Ecological Economics 130 (2016) 232–242

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

Some vegetarians spend less money on food, others don't

Jayson L. Lusk, F. Bailey Norwood *

Department of Agricultural Economics, Oklahoma State University, United States

ARTICLE INFO

Article history:
Received 20 July 2015
Received in revised form 16 June 2016
Accepted 20 July 2016
Available online 9 August 2016

Keywords:
Vegetarianism
Veganism
Food costs
Food preferences

ABSTRACT

Vegetarianism is often promoted as a more ethical and less expensive diet. This study tests whether vegetarians do indeed spend less on food. A large U.S. internet survey consisting of 24,537 respondents is used to determine whether the self-reported food expenditures for vegetarians are different from their meat eating counterparts. Compared to meat eaters, results show that "true" vegetarians do indeed report lower food expenditures. They spend less partly due to the foods they eat and partly due to different demographics. We also find that some individuals self-identify as vegetarians even though they sometimes eat or buy meat, and this category of consumer spends more money on food than meat eaters. This demonstrates that there are at least two different types of self-identified vegetarians.

1. Introduction

Becoming a vegetarian or vegan in the West is largely a matter of personal choice, and not a cultural tradition as it is in many eastern cultures (Ruby, 2012). Reasons for abstaining from meat vary across people and largely involve personal taste, health, animal welfare, sub-culture identity, and environmental considerations (Beardsworth and Keil, 1992; Fox and Ward, 2008a; Kenyon and Barker, 1998; Krizmanic, 1992; Povey et al., 2001; Rozin et al., 1997; Vegan Society, 2015). Although animal welfare differs across species, many consumers view industries like the pork and egg sector as providing low animal welfare (Norwood and Lusk, 2011), and some see livestock production itself as unacceptable, leading some to eschew animal-derived foods for ethical reasons (Jabs et al., 1998). Another ethical motivation concerns climate change, as studies find that vegetarian and vegan diets have lower carbon footprints (Bajželj et al., 2014; Berners-Lee et al., 2012; Fiala, 2008, 2009; Hedenus et al., 2013; Popp et al., 2010; Scarborough et al., 2014; Sabate and Soret, 2014; Soret et al., 2014; Stehfest et al., 2009; Tilman and Clark, 2014; Vieux, et al., 2012).[1] Vegetarian diets viewed by some experts as being healthier than diets containing animal-derived products (Sabate, 2003; Leenders et al., 2013; Venderley and Campbell, 2006; Watson and Linda, 2013), so much so that some New York doctors actually prescribe fruits and vegetables to overweight patients (O'Marra, 2013). As individuals orient their diet to match their ethical beliefs and health goals, vegetarianism can become a part of one's identity (Fox and Ward, 2008b) and can result in vegetarian subcultures (Larsson et al., 2003).

Periodically the issue of cost arises. Although food costs are rarely listed as the prime motivation for becoming a vegetarian, the environmental impacts are, and studies have shown that the two items are related. Of the many varieties of vegetarianism, an economic vegetarian is one who shuns meat because it is more expensive, and the person seeks a more austere life. This was the motivation for Christians centuries ago, when they would avoid meat on religious holidays (Montanari, 1996). Some people have argued that they save money by participating in Meatless Mondays (Troutman, 2014), and others reached similar conclusions by studying hypothetical meals (Hadley, 2010), but that doesn't mean the average person would save likewise. Berners-Lee et al. (2012) estimated that vegans save 14% on their grocery store purchases relative to meat eaters, but that estimate is not based on individual data, but an amalgamation of several datasets and various assumptions about how UK eating habits mimic those of the US. Lusk and Bailey Norwood (2009) also conclude that some types of plant-based sources of food are less expensive, but they considered only major commodity crops like corn, wheat, soybeans, and peanuts—not the specific meals that vegetarians and their counterparts actually eat.

Only one study (to our knowledge) has analyzed food expenditures at the individual level for those who are and are not vegetarians. Using a survey of 1600 Canadians, data were collected on vegetarian status (lacto-ovo vegetarians, to be specific) and self-reported monthly food expenditures. Results showed that, contrary to previous studies, vegetarians actually spent more money on food (Guillemette and Cranfield, 2012). Though the respondents were Canadian it seems likely their eating habits are mirrored by US citizens and perhaps UK consumers as well. One of the challenges with these sorts of studies (one that we rectify here) is that, given the small percentage of vegetarians in the

* Corresponding author.
E-mail address: bailey.norwood@okstate.edu (F.B. Norwood).

[1] Note that the term 'carbon footprint' refers to the emission of all greenhouse gases, stated in carbon-equivalent units.

http://dx.doi.org/10.1016/j.ecolecon.2016.07.005
0921-8009/

population, it is difficult to attain a large enough sample to make meaningful, robust inferences.

Given these conflicting conclusions about the relationship between vegetarianism and food expenditures, more studies are needed to better understand the implications of a move toward vegetarian diets. The implications of the dietary costs of vegetarians goes beyond the impacts on one's wallet—it will help determine the carbon footprint of meat, dairy, and eggs. If a vegetarian spends less on food, what do they do with their remaining income? And do those other purchases have higher or lower carbon impacts? If vegetarian diets have both a lower carbon footprint and a lower price-tag, then one cannot really determine the carbon impact of becoming a vegetarian without accounting for how those food savings are spent. If vegetarians spend 15% less on food but use those savings on a plane flight, then their overall carbon footprint might rise. Indeed, Grabs (2015), who labels this a "rebound effect", found that half of the carbon footprint reduction attributable to a vegetarian diet actually disappeared after accounting for the carbon effects of the remaining expenditures. Like Berners-Lee, Grabs infers the expenditure patterns of vegetarians using an amalgamated dataset using inferred (rather than observed) prices paid by each individual, where US data on the differences between the diets of vegetarians and omnivores based on Haddad and Tanzman (2003) is assumed to hold true for Swedish citizens.

Even if the cost of food isn't a prime reason typically given to adopt vegetarianism, environmental impacts are, and what Grabs shows is that the two items are related. A better understanding on the relationship between vegetarian diets and food expenditures is thus warranted not just because it helps us understand the monetary consequences of altering our diets, but the environmental consequences as well.

2. Data and Methods

This study measures self-reported expenditures on food at home and away from home for vegetarian and non-vegetarian Americans in a large sample from a US internet survey. We assemble what we believe to be one of the largest and most representative data sets that exists for such a comparison. In addition to asking about self-reported vegetarian status, the survey also includes a set of choice-experiment questions asking people which of several food products they would buy at different prices. Some of the self-reported vegetarians chose meat in this exercise, allowing us to construct measures for two types of vegetarians: those who do and those who do not purchase meat, as some vegetarians may purchase food for non-vegetarian members of their household.

In addition to exploring the impact of vegetarian status, the data reveal that vegetarians and meat eaters are different types of people, described by different demographics, and many of these demographics do not and could not change as an individual transforms her diet. This suggests that instead of just comparing the food expenditures of vegetarians and meat eaters, statistical methods should be used to estimate the change in food expenditures when becoming a vegetarian, holding demographics constant. However, some demographics can and might change for an individual as their diets change. Vegetarians tend to have a smaller body mass index and are more politically liberal, so statistical methods are also used to identify the monetary consequences of becoming a vegetarian holding every demographic constