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The significance of political culture, economic context and instrument type for climate policy support: a cross-national study

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ABSTRACT

While many countries have pledged to reduce greenhouse gas (GHG) emissions, the choice of national climate policy measures demonstrates widespread variation. Although system of government, path-dependency and economic entanglements can explain a certain amount of variation in policy choice, research also points specifically towards the highly politicized nature of climate policy instruments and their sensitivity to public support as explanatory factors for cross-national differences. Previous studies hypothesize that various country-specific contextual factors determine both general preferences for environmental protection and the public's preferences for different types of policy instruments. One suggestion is that countries' prevailing political cultures have significant consequences for such public support. Another supposition is that, since countries differ in their economic dependency on climate detrimental industry such as fossil fuel production, this should be a significant factor determining both public attitudes and subsequent political decisions. This paper applies unique, original data from four countries with significant variation in (i) political-cultural contexts (Sweden and Norway vs New Zealand and Australia and (ii) economic dependency (Norway and Australia vs Sweden and New Zealand) to analyze how, and to what extent, these two contextual variables interact with, and moderate, the effect of individual-level factors on support for climate policy measures in the four countries. Furthermore, the paper explores variations in support for different types of CO₂ taxes (directed towards individual consumers, industry, and fossil-fuel producers) in the four countries.

Key policy insights

- Across contexts, public policy support is lower for taxes directed towards private consumption than for taxes directed towards industry, and the strongest for CO₂ taxes on fossil fuel producing industry.
- Political culture and economic context influence the effect of individual-level factors on policy support.
- In a context of high economic dependency on the fossil-fuel industry, people are less likely to support the introduction of CO₂ taxes.
- The effect of left-right ideology on policy support is sensitive to political-cultural context.

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CO₂ tax; climate; policy; comparative; political culture; economic dependency

Introduction

Several studies show that public concern about climate change is consistently rather high in both the developing and developed world (Kim & Wolinsky-Nahmias, 2014; Steentjes et al., 2017). In parallel, many countries have

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pledged to reduce greenhouse gas (GHG) emissions, notably under the 2015 Paris Agreement. Still, both the level of emission reductions pledged, as well as the choice of national climate policy instruments, demonstrate widespread variation. When considering, for example, the differences in policy output among EU member-states, it is evident that some countries are far more successful than others both in designing and implementing effective climate policies (cf. IPCC, 2014). Looking outside the European context, cross-national differences in climate policy-implementation are even more tangible (cf. Iacobuta, Dubash, Upadhyaya, Deribe, & Höhne, 2018). How, then, can this variation be understood?

As explanatory factors for these cross-national differences, previous research points specifically towards the highly politicized nature of climate policy instruments and their sensitivity to public support (e.g. Tjernström & Tietenberg, 2008). The findings in the rather rich literature on the opinion-policy nexus suggest both that the public actually notices what policy-makers do and respond accordingly (Wlezien, 1995), and that policy-makers are responsive to public opinion when making decisions (Burstein, 2003; Stimson, MacKuen, & Erikson, 1995). These findings imply that public attitudes certainly matter for policy choice and contribute to the cross-country variations that we see in regard to climate policy measures. Figure 1, as an example, displays the variations in public opinion towards energy taxes among European countries.

Compared to the wealth of studies in nationally-based samples, mostly from the US or Northern Europe, that focus on individual-level factors explaining climate policy attitudes, studies on cross-national attitudinal differences are rather scarce. In the former, a number of factors have been shown to influence an individual's attitudes to climate policy measures, including values, ideology, personal norms, environmental concerns and beliefs, as well as the person's trust in politicians, the institutional system and people in general (Drews & van den Bergh, 2015). In the latter, that is, cross-national attitudinal differences, system of government, industry characteristics, path-dependency and economic entanglements have been suggested to interact with individual-level factors to explain a certain amount of variation in outcomes, policy choice, and public opinion (Harrison & Sundstrom, 2010; Lachapelle & Paterson, 2013). In this article, we study the impact of two further contextual factors on public attitudes towards climate change mitigation policies, and in prolongation thus also on the variation that we see in countries' attempts to combat climate through the implementation of policy measures: *political culture* and countries' *economic dependency* on the production of fossil fuels (from here on referred to as 'economic dependency'). As such, this paper aims to explore whether, and if so how, the contexts of political culture and economic dependency affect how individual-level factors influence support for climate policy measures.

To achieve this aim, we apply unique, original survey-data from four countries that pair-wise share a number of contextual features, including almost identical political culture (Sweden and Norway vs. Australia and New Zealand), but differ greatly in their economic dependency (Norway and Australia vs. Sweden and New Zealand). More specifically, we first investigate if there are any consistent differences between countries varying in political culture and economic dependency in regard to public attitudes towards climate change

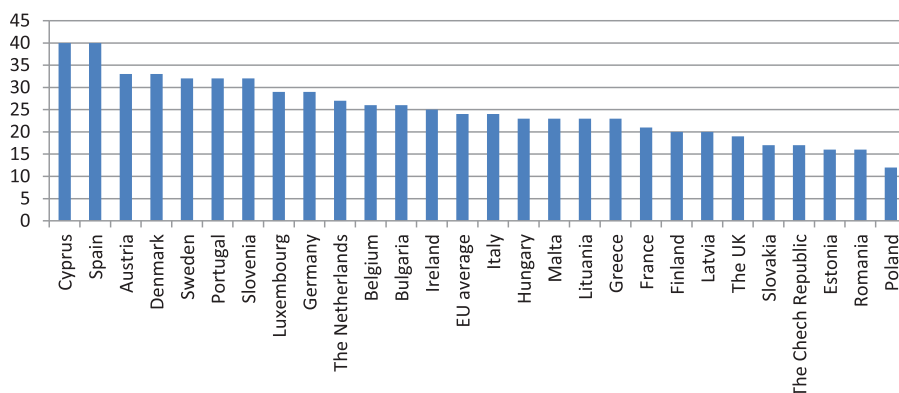


Figure 1. Taxation should be based more on the way we use energy. *Comment:* Percentage Totally agree to the statement: "Taxation should be based more on the way we use energy". Source: Special Eurobarometer 372.

