissions, businesses and consumers are encouraged to reduce their carbon footprints. The initial carbon tax rate could amount to $40 per ton and will increase steadily over time (Baker et al., 2017).

2. Carbon dividends for all Americans

The second pillar suggests returning the money raised directly to the citizens in the form of equal monthly dividends. The total revenue of the carbon tax would be returned to the American people "via dividend checks, direct deposits or contributions to their individual retirement accounts" (Baker et al., 2017, p. 3). A family of four would receive about $2,000 in carbon dividends in the first year. As the carbon tax rate increases, this amount would grow, establishing a positive feedback loop: "the more the climate is protected, the greater the individual dividend payments to all Americans" (Baker et al., 2017, p. 3).

3. Border carbon adjustments

To protect America's competitiveness, border adjustments for the carbon content of imports and exports should be created. This would punish free-riding by other countries and encourage them to implement carbon prices. Companies that export their products to countries that do not have equivalent carbon pricing systems would receive refunds for carbon taxes paid, whereas imports from such countries would be charged fees on the carbon content of their products. The revenues from these fees increase the carbon dividend, thereby benefiting the American people (Baker et al., 2017).

4. Simplification of regulation

Removing redundant regulations is the final pillar. A large part of the Environmental Protection Agency's (EPA) regulatory authority over carbon dioxide emissions would be eliminated, including a complete repeal of the Clean Power Plan. A carbon tax would also eliminate federal and state tort liability for emitters. To achieve and maintain bipartisan agreement for regulatory simplification of this scale, the initial tax rate should be set at a level that results in greater emissions reductions than envisioned in current regulations (Baker et al., 2017).

This climate solution does not only incentivize people to lower their carbon footprints and thus reduce overall carbon emissions, but also offers several far-reaching non-climate benefits, such as helping working-class Americans, strengthening the economy, and simplifying regulations, as discussed next.

Carbon dividends would help to reduce economic insecurity among the population which is driven by technological progress and globalization. According to the US Department of Treasury the bottom 70 % of Americans would receive more in dividends than they pay in increased energy prices. Carbon dividends would increase the income of most Americans while disproportionately supporting people who are struggling with their finances. The more people minimise their carbon footprint, the more money is earned through the dividends (Baker et al., 2017).

The Carbon Dividends Plan represents an incentive for economic growth and innovation. This plan would stimulate technological innovation and substitution of current energy and transportation infrastructure, spurring new investment. It would also provide companies with the predictability they currently lack, removing a major barrier to longer-term capital investment. Furthermore, this plan would allow companies the freedom to lower emissions in the most efficient manner by eliminating the need for several regulations (Baker et al., 2017).

Most carbon tax proposals are revenue neutral. However, this proposal goes a step further by reducing bureaucratic work as well as streamlining the regulatory state. Eliminating several energy-related regulations would lead to a decrease in government bureaucracy, a stimulation of economic growth, and a relief of the resources currently devoted to administering and complying with these programs (Baker et al., 2017).

2.4.3 Environmental, Health and Diplomatic Benefits

An escalating carbon fee is the most cost-effective tool to reduce carbon emissions (Climate Leadership Council, 2019). Through the introduction of a carbon tax, incentives are created for all economic actors, ranging from industry to households. The tax rewards energy conservation, encourages energy substitution, and stimulates investment in the use of available alternatives and innovation in new fuels and technologies.

The positive effects of the implementation of a carbon tax bring benefit to various actors. Since the tax design provides for all revenues to be returned to the population, every citizen benefits. The net benefit varies from household to household due to differences in, inter alia, household size and energy consumption. The households can spend the dividend as desired. It can for instance, be invested in ways to reduce one's carbon footprint, creating a long-term benefit (Climate Leadership Council, n.d.-c).

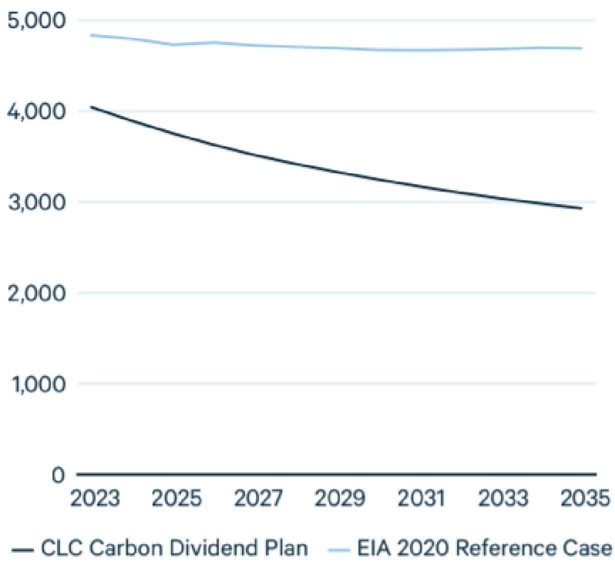

Figure 2: Energy-related CO_2 emissions by year in million metric tons (Resources for the Future, 2021, p. 2)

Introducing a carbon tax is a fast way to curb emissions (Bertelsen et al., 2021; Hu et al., 2020; Wittneben, 2009). Figure 2 shows the projected future energy-related CO_2 emissions in the US until 2035. The CO_2 emissions reductions expected from the Carbon Dividends Plan are modelled based on the Goulder-Hafstead Energy-Environment-Economy E3 CGE Model (Resources for the Future, 2021). The reason for the quick reduction in emissions is that immediately after the introduction of a carbon fee, businesses and consumers will begin to activate low-carbon alternatives (Bertelsen et al., 2021). Projections indicate that there will be a steep decline in emissions in the first few years (Resources for the Future, 2021). The projected steep decline in emissions can be explained by a quick shift away from carbon-intensive forms of electricity generation. However, even before the carbon tax enters into force, its introduction leads to emission reductions. Once the exact level of the carbon fee is known, households, businesses and investors can predict how their bottom lines will be affected. At this point in time they will already be making plans to reduce their fee burden (Bertelsen et al., 2021).

Although model projections show that a carbon tax can significantly reduce emissions, the projections do not represent firm predictions. In case economic conditions or fuel prices change drastically, the effect of the tax on carbon emissions reduction may deviate from the projections. To ensure that environmental targets are met by the Carbon dividends policy, the *Emissions Assurance Mechanism* (EAM) has been developed (Bertelsen et al., 2021). Including an EAM in U.S. carbon tax legislation could overcome concerns that a carbon tax is not an efficient instrument to achieve emission reduction targets (Metcalf, 2020). The EAM would automatically increase the carbon tax rate if it falls short of projections. If cumulative emissions exceed the target pathway, the EAM is triggered (Figure 3) (Bertelsen et al., 2021). The incorporation of an EAM provides more certainty about environmental impacts. For this reason, it could be a helpful tool to increase public support for a carbon tax (Metcalf, 2020).

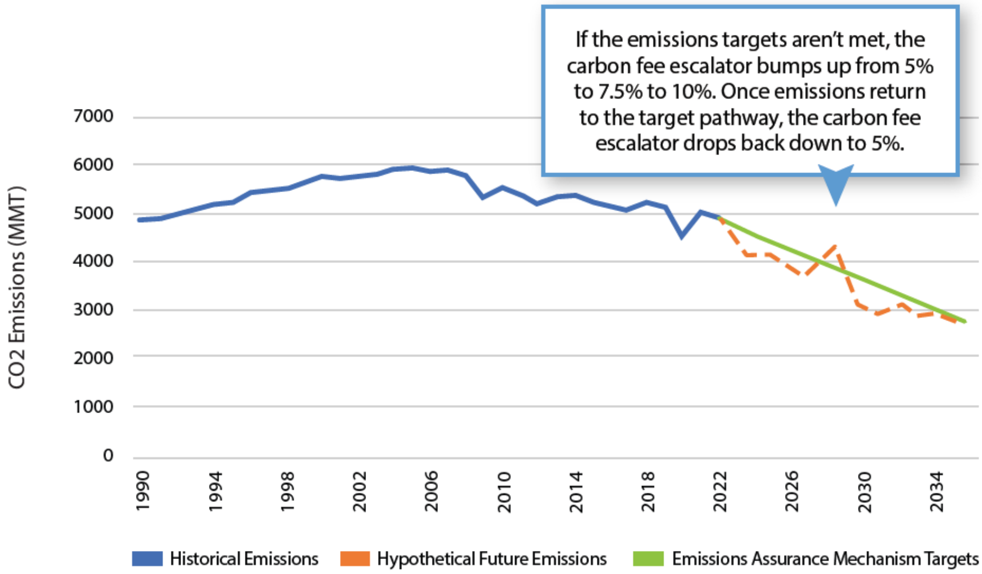

Figure 3: Emissions assurance mechanism (Bertelsen et al., 2021, p. 4)

The Carbon Dividends Plan has a crucial impact on the economy. It proposes to develop a comprehensive U.S. climate policy and provide a competitive advantage to carbon-efficient U.S. companies (Bertelsen et al., 2021). There is, in fact, a group of actors that currently does not receive benefits from making investments to cut emissions: the U.S. manufacturers. The United States has a high "carbon advantage," signifying that nearly every U.S. sector produces goods with fewer emissions than almost any country in the world (Climate Leadership Council, 2021b). An example is rebar steel that is produced to reinforce concrete. The production in the United States generates less than 25% of the carbon emissions per ton than rebar steel production in other countries. Steel producers are currently forced to compete with manufacturers overseas who operate with lower environmental standards. The Carbon Dividends Plan proposes to reward more efficient U.S. manufacturers and penalize imports with high carbon emissions. It is envisaged to implement border carbon adjustments that charge a carbon fee on imported goods at the border. This would allow U.S. manufacturers to operate under the same conditions as the producers overseas. In addition, they would receive a refund for any carbon fees they paid when exporting goods from the country. This makes it possible for U.S. manufacturers to outcompete less efficient foreign producers. As a result, domestic companies grow, jobs are created and the economy is strengthened (Climate Leadership Council, n.d.-d).

Every national strategy also needs to encourage other leading emitters to increase their climate ambitions, as solutions to climate change must be addressed at the global level. Accordingly, the Carbon Dividends Plan envisages creating border carbon adjustments. A carbon tax paired with a border carbon adjustment does not only strengthen the competitiveness of U.S. manufacturers but also encourages climate ambition on a global basis. Through carbon pricing adjustments, U.S. trading partners will be pressured to reduce their emissions. Exporters to the United States are thus faced with the decision of either reducing their emissions or losing market share in the United States which is the world's largest economy (Bertelsen et al., 2021).

Furthermore, a carbon tax is a suitable instrument to accelerate the deployment of low-carbon technologies which is fundamental for reducing GHG emissions. It creates a market incentive for companies to develop climate friendly technologies. A carbon fee provides a stable as well as predictable cost advantage for carbon-efficient solutions. Furthermore, a carbon fee will stimulate demand for low-carbon technologies not only in individual sectors, but across the entire economy (Climate Leadership Council, n.d.-a).

The so-called negative emissions play a key role in achieving the climate targets (Climate Leadership Council, 2021a; Geden & Schäfer, 2016; Kühn, 2011; Oei et al., 2011). For companies, however, capturing and storing CO_2 is associated with high costs. The cheapest way to get rid of CO_2 is to emit it into the atmosphere (Kühn, 2011). There already exists a federal program, section 45Q, which encourages investment in carbon sequestration by granting a tax credit to companies for capturing and storing CO_2. To further increase the attractiveness of carbon sequestration for companies, the Carbon Dividends Plan provides an incentive. Factories that receive a 45Q tax credit would also receive a rebate in the Carbon Dividends Plan. The combination of these incentives ensures to accelerate the deployment of carbon capture. The Carbon Dividends Plan envisages to eventually replace the tax credit entirely with the carbon fee (Climate Leadership Council, n.d.-e).

The main objective of a carbon tax is to reduce CO_2 emissions. However, the reduction of CO_2 goes hand in hand with the reduction of other pollutants, particularly criteria air pollutants, such as "sulfur dioxide (SO2), nitrogen oxides (NOx), volatile organic compounds (VOCs), and inhalable particulate matter (PM)" (Bertelsen et al., 2021, p. 7). When CO_2 emissions sources become more efficient or are replaced by more carbon-efficient alternatives, emissions of the pollutants mentioned will also decrease. This creates significant health benefits at the community level. The rapid reduction of other pollutants without additional regulations is a clear co-benefit of the carbon tax. However, a carbon tax is a complement and not a substitute for further measures to limit other pollutants (Bertelsen et al., 2021).

2.5 Hypotheses Development and Conceptual Model

2.5.1 Elaboration of Hypotheses

Various studies indicate that the use of the tax revenues has a significant influence on the acceptability of a carbon tax. Bristow et al. (2010) found that acceptability varies considerably depending on whether the revenues are hypothecated or go to the general tax budget. The respondents showed a clear preference for hypothecation. Drews and Van den Bergh (2016) found that the redistribution of revenues can substantially increase public support for climate policies. In line with this, a study by Shultz & Halstead (2018) found that by far the most popular revenue use is returning the money directly to all citizens in the form of dividends. Mattauch et al. (2020) also emphasise the importance of transparency on the part of policy-makers regarding the use of revenues. This is especially important because citizens generally do not trust the government to use the revenues wisely (Carattini et al., 2018). It is thus hypothesized that the information about returning the revenues generated directly to all citizens increases public acceptability. Therefore, the following sub-hypothesis is formulated:

H_{1a}: The information about the redistribution of the tax revenues back to the population positively affects the acceptability of the introduction of a carbon tax.

Carbon taxes are often perceived as unfair because of the concern that poorer people will be disadvantaged as they spend a large share of income on energy-intensive products (Carattini et al., 2018; Wang et al., 2016). In contrast, wealthier people are less affected by the increased prices relative to their income (McLaughlin et al., 2019). However, it is important to keep in mind that the damage resulting from inadequate climate protection often hits the less affluent population hardest (Mattauch et al., 2020). In order to implement an equitable carbon tax, tax revenues can be used to relieve the burden on lower-income households. One possible compensation measure is an equal redistribution to citizens as a per capita bonus (climate bonus). Several studies show that low-income households tend to be reimbursed more money with the mentioned measure than they paid for increased prices due to the tax (Edenhofer et al., 2019; Klenert & Mattauch, 2016; Williams et al., 2015). Compliant with these study results, Kirchner et al.'s (2019) calculations show that lump sum transfers have progressive impacts on real income and real expenditure. Based on previous studies that found that the redistribution of revenues back to the population can offset negative distributional effects or even make the tax progressive (Carattini et al., 2018; Klenert & Mattauch, 2016; Speck, 1999), it can be assumed that this recycling option positively affects the perceived fairness of a carbon tax.

