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Attitudes toward global and national climate policies in Finland – The significance of climate change risk perception and urban/rural-domicile

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Abstract This paper examines public support for global- and national-level climate policy instruments in Finland, and the ways urban/rural-domicile and climate change risk perception predict people's attitudes toward climate policies. Moreover, this study analyzes the degree to which perception of closeness to the district modifies people's climate policy attitudes. The research method employed was ordinal logistic regression and data were from the demographically representative Finland 2019-survey ($n = 1742$ and response activity = 44%). According to the results, subsidizing renewable energy is an especially popular climate policy instrument, whereas approving new nuclear plants is rather unpopular. Policy instruments were typically more popular at the global level than they were at the national level. Perception of climate change risk was especially strongly linked with support for a national carbon tax. The effect of urban/rural-domicile and subjective closeness to the district on the attitudes was highly dependent on the policy instrument in question. The study contributes to the understanding of how climate policy attitudes vary depending on the climate change risk perception, urban/rural-domicile, and the instrument-type.

Keywords Climate policy · Climate change · Finland · Public opinion · Risk · Energy production

Introduction

Climate change belongs to the most important collective action problems of our time. First and foremost, climate change is a global-scale issue: Greenhouse gas emissions do not follow national borders but cause global heating. However, although the increase of emissions forms a global problem, implementation of global climate policies has proven to be difficult, and thus climate change mitigation clearly requires – at least in addition – national or local policies. Yet, there is little evidence that countries have been able to reduce their emissions to the sustainable level (UNEP, 2021).

It is often theorized that an essential reason why climate change is a difficult collection action problem to solve is that the cost–benefit calculus may look negative for each individual nation: If one country practices ambitious climate policy while others 'free-ride', it may face certain negative economic consequences − at least in the short-term (Esty & Moffa, 2012; Stevenson, 2018). Moreover, politicians on the national level are depend on public opinion, and without public legitimacy, climate policies can remain ineffective and short-term (Matti, 2015). On the other hand, if all (or enough) actors cooperate in solving

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the problem, then climate change mitigation would be effective.

There is public argument about the level to which climate policies should be implemented: For instance, whether a global carbon tax or emissions trading system should exist or whether countries should decide climate policies individually. Moreover, experts differ on their stands on whether climate change should be governed and mitigated with state-based institutions, or whether there should be a solution within the framework of international society. Third option, that is some kind of mix between the two mentioned approaches, also has its supporters (Lederer, 2015).

Governance can be defined as "the maintenance of collective order, the achievement of collective goals, and the collective processes of rule through which order and goals are sought" (Rosenau, 2000: 175). In other words, the legitimacy of governance activities is related to common good (Zürn, 2012). There are several ways how global governance could be implemented (e.g. Zürn, 2012), but this paper does not focus on them in detail.

Defenders of the nation state approach argue that environmental crisis requires states' intervention in the global economy (e.g. Meadowcroft, 2012). On the other hand, a global policy solution would be more efficient than domestic solutions would be (Meckling & Hepburn, 2013). For better or worse, the research on environmental or climate policy instruments has mostly concentrated on the national level policies (Sterner & Robinson, 2018).

It is worth noting, however, that besides attitudinal differences between countries, important differences also exist within countries. One essential dividing line is related to place of residence; when compared to their urban counterparts, rural citizens are often more likely to deny anthropogenic climate change (Lübke, 2021) and be less in favor of climate policies (Bonnie et al., 2020; Devine-Wright et al., 2015; Douenne & Fabre, 2020).

Urban–rural-cleavage is a globally timely perspective, since both the developed and developing nations are urbanizing. For example, at the national level, Finland has urbanized rapidly over the past decades. Currently more than 50% of the population lives in the southern part of Finland, including the capital Helsinki area (Statistics Finland, 2021).

Finland and the other Nordic countries have sometimes been considered pioneers in the implementation of climate policies (e.g., Hoff, 2018). However, when it comes to output of climate policies, Finland can be considered an ambivalent case. On the one hand it was the first country to implement the carbon tax, in 1990 (Honkatukia, 2000; Talousneuvosto, 2000). On the other hand, emissions per capita are at an unsustainable level (Larsen & Alslund-Lanthén, 2017), and implementation of sufficiently effective climate policies has so far proven challenging. One commonly heard argument in the public discussion is that climate policies should be implemented internationally, instead of nationally.[1]

Somewhat differentiating from the earlier United Nations' negotiations, the UN's Paris agreement (2015) gives countries discretion on how they carry out the reduction of the greenhouse gas emissions. Even though there are effective climate policy instruments to choose from, they may be difficult to implement for the governments since effective climate policies are often rather unpopular among the public (Drews & van den Bergh, 2016).

This paper examines the attitudes of the Finnish public regarding global- and national level climate policy instruments using the "Finland 2019"-survey data (Saari et al., 2019). Certainly, some instruments in this study are more suitable to either the global or the national level. However, this paper does not examine the effectiveness or viability of the instruments, but public attitudes toward them.

Many studies have explored citizens' support for national-level climate policies (e.g. Jagers et al., 2019; Kotchen et al., 2013), but there is need for knowledge about attitudes on global climate policies. Moreover, research that compares support for specific climate policy instruments at global and national level is lacking, to which information gap this study contributes. Additionally, this study examines the way climate policy risk perception, which has been found to predict support for climate protection (e.g. Mayer, 2020; O'Connor et al., 1999; Park & Vedlitz, 2013; Zahran et al., 2006), is related on the attitudes toward different climate policy measures.

[1] For example, Jussi Halla-aho, former leader of the national-conservative The Finns Party (2017–2021), has repeated this opinion in several occasions (e.g. Iltalehti, 2020), as well as his successor, Riikka Purra (Aaltonen and Keski-Heikkilä, 2021).