policies. We apply carbon tax as the policy under scrutiny for this study, as CO₂ taxation is regularly described as one of the most cost-effective policy measures for combatting climate change (cf. Sterner & Coria, 2012) and falls in-between soft policies such as nudges and information, and hard policies such as regulation and fines in terms of coercion. Second, we complement the cross-national comparisons with analyses of individual-level data to see if there are any systematic differences between respondents in the selected countries, in terms of individual perceptions on economic consequences for the own country. Third, we ascertain if any such differences can in any way be associated with the contextual differences that we propose in the first place.

From previous research, we know that people in general are negatively disposed towards hard policies, at least when it comes to regulating their own behaviour, and that CO₂ taxes directed towards private consumption often face rather strong resistance (Rabe & Borick, 2012). However, we know much less about attitudes and their antecedents when it comes to CO₂ taxes targeting other actors, such as industry. In this paper, therefore, we analyse the drivers of public support for three different designs of CO₂ taxes: one addressing private consumption of fossil fuels, one aiming at reducing climate change contributions from industry, and one targeting fossil fuel producing industry specifically.

Theorizing public support for CO₂ taxes

In the literature, a variety of drivers are suggested as explaining why policy support diverges both between and within countries. Focusing on individual-level drivers, previous studies point at the importance of motivation (e.g. Schleich, Schwirplies, & Ziegler, 2018; Steg et al, 2006) based in personal value-priorities (Harring, Jagers, & Matti, 2017; Nordlund & Garvill, 2002), environmental beliefs (Dunlap, Van Liere, Mertig, & Jones, 2000), and personal norms (Guagnano, Stern, & Dietz, 1995). Other studies highlight the significance of political ideology (Fairbrother, 2016; Feldman & Hart, 2018) as well as the individual's level of institutional, political, and interpersonal trust (Harring, 2014; Kallbekken, Garcia, & Korneliussen, 2013) as important factors for policy support. Furthermore, the perceived consequences of introducing a measure have attracted increasing attention (cf. Drews & van den Bergh, 2015; Ščasný, Zvěřinová, Czajkowski, Kyselá, & Zagórska, 2017). In a recent literature review, Carattini, Baranzini, Thalmann, Varone, and Vöhringer (2017; Carattini, Carvalho, & Fankhauser, 2017) identify a large number of such policy-specific beliefs that help explain why people are averse to carbon taxes specifically. Firstly, and based on studies with various methodological approaches, a common perception is that the personal costs of a tax would be too high, thus driving negative sentiments (Alberini, Scasny, & Bigano, 2016; Carattini, Baranzini, & Lalive, 2016; Heres, Kallbekken, & Galarraga, 2017; Jagers & Hammar, 2009; Schuitema, Steg, & Forward, 2010). Another reason for skepticism is the regressive nature of carbon taxes, triggering perceptions of the tax as primarily affecting low-income households and thereby having negative distributive effects (Baranzini & Carattini, 2017; Gevrek & Uyduranoglu, 2015; Kallbekken & Aasen, 2010; Murray & Rivers, 2015). A third driver behind aversion is the belief that carbon taxes might have a negative impact on the wider economy (Thalmann, 2004). In addition, a number of studies point towards public suspicion that carbon taxes will not effectively discourage high-carbon behaviour (Hsu, Walters, & Purgas, 2008; Kallbekken & Saelen, 2011; Steg, Dreijerink, & Abrahamse, 2006) as well as a concern that the purpose of introducing a carbon tax is primarily to increase government revenues, rather than to positively impact the climate (Klok, Larsen, Dahl, & Hansen, 2006). These and other studies all highlight the significance of policy design for increasing support for CO₂ taxes, in terms of the tax rate itself, revenue use, and combining the tax with other measures (see Bento, Franco, & Kaffine, 2009; Dresner, Dunne, Clinch, & Beuermann, 2006; Eriksson, Garvill, & Nordlund, 2008; Hammar & Jagers, 2006; Hsu et al., 2008; Jagers, Martinsson, & Matti, 2018; Sumner, Bird, & Dobos, 2011). Here, we acknowledge the possible effect of policy-specific beliefs on policy attitudes, both as a CO₂ tax might be perceived to have direct negative consequences for the economy of the country (and thus for the citizens of that country), and since the economic consequences might be perceived as affecting the own country more than other comparable economies.

A number of attempts have also been made to identify and elucidate contextual drivers behind public policy attitudes, focusing on a diverse range of macro-level factors such as the degree of polarization among political elites on both the definition of the problem itself and the strategies for amending it (e.g. Linde, 2018), or the institutional quality and level of corruption within a country (Aghion, Algan, Cahuc, & Shleifer, 2010; Harring, 2016). In this paper, however, we are concerned with two additional contextual factors: *political culture* and

economic dependency on fossil fuel production. Political culture has been shown to have significant consequences for the prospects of gaining public support for other policy instruments (cf. Cherry, García, Kallbekken, & Torvanger, 2014; Cherry, Kallbekken, & Kroll, 2017) and might thus be a key to the general viability of introducing or increasing CO₂ taxes too. Even in Western democracies, studies show distinct differences in terms of political culture. For example, it is likely that where individual autonomy and active self-assertion are core cultural elements, such as in the Anglo-Saxon culture, policy preferences favour less governmental regulation and are more in favour of certain types of market-based instruments (Cherry et al., 2017; Jagers, Löfgren, & Stripple, 2010). In contrast, a general cultural emphasis on group well-being and egalitarianism, as to be found in the Scandinavian context, is likely to be expressed in more cooperative terms with a significant element of state power (Inglehart & Baker, 2000; Schwartz, 2006).

