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Habit spillovers or induced awareness: Willingness to pay for eco-labels of rice in China

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ABSTRACT

The willingness to pay (WTP) for eco-labeled rice is investigated for Chinese consumers using choice experiments with information interventions. The mixed logit model shows preference heterogeneities, and the latent class model unveils two sources: pro-environmental behaviors with spillover effects, which are defined as "catalyst behaviors", and the awareness about imperatives of ecological farming, which is defined as "induced awareness". Classification results identify that using BP bags and sorting waste are "catalyst behaviors". As the multivariate ordered probit model implies, consumers with higher educational attainment and family income levels are more likely to adopt these behaviors. Instead of creating the preference for eco-labels, the "induced awareness" is only found to strengthen preferences that already exist. The results of this study provide policy implications for the design of proper strategies to develop the eco-labeled food market, especially in developing economies.

1. Introduction

In the agricultural sector, the use of pesticides and fertilizers has become a main threat to the environment (Sanders, 2006). The situation is particularly severe in developing economies such as China, since more agricultural chemicals tend to be used for food security concerns. As a response to the increasing attention of environmental protection, eco-labeled food, i.e. products with limited use of chemicals and less negative environmental impacts, are expanding dramatically around the world. In many countries, organic food is a main eco-labeled agricultural product. China, as a developing country however, has a multileveled labeling system. The "Green Food" label, which is unique to China, allows limited use of synthetic chemicals during production. The organic label, in contrast, represents more stringent standards that resemble those in other countries (Yu et al., 2014).[1] While the growth is rapid, eco-labeled food still represents a small share in the food market. The Soil Association, the UK's main certifying body, reported that the highest share of organic food in 2014 was registered by Denmark at 7.6%. The share was only 5% for the US in spite of its world's largest organic market with a total value of 39.1 billion USD, and even lower for developing countries. To boost the eco-labeled food market, the UK policymakers highlighted foot-in-the-door techniques (Thøgersen and Crompton, 2009). In their opinion, pro-environmental behaviors (PEBs) that fit within people's current lifestyles (e.g. garbage sorting) might catalyze fundamental shifts to more difficult behaviors such as purchasing eco-labeled food due to similar underlying ideologies. PEBs with such spillover effects

[1] The pollution-free (also known as "no harm" or "safe") label is also unique to China. Issued against the background of food safety concerns, it targets the use of toxic chemicals that can harm human health; in contrast, both green and organic labels highlight recyclable production (Zhou et al., 2011). Also, the pollution-free label on rice has been lifted since 2014 (see http://www.moa.gov.cn/govpublic/ncpzlaq/201307/t20130704_3512964.htm). Therefore, the pollution-free label is not considered in this paper.

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are known as "catalyst behaviors".[2] In contrast, communication tools including media reports and consumer education programs have been prevalently used to increase the public awareness about imperatives of ecological farming, which can affect consumers' attitude toward environmental protection. Such "induced awareness" can result in a conscious behavior of purchasing eco-labeled food.[3] Although recent studies have investigated determinants of eco-labeled food consumption, the impact of "catalyst behaviors" and "induced awareness" has been rarely examined and compared in a unified framework. With a specific focus on China's rice market, we fill this void using choice experiments.

Eco-labeled food is primarily consumed out of two concerns: food safety and environmental sustainability (Padel and Foster, 2005; Aertsens et al., 2011). Not denying food safety concerns as an important consumption motive (Yu et al., 2014), the question that we are keen to answer in this paper is whether "catalyst behaviors" and "induced awareness" can benefit the growth of China's eco-labeled food market and how their relative effectiveness may differ across consumer groups. With environmental concerns serving as the common root, several studies have unveiled spillovers among PEBs (Thøgersen and Ölander, 2003; Whitmarsh and O'Neill, 2010; Van der Werff et al., 2013), which can arise through two mechanisms: consistency and self-identity. Consistency refers to either self-consistent behaviors that prevent discomforts of cognitive dissonance and conflicting attitudes (Thøgersen, 2004) or behavioral consistency with social norms to avoid sanctions and the image of disintegrity (Suh, 2002; Abrahamse et al., 2005). Self-identity refers to the label which is used to identify oneself. It stems from the reinforced self-perception through initial behaviors, and leads to future behaviors compatible with the role (Whitmarsh and O'Neill, 2010; Van der Werff et al., 2013; Truelove et al., 2014). Spillover effects on eco-labeled food consumption, however, have been rarely assessed. One exception is Thøgersen and Ölander (2003), where evidence of a higher inclination to eco-labeled products among heavy recyclers was presented. It should be noticed that PEBs are not always positively correlated since some behaviors have non-environmental motives (Thøgersen and Ölander, 2003). For example, Korfiatis et al. (2004) discovered that the reduced use of plastic packing bags and private cars were partly attributed to the wish to save expenses. Similarly, Fujii (2006) found that the less use of electricity and gas was a result of frugality. Consequently, we will consider a wide range of PEBs and examine the spillover effects on eco-labeled food consumption separately.

