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# Does experience eliminate the effect of a default option?

- A field experiment on CO<sub>2</sub>-offsetting for air transport\*

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## Abstract

Earlier research has shown that using a default option has a decisive effect on individuals' choices. In many cases, however, the low proportion of subjects who switch from the pre-set default option might partly explained by inexperience with the goods or services offered, and high transaction costs for switching. By conducting a natural field experiment when environmental economists registered on the web to a conference, the default option to offset CO<sub>2</sub> emissions was randomly pre-set. Either the participants had to opt-in to offset, opt-out to offset or there was no default option, i.e. an active choice had to be made with no implicit "guidance" from the default. We used experienced subjects and had low transaction costs of switching. Our findings show that the default has no significant effect on the decision to offset.

**Key words:** CO<sub>2</sub>-offsetting; Default option; Field experiment; Public goods.

**JEL code:** C93; D03; D62; Q53.

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## 1. Introduction

According to neoclassical theory, individuals are rational and this assumes both coherence and procedure invariance. The assumption of procedure invariance postulates that normatively equivalent procedures should result in the same choice by an individual. Several studies have investigated the impact of pre-set default options. Johnson and Goldstein (2003) compared countries that had different rules regarding organ donation upon death. They find that countries where people by default are not donors, i.e. when people had to opt-in to become donors, had a significantly and dramatically lower fraction of people donating compared to countries where people by default are donors, i.e. where people have to opt-out not to become a donor. Similar effects of the default options have been found in for e.g. pension saving (Madrian and Shea, 2001; Choi et al., 2004), insurance (Johnson et al., 1993), fair-price in corporate law (Listokin, 2009) and marketing (Brown and Krishna, 2004). In the environmental area, Pichert and Katsikopoulou (2008) showed that green defaults can have significant effects on pro-environmental behavior in the choice of “green” electricity. They find that power suppliers that established “green defaults”, i.e. when customers had to opt-out in order to buy “non-green” electricity, had a significantly higher proportion of customers buying “green” electricity.

Thus, as summarized above, previous research on default has shown that the assigned default option has a decisive influence on individuals’ choices.<sup>1</sup> However, it should be noted that in the cases described above, the individuals often lack experience with respect to the goods or services under investigation as well as it is costly to switch. Lack of experience may influence individuals

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<sup>1</sup> For a more general discussion on causes to the disparity between revealed and normative preferences see e.g. Beshears et al. (2008).

to choose the default option since they might interpret the default option as a carefully prepared recommendation (e.g. Beshears et al., 2006). Also, preferences that are constructed at the time when the individuals are exposed to the good or to the service could result in preferences in favor of the default (compare discussion to status quo bias) (e.g. Lichtenstein and Slovic, 2006 and Plott, 1996). Comparisons of behavior between experienced and inexperienced consumers in experiments have shown that experienced consumers are less affected by context, e.g. the endowment effect becomes negligible when consumers (traders) are highly experienced (List, 2003), while the effect of cheap talk does not reduce hypothetical bias when bidders are experienced (List, 2001).

The objective of this paper is to investigate whether the default option influences the decision to CO<sub>2</sub>-offset for air transport among experienced consumers when cost of switching is low. We conducted our field experiment on CO<sub>2</sub>-offsets among environmental economists participating at the European Association of Environmental and Resource Economists (EAERE) meeting in June 2008, which is an annual conference for environmental economists. Compared to the above mentioned studies, our subjects are experienced with the good (carbon offsetting) since they are working professionally in the field of environmental economics and on average fly more than the average person. When they registered at the conference website, they were given the option to offset their CO<sub>2</sub>-emissions if flying to the conference. Participants were randomly assigned to one out of three treatments; (i) offsetting their CO<sub>2</sub> emission, i.e. the participants had to opt-out if they did not want to offset; (ii) not offsetting their CO<sub>2</sub> emission, i.e. the participants had to opt-in if they want to offset, and (iii) no default option was pre-set, i.e. participants had to make an

active choice of whether or not to offset<sup>2</sup>. Thus, the transaction costs of switching are low in our experiment since it is only a mouse-click away. The rest of the paper is organized as follows. In the next section we present the experimental design, followed by a section containing our results. Finally, we discuss the policy implications of our findings.

