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**Working Paper**

## Carbon Capture and Storage: Publics in five countries around the North Sea prefer to do it on their own territory

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# KIEL WORKING PAPER

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Storage -  
Publics in five  
countries around the  
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territory**



No. 2252 July 2023

*Christine Merk, Gisle Andersen, Åsta Dynnes Nordø & Torben Helfrich*

# ABSTRACT

## **CARBON CAPTURE AND STORAGE - PUBLICS IN FIVE COUNTRIES AROUND THE NORTH SEA PREFER TO DO IT ON THEIR TERRITORY**

*Christine Merk\*, Gisle Andersen, Åsta Dyrnes Nordø & Torben Helfrich*

Carbon Capture and Storage (CCS) has been identified as an essential part of the lowest-cost path toward reaching the goals of the Paris Agreement. In Europe, an accelerated pace of CCS development indicates that a CO<sub>2</sub> transport and storage system could be established by 2030. However, we know little about how the public views the market for transport and storage of CO<sub>2</sub> currently under development in Europe. In early 2023, we conducted an experimental comparative survey to study public opinions on cross-border CO<sub>2</sub> trade for storage in Denmark, Germany, the Netherlands, Norway and the UK.

The share of respondents that perceive CCS as somewhat positive or very positive varies considerably between the countries; we find the highest share in Denmark (69%), followed by the UK (68%), Norway (67%), the Netherlands (57%) and the lowest share in Germany (49%). Especially concerns about environmental risks and costs lead to more negative views, while perceptions of job creation and economic opportunities lead to more positive evaluations.

The experimental results show that importing CO<sub>2</sub> for storage is among the least preferred options in all countries, while the storage of CO<sub>2</sub> that has been captured in the own country is the most preferred option; the gap in the share of positive evaluations is substantial and amounts to up to 20 percentage points in the UK. Respondents who feel that countries are responsible for reducing national greenhouse gas emissions and storing their own captured CO<sub>2</sub> drive the pattern of a more positive evaluation of a domestic CCS value chain and a more negative evaluation of importing CO<sub>2</sub>.

**Keywords:** carbon capture and storage, public perceptions, trade

**JEL classification:** F35; O18

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## Summary

In early 2023, we ran a representative survey experiment in Denmark, Germany, the Netherlands, Norway and the UK to study public opinions on importing and exporting CO<sub>2</sub> for storage versus capturing CO<sub>2</sub> at domestic industry installations and storing it on national territory. The results reflect the current status of Carbon Capture and Storage (CCS) development in the respective countries:

Perceptions of CCS are more positive in Denmark, Norway, and the UK where advanced demonstration projects exist compared to the Netherlands and Germany with either less advanced or no demonstration projects. Generally, knowledge and awareness about CCS are low, with the exception of Norway. National projects such as Northern Lights, Greensand, Net Zero Teesside, or Porthos are not well known in the population.

All countries plan to be part of a Northern European network for CO<sub>2</sub> transport and storage under the North Sea – either as importers or exporters. However, we find that importing CO<sub>2</sub> for storage is viewed more negatively than storing CO<sub>2</sub> that has been captured at domestic industry installations. Especially in Norway, the UK, and Denmark, where CCS is in general perceived more positively, the difference in the perceptions between storing domestic and imported CO<sub>2</sub> is particularly large. Furthermore, exporting CO<sub>2</sub> is not perceived more positively compared to storing it on national territory. This implies for countries that hope to establish a new industry and plan to import CO<sub>2</sub> for storage, that the public views on the technology might be a lot less favorable when the CO<sub>2</sub> comes from other countries. For countries with lower levels of support for CCS, this implies that exporting CO<sub>2</sub> to other countries might not be the solution to avoid opposition at home.

We find that the group of respondents that feel that countries are responsible for reducing greenhouse gas emissions and for storing their own captured CO<sub>2</sub> drive the pattern of a more positive evaluation of a domestic CCS value chain versus a more negative evaluation of importing CO<sub>2</sub>. In Norway, Germany and the Netherlands, this pattern also occurs for all other scenarios that involve shipping CO<sub>2</sub> for storage from one country to another. These respondents do not want to take responsibility for storing other countries' CO<sub>2</sub> and perceive it also as more negative when they or other countries export their emissions to other countries instead of storing it nationally. Respondents that do not think there is this responsibility do not show any variation in their reactions to the different storage settings.

Concerns about environmental risks and costs are associated with more negative perceptions of CCS in general. The expectation of economic benefits and job creation from CCS leads to more positive views of the technology. Especially respondents in the EU non-member states, i.e., Norway and particularly the UK, but also in Denmark agree that European states should cooperate on CCS infrastructure projects. However, these factors can explain differences in the reactions to the import-export relationships only to a limited extent.

Concerns about CCS being used as an argument to continue burning fossil fuels are associated with more negative views of the technology. Notably, in Denmark respondents that are concerned about CCS extending the use of fossil fuels perceive all CO<sub>2</sub> trade settings as more negative compared to a completely domestic CCS value chain. A potential explanation might be the informal commitment of the Danish government not to use CCS for the mitigation of fossil fuel emissions.

# 1 Carbon Capture and Storage in countries around the North Sea

Carbon Capture and Storage (CCS) has been identified by the IPCC, the IEA and the EU as an essential part of the lowest-cost path towards reaching the goals of the Paris Agreement (IPCC 2018) (IEA 2020). It is essential for cutting residual emissions from sources like waste incineration or cement production and for various Carbon Dioxide Removal methods such as Bio-Energy with CCS and Direct Air Capture with carbon storage. Unlike other approaches, CCS is technically ready for full-scale global deployment, i.e., for developing the entire value chain from capture to storage at the large scale that would be needed to support the goal of limiting global warming to 1.5°C. However, for the EU *Net Zero Industry Plan* the European Commission identified the lack of CO<sub>2</sub> storage sites as a major stumbling block for the development of a complete CCS value chain from capture to storage. The target is to build up an annual capacity of 50 Mt CO<sub>2</sub> per year by 2030. Currently, annual storage is only around 2 MtCO<sub>2</sub> per year (European Commission 2023).

In European countries, the lack of public acceptance, especially of onshore storage (L'Orange Seigo et al. 2014; Gough et al. 2002), has been one of the barriers to CCS deployment in Europe in the past and partly explains the current focus on offshore storage. Except for the Danish plans to also store onshore, all current CCS demonstration and full-scale projects in Europe use offshore storage in geological formations under the seabed in the North Sea. Prominent examples are Northern Lights in Norway, Net Zero Teesside in the UK, and Greensand in Denmark. These projects aim to set up a European solution for CO<sub>2</sub> storage, where it is collected by ship from industrial sites in several countries, loaded off at onshore sites and then sent offshore to an injection site via pipelines.

The estimated offshore storage potential in Europe is 140 GtCO<sub>2</sub> of which the largest share is below the North Sea – with about 56 GtCO<sub>2</sub> on Norwegian territory and around 78 GtCO<sub>2</sub> on British territory. The Netherlands has an estimated storage potential of 2.7-3.2 GtCO<sub>2</sub>, which is mostly onshore (IEA 2020). Denmark has an estimated storage potential of 22 GtCO<sub>2</sub> (Danish Energy Agency 2023). Most of Germany's 20 GtCO<sub>2</sub> storage potential is also offshore but currently, 80% of the capacity cannot be used as it is legally forbidden due to objections in the population (IEA 2020). Until changes in the legal situation, the German industry would have to rely on exporting captured CO<sub>2</sub> to other countries such as Norway or Denmark for storage. The current developments indicate that a European CO<sub>2</sub> transport and storage system could be established by 2030.

Despite the accelerated pace of CCS development, we know little about public views about shipping CO<sub>2</sub> across the North Sea between countries. On the one hand, we might expect low opposition because offshore storage locations are not close to populated areas, and the public safety hazard is therefore low. On the other hand, we might expect strong opposition because people do not wish to make *their* land (or seabed) available for foreign waste (Merk et al. 2022), as CO<sub>2</sub> is often associated with waste (Jones et al. 2017). International policy frameworks and legal regulations aim to reduce cross-border transport of various types of waste; these can be considered as established norms that might lead laypersons to be negatively inclined towards cross-border transport of CO<sub>2</sub> and sub-seabed storage. It is also plausible to hypothesize that citizens might feel a responsibility to manage their domestic emissions and that they, therefore, might object to exporting CO<sub>2</sub> (Merk et al. 2023; Schleich et al. 2016; Xenias und Whitmarsh 2018; Whitmarsh et al. 2019). As such, the public might see the CCS projects as national projects, with the possible effect that activities abroad may not be perceived as the mitigation of domestic emissions. Necessary amendments to international legal frameworks that prohibit waste dumping at sea are currently being discussed, to allow cross-border transport of CO<sub>2</sub> and sub-seabed storage (Birchenough und Haag 2020). Although we assume that most citizens are not

aware of this development, the established norms might strengthen their view of mitigating CO<sub>2</sub> emissions as a national responsibility. Based on the accountability perspective and legal frameworks, we expect the public in both exporting and importing countries to be less positive towards the proposed CCS market that involves shipping CO<sub>2</sub> across borders.

We studied public opinions on cross-border trade in Germany and Norway in an earlier study (Merk et al. 2022). In the current study, we refined the experimental design, included more context in the description of CCS in the questionnaire, and extended the geographical focus. We compare public perceptions in Denmark, Germany, the Netherlands, Norway and the UK using a comparative survey. These countries are committed to achieving net zero emissions and plan to import or export CO<sub>2</sub> for storage. Previous research found that CCS support is relatively high in Norway and the UK (Tvinnereim und Steinshamn 2016; Whitmarsh et al. 2019), whereas support was identified as comparatively lower, i.e. less positive or neutral, in Germany and the Netherlands (Merk et al. 2022; Broecks et al. 2021; Ashworth et al. 2013; Whitmarsh et al. 2019; Eurobarometer 2011). This is also reflected in a much higher level of concern about the risks of CO<sub>2</sub> storage among German and Dutch survey participants compared to Norwegian respondents (Otto et al. 2022). Norway has a long history of public and political debates about CCS (Nordø et al. 2023). Therefore, the awareness and knowledge about CCS is high among the population. In the other countries, people have often never heard about CCS before or know only little, even though there have been long-standing demonstration projects like in the UK (Whitmarsh et al. 2019; Merk et al. 2022; Broecks et al. 2021). For Denmark, there are no published studies of CCS acceptability, yet.