Information exposure changes people's alertness and attitude to environmental sustainability, which further influences their PEBs (Hawkins et al., 1998; Holbert et al., 2003). Obermiller (1995) demonstrated that as two ways of information exposure, increasing the attention to environmental issues (e.g. "the use of pesticides may contaminate the soil permanently") and affirming individual actions (e.g. "purchasing eco-labeled food helps to make the environment sustainable") could both encourage desired PEBs. In development histories of organic food markets, the UK and Germany both enjoyed a demand-induced growth from the mid-1970s to the late 1980s thanks to the rise of pro-environmental attitudes and public concerns about environmental damages of food production (Latacz-Lohmann and Foster, 1997). In our choice experiments, an information exposure will be imposed randomly on respondents as an exogenous shock.

To examine how "catalyst behaviors" and "induced awareness" influence the preference for eco-labeled rice, we first use the mixed logit model to explore heterogeneities in the willingness to pay (WTP) among consumers. We then categorize respondents based on their involvement in four typical PEBs to identify spillover effects using the latent class model. We interact eco-label variables with respondents' exposure to the randomly imposed information intervention to scrutinize the effect of induced awareness. Our findings confirm that both the involvement in "catalyst behaviors" and the degree of "induced awareness" increase the preference for eco-labeled rice, even when food safety concerns are controlled. Finally, we examine socioeconomic and household determinants of PEBs with the multivariate ordered probit model to detect consume groups that are more likely to take "catalyst behaviors".

As an emerging research topic, the consumer preference for eco, green, organic or sustainable labels has received increasing attention, especially in developing markets such as China (Gao et al., 2016c; Shen, 2012; Xu et al., 2012). Although conventional demographic and economic factors have been discussed in pioneering works (e.g. Yu et al., 2014), limited efforts have been made to seek how the preference relates to consumers' PEBs and awareness of imperatives of ecological farming. With immediate implications for favorable strategies to promote eco-labeled food markets, such efforts would be invaluable to policymakers.

The rest of paper is organized as follows. Section 2 describes the design of our survey and the estimation strategies. Section 3 characterizes our data and provides empirical results. And Section 4 concludes the paper.

2. Survey design and estimating strategies

2.1. Survey design

Comparing with the standard contingent valuation technique, choice experiments are not only suitable to deal with multidimensional product attributes and more informative to respondents, but can also minimize response difficulties such as protest bids, strategic behaviors and yeah sayings during an explicit elicitation process of consumers' WTP (Lusk and Schroeder, 2004; Van Loo et al., 2011). As a result, they have been increasingly used in the literature (e.g. Ouma et al., 2007; Van Loo et al., 2011; Ortega et al., 2011; Janssen and Hamm, 2012; Denver and Jensen, 2014; Nguyen et al., 2015).

Our choice experiments were conducted from January to March of 2015 in capital cities of ten provinces and two direct-controlled municipalities of China. Seeing a notable overlap between consumption and production regions (Wang, 2004), the ten provinces were selected from the three major rice production areas.[4] The two direct-controlled municipalities, i.e. Beijing and Shanghai, were also included because they are important consumption markets of eco-labeled rice (Yin et al., 2010). Taking advantage of relative low costs and quick completion times (Van Loo et al., 2011), our choice experiments were designed as online surveys, which were subsequently

[2] The concept was coined by the Department for Environment, Food and Rural Affairs of the UK Government (2008). Thøgersen and Ölander (2003), Thøgersen (2004) and Whitmarsh and O'Neill (2010) provided empirical evidence.

[3] See the Ministry of Food, Agriculture and Fisheries (2008) for the case of Denmark and the UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development (2008) for an overview of cases in a number of developing countries including Costa Rica, Egypt, Malaysia and Thailand.

[4] These major rice production areas are the Northeast China Plain, the Yangtze River Basin, and the coastal areas of Southeast China. Their cropping area accounted for 98% of that of the country in 2014 according to the China Statistical Yearbook 2015 (http://www.stats.gov.cn/tjsj/ndsj/2015/indexch.htm). The ten provinces covered in our survey are Heilongjiang, Shandong, Anhui, Jiangxi, Hunan, Hubei, Zhejiang, Jiangsu, Fujian and Guangdong.