## **2. Experimental design**

The experiment was conducted during the registration for the 16th Annual conference of the European Association of Environmental and Resource Economists (EAERE), June 25-28 2008, in Gothenburg, Sweden. The registration was web-based and participants had to fill in a registration form when registering for the conference. This webpage included the possibility to offset the CO<sub>2</sub> emissions they would cause if flying to the venue. There were two different levels of offsetting fee, one for participants flying within Europe and another one for participants flying from outside Europe. The offset was undertaken by buying European Allowance Units (EAU) after the conference. The prices of 10 Euro and 40 Euro respectively were based on data saying that an average European return flight emits around 0.5 tons CO<sub>2</sub> and an average transatlantic return flight around 2 tons. The permit price at the time was approximately 20 Euro per ton CO<sub>2</sub>.

A screen shot from the web registration formula is shown in Appendix. The possibility to offset occurs in the middle of the second registration page, and it is labeled “CO<sub>2</sub> compensation for flying”. The first two options in this section relate to compensation (used henceforth

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<sup>2</sup> Carroll et al. (2009) discuss the advantages (to let the individuals to actively think about their choices) and disadvantages (to avoid individuals to spend lots of time when making their choices) of having no default option at all.

interchangeably with the term “offset”). When the participant logged on to the webpage, the random number generator drew an integer number between 1 and 3, which determined to which of the three treatments the participant was assigned.<sup>3</sup> When “compensation” was the default option, the dot was located in the circle in front of either “Flight from a country inside Europe” or “Flight from a country outside Europe” based on earlier registered information on the country of origin. This represents the “opt-out” treatment since participants had to make an active choice not to compensate by clicking to change from the default option to another option. In the treatment “opt-in”, the dot was located in the circle in front of the option “I do not want to compensate for my CO<sub>2</sub> emissions”. The third treatment was a “no choice” treatment, where the dot was located in the circle in front of the text “Select your choice”. In this case, the participant had to make an active and fully independent choice (unassisted by any implicit hint from the default) of whether or not to CO<sub>2</sub> offset their travel. To be able to disentangle the pure default effect from transaction costs of switching, the choice was made on the same webpage as the registration to the conference. The cost of switching was close to zero since the only effort involved to switch was one mouse-click. Compared to e.g. Johnson and Goldstein (2003) default on organ donations with subjects often lacking experience in the area together with high transaction costs for switching, we have both experienced subjects and a low cost of switching.<sup>4</sup>

### **3. Analysis**

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<sup>3</sup> Not all participants could be randomly assigned to a treatment due to computer compatibility problems. If they did not use a browser that support the random number generator `math.random()` in Javascript, a random number could not be generated (and hence they were not part of the experiment).

<sup>4</sup> This is in no way meant as a critique of their work, but just as a clarification of the differences.

A total of 240 conference participants had complete and valid data that could be used in the analysis.<sup>5</sup> Descriptive statistics of the choices by the participants of whether or not to offset their air travel is shown in Table 1 below. As can be seen in Table 1, there are small differences between the three treatments. The overall results, presented in the second column of Table 1, are not separated by country of origin. They show that the highest level of compensation was made in the treatment where no option was preset (46.75% chose to compensate), followed by the opt-out treatment (43.24% chose to compensate) and then the opt-in choice (39.33% chose to compensate). However, these differences are small and we cannot reject the null hypothesis of equal participation between all the treatments at the 5% significance level (p-value=0.627) using a Chi-square test. Moreover, we also conducted pair-wise tests between the treatments. We cannot reject the null hypothesis of equal proportion of participants who offset between any of the three pair-wise comparisons of treatments at the 5% significance level (“No pre-set choice” vs. “Opt-in” (p-value=0.335); “No preset choice” vs. “Opt-out” (p-value=0.665); “Opt-in” vs. “Opt-out” (p-value=0.613)).

