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Are consumers concerned about palm oil? Evidence from a lab experiment

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ABSTRACT

A lab experiment evaluates the consumers' willingness to pay (WTP) for food products made with and without palm oil. Palm oil production induces environmental damages, and its consumption presents a health risk. However, the production of alternative oils raises land use issues. In the experiment, successive messages emphasizing the characteristics of palm oil and palm oil-free products are delivered to participants. Information has a significant influence on WTP when it underlines the negative impact of the related product. This effect is stronger for the palm oil product than for the palm oil-free product. The experiment also compares the welfare effects of two regulatory instruments, namely a consumer information campaign versus a per-unit tax. Because of the respective attributes of both palm oil and palm oil-free products, the information campaign improves welfare with a much larger impact than the tax.

Introduction

Palm oil is increasingly used in many cosmetics (soaps, shampoos, creams) and food products (margarine, ice cream, crisps, chips, instant noodles, pastry, chocolate, cereals, instant soup, etc.) sold in developed countries. One in 10 products sold in UK supermarkets includes palm oil (Friends of the Earth, 2005). Its production, mainly in Malaysia and Indonesia, has become a sensitive topic. Non-governmental organizations (NGOs) have conducted several intensive campaigns against its use (e.g., Greenpeace, 2007). Academic researchers have also highlighted environmental damage related to palm oil production (e.g., Warr and Yussuf, 2011). These academic and non-academic works underline the destruction of rainforests in Southeast Asia and their replacement by gigantic palm groves, with numerous detrimental consequences for biodiversity, endangered species, such as orangutans, and greenhouse gas emissions. The health impact of palm oil, which has a high concentration of saturated fat, is another sensitive issue generally overlooked by NGOs and the media.

This palm oil debate is of crucial importance for food multinationals, such as Nestlé, Kraft Foods or Unilever. Being publicly perceived as an environmentally unfriendly company could lead to financial losses and a negative image. Following a Greenpeace campaign in 2008, Unilever agreed to support an immediate moratorium on deforestation for palm oil in Southeast Asia (Greenpeace, 2009). Firms and growers also joined the Roundtable on Sustainable Palm Oil for defining a "sustainable" palm oil. However, world demand for sustainable palm oil has been sluggish, and there are many disagreements about the certification process and the precise definition of a sustainable standard (The Economist, 2010).

An additional difficulty arises when looking for an environmentally friendly substitute to palm oil. The production of alternative oils (e.g., groundnut, cotton, sunflower, soy or rapeseed oil) raises the issue of land use. To supply the same amount of oil, one would need to plant 5–10 times as much land with other oleaginous plants compared to palm groves (SIFCA, 2009). In other words, palm oil is relatively advantageous for the land use despite other environmental and health problems.

While the debate is technical due to the complexity of agronomic, environmental and health questions, little attention has been given to consumers' perceptions. These perceptions are essential not only for food multinationals but also for non-governmental organizations arranging boycotts or "buycotts" (i.e., active campaigns to buy clean products). Consumers' attitudes are also important for policymakers defining regulatory interventions.

Our paper sheds light on issues linked to palm oil and consumer valuation. In particular, we investigate the following questions: Do consumers pay attention to the effects of the palm oil production and consumption on the environment, land use and health? Do these effects impact their purchasing decisions? Which regulatory

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policies could be implemented to address this issue and improve consumer welfare?

Our paper addresses these questions by using a lab experiment conducted in France in 2011 and focused on milk rolls made with and without palm oil. Food is particularly well suited to lab experiments with auction mechanisms (Lusk and Shogren, 2007) by eliciting environmental values stemming from differences between consumers' willingness to pay (WTP) for milk rolls before and after the revelation of information about various environmental issues (Lusk and Norwood, 2009; Norwood and Lusk, 2011). This experimental approach has the advantage of relying on data from non-hypothetical choices, representing a type of quasi-revealed preference data.[1]

Our experiment evaluates consumers' WTP for milk rolls made with and without palm oil. Palm oil-free milk rolls using sunflower oil were introduced in the French market only two months prior to the experiment. Therefore, the label indicating the absence of palm oil can be considered new to participants. We use the procedure defined by Becker, DeGroot and Marschak (1964), hereafter BDM, to elicit WTP for both products, in which participants are asked to indicate the maximum price they are willing to pay for each product. Successive messages are delivered to the participants revealing the effects of both products on the environment, land use and health. The BDM procedure is incentive-compatible because, at the end of the experiment, participants buy one of the two products if their WTP is higher than a randomly selected price of exchange. Our results highlight a statistically significant influence of information on participants' WTP when the negative impact of the related product is underlined in the message.