Therefore, the following sub-hypothesis will be tested:

H_{1b}: The information about the redistribution of the tax revenues back to the population positively affects the perceived fairness of a carbon tax.

The role of fairness in the context of environmental policies has often been addressed in academic literature. Justice is seen as central to a well-functioning society and fairness is expected in everyday interactions. When policies are perceived as unfair, this can lead to protests and division in communities, especially if they benefit some parts of the community at the perceived cost of others. The existence of winners and losers within a society often leads to a decline in social well-being and impaired relationships between people (Gross, 2007). The results of Kim et al.'s (2014) study show that fairness significantly positively influences the acceptability of environmental taxes. Similarly, Clayton (2018) found that perceived fairness is an important predictor of public acceptability of climate policy tools. It is thus hypothesized that fairness is an important determinant of the public acceptability of a carbon tax. It is assumed that the fairer a carbon tax is perceived, the higher the acceptability of this political instrument will be. The following sub-hypothesis is therefore proposed:

H_{1c}: The perceived fairness of a carbon tax positively affects the acceptability of the introduction of a carbon tax.

Based on the sub-hypotheses above, the following mediation hypothesis results:

H_1: Fairness mediates the relationship between the information about the redistribution of the tax revenues back to the population and acceptability.

A major reason why people display a negative attitude towards carbon taxes is that they perceive the personal costs as too high (Carattini et al., 2018; Jagers & Hammar, 2009). In order to cushion the increased costs, there exist different revenue recycling measures (Carattini et al., 2018; Dresner, Dunne et al., 2006). When rebating the tax revenues to the population a large part of the population can benefit (Shultz & Halstead, 2018). Since low-income households generally tend to spend less on energy consumption in absolute terms than high-income households, carbon taxes with lump-sum transfers are progressive in total. Thus, low-income households are likely to receive compensation that is larger than the increase in costs they face (Carattini et al., 2018). In addition, all those who engage in environmentally friendly and lower-emission behaviours benefit from a redistribution back to the population in equal dividends, as they are also likely to get a compensation larger than the increased costs they paid. It is assumed that this financial advantage that can be achieved through the climate bonus positively influences the acceptability of a carbon tax.

Based on this argumentation, the following hypothesis is derived:

H_2: An economic motive positively affects the acceptability of the introduction of a carbon tax.

However, there exist several other determinants for acceptability. A further factor influencing acceptability is the trust in the government. Several studies have shown that people are more willing to pay taxes when they trust their government (Alm & Torgler, 2011; Scholz & Lubell, 1998; Scholz & Pinney, 1995). Hammar and Jagers (2006) prove in their study that trust in politicians has a significantly positive effect on the public support for a carbon tax increase. This can be explained by the fact that if people trust politicians, they are likely to trust the policies they implement. In line with that, Kim et al.'s (2014) study revealed that the motive "trust in government" had the largest effect on the acceptability of carbon taxation among a variety of determinants studied. Klenert et al. (2018) and Rafaty (2018) provide evidence that the higher the citizen's distrust towards the politicians in a country was, the weaker their climate policies were. It can therefore be assumed that citizens who have confidence in their politicians are more willing to accept the introduction of a carbon tax.

Based on subject literature, the perceived effectiveness is another factor that affects the acceptability of a carbon tax. The term effectiveness "refers to the degree to which the aims of the measure can be reached" (Schade & Schlag, 2003, p. 49). Several studies confirm that the perceived effectiveness is positively related with the acceptability of a policy measure. Schade und Schlag's (2003) study about the acceptability of urban transport pricing strategies revealed that acceptability is positively influenced by the perceived effectiveness. Jaensirisak et al.'s

(2005) study on the acceptance of road pricing schemes came to a similar conclusion. The results showed that if the charging of road use was perceived to be an effective way to reduce congestion and pollution, respondents considered it more acceptable. Furthermore, Hammar and Jagers (2006) found that the more one believes in the effectiveness of taxes, the more likely one is to support a tax increase. Many scientists agree that a carbon tax (combined with other climate policy measures) is a highly effective tool to reduce carbon emissions (Andersen et al., 2009; Broin et al., 2021; Hájek et al., 2019; Runst & Thonipara, 2020; Sairinen, 2012). However, many people doubt the effectiveness of this measure and do not understand or do not believe in the steering effect of the tax. This is made clear in Dresner, Dunne et al.'s (2006) study about the attitude of the general public towards ecological tax reform policies in Europe, in which participants in focus groups and interviews stated that they were very critical of the tax reform. Several people did not understand how a tax could have a positive impact on the environment. The respondents saw environmental taxes purely as a means of raising revenue and not as an incentive for climate-friendly behaviour. There was also a suspicion that people were being tricked by the government by being told that the tax would benefit the environment (Dresner, Dunne et al., 2006). Given the findings from previous studies it is hypothesized that the perceived effectiveness of a carbon tax positively influences its acceptability.

Moreover, climate change is having a devastating impact on the environment and on people. This is now clearly noticeable in the form of rising temperatures, rising sea levels and an increase in natural disasters and extreme events such as heat waves and floods (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, 2022b). This is why there is widespread agreement among economists that action must be taken to mitigate climate change (Climate Leadership Council, n.d.-b). Nevertheless, there are differences in attitudes among the population towards climate change. There are people that hold sceptical opinions about climate change and have a different understanding and experience of it. Climate change can also be viewed differently because each person evaluates things differently and worries about diverse things. Besides that, conflicting messages are transmitted in the media, which are interpreted in different ways (Hulme, 2009). Previous studies have demonstrated the influence of public concern about climate change on the acceptability of climate policy measures. Jaensirisak et al. (2005) found that the level of concern about the environment influenced the acceptability of road pricing schemes. Participants who considered pollution to be a serious problem were more likely to accept charging. A study by DeBono et al. (2012) indicates that the perception of climate change as a serious risk to health and wellbeing is a strong predictor of the support for climate policy action. In addition, the findings of Sibley and Kurz's (2013) study demonstrate that beliefs about the reality of climate change were predictive of the support for policies to mitigate climate change. In a study by the Partnership for Market Readiness and the Carbon Pricing Leadership Coalition (2018) it is highlighted that it does not always make sense to cite climate protection as the main benefit in the communication of a carbon tax. The authors state that this only makes sense in countries where awareness of climate change is high, or where the issue is not politically polarized.

Based on the findings in previous literature, the following hypothesis is derived:

H_3: Political trust ($H_{3a)}$, effectiveness (H_{3b}) and the concern about climate change (H_{3c}) have an effect on acceptability.

2.5.2 Conceptual Model

The present study investigates how the information about the redistribution of the tax revenues to the population affects the social acceptability of the introduction of a carbon tax in Austria. Figure 4 illustrates the research model underlying the hypotheses consisting of two independent variables, a dependent variable, a mediator and three control variables.

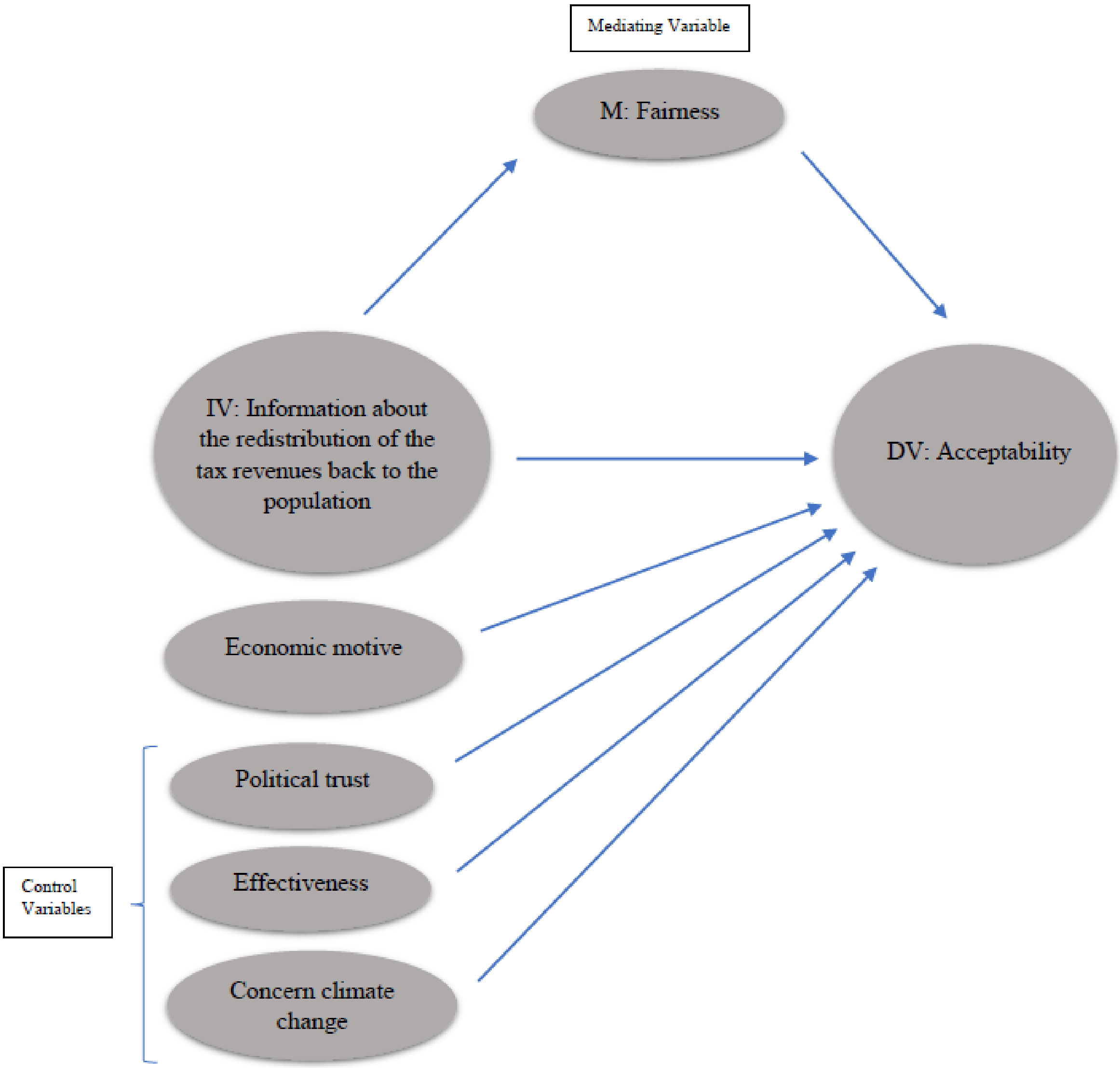

Figure 4: Conceptual research model (Own Illustration)

As illustrated in Figure 4 it is hypothesized that fairness mediates the relation between the information about the redistribution of the tax revenues back to the population and acceptability. It is assumed that returning the tax revenues to the population increases the perceived fairness of a carbon tax, which in turn has a positive impact on the tax's acceptability. Furthermore, it is assumed that the financial incentive created by the climate bonus (economic motive) may also influence the dependent variable. In addition, based on the literature, it is expected that political trust, effectiveness, and the concern about climate change influence acceptability, which is why these factors are included in the model as control variables.

3 Methodology

3.1 Research Design

3.1.1 Study Procedure

To be able to answer the research question, an online experiment was conducted with two treatment groups and a control group. An experimental approach was considered appropriate for this study, as it allows to test causal influence and not only correlative relationship (Reips, 2003). In addition, experimental research designs are often used in empirical studies that investigate public support for climate policies (Attari et al., 2009; Bechtel & Scheve, 2013; Bristow et al., 2010; Cherry et al., 2012).

For this study, a scenario-based approach, a special form of laboratory experiment (Bruns, 2016), was chosen to investigate a possible effect of the information about the redistribution of the tax revenue on societies' acceptability of a carbon tax. On the platform SoSci Survey three questionnaires were created, which were identical except for the treatments and one additional question in experimental group 1. The questionnaires were created in German as the study was conducted in Austria. To avoid respondents to omit questions, all questions were set as required fields, so participants had to provide an answer to every question in order to proceed. The survey period took place from 17/02/2022 to 14/03/2022.

Before the pre-test was started, the questionnaire was sent out via a pretest hyperlink to 5 people who were asked to leave comments about any uncertainties, comprehension problems or formatting errors in the text input. Some of the wording in the questions and stimuli was then adjusted based on the feedback of the participants.

On the first page of the questionnaire, participants were asked to answer the questions truthfully and were informed that there were no right or wrong answers. The respondents were also assured of anonymity. These measures were taken to reduce respondents' orientation towards socially desirable response behaviour. Thus, "Common Method Bias", variance caused by the measurement method, which can negatively influence data quality, can be avoided as far as possible (Söhnchen, 2009). After giving the participants an introduction to the topic, that was identical in all groups, the participants were randomly assigned to one of the three groups by a random generator. The stimulus was varied using the scenario method (Kim & Jang, 2014), i.e., the information about the redistribution of tax revenues was manipulated. A between-subject design was chosen, which implied that each individual experienced only one of the treatments of the experiment (Charness et al., 2012). All other conditions were the same between the three groups. The subjects were presented with one of the three scenarios and were asked to read it carefully. Based on the respective scenario, the participants were consequently asked to indicate their agreement or disagreement with statements used to measure their attitude towards the introduction of a carbon tax. Participants assigned to experimental group 1 (hereafter referred to as EG1) were informed that tax revenues would be returned to each Austrian citizen in the form of a per capita bonus (*Klimabonus*) (scenario 2). In contrast, the participants in experimental group 2 (hereafter EG2) were provided with the information that the tax revenues would be invested in climate protection projects, such as reforestation, forest protection or the expansion of renewable energy (scenario 3). The respondents in the control group (hereafter CG) were only told that a carbon tax would be introduced in Austria (scenario 1). Afterwards, the dependent variable acceptability was queried. The independent variables were then assessed using 5-point likert scales. To avoid a “Common Method Bias”, the dependent variable was queried before the independent variables. To check whether the manipulation of the independent variable was successful, participants were subsequently asked what the tax revenue was used for. In the end, participants were asked to provide various demographic data in the survey.