As already mentioned, there were two different levels of compensation fee, one for participants flying within Europe and another one for participants flying from outside Europe. A natural hypothesis to test is whether the compensation choice differs between these two groups given that it was more expensive to compensate from outside Europe (40 Euros from outside Europe vs. 10 Euros from Europe). Frequencies for these two groups are presented in the third and fourth column of Table 1. As can be read from table 1, there does seem to be a significant difference in

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<sup>5</sup> A large number of participants, especially those from the Nordic countries, did not fly to the venue. We also excluded a number of participants from low-income countries whose trip was financed by scholarships by the organizer. Moreover, a number of participants were also excluded for computer technical reasons as discussed in footnote 3.

the fraction of participants offsetting their flights within Europe and from outside Europe to the conference in each of the three treatments. The overall compensation rate is much higher when flying from Europe compared to flying from outside Europe (53.25% vs 24.42% at the overall level of all treatments,  $p$ -values=0.000). A chi-square test confirms that the compensation rates differ significantly between flights from Europe and outside Europe in each of the three treatments at a 5% significance level (“No pre-set choice” ( $p$ -values=0.066), “Opt-in” ( $p$ -value=0.007) and “Opt-out” ( $p$ -value=0.002)). Accounting for this significant difference in behavior between the samples, we conducted a chi-square test to investigate the effect of the default option on European and Non-European flights separately. The null hypothesis that an equal proportion of participants has offset their trip in all three treatments could not be rejected for the two samples separately at a 5% significance level using a chi-square test (flying from Europe ( $p$ -values=0.827) and flying from outside Europe ( $p$ -value=0.215)). We also conducted a probit regression analysis to analyze if any socio-economic variables influenced the choice to compensate. In the analysis, we controlled for the treatments using dummy variables together with socio-economic variables (gender, geographic location and academic position). The results showed that none of the socio-economic variables are significant when included on their own together with treatment dummy variables, nor if the treatment and socio-economic variables are interacted in addition to the socio-economic and treatment variables.

>>> Table 1



#### **4. Conclusions**

According to neoclassical theory, individuals' preferences should be invariant to the procedure chosen if the procedures are normatively equivalent and hence choices should be unaffected by a default option. In contrast, the previous research on the effect of default options has shown that the default can have a very decisive influence on individuals' choices. This raises the question if default invariably is decisive. Using a natural field experiment on CO<sub>2</sub> offsets when flying, we investigate the effect of default option when individuals are experienced and the transaction cost of switching is low (just a mouse-click away). We find no significant effect of the default option among our experienced sample consisting of environmental economists registered to an environmental economic conference on the web. Hence, our results indicate that the effect of a default option strongly attenuates with experience and hence converges to the predictions by standard economic theory of procedure invariance.

In the context of public policy making, it is sometimes argued that the policy maker should make use of the default option to guide the citizens to the right choice, i.e. the choice that coincides with their normative preferences (or a choice that is in the social interest when taking externalities into account). Thaler and Sunstein (2003) argue, in a libertarian paternalistic view, that the default option should be used (see also Camerer et al., 2003) to help the irrational individuals without imposing too much of a cost on the rational individuals. Our results together with previous findings show that the strength of the default option as affecting final choice decreases with respondent experience and reduced transaction costs of switching. Some tentative conclusions from our results are that in the case of experienced individuals and low transaction

