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Is Fairness Blind? -
The effect of framing on preferences for effort-sharing rules

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Abstract

By using a choice experiment, this paper focuses on citizens' preferences for effort-sharing rules of how carbon abatement should be shared among countries. We find that Swedes do not rank the rule favoring their own country highest. Instead, they prefer the rule where all countries are allowed to emit an equal amount per person, a rule that favors Africa at the expense of high emitters such as the U.S. The least preferred rule is reduction proportional to historical emissions. Using two different treatments, one where the respondents were informed about the country names and one where the country names were replaced with anonymous labels A-D, we also test whether people's preferences for effort-sharing rules depend on the framing of the problem. We find that while the ranking of the principles is the same in both treatments, the strength of the preferences is significantly increased when the actual names of the countries are used.

Key words: climate change, fairness, framing, ethics, effort-sharing rules.

JEL classification: D03, Q54.

1. Introduction

Today, there is a consensus that any meaningful climate policy aimed to reduce greenhouse gas emissions (GHGs) must involve joint efforts among most countries in the world. However, the perception of how much each individual country should be obliged to reduce (often referred to as effort-sharing or burden-sharing rule) its GHGs differs among countries. During the last decade, a large literature has been devoted to identifying the most relevant effort-sharing rules in relation to international climate negotiations; see, e.g., Rose et al. (1998), Torvanger and Ringius (2002), Ringius et al. (2002), and Lange et al. (2007). While these articles have mainly focused on the economic consequences of the rules at the country level, one important aspect often neglected in the literature is ordinary citizens' preferences for different effort-sharing rules. In line with Beetham (1991), one could argue that in order for policy makers to have legitimacy in international negotiations, the costs paid by each country to reduce emissions must be accepted and supported by its citizens, who in the end have to pay for the reduction. The present paper aims to fill this gap in the literature and therefore focuses on ordinary citizens' preferences for different effort-sharing rules to give guidance about what people think is a fair allocation of the global mitigation of GHGs.

The aim of effort-sharing rules is to assign emission limitations for countries in an equitable fashion. Once a rule, e.g., that countries must reduce emissions proportionally to historical emissions, is accepted, the same rule applies for all countries. However, research has shown that it is likely that preferences for a particular allocation rule are influenced by a *fairness bias*. For example, Johansson-Stenman and Konow (2009) denote the discrepancy between the fairness judgments made by a stakeholder and an impartial spectator as a fairness bias. This bias is due to both a self-centered bias, which is a discrepancy that the stakeholder is aware of, and a self-serving bias, which is a distortion of the stakeholders' beliefs (see, e.g., Festinger, 1957; Babcock and Loewenstein, 1997; Konow, 2000). Similar biases could be present if one asks about preferences for effort-sharing rules. For example, in the case of effort sharing, people from developing countries are more likely to prefer effort-sharing rules based on need, while people from developed countries are more likely to prefer a rule of equal sharing of the costs. The question is the extent to which these preferences are influenced by self-centered or self-serving principles. Given the potential of fairness bias to influence the possibility to reach settlements in climate negotiations[1], a second contribution of this paper is

[1] Reaching a global agreement has proven very difficult, as illustrated by the COP 15 negotiations in Copenhagen in December 2009.

to test whether people have the same preferences for effort-sharing rules when the questions asked only address the rules per se as they do when the questions asked include information on actual country names. This is analogous to the way fairness bias is defined (Johansson-Stenman and Konow, 2009).

While we are unable to say anything about the motivation behind such a potential fairness bias, we are able to determine whether preferences are based only on the rules per se or if they are cofounded with personal preferences (positive or negative) for different countries. This is done by conducting two treatments of a survey-based choice experiment (CE) distributed to a random sample of Swedish citizens. In one treatment, we present how the different effort-sharing rules relate to four groups of countries (US, EU, China, and Africa) in terms of how much they have to reduce their CO_2 emissions. In the other treatment, we still give information describing the distributional consequences for the different countries/groups of countries, but their names are replaced with generic labels A to D. Thus, in the treatment without country names, respondents are not able to relate the consequences of the effort-sharing rules to specific groups of named countries.[2] The aim of this comparison is to test for differences in willingness to pay for the different rules, and whether the ranking of the preferences differs between the treatments. A difference between the two treatments would imply that the rules per se do not fully capture people's preferences, but that they depend on the countries being considered.