A total of two pre-tests were conducted to check and modify the questionnaires. To check the quality of the manipulation of the independent variable, a first pre-test was performed. Since the manipulation check showed that the dependent variable acceptability did not differ significantly between the groups, the stimuli were formulated in a more comprehensible way and an example was given in EG1, as it was assumed that the subjects did not perceive or understand the stimuli. Subsequently, a second pre-test was conducted, which showed that the manipulation was successful. 83,93 % of the participants answered the manipulation check question correctly.

3.1.2 Data Collection

In the present study, both the recruitment of participants and the data collection were carried out online. Conducting the survey online ensures that the data can be collected in a cost-effective and timely manner (Blasius & Brandt, 2009). Further reasons for piloting the study online were geographical independence and the avoidance of contacts in the context of the COVID-19 pandemic (Reips, 2003). Moreover, it seems more convenient to find participants for a study via the internet, which enables the recruitment of large samples and thus has a positive effect on statistical validity (Treiblmaier, 2011).

Despite the advantages mentioned, online surveys also involve certain risks, that can lead to lower data quality (Treiblmaier, 2011). It is problematic, for example, that only people with internet access can participate in the study, which means that certain groups cannot be reached at all. In terms of representativeness of the overall population, online samples are considered biased, especially in terms of age, gender and education (Blasius & Brandt, 2009).

Both in the pre-test and in the main study, the respondents were provided with a link to the online questionnaires that were created on the platform "SoSci Survey". The link to the questionnaire which led the participants to one of the three groups was sent via social media, such as WhatsApp, Facebook, and Instagram, as well as via e-mail.

3.1.3 Sample

The defined target group consists of people who are residents in Austria. For both the pre-test and the main study a convenience sample was acquired. Due to the strict timetable for conducting this study, convenience and snowball sampling were considered appropriate sampling methods. This non-probability sampling technique made it possible to recruit participants quickly and cost-effectively. In non-probability sampling, the probability that a person will be selected is unknown, leading to bias in the study (Acharya et al., 2013).

Convenience sampling is the most frequently used sampling method, as the sample is selected based on the convenience of the investigator. Many respondents are chosen because they happen to be in the right place at the right time. However, the limitations of convenience sampling, such as that variability and bias cannot be measured or controlled, need to be addressed. Also, generalization of the results beyond the sample is not possible (Acharya et al., 2013).

Snowball sampling, which is often defined as a form of convenience sampling (Naderifar et al., 2017; Parker et al., 2019), was used in this study as well to collect data. Friends and acquaintances were asked to forward the link of the study to friends and acquaintances who corresponded to the target group. Hence, a relatively high number of people were recruited for the study. Further advantages of the snowball sampling were, similar to the convenience sampling method, the low cost and time involved in this process. However, the disadvantages, such as a potential sampling bias, must also be considered here, as the initial participants selected additional participants and may have referred to people who display similar characteristics. Thus, a generalization of the results is not possible when applying this recruitment technique (Acharya et al., 2013).

In the **first pre-test**, 106 people took part, two of whom were excluded due to unrealistically short completion times. Of these 104 (n=104) people, 37 participants were in the CG, 32 in EG1 and 35 in EG2. 69.2% of the study participants were female which indicates that significantly more than half of the participants were women, 27.9% were male and 2.9% diverse. The sample is characterised by a high level of education, with almost 66.3% holding a university degree. Furthermore, 28.8% had a high-school degree (Matura). The age range of the respondents was from 18 to 65 years and the average age was 27.95 years (SD = 9.69).

In the **second pre-test**, 118 respondents participated. 6 subjects had to be excluded as their place of residence was outside of Austria. In addition, 18 people were excluded who could not remember the content of the stimulus, i.e., who did not answer the manipulation check question correctly. Of the remaining 94 (n = 94) participants 58.5% were female, 40.4% male and 1.1% diverse. 27 participants were part of the CG, 38 of the EG1 and 29 of the EG2. The sample is highly educated, with 69.1% holding a university degree and 28.7% having a high school degree. The respondents were between 19 and 68 years old and the average age was 29.38 years (SD = 10.200).

A total of 361 people participated in the **main study**. 19 subjects were excluded because their place of residence was outside of Austria. In order not to distort the results, participants were excluded if they answered the manipulation check question incorrectly. This resulted in the exclusion of a total of 88 datasets, which significantly reduced the sample size. After data cleaning, the final sample consisted of 254 (n = 254) respondents, 68 were in the CG, 97 in EG1 and 89 in EG2. 75.2% of the participants were female, 24.4 % male, and 0.4 % diverse. The proportion of women was thus clearly overrepresented. The participants had a high level of education, as 79.1% had a university degree and 19.3 % held a high school degree. As shown in Figure 5, the age of the participants ranged from 19 to 66 years with a mean value of 28.37 years (SD = 8.25).

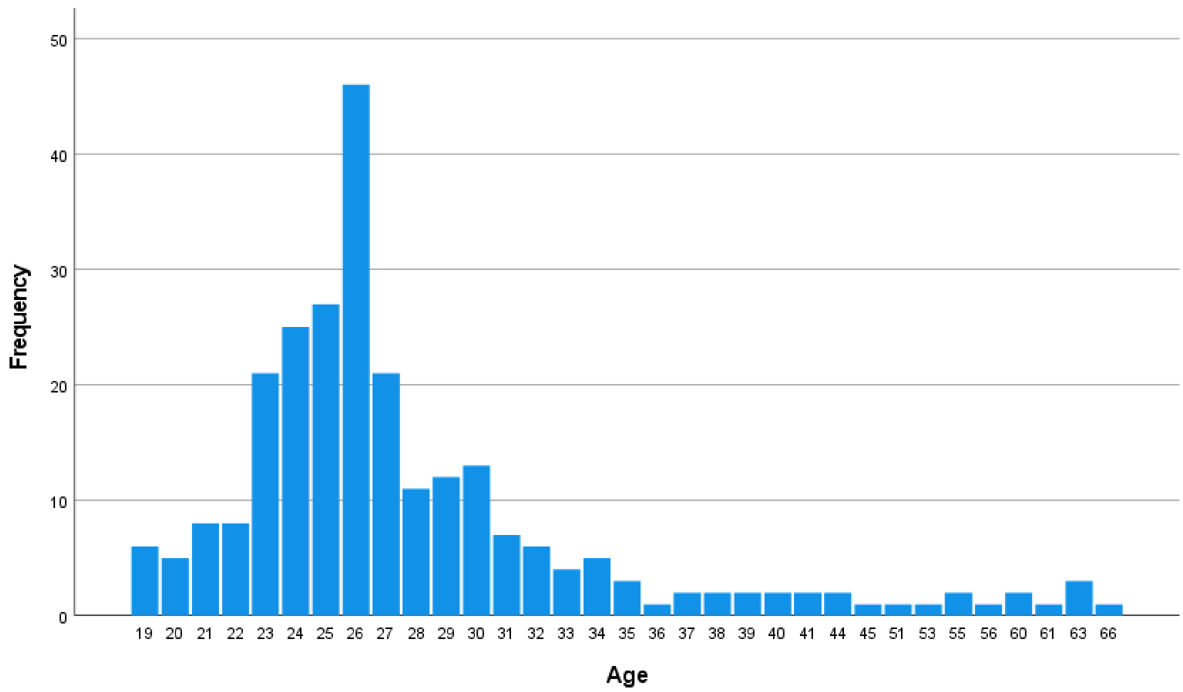

Figure 5: Age distribution of participants (main sample)

Furthermore, 76.8% of the respondents had Austrian citizenship, followed by 16.1% who had Italian citizenship and 4.3% who had German citizenship. Other nationalities indicated were Turkish, Polish, French, Hungarian, Czech, Russian and Luxembourgish. In terms of employment, the sample consisted of 50.4% students, 34.6% employees and 5.5% self-employed. The remaining 9.5% consisted of people working alongside their studies, workers, people on maternity leave, retired people, and teachers. One person stated that he/she was looking for work. About 40% of the participants stated that they received a monthly net income of more than 2001€ (Figure 6). Furthermore, 69.3% of the respondents are tenants and 30.7% are homeowners. Concerning the subjects' main place of residence, the majority (74%) stated that they were living in urban areas.

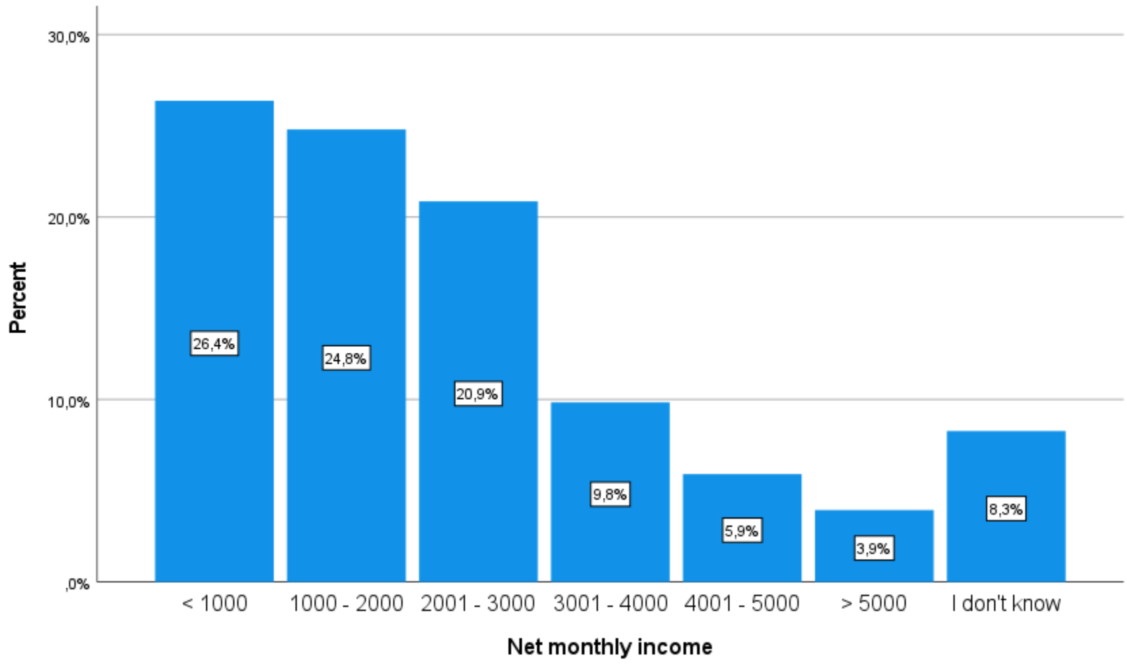

Figure 6: Participants' net monthly income (main sample)

Generally, the study results revealed that about 60% of the respondents consider the introduction of a carbon tax acceptable. Almost 30% do not agree with the introduction of a carbon tax and nearly 15% state to be uncertain about such a tax (see Figure 7).

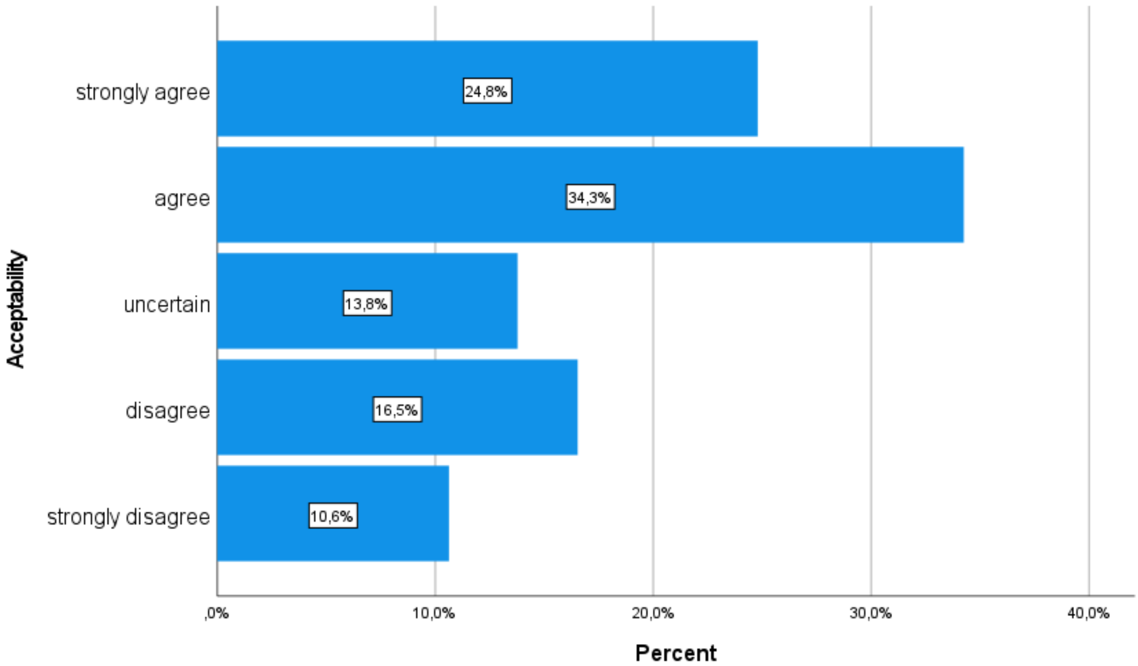

Figure 7: Acceptability of the introduction of a carbon tax

3.2 Measures

As already mentioned, the independent variable scenario (SCENARIO) was manipulated via the scenario technique. Figure 8 shows the treatment for EG1, which received the information that tax revenues would be refunded to the population via a climate bonus. The treatment was translated into English.

Please read the next paragraph **very carefully**! The questions on the following pages refer to this.