Table 1 Climate policy instrument categories

Policy instrument	Price-type	Rights	Quantity type regulation	Push	Pull
Carbon tax	x			x	
Subsidize renewables	x				x
Cutting coal energy use subsidies	x			x	
Cutting beef production subsidies	x			x	
Cap and trade		x		x	
Reducing logging		x		x	
New nuclear plant permissions			x		x
Coal ban			x	x	

Categories adopted from Sterner and Robinson (2018) and Drews and van den Bergh (2016)

Because no systematic research has examined the way climate-policy risk perception is related to attitudes toward different global- and national-level climate policy instruments, it is therefore a meaningful area of climate research. The survey data enabled relatively accurate analysis of attitudes toward different climate policy instruments.

In addition, this paper analyzes whether climate policy attitudes differ between rural and urban populations as well as the way identification with district mediates those attitudes, which earlier studies have recognized as a relevant aspect regarding environmental attitudes (Joshi et al., 2013; Mustafa et al., 2019; Yu, 2014). Social networks are importantly connected with governance due to the fact that they are channels of influence: they are mediators of information, norms, innovations, and mobilization (Bevir, 2007). Hence, it is also possible that subjective closeness with district strengthens one's attitudes to the direction that is prevalent in the area in question.

Based on the discussions described above, following research question are formed:

RQ1: How do the attitudes toward climate policy instruments vary in Finland?

RQ2: How do the attitudes toward climate policy instruments vary between global and national level policies in Finland?

RQ3: How is the perception of climate change risk associated with attitudes toward climate policy instruments?

RQ4: How does urban/rural-domicile and identification with one's district connect to attitudes toward climate policy instruments?

First, this paper introduces various types of climate policy instruments and the ways they are typically supported by the public. Second, the significance of the effect of climate-change risk perception on climate policy attitudes and research questions are presented. Third, the Finland 2019-survey data is introduced, as well as the quantitative methodology employed. Finally, the results of the analysis are presented and discussed.

Theoretical framework

Climate policy instrument types

Ideas about what would be the best climate policy instrument have varied over time: While in the 1990s solutions such as carbon taxes were more popular among experts, solutions such as subsidies and investments have since grown in popularity. One essential reason why state interventionist policies have grown in popularity is related to the economic crisis that began in 2008, which led to a debate about the more active role of the state in the economy: While neoliberal governance had been the dominant form of governing, including environmental administration since 1980s, the mentioned economic crisis opened space for the new approaches regarding environmental governance (Mccarthy, 2012; Meckling & Allan, 2020).

One way to categorize climate policy instruments is classifying them into three categories: price-type, rights-based, and quantity-type regulation (Table 1). Price-type instruments include subsidies and tax-based instruments. They attempt to make certain actions or behaviors either less or more attractive by affecting prices. Rights-based instruments are typically related to property rights. For example, they can

define whether a landowner has a right to utilize ecosystems on her land. Rights instruments also include tradable permission systems such as cap and trade. Quantity-type regulation, instead, controls amounts of pollution or production. Activities can be banned or regulated so that they are ordered to perform in specific manner, time, or area (Sterner & Robinson, 2018).

When it comes to public support for climate policies, even relatively hard regulation is often more popular than price-based solutions, because effects of price-instruments are more visible for the citizens (Cullenward & Victor, 2021).

Other way to classify various instruments is whether they are 'push or 'pull' instruments. Push instruments constrain certain behavior, whereas pull instruments attempt to promote specific actions. The former is typically less popular among the public than the latter is (Drews & van den Bergh, 2016). In the following, basic features of the climate policy instruments that are included to this study are presented (see, Table 1) and their degrees of popularity among citizens discussed.

The idea of an environmental tax is to internalize effects − such as greenhouse gas emissions − that would otherwise be external. This type of taxation attempts to make unwanted products or actions more expensive and hence reduce them. Moreover, an environmental tax offers revenues to the public sector and is thus a relatively cost-effective measure (Hsu, 2016; Sterner & Robinson, 2018).

Citizens tend to overestimate negative effects and underestimate positive effects of carbon taxation (Carattini et al., 2019). Therefore, when compared to pull-type policy instruments, the support for carbon taxation is typically at a relatively low level (Carattini et al., 2018; Lucas, 2017; Matti, 2010; Pohjolainen et al., 2018). However, when compared with other European countries, the public support for fossil fuel taxation is at relatively high in the Nordic countries (Pohjolainen et al., 2018).

Subsidies represent other type of approach. From the climate policy perspective, subsidies attempt to advance climate friendly behavior by paying for it, which attempts to make subsidized actions or products more tempting than less climate friendly alternatives (Széchy, 2020). Subsidies can be considered a 'soft' climate policy instrument: their influence on household economies is relatively indirect, when compared to 'hard' instruments, such as taxation. Hence, support for subsidizing renewable energy is typically at a relatively high level (Carattini et al., 2018; Lucas, 2017; Pohjolainen et al., 2018).

Once subsidies have been put in place, often after tight political struggle, people often tend to consider them a 'normal' part of societal actions. Removal of subsidies can also be thought as a policy instrument − sometimes the original purpose of subsidies may be forgotten, but with help of lobbies, they continue to exist (Sterner & Robinson, 2018). However, researchers tend to consider several subsidies harmful to the climate. For example, subsidies for coal energy production and beef production fulfill this criterion (Anderson & McKibbin, 2000; Lankoski et al., 2020).

Removal of coal and other fossil fuel subsidies is a workable way to reduce carbon emissions, and some countries have already reduced them (Anderson & McKibbin, 2000; Asselt et al., 2018). Because the effect of subsidy abatement on household economies is less direct than, for example, taxation is, one would expect the support for coal subsidy abatement to exceed the support for carbon taxation.

Other discussion concerns removal or cutting beef production subsidies, which also faces opposition from the lobbyists. Abatement of livestock production subsidies belongs to the one of the main measures that can decrease its emissions (Lankoski et al., 2020). Earlier research showed that that majority of Finnish people think there is a link between meat consumption and climate change (Pohjolainen et al., 2016). However, even though most Finns eat too much red meat from a health point of view (Valsta et al., 2018), an earlier study found that the average Finn was not willing to decrease one's meat consumption (Pohjolainen et al., 2016).

