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Russian consumer willingness to pay for genetically modified food

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ABSTRACT

Addressing a gap in the literature on genetically modified (GM) food preferences, we conducted a survey in Russia, where legislation forbids GM food production and importation. Based on in-person consumer surveys and choice experiments in Perm, Russia, we estimate the willingness to pay (WTP) for bread containing GMOs. In addition, we utilized a principal-component analysis (PCA) to construct variables that indicate types of consumers. Within this approach, we estimate how respondents' money- and health-consciousness affects their WTP for bread containing GMOs. Our findings are consistent with previous studies of Russian consumer preferences, who find that Russian consumers' food purchases are often motivated by health concerns and the "naturalness" of foods. Our results indicate that information-seeking health-conscious consumers tend to be less likely to purchase GM foods, while more money-conscious consumers are more likely to purchase the GM product. Overall, even with discounts ranging between 5% and 50%, only around 20% of respondents in our survey are willing to choose bread containing GMOs rather than bread made using conventional inputs.

1. Introduction

In many parts of the developed world, there has been a consumer movement to reject modern agricultural technology such as genetically modified organisms (GMOs), which were introduced in the mid-1990s to improve product quality, yields, and disease and pest resistance (Pinstrup-Andersen and Schiøler, 2001). Despite a growing consensus in scientific research that genetically modified (GM) products are no more hazardous than conventional alternatives (Nicolia et al., 2014; Tagliabue, 2016), the lack of universal consumer acceptance is well documented across many countries and has resulted in curbed demand for GM food products (see Huffman and McCluskey, 2014, for a discussion). This consumer skepticism is based on perceived risks over generally unknown long-run environmental and health consequences.

GM foods are not currently available in Russia, where government officials have taken a stance against the internal production and importation of GMOs in spite of significant cost-savings and increased yields generally associated with the technology. Russia's decision to ban GM foods could be an effective trade strategy given the growing demand for non-GM foods in many developed countries. In a speech given to Russian Parliament in December 2015, Russian President Vladimir Putin announced his intention to be the world's leading supplier of "ecologically clean and high-quality food" and criticized GMO food production in western countries even as demand for organic food continues to increase at high rates (Chow, 2015). Russia's position on

GM crops is not unique; many European nations have, at some point, enacted (or attempted to enact) legislation restricting GM crop importation or production or banning it outright (LLC, 2014; GMO-free Europe, 2017).

This article investigates Russian consumer preferences for bread containing GMOs using data from in-person interviews in Perm, Russia, obtained for the purpose of this study. Given that GM foods are illegal to import or produce in Russia, market transactions data do not exist. Experimental auctions, though useful in many contexts, are not feasible here for three reasons. First, auctions use explicit prices for a hypothetical product with a direct relationship to an existing product for which consumers face heterogeneous prices. This introduces unnecessary starting-point bias into the WTP estimation. Second, auctions could potentially dissuade respondents from bidding for an illegal product if their personal information was to be maintained for ex post contact. Lastly, and sufficient on its own to eliminate the plausibility of auctions in this case, the product cannot be delivered to bidders.

A stated-preference (SP) approach is the best among our feasible options. With a SP approach, hypothetical bias (HB) is a concern. HB refers to situations in which the WTP estimates elicited from hypothetical formats diverge from the WTP elicited from non-hypothetical formats. In other words, there exists a major concern with SP surveys that stated WTP will exceed true WTP (List and Gallett, 2001; Lusk et al., 2005). In the context of goods made with new technology, HB may take the form of an overstatement of the required discount for the

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food product made with new technology (Huffman and McCluskey, 2017). However, even with potential HB, useful information can be obtained from the responses. Since there is evidence of cross validation between SP approaches and revealed preference approaches, SP data can provide support for policy decisions (see Loureiro et al., 2003; Chang et al., 2009).

Specifically, we utilize a survey-based contingent valuation (CV) approach to elicit consumers' mean willingness to pay (WTP) for GM bread relative to the preexisting non-GM alternative.¹ In addition to basic bid and demographic survey questions, we obtained several categorical subjective variables. We employ principal-component analysis to combine subjective variables in respondents' questionnaires. Within this approach, we estimate how economic and social positions affect the mean consumer's relative WTP for bread containing GMOs. Though it is not possible to disentangle directly consumers' intrinsic preferences from those established by their environment, this article provides the groundwork for future research considering regions with similar institutions and levels of economic development but different degrees of state intervention.

2. Background and literature

Initially, GM technologies were employed to reduce crop susceptibility to disease and pests and to increase the efficiency of the agricultural sector (Pinstrup-Andersen and Schiøler, 2001). Second-generation GM products followed, such as functional foods fortified with nutritional supplements. Both first- and second-generation GM products have been subject to varying country-specific regulations (Veeman, 2002), but empirical evidence suggests that those GM products in the first generation have been more susceptible to negative consumer perception (Lusk et al., 2005). The lack of unanimity in perception of GM foods may in part be due to their implicit classification as credence goods – goods for which the quality is unknown even after consumption (Darby and Karni, 1973). This temporally-persistent information asymmetry between sellers and buyers can deter the latter. In the case of GM foods, the information asymmetry can lead to consumers' fear about a product's creation or consumption, whether warranted or not.