Imagine that the entire tax revenue generated by the carbon tax is refunded to each Austrian citizen via a "Klimabonus".

The revenues from the carbon tax will be refunded to the citizens as a per capita bonus. For you as an Austrian citizen, this means that you will receive a sum of money once a year, regardless of your carbon consumption. If you buy products with lower CO_2 emissions, you benefit from it as you may be refunded more than you paid for the carbon tax.

Considering this background, to what extent do you agree with the following statements?

Figure 8: Experimental treatment EG1: Scenario 2 (Own Illustration)

The further variables of interest were measured using 5-point Likert scales with two contrary endpoints “strongly disagree”, coded with 1, and “strongly agree”, coded with 5. The constructs were measured with single items. To measure the DV acceptability (ACCEPT) the respondents were asked to rate their level of agreement regarding the following item: “The price of gasoline will rise by 7.7 cents per liter (including VAT) if a carbon tax is introduced at a rate of 30 euros per ton of CO_2. I find this acceptable.”. The increase in the price of gasoline was used here as an example of a product that would become more expensive after the introduction of a carbon tax. Since it is more tangible for the subjects, it was decided to measure acceptability using a concrete product.

The further variables were also measured using five-point Likert scales. The following item was used to measure effectiveness (EFFECTIVE): “I believe that the carbon tax will reduce CO_2 emissions.”. Respondents were asked to express how much they agree or disagree with “I feel that a carbon tax is socially just.” to measure the mediating variable fairness (FAIR). In EG1, an additional variable was collected to assess the economic motive (ECONMO). The following statement was used for this purpose: “With the rebate of tax revenues to the population, I believe that I will ultimately get more money back than I pay through the increased prices due to the carbon tax”. To measure political trust (POLITRUST) respondents were asked to rate this statement according to the level of their agreement: “I have confidence in the work of the current government of my country.”. The following statement was used to measure the respondents' level of concern about climate change (CONCLIMATE): “I am concerned about climate change.”.

Since the results of the first pre-test indicated that the redistribution of tax revenues back to the population could not have any influence on the acceptability of the carbon tax, a manipulation check question was integrated in the second pre-test. The question was used to check whether the respondents had perceived the stimulus. The subjects were asked the following question: “Do you remember what the tax revenues generated by the carbon tax are used for?”. The response options were as follows: “The revenues are invested in climate protection projects”, “The revenues are rebated to the population via a climate bonus”, “The revenues are used to reduce income tax” and “This information was not provided in the questionnaire”.

4 Analysis and Results

4.1 Analysis of the Pre-Tests

The collected data was analysed using the statistics programme IBM SPSS Statistics 26. Before the analysis, the data was cleaned and screened. The variable names have been modified for clarity and consistency. Furthermore, the scale levels were checked and changed if necessary.

In the **first pre-test**, the subjects in EG1 who received the information about the redistribution of the revenues ($M = 3.56$, $SD = 1.134$) had a slightly higher acceptability than the subjects in the CG ($M = 3.32$, $SD = 1.355$) and EG2 ($M = 3.34$, $SD = 1.110$). A manipulation check using an ANOVA was performed, to analyse the difference of acceptability between the three groups. The assumptions of normality and homoscedasticity were checked. Acceptability was not normally distributed in all the three groups as assessed by the Shapiro-Wilk-Test, $p < .05$. However, the violation of this assumption is not a problem with $n > 30$, according to the Central Limit Theorem. The result of the Levene's Test showed that homogeneity of variance could be assumed ($p=.148$). The conducted ANOVA showed that there was no significant difference in acceptability between the groups, F(2, 101) = .399, p = .672. This implies that the manipulation did not show the expected effects.

With the data collected of the **second pre-test** a manipulation check was performed. As a first step, an ANOVA was conducted with all the participants, except those who had been excluded as their place of residence was outside of Austria (n = 112). Acceptability was divided into three groups: group 0 (M = 3.33, SD = 1.352), group 1 (M = 3.79, SD = .951) and group 2 (M = 3.11, SD = 1.390). The Shapiro-Wilk-Test showed that acceptability was not normally distributed in all groups (p < .05). With a subject number above 30 this is not problematic according to the Central Limit Theorem. Levene's Test was significant (p < .05), indicating unequal variances. Accordingly, Welch's ANOVA was interpreted and it showed that acceptability differed significantly between the groups, F(2, 68.87) = 3.56, p < .05. Since the groups had unequal variances, Dunnet's T3 was chosen for a post hoc test, which revealed that the means of EG1 (group1) and EG2 (group 2) differed significantly (p = .044).

In a second step, the datasets of the participants that did not answer the manipulation check question correctly, were eliminated and only the mean differences of the remaining datasets (n = 94) were analysed. A slight difference in the group means was noticeable when checking the descriptive statistics: the mean of group 0 was 3.19 (SD = 1.442), the mean of group 1 was 3.76 (SD = .943) and the mean of group 2 was 3.03 (SD= 1.451). Before conducting an ANOVA, its assumptions were tested. The Shapiro-Wilk test showed that none of the groups was normally distributed in acceptability (p < .05). Due to a significant Levene's Test (p < .001), the null hypothesis of equal group variances was rejected, and the heterogeneity of variances was assumed. As the assumptions of normality and homogeneity of variances were not met by the data, a Kruskal Wallis Test was carried out. No significant differences in the level acceptability were found between the three groups, H(2) = 4.268, p = .118. The analysis exhibited that significance disappeared when removing those participants who answered the manipulation check question incorrectly.

4.2 Main Data Analysis

The main analysis was also carried out with IBM SPSS Statistics 26. Before the analysis was conducted, data screening and cleaning was performed. In total, 254 (n=254) valid cases were analysed. The participants who indicated that they did not live in Austria were removed, as they did not correspond to the defined target group.

Redistribution of the Revenues Back to the Population and Acceptability - Direct Effect

In H_{1a} it is assumed that the information about the redistribution of the tax revenues back to the population positively affects the acceptability of the introduction of a carbon tax. The independent variable SCENARIO was divided into three groups: scenario 1 (M = 3.28, SD = 1.280), scenario 2 (M = 3.59, SD = 1.256) and scenario 3 (M = 3.46, SD = 1.390). To investigate whether the acceptability scores differed between the three groups, a one-way ANOVA was conducted. As assessed by the Shapiro-Wilk-Test, acceptability was not normally distributed in all groups, $p < .05$. However, with a subject number above 30, normality can be assumed. The Levene's Test showed that equal variances could be assumed ($p = .173$). Therefore, the assumptions of normal distribution and homogeneity of variances were fulfilled by the data, and the ANOVA was conducted. The ANOVA showed no statistically significant difference in acceptability scores for the different scenarios ($F(2, 251) = 1.11$, $p = .333$). Therefore, the null hypothesis, which assumed that the means of the groups did not differ, had to be retained. In addition, it was tested whether there were significant differences between two groups. The t-test showed that there was no statistically significant difference between the acceptability of the CG and EG1, $t(163) = -1.539$, $p = .126$. In addition, there were no significant differences between CG and EG2, $t(155) = -.838$, $p = .404$. EG1 and EG2 also did not differ significantly, $t(184) = .654$, $p = .514$. Hence, the null hypothesis, i.e. that the group means do not differ, must be retained.

However, Rucker et al. (2011) doubt the relevance of the existence of a direct effect in mediations and conclude that there can be an indirect relationship even without a direct effect. Hayes (2009) and Zhao et al. (2010) also support the view that a significant direct effect is not a prerequisite for a mediation analysis. Based on these findings, it was decided to further analyse the different paths of the mediation even if there was no significant direct effect. In the following section, the analysis of the individual paths of the mediation model with linear regressions will be presented.

Redistribution of the Revenues Back to the Population and Fairness

It was analysed if fairness differed significantly between the three groups. For this purpose, an ANOVA was performed. The assumptions of normality and homogeneity of variances were not fulfilled by the data, as shown by a significant Shapiro-Wilk-Test ($p < .001$) and a significant Levene's Test ($p < .05$). The violation of normality is not problematic however, as the subject number is above 30. Due to unequal variances, Welch's ANOVA was conducted. It displayed that fairness differed significantly between the groups, Welch's $F(2, 162.46) = 4.72$, $p < .05$.

Moreover, Dunnet's T3 post-hoc analysis revealed a significant difference ($p < .05$) between the means of group 0 and 1.

Fairness and Acceptability

In order to investigate the relationship between fairness and acceptability, a simple linear regression analysis was carried out. All assumptions for the linear regression were checked in advance. These were all fulfilled except for two outliers. To test the influence of the outliers, Cook's distance was calculated. The highest value was 0.097, which suggests that the two outliers do not deviate much from the regression line. For this reason, the outliers were retained. As a next step, the regression model as a whole and the individual regression coefficients were tested for statistical significance. The results indicated that 20.3% of the variance in the data can be explained by fairness ($R^2 = .20$), indicative for a relatively good model. The results of the ANOVA exhibited that the model can explain acceptability ($F(1, 252) = 64.19, p < .001$). The findings showed that fairness significantly positively predicts acceptability ($B = 0.483, p < .001$). This result confirmed hypothesis H_{1c}, which states that the perceived fairness of a carbon tax positively affects its acceptability.

Fairness as a Mediator

A hierarchical regression analysis was performed in order to test if the direct effect differed when integrating the mediator into the model. For this purpose, two dummy variables called "Szenario1" and "Szenario2" were created for the two experimental groups with the value 1 for 'yes' and 0 for 'no'. The CG (Group 0) served as the reference category. Model 1 only contained the dummy variables and in model 2 fairness was integrated. It was noticed that the result of the Durbin Watson Test was very low with .256, which suggests that important explanatory factors are missing. For this reason, the model was additionally estimated with robust standard errors and yielded the same results as presented below. In model 1, R^2 is very low with .09 indicating that a low percentage (9%) of the variance of acceptability can be explained by model 1. This confirms the result of the previously conducted ANOVA when analysing the direct effect, where no significant differences in acceptability between the groups were found. The R^2 in model 2 was .20 (adjusted $R^2 = .19$). For model 1 the ANOVA presented no significant results ($F(2, 251) = 1.105, p = .333$) whereas model 2 explained acceptability ($F(3, 250) = 21.341, p < .001$). The results showed that the groups did not differ significantly in their acceptability. It was noticed that the significance levels of "Szenario1" and "Szenario2" were considerably higher in model 2 than in model 1. This illustrates that even if there was no significant direct effect, the mediator explained a part of the variance between group and acceptability. In line with the results of the simple linear regression analysis, fairness was still significant in model 2 (B = 0.482, $p < .001$). After analysing each individual path of the mediation model, the findings demonstrated that there is no mediation, as the direct effect is not significant, but an indirect relationship exists between the groups and acceptability.

Economic Motive and Acceptability

First, the data of ECONMO were analysed descriptively. A close look was taken at the frequencies, which are illustrated in the following graph (Figure 9).

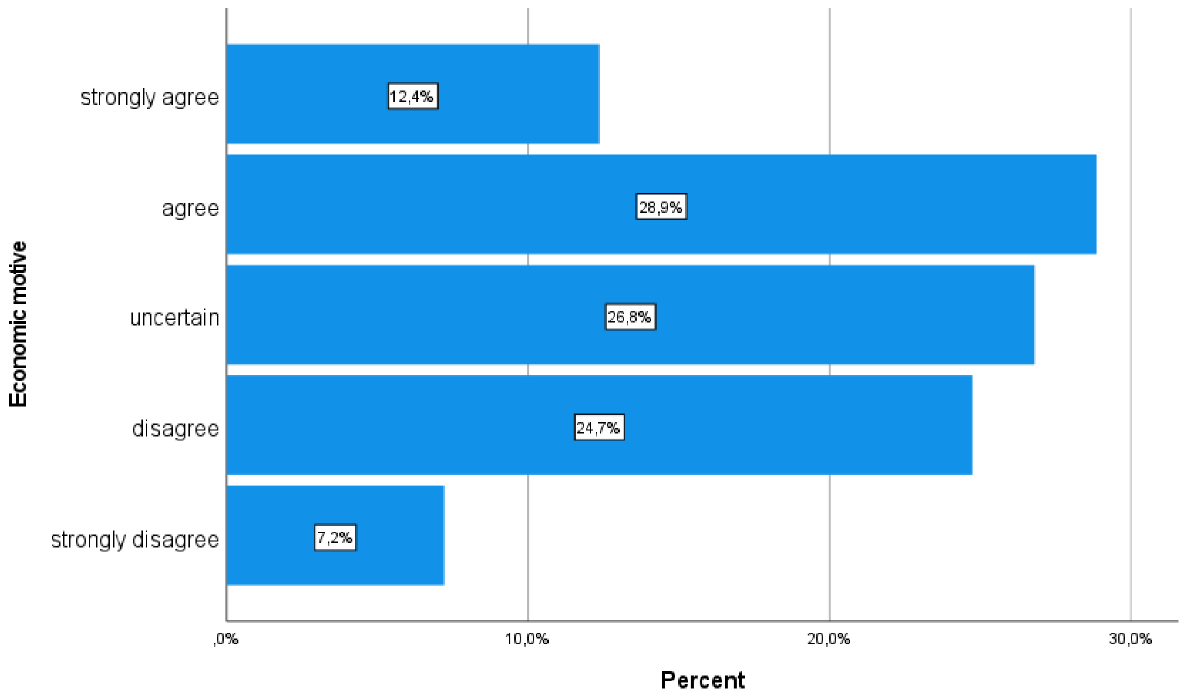

Figure 9: Percentage frequency distribution of the variable economic motive

The participants in EG1 (n = 97) were asked if they believed that they would ultimately get more money back through the climate bonus than they paid through the increased prices due to the carbon tax. They were asked to rate their agreement with this statement on a 5-point Likert scale. The percentage frequency distribution reveals that there is no clear tendency. The mean value is 3.14 (SD 1.146). 41.3% believe that they will get more money back from the climate bonus than they pay for the carbon tax. 31.9% state that they do not believe that the climate bonus exceeds their increased expenditure. In addition, 26.8% of the respondents claim to have a neutral stance, which could be attributed to the “central tendency bias” (Douven, 2018, p. 1203), i.e. the tendency of respondents to select answers close to the midpoint on Likert scales.