Based on previous research (Torvanger and Ringius, 2002, and Lange et al., 2007), we use the following three effort-sharing rules to estimate distributional preferences: 1) CO_2 reduction proportional to historical emission levels, 2) CO_2 reduction proportional to current emission level, and 3) CO_2 reduction based on equal right to emissions per person in all countries.[3]

[2] The treatment without country names can also be understood in terms of a blind test. Blind tests have previously been used in economics on a number of occasions. Mentioning a few, Golding and Rouse (2000) analyzed what difference blind auditions have made for female musicians in the U.S. and found evidence that blind auditions foster impartiality and increase the proportion of women in symphony orchestras. Lee et al. (2006) performed an experiment to elicit preferences for a beer containing balsamic vinegar. Not surprisingly, they found that preferences for the beer were higher in the blind-test treatment compared to when respondents were informed before or after tasting. McClure et al. (2004) found Coke to be rated higher when consumed from a cup bearing the brand logo rather from an unmarked cup.

[3] The decision to limit the choices to *three* effort-sharing rules was primarily made to reduce the cognitive load of the survey. Moreover, we limited our survey to CO_2 emissions (and did not include all GHGs) again to make the survey congitively less demanding for the respondents.

The rest of the paper is organized as follows: Section 2 presents the CE and the econometric model and Section 3 the results. Section 4 concludes the paper.

2. Survey and experiment design

A random sample of Swedish citizens was surveyed using the CE method.[4] The respondents (repeatedly) chose their preferred alternative from a choice set. Survey responses were collected from a mail questionnaire sent out during the spring of 2009 to a random sample of 1,200 men and women aged 18-75, drawn from the Swedish census registry. The country name treatment was applied to half the sample and the generic labels treatment to the other half. Hence, the only difference between the treatments was whether or not the country names (US, EU, China, and Africa) were presented.

We did not send out any reminders, but the respondents got a lottery ticket (worth SEK 10) with the questionnaire to encourage them to fill in the questionnaire. The questionnaire consisted of questions about the respondents' attitudes towards climate change, a choice experiment related to reductions in CO_2 emissions (which we do not analyze in this paper), the choice experiment regarding effort-sharing rules analyzed in this study, and questions regarding the respondents' socio-economic status. The alternatives in the choice sets were described by a number of attributes at different levels. The scenario description preceding the CE for effort-sharing principles encouraged the respondents to assume a 60 percent reduction in CO_2 emissions.[5]

In each choice situation of the CE, the respondents had two alternatives to choose between. The alternatives differed with respect to principles for the effort-sharing rule and implied a cost to the respondent's household. Each respondent answered four choice sets. As already mentioned, the effort-sharing rule attribute had three levels: reductions in CO_2 according to (i) historical emission levels, (ii) current emission levels, and (iii) equal per capita emissions. Together with the effort-sharing rules, the respondents were also given information about each country's/country group's current emissions. The other attribute in the CE was yearly

[4] For a methodological overview, see, e.g., Louviere et al. (2000) or Alpizar et al. (2003).

[5] Other studies have shown that the perception of distributive justice is also affected by efficiency concerns, i.e., whether an allocation of resources is made in an efficient way (Konow, 2001). In the present study, we are not primarily interested in such a trade off, and have therefore kept efficiency constant between the effort-sharing rules. Hence, there is no difference in total costs of reducing CO_2 with 60% between the different effort-sharing rules.

cost to the respondent's household until 2050. This attribute had four possible levels: 2,000, 2,200, 2,400, and 3,000 SEK per year. The choice sets were created using a D-optimal linear design. The experimental design sufficiently reduced the correlation between the two attributes, allowing us to estimate the preferences separately. The attribute levels are summarized in Table 1.[6]

Table 1: Description of attributes

Attribute	**Attribute levels**	**Description**
Effort-sharing rules	According to historical emission levels	Countries with a *history* of high emission levels per person must decrease their emissions more than countries with a *history* of lower emission. This option means, however, that countries with a history of high emissions will continue to emit more than others.
	According to current emission levels	Countries with *currently* high emission levels per person must decrease their emissions more than countries with *currently* low emission levels. This option means, however, that countries with currently high emissions will continue to emit more than others.
	According to equal emission levels per person	Countries with currently high emission levels *per person* must decrease their emissions *much* more than countries with low emission levels *per person.* Countries with very low emission levels might even be allowed to increase their emission levels. This option means that all countries are allowed to emit an equal amount per person.
Cost	2000, 2200, 2400, 3000 SEK	Yearly cost for the household until year 2050.