## 2 Survey design

Our survey experiment took place between 25 January to 23 February 2023. It was administered online in Denmark, Germany, the Netherlands, Norway, and the United Kingdom. Participants were recruited from commercial online panels based on quotas for gender, age, and level of education to be representative of the respective national population that is active online. This means that older and less educated residents are slightly underrepresented.

In every country, between 1,158 and 1,211 respondents participated in the experiment. They answered questions about CCS and climate change that had been translated by professional translators into the countries' official language. The minimum age in all countries was 18 and the maximum age was 80. In Table 1 respondents' demographic characteristics are shown for all countries.

**Table 1: Sample characteristics by country**

	Country					
	Denmark	Germany	Netherlands	Norway	UK	Total
Female	58.6%	56.0%	54.1%	50.5%	52.7%	54.4%
Education						
All other education degrees	66.3%	76.2%	62.8%	60.5%	57.5%	66.7%
Bachelor / Master / PhD	33.7%	13.8%	37.2%	39.5%	42.5%	33.3%
Mean age	47.5	51.3	51.4	46.7	50.5	49.5
SD age	18.0	15.9	15.5	16.6	15.5	16.5
Number of Observations	1,221	1,169	1,210	1,221	1,182	6,003

After reading a brief explanation of CCS and the option to build up a joint infrastructure for the import and export of CO<sub>2</sub> together with other countries around the North Sea (Table A- 1), respondents were randomly assigned to one of five treatment groups. The average age, education level and share of women are similar in all groups.<sup>1</sup>

Each group read one of five different import-export settings:

1. The country where the CO<sub>2</sub> is captured and the country where the CO<sub>2</sub> is stored are *not specified*.
2. CO<sub>2</sub> is captured and stored *domestically*.
3. CO<sub>2</sub> is *imported* from other European countries and stored domestically.
4. CO<sub>2</sub> is captured domestically and *exported* to other European countries.
5. CO<sub>2</sub> is captured *abroad* in other European countries and stored *abroad* in other European countries.

This is an example of the text in the *import* setting for Denmark:

*„Imagine a proposal to build up an infrastructure where large amounts of CO<sub>2</sub> are captured in other European countries and stored deep under the North Sea on Danish territory.“*

Participants were then asked about their opinion about the project on a 4-point scale from “very negative” to “very positive” with the additional options “no opinion” and “don’t know”. Furthermore, we asked whether they had ever heard about the possibility to capture and store CO<sub>2</sub> in general and about specific national CCS projects such as *Greensand* or *Bifrost* in Denmark (country-specific projects see Figure 2).

To control for the effect of referring to “other European countries”, we asked whether respondents think that their country benefits from EU membership. For the UK and Norway, we asked whether the country has benefitted or would benefit from membership, respectively. The response options were “has benefitted”, “has not benefitted”, and “don’t know”.

Furthermore, we elicited respondents’ concerns about and perceptions of different aspects of CCS. Table 2 shows the items and the factors they represent. The response scale was a 6-point-Likert-scale from “strongly disagree” (1) to “strongly agree” (6) including the options “Don't know” and “No opinion”. We aggregate factors with more than one item by calculating the mean.

Respondents answer questions about their concerns about environmental risks, the cost of CCS, and the extension of fossil fuel use because of the availability of CCS, i.e. moral hazard. We also elicit their perceptions of the economic opportunities, such as job creation from building up the CCS infrastructure in their country, what they think about cooperation for CCS between European countries and whether they perceive a national responsibility for mitigating and storing “national” emissions.

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<sup>1</sup> This means the randomization into treatment groups has worked and the groups are not significantly different in terms of age, gender, and level of education (compare table Table A- 2; likelihood-ratio-test for the equality of group means:  $\chi^2 df(12) = 15.22, p = 0.230$ ).

**Table 2: Factors and items measuring concern about and perceptions of CCS**

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<b>Factors and items</b>
<b>Environmental risks</b> I am concerned that CO <sub>2</sub> might leak and cause harm to humans or the environment. I believe that CO <sub>2</sub> transport across the North Sea represents a hazard to the marine environment.
<b>Cost of CCS</b> I am concerned that using CCS will be very expensive. I think money that the government will spend on CCS should be spent elsewhere. I believe building up an infrastructure for CCS is too expensive.
<b>Prolongs use of fossil fuels</b> I am concerned that CCS will encourage the prolonged use of fossil fuels.
<b>Economic opportunities</b> I believe the increased use of CCS will create jobs in <country>. I believe <country's> firms and businesses will benefit from building up a CCS infrastructure.
<b>Foster cooperation in Europe</b> Countries in Europe should work together to capture CO <sub>2</sub> in all countries and store it in suitable sites. I think that European countries should cooperate more on infrastructure projects to reduce greenhouse gas emissions.
<b>National responsibility</b> Every country is responsible for reducing its own CO <sub>2</sub> emissions. Every country should store its captured CO <sub>2</sub> emissions on its own territory.
<i>Response scale:</i> <i>(1) Strongly disagree, (2) Disagree, (3) Rather disagree,</i> <i>(4) Somewhat agree (5) Agree, (6) Strongly agree; Don't know, No opinion</i>

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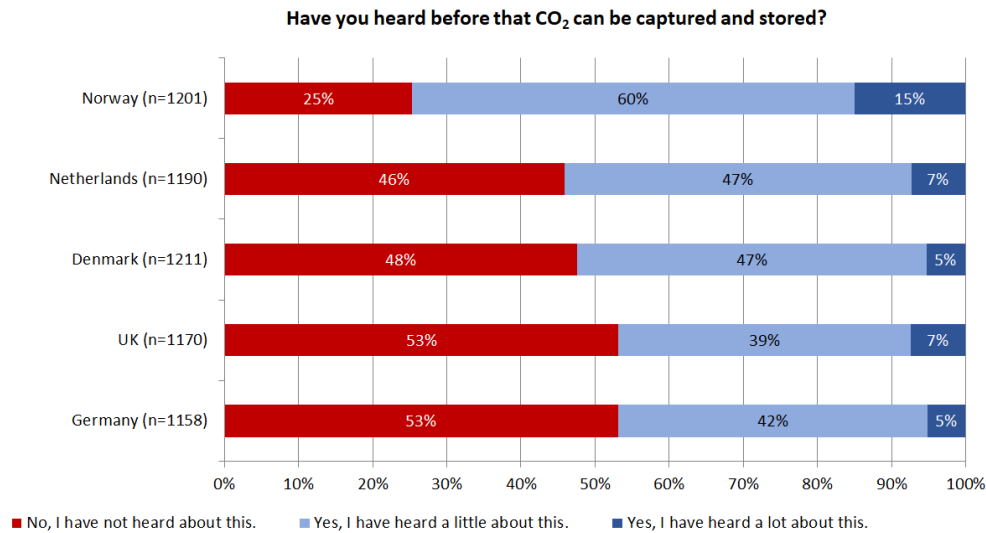
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### 3 Results

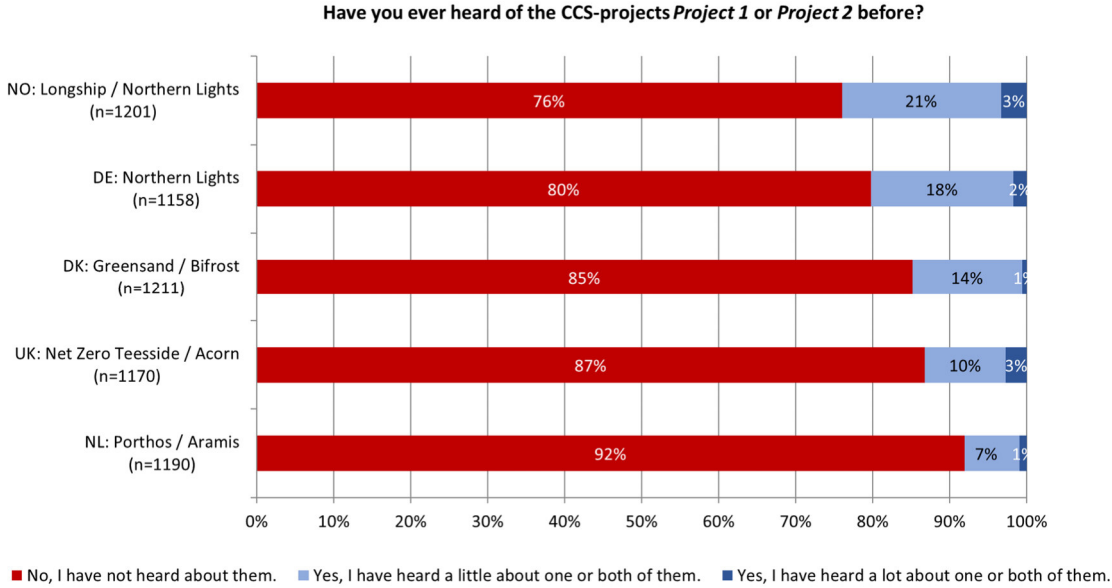
The **awareness about CCS methods** was highest among Norwegian respondents. Three-quarters of the respondents had heard at least a little bit about CCS before answering our survey (Figure 1). In the other countries, around half of the respondents had never heard about CCS before.