As messages significantly impact WTP, it suggests that the demand for products does not fully internalize all dimensions linked to palm oil. Regulation is legitimate because consumers are not perfectly informed. The simulated regulation is only based on consumers' preferences including preferences for a better environment. In particular, direct measures of both losses and benefits for inhabitants and palm oil producers in Malaysia and Indonesia are not considered, even if they matter for a complete cost-benefit analysis.

This paper also compares the welfare effects of two regulatory instruments, namely a campaign for informing consumers or a per-unit tax. The per-unit tax recently gains momentum, since the French government plans to impose a per-unit tax linked to the use of palm oil in food products (Daily News, 2012). We show that a campaign decided by the regulator and perfectly informing all participants generates the highest welfare increase, but is practically hard to implement. The welfare impact of a per-unit tax on the palm oil product is also positive but relatively low, because of the heterogeneity of participants' preferences. For some participants, the tax indeed leads to inappropriate changes in consumption compared to an information campaign.

In this paper, we present what we believe to be the first lab experiment focusing on the perception regarding palm oil. This paper completes previous works on new products or new technologies in food, such as genetically modified organisms (Hu et al., 2005; Huffman et al., 2003; Lusk et al., 2005), irradiation (Fox et al., 2002). Except for the case of irradiation fighting food pathogens, previous experiments have focused on the new product tested in the experiment without revealing information about existing or alternative products.

We contribute to the literature by clearly eliciting WTP for issues such as deforestation or land use change that are missing in many agronomic or environmental studies. Our experiment is based on consequential WTP coming from one real-payment experiment with products sold with an incentive compatible auction, while many contributions on environmental characteristics are based on hypothetical WTP coming from contingent valuations. For instance, Solomon and Johnson (2009) set up a classical survey for eliciting hypothetical valuation of mitigating global climate change through the WTP for "cellulosic" ethanol. Conversely, our experiment shows the possibility to use real products for environmental questions.

We also contribute to the public debate by precisely studying the impact of two regulatory instruments (per-unit tax versus consumer information campaign). Gintis (2000) underlines the advantage of determining policy with experimental results. Previous studies (e.g., Huffman et al., 2003; Lusk et al., 2005) have mainly investigated the value of information and labels without any attention on other instruments such as a per-unit tax, a ban or a standard. Our paper focuses on the impact of a per-unit tax as Marette et al. (2011), but it does not use data coming from field experiments.

The paper is organized as follows. Section 'The experiment' focuses on the experimental design, and Section 'Results' presents the results. Section 'Consumer welfare and regulation' discusses the implications for regulatory policies. Section 'Conclusion' concludes.

The experiment

This section details the respondents, the product, the experimental procedure and the information revealed.

Target respondents

We conducted the experiment in Paris, France, in multiple sessions in March 2011. We selected the participants with the help of one of the major French survey institute using the quota method, which uses the same proportions of sex, age and socio-economic status (occupation, income, education) criteria in the group of respondents as in the general French population. Our panel is extracted from a pre-existing database of French consumers built by the survey institute. Our targeted group is relatively representative of the age-groups and the socio-economic status of the French population although well-educated people are slightly overrepresented (which is a characteristic of Paris compared to the rest of France). Participants were first contacted by phone and informed that they would earn a participation fee of €20 for replying to questions about food for 1 h. The target respondents consist of 101 people aged between 19 and 74.[2] In the experiment, we divide our respondents into two groups and randomly assign participants to one group. Group I includes 53 participants, and Group II includes 48 participants. The two groups receive the same information but in a different order (see below).

Table 1 presents the socio-economic characteristics (gender, age, education, income, household composition) of the participants within each group and the frequency of their milk roll consumption. Differences between the two groups are tested using the Pearson chi-squared test. A *P*-value (against the null hypothesis of no difference) of less than 5% is considered significant. The results in the last column of Table 1 suggest that the two groups are not significantly different.

[1] Lab experiment data may be subject to criticisms of external validity, which allows one to generalize the relationships found in one experiment to other contexts (e.g., Harrison and List, 2004). However, as shown by Lusk (2011), experiments with food products have a relative high level of external validity compared to experiments dealing with non-food products or with topics such as real estate, charity or contribution to public goods.

[2] The exclusion of unengaged participants bidding zero at each round does not change the nature of the results. Results are available upon request.