Along with carbon tax, cap and trade is often considered one of the most important climate policy options. Cap and trade programs include issuances of allowances for the polluters, which can be traded between companies or other market agents (Hsu, 2011). A US study found that support for a cap and trade policy did not differ significantly from the support for a carbon tax (Kotchen et al., 2013).

In Finland, discussion on whether national forest resources should be kept to an increasing extent as carbon sinks or utilized further by the forest industry has been lively. However, experts on climate change tend to argue that to achieve Finland's emission cut

targets, logging should not be increased (Seppälä et al., 2015, 2022).

Although nuclear power can be considered low-carbon technology (Harjanne & Korhonen, 2019), opposing nuclear power and highlighting its risks has traditionally been one of the mainstream schools of thought among the environment movement. This may be one reason for relatively low support for nuclear power in Finland (Pitkänen & Westinen, 2017) and other European countries (Pohjolainen et al., 2018: 7).

However, there is some evidence that during the recent years public attitudes toward nuclear power have become slightly more positive since it has been framed a low-carbon solution. For example, Corner et al. (2011) indicated that conditional support for nuclear power increased in the United Kingdom between 2005 and 2010. On the other hand, a study concerning South Korea showed climate change concern decreases support for nuclear power (Chung & Kim, 2018).

Banning can be classified as a 'hard regulation', whereas 'soft regulation' includes for instance tax breaks (Attari et al., 2009). As an example of banning, Finland set a law that bans use of coal for energy starting in 2029 (TEM, 2019). Banning tends to be more popular than taxation is, but less popular than subsidizing is typically among the public (Davidovic & Harring, 2020; Lucas, 2017; Pohjolainen et al., 2018).

Climate change risk perception and urban/rural-domicile

Previous studies have shown that support for climate policies depends on various societal or contextual factors, individual level factors, and characteristics of the policy instrument itself. It may be unsurprising that the perception of climate change risk has been considered an important explainer of climate policy support (Bostrom et al., 2012; Smith & Mayer, 2018; Sterner & Robinson, 2018).The perception of climate change risk is an independent factor that affects climate change actions and climate policy attitudes, along with other types of environmental attitudes and demographic factors.

US data suggest that subjective perception of climate change risk is a more significant predictor of supporting climate policy than objective perception of climate change risk is (Zahran et al., 2006). Nevertheless, subjective climate change risk perception may be a more relevant factor in supporting certain climate policies than it is in others. This study compares the link between the perception of climate change risk and support for different types of climate policy instruments at both global and national levels.

When it comes to the connection between place of residence and environmental attitudes, the evidence appears to be mixed. A Swedish study finds that rural citizens are less in favor of carbon tax than urban residents (Ewald et al., 2021). Other studies have found that people living in rural areas are less concerned about environmental problems than citizens in urban areas are, but the concern appears to be much related to the environmental problem in question (Mustafa et al., 2019; Yu, 2014). For example, farmers are more concerned about topics related to agriculture (Yu, 2014).

Interestingly, Devine-Wright et al. (2015) found that the "my country first" attitude was more common among people in rural areas, which in turn is linked to lower support for climate change mitigation. A US study showed that rural residents were somewhat less in favor of climate-related regulation than urban citizens, and rural citizens with stronger local place identity were less in favor of US actions against climate change than rural citizens with weaker local identity (Bonnie et al., 2020). Other studies concerning India (Budruk et al., 2009) and Tenerife in Spain (Hernández Bernardo et al., 2010) indicated that place identification influences environmental attitudes. Hence, it is relevant in this study to explore the way identification with one's district is related to support for climate policies among urban and rural citizens.

When it comes to Finland, the urban/rural-divide is one of the traditional political cleavages, which has not lost its relevance (Karvonen, 2014). Originally rural and urban areas of Finland have had different type of economic structures, which have been reflected in political attitudes. Both urban and rural identities are both still felt quite strongly among Finnish citizens (Westinen, 2015). According to Westinen (2015), the traditional rural–urban divide has evolved to a cleavage which puts the residents of rural or small municipalities and the residents in the metropolitan area against each other.

Data and methodology

The nationally representative data used in this paper are from the Finland 2019 – Consumption and Way of Life survey, which was conducted between April and June 2019. The questionnaire was sent to 4001 Finnish-speaking persons aged 18–74 and living in Finland. The sampling was carried out as an age-stratified random sample from population register data. The final number of responses to the survey was 1742, and the response rate was 44% (Saari et al., 2019). The Finland data are part of a research series that has been collected every fifth year since 1999. The data series has been used in several previous studies (e.g. Aro & Wilska, 2014; Kekäkäläinen et al., 2017; Kuoppamäki et al., 2018). In 2019, the data series included climate policy related questions for the first time.

The dependent variables measure attitudes toward different climate policies. The question was, "To what extent do you support or oppose the following policy actions?" Participants responded on a scale from 1 (*support strongly*) to 5 (*oppose strongly)*; the scales were reversed so that 1 = (*oppose strongly)* and 5 = (*support strongly*). Climate policies in question were the following:

- Tax on carbon dioxide emissions
- Subsidizing renewable energy (e.g. solar and wind power)
- Cutting subsidies for coal energy use
- Cutting subsidies for beef production
- Cap and trade
- Reducing logging
- Licensing of new nuclear power plants
- Ban on the use of coal for energy

Each question was asked at both global and national levels. Descriptive statistics of the dependent variables are presented in Table 4 (in the appendix).

The independent variable is the perception of climate change risk, which was measured with the following question: "To what extent do you consider the following issues as risks or sources of uncertainty in society?" – "Climate change". Participants responded on a scale from 1 (*very significant*) to 5 (*not at all significant*). To allow greater intuitive interpretation, we reversed the scale.

Urban/rural accommodation was asked as follows: "Is your residential area an urban/city area (scored as 1) or a rural area (scored as 2)?" Closeness with local district was asked: "How closely do you feel you belong to the following: district or village?" For easier interpretation, the scale was reversed so that 1 = (*not at all)* = and 5 = (*very closely)*. The same variable has been used in several previous studies (e.g. Lehdonvirta & Räsänen, 2011; Näsi et al., 2011).

Control variables include education, gender, and age group. Gender was used because it has been associated with environmental attitudes in previous studies (e.g. Fritz & Koch, 2019; McCright & Dunlap, 2011). Education was categorized into three classes: 1 (*basic level*), 2 (*secondary level*), and 3 (*higher level*). Gender was classified in the following way: 1 = (*male)*, 2 = (*female)*. Age (based on year of birth) was classified as follows: 1 = 18−31, 2 = 32−45, 3 = 46−59, and 4 = 60−74. Since many climate policy instruments have potential effects on household income levels, the respondents' monthly income is also included to the control variables. Due to the income variable's positively skewed distribution, it is used as logged. Descriptive statistics of the independent and control variables are presented in the Table 5 (in the appendix).

All the data and results presented in this paper are executed with a weight that balances age and gender biases (Saari et al., 2019). The research method is ordinal logistic regression, and the analysis was carried out with Stata version 15.1.

Results

The results of the analysis show Finns' attitudes vary toward different global- and national-level climate policy instruments and that the perception of climate change risk is associated with the attitudes in question.

Figure 1 presents support for various climate policy instruments and the ways it varies between global and national levels. The most supported instruments were subsidizing renewable energy and cutting coal production subsidies. The least popular policy instrument was new nuclear plant permissions, although it can be classified as a pulling instrument (Table 1). These findings applied at both global and national levels.

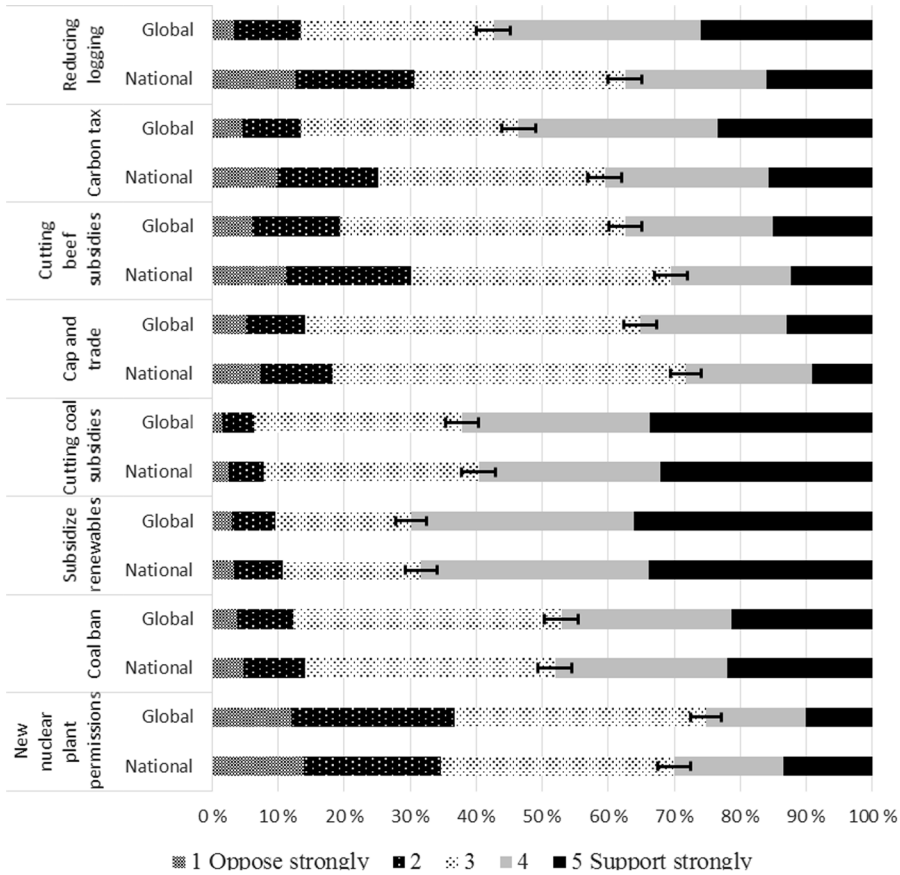

Fig. 1 Support for global and national level climate policy instruments. 1 = Oppose strongly − 5 = Support strongly. Proportion of total support (responses 4 and 5) includes 95% confidence interval

Policies were more often supported at the global rather than national level. The only exception was new nuclear plant permissions, which was slightly more supported at the national level (yet, not statistically significantly). The largest difference between levels of global and national policy support was found for reducing logging, whereas the second largest difference was found for the carbon tax. The difference between global and national-level policies is also clearly found for cutting beef production subsidies and cap and trade. When it comes to support for cutting coal subsidies, subsidizing renewable energy, and banning coal, the differences between support at the global and national levels were not particularly notable.

Tables 2 and 3 show the perception of climate change risk and urban/rural domicile affect people's attitudes toward different policy instruments. Higher climate risk perception was most strongly connected with national carbon tax. Exceptionally, higher perception of climate change risk was negatively related to attitudes toward new nuclear plants at both global and national levels. The connection between higher perception of climate change risk and support for all the other policy instruments was positive.

When compared with urban residents, respondents with rural domiciles showed less support for subsidizing renewable energy at the national level, cutting beef production subsidies at both global and national levels, and reducing logging at both levels.