Consumer perception and acceptance of GM foods varies across cultures and countries. Russia spans the continental landmass of Europe and Asia, so it is informative to examine studies of GM food perceptions across those continents as a point of comparison with Russian consumers. In Europe, broadly speaking, consumers are more critical toward food products utilizing new technology compared to their American counterparts (Lusk et al., 2003; Lusk et al., 2005; Huffman and McCluskey, 2014). Lusk et al. (2003) find that consumers in France, Germany, and the United Kingdom are willing to pay much higher premiums for beef not fed GM corn compared to US consumers. In a meta-analysis of 25 studies of GM food valuation, Lusk et al. (2005) find that European consumers, regardless of survey methodologies, hold higher valuations of non-GM food than U.S. consumers.

Research suggests that GM acceptance among Asia nations has been less consistent. China has been relatively accepting of GM foods, while Japan has rejected the technology. Li et al. (2002), using data from a consumer survey conducted in China, conclude that the Chinese consumers in their sample, on average, are willing to pay a 38% premium for Golden Rice, which is enhanced with additional vitamins. Lin et al. (2006) conduct a survey to estimate consumers' WTP for biotech foods, comparing biotech to non-biotech soybean oil and insect-resistant to non-biotech rice. They find that at least 60% of respondents are willing to purchase biotech foods without any discount. In contrast, McCluskey et al. (2003) find that only slightly over 3% of Japanese consumers are willing to purchase GM noodles at the same price as non-GM noodles,

and only 17% are willing to purchase the former at a randomly assigned discount.

Some research has hinted at the impact of socioeconomic status on the biotechnology acceptance. With the exception of the United States and Canada, more developed countries tend to exhibit more intense aversion to GM foods than less developed countries. In Kenya, research suggests that a majority of consumers, though largely limited in knowledge about GM products, are willing to buy GM food products at the same price as their regular equivalent (Kimenju and De Groot, 2008). Curtis et al. (2004) directly address consumer acceptance of GM food in less developed countries, positing that the benefits of increased food availability that stems from biotechnological advances may outweigh any perceived potential long-run consequences.

Russia presents an interesting case because of its geographic size and location, its unique culture and political structure, and its intermediate level of economic development. Limited research has been conducted to investigate Russian consumer response to new food technology, and to our knowledge, there are no studies on the Russian consumer response to first-generation GM foods. Bruschi et al. (2015b) examine consumer acceptance and WTP for novel functional food bakery products among young, urban Russians, but their study focuses on an old wheat variety that is naturally rich in antioxidants. They find that with an information provision, their participants value the health-enhancing product over the base product and that the information type had a significant effect. For example, participants who were provided information that the purple wheat bakery products were made with an old variety of wheat are willing to pay more than those who were provided information about the specific antioxidants comprising the product. Also regarding functional foods, Dolgopolova et al. (2015) discuss the prevalence of food neophobia in Russia. They conclude that, in practice, novel foods are not purchased in Russia if traditional alternatives are available.

In nearby Uzbekistan, a former Soviet republic, Zaikin and McCluskey (2013) investigate the consumer response toward a new functional food product – apples enriched with an antioxidant coating. They find that the mean respondent was willing to purchase functional apples only at a discount, even when provided with positive health information. In contrast to the coated apples in Zaikin and McCluskey (2013), Bruschi et al.'s (2015b) product had a naturally occurring functional attribute, which may have made consumers more accepting of it. Comparing Zaikin and McCluskey's (2013) results with a U.S. study of the same product (Markosyan et al., 2009), the Uzbek respondents were willing to pay less for apples with coatings that contain antioxidants (a mean discount of 6%) compared to the U.S. sample (a mean premium of 8%). In contrast to our research on first-generation GM products treated as a pure process attribute, the studies above explore consumer demand for second-generation GM products with decidedly positive nutritional attributes. And our results are correspondingly less optimistic about consumer acceptance of GM products.

On the more general topic of Russian food preferences, Honkanen and Frewer (2009) and Honkanen (2010) use survey data to examine Russian consumers' food-choice motives, consumption frequencies, health perceptions, and attitudes. Both studies suggest that sensory motives are the most important factors in food choice, followed by availability, naturalness, prices, consumers' moods, and state of health. The importance of "naturalness" suggests that Russians are unlikely to embrace GM foods. Russian consumers often cite food quality and health as a major factor influencing their food choices (Bruschi et al., 2015a). Popova et al. (2010) found that Russian consumers have doubts as to whether authorities can protect consumers from food risks. Using survey data, Bruschi et al. (2015a) study Russian consumer preferences for organic foods. Their results indicate that Russian consumers who purchase organic foods are mainly motivated by personal wellbeing and less by social or environmental concerns. Staudigel and Schröck (2015) estimate Russian food demand elasticities over time and across consumer segments, but their analysis is highly aggregated and does not

¹ See Lusk (2003) for a detailed explanation of the merits and drawbacks of the CV approach.

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