**Figure 1: Awareness about CCS by country**



When asked about their awareness about country-specific CCS projects, most respondents had never heard about the projects before (Figure 2). In all countries, this share is at least 76% and rising to 92%. On average, only 16% of respondents had already heard about the CCS projects they were asked about. Overall, Longship and Northern Lights in Norway are the best-known projects. About 24% had heard about either or both projects. This is consistent with the high level of general awareness about CCS technology in Norway. Awareness is about Greensand or Bifrost in Denmark (15%) and Net Zero Teesside or Acorn in the UK (13%) is lower in comparison. However, Porthos or Aramis in the Netherlands are least well known, only 8% had heard about them before. It should be highlighted that even though German participants are asked about a Norwegian CCS project, 18% said they had heard about it. This is noteworthy considering that less than half of the German respondents had heard about CCS at all.

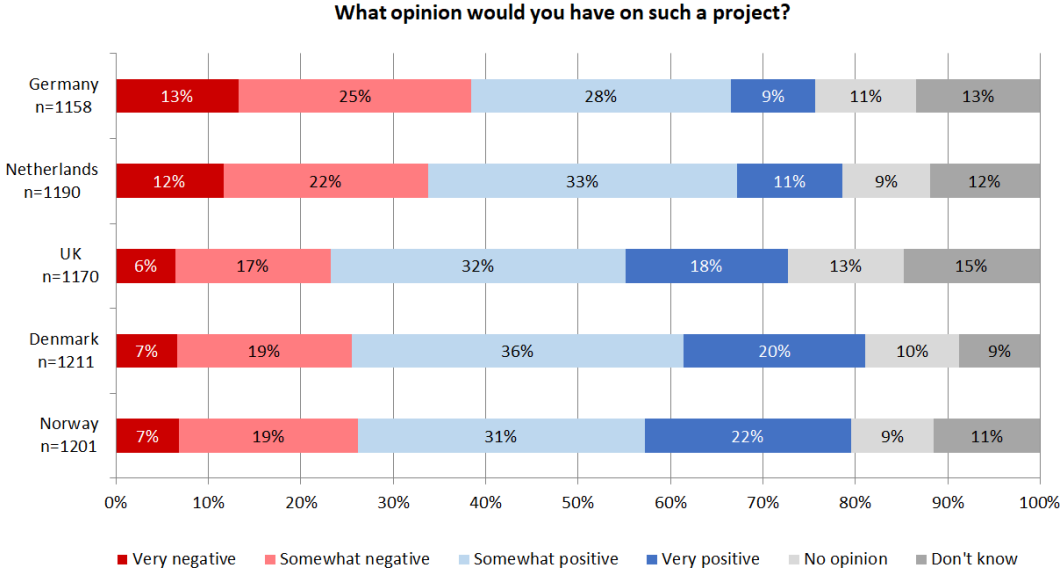
**Figure 2: Awareness of country-specific CCS-projects**



*Note: As there are currently no planned storage projects in Germany, we asked about the Norwegian Project Northern Lights where according to plans of the federal government storage was to be done.*

Figure 3 shows the **average evaluation of CCS** across all settings. As the awareness about CCS is rather low in all countries, respondents could respond that they have “no opinion” or that they “don’t know” how to assess the project – together referred to as NODK. On average, 10% of respondents stated that they have “no opinion” and 12 % answered “don’t know”. These shares are quite similar across countries. The UK has the highest share of “no opinion” (13%) and “don’t know” responses (15%). Norway has the lowest share of “no opinion” answers (9%). Denmark has the lowest share of “don’t know” answers (9%). Except for Denmark, the share of “don’t know” answers is always higher than the share of “no opinion” answers. Thus, the UK has the highest share of respondents who do not assess the CCS setting, i.e. responded NODK (28%), followed by Germany (24%), the Netherlands (21%), Norway (20%), and Denmark (19%). In all countries, about two-thirds that had never heard about CCS before, evaluated the setting and one-third responded NODK. There are no significant differences in the share of NODK answers between the settings except for the Netherlands, where respondents in the *import* setting were significantly less likely to respond NODK compared to all other settings (compare Table A- 2). The likelihood to answer NODK decreases with knowledge about CCS, is significantly higher for women and higher for respondents with a lower level of education in all countries but Denmark. Age does not have a significant effect.

**Figure 3: Perceptions of CCS setting by country aggregated over all treatments, including “no opinion” and “don’t know” responses**



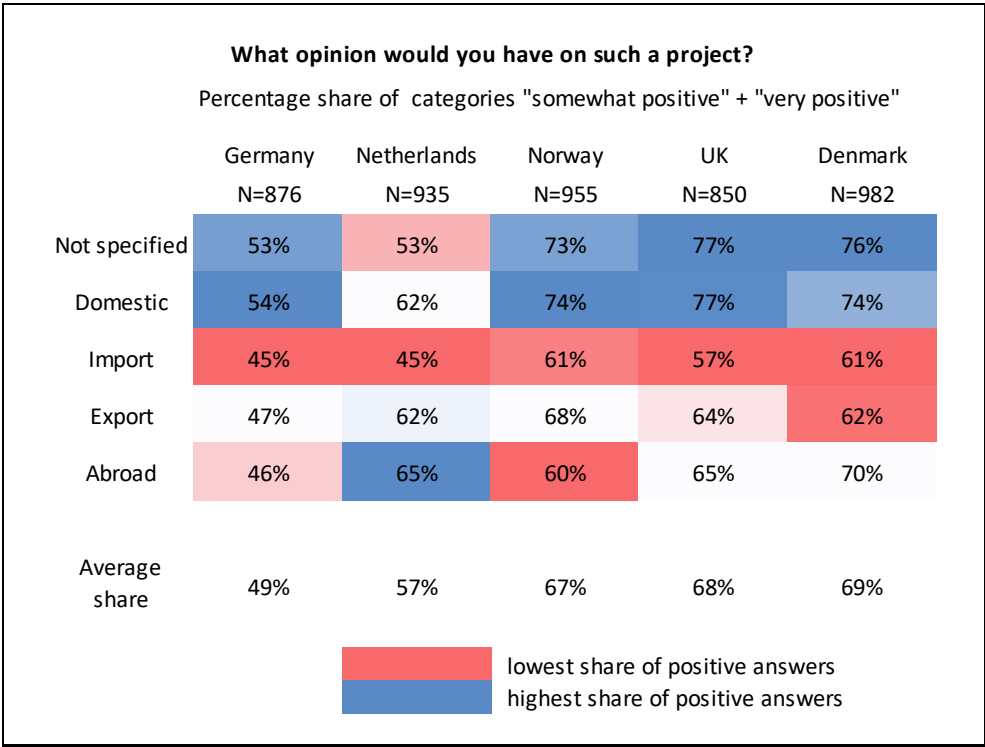
Note: Countries sorted ascending by share of “very positive”.

Across all settings (Figure 3), the share of “somewhat positive” and “very positive” is highest in Denmark (56%) followed by Norway (53%) and the UK (49%). Respondents from the Netherlands have a more negative attitude toward the projects with 45% saying that they would either have a “somewhat” or “very positive” opinion. This share is even lower in Germany, where only 37% of respondents stated at least a “somewhat positive” opinion on the CCS settings. In addition, this share is about as high as the share of “somewhat” and “very negative” answers (38%).

To dive deeper into the effects of specifying capture and storage locations in the five CCS settings on people’s perceptions, we exclude the NODK responses and only look at respondents that answered on the four-point scale from “very negative” to “very positive”.

Figure 4 shows the share of “somewhat positive” plus “very positive” in the five settings. The countries in the columns are sorted by the average share of at least “somewhat positive” responses. In the settings, we varied where the CO<sub>2</sub> is captured and where it is stored. Resulting in four combinations – *domestic, import, export, abroad* - plus a control setting, where capture or storage location was *not specified*.

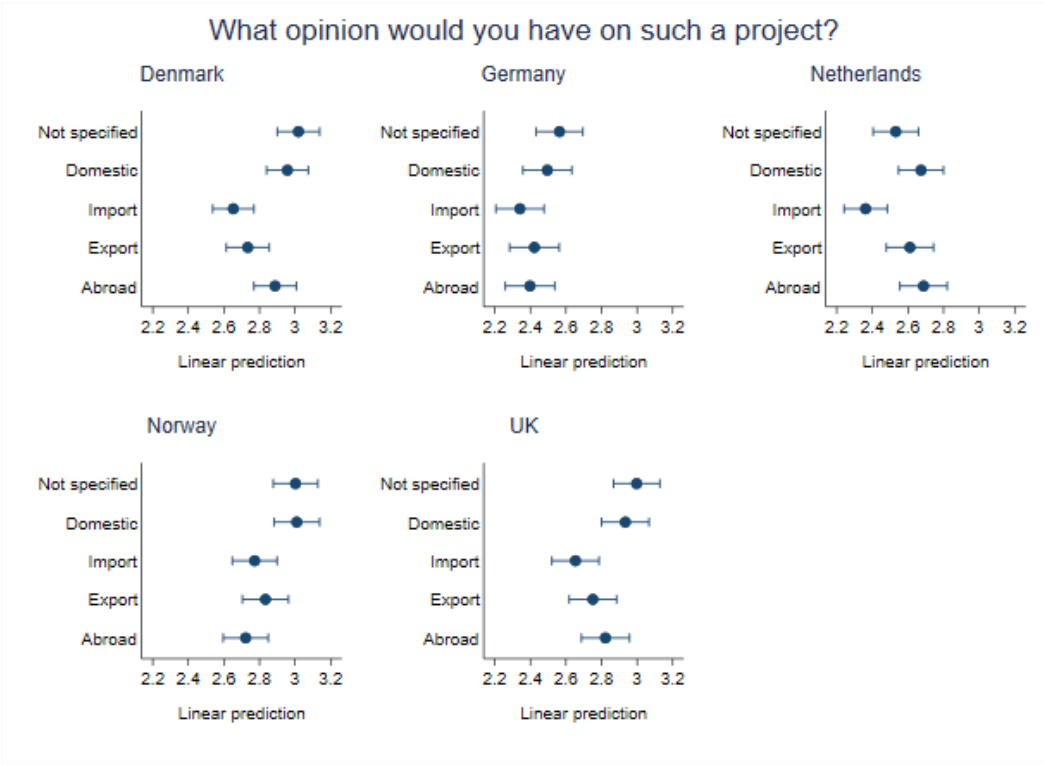
**Figure 4: Share of “somewhat positive” plus “very positive” evaluations of the CCS settings by country**



Overall, German respondents show the least positive opinions toward any of the CCS settings, and the difference between the lowest (dark red) and the highest share of positive evaluations (dark blue) is the smallest. It ranges from 45% in the *import* to 54% in the *domestic* setting. For the Dutch respondents, the lowest share is also 45% in the *import* setting, but the range is larger with a maximum share of 65% in the *abroad* setting and a 10-percentage point higher overall average compared to the German sample. The remaining countries’ average lies another ten percentage points above the Dutch results. In Norway, the UK, and Denmark, more than half of the respondents answer at least “somewhat positive” in all settings. The least favored setting in Norway received 60% (*abroad*) positive responses, and the *domestic* setting that was evaluated most positively received 74%. The spread between the lowest and the highest share of positive responses is highest in the UK with 20 percentage points, ranging from 57% (*import*) to 77% (*not specified/ domestic*). Denmark, the country with the highest overall positive share (69%), has a lower spread of 15 percentage points from 61% (*import*) to 76% (*not specified*).