Figures 2 and 3 show that support for most climate policy instruments does not differ significantly between urban and rural populations and that feeling closer to one's district did not significantly change the results. However, among rural respondents, feeling closer to one's district is significantly related to less support for reducing logging at the global level, while the effect among urban respondents was the opposite (closeness with one's district predicted more support for reducing logging at the global level). Hence, polarization between urban and rural citizens appears

Table 2 Ordinal logistic regression on the effect of the perception of climate change risk and domicile on the support for different price-type climate policy instruments (at global and national levels)

	Carbon tax, global	Carbon tax, national	Subsidize renewables, global	Subsidize renewables, national	Cutting coal energy use subsidies, global	Cutting coal energy use subsidies, national	Cutting beef production subsidies, global	Cutting beef production subsidies, national
Climate risk perception	0.835***	1.022***	0.888***	0.864***	0.626***	0.690***	0.657***	0.609***
	(0.0767)	(0.0603)	(0.0624)	(0.0653)	(0.0674)	(0.0728)	(0.0712)	(0.0693)
Rural area domicile (ref. Urban area)	−0.188	−0.140	−0.215	−0.366**	−0.109	0.0333	−0.379**	−0.516***
	(0.122)	(0.123)	(0.133)	(0.134)	(0.132)	(0.130)	(0.135)	(0.135)
Education: (ref. Basic) Secondary	0.366*	0.0951	0.0851	0.0502	0.233	0.180	−0.131	−0.145
	(0.171)	(0.155)	(0.182)	(0.163)	(0.181)	(0.176)	(0.164)	(0.163)
Tertiary	0.731***	0.299	0.170	0.109	0.706***	0.613**	0.279	0.134
	(0.196)	(0.177)	(0.200)	(0.185)	(0.213)	(0.209)	(0.191)	(0.189)
Income/ month (logged)	−0.195	−0.191*	−0.177	−0.108	−0.133	−0.159	−0.131	−0.130
	(0.106)	(0.0859)	(0.0970)	(0.0962)	(0.135)	(0.122)	(0.0957)	(0.0817)
Gender (ref. Male)	−0.126	0.123	0.0171	0.283**	−0.736***	−0.560***	−0.00581	0.0999
	(0.104)	(0.108)	(0.104)	(0.104)	(0.109)	(0.105)	(0.107)	(0.110)
Age: 32−45 (ref. 18−31)	0.0432	0.0710	−0.289	−0.376*	−0.0455	−0.0589	−0.320	−0.377
	(0.196)	(0.178)	(0.179)	(0.177)	(0.212)	(0.202)	(0.189)	(0.193)
46–59	0.0765	0.230	−0.306	−0.415**	0.0482	0.0368	−0.360*	−0.314
	(0.183)	(0.154)	(0.163)	(0.160)	(0.204)	(0.193)	(0.176)	(0.173)
60−74	−0.0626	0.190	−0.360*	−0.448**	0.183	0.246	−0.323	−0.214
	(0.168)	(0.144)	(0.158)	(0.152)	(0.195)	(0.183)	(0.170)	(0.166)
Cut1	−1.326	0.382	−1.972*	−1.178	−3.624***	−2.887**	−1.750*	−1.048
	(0.835)	(0.700)	(0.787)	(0.771)	(0.997)	(0.927)	(0.773)	(0.703)
Cut2	−0.0237	1.749*	−0.511	0.325	−2.210*	−1.641	−0.271	0.320
	(0.808)	(0.694)	(0.773)	(0.765)	(0.930)	(0.878)	(0.753)	(0.695)
Cut3	1.997*	3.597***	1.118	1.927*	0.288	0.715	1.910*	2.176**
	(0.820)	(0.696)	(0.774)	(0.765)	(0.958)	(0.898)	(0.763)	(0.698)
Cut4	3.541***	5.129***	2.857***	3.671***	1.569	1.965*	3.256***	3.376***
	(0.831)	(0.701)	(0.786)	(0.780)	(0.961)	(0.903)	(0.761)	(0.694)
N	1523	1515	1521	1523	1514	1516	1512	1513
Pseudo R2	0.077	0.105	0.091	0.090	0.057	0.059	0.057	0.051

Standard errors in parentheses

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

– at most – moderate and associated with few policies (Tables 2 and 3).

Discussion

This paper examined the Finnish-speaking public's attitudes toward climate policy instruments at global and national levels. Additionally, this study investigated the way the perception of climate change risk and urban/rural-domicile affect the attitudes toward climate-related policy instruments.

First research question asked how do the attitudes toward climate policy measures vary in Finland? The most frequently supported instruments were subsidizing renewable energy and cutting coal subsidies,

Table 3 Ordinal logistic regression on the effect of the perception of climate change risk and domicile on the support for different rights and quantity−type regulation climate policy instruments (at global and national levels)