The relationship between the economic motive and acceptability was investigated using a simple linear regression analysis. All assumptions for the linear regression were checked and were met by the data. The results indicated that 13% of the variance in the data can be explained by the economic motive ($R^2 = .13$). The results of the ANOVA demonstrated that the model can predict acceptability ($F(1, 95) = 14.17, p < .001$). Moreover, the findings showed that the economic motive significantly positively predicted acceptability ($B = .395, p < .001$). Since the residuals were not independent, the model was estimated with robust standard errors, which showed the same result. Thus, H_2, which assumed that an economic motive positively influenced the acceptability of a carbon tax, is confirmed.

Table 1: Overview of linear regression models

Acceptability	**Model 1**	**Model 1**	**Model 2**	**Model 3**
Fairness	0.483*** (0.060)		0.482*** (0.062)	0.295*** (0.063)
Szenario1		0.308 (0.207)	0.057 (0.189)	0.096 (0.175)
Szenario2		0.181 (0.211)	-0.032 (0.192)	0.110 (0.178)
Concern climate change				0.383*** (0.091)
Political trust				0.092 (0.072)
Effectiveness				0.235*** (0.064)
Constant	2.216*** (0.172)	3.279*** (0.159)	2.210*** (0.198)	0.007 (0.420)
Adjusted R^2	0.200	0.001	0.194	0.315

Notes: Table shows unstandardized regression coefficients

* p < .05, ** p < .01, *** p < .001

Control Variables

In order to investigate whether the collected control variables predicted the DV, concern about climate change, political trust and effectiveness were entered into model 3. First, it was checked for multicollinearity and this assumption was met by the data. In model 3, the R^2 was .33 (adjusted R^2 = .32), which indicates a high goodness-of-fit according to Cohen (1988). The adjusted R^2 was higher in model 3 implying that this model explained the dependent variable better than model 1 and 2. It was found that the model was significant ($F(6, 247) = 20.35$, $p <$ .001). The analysis showed that "Szenario1" and "Szenario2" still did not significantly predict acceptability. As in model 2, fairness continued to have a significant positive effect ($B = 0.295$, $p < .001$). Concern about climate change also had a significant positive effect ($B = 0.383$, $p <$ .001). Political trust, however, had no significant effect. It was further found that effectiveness significantly predicted acceptability ($B = 0.235$, $p < .001$). Since the independence of residuals was not given, the model was estimated with robust standard errors. This yields the same result as presented above.

Table 2: Overview of hypotheses and their support (Own

Hypothesis	**Support**
H_{1a}: The information about the redistribution of the tax revenues back to the population positively affects the acceptability of the introduction of a carbon tax.	×
H_{1b}: The information about the redistribution of the tax revenues back to the population positively affects the perceived fairness of a carbon tax.	✓
H_{1c}: The perceived fairness of a carbon tax positively affects the acceptability of the introduction of a carbon tax.	✓
H_2: An economic motive positively affects the acceptability of the introduction of a carbon tax.	✓

H$_{3a}$: Political trust affects acceptability.	×
H$_{3b}$: Effectiveness affects acceptability.	✓
H$_{3c}$: Concern about climate change affects acceptability.	✓

✓ = supported

× = rejected

5 Discussion

This study aimed at investigating the social acceptability of the introduction of a carbon tax in Austria. The goal was to obtain an understanding of the respondent's opinion about a carbon tax when presented with information about how the revenue is used. The effect of the redistribution of the tax revenues back to the population on the acceptability of a carbon tax was assessed using an online experiment with 254 subjects. The experiment was conducted with two treatment groups and a control group.

To check the quality of the treatments, two pre-tests were conducted. In the analysis of the first pre-test, no significant group differences were found. For this reason, a second pre-test was conducted, as it was suspected that the manipulation had not worked. The treatments were edited and formulated more comprehensibly. In addition, a manipulation check question was included to ensure that the lack of variation was not caused by a weak or incomprehensible manipulation. In the second pre-test it was found that the manipulation worked, as 83,93 % of the participants answered the manipulation check question correctly

The main analysis led to the result that, contrary to expectations that there existed an effect between the groups and acceptability mediated through fairness, no direct significant relationship between group assignment and acceptability could be found. It should be noted, however, that due to the data collection method, the sample was not representative. It is quite possible that a significant direct effect could be detected when analysing a representative sample. Another possible reason for the absence of the direct effect in this study can be the measurement of acceptability through only one item. In order to illustrate to the participants how the population is affected by the introduction of a carbon tax, an example, namely the price increase of gasoline, was used. Given that example, it is important to consider that subjects who do not own a car may be more accepting, since they are not directly affected by the increase in gasoline prices. For this reason, it can be speculated that a significant effect of the group assignment on acceptability could exist if acceptability was measured in a more differentiated way.

Although no direct effect could be proven in the present study, the results revealed that the group assignment had an indirect effect on the acceptability of a carbon tax via the fairness. Relying on the findings of Hayes (2009) and Zhao et al. (2010), the indirect relationship between the group allocation and acceptability was explored even though the direct effect was not significant. These results are in line with the study of Rucker et al. (2011) that provides evidence that the lack of the direct effect, does not preclude the occurrence of indirect effects. The study results indicate that group assignment has an effect on acceptability, yet only via different factors.

Based on Shultz and Halstead (2018), the results showed a significant relationship of economic motive and acceptability. This confirmed H_2. In line with the findings of Jaensirisak et al. (2005) and Schade and Schlag (2003), a significant effect of effectiveness and concern about climate change on acceptability was found, as hypothesized in H_{3b} and H_{3c}. However, H_{3a}, which assumed political trust had an effect on acceptability could not be confirmed. This result contrasts with previous study findings (Alm & Torgler, 2011; Scholz & Lubell, 1998) that found that political trust affects the acceptability of a carbon tax. It is possible that a different measurement of the variable political trust could lead to different results.

From a theoretical point of view, the present study contributes to a better understanding of society's perception of a carbon tax in Austria by filling an important research gap through the investigation of the connection between the use of tax revenues, and here in particular, the redistribution of tax revenues back to the citizens, and the social acceptability of a carbon tax. A meaningful and highly interesting finding of the study is that a significant indirect relationship can exist in a mediation even without a significant direct effect. This is in line with several authors who question the relevance of a direct effect of mediation (Rucker et al., 2011; Zhao et al., 2010). They conclude that it should be considered less important, and they point out that an indirect relationship can be present without a direct effect. The current study shows that it is reasonable to explore indirect effects regardless of the significance of the direct effect.

Furthermore, this study also provides a meaningful practical contribution. The findings of this work are particularly relevant for policymakers and legislators in in order to be able to point out what needs to be considered when designing and communicating a carbon tax to achieve a high level of acceptability among the population. The results show that information about the redistribution of tax revenues back to the population positively influences the perceived fairness of a carbon tax. A carbon tax was perceived as significantly fairer by subjects who received the information about the refund of the revenues via a climate bonus. This is a valuable finding, as carbon taxes are often considered unfair (McLaughlin et al., 2019). The present study provides evidence that a climate bonus is a suitable compensation measure to increase the perceived fairness of a carbon tax. It was also shown that the fairer the carbon tax was evaluated, the higher was its acceptability. For this reason, the climate bonus should be a crucial part in the communication strategy of the carbon tax. Moreover, the results demonstrate that the more effective a carbon tax is evaluated, the higher its acceptability is. For this reason, the population should be informed about the steering effect of a carbon tax, since many people do not understand how the mechanisms of a carbon tax work. Information campaigns should be launched to create awareness about the effectiveness of climate protection instruments in order to increase their acceptability. In addition, the results displayed that concern about climate change also predicted acceptability, from which another recommendation for action can be derived. Targeted communication measures also play a key role when it comes to addressing the consequences of climate change. The development of strategic communication concepts on the part of policymakers is necessary in order to raise awareness for the concrete effects of climate change and to draw attention to them. This should ensure that the dramatic consequences of the global warming are recognized by citizens.

6 Conclusion

The effects of climate change are becoming increasingly noticeable and visible. For this reason, the EU agreed upon the goal to cut emissions by 55% by 2030. In view of this ambitious target and Austria aiming to achieve climate neutrality by 2040, in addition to existing climate protection policies, further measures are necessary to drastically reduce GHG emissions. The implementation of a carbon tax is considered to be a highly effective method of mitigating GHG emissions. Such a tax creates an incentive for people to switch to climate-friendly alternatives. However, various countries are reluctant to implement such a tax as it is difficult to obtain public support for new taxes, especially environmental taxes. As a broad social consensus is a prerequisite for the implementation of carbon pricing policies, the investigation of determinants of public acceptability of carbon taxes is highly important. The relevance of the topic and the fact that little research has been done on the effect of the revenue use on the acceptability of a carbon tax motivated the composition of this master's thesis. The aim was to examine the impact of the information about the redistribution of the tax revenues back to the population on social acceptability of the introduction of a carbon tax in Austria.

The results of the analysis could not confirm a direct effect between the reimbursement of the tax revenues and public acceptability, however, provide evidence for an indirect relation. The redistribution of the tax revenues back to the population via a climate bonus positively affects the perceived fairness of a carbon tax which in turn affects its acceptability. The major conclusion is that paying a climate bonus leads to a carbon tax being perceived as fairer and an increase in fairness leads to a higher acceptability. Shedding light on the presence of this indirect effect represents the key finding of this thesis. In addition, the study also revealed that effectiveness and concern about climate change have a significantly positive effect on acceptability. Another positive effect on acceptability is the financial incentive provided by the payment of the climate bonus.

Regarding the limitations of this study, it has to be noted that the questionnaire lacked a post-experimental debriefing to inform the participants about the intentions of the study. Some of the subjects assigned to Scenario 3 were confused about the information of revenues being invested in climate protection projects. This can be attributed to the fact that some of the participants already knew that the tax revenue from the Austrian carbon tax will be refunded to the citizens via a climate bonus. To counteract the confusion of the subjects, a debriefing would have been useful. Furthermore, the recruited sample was not representative due to the convenience sampling method, which explains the high proportion of students and young people. A representative reflection of the population could be achieved with a larger random sample. The fact that the experiment was conducted online also resulted in the exclusion of people without internet access. This also affects the representativeness of the sample, as certain groups could not be reached at all.

In general, further research is needed, to investigate whether compensation measures have an impact on the acceptability of a carbon tax, as especially in German-speaking countries this is a sparsely researched study area. Further studies in the field of carbon tax acceptability are absolutely necessary, as the support of the population is fundamental for the introduction of climate protection measures. A recommendation for future research is to measure acceptability with several items in order to capture the construct in a more differentiated way and thus to obtain more precise results. In addition, a similar study should be conducted on a larger scale with a bigger sample in order to attain more meaningful results.

Moreover, future research should focus on the influence of the level of the tax on acceptability. Due to the limited scope and time of this study, it was only possible to investigate the acceptability of the tax rate that will be introduced in Austria in July 2022 (EUR 30 /t CO_2). Since this tax rate and the planned tax increase of 55 euros per tonne CO_2 in 2025 is far below the recommendations of the scientific community to achieve significant emissions reductions, it is also necessary to investigate to what extent higher tax rates are accepted by the population.

Furthermore, the present study focused only on the acceptability of the introduction of a carbon tax which refers to the evaluation of a policy that will be implemented in the future. Therefore, conducting a similar study, which investigates the acceptance of the carbon tax in Austria after the tax has been introduced, could be of interest for further research. Respondents could evaluate the carbon tax based on their own experience after the tax had been implemented. They could then actually assess whether a behavioural change towards a more environmentally friendly way of living is incentivised by the tax. Furthermore, they could individually evaluate whether the climate bonus exceeds the costs of the price increase. In conclusion, it is of major importance to investigate further determinants of the acceptability and acceptance of carbon taxes. In order to achieve the climate targets and thus mitigate the severe consequences of climate change, further climate protection policies are necessary, and achieving their social acceptability is a prerequisite for their implementation.

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Appendix

Appendix A. Questionnaire and Scenarios in German

0% ausgefüllt

Liebe Teilnehmer*innen!

Ich freue mich, dass Sie sich die Zeit nehmen, diesen Fragebogen auszufüllen. Mein Name ist Mathilde Dalsass, ich bin Studierende des Masterstudiums Internationale Betriebswirtschaft mit Vertiefung Marketing & Internationales Marketing an der Universität Wien. Im Rahmen meiner Masterarbeit führe ich eine Befragung zur gesellschaftlichen Akzeptanz einer CO_2-Steuer durch.

Bitte nehmen Sie an der Umfrage nur teil, wenn Sie derzeit **in Österreich** leben.

Das Ausfüllen des Fragebogens wird in etwa **3 Minuten** in Anspruch nehmen. Bitte lesen Sie die Fragen **sorgfältig** durch und beantworten Sie diese wahrheitsgemäß. In diesem Fragebogen gibt es keine richtigen oder falschen Antworten.

Ihre Teilnahme an der Umfrage erfolgt freiwillig und völlig anonym. Ihre Daten und alle von Ihnen gemachten Angaben werden vertraulich behandelt und nur für diesen wissenschaftlichen Forschungszweck verwendet.

Bei Fragen zur Studie können Sie sich gerne an mich wenden: a01404899@unet.univie.ac.at

Vielen Dank für Ihre Teilnahme und Unterstützung!

Zum Starten der Umfrage bitte auf "weiter" klicken.

Weiter

B.A. Mathilde Dalsass, Universität Wien – 2022

0% ausgefüllt

1. In welchem Land leben Sie derzeit?

[Bitte auswählen]

Weiter

10% ausgefüllt

Einführung ins Thema:

Da die Auswirkungen des Klimawandels zunehmend spürbar werden, müssen Treibhausgasemissionen erheblich reduziert und schrittweise eingestellt werden. Eine mögliche Maßnahme ist die Einführung einer CO2-Steuer, die zu einem Anstieg der Preise von fossilen Energieträgern wie Benzin, Diesel, Heizöl, Erdgas und Kohle führt.