Figure 5 shows the estimated evaluation of the CCS setting by treatment and the confidence intervals. We control for gender, education, and age because at least the first two have an effect on the likelihood to respond NODK (for estimation results see Table A- 3) and thus influence the selection into the sample for the analysis of negative and positive evaluations.

**Figure 5: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression of CCS dependent on setting**



Note: Results from OLS regressions controlling for age, gender, education (not shown); full regression results see Table A- 3.

The *import* setting is among the least preferred options in all countries. Whereas everywhere – except in the Netherlands – the *domestic* or the *not specified* setting are evaluated most positively. The *import* setting is evaluated significantly less positive compared to the domestic setting in Denmark ( $p < 0.001$ ), the Netherlands ( $p = 0.001$ ), Norway ( $p = 0.007$ ) and the UK ( $p = 0.004$ ). In Germany, the difference is not statistically significant ( $p = 0.093$ ) though it is significantly lower compared to the *unspecified* setting ( $p = 0.016$ ).

The perceptions of the *domestic* and the *not specified* setting are not significantly different in any of the countries. We assume that without further specification, most respondents do not think about transporting CO<sub>2</sub> from one country to another.

The perception of the *export* setting (capture CO<sub>2</sub> domestically and store it in other European countries) is not significantly different from the *domestic* setting except for Denmark ( $p = 0.010$ ) and Norway ( $p = 0.036$ ). In Denmark, it is almost as unpopular as the *import* setting (62% vs 61%).

Perceptions of the *abroad* setting (capture and storage in other European countries) differ across countries. While it is the most popular setting in the Netherlands, perceptions are least positive in Norway and the second to last in Germany. The perceptions of CCS trade between other countries are close to the overall average in the UK and Denmark. Only for Norway, evaluations are significantly lower compared to the *not specified* and the *domestic* setting ( $p < 0.01$ ). This result cannot be explained by a selection effect, as Norwegians in the *abroad* setting are not more likely to respond NODK. This means Norwegian respondents are just as likely to assess a setting that only involves other European countries compared to a setting where Norway is involved.

We did not specify what other countries the CO<sub>2</sub> would come from or go to, but framed them as “European” because we wanted to avoid country-specific effects. Using all possible country combinations would have inflated the study design. To check whether attitudes toward the EU interact with our treatment, we control in the regression for views on whether the own country has benefitted or would have benefitted from EU membership. We find in all countries that positive views on the benefits of the EU lead to more positive evaluations of CCS. This effect does not vary between settings. This means that respondents who evaluate the benefits of EU membership negatively do not react differently to the settings that imply cross-border cooperation compared to those who evaluate them positively. An exception is Denmark; comparing respondents who think the country does not benefit from EU membership in the *import* setting and the *not specified* setting, we find significantly more negative evaluations for the import setting (Wald test:  $p=0.002$ ). In the *export* and the *abroad* setting these differences are, however, at best marginally significant or not significant at all (Wald test:  $p=0.076$ ;  $p=0.279$ ). This means that referring to “other European countries” does not systematically lower the evaluations of all settings that involve cross-border CO<sub>2</sub> trade (compare Figure A- 1 and **Fehler! Verweisquelle konnte nicht gefunden werden.**).

Figure 6 shows the mean values of the responses to the items measuring concern about and perceptions of CCS. The dark red shades in the first panel indicate that respondents from the respective country showed on average the highest level of this concern compared to the other countries. The dark blue shades in the second panel indicate that respondents from the respective country had on average the highest of level agreement with opportunities and perceptions of responsibility.

Germany ( $\bar{x} = 4.38$ ) and the UK ( $\bar{x} = 4.32$  ; t-test for mean differences  $p=0.244$ ) range highest on the average **concern about environmental risks**. They are followed by a significantly lower level of concern in the Netherlands ( $\bar{x} = 4.20$ ; t-test NL vs. UK:  $p=0.014$ ) and Denmark ( $\bar{x} = 4.07$ ; t-test DK vs NL  $p=0.006$ ). Norwegian respondents show on average the lowest level of concern ( $\bar{x} = 3.82$ ).

A high level of concern about environmental risks yields more negative evaluations of all settings in all countries compared to a low level of concern (Figure A- 2). There is a tendency in Denmark, the Netherlands, and the UK that the perception of the *import* setting in the group of respondents with strong environmental concerns is lower than in the other settings. This indicates a reluctance to bear the environmental risks from the storage of CO<sub>2</sub> from other countries.

**Figure 6: Cross-country mean comparison of concerns and perceptions of opportunities and responsibility for emissions**

	Germany	Netherlands	Norway	UK	Denmark
<b>Concerns</b>					
Environmental risks	4.38	4.2	3.82	4.32	4.07
Cost of CCS	4.6	4.35	4.01	4.27	4.13
Prolongs fossil fuel use	3.94	3.97	3.5	4.13	4.06
		lowest avg. concern		highest avg. concern	
<b>Perceptions of opportunities and responsibilities</b>					
Economic opportunities	3.92	4.05	4.23	4.08	4.2
Foster cooperation in Europe	4.57	4.57	4.62	4.81	4.66
National responsibility	4.83	4.58	4.6	4.98	4.3
<b>% of positive responses to CCS</b>	49%	57%	67%	68%	69%
		lowest avg. value		highest avg. value	

Note: Response scale: (1) Strongly disagree, (2) Disagree, (3) Rather disagree, (4) Somewhat agree (5) Agree, (6) Strongly agree; Don't know, No opinion. When a participant responded "No opinion" or "Don't know" for an item, the item was excluded from the mean calculation. Standard deviations and number of observations see Table A-5. Color coding by factor. Items and factors see Table 2.

The **cost of using CCS and building up an infrastructure** is on average most concerning to German respondents ( $\bar{x} = 4.6$ ). This is also the highest level of concern we find overall. In the Netherlands and the UK, the concerns about costs show similar levels (NL:  $\bar{x} = 4.35$ ; UK:  $\bar{x} = 4.27$ ). Followed by Denmark ( $\bar{x} = 4.13$ ). The average concern about costs is lowest in Norway ( $\bar{x} = 4.01$ ).

A high level of concern about the costs of CCS and the build-up of an infrastructure for CO<sub>2</sub> transport and storage leads to more negative evaluations of all settings in all countries compared to a low level of concern (Figure A- 3). There is a tendency in Denmark, Germany, and the UK that the *import* and the *export* settings are perceived more negatively in the group with concerns about high costs compared to other settings, but generally a perception of high costs for the transport and storage infrastructure does not influence the evaluation of the settings differently.

Norwegian respondents are also least concerned about the **prolongation of fossil fuel use** if CCS was used ( $\bar{x} = 3.5$ ). The concern about this so-called moral hazard is highest among respondents from the UK ( $\bar{x} = 4.13$ ) and Denmark ( $\bar{x} = 4.06$ ; t-test UK vs. DK: p=0.252). German and Dutch respondents show lower levels of concern about this (DE:  $\bar{x} = 3.94$ ; NL:  $\bar{x} = 4.06$ ; t-test DE vs DK: p=0.025).

The level of concern about **moral hazard, i.e. the prolongation of the use of fossil fuels** because of CCS, does not influence the perception of the settings as strongly as the other concerns and attitudes (Figure A- 4). The group with a low level of concern about moral hazard tends to perceive CCS more positively compared to the group with a high level of concern. This divide is less pronounced in Germany and the UK. Notably, Danish respondents who are concerned about CCS extending the use of fossil fuels perceive all trade settings, i.e. *import*, *export*, and *abroad*, more negatively compared to the *domestic* setting.

For the expectations about **economic opportunities**, we see a reverse picture. Norway and Denmark show high levels of agreement (NO:  $\bar{x} = 4.23$ ; DK:  $\bar{x} = 4.2$ ; p=0.570). While the British and Dutch

responses (UK:  $\bar{x} = 4.08$ ; NL:  $\bar{x} = 4.05$ ; t-test  $p=0.478$ ) range below them. German participants agree least with the prospect of job creation or business opportunities (DE:  $\bar{x} = 3.92$ ; DE vs. NL:  $p=0.006$ ).

Participants who see economic opportunities perceive CCS more positively across all settings compared to participants who perceive fewer opportunities (Figure A- 5). In Denmark and the Netherlands, respondents in the many-opportunities groups perceive the *import* setting and in Denmark also the *export* setting more negatively compared to the other settings despite their hope that CCS might create jobs and economic opportunities in their country.

The perceptions that **European countries should cooperate** on infrastructure projects are lowest in Germany and the Netherlands ( $\bar{x} = 4.57$ ). Danish respondents agree less to the need for cooperation among EU countries, but significantly more than German or Dutch respondents ( $\bar{x} = 4.66$ ; t-test: DK vs DE:  $p=0.019$ ; DK vs NL:  $p=0.015$ ). Respondents in the EU non-member states, Norway and particularly the UK, agree that European states should cooperate on CCS infrastructure projects. This might be driven by the different starting conditions. In these countries cooperation between European countries is not a given (anymore) and it has to be negotiated from the start.