Our second contextual factor potentially also affecting public opinion, is the degree to which a country's industry and national economy are *dependent* upon the use of fossil fuels and even more so, on fossil fuel production. A set of recent studies suggest the importance of economic conditions and dependencies (cf. Jagers & Matti, 2018; Kenny, 2018; Ščasný et al., 2017). For example, studies of global climate negotiations suggest that oil-producing countries are reluctant to support the introduction of forceful emissions-targets and restrictions on the use of fossil fuels both domestically and on a global level, for fear of losing out economically if a transition to other energy sources becomes a widespread reality (cf. Buys, Deichmann, Meisner, Ton That, & Wheeler, 2009; Depledge, 2008). In line with this, we can expect that a country's relative economic dependency on environmentally detrimental industry will also affect the formation of policy preferences among the individuals living there. As previous research tells us, cost-benefit calculations and resulting personal outcome expectancies, that is, the extent to which implementation of a policy measure is expected to imply consequences in terms of higher costs for the individual, is an important explanatory factor for policy support (Lubell, Vedlitz, Zahran, & Alston, 2006; Schuitema et al., 2010). In the event of a policy measure implying stricter regulations or limitations on a significant part of a country's industrial base, e.g. a tax on production of fossil fuels, we can expect this to negatively impact public support.

Research questions

Based on previous theoretical discussion, this paper will explore how various contextual elements affect the influence of individual-level factors on support for climate policy measures. Three main research questions will guide the exploration:

RQ1: Is there any variation in support for different CO₂ taxes among different contexts?

RQ2: Is there any variation in how individual-level factors are affecting public support for CO₂ taxes among different contexts?

RQ3: Is there an interaction of context on individual-level factors, i.e. such that:

(a) Ideology affects public support differently in countries with different political cultures?

(b) Individuals' concern for economic consequences of a tax (personal outcome expectancy) affects public support differently in countries with high and low economic dependency?

In order to approach an answer to our above questions, we select countries that differ in regard to both political culture and economic dependency in line with the 4-square matrix displayed in [Figure 2](#) below. Countries are arranged according to whether they have a political culture that is supportive of governmental intervention or not, as well as whether they have a low or high economic dependency on fossil fuel production. We thus expect countries in the top left corner (+/+) to have the most favourable contextual conditions, and countries in the bottom right corner (-/-) the least favourable. In the following section, we explain and motivate our selection of countries to populate this model.

Selection of cases

As indicated, for the purpose of this article, we use a four-country comparative design. Selecting Australia and New Zealand as one country pair, and Sweden and Norway as the other country pair, allows us to compare public

		Economic dependency	
		Low	High
Political culture	Supportive of governmental steering	+/+	+/-
	Unsupportive of governmental steering	-/+	-/-

Figure 2. Criteria for case selection.

attitudes to climate policy measures in countries that are highly similar in respect to political culture, although differing greatly in their dependency on fossil fuel production for the domestic economy. First of all, we emphasize that these four modern Western democracies in many respects are very similar; however, following the work on general cultural values by psychologist Shalom Schwartz (e.g. 2006) and colleagues, there are also relevant differences. Sweden and Norway could be described to have what we define as a *Scandinavian* political culture, based on values such as altruism, responsibility and cooperation, and acceptance of political steering. Both countries have universalistic and highly redistributive welfare states, based on high (income) tax levels. Furthermore, Norway and Sweden have a consensus-driven policy process, while Australia and New Zealand have more adversarial systems (Svallfors, 1997). At the same time, the two latter countries have an Anglo-Saxon heritage, which places greater emphasis on the values of hierarchy, mastery and active self-assertion (Schwartz, 2006).

However, when it comes to economic dependency on fossil fuels, the countries cluster in a totally different way. Although domestic energy use mainly consists of hydro-electric power, Norway is among the global top five exporters of crude oil, with the oil and gas sector constituting around 22% of GDP and 67% of exports. Similarly, Australia is one of the top coal producers in the world, with its export of fossil fuels (crude oil, gas and coal) amounting to about 22% of total exports (Atlas of Economic Complexity, 2016). In total, the Australian mining sector (although including iron) constitutes about 7% of GDP. Sweden and New Zealand, on the other hand, have none or very limited assets in terms of fossil fuel exports, although both have a small amount of fossil-fuel related industries, for example refineries and domestic energy production.

From an international perspective, Sweden and Norway are often described as environmental frontrunners, with a tangible national consensus on both problem description and political solutions (Lundqvist, 2004; Sarasini, 2009; Scruggs, 1999; Zannakis, 2015). In both countries, carbon taxes on private consumption have also been in place since the early 1990s (Jagers & Hammar, 2009; Steentjes et al., 2017). However, Norway's growing economic dependence on the fossil-fuel sector has, in recent years, challenged the political consensus and increased polarization among political parties on the issue of climate change (Hovden & Lindseth, 2004; Roettereng, 2016).

The politics of climate change in Australia and New Zealand is to a considerable degree characterized by political polarization. In the latter, despite a certain degree of cross-partisan agreement on the need for climate policies, this polarization is manifested in political indecisiveness surrounding attempts to implement a New Zealand emission trading scheme (Bullock, 2012; Harker, Taylor, & Knight-Lenihan, 2017). In Australia, climate politics have become both more politicized and more polarized over time (Fielding, Head, Laffan, Western, & Hoegh-Guldberg, 2012; McDonald, 2016; Pearse, 2016; Tranter, 2013), causing a considerable degree of volatility in climate change politics and failed attempts to implement a carbon pricing policy (Crowley, 2017; McDonald, 2016) (Figure 3).