	Cap and trade, global	Cap and trade, national	Reducing logging, global	Reducing logging, national	New nuclear plant permissions, global	New nuclear plant permissions, national	Coal ban global	Coal ban, national
Climate risk perception	0.711***	0.791***	0.533***	0.647***	−0.278***	−0.291***	0.610***	0.778***
	(0.0609)	(0.0659)	(0.0683)	(0.0592)	(0.0577)	(0.0558)	(0.0685)	(0.0612)
Rural area domicile (ref. Urban area)	−0.247	−0.152	−0.637***	−0.679***	−0.0364	−0.0479	−0.0632	−0.0150
	(0.130)	(0.130)	(0.137)	(0.134)	(0.127)	(0.123)	(0.125)	(0.127)
Education: Secondary (ref. Basic)	0.0432	−0.0461	0.000622	−0.0635	0.0165	0.173	0.0332	−0.0299
	(0.173)	(0.165)	(0.190)	(0.167)	(0.184)	(0.174)	(0.167)	(0.173)
Tertiary	0.269	0.123	0.0361	−0.351	0.473*	0.624**	0.386	0.283
	(0.208)	(0.197)	(0.212)	(0.190)	(0.212)	(0.204)	(0.201)	(0.207)
Income/month (logged)	0.103	−0.146	−0.153	−0.0568	0.130	0.0552	−0.150	−0.135
	(0.127)	(0.0927)	(0.109)	(0.111)	(0.122)	(0.117)	(0.132)	(0.127)
Gender (ref. Male)	−0.0605	0.135	0.188	0.657***	−1.011***	−1.080***	−0.355***	−0.400***
	(0.109)	(0.113)	(0.106)	(0.108)	(0.109)	(0.109)	(0.107)	(0.106)
Age: 32–45 (ref. 18–31)	0.116	0.300	0.0441	0.0756	−0.406*	−0.428*	0.289	0.405*
	(0.183)	(0.178)	(0.187)	(0.185)	(0.187)	(0.185)	(0.209)	(0.202)
46–59	0.110	0.146	−0.133	−0.0457	−0.554**	−0.582**	0.378	0.461*
	(0.180)	(0.165)	(0.174)	(0.175)	(0.184)	(0.183)	(0.195)	(0.191)
60–74	0.170	0.258	−0.402*	−0.0655	−0.309	−0.379*	0.666***	0.830***
	(0.168)	(0.157)	(0.164)	(0.164)	(0.173)	(0.171)	(0.182)	(0.180)
Cut1	0.393	−0.469	−2.636**	0.608	−4.058***	−4.520***	−2.254*	−1.368
	(0.931)	(0.727)	(0.921)	(0.825)	(0.881)	(0.833)	(0.914)	(0.877)
Cut2	1.636	0.701	−0.936	1.996*	−2.471**	−3.187***	−0.887	−0.0401
	(0.924)	(0.717)	(0.891)	(0.825)	(0.869)	(0.819)	(0.946)	(0.899)
Cut3	4.346***	3.500***	0.734	3.501***	−0.658	−1.526	1.423	2.147*
	(0.923)	(0.719)	(0.883)	(0.819)	(0.874)	(0.823)	(0.956)	(0.907)
Cut4	5.737***	4.964***	2.235*	4.798***	0.560	−0.371	2.745**	3.506***
	(0.929)	(0.718)	(0.889)	(0.826)	(0.880)	(0.826)	(0.960)	(0.909)
N	1498	1496	1515	1518	1500	1504	1516	1507
Pseudo R2	0.057	0.072	0.047	0.068	0.047	0.050	0.048	0.071

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

while the least supported instrument was new nuclear plant permissions. Popular support for subsidizing renewable energy as a policy instrument is in line with previous studies (Drews & van den Bergh, 2016; Lucas, 2017; Marquart-Pyatt et al., 2019; Pohjolainen et al., 2018).

In turn, second research question considered how do the attitudes toward climate policy instruments vary between global- and national-level policies in Finland? Since attitudes of toward global and national level climate policies in Finland had not been explored before, the results provide new information regarding which instruments are (possibly) more popular at global level and which at the national level. On certain instruments, the popularity was higher at the global level than it was at the national level. This was especially the case with reducing logging, but also with carbon tax and cutting beef production subsidies. Because the forest industry is an especially important part of the Finnish national economy, it could explain

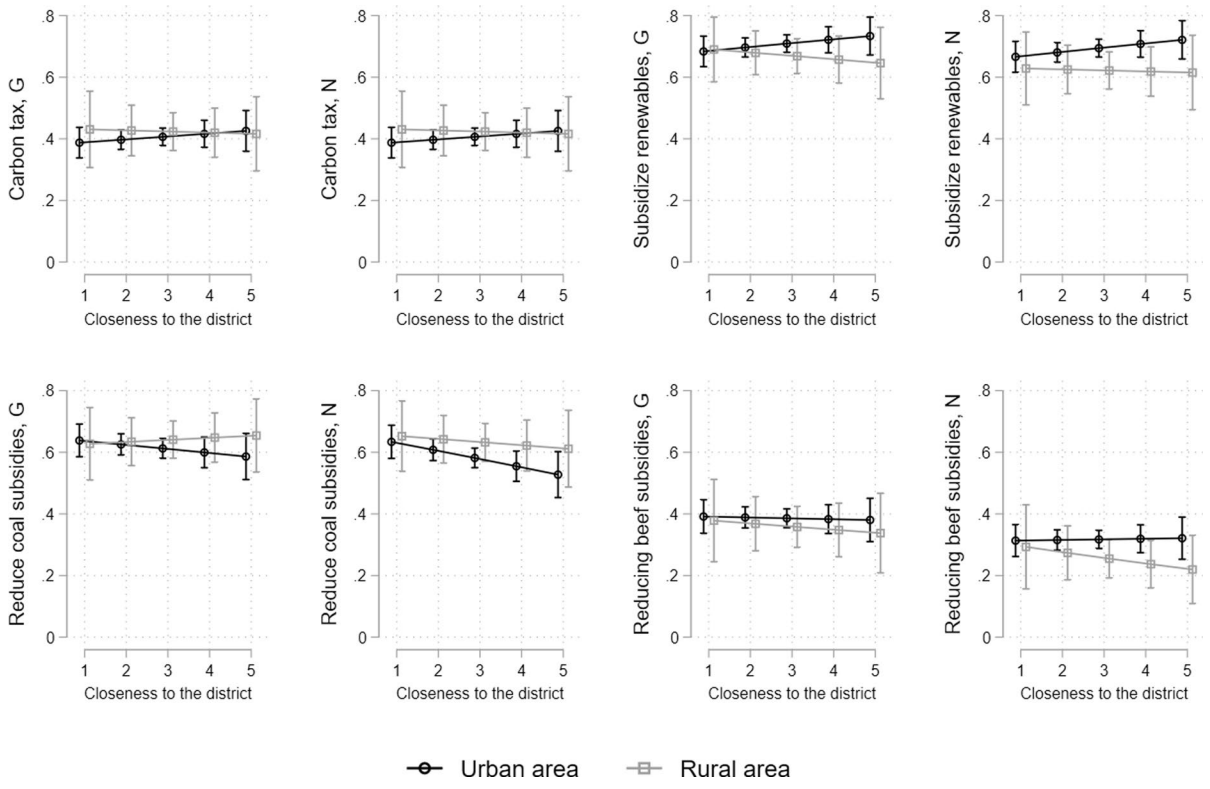

Fig. 2 Probability of supporting climate policy options (answers 4 or 5 on a scale from 1 = oppose strongly to 5 = support strongly) by domicile and closeness with the district. G = global level, *N* = national level

why respondents were relatively unwilling to reduce logging at the national level. However, because reducing logging was more clearly popular at the global level, it indicates that reduction of logging is seen as more worthwhile as an international objective. Along with more economic explanations, other possible interpretation is that the respondents felt that forests in other parts of the world are more important in terms of nature conservation than Finnish forests.