In order to illustrate more clearly to the respondent what the three effort-sharing rules would imply, we showed the current level of CO_2 emissions per person and country and, for each of the rules, the corresponding decrease in emissions per person and country. The exact information provided to the respondents in the treatment with country names is given in Figure 1 below. In the treatment without country names, the country names were replaced with the generic labels Group A, B, C, and D.

[6] At the time of the survey, 1 USD = 7 SEK.

Figure 1. Presentation of emission reduction information in the survey; country name treatment, emissions expressed in metric ton.

	CO_2 emissions per person today	**Distribution of the reduction**		
		According to historic emissions	According to current emissions	According to equal emissions/person in all countries
USA	19 ton	-13 ton	-11 ton	-17 ton
EU	8.5 ton	-7 ton	-5 ton	-7 ton
China	4.5 ton	- 1 ton	-3 ton	-2.5 ton
Africa	1 ton	-0.5 ton	-0.5 ton	+1 ton

As shown in Figure 1, moving from the effort-sharing rule *current emission* to either the *historical* or the *equal emissions* rules means that both the U.S. and the EU countries would have to decrease their emissions. African countries would either face about the same abatement requirement or even be allowed to increase their emissions, while China's reduction would be the largest with the *current emissions* rule and the smallest with the *historical emissions* rule. Thus, those who, for example, want to "punish" the U.S. could choose the *equal emissions* rule, while those who want to minimize EU´s reduction obligation EU to have less reduction could pick the rule based on *current emissions*, irrespectively of what they think of the rules per se. Examples of the choice sets and the two treatments are given in Appendix 1.

There are many possible interpretations of fairness and alternative value systems. Equal emissions per capita can be motivated as an extension of other human rights to public goods or common ecosystem resources. Reductions in proportion to current emissions means user rights in proportion to current emissions (also called grandfathering), and is related to the legal concept of "prior appropriation." This principle underlies much of the current negotiations and even Kyoto had equal percentage reductions as its starting point (for Annex 1 countries). Finally, abatement in proportion to historic emission levels reflects recognition of the fact that we are dealing with a stock and not a flow pollutant. Hence, those who have emitted a lot historically are asked to reduce their emissions somewhat more than others.

Econometric Model

In the analysis of the responses, we apply a standard random utility framework. However, in focus groups and in pilot studies, we learned that there was a risk that some respondents would not pay proper attention to the cost-for-the-household attribute. There is a growing literature indicating that this is the case for many stated preference surveys (see, e.g., Gilbride

et al., 2006; Carlsson et al., forthcoming; Campbell, 2008; Hensher, 2008; Scarpa et al., 2009). Therefore, we chose to use a latent class model following Scarpa et al. (2009). This model allows for distinguishing respondents who do not pay attention to the cost attribute from those who do. In our case, the latent class model has two classes, one with no restrictions and one where the coefficient of the cost attribute is restricted to zero. The utility of alternative *j* for individual *i* in class *t* is specified as:

$$U_{ijt} = \beta_t^{'} x_j + \varepsilon_{ij_t},$$

where x_j is a vector of the attribute levels of alternative *j*, β_t is the corresponding parameter vector for individuals in class *t*, and ε_{ij_t} is an error term. Our main interest is to estimate the willingness to pay (WTP) for each of the effort-sharing rules. This will simply be the ratio between the attribute coefficient and the cost coefficient. For the class where the cost coefficient is restricted to zero, we will use the cost coefficient from the unrestricted class when estimating WTP. This means that we assume that all subjects have the same marginal utility of money, and thus the reason they ignored the cost attribute was not that they do not care about the money. One plausible explanation for why people ignore the cost attribute is that they might take more of a citizen perspective than an individual perspective when answering a stated preference survey. According to Nyborg (2000), this might be particularly common when the good to be valued is ethically complex, which is certainly true for effort-sharing rules.

3. Results

In total 411 questionnaires were returned, of which 397 were sufficiently complete. Some respondents did not answer all six choice sets; however, we still chose to include these individuals in the analysis. Table 2 presents the descriptive statistics for the whole sample.

Table 2. Descriptive statistics.