Respondents who are in favor of cooperation between European countries tend to perceive the *import* setting similarly as the *domestic* setting, they do not put a penalty on the *import* setting (Figure A- 6). The exception is the Netherlands, where the *import* and the *abroad* setting are perceived similarly, independent of a preference for cooperation between European countries. In Germany, we find this for the *export* and the *abroad* setting.

Perceptions of a **national responsibility** to mitigate emissions and store CO<sub>2</sub> domestically is highest in the UK ( $\bar{x} = 4.98$ ), followed by Germany ( $\bar{x} = 4.83$ ; t-test UK vs. DE:  $p<0.000$ ). It is lowest in Denmark ( $\bar{x} = 4.30$ ). The average agreement for Dutch ( $\bar{x} = 4.58$ ) and Norwegian respondents ( $\bar{x} = 4.60$ ) is in mid-range (t-tests: NL vs NO  $p= 0.730$ ; DK vs NL:  $p<0.000$ ; DK vs NO:  $p<0.000$ ).

Differences in the perception of national responsibilities drive the drop in the evaluations of the *import* setting compared to the *domestic* setting (Figure A- 7). This means we see less positive evaluations of the *import* setting for participants who agree that countries have a responsibility to reduce their own emissions and that countries should store captured CO<sub>2</sub> on their own territory. The – relatively small – group of respondents that does not see a strong national responsibility does not react systematically different to any of the treatment settings in any of the countries. In several of the countries, especially Norway, but also Germany and the Netherlands, we can observe more negative evaluations in the high-responsibility group for all settings with international CO<sub>2</sub> trade, i.e. *import*, *export*, and *abroad*. This means they do not want to take responsibility for storing other countries' CO<sub>2</sub> and are also less in favor of exporting it to other countries.

## 4 Conclusion

The results from our survey in Denmark, Germany, the Netherlands, Norway, and the UK confirm and extend our findings from an earlier study (Merk et al. 2022), where we found that it matters to laypersons in Norway where the CO<sub>2</sub> for storage comes from and where it is stored. In Germany, we had not found different reactions to CCS depending on the country of origin of the CO<sub>2</sub> and the storage country. We attributed the lack of differentiation among the German respondents to a low level of awareness and a resulting high psychological distance to CCS which led to more generalized and less context-dependent evaluations. In the current study, we refined the experimental design, included



more context in the description of CCS in the questionnaire, and added Denmark, the Netherlands, and the UK to the list of study countries.

We find that, CO<sub>2</sub> import for storage is among the least preferred options in all countries. Especially in Norway, the UK and Denmark where CCS is in general perceived more positively, the difference in the perception of the storage of domestic and imported CO<sub>2</sub> is particularly large. The gap in the share of positive evaluations amounts to up to 20 percentage points in the UK.

Domestic storage of domestic CO<sub>2</sub> ranges highest in respondents' favor. In Germany, about half of the respondents feel positively about this, while this share amounts to about three-quarters in Norway, the UK, and Denmark. Only in the Netherlands, it is evaluated more negatively compared to other settings.

We find that respondents who feel that countries are responsible for reducing greenhouse gas emissions and storing their own captured CO<sub>2</sub> drive the pattern of a more positive evaluation of a domestic CCS value chain versus a more negative evaluation of importing CO<sub>2</sub>. In Norway, Germany and the Netherlands, this also extends to all settings with international CO<sub>2</sub> trade. This means they do not want to take responsibility for storing other countries' CO<sub>2</sub> and perceive it also as more negative if they or other countries export their emissions to other countries.

The average perception of CCS is more negative in the Netherlands and Germany compared to Denmark, Norway, and the UK. In the latter three, more than half of the respondents tend to perceive CCS as at least somewhat positive. Knowledge and awareness about CCS are low, with the exception of Norway. National projects such as Northern Lights, Greensand, Net Zero Teesside, or Porthos are not well known in the population.

The attitudes towards and the perceptions of CCS support the findings on the overall evaluation of the technology. **German** respondents show among the highest levels of concern, see least economic opportunities, and are most skeptical about European cooperation on CCS. This reflects the current status of CCS in the country, where storing CO<sub>2</sub> is legally not yet possible.

**Norwegian** survey participants are least concerned about any of the arguments against CCS – even about the cost of CCS despite the history of past debates around unsuccessful government spending in the country (Nordø et al. 2023). The technology is seen as a way to generate jobs and economic opportunities, this might lower the concerns about cost. Also, CCS as an excuse to extend the use of fossil fuels is not a concern among Norwegian respondents, perhaps because the extraction of fossil fuels is still an important source of the national wealth.

Respondents in **Denmark** also see more economic opportunities compared to the other countries. Together with a low level of concerns about costs and environmental risks, this probably drives the positive overall evaluations. The concern that CCS might be a way to extend the use of fossil fuels is relatively high in comparison to the other countries. Respondents who are concerned about this so-called moral hazard, evaluate all settings that imply the trade of CO<sub>2</sub> more negatively compared to a domestic CCS value chain. This might be because Denmark has committed to strongly reduce emissions and has informally limited the domestic application of CO<sub>2</sub> capture and storage to the mitigation of hard-to-abate emissions or negative emissions. The effect of this commitment on public perceptions should be further researched.

The **UK** results are mixed; respondents view CCS positively despite relatively high levels of concern and low levels of perceived benefits. Respondents are highly concerned about environmental risks and are

most concerned about an extension of fossil fuel use. Furthermore, economic opportunities are perceived as lower compared to Norway and Denmark, but still, CCS is perceived as positively in the UK as in these two countries.

The **Netherlands** shows a slightly different pattern. Like in the other countries, importing CO<sub>2</sub> for storage is the least preferred and a domestic CCS value chain is evaluated more positively, in comparison. But the most preferred setting is where the CO<sub>2</sub> is captured and stored in other European countries, i.e. the Netherlands are not involved. Concerns about environmental risks, cost, and moral hazard, as well as the perceptions about economic benefits, European cooperation and national responsibility are in the mid-range compared to the other countries.

Our results on public perceptions reflect the state of CCS development in the five countries. Denmark, Norway, and the UK with far advanced demonstration projects, and the Netherlands but especially Germany lagging behind. Even though all countries plan to be part of a Northern European network for CO<sub>2</sub> transport and storage – either as an importer or an exporter – this is less well perceived among survey participants compared to a domestic value chain for CCS. For countries with lower levels of CCS-support, this implies that exporting CO<sub>2</sub> to other countries might not be the solution to avoid opposition at home. For countries that hope to establish a new industry and plan to import CO<sub>2</sub> for storage, this implies that the views on the technology might be a lot less favorable when the CO<sub>2</sub> comes from other countries.

The current developments in the discourses on CCS are very dynamic. For example, Denmark has started a CCS pilot project within a short time in early 2023 and in Germany the law that has led to the de facto prohibition of CCS on German territory has been re-evaluated in late 2022 and the advice was to formulate a national carbon management strategy. If the topic gains further visibility and CCS is more widely discussed, public perceptions will probably change depending on the ways it is picked up by political actors, societal stakeholders, and the media. However, our results provide a valuable snapshot of the current views and factors that influence them.

## **Acknowledgement**

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## 5 Appendix

**Table A- 1: Information text provided in the survey**

Carbon capture and storage (CCS) is a process where carbon dioxide (CO<sub>2</sub>) is captured at industrial installations that emit large amounts of CO<sub>2</sub> during production processes. The captured CO<sub>2</sub> is transported by ships and pipelines to suitable storage sites deep under the seabed. The stored CO<sub>2</sub> will not reach the atmosphere and thus not contribute to climate change.

This technology is already in use today. The plan is to build up an infrastructure for capturing, transporting and storing CO<sub>2</sub> to reduce the CO<sub>2</sub> emissions that cannot be reduced otherwise, like from waste incineration. The firms and households that use such services, like waste management, would pay for the costs.

The infrastructure could be built to connect only capture and storage sites in Denmark. Alternatively, several European countries could jointly use the infrastructure for the storage of CO<sub>2</sub> under the North Sea.

**Table A- 2: Mean age, share of higher education and share of women by treatment group and country**

Variable: Age	Denmark	Germany	Netherlands	Norway	UK	Total
<b>Treatments</b>						
<u>Not specified</u>						
Mean	48.50	52.04	52.20	46.62	50.49	49.96
SE of the mean	0.82	0.68	0.70	0.75	0.72	0.33
<u>Domestic</u>						
Mean	47.63	50.99	51.83	46.91	49.88	49.42
SE of the mean	0.82	0.73	0.74	0.77	0.72	0.34
<u>Import</u>						
Mean	48.28	50.81	50.95	46.96	50.19	49.42
SE of the mean	0.82	0.74	0.71	0.77	0.71	0.34
<u>Export</u>						
Mean	48.10	50.87	53.44	47.55	50.29	50.03
SE of the mean	0.81	0.73	0.71	0.76	0.72	0.34
<u>Abroad</u>						
Mean	47.70	52.10	50.71	47.06	50.33	49.57
SE of the mean	0.83	0.68	0.74	0.74	0.76	0.34
<u>Total</u>						
Mean	48.04	51.37	51.82	47.02	50.24	49.68
SE of the mean	0.37	0.32	0.32	0.34	0.33	0.15

<b>Variable: Education</b>	Denmark	Germany	Netherlands	Norway	UK	Total
<b>Treatments</b>						
<u>Not specified</u>						
Mean	0.36	0.24	0.36	0.40	0.31	0.34
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Domestic</u>						
Mean	0.32	0.28	0.37	0.37	0.32	0.33
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Import</u>						
Mean	0.30	0.27	0.36	0.37	0.32	0.32
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Export</u>						
Mean	0.35	0.27	0.35	0.40	0.34	0.34
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Abroad</u>						
Mean	0.35	0.29	0.40	0.40	0.35	0.36
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Total</u>						
Mean	0.34	0.27	0.37	0.39	0.33	0.34
SE of the mean	0.01	0.01	0.01	0.01	0.01	0.00

<b>Variable: Gender</b>	Denmark	Germany	Netherlands	Norway	UK	Total
<b>Treatments</b>						
<u>Not specified</u>						
Mean	0.59	0.54	0.53	0.55	0.57	0.56
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Domestic</u>						
Mean	0.58	0.56	0.55	0.50	0.51	0.54
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Import</u>						
Mean	0.59	0.54	0.52	0.48	0.50	0.52
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Export</u>						
Mean	0.59	0.55	0.53	0.52	0.55	0.54
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Abroad</u>						
Mean	0.58	0.52	0.57	0.50	0.52	0.54
SE of the mean	0.02	0.02	0.02	0.02	0.02	0.01
<u>Total</u>						
Mean	0.59	0.54	0.54	0.51	0.53	0.54
SE of the mean	0.01	0.01	0.01	0.01	0.01	0.00

**Table A- 3: Results from Logit regression on responding NODK in the evaluation of the CCS project by country**

	Denmark b/se	Germany b/se	Netherlands b/se	Norway b/se	UK b/se
<i>Setting, reference category: Domestic</i>					
Not specified	0.058 (0.25)	-0.349 (0.22)	0.092 (0.24)	-0.439 (0.23)	-0.105 (0.22)
Import	-0.094 (0.25)	-0.301 (0.23)	-0.302 (0.25)	-0.428 (0.24)	-0.117 (0.22)
Export	0.325 (0.24)	-0.030 (0.22)	0.514* (0.23)	-0.111 (0.23)	0.019 (0.22)
Abroad	0.310 (0.24)	0.001 (0.22)	0.343 (0.23)	-0.240 (0.23)	0.187 (0.21)
<i>CCS Awareness, reference category: Have never heard about CCS</i>					
Heard little about CCS	-1.270*** (0.18)	-0.525*** (0.15)	-0.964*** (0.16)	-0.850*** (0.17)	-0.809*** (0.15)
Heard a lot about CCS	-2.247** (0.73)	-1.424** (0.53)	-1.649*** (0.48)	-1.362*** (0.31)	-2.266*** (0.52)
Female	0.513** (0.18)	0.608*** (0.15)	0.709*** (0.17)	0.593*** (0.16)	0.542*** (0.14)
Age	0.001 (0.00)	-0.007 (0.00)	-0.003 (0.01)	-0.003 (0.00)	-0.004 (0.00)
Higher Education	-0.221 (0.17)	-0.461** (0.18)	-0.513** (0.18)	-0.438** (0.16)	-0.338* (0.16)
Constant	-1.342*** (0.31)	-0.683* (0.30)	-1.094** (0.37)	-0.512 (0.30)	-0.596 (0.31)
N	1211	1158	1190	1201	1170
Pseudo R <sup>2</sup>	0.093	0.053	0.097	0.074	0.073
Df	9.000	9.000	9.000	9.000	9.000
Log-likelihood	-532.848	-608.943	-558.290	-563.896	-636.296

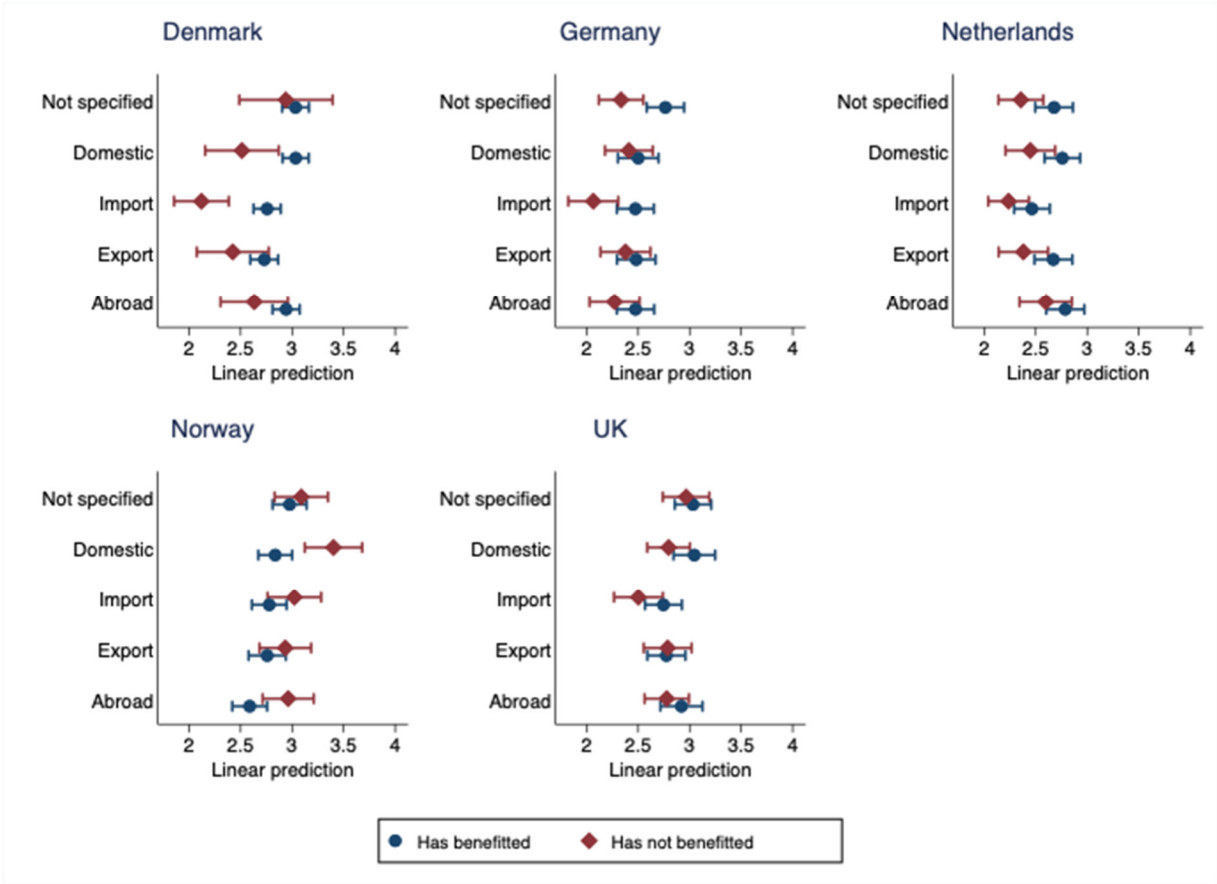
*Note: dependent variable = 0 for responses from very negative to very positive; = 1 for responses "no opinion" or "don't know" (NODK); \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001*

**Table A- 4: Results from OLS regression of the CCS setting with demographic controls**

	Denmark b/se	Germany b/se	Netherlands b/se	Norway b/se	UK b/se
<i>Setting, reference category: domestic</i>					
Not specified	0.054 (0.09)	0.064 (0.10)	-0.139 (0.09)	-0.026 (0.09)	0.066 (0.09)
Import	-0.305*** (0.08)	-0.165 (0.10)	-0.310*** (0.09)	-0.249** (0.09)	-0.278** (0.10)
Export	-0.222** (0.09)	-0.098 (0.10)	-0.059 (0.09)	-0.194* (0.09)	-0.186 (0.10)
Abroad	-0.069 (0.09)	-0.105 (0.10)	0.015 (0.09)	-0.307*** (0.09)	-0.107 (0.10)
Female	-0.432*** (0.06)	-0.171** (0.06)	-0.306*** (0.06)	-0.417*** (0.06)	-0.206*** (0.06)
Age	-0.001 (0.00)	-0.000 (0.00)	-0.002 (0.00)	-0.002 (0.00)	0.000 (0.00)
Higher Education	0.169** (0.06)	-0.038 (0.07)	0.120 (0.07)	0.202*** (0.06)	0.057 (0.07)
Constant	3.192*** (0.10)	2.596*** (0.13)	2.886*** (0.14)	3.210*** (0.11)	3.006*** (0.14)
N	982	876	935	955	850
R <sup>2</sup>	0.091	0.017	0.052	0.075	0.034

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

**Figure A- 1: Mean predicted evaluation and 95%-confidence intervals (whiskers) from OLS regression of CCS dependent on the setting and perceived benefits from the EU-membership**



*Note: In Norway, the question was whether the country would benefit. In the UK, whether it has benefited, in the other countries, the question was whether the country benefits from the EU membership. Results from OLS regression where the treatment and the perception of benefits from EU-membership are interacted. "Don't know" answers have been included in the regression but are not displayed here.*

**Table A- 5: Results from OLS regression controlling for the perception of the benefits of the EU membership of the country**

	Denmark b/se	Germany b/se	Netherlands b/se	Norway b/se	UK b/se
<i>Setting, reference category: domestic</i>					
Not specified	0.038 (0.08)	0.065 (0.10)	-0.124 (0.09)	-0.037 (0.09)	0.050 (0.10)
Import	-0.273** (0.08)	-0.177 (0.10)	-0.291** (0.09)	-0.258** (0.09)	-0.295** (0.10)
Export	-0.217* (0.08)	-0.108 (0.10)	-0.054 (0.09)	-0.213* (0.09)	-0.199* (0.10)
abroad	-0.058 (0.08)	-0.116 (0.10)	0.017 (0.09)	-0.325*** (0.09)	-0.107 (0.10)
<i>EU membership reference category: Has benefitted</i>					
Has not benefitted	-0.422*** (0.08)	-0.256*** (0.07)	-0.249*** (0.07)	0.298*** (0.07)	-0.137* (0.07)
Don't know	0.013 (0.10)	-0.111 (0.10)	-0.067 (0.08)	0.064 (0.07)	-0.152 (0.09)
Female	-0.420*** (0.06)	-0.170** (0.06)	-0.313*** (0.06)	-0.390*** (0.06)	-0.197** (0.06)
Age	-0.001 (0.00)	0.000 (0.00)	-0.002 (0.00)	-0.002 (0.00)	0.000 (0.00)
Higher Education	0.156** (0.06)	-0.079 (0.07)	0.052 (0.07)	0.190** (0.06)	0.035 (0.07)
Constant	3.207*** (0.10)	2.709*** (0.13)	2.990*** (0.14)	3.168*** (0.11)	3.085*** (0.14)
N	982	876	935	955	850
R <sup>2</sup>	0.115	0.033	0.066	0.092	0.040

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

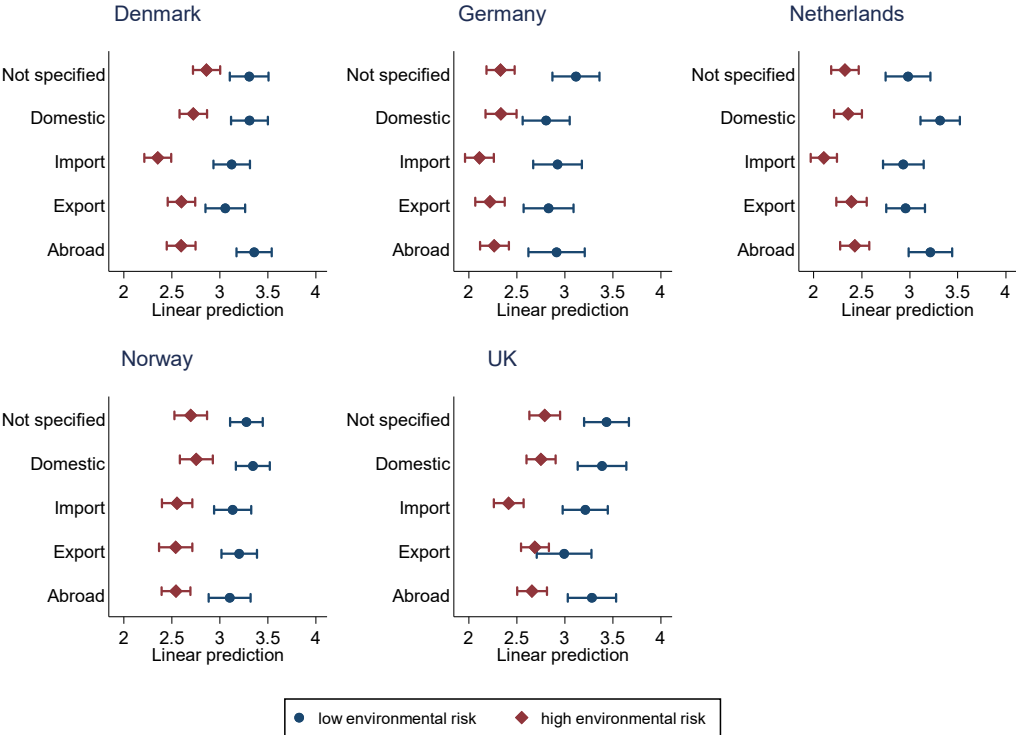


**Table A- 6: Means, standard deviations (SD) and number of observations (n) for concerns, perceptions of opportunities, responsibility and cooperation, see also Figure 6**

		Germany	Netherlands	Norway	UK	Denmark
Environmental concerns	Mean	4,38	4,2	3,82	4,32	4,07
	SD	1,11	1,16	1,2	1,14	1,11
	n	1100	1108	1131	1082	1140
Cost concerns	Mean	4,6	4,35	4,01	4,27	4,13
	SD	0,95	0,89	1,05	0,99	0,96
	n	1100	1094	1160	1094	1129
Prolongs fossil fuels	Mean	3,94	3,97	3,5	4,13	4,06
	SD	1,25	1,25	1,37	1,27	1,21
	n	869	934	1051	907	1028
Economic opportunities	Mean	3,92	4,05	4,23	4,08	4,2
	SD	1,05	0,96	0,97	1,02	0,85
	n	1017	1011	1072	947	1015
European cooperation	Mean	4,57	4,57	4,62	4,81	4,66
	SD	1,04	0,95	0,97	0,90	0,82
	n	1094	1139	1151	1085	1164
National responsibility	Mean	4,83	4,58	4,6	4,98	4,3
	SD	0,95	0,94	0,95	0,79	0,95
	n	1125	1143	1175	1119	1171

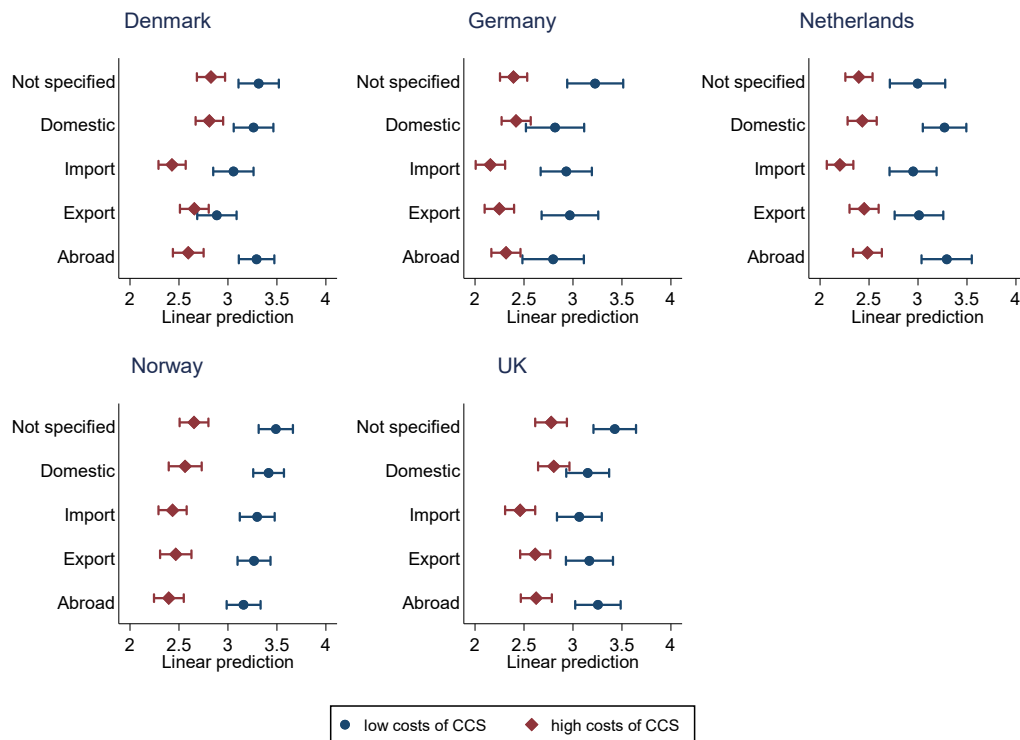
*Note: Response scale: (1) Strongly disagree, (2) Disagree, (3) Rather disagree, (4) Somewhat agree (5) Agree, (6) Strongly agree; Don't know, No opinion. The number of observations (n) varies because when a participant responded "No opinion" or "Don't know" on an item, the respondent was excluded from the mean calculation.*

**Figure A- 2: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and level of concern about environmental risks**



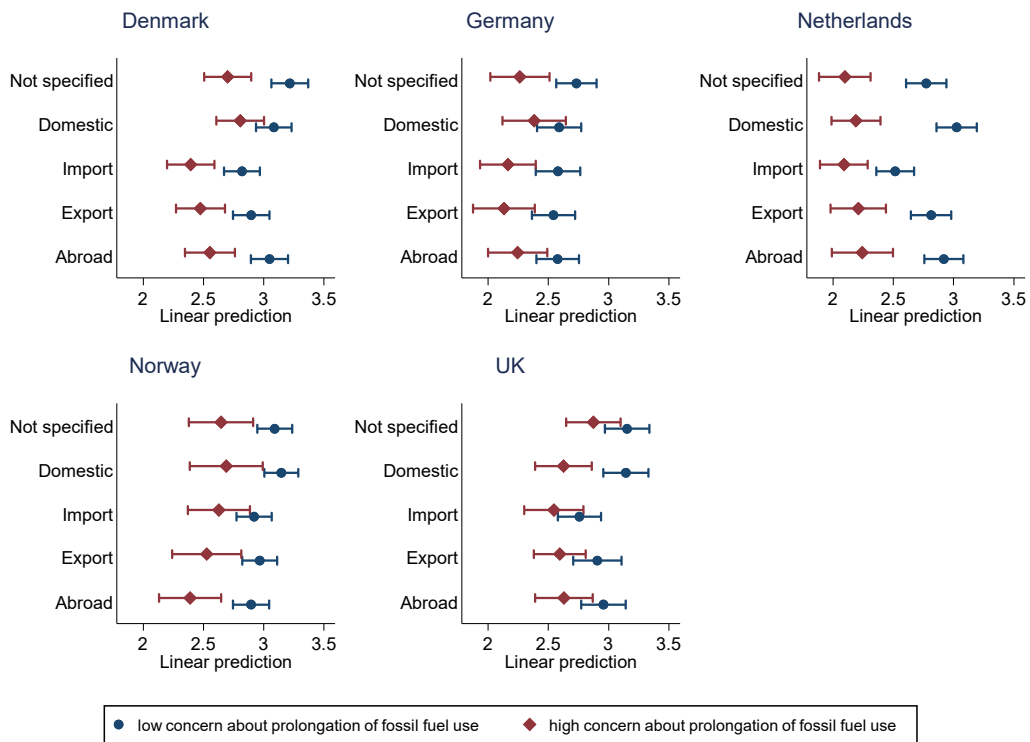
*Note: Environmental concern is the mean value of the responses to the items (1) "I am concerned that CO<sub>2</sub> might leak and cause harm to humans or the environment." (2) "I believe that CO<sub>2</sub> transport across the North Sea represents a hazard to the marine environment." on a six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=4, where respondents with mean values below 4 fall in the low environmental risk group, respondents with a mean value of 5 or above fall in the high environmental risk group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