costs, the default option should be set to the option that most individuals would choose in order to minimize the transaction cost of switching. For a group of experienced individuals, this argument becomes even more important when switching is costly. In the case of inexperienced individuals, or entirely new goods and services, the policy maker has more discretionary power on the final proportion opting-in or opting-out by setting the default option. However, the potential for abuse of the prerogative of setting the default increases with respondent inexperience and transaction cost of switching. This is discussed by Beshears et al. (2008) who therefore argue for monitoring of policy makers. However, in cases of large heterogeneity in preferences among individuals, an active choice without a default option should be considered as discussed in Carroll et al. (2009). The disadvantage of having no default option is that it is costly both for individuals since they need to make a choice, as well as and for the society to implement it. In the case of environmental goods, our study indicates that each case has to be carefully considered. The degree of experience, transaction cost of switching and preference structure should be taken into account when deciding whether a default option should be used and in such case how the default option should be pre-set.

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**Table 1.** Descriptive statistics of choices by participants to offset.

<b>Treatment</b>	<b>Percentage who compensated their flight to the conference</b>		
	All flights	Flights from European countries	Flights from Non-European countries
1: “No preset choice”	46.75%	55.56%	34.38%
2: “Opt-in”, preset choice not to compensate.	39.33%	50.00%	21.21%
3: “Opt-out” preset choice to compensate.	43.24%	54.72%	14.29%
Total	42.92%	53.25%	24.42%
Number of observations	240	154	86

**Note.** The confidence intervals for the “All flights” are for “No pre-set default option” (40.4-53.0), “Opt-in” (33.0-45.4) and “Opt-out” (37.1-49.6).

## Appendix. Screenshot of the CO<sub>2</sub> compensation.

Registration form

### Registration and accommodation for EAERE 2008

For administration purpose only

**\*Compulsory fields. Please use both capital and lower case letters.**

*First name <input type="text"/>	*Family name <input type="text"/>
*Title <input type="text"/>	*Affiliation <input type="text"/>
Department <input type="text"/>	Street/ P O Box <input type="text"/>
Postal code <input type="text"/>	*City <input type="text"/>
Zip code:Asia, Australia,Canada,Gr Britain,USA <input type="text"/>	*Country <input type="text"/>
Telephone (incl. Country and Area code start with +) <input type="text"/>	Telefax (incl. Country and Area code start with +) <input type="text"/>
*E-mail <input type="text"/>	URL <input type="text"/>
Ident nr from webmeets.com* (see below) <input type="text"/>	
Mobile Phone Number (incl. Country & Area code) <input type="text"/>	

Ident nr: This is mandatory information if you have submitted a paper to the conference. Please find your ident number in the personal profile you created when submitting your paper.

#### Accompanying person(s)

Registration for accompanying persons (wives/husbands/family travelling with a delegate)  
Please note that an accompanying person does not have access to the scientific part of the congress.

1. Family name <input type="text"/>	First name <input type="text"/>
2. Family name <input type="text"/>	First name <input type="text"/>

#### REGISTRATION FEES

For EU participants who pays fee excl VAT, please fill in your [VAT](#) No below  
Observera att alla deltagare ifrån Sverige betalar inkl. moms!

Please check if you are a member of EAERE for 2008 at [www.eaere.org](http://www.eaere.org). If you are not, you may register for the conference as EAERE joining or renewing member.  
The categories of participants entitled to the reduced fee is found here [www.eaere.org](http://www.eaere.org)  
Your conference registration fee will include the EAERE membership for year 2008.

Exchange rates from November 15th, 2007



Select the correct fee for you below

##### Registration fees excl. VAT

Joining or renewing member

**Early fee until May 7th**  
**SEK/EURO**

SEK 4060:-/€ 431

**Late fee from May 8**  
**SEK/EURO**

SEK 4660:-/€ 496

Joining or renewing member at reduced fee

SEK 2860:-/€ 304

SEK 3290:-/€ 350

\*\*Joining or renewing member + ERE paper version

SEK 4800:-/€ 511

SEK 5150:-/€ 547

Joining or renewing member at reduced fee + ERE paper version

SEK 3610:-/€ 384

SEK 4050:-/€ 430

EAERE member

SEK 3670:-/€ 390

SEK 4280:-/€ 455

EAERE member - reduced fee

SEK 2750:-/€ 292

SEK 3180:-/€ 338

##### Registration fees incl. VAT\*

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SEK 5075:-/€ 539

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<https://www.scandinavia.mci-group.com/wcraform/receive.csp?kgid=50801&lang=2>[2009-09-14 14:49:51]