Konkret wird jedes Produkt dabei in Abhängigkeit vom verursachten CO2-Ausstoß besteuert. Für 1 Liter Heizöl bedeutet das beispielsweise einen Preisanstieg von 9,7 Cent. Diesel wird um 8,8 Cent / Liter teurer.

Einer Bepreisung von CO2 liegt der Gedanke zugrunde, dass die negativen Effekte auf die Umwelt im Preis mitberücksichtigt werden sollen. Durch den Preisanstieg sollen die Menschen dazu angeregt werden, klimaschädliche Güter sparsamer zu verwenden und auf klimafreundlichere Alternativen umzusteigen.

Weiter

Scenario 1

20% ausgefüllt

Bitte lesen Sie sich den folgenden Absatz **ganz genau** durch! Die Fragen auf den kommenden Seiten beziehen sich darauf.

Stellen Sie sich vor, dass in Ihrem Land eine CO_2-Steuer eingeführt wird.

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen.

Weiter

Scenario 2

9% ausgefüllt

Bitte lesen Sie sich den folgenden Absatz **ganz genau** durch! Die Fragen auf den kommenden Seiten beziehen sich darauf.

Stellen Sie sich vor, dass die gesamten Steuereinnahmen, die durch die CO2-Steuer generiert werden, in Form eines „Klimabonus“ an jede/n Bürger*in Österreichs rückvergütet werden.

Die Einnahmen aus der CO2-Steuer werden an die Bürger*innen als Pro-Kopf-Prämie rückvergütet. Für Sie als österreichische/r Bürger*in bedeutet das, dass Sie einmal pro Jahr einen Geldbetrag überwiesen bekommen, unabhängig von Ihrem CO2-Verbrauch. Wenn Sie Produkte mit weniger CO2-Ausstoß kaufen, profitieren Sie also, weil Sie ggf. mehr zurückbekommen als Sie CO2-Steuer bezahlt haben.

Inwieweit stimmen Sie den folgenden Aussagen vor diesem Hintergrund zu?

Weiter

Scenario 3

10% ausgefüllt

Bitte lesen Sie sich den folgenden Absatz **ganz genau** durch! Die Fragen auf den kommenden Seiten beziehen sich darauf.

Stellen Sie sich vor, dass die gesamten Steuereinnahmen, die durch die CO2-Steuer generiert werden, in Klimaschutzprojekte investiert werden. Die Einnahmen werden beispielsweise verwendet, um Aufforstung, Waldschutz oder den Ausbau erneuerbarer Energien zu finanzieren.

Inwieweit stimmen Sie den folgenden Aussagen vor diesem Hintergrund zu?

Weiter

30% ausgefüllt

2. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Der Benzinpreis steigt um 7,7 Cent pro Liter (inkl. Mehrwertsteuer), wenn eine CO2-Steuer mit einem Steuersatz von 30 Euro pro Tonne CO2 eingeführt wird. Ich empfinde dies als akzeptabel.	○	○	○	○	○

Weiter

40% ausgefüllt

3. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Ich glaube, dass die CO2-Steuer zu einem Rückgang der CO2-Emissionen führen wird.	○	○	○	○	○

Weiter

50% ausgefüllt

4. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Ich empfinde eine CO2-Steuer als sozial gerecht.	○	○	○	○	○

Weiter

60% ausgefüllt

5. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Ich empfinde den Klimawandel als besorgniserregend.	○	○	○	○	○

Weiter

70% ausgefüllt

6. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Ich habe Vertrauen in die Arbeit der amtierenden Regierung meines Landes.	○	○	○	○	○

Weiter

80% ausgefüllt

7. Erinnern Sie sich, wofür die Steuereinnahmen, die durch die CO2-Steuer generiert werden, verwendet werden?

- ○ Die Einnahmen werden in Klimaschutzprojekte investiert
- ○ Die Einnahmen werden in Form eines „Klimabonus" an die Bevölkerung rückvergütet
- ○ Die Einnahmen werden zur Reduzierung der Einkommensteuer verwendet
- ○ Diese Information wurde im Fragebogen nicht mitgeteilt

Weiter

90% ausgefüllt

8. Welches Geschlecht haben Sie?

[Bitte auswählen]

9. Wie alt sind Sie?

Bitte geben Sie Ihr Alter in vollen Jahren an.

Ich bin... ____ Jahre alt.

10. Welche Staatsbürgerschaft(en) besitzen Sie?

- ☐ Österreichische Staatsbürgerschaft
- ☐ Deutsche Staatsbürgerschaft
- ☐ Italienische Staatsbürgerschaft
- ☐ Sonstige: ____

11. Welcher ist der höchste Bildungsabschluss, den Sie haben?

- ○ Pflichtschule
- ○ Lehre
- ○ Matura
- ○ Universität/Fachhochschule
- ○ Sonstiges: ____

12. Was ist Ihre derzeitige Beschäftigung?

- ◯ Schüler*in
- ◯ Studierende*r
- ◯ Angestellte*r
- ◯ Arbeiter*in
- ◯ Selbstständig
- ◯ Ruhestand
- ◯ Sonstiges: [ ]

13. Wie hoch ist Ihr Nettohaushaltseinkommen pro Monat?

- ◯ <1000
- ◯ 1000 bis 2000
- ◯ 2001 bis 3000
- ◯ 3001 bis 4000
- ◯ 4001 bis 5000
- ◯ mehr als 5000
- ◯ weiß nicht

14. Wo befindet sich Ihr Lebensmittelpunkt?

- ◯ In der Stadt
- ◯ Am Land

15. In welcher Eigenschaft nutzen Sie derzeit Ihren Wohnraum?

- ◯ Eigentümer*in
- ◯ Mieter*in

16. Wie viele Personen leben in Ihrem Haushalt insgesamt?

Bitte Personenanzahl eintragen: [ ]

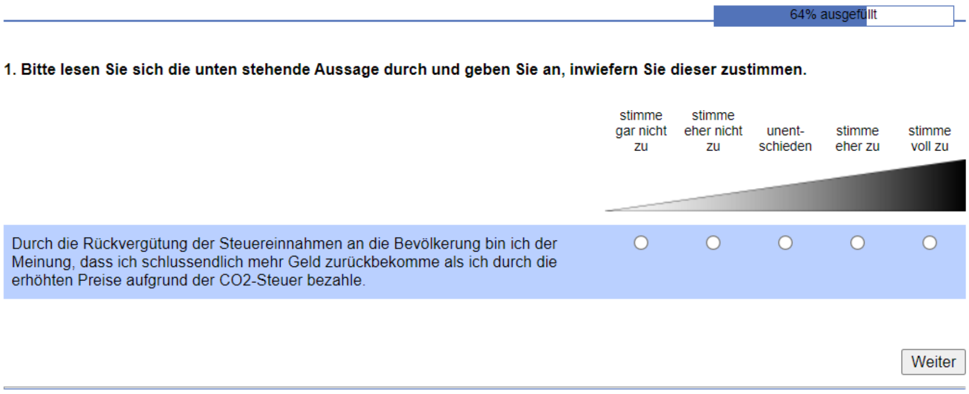
Weiter

Vielen Dank für Ihre Teilnahme!

Wir möchten uns ganz herzlich für Ihre Mithilfe bedanken.

Ihre Antworten wurden gespeichert, Sie können das Browser-Fenster nun schließen.

Additional question in EG1:


64% ausgefüllt

1. Bitte lesen Sie sich die unten stehende Aussage durch und geben Sie an, inwiefern Sie dieser zustimmen.

	stimme gar nicht zu	stimme eher nicht zu	unent-schieden	stimme eher zu	stimme voll zu
Durch die Rückvergütung der Steuereinnahmen an die Bevölkerung bin ich der Meinung, dass ich schlussendlich mehr Geld zurückbekomme als ich durch die erhöhten Preise aufgrund der CO2-Steuer bezahle.	○	○	○	○	○

Weiter

Appendix B.

Pretest 1 Demographics

Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CG	37	35.6	35.6	35.6
	EG1	32	30.8	30.8	66.3
	EG2	35	33.7	33.7	100.0
	Total	104	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	72	69.2	69.2	69.2
	male	29	27.9	27.9	97.1
	divers	3	2.9	2.9	100.0
	Total	104	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	104	18	65	27.95	9.692
Valid N (listwise)	104				

Education

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Matura	30	28.8	28.8	28.8
	University	69	66.3	66.3	95.2
	Other	5	4.8	4.8	100.0
	Total	104	100.0	100.0	

Appendix C.

Pretest 1 Data Analysis

Descriptives

Acceptability

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
0	37	3.32	1.355	.223	2.87	3.78	1	5
1	32	3.56	1.134	.200	3.15	3.97	1	5
2	35	3.34	1.110	.188	2.96	3.72	1	5
Total	104	3.40	1.203	.118	3.17	3.64	1	5

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Gruppe	Statistic	df	Sig.	Statistic	df	Sig.
Acceptability	0	.286	37	.000	.856	37	.000
	1	.213	32	.001	.893	32	.004
	2	.266	35	.000	.886	35	.002

a. Lilliefors Significance Correction

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Acceptability	Based on Mean	1.944	2	101	.148
	Based on Median	.391	2	101	.678
	Based on Median and with adjusted df	.391	2	96.686	.678
	Based on trimmed mean	1.851	2	101	.162

ANOVA

Acceptability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.170	2	.585	.399	.672
Within Groups	147.869	101	1.464		
Total	149.038	103			

Appendix D. Pretest 2 Demographics

(n=94)

Manipulation Check * Group Crosstabulation

Count

		Group			Total
		CG	EG1	EG2	
Manipulation Check	Die Einnahmen werden in Klimaschutzprojekte investiert	1	0	29	30
	Die Einnahmen werden in Form eines „Klimabonus" an die Bevölkerung rückvergütet	8	38	7	53
	Die Einnahmen werden zur Reduzierung der Einkommensteuer verwendet	0	1	0	1
	Diese Information wurde im Fragebogen nicht mitgeteilt	27	0	1	28
Total		36	39	37	112

Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CG	27	28.7	28.7	28.7
	EG1	38	40.4	40.4	69.1
	EG2	29	30.9	30.9	100.0
	Total	94	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	55	58.5	58.5	58.5
	male	38	40.4	40.4	98.9
	divers	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	94	19	68	29.38	10.200
Valid N (listwise)	94				

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compulsory school	1	1.1	1.1	1.1
	Matura	27	28.7	28.7	29.8
	University	65	69.1	69.1	98.9
	Other:	1	1.1	1.1	100.0
	Total	94	100.0	100.0	

Appendix E. Pretest 2 Data Analysis

Welch's Anova (n = 112)

Descriptives

Acceptability

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0	36	3.33	1.352	.225	2.88	3.79	1	5
1	39	3.79	.951	.152	3.49	4.10	1	5
2	37	3.11	1.390	.229	2.64	3.57	1	5
Total	112	3.42	1.264	.119	3.18	3.66	1	5

Tests of Normality

	Scenario	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
ACCEPT	0	.245	36	.000	.875	36	.001
	1	.252	39	.000	.868	39	.000
	2	.280	37	.000	.853	37	.000

a. Lilliefors Significance Correction

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Acceptability	Based on Mean	7.898	2	109	.001
	Based on Median	2.993	2	109	.054
	Based on Median and with adjusted df	2.993	2	95.133	.055
	Based on trimmed mean	8.142	2	109	.001

Robust Tests of Equality of Means

Acceptability

	Statistic[a]	df1	df2	Sig.
Welch	3.562	2	68.874	.034

a. Asymptotically F distributed.

Multiple Comparisons

Dependent Variable: ACCEPT

	(I) Scenario	(J) Scenario	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Bonferroni	0	1	-.462	.287	.332	-1.16	.24
		2	.225	.291	1.000	-.48	.93
	1	0	.462	.287	.332	-.24	1.16
		2	.687	.285	.053	-.01	1.38
	2	0	-.225	.291	1.000	-.93	.48
		1	-.687	.285	.053	-1.38	.01
Dunnett T3	0	1	-.462	.272	.256	-1.13	.21
		2	.225	.321	.861	-.56	1.01
	1	0	.462	.272	.256	-.21	1.13
		2	.687*	.275	.044	.01	1.36
	2	0	-.225	.321	.861	-1.01	.56

		1	-.687*	.275	.044	-1.36	-.01
Games-Howell	0	1	-.462	.272	.214	-1.11	.19
		2	.225	.321	.763	-.54	.99
	1	0	.462	.272	.214	-.19	1.11
		2	.687*	.275	.039	.03	1.35
	2	0	-.225	.321	.763	-.99	.54
		1	-.687*	.275	.039	-1.35	-.03

*. The mean difference is significant at the 0.05 level.