Third research question was articulated as follows: "How is the perception of climate change risk associated with people's attitudes toward climate policy instruments?". Higher climate risk perception predicted especially strong support for a national level carbon tax. It may be that the effects of a national carbon tax on the national or domestic economy are thought to be relatively negative, from which it follows that supporting it requires concern of climate change risks.

Fourth research question addressed how does urban/rural domicile and identification with one's district connect to attitudes toward climate policy instruments? Overall, the difference between urban and rural citizens was relatively small; large-scale polarization was not found. Nevertheless, certain differences were found. Urban respondents were more in favor of the instruments. This was especially the case for instruments related to rural industries, such as beef production and logging. One obvious explanation for this could be that rural residents are worried about the livelihood in their local area, which leads to the observed outcome. Still, attitudes regarding these instruments – and how identification with one's district effects to those attitudes – in Finland had not been surveyed before, and hence the results provide a basis for the future research regarding spatial differences in climate attitudes.

However, although some (seemingly) interest-based opinion differences between rural and urban respondents were found, they only related to certain climate policies. Feeling closeness with one's district was not typically related to people's attitudes toward climate policy instruments, with the exception of attitudes

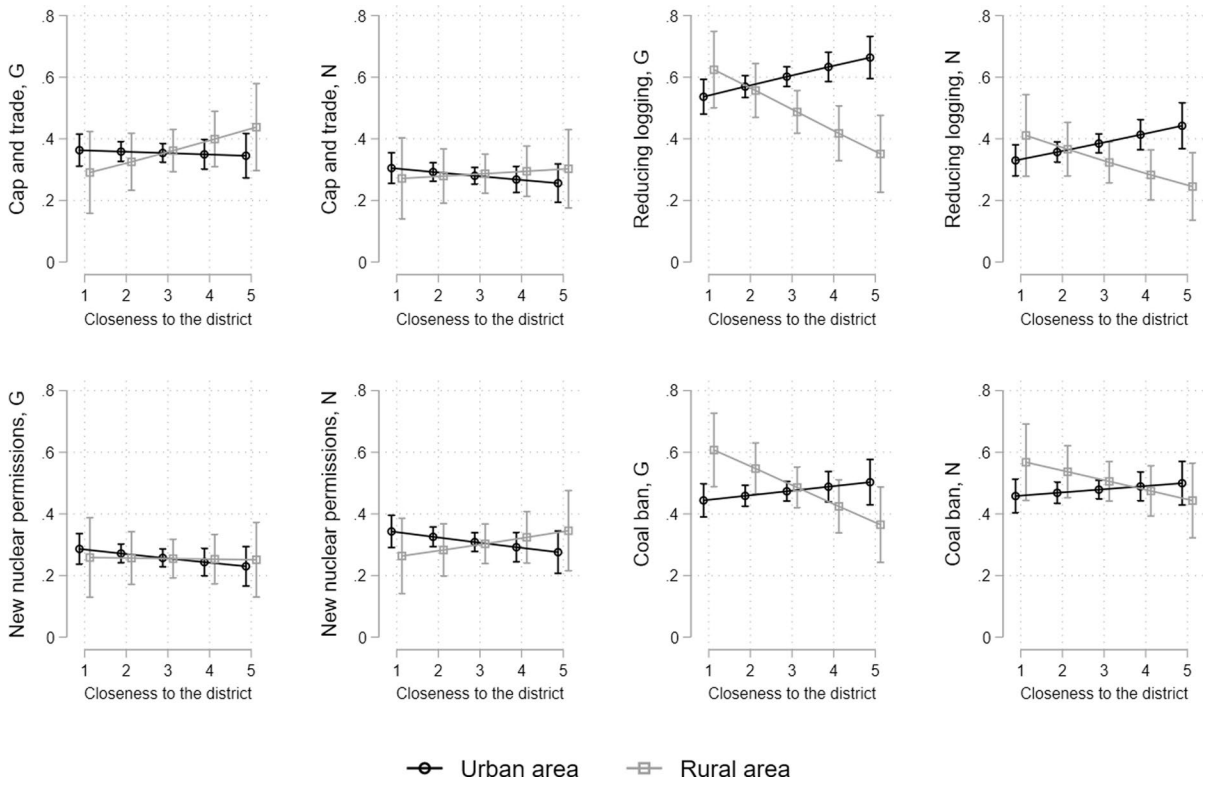

Fig. 3 Probability of supporting climate policy options (answers 4 or 5 on a scale from 1 = oppose strongly to 5 = support strongly) by domicile and closeness with the district. G = global level, *N* = national level

toward reducing logging. For many rural communities and citizens, logging is an important part of their livelihood, which could explain the results. It may also be that discourses related to logging differ between urban and rural areas, which could at least partly explain why closeness with a district has different types of effects for the citizens in different areas.

Even though nuclear power is a relatively low-carbon technology and IPCC (2018) has acknowledged nuclear power as a partial solution in the transition toward a low-carbon society, it seems that its support is not significantly related to the perception of climate change risk; higher climate risk perception even decreases support for new nuclear plant permissions at both global and national levels. The fact that nuclear power is rather unpopular is not surprising in the light of earlier research (e.g., Pitkänen & Westinen, 2017). The finding that higher perception of climate change risk predicts less support for new nuclear power plants is in line with previous results from South Korea (Chung & Kim, 2018). The dynamics between climate change risk and nuclear power risk perceptions could be studied more in the future.