Data and methods

Data was collected through web-surveys administered by the Laboratory of Opinion Research (LORE) at the University of Gothenburg, Sweden. In Sweden, data collection was included in wave 14 of the Swedish Citizen Panel,

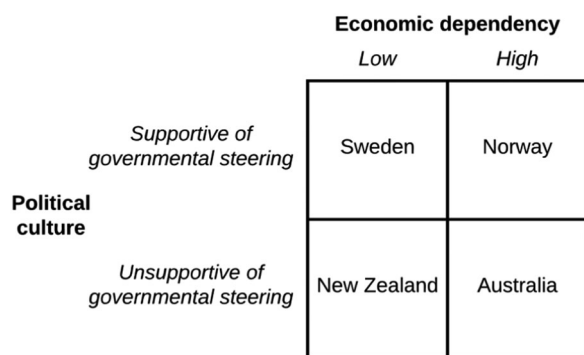


Figure 3. Selected cases.

run by LORE (www.lore.gu.se). As of today, the panel has some 60,000 respondents who are regularly invited to complete surveys on a wide range of topics. No payment is made to the panel participants. The sample in this study is a combination of non-probability and probability respondents (56/44) and is pre-stratified on four dimensions: gender, age, education and geographical location. Fieldwork lasted 27 days between 5 February and 5 March 2015. After two sets of reminders, the participation rate was 78.5%, resulting in a total of 2,708 responses. Simultaneously with the end of the Swedish field period, data collection in Norway, Australia and New Zealand was commenced through the sample provider Cint (www.cint.com), repeating the questions asked in Sweden. In addition, a complementary New Zealand sample was collected through SSI (Survey Sampling International) to reach the required sample size per country. The aim for each of these quota samples, based on a combination of gender and age, was 2,000 responses in each country (1,000 for each of the two New Zealand samples). After 16 days of fieldwork, from 16 to 31 March 2015, a total of 2,072 (Australia), 1,996 (Norway), and 1,975 (New Zealand) responses had been collected, excluding partial responses. For further explorations of this data set see Linde (2018). The socioeconomic characteristics for the four samples are displayed in Table 1.

Although small, the differences between Sweden and the other three countries are statistically significant for two of the socioeconomic characteristics. The Swedish sample are slightly older, and with overall higher income. Additionally, compared to New Zealand, education is slightly higher and the sample also contains a smaller share of women. The New Zealand sample further displays a lower overall income compared to the three other countries. Table 2 further shows that the Swedish respondents differ in terms of individual-level factors: overall, Swedes identify themselves as slightly more to the ideological left and as holding a more environmentalist orientation than respondents from the other three countries. This is also reflected in the strength of the personal environmental norm, which is more tangible in the Swedish sample. We also note that the Australian sample is clearly less environmentally oriented than other respondents. Based on these characteristics alone, we should expect to find slightly more positive attitudes towards environmentally protective measures among Swedes, and we therefore control for both socioeconomics and individual level factors in all further analyses.

Table 1. Socioeconomic factors (mean values).

	Australia		Norway		New Zealand		Sweden	
	Sample	Country	Sample	Country	Sample	Country	Sample	Country
Sex (% women)	52	–	54	–	56 ^{††}	–	50 [†]	–
Age	42.22 ^{††}	37.8	41.84 ^{††}	39.2	42.02 ^{††}	37.9	49.52 ^{*/**/†}	41.2
Education	2.42	80%	2.41	82%	2.40 ^{††}	77%	2.44 [†]	83%
Income	2.73 ^{†/††}	33417	2.62 ^{†/††}	35739	2.45 ^{*/**/††}	30563	3.02 ^{*/**/†}	30553

Note: significant differences are marked as * = from Australia, ** = from Norway, † = from New Zealand, and †† = from Sweden (Welsh-test/Games-Howell w. 95% CI). Age for Sample is age in 2014, for Country median age in 2018 (CIA World Factbook). Education for sample is measured as Low (1), Medium (2), High (3), for Country share of adults aged 25–64 that have completed upper secondary education (OECD Better Life Index), Income for sample is measured in five steps (1–5) from lowest to highest, for Country the average household net adjusted disposable income per capita in USD (OECD Better Life Index).

Table 2. Individual-level factors (mean values, SD in parentheses).

	Australia	Norway	New Zealand	Sweden
Ideology	5.07 ^{††} (1.981)	5.04 ^{††} (2.423)	4.93 ^{††} (1.830)	4.46 ^{*/**/†} (2.452)
Environmentalism	5.38 ^{**/†/††} (2.638)	5.76 ^{*/††} (2.482)	5.78 ^{*/††} (2.396)	6.09 ^{*/**/†} (2.512)
Personal norm	4.80 (1.298)	4.74 ^{†/††} (1.307)	4.89 ^{**/††} (1.218)	5.03 ^{*/**/†} (1.240)

Note: significant differences are marked as * = from Australia, ** = from Norway, † = from New Zealand, and †† = from Sweden (Welsh-test/Games-Howell w. 95% CI). Ideology and Environmentalism are measured on an 11-point scale (left to right, and not green to green respectively). Personal norm is a 6-question index (scaled 1–7).