Kruskal Wallis Test (n = 94)

Descriptives

ACCEPT

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean: Lower Bound	95% Confidence Interval for Mean: Upper Bound	Minimum	Maximum
0	27	3.19	1.442	.278	2.61	3.76	1	5
1	38	3.76	.943	.153	3.45	4.07	1	5
2	29	3.03	1.451	.269	2.48	3.59	1	5
Total	94	3.37	1.295	.134	3.11	3.64	1	5

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	SCENARIO	Statistic	df	Sig.	Statistic	df	Sig.
ACCEPT	0	.232	27	.001	.869	27	.003
	1	.257	38	.000	.869	38	.000
	2	.230	29	.000	.872	29	.002

a. Lilliefors Significance Correction

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
ACCEPT	Based on Mean	9.365	2	91	.000
	Based on Median	6.440	2	91	.002
	Based on Median and with adjusted df	6.440	2	75.354	.003
	Based on trimmed mean	9.646	2	91	.000

Ranks

	SCENARIO	N	Mean Rank
ACCEPT	0	27	44.56
	1	38	54.17
	2	29	41.50
	Total	94	

Test Statistics[a,b]

	ACCEPT
Kruskal-Wallis H	4.268
df	2
Asymp. Sig.	.118
Exact Sig.	.118
Point Probability	.000

a. Kruskal Wallis Test

b. Grouping Variable: SCENARIO

Appendix F. Main Study Demographics

Sample (n= 254)

Manipulation Check * Group Crosstabulation

Count

		Group			Total
		CG	EG1	EG2	
Manipulation Check	Die Einnahmen werden in Klimaschutzprojekte investiert	25	2	89	116
	Die Einnahmen werden in Form eines „Klimabonus“ an die Bevölkerung rückvergütet	25	97	7	129
	Die Einnahmen werden zur Reduzierung der Einkommensteuer verwendet	5	1	4	10

	Diese Information wurde im Fragebogen nicht mitgeteilt	68	7	12	87
Total		123	107	112	342

Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	68	26.8	26.8	26.8
	1	97	38.2	38.2	65.0
	2	89	35.0	35.0	100.0
	Total	254	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	191	75.2	75.2	75.2
	male	62	24.4	24.4	99.6
	diverse	1	.4	.4	100.0
	Total	254	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Alter: Ich bin... ... Jahre alt.	254	19	66	28.37	8.250
Valid N (listwise)	254				

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compulsory school	3	1.2	1.2	1.2
	Apprenticeship	1	.4	.4	1.6
	Matura	49	19.3	19.3	20.9
	University	201	79.1	79.1	100.0
	Total	254	100.0	100.0	

Tenant / homeowner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Homeowner	78	30.7	30.7	30.7
	Tenant	176	69.3	69.3	100.0
	Total	254	100.0	100.0	

Centre of life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban area	188	74.0	74.0	74.0
	Rural area	66	26.0	26.0	100.0
	Total	254	100.0	100.0	

Nationality Frequencies

		Responses		Percent of Cases
		N	Percent	
Nationality[a]	Italy	41	16.0%	16.1%
	Luxembourg	1	0.4%	0.4%
	Czech Republic	1	0.4%	0.4%
	Poland	2	0.8%	0.8%
	Turkey	3	1.2%	1.2%
	Russia	1	0.4%	0.4%
	Hungary	1	0.4%	0.4%
	Austria	195	75.9%	76.8%
	Germany	11	4.3%	4.3%
	France	1	0.4%	0.4%
Total		257	100.0%	101.2%

a. Dichotomy group tabulated at value 2.

Beschäftigung

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	128	50.4	50.4	50.4
	Employee	88	34.6	34.6	85.0
	Worker	4	1.6	1.6	86.6
	Self-employed	14	5.5	5.5	92.1
	Retired	3	1.2	1.2	93.3
	Looking for work	1	.4	.4	93.7
	Student and employee	10	3.9	3.9	97.6

Maternity leave	4	1.6	1.6	99.2
Teacher	2	.8	.8	100.0
Total	254	100.0	100.0	

Appendix G. Main Study Data Analyis

Redistribution of the revenues back to the population and Acceptability - Direct effect

ANOVA

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Gruppe	Statistic	df	Sig.	Statistic	df	Sig.
Acceptability	0	.257	68	.000	.874	68	.000
	1	.258	97	.000	.856	97	.000
	2	.235	89	.000	.859	89	.000

a. Lilliefors Significance Correction

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Acceptability	Based on Mean	1.765	2	251	.173
	Based on Median	1.023	2	251	.361
	Based on Median and with adjusted df	1.023	2	250.376	.361
	Based on trimmed mean	1.845	2	251	.160

ANOVA

Acceptability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.798	2	1.899	1.105	.333
Within Groups	431.309	251	1.718		
Total	435.106	253			

T-tests

Group Statistics

	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Acceptability	0	68	3.28	1.280	.155
	1	97	3.59	1.256	.128

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Acceptability	Equal variances assumed	.994	.320	-1.539	163	.126	-.308	.200	-.704	.087
	Equal variances not assumed			-1.534	142.676	.127	-.308	.201	-.705	.089

Group Statistics

	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Acceptability	0	68	3.28	1.280	.155
	2	89	3.46	1.390	.147

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Acceptability	Equal variances assumed	.590	.443	-.838	155	.404	-.181	.216	-.609	.246
	Equal variances not assumed			-.847	149.672	.398	-.181	.214	-.604	.242

Group Statistics

	Gruppe	N	Mean	Std. Deviation	Std. Error Mean
Acceptability	1	97	3.59	1.256	.128
	2	89	3.46	1.390	.147

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Acceptability	Equal variances assumed	3.208	.075	.654	184	.514	.127	.194	-.256	.510
	Equal variances not assumed			.651	177.775	.516	.127	.195	-.258	.512

Redistribution of the revenues back to the population and Fairness

Tests of Normality

	Gruppe	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Fairness	0	.272	68	.000	.854	68	.000
	1	.235	97	.000	.896	97	.000
	2	.235	89	.000	.880	89	.000

a. Lilliefors Significance Correction

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Fairness	Based on Mean	3.335	2	251	.037
	Based on Median	2.319	2	251	.101
	Based on Median and with adjusted df	2.319	2	243.573	.101
	Based on trimmed mean	3.981	2	251	.020

Robust Tests of Equality of Means

Fairness

	Statistic[a]	df1	df2	Sig.
Welch	4.724	2	162.495	.010

a. Asymptotically F distributed.

Multiple Comparisons

Dependent Variable: Fairness

Dunnett T3

(I) Gruppe	(J) Gruppe	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
0	1	-.522*	.179	.012	-.95	-.09
	2	-.442	.190	.061	-.90	.02
1	0	.522*	.179	.012	.09	.95
	2	.079	.184	.963	-.36	.52
2	0	.442	.190	.061	-.02	.90
	1	-.079	.184	.963	-.52	.36

*. The mean difference is significant at the 0.05 level.

Fairness and acceptability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Fairness[b]	.	Enter

a. Dependent Variable: Acceptability

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.451[a]	.203	.200	1.173	.254

a. Predictors: (Constant), Fairness

b. Dependent Variable: Acceptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.333	1	88.333	64.192	.000[b]
	Residual	346.773	252	1.376		
	Total	435.106	253			

a. Dependent Variable: Acceptability

b. Predictors: (Constant), Fairness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.216	.172		12.892	.000	1.878	2.555
	Fairness	.483	.060	.451	8.012	.000	.365	.602

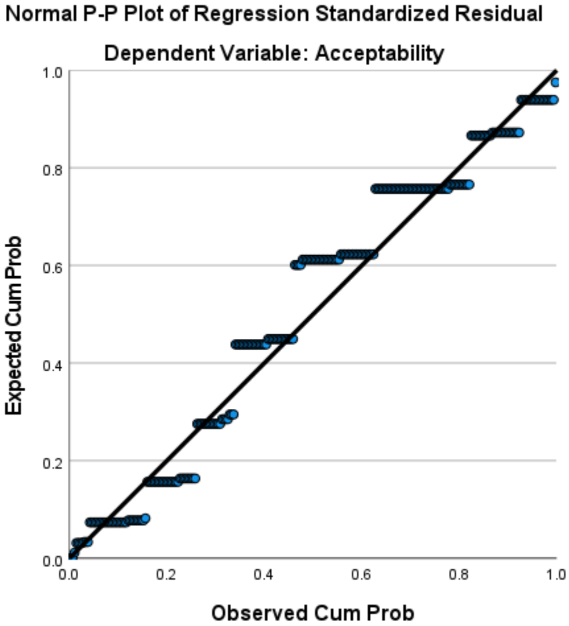
a. Dependent Variable: Acceptability

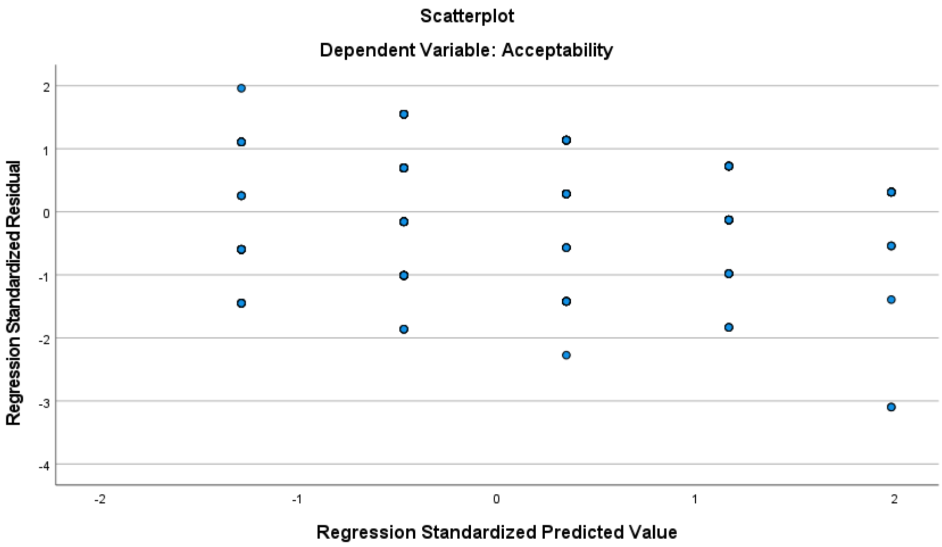
Assumptions of the regression:

Casewise Diagnostics[a]

Case Number	Std. Residual	Acceptability	Predicted Value	Residual
1	-3.097	1	4.63	-3.633
2	-3.097	1	4.63	-3.633

a. Dependent Variable: Acceptability





Fairness as a mediator

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Szenario2, Szenario1[b]	.	Enter
2	Fairness[b]	.	Enter

a. Dependent Variable: Acceptability

b. All requested variables entered.

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.093[a]	.009	.001	1.311	
2	.452[b]	.204	.194	1.177	.256

a. Predictors: (Constant), Szenario2, Szenario1

b. Predictors: (Constant), Szenario2, Szenario1, Fairness

c. Dependent Variable: Acceptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.798	2	1.899	1.105	.333[b]
	Residual	431.309	251	1.718		
	Total	435.106	253			
2	Regression	88.708	3	29.569	21.341	.000[c]
	Residual	346.398	250	1.386		
	Total	435.106	253			

a. Dependent Variable: Acceptability

b. Predictors: (Constant), Szenario2, Szenario1

c. Predictors: (Constant), Szenario2, Szenario1, Fairness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.279	.159		20.630	.000	2.966	3.592
	Szenario1	.308	.207	.114	1.487	.138	-.100	.717
	Szenario2	.181	.211	.066	.859	.391	-.235	.597
2	(Constant)	2.210	.198		11.186	.000	1.821	2.599
	Szenario1	.057	.189	.021	.302	.763	-.315	.429

Szenario2	-.032	.192	-.012	-.166	.868	-.409	.345
Fairness	.482	.062	.449	7.828	.000	.360	.603

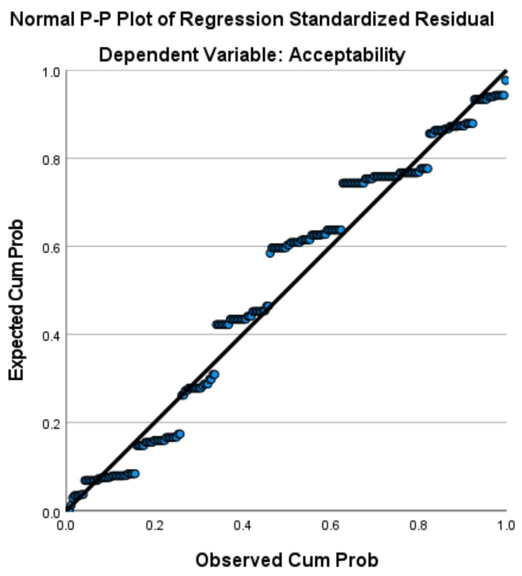
a. Dependent Variable: Acceptability

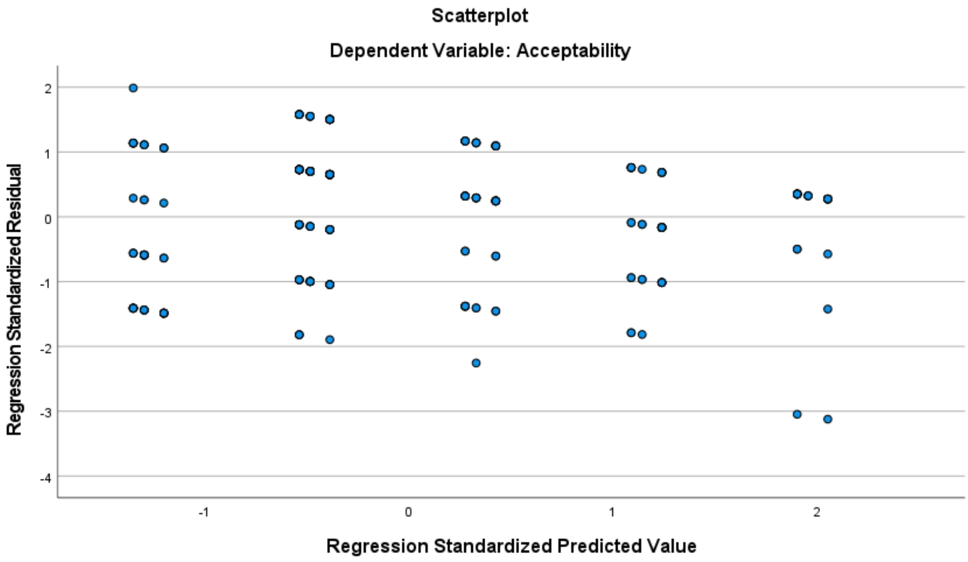
Assumptions of the regression:

Casewise Diagnostics[a]

Case Number	Std. Residual	Acceptability	Predicted Value	Residual
1	-3.122	1	4.67	-3.675
2	-3.047	1	4.59	-3.586

a. Dependent Variable: Acceptability





Parameter Estimates with Robust Standard Errors

Dependent Variable: Acceptability

Parameter	B	Robust Std. Error[a]	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Intercept	2.210	.201	10.992	.000	1.814	2.606
Szenario1	.057	.185	.308	.759	-.308	.422
Szenario2	-.032	.197	-.161	.872	-.419	.355
FAIR	.482	.064	7.483	.000	.355	.608

a. HC3 method

Control Variables

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Szenario2, Szenario1[b]	.	Enter
2	Fairness[b]	.	Enter
3	Political trust, Concern cc, Effectiveness[b]	.	Enter

a. Dependent Variable: Acceptability

b. All requested variables entered.