Variable	Description	Mean (Std. Dev.)		P-value t/proportion-test
		With names	Without names	
Age	Age in years	47.9 (16.0)	48.9 (15.0)	0.46
Household income per month	Income in SEK per month	30.635 (12.984)	29.612 (13.979)	0.44
Male	= 1 if male respondent	50.1	48.8	0.81
University education	= 1 if respondent has university education	0.36	0.40	0.44
Lives in rural area	= 1 if respondent lives in a	0.35	0.33	0.74

Lives in large city	rural area = 1 if respondent lives in a large city	0.24	0.31	0.14

Using t-tests for the first two variables and proportion tests for the others, we cannot reject the hypothesis of equal means/distributions for any of the socio-economic variables. Thus, the two samples in the two different treatments are definitely comparable.

We now turn to the results of the latent class models. All models are estimated using Nlogit 4.0. Note that the effort-sharing rule attribute is effects coded. This means that instead of normalizing the willingness to pay to zero for one of the attribute levels, we normalize the sum of willingness to pay to zero (see, e.g., Louviere et al., 2000). As discussed in the previous section, each model has two classes, where class 2 involves a restriction of the cost coefficient to be zero.

Table 3. Estimated latent class logit models; standard errors in parentheses.

	Without names		**With names**	
	Class 1	**Class 2 (non-attendance)**	**Class 1**	**Class 2 (non-attendance)**
Alternative specific constant (=1 for alternative 1)	0.302**	-0.106	-0.035	0.150
	(0.133)	(0.097)	(0.128)	(0.118)
Historical Emissions	-0.713***	0.283***	0.240**	-1.196***
	(0.115)	(0.0.077)	(0.105)	(0.120)
Equal Emissions	1.125***	-0.977***	-0.746***	2.185***
	(0.144)	(0.0.097)	(0.133)	(0.203)
Cost	-0.0014***	Restricted	-0.0014***	Restricted
	(0.0003)		(0.0003)	
Latent Class Prob.	0.584***	0.416***	0.500***	0.500***
	(0.027)	(0.046)	(0.045)	(0.045)
No. individuals	208		189	
McFadden pseudo R^2	0.11		0.16	
Always choose alternative with				
Least cost	8 %		6 %	
Historical emissions	6 %		5%	
Equal emissions	0 %		0 %	
Today´s emissions	0 %		0%	

*, **, and *** denote that the coefficient is statistically significant at the 10%, 5%, and 1% level, respectively.

As can be seen in Table 3, the class probabilities are around 0.5 for both models, indicating that in both treatments, there is a high probability that the respondents did not pay attention to the cost attribute when making their choices. In class 2, subjects are thus only making a choice between different effort-sharing rules, which means that we can still estimate the probability of choosing a certain rule.

The model based on the treatment with country names has a better fit, maybe because people find it easier to relate to the effort-sharing rules when helped by country names. This is further strengthened by the positive and significant intercept in the treatment without country names (for class 1). The positive intercept is a sign that respondents to some extent have had preferences for the left-hand alternative and since the CE is generic, this is likely to be driven by heuristics in their decision. Notably, this effect does not turn up in the treatment with names. Finally, at the bottom of Table 3, we see that the respondents generally do not show signs of having lexicographical preferences. For example, only 6-8 percent chooses the least cost alternatives in all the choice sets.

The focus is to estimate the WTP for the different effort-sharing rules for the two treatments and then compare the WTP and ranking of rules between the treatments. The WTP results are presented in Table 4. Note that we report the average WTP for the two classes for each treatment. This means that we use the estimated cost coefficient for class 1 for all subjects when estimating the WTP, and the average WTPs are estimated taking the class probabilities into account.

Table 4. WTP and difference in WTP in SEK; standard errors in parentheses.

	Average WTP (taking latent class probabilities into account)		**Diff. average WTP**
	Without names	With names	
Historical Emissions	-214***	-336***	122
	(68.56)	(101.15)	(122.19)
Equal emissions	179**	506***	-327*
	(75.81)	(161.64)	(178.54)
Current Emission	35	-170**	205**
	(54.01)	(77.80)	(94.71)

*, **, and *** denote that the coefficient is statistically significant at the 10%, 5%, and 1% level, respectively.

There is consistency between the two treatments in terms of ranking of the rules. In both treatments, the *equal emissions* rule has the highest WTP. This principle favors Africa the most and puts the largest burden on the U.S. In both treatments, the second most favored rule is the *current emissions* rule. Note also that the *current emissions* rule is the most favorable for the EU. This preference ordering of the rules is in line with the results presented in Törnblom and Foa (1983), according to which Swedish subjects consistently seem to prefer equality (comparing equality, need and equity) for different so-called resources (love, status, information, money, goods, and services). The least preferred rule in both treatments is the *historical emissions* rule.