For the purposes of measuring our main dependent variables, we asked the respondents to indicate their attitude towards (1) a CO₂ tax on fossil fuels used by citizens, (2) a CO₂ tax on fossil fuels used by industry, and (3) a CO₂ tax specifically directed towards the fossil fuel producing industry. All respondents in all countries were asked about their attitudes to all three policy proposals. Responses ranged from –3 (completely against) to +3 (completely for), with 0 labelled as neither against nor for. The responses were then recoded into a scale from 1–7 so as to facilitate analysis. We expect that the support for CO₂ taxes targeting citizens will be lower overall since these taxes affect respondents more directly, but also that, relatively speaking, the economic context will have more tangible effects on support for CO₂ taxes targeting fossil fuel producing industry. There are of course limitations to using survey techniques in general, given that people's preferences are volatile. It is important to emphasize that the ambition with the survey questions is not to investigate people's attitudes to *existing* policy suggestions in the selected countries, but to explore possible variations in public support due to policy design. Our ambition is thus to capture whether people are sensitive to key concepts in the various policy proposals, such as whether the tax targets consumers or industry, and furthermore whether it matters if the policy targets industry in general or the most polluting industries. Therefore, the policy proposals suggested are rather hypothetical. Furthermore, it is important to note that the selected countries vary in the degree of actual CO₂ taxes and carbon pricing in place, and in some cases even have tax exemption policies for certain industries (Andersson, 2017; Lin & Li, 2011; World Bank, 2018).

In order to further explore whether countries' economic dependency on fossil fuel producing industry matters, we also capture attitudes at an individual level. So, in order to assess the respondents' understanding of the effects of climate change mitigation policies on their respective country's economy (economic self-assessment), two questions were asked. First, on a response-scale from very negative (1) to very positive (7), respondents were asked to indicate how they believed their country's economy would be affected by forceful political measures to deal with climate change (OwnEconEff). Second, on a scale between much less (1) to much more (7), they were also asked to compare the economic effects on their country with the effects on other comparable industrialized countries (CompEconEff). Creating an index of these two self-evaluation questions is not possible (Cronbach's $\alpha = .093$). Therefore, we included them independently in the analyses. In addition, the analyses include a number of control variables, previously demonstrated as being significant for pro-environmental policy support (Steg et al., 2005; Stern, Dietz, & Black, 1995), namely: ideology (self-reported on a scale from far left [1] to far right [10]), environmentalism (self-reported on a scale from not green at all [1] to very green [10]), and the strength of a personal environmental norm. The latter is an index composed of six questions tapping the respondents feeling of moral obligations to personally act in favour of the climate (Cronbach's $\alpha = .833$). In models run for the complete sample, the contextual differences are included in the analyses as dummy-variables measuring economic dependency (1 if the respondent is from Norway or Australia, 0 if the respondent is from Sweden or New Zealand), and Scandinavian political culture (1 = Sweden or Norway, 0 = Australia or New Zealand).

Empirical results

Descriptive data

We start our analysis by first considering overall differences in policy support for our four cases, displayed in Table 3. On average, our results suggest that Swedes are significantly more supportive of CO₂ taxes than are

respondents from the other countries, although the differences are small and the overall support is unexpectedly high in all countries. Furthermore, public policy support is lower for taxes directed towards private consumption than for taxes directed towards industry. When asking about CO₂ taxes on fossil fuel producing industry, we get the strongest average support in all cases.

In absolute numbers, the four countries are arranged according to what should be expected if economic dependency were to matter for public policy attitudes, at least toward introducing taxes on industry and fossil-fuel producers. As expected from theory, the consistently lower support in Norway (mean = 3.69, 4.78, and 4.80 respectively) compared to Sweden ($p < 0.05$) and, for taxes directed towards industry, New Zealand ($p < 0.05$), seems to indicate that economic context does play a role for policy support. Although we thus see that a common Scandinavian political culture is not able to counteract the economic dependency differences between Sweden and Norway, we find no significant differences in attitudes between the two Anglo-Saxon cultural contexts, despite their varying economic dependencies. Note, however, a significant difference on the 90% level between Australia and New Zealand for CO₂ taxes on fossil fuel producers. This is also the policy attitude that should be the most sensitive for an economic dependency-context as it is directly targeting this part of the national industry. As expected, we also find that CO₂ taxes targeting individual consumers (mean < 4) are much less supported in absolute numbers across contexts, compared with CO₂ taxes targeting industry or producers (means > 4).

As discussed above, we also propose that the effect of an economic dependency context on the policy attitudes of individuals is mediated by perceptions that strengthened climate mitigation will have a negative impact on the domestic economy. To further scrutinize the attitudinal differences and their antecedents, we therefore consider also how respondents in the four countries differ in terms of economic self-assessment. Figures are displayed in Table 4.

Although it seems reasonable to assume that Norway and Australia, both being major producers of fossil fuels, will be negatively affected by stronger efforts to mitigate climate change (which, for example, would imply considerably reducing the use of fossil fuels), Norwegian respondents do not perceive these effects as particularly negative but rather position themselves close to the scale-midpoint (mean = 3.93). What is more, in this sample, Swedes on average perceive the economic effects from strengthened climate mitigation policies to be the most negative (mean = 3.83). For the second self-assessment item, the country-comparative results are more expected, although mean-differences are very small and the average answer again is close to the scale-midpoint. Compared to the other three cases, Australians perceive economic effects to be slightly larger for their own country than for comparable industrialized countries.

Econometrics

To further analyze our data and the effects of context, self-assessment and beliefs on policy support, we use ordinary least squares (OLS) regressions. In Table 5, we consider the factors driving support for CO₂ taxes directed towards citizens, industry, and fossil fuel producers respectively in the four countries.

Studying the different models, we note that there is indeed variation in how some individual factors affect public support for CO₂ taxes in the different countries, while other factors seem to be more stable cross-nationally. The effect of ideology varies between contexts. In Norway ($-.06^{***}$) and Sweden ($-.07^{***}$) people on the left

Table 3. Country-level attitudes towards CO₂ taxes (mean values, SD in parentheses).