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.093[a]	.009	.001	1.311	
2	.452[b]	.204	.194	1.177	
3	.575[c]	.331	.315	1.086	.576

a. Predictors: (Constant), Szenario2, Szenario1

b. Predictors: (Constant), Szenario2, Szenario1, Fairness

c. Predictors: (Constant), Szenario2, Szenario1, Fairness, Political trust, Concern cc, Effectiveness

d. Dependent Variable: Acceptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.798	2	1.899	1.105	.333[b]
	Residual	431.309	251	1.718		
	Total	435.106	253			
2	Regression	88.708	3	29.569	21.341	.000[c]
	Residual	346.398	250	1.386		
	Total	435.106	253			
3	Regression	143.944	6	23.991	20.352	.000[d]
	Residual	291.162	247	1.179		
	Total	435.106	253			

a. Dependent Variable: Acceptability

b. Predictors: (Constant), Szenario2, Szenario1

c. Predictors: (Constant), Szenario2, Szenario1, Fairness

d. Predictors: (Constant), Szenario2, Szenario1, Fairness, Political trust, Concern cc, Effectiveness

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.279	.159		20.630	.000	2.966	3.592		
	Szenario1	.308	.207	.114	1.487	.138	-.100	.717	.667	1.500
	Szenario2	.181	.211	.066	.859	.391	-.235	.597	.667	1.500
2	(Constant)	2.210	.198		11.186	.000	1.821	2.599		
	Szenario1	.057	.189	.021	.302	.763	-.315	.429	.648	1.544
	Szenario2	-.032	.192	-.012	-.166	.868	-.409	.345	.653	1.531

	Fairness	.482	.062	.449	7.828	.000	.360	.603	.968	1.033
3	(Constant)	.007	.420		.016	.987	-.821	.835		
	Szenario1	.096	.175	.036	.552	.582	-.248	.440	.644	1.552
	Szenario2	.110	.178	.040	.616	.538	-.241	.461	.643	1.555
	Fairness	.295	.063	.275	4.659	.000	.170	.420	.777	1.287
	Concern cc	.383	.091	.240	4.196	.000	.203	.562	.831	1.204
	Political trust	.092	.072	.068	1.282	.201	-.050	.235	.966	1.035
	Effectiveness	.235	.064	.222	3.697	.000	.110	.361	.754	1.327

a. Dependent Variable: Acceptability

Assumptions of Regression:

Collinearity Diagnostics[a]

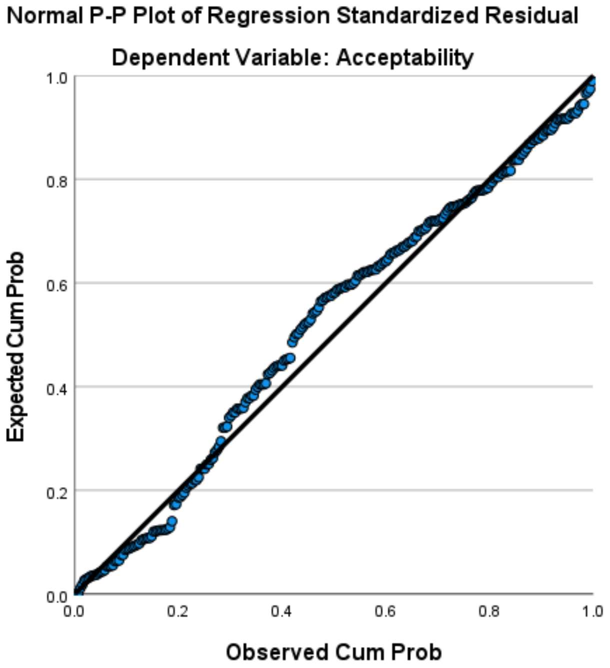
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	Szenario1	Szenario2	Fairness	Concern cc	Political trust	Effectiveness
1	1	1.856	1.000	.07	.06	.06				
	2	1.000	1.362	.00	.20	.23				
	3	.144	3.587	.93	.74	.72				
2	1	2.715	1.000	.02	.03	.02	.02			
	2	1.000	1.648	.00	.19	.22	.00			
	3	.195	3.729	.03	.69	.65	.29			
	4	.090	5.503	.95	.09	.11	.69			
3	1	5.388	1.000	.00	.01	.01	.00	.00	.00	.00
	2	1.001	2.321	.00	.18	.23	.00	.00	.00	.00
	3	.253	4.612	.00	.69	.59	.00	.00	.05	.05
	4	.164	5.739	.00	.00	.01	.31	.00	.51	.07
	5	.100	7.333	.01	.00	.00	.66	.02	.24	.30
	6	.079	8.235	.08	.11	.14	.01	.08	.16	.55
	7	.014	19.348	.90	.01	.03	.01	.90	.03	.02

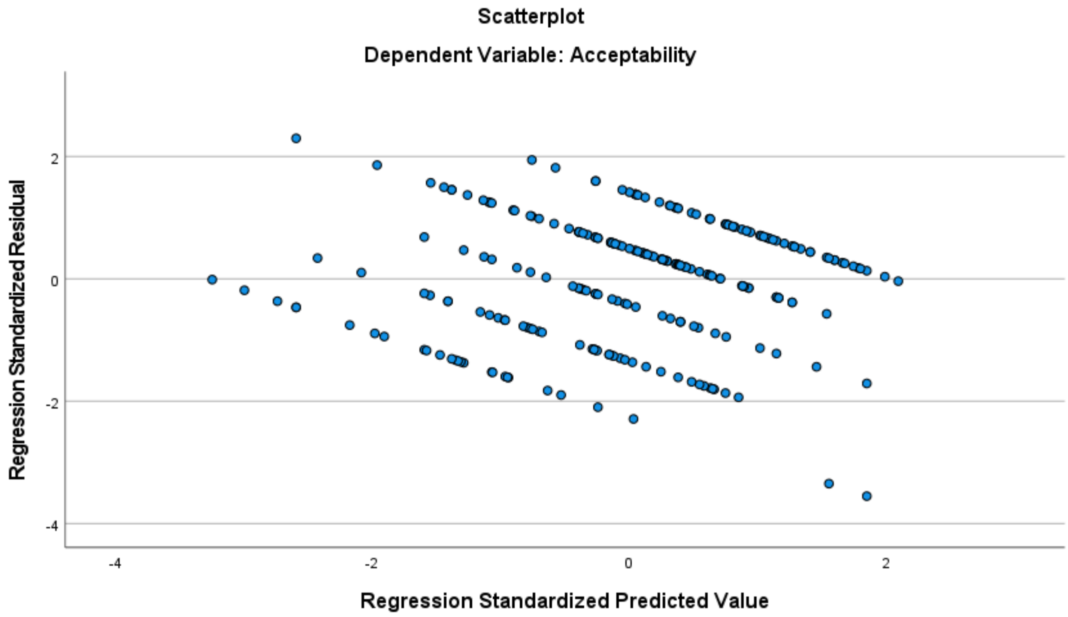
a. Dependent Variable: Acceptability

Casewise Diagnostics[a]

Case Number	Std. Residual	Acceptability	Predicted Value	Residual
1	-3.551	1	4.86	-3.855
2	-3.346	1	4.63	-3.633

a. Dependent Variable: Acceptability





Economic motive and acceptability

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Economic motive[b]	.	Enter

a. Dependent Variable: Acceptability

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.360[a]	.130	.121	1.178	.427

a. Predictors: (Constant), Economic motive

b. Dependent Variable: Acceptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.665	1	19.665	14.170	.000[b]
	Residual	131.840	95	1.388		
	Total	151.505	96			

a. Dependent Variable: Acceptability

b. Predictors: (Constant), Economic motive

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.345	.351		6.681	.000	1.648	3.042
	Economic motive	.395	.105	.360	3.764	.000	.187	.603

a. Dependent Variable: Acceptability

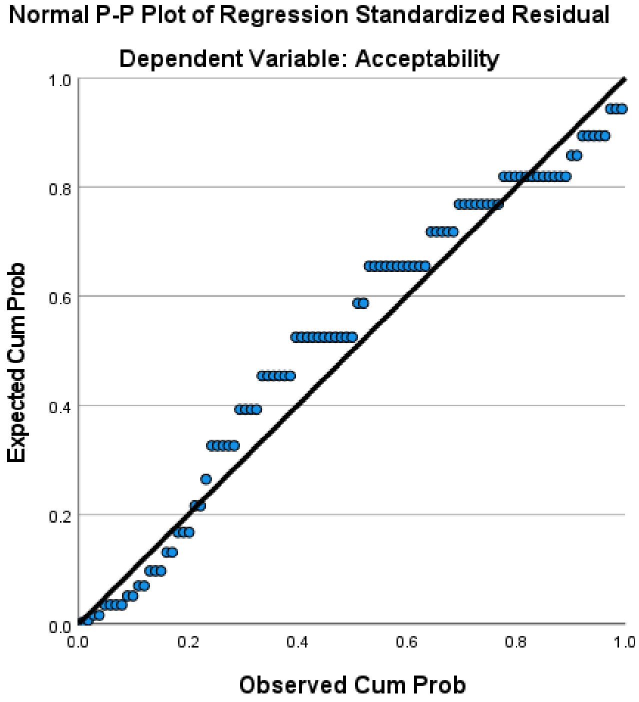
Parameter Estimates with Robust Standard Errors

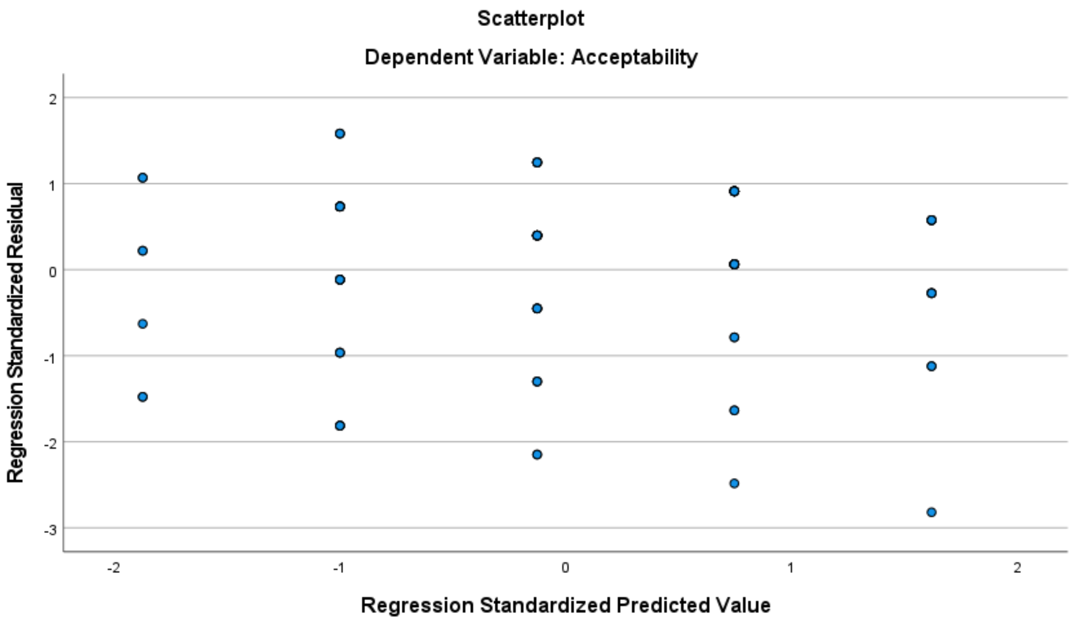
Dependent Variable: Acceptability

Parameter	B	Robust Std. Error[a]	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Intercept	2.345	.374	6.263	.000	1.602	3.089
ECONMO	.395	.110	3.595	.001	.177	.613

a. HC3 method

Assumptions of the regression:




Scatterplot
Dependent Variable: Acceptability
Regression Standardized Residual
2
1
0
-1
-2
-3
-2
-1
0
1
2
Regression Standardized Predicted Value

Appendix H. Abstract (German)

Zielsetzung. In dieser Arbeit wurde der Zusammenhang zwischen der Verwendung von Steuereinnahmen und der gesellschaftlichen Akzeptabilität einer CO_2-Steuer analysiert. Es wurde untersucht, ob die Information über die Rückverteilung der Steuereinnahmen an die Bevölkerung einen Einfluss auf die gesellschaftliche Akzeptabilität einer CO_2-Steuer in Österreich hat.

Methode. Es wurde ein experimentelles Untersuchungsdesign mit zwei Experimentalgruppen angewandt. Der Stimulus wurde mittels der Szenariotechnik variiert. Die Daten wurden online erhoben. Um die Qualität der Manipulation der unabhängigen Variable zu überprüfen, wurden zwei Pretests durchgeführt. Die Stichprobe der Hauptstudie bestand aus 254 Personen.

Ergebnisse. Die Ergebnisse zeigen, dass es einen indirekten Effekt zwischen der Rückverteilung der Steuereinnahmen an die Bevölkerung durch einen Klimabonus auf die Akzeptabilität einer CO_2-Steuer gibt. Die Rückverteilung der Steuereinnahmen an die Bevölkerung wirkt sich positiv auf die wahrgenommene Fairness einer CO_2-Steuer aus, was wiederum die Akzeptabilität dieser beeinflusst. Darüber hinaus zeigte die Analyse, dass die wahrgenommene Wirksamkeit und die Besorgnis über den Klimawandel einen signifikant positiven Effekt auf die Akzeptabilität haben. Positiv auf die Akzeptabilität wirkt sich auch der finanzielle Anreiz aus, den die Auszahlung des Klimabonus bietet.

Beitrag. Die Ergebnisse dieser Studie liefern sowohl einen wertvollen theoretischen als auch praktischen Beitrag. Aus theoretischer Sicht bereichert die vorliegende Arbeit die bestehende Literatur zur Wahrnehmung von CO_2-Steuern in der Gesellschaft. Darüber hinaus liefert diese Studie einen wichtigen praktischen Beitrag, indem sie aufzeigt, was bei der Ausgestaltung und Kommunikation einer CO_2-Steuer beachtet werden muss, um eine hohe Akzeptabilität in der Bevölkerung zu erreichen.