**Figure A- 3: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and level of concern about the costs of CCS**



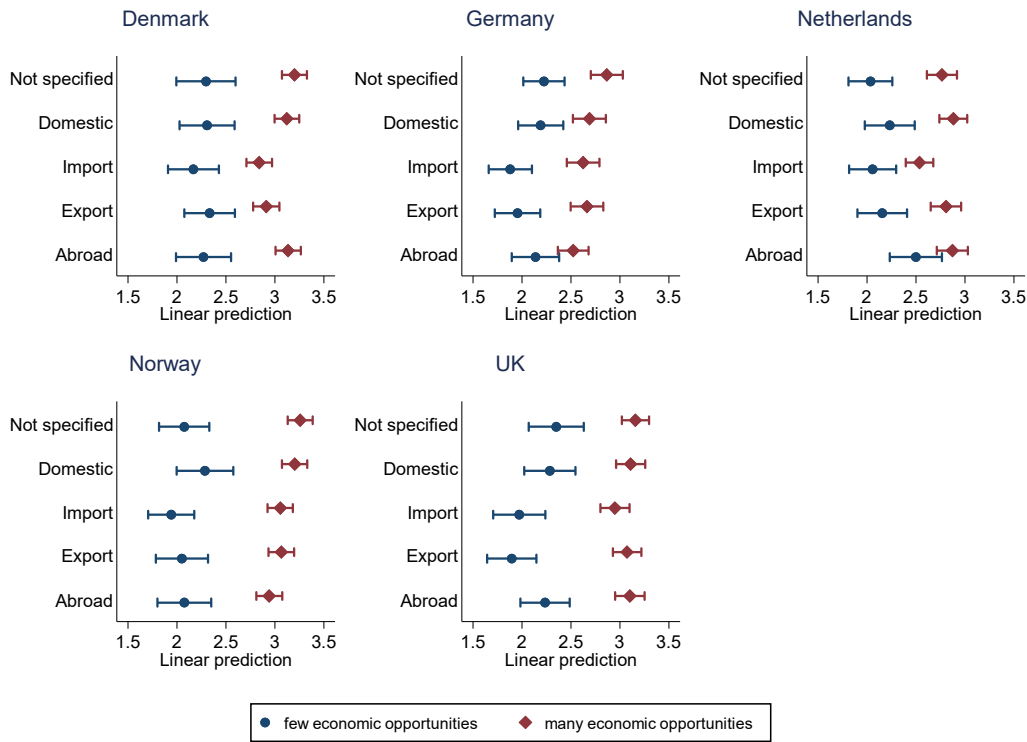
*Note: Concerns about the cost of CCS is the mean value of the responses to the items (1) "I am concerned that using CCS will be very expensive.", (2) "I think money that the government will spend on CCS should be spent elsewhere.", (3) "I believe building up an infrastructure for CCS is too expensive." on a scale six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=4, where respondents with mean values below 4 fall in the low cost group, respondents with a mean value of 4 or above fall in the high cost group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

**Figure A- 4: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and level of concern about the prolongation of fossil fuel due to CCS**



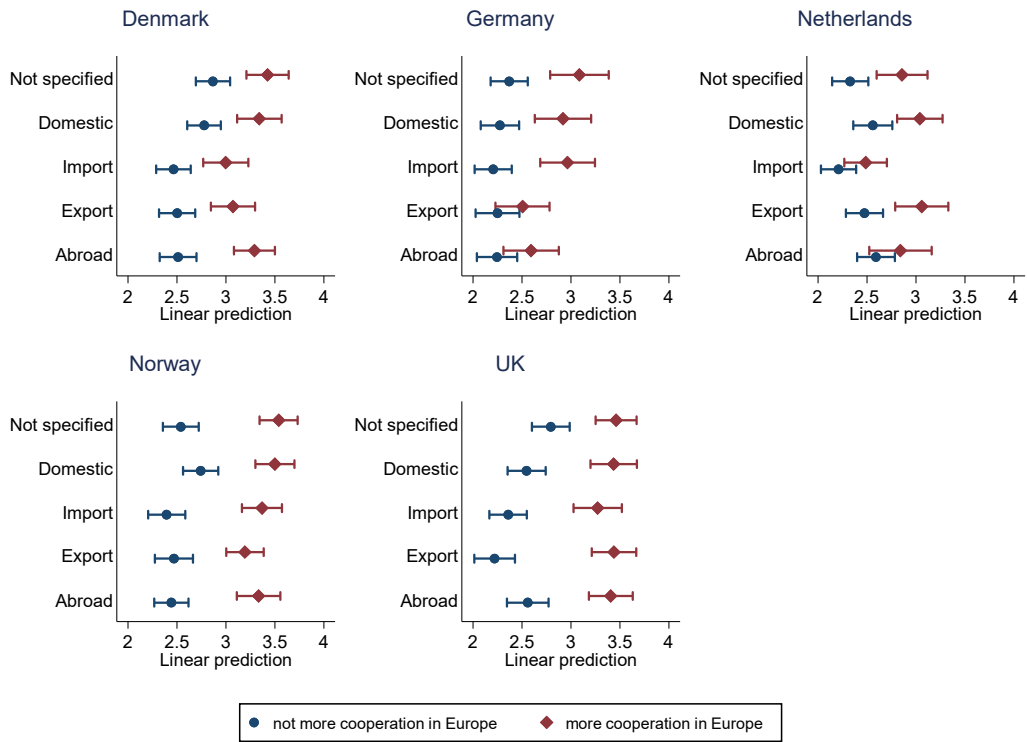
*Note: Concerns about the prolongation of fossil fuel use caused by CCS, i.e. moral hazard, is the response to the item “I am concerned that CCS will encourage the prolonged use of fossil fuels.” on a scale six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=4, where respondents with a value below 4 fall in the low moral hazard concern group, respondents with a value of 4 or more fall in the high moral hazard concern group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

**Figure A- 5: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and expectations of economic opportunities from CCS deployment**



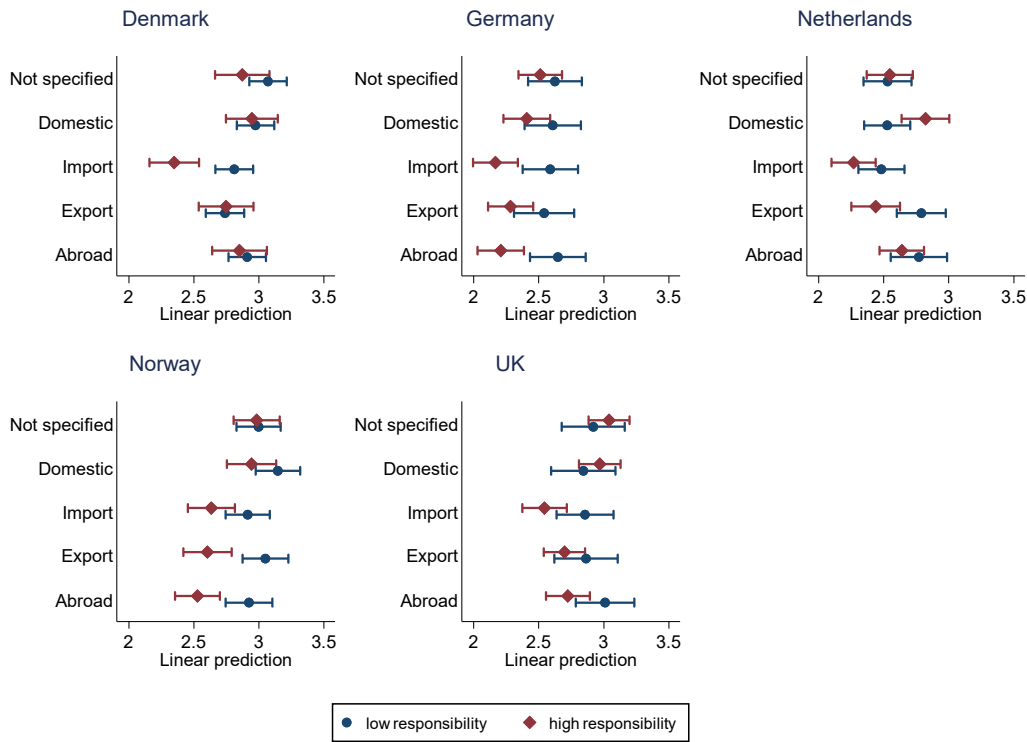
*Note: The expectation of economic opportunities from CCS is the mean value of the responses to the items (1) “I believe the increased use of CCS will create jobs in <country>.”, (2) “I believe <country’s> firms and businesses will benefit from building up a CCS infrastructure.” on a scale six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=4, where respondents with mean values below 4 fall in the few economic opportunities group, respondents with a mean value of 4 or above fall in the many economic opportunities group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

**Figure A- 6: Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and views about cooperation between European countries on infrastructure projects**



*Note: The view that European countries should cooperate on infrastructure projects is the mean value of the responses to the items (1) “Countries in Europe should work together to capture CO<sub>2</sub> in all countries and store it in suitable sites.”, (2) “I think that European countries should cooperate more on infrastructure projects to reduce greenhouse gas emissions.” on a scale six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=5, where respondents with mean values below 5 fall in the low environmental risk group, respondents with a mean value of 5 or above fall in the high environmental risk group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

**Figure A- 7 Mean predicted evaluation of CCS (point) and 95%-confidence intervals (whiskers) from OLS regression dependent on setting and level of perceived responsibility for national CO<sub>2</sub> emissions**



*Note: National responsibility is the mean value of the responses to the items (1) “Every country is responsible for reducing its own CO<sub>2</sub> emissions.” (2) “Every country should store its captured CO<sub>2</sub> emissions on its own territory.” on a scale six-point Likert scale from (1) Strongly disagree to (6) Strongly agree. The samples are split at the median=5, where respondents with mean values below 5 fall in the low responsibility group, respondents with a mean value of 5 or above fall in the high responsibility group. The cut-off value was chosen to create equally sized groups. The regression controlled for age, gender, and level of education (not shown).*

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