	Australia	Norway	New Zealand	Sweden
1. CO ₂ tax (private)	3.77 ^{††} (1.857)	3.69 ^{††} (1.930)	3.73 ^{††} (1.650)	3.92 ^{*/††/‡} (1.888)
2. CO ₂ tax (industry)	4.82 ^{††} (1.830)	4.78 ^{‡/††} (1.858)	4.93 ^{**/††} (1.689)	5.11 ^{*/††/‡} (1.732)
3. CO ₂ tax (producers)	4.84 ^{††} (1.851)	4.80 ^{‡/††} (1.883)	4.98 ^{**/††} (1.660)	5.19 ^{*/††/‡} (1.761)

Note: significant differences are marked as * = from Australia, ** = from Norway, † = from New Zealand, and †† = from Sweden (Welsh-test/Games-Howell w. 95% CI). Tax attitudes are measured by asking the respondents to indicate, in turn, their "position on the following policy proposals?" 1. A carbon dioxide tax (CO₂) on fossil fuels used for private consumption, 2. A carbon dioxide tax on fossil fuels used by the industrial sector, and 3. A carbon dioxide tax on fossil fuel producing industries. Responses ranged from -3 (completely against) to +3 (completely for), with 0 labelled as neither against nor for (recoded into a 1-7 scale).

Table 4. Perceptions of economic effects (mean-values, SD in parentheses).

	Australia	Norway	New Zealand	Sweden
1. OwnEconEff	4.04 ^{††} (1.666)	3.93 (1.360)	4.01 ^{††} (1.566)	3.83 ^{*/†} (1.461)
2. CompEconEff	4.56 ^{**/†/††} (1.331)	4.09 ^{*/†} (1.274)	4.40 ^{*/**/††} (1.367)	4.03 ^{*/†} (1.190)

Note: significant differences are marked as * = from Australia, ** = from Norway, † = from New Zealand, and †† = from Sweden (Welsh-test/Games-Howell w. 95% CI). OwnEconEff is measured by the question "How do you think your country's economy would be affected by forceful political measures against climate change?" (7-points from Very negatively to Very positively). CompEconEff is measured by the question "In comparison with other industrialized countries, how will your country's economy be affected by forceful political measures against climate change?" (7-points from Substantially more to Substantially less).

of the political scale show more support for a CO₂ tax on private consumption, while in Australia and New Zealand, we do not find any significant ideological effects. The effect of ideology is more stable between contexts in support for CO₂ taxes targeting industry and fossil fuel producers. In all contexts, people on the left are more supportive (even though the effect of ideology on public support for CO₂ taxation on industry is not significant in New Zealand). The effects vary in the sense that ideology is a stronger predictor of support for CO₂ taxes on industry and fossil fuel producers in Sweden ($-.13^{***}$, $-.11^{***}$) than in Australia ($-.06^{***}$, $-.06^{**}$).

Furthermore, we note that environmentalism and personal norms are more stable than ideology, in the sense that the effects are significant in all contexts (except the effect of environmentalism on the support for CO₂ taxes on private consumption in New Zealand) and have the same positive sign. More environmentalism and stronger personal environmental norms generate a stronger support for CO₂ taxes on consumers, CO₂ taxes on industry and CO₂ taxes on fossil fuel producers. The effect sizes do however vary between contexts.

Studying the effects of perceptions about whether the respondents believed their country's economy would be affected by forceful political measures to deal with climate change (OwnEconEff) on policy support, we find that the effects are quite stable between countries, even though the effect sizes vary. However, the effects of perceiving that there will be consequences for one's own country compared to the other comparable industrialized countries (CompEconEff) vary between contexts. There are negative effects in Australia (not statistically significant) and Sweden (statistically significant), suggesting that the more people think that their country will be affected, the less strongly they supported the policies. We find no effects of this on any of the policies in the Norwegian and New Zealand samples.

Using the complete set of respondents from our two cases allows us to illustrate and test the significance of context through the inclusion of an economic dependency- as well as a Scandinavian context-dummy in the regression-models. The results are displayed in Table 6.

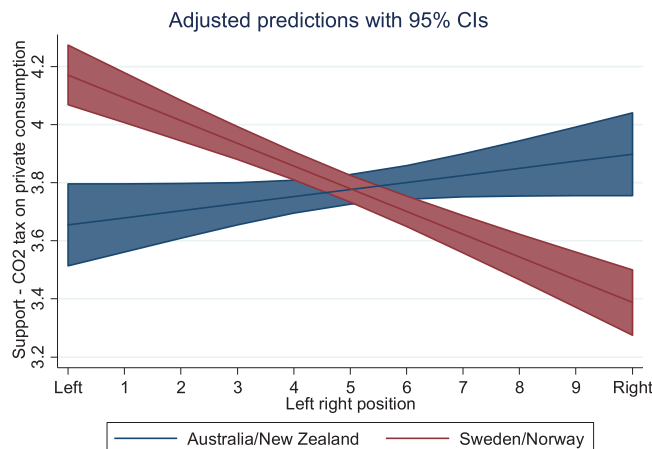
**Graph 1.** Conditional effects of political culture on the relationship between ideology and support for a CO₂ tax on private consumption.

Table 5. Regression for public support for CO₂ tax on private consumption, per country (standardized coefficients, 95% confidence intervals in brackets).

