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Analysis

Effect of distance of transportation on willingness to pay for food

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ABSTRACT

Consumers' interest in locally produced foods is increasing. Hence, there is a need to decipher and quantify consumers' desire for local foods and understand the underlying causes of this demand. More specifically, we examine in this paper the issue of distance of transportation and its' impact on consumer preferences. We investigate how consumers' willingness to pay (WTP) for food varies with the distance the food traveled. Results from non-hypothetical second-price auctions indicate that average WTP is falling in distance traveled, indicating a preference for local production. Results also indicate that the marginal value of a mile traveled depends on the type of food studied (apples vs. wine). Socio-demographic characteristics, perceptions of freshness, taste and food safety, as well as support of local economy impact WTP for local foods.

1. Introduction

Consumers are increasingly showing interest in foods that are locally produced (Carpio and Isengildina-Massa, 2009). Consequently, some foods are increasingly marketed as "locally grown" (Darby et al., 2008). But, how much do consumers really want *local foods* and why are these products desired? In this paper, we seek to answer these questions by investigating 1) how consumers' willingness to pay (WTP) for food varies by the number of miles the food traveled, and 2) the drivers of consumer preferences towards food miles. Several previous authors have studied various topics related to consumers' preferences and WTP for local food (e.g., Jekanowski et al., 2000); local food in comparison with other attributes such as organic and GMO (genetically modified organism)-free (Loureiro and Hine, 2002) as well as estimates of price premiums for low vs. high-end local specialty goods (Giraud et al., 2005). Some studies have been conducted on consumer motives for preferring local foods, focusing primarily on qualitative assessments of consumer behavior (e.g. Zepeda and Deal, 2009). Overall, previous research has shown that preferences for sustainable foods, local foods, farmers markets and food miles are affected by consumers' health concerns, support of local farmers and producers, environmental concerns, perceived social influences, consumer effectiveness and availability, entertainment value, and positive emotions (Onozaka et al., 2010; Sirieix et al., 2008; Stringer and Umberger, 2008; Thilmany et al., 2008; Toler et al., 2009; Vermeir and Verbeke, 2008).

Our study design differs from previous research in that we do not use the term "local food" or the generic term "food miles" in the product description with consumers when measuring WTP. On the contrary, we elicit consumer WTP for food that has traveled specific distances ("distance of transportation") using non-hypothetical experimental auctions involving real food and real money.[1] At the same time we collect information regarding participants' attitudes, beliefs, and socio-demographics. Our approach allows us to first measure preferences towards food miles directly and secondly, to analyze the determinants of their WTP for food miles. Hence, we contribute to the literature by not only estimating WTP for local food but also by constructing an experimental design that can uncover the underlying motives for doing so. Furthermore, we are able to explicitly answer the question on whether WTP differs depending on the distance of transportation.

While there are a number of studies on country-of-origin labeling, much less is known about consumer preferences regarding distance of transportation. Distance of transportation has several impacts

Abbreviations: WTP, Willingness to pay.

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[1] Note: Though we don't use the words "local" and "food miles" in the experimental description we still use it in the manuscript for expositional convenience.

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that can be related for example to freshness, the environment, taste, health and local economy. Therefore, a food miles label is different from labeling origin alone (of course, consumers may attribute different qualities to a country, e.g., Italian olive oil is preferred because of fond memories of a vacation to Tuscany; or a preference for French cheese resulting from the country's quality reputation). Hence, providing additional information on distance of transportation might be of value for consumers, whether as a standalone label or in relation to origin labeling.

In this study, we collected data on WTP for foods differing by distance of transportation using non-hypothetical second price auctions in Germany. The study also included questionnaires eliciting socio-demographics and perceptions and attitudes about freshness, the environment, safety, etc. The WTP data were analyzed to investigate why certain consumer segments are willing to pay a premium for shorter transportation distance.

In the following section, we provide background information on food miles and local food. We then describe our experimental design and empirical results. We finish the paper with some concluding remarks.

2. Previous Literature on Food Miles and Local Food

Following Hill (2008), the term 'food miles' refers to the distance food travels from the location where it is grown to the location where it is consumed. This distance has been steadily increasing over the last fifty years (Hill, 2008). Processed food in the US travels more than 1300 miles on average while fresh produce travels over 1500 miles before being consumed. For example, the distance that local apples travel in Iowa is 61 miles while conventional apples travel about 1726 miles (Pirog, 2004).[2] Several studies have investigated whether consumers prefer local food and whether they are willing to pay a premium for locally produced food. For instance, Jekanowski et al. (2000) showed that 60% of Indiana, USA, customers indicated that they were very likely to consume local food while Carpio and Isengildina-Massa (2009) found that South Carolina, USA, consumers are willing to pay average premiums of 27% for local produce and 23% for local animal products.