Registration form

Joining or renewing member at reduced fee	SEK 3575:-/€ 380	<input type="radio"/> SEK 4112:-/€ 438	
Joining or renewing member + ERE paper version	SEK 6000:-/€ 639	<input type="radio"/> SEK 6438:-/€ 684	
Joining or renewing member at reduced fee + ERE paper version	SEK 4512:-/€ 480	<input type="radio"/> SEK 5062:-/€ 538	
EAERE member	SEK 4588:-/€ 488	<input type="radio"/> SEK 5250:-/€ 569	<b>Total SEK</b>
EAERE member - reduced fee	SEK 3438:-/€ 365	<input type="radio"/> SEK 3975:-/€ 423	<input type="text"/>

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I accept the EAERE Statutes [www.eaere.org](http://www.eaere.org) please tick the box(only for joining or renewing members)

Accompanying person(s) fee late from May 1st, incl. VAT      No. of person(s)       SEK 2288:-/€ 244      **Total SEK**

\*Prices include VAT increment of 12%-25%. MCI's VAT registration number is SE 556127722801.

**CO2 COMPENSATION FOR FLYING (Mandatory fields!)**

- |  |                     |  |                      |
|--|---------------------|--|----------------------|
| <input checked="" type="radio"/>                                       | <b>SEK/Euro (€)</b> |  |                      |
| <input type="radio"/> Flights from a country outside Europe            | SEK 380/€ 40        |  |                      |
| <input type="radio"/> Flights within Europe                            | SEK 95/€ 10         |  |                      |
| <input type="radio"/> I have already compensated for my flight         |                     |  |                      |
| <input type="radio"/> I do not want to compensate for my CO2 emissions |                     |  | <b>Total SEK</b>     |
| <input type="radio"/> I do not fly to the conference                   |                     |  | <input type="text"/> |

Please read more about our decision to introduce a voluntary additional fee for CO2 emissions at [www.eaere2008.org](http://www.eaere2008.org)

**CHOICES OF EVENTS**

*Mandatory fields below!*

			No. of person(s)	
<b>June 25th, Reception at the School of Business Economics and Law</b>				
<input checked="" type="radio"/> Reception at the School of Business...	<input type="radio"/> No thanks	<input type="radio"/> Yes please	<input type="text"/>	included in fee <input type="text"/>
<b>June 26th, Reception at Börsen</b>				
<input checked="" type="radio"/> Reception at Börsen..	<input type="radio"/> No thanks	<input type="radio"/> Yes please	<input type="text"/>	Included in fee
<b>June 27th, Gala Dinner</b>				
<input checked="" type="radio"/> Gala Dinner..	<input type="radio"/> No thanks	<input type="radio"/> Yes please	<input type="text"/>	Included in fee
<b>June 28th, Half day trip and Dinner to Marstrand island</b>				
<input checked="" type="radio"/> Half day trip and dinner...	<input type="radio"/> No thanks	<input type="radio"/> Yes please	<input type="text"/>	Included in fee

Special dietary requirements, tick the box and specify below

**Total Amount SEK**

**Cancellation of Registration**

Registration can be cancelled upon written notification of the local organisers, preferably by e-mail to [confirmation-sweden@mci-group.com](mailto:confirmation-sweden@mci-group.com)  
 A refund of 80 percent or 50 percent will be given if the cancellation is received before 20th May, or 5th June respectively. For cancellations received after the 5th of June no refund will be given.  
 In any case, no refund of the EAERE membership and the ERE paper subscription fee will be given.