	DV: CO ₂ tax on private consumption				DV: CO ₂ tax on industry				DV: CO ₂ tax on fossil fuel producers			
	1 AUS	2 NOR	3 NZ	4 SWE	5 AUS	6 NOR	7 NZ	8 SWE	9 AUS	10 NOR	11 NZ	12 SWE
Ideology	0.02	-0.06***	0.00	-0.07***	-0.06***	-0.05**	-0.02	-0.13***	-0.06**	-0.07***	-0.03	-0.11***
Environmentalism	0.12***	0.12***	0.02	0.18***	0.12***	0.11***	0.10***	0.10***	0.13***	0.09***	0.09***	0.11***
Personal norm	0.22***	0.41***	0.29***	0.23***	0.42***	0.37***	0.39***	0.20***	0.39***	0.43***	0.37***	0.22***
OwnEconEff	0.43***	0.31***	0.32***	0.33***	0.25***	0.23***	0.14***	0.30***	0.27***	0.25***	0.19***	0.31***
CompEconEff	-0.04	0.03	0.02	-0.10***	-0.05	0.03	-0.02	-0.12***	-0.04	0.00	-0.02	-0.10***
Sex (female)	0.07	0.06	0.20**	0.11	0.07	-0.05	0.04	-0.12*	0.02	-0.05	0.07	-0.04
Age	0.00	-0.01**	-0.00	-0.00	0.01***	-0.01***	0.01**	-0.01***	0.01***	-0.01***	0.01**	-0.01***
Moderate	-0.34	0.22	-0.02	-0.09	0.66*	0.41*	0.42	0.17	0.52	0.41*	0.45	0.24
High	0.08	0.59***	0.32	0.29*	0.95**	0.73***	0.76*	0.27*	0.74*	0.72***	0.68*	0.33*
Level 2	0.05	-0.08	0.07	-0.18	-0.03	-0.02	0.15	-0.02	-0.09	0.04	0.14	-0.19*
Level 3	-0.02	-0.12	-0.04	-0.10	-0.25*	-0.19	0.11	-0.15	-0.24*	-0.05	0.14	-0.35**
Level 4	0.00	-0.08	-0.00	-0.08	-0.09	-0.12	0.16	-0.03	-0.08	-0.03	0.21*	-0.18*
Level 5	0.17	-0.11	-0.06	0.15	-0.20	-0.30*	0.15	0.00	-0.10	-0.18	0.20	-0.19*
Constant	0.41	-0.07	0.74*	1.10***	0.41	1.64***	1.11**	3.78***	0.50	1.64***	1.10**	3.52***
N	1852	1801	1697	2495	1852	1797	1852	2500	1848	1798	1691	2501
R ²	0.371	0.362	0.231	0.365	0.356	0.312	0.220	0.361	0.344	0.345	0.233	0.355

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^aReference category *low*, ^bReference category *Level 1*. Ideology and Environmentalism are measured on an 11-point scale (left to right, and not green to green respectively). Personal norm is a 6-question index (scaled 1–7). OwnEconEff is measured by the question “How do you think your country’s economy would be affected by forceful political measures against climate change?” (7-points from Very negatively to Very positively). CompEconEff is measured by the question “In comparison with other industrialized countries, how will your country’s economy be affected by forceful political measures against climate change?” (7-points from Substantially more to Substantially less).

Table 6. OLS-regression for public support for CO₂ taxes, whole sample (standardized coefficients, 95% confidence intervals in brackets).

	(13) Private	(14) Private	(15) Industry	(16) Industry	(17) Producers	(18) Producers
Ideology (left-right)	-0.04*** [-0.06,-0.03]	0.02 [-0.00,0.05]	-0.08*** [-0.10,-0.06]	-0.05*** [-0.07,-0.02]	-0.08*** [-0.10,-0.07]	-0.04** [-0.07,-0.02]
Environmentalism	0.12*** [0.10,0.14]	0.12*** [0.10,0.13]	0.11*** [0.09,0.12]	0.11*** [0.09,0.12]	0.10*** [0.09,0.12]	0.10*** [0.08,0.12]
Personal norm	0.29*** [0.26,0.33]	0.30*** [0.26,0.33]	0.35*** [0.31,0.38]	0.35*** [0.31,0.38]	0.36*** [0.32,0.39]	0.36*** [0.32,0.39]
OwnEconEff	0.36*** [0.33,0.38]	0.31*** [0.28,0.35]	0.24*** [0.22,0.27]	0.21*** [0.18,0.24]	0.26*** [0.24,0.29]	0.23*** [0.20,0.27]
CompEconEff	-0.02 [-0.05,0.00]	-0.03* [-0.06,-0.00]	-0.04** [-0.07,-0.02]	-0.04*** [-0.07,-0.02]	-0.04** [-0.07,-0.02]	-0.05*** [-0.07,-0.02]
Sex (Female)	0.10** [0.03,0.17]	0.09** [0.02,0.16]	-0.01 [-0.08,0.06]	-0.01 [-0.08,0.06]	0.01 [-0.06,0.08]	0.01 [-0.06,0.08]
Age	-0.00* [-0.01,-0.00]	-0.00* [-0.01,-0.00]	-0.00 [-0.00,0.00]	-0.00 [-0.00,0.00]	-0.00 [-0.00,0.00]	-0.00 [-0.00,0.00]
Education ^a						
Moderate	0.03 [-0.16,0.21]	0.03 [-0.15,0.21]	0.34*** [0.16,0.52]	0.34*** [0.16,0.52]	0.37*** [0.19,0.55]	0.37*** [0.19,0.55]
High	0.40*** [0.22,0.59]	0.41*** [0.23,0.60]	0.58*** [0.40,0.77]	0.59*** [0.40,0.77]	0.57*** [0.39,0.76]	0.58*** [0.39,0.76]
Income ^b						
2	-0.05 [-0.15,0.05]	-0.06 [-0.15,0.04]	-0.01 [-0.10,0.09]	-0.01 [-0.11,0.09]	-0.06 [-0.16,0.04]	-0.06 [-0.16,0.03]
3	-0.09 [-0.19,0.02]	-0.08 [-0.19,0.02]	-0.16** [-0.26,-0.05]	-0.16** [-0.26,-0.05]	-0.16** [-0.26,-0.05]	-0.16** [-0.26,-0.05]
4	-0.02 [-0.12,0.07]	-0.04 [-0.14,0.06]	-0.05 [-0.14,0.05]	-0.06 [-0.15,0.04]	-0.06 [-0.16,0.03]	-0.07 [-0.17,0.02]
5	0.10 [-0.02,0.22]	0.10 [-0.02,0.22]	-0.13* [-0.24,-0.01]	-0.13* [-0.24,-0.01]	-0.13* [-0.25,-0.02]	-0.13* [-0.25,-0.02]
ScandCult	0.01 [-0.06,0.08]	0.53*** [0.35,0.70]	0.02 [-0.05,0.09]	0.29*** [0.12,0.46]	0.04 [-0.03,0.11]	0.34*** [0.17,0.51]
EconDep	-0.01 [-0.08,0.05]	-0.34*** [-0.53,-0.15]	-0.10** [-0.17,-0.03]	-0.32*** [-0.51,-0.14]	-0.14*** [-0.21,-0.07]	-0.35*** [-0.53,-0.16]
ScandCult*Ideology		-0.11*** [-0.14,-0.07]		-0.06*** [-0.09,-0.02]		-0.06*** [-0.09,-0.03]
EconDep*OwnEconEff		0.08*** [0.04,0.13]		0.06* [0.01,0.10]		0.05* [0.01,0.10]
Constant	0.46** [0.16,0.76]	0.33* [0.00,0.66]	1.93*** [1.64,2.23]	1.89*** [1.57,2.21]	1.85*** [1.56,2.15]	1.79*** [1.47,2.11]
Adj R-squared	.33	.33	.30	.31	.32	.32
N	7845	7845	7845	7845	7838	7838