For food purists, "local" is the new ideal because it promises healthiness for the body and the planet (Cloud, 2007). The "buy local" food movement argues that locally produced food is not only fresher, has a higher nutrient value and is better tasting, but it is also better for the environment due to shorter distances of transportation and less energy usage during production and transport. In this regard, the local food movement refers to food miles not only based on the distance food has traveled from production to consumption but also on the environmental impact of the product (Desrochers and Shimizu, 2008). For example, increasing food miles may lead to higher usage of fossil fuels that are required for transport. This in turn leads to the emission of greenhouse gasses, which contribute to global warming (Hill, 2008). There is some debate on the extent to which buying products based solely on the criteria of miles traveled is actually a good indicator of environmental impact, given that many studies show that distance traveled is actually a poor indicator of total environmental impact (e.g., see Coley et al., 2009; Mason et al., 2002; Teisl, 2011). Nevertheless, the point remains that local foods are often promoted on the basis that they are better for the environment.

Local foods are promoted on other grounds too such as freshness and quality. Brown's (2003) survey shows that for fresh produce, quality and freshness were most important to consumers. These consumers also considered fresh produce at farmers' markets to be of higher quality and lower price. Pirog (2002, 2004) and Zumwalt (2001) also found that many consumers are interested in local foods because of the perceived benefits of freshness, stronger/great taste and high(er) quality. Meyer and Sauter (2004) argue that in addition to freshness and health, another reason why consumers buy local foods is trust on these products due to more visible and safer supply chains. Henseleit et al. (2007) find that for German consumers perceived higher food safety of regional products is a significant and important factor when purchasing local food. Hence, given these past findings, we test whether the consumers perceive that local apples/wine is fresher, has a better taste and is also better for the environment, and whether these perceptions relate to WTP in order to better understand the underlying causes of the demand for local foods/distance of transportation.

Other advertised advantages of local food are improvement of the economic situation of (especially small scale) farmers and rural communities (Desrochers and Shimizu, 2008). It has been suggested that localized food systems improve environmental sustainability and bring higher efficiency and economies of scale, and raise consumer benefits and social welfare (Curtis, 2003; Meyer and Sauter, 2004). Many consumers also buy local foods so that they can help support family farmers and help the local economy (Chinnakonda and Telford, 2007). Several studies, however, have questioned these purported economic benefits of local foods (e.g., Desrochers and Shimizu, 2012; Lusk and Norwood, 2011). To address this issue, we investigate whether consumers who hold the view that it is important to support the local economy are more likely to purchase food that traveled less miles.

Another issue addressed in this study is the value of a food-mile label itself aside from the actual distance traveled (i.e., what is the value of knowing distance traveled?). In a stated preference survey in the UK, Kemp et al. (2010) find that about 22% of participants would stop buying products from New Zealand if 'food miles' or 'the long distance it travels' were labeled. In a survey on consumers' desire for additional information on food labels, 64% of consumers indicated that they were very interested in additional information regarding country of origin, 45% said they were very interested in locally grown food, and 40% indicated being very interested in information regarding state grown food (Hallman and Aquino, 2005).

Overall, the literature supports the notion that consumers are willing to pay premiums for local food products and that this value varies by country/state and by product. Hence, there is a need to examine consumers' WTP for different types of products and the reasons for possible differences in the WTP values.

3. Methods

To address our research questions, we conducted an experiment with randomly selected consumers in fall 2009 in Bonn, Germany. Participants were recruited by a recruitment company from the area according to a quota system to have a sample that is comparable to the socio-demographics of Germany. Hence, the sample consists of a diverse group of respondents. Respondents were paid 25€ to participate in the survey, which took place in the facilities of the University of Bonn, Germany. Participants were invited over the course of a week in groups of 9 to 10. The sample is characterized by a slightly higher share of female participants (64%) than men, which is appropriate given our focus in food purchases. The average age of participants is 43 years with the youngest being 19 and the oldest being 73. Average household size is two. About 22% of the respondents have children under the age of 12 years in their household. The sample is characterized by a relatively high education level. Average monthly income is 2146€. The sample is generally representative of the population of Germany, with the exception of the over-representation of young and highly educated consumers.

Respondents participated in second price Vickrey auctions to determine the WTP for apples and wine differing in the distance of transportation/miles traveled. They also completed a questionnaire

[2] For a discussion of the definition of local food see also Hand and Martinez, 2010.