The support for climate policy instruments in this study does not completely follow the theory about push and pull divide and their popularity: the most supported and least supported instruments can be classified in the pull category. It seems that new nuclear power plant permissions is an exceptional case in the climate policy toolkit, because the it can be classified to the pull-category, but the support for it is low. Broadly speaking, researchers should pay attention to which kinds of energy production or other actions a certain policy instrument affects, instead of just restricting or enabling aspects of the policy instrument.

Interestingly, although banning coal can be considered a relatively hard regulation, it was more popular than cap and trade was. The observation appears to be in line with Cullenward and Victor's (2021) argument that the economic effects regulations have on households is relatively hidden, and hence regulation is comparatively popular among the public.

While subjective closeness with district was not significantly related to support for reducing beef production subsidies, it was related to support for reducing logging: rural residents who felt strong identification with their district were more often against reductions in logging. Beef production and forest industry are both relatively important livelihoods in – especially – rural Finland, but attitudes toward logging are more linked to the feeling of belonging to the district than attitudes toward beef production. In the upcoming research, it would be interesting to examine more precisely the discourses that take place on this topic in rural and urban communities.

The results of this study provide partial, but only partial, support for the collective problem theory. In light of these results, much depends on the policy measure, how much it matters in terms of attitudes, whether it is implemented in the respondents' country of residence or whether it is implemented globally.

Limitations of this study include its cross-sectional design, and hence changes over time remain obscure. The extent to which the respondents' answers correspond with their actual voting decisions or other actions is also uncertain. More research on changes in climate policy attitudes over time is needed. In addition, research using the split-ballot technique would provide additional information on support for global and national climate policy measures. Furthermore, in survey research, it is questionable whether respondents understand the questions in the same manner; that is, societal risks due to climate change could be understood in different ways.

Conclusions

This study found that, among Finns, the difference between supporting global and national level climate policies was particularly high regarding those instruments that presumably have an impact on household economies: the support was higher for the global policies, offering at least limited support for the collective action theory. Stronger climate change risk perception was positively associated with greater support for all the studied climate policy measures, except for new nuclear plant permissions, for which the connection was negative.

Overall, there was no significant attitudinal polarization found between urban and rural residents. However, policies related to rural livelihoods – such as cutting beef production subsidies and reducing logging – were more popular among citizens living in the urban areas. A stronger feeling of closeness with one's own district increased attitudinal differences between urban and rural respondents regarding reducing logging.

While the general view is that so-called pull policy instruments are more popular than push instruments, this study shows that the attitudes are strongly dependent on what is managed by the instrument: In this study, both the most popular and the most unpopular policy instrument belong to the pull instrument-category.

Apart from new nuclear power plant permissions at the global and national level and reducing logging at the national level, there was more support than opposition to all the policy instruments examined. On this basis, politicians could be bolder in advancing climate policies, even in the case of so-called hard policies.

The results of this study contribute to the accumulating understating of how climate policy attitudes are formed among citizens. However, more research on the determinants of climate attitudes is needed. For instance, future studies could examine how support for different climate policy instruments at global and national levels is formed in different societal contexts.

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Declarations

Conflict of interest The author declares that they have no conflicts of interest.

Human or Animals and Informed consent The respondents of the survey used in the study voluntary accepted their participation were and informed about the data handling processes and information security. The data has been handled following General Data Protection Regulation by European Union.

Appendix

Table 4 Weighted descriptive statistics of the dependent variables from Finland 2019− data

Variable	*n*	1 Oppose strongly (%)	2 (%)	3 (%)	4 (%)	5 Support strongly (%)
Carbon tax (global)	1714	4.62	8.88	32.93	30.17	23.39
Carbon tax (national)_	1705	9.93	15.27	34.29	24.81	15.69
Subsidize renewables (global)	1712	3.04	6.50	20.55	33.79	36.13
Subsidize renewables (national)	1717	3.34	7.31	20.97	34.47	33.90
Cutting coal energy use subsidies (global)	1702	1.62	4.70	31.52	28.45	33.71
Cutting coal energy use subsidies (national)	1707	2.51	5.24	32.63	27.53	32.08
Cutting beef production subsidies (global)	1702	5.99	13.47	43.20	22.25	15.10
Cutting beef production subsidies (national)	1704	11.21	18.94	39.38	18.10	12.37
Cap and trade (global)	1682	5.03	9.09	50.78	22.14	12.96
Cap and trade (national)	1680	7.29	10.96	53.59	19.04	9.13
Reducing logging (global)	1705	3.32	10.12	29.16	31.47	25.92
Reducing logging (national)	1710	12.56	18.10	31.93	21.42	15.99
New nuclear plant permissions (global)	1687	12.06	24.69	38.14	15.02	10.09
New nuclear plant permissions (national)	1691	13.97	20.63	35.44	16.54	13.42
Coal ban (global)	1704	3.74	8.62	40.54	25.71	21.39
Coal ban (national)	1698	4.81	9.33	37.81	26.07	21.98

Table 5 Weighted descriptive statistics of the control and independent variables from Finland 2019-data

Variable	*n*	Min	Max	Mean	SD	Share (%)
Climate change risk perception	1716	1	5	4.01	1.08	
Closeness to the district	1703	1	5	2.72	1.07	
Domicile	1709	1	2			
Urban	1372					80.26
Rural	337					19.74
Income € per month (logged)	1644	0.83	10.60	7.44	0.67	
Age group	1736	1	4			
18–31	400					23.07
32–45	427					24.57
46–59	435					25.06
60–74	474					27.31
Gender	1721	1	2			
Male	857					49.82
Female	864					50.18
Education	1659	1	3			
Primary	168					10.14
Secondary	915					55.13
Tertiary	576					34.73

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