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^aReference category low, ^bReference category Level 1. Ideology and Environmentalism are measured on an 11-point scale (left to right, and not green to green respectively). Personal norm is a 6-question index (scaled 1–7). OwnEconEff is measured by the question “How do you think your country’s economy would be affected by forceful political measures against climate change?” (7-points from Very negatively to Very positively). CompEconEff is measured by the question “In comparison with other industrialized countries, how will your country’s economy be affected by forceful political measures against climate change?” (7-points from Substantially more to Substantially less). EconDep (1 = Norway or Australia, 0 = Sweden or New Zealand) and ScandCult (1 = Sweden or Norway, 0 = Australia or New Zealand) are dummy-variables.

In models 13,15, and 17, we note that the effect of the dummy for Scandinavian political culture turn out insignificant in all instances. The dummy for economic dependency, however, has a significant negative effect for support of taxes on both industry and fossil-fuel producers. In models 14, 16, and 18 we further test whether country context interacts to moderate the effect of the individual level factors. Here, we note that this is indeed the case. For all three tax proposals, being part of a Scandinavian cultural context compared to an Anglo-Saxon one increases the effect of personal political ideology on policy attitudes (also illustrated in Graph 1).

Being in a context of high economic dependency on fossil fuel production only marginally strengthens the influence of perceived economic consequences for the respondents’ own country.

Conclusions

Understanding the mechanisms behind support for climate policy measures in general, and CO₂ taxation in particular, is crucial for their successful implementation. As much of the current literature in the area of public policy support has focused on the individual level, this article rather studies the possible effects of country context as a way of grasping the apparent global variations in climate policy choice. Specifically, the article aims to explore whether, and if so how, the contexts of political culture and economic dependency affect how individual-level factors influence support for climate policy measures. By studying variations in support for three different tax designs, directed towards consumers, industry, and fossil-fuel producers respectively, this article finds, first, that there indeed is substantial variation in the level of support for different CO₂ taxes among different political and economic contexts. Nevertheless, the study also reveals a pattern across contexts in that CO₂ taxes targeting industry and producers receive more support than CO₂ taxes directed towards consumers. This is in line with a range of other studies indicating that people in general are less supportive of policy measures that have a possible negative, direct effect on themselves. Although taxes on industry and producers most likely would affect also the consumers, these indirect effects are less apparent to the individual.

Second, exploring the drivers behind policy attitudes, findings suggest that whereas variables often emphasized in the literature, such as personal norms and environmentalism, seem to be very stable between contexts, the effects of political-ideological orientation clearly vary across countries. Moreover, among Swedes there is a concern for the global distributional effects of a CO₂ tax that lowers support across all suggested tax-variants. For Australia, New Zealand and Norway, no significant effects from the item on comparative economic effects are found.

Third, by studying the effects in the various samples and the interaction effects between individual-level and contextual factors on policy support, the study concludes that there is variation in how individual-level factors are linked to public support for CO₂ taxes in different contexts. Political culture reinforces the (negative) effect of an ideological positioning to the right in the Scandinavian countries. Although these results should be further scrutinized through large-N comparative studies, they suggest that cultural context plays a part in defining the meaning of left-right ideology, and therefore also its effects on policy support. However, although culture might be part of the explanation for why environmentalism is more prominent in some countries than in others, neither the substantial meaning of environmentalism nor its effect on policy attitudes are different across country-contexts in this study.

The article thus contributes to the growing literature on public support for climate policy measures in general and for CO₂ taxes in particular, by demonstrating how political-cultural and economic contexts seems to influence the effect of individual-level factors previously associated with policy support. Moving beyond the limited four-country comparison in this article, our findings can be both reinforced, challenged, and further scrutinized. In addition, such an expansion of the research, to cover more countries and contexts, would also be able to contribute with important lessons for policy innovation. For example, better understanding how the mechanisms of individual-level drivers change as a result of both political, cultural, and economic macro-level settings will be key to the design of carbon pricing schemes that are sensitive to country specificities, and thus less politically costly to implement. Moreover, an increased contextual sensitivity in the policy design stages can help identify other policies and measures that either on their own, or as policy packages, would be able to reach higher levels of both legitimacy and compliance.

Data availability statement

The data that support the findings of this study is collected within the framework of a multi-partner research project, and will be made publicly available within a year of project completion. Before this time, data sharing will be considered upon reasonable request to the corresponding author, [SM].

Disclosure statement

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