Even if the ranking is the same, there is a significant difference in WTP between the two treatments. The absolute values of the WTPs are larger in the treatment with country names. For example, the average WTP for an effort-sharing rule based on *equal emissions* per person is 506 SEK in the treatment with country names, but only 179 SEK in the other treatment. Using a t-test, two of the three WTPs are significantly different between the treatments. Thus, the main finding of the two-treatment test is that although people have consistent preferences for which rule they find to be the most fair, their WTP changes considerably when presented with the country names: The WTP for the rule *equal emissions* is significantly higher, while the WTP for *current emissions* is significantly lower. Hence, the strength of people's preferences for fairness in allocation is dependent on whether the consequences of effort-sharing rules are related to specific countries. One might conjecture that the feeling that "This is real and it's important" becomes stronger when actual country names, rather than four letters, are used.

4. Conclusions

Fairness in effort sharing among countries has been a central point in the last few years of efforts to design a climate agreement. A number of different effort-sharing rules have been suggested in the hope that countries eventually will be able to agree upon some principle that they perceive as fair. Using responses from a choice-experiment on Swedish citizens, we test for three distributive preferences, i.e., for the effort sharing rules based on *historical emissions*, *current emissions*, and *equal emissions*. The *equal emissions* rule was found to be the rule that Swedes prefer the most, while the *historical emissions* rule attracted the least support. Naturally, the preferences for different effort-sharing rules may differ between countries, and important future research therefore includes studying individuals' WTP in different countries.

In addition to the issue of perceived fairness in allocation, we raise the question of whether people's preferences for the rules are independent of how the rules affect specific countries or if people have fairness-bias in the sense that they do not make their decision based solely on the principles. Interestingly, the ranking of the three rules is the same for the two treatments, i.e., with and without names. However, the WTP for the *equal emissions* rule is significantly higher and less noisy while the WTP for *current emissions* is lower when country names are disclosed. This difference between the two treatments means that discussing effort-sharing

rules without referring to specific countries does not fully capture how people believe that the sharing should be undertaken.

Our results also suggest that it is harder for the respondents to relate to the rules if not provided with information about their implications for specific countries/groups of countries. This showed up in terms of difference in explanatory power between the models, i.e., the treatment with names had higher explanatory power and lower variances and the treatment without names showed signs of heuristics in decision making. This result seems intuitive since the abstract principles are difficult to interpret and country names help the respondents by clearly showing how the rules would affect specific countries. On the other hand, one can argue that disclosing country names opens up for other considerations and aspects. With disclosure, it is no longer obvious that people´s choices only depend on how they perceive the fairness of the rules per se. It is likely that their choices are also affected by considerations related to the countries.

While earlier findings have pointed to the risk that both self-centered and self-serving bias might complicate international agreements our research shows that respondents' preferences may also include respect for fairness, particularly when explicit reference is made to country group names such as Africa. In our study, in the both treatments, individuals did not prefer the rule favoring their own country group (i.e., EU), but rather the rule that favored Africa. Hence, it seems, at least for the Swedish case, that this effect works in the opposite direction than both self-centered and self-serving bias. Interestingly, we found that this preference for fairness was not weakened but in fact strengthened when country names were disclosed. This may be a reflection of the difficulty of eliciting preferences for principles of sharing on an abstract level.

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Appendix 1

Figure A1: Example of choice set used in the questionnaire, treatment with names

		Alternative 1		**Alternative 2**
Distribution of reduction USA EU China Africa		**According to historical emission levels** -13 ton -7 ton -1 ton -0.5 ton		**According to emission levels today** -11 ton -5 ton -3 ton -0.5 ton
Yearly cost for your household		3,000 SEK		2,400 SEK

I would choose: □ Alternative 1 □ Alternative 2

Figure A2: Example of choice set used in the questionnaire, treatment without names

		Alternative 1		**Alternative 2**
Distribution of reduction A B C D		**According to historical emission levels** -13 ton -7 ton -1 ton -0.5 ton		**According to emission levels today** -11 ton -5 ton -3 ton -0.5 ton
Yearly cost for your household		3,000 SEK		2,400 SEK

I would choose: □ Alternative 1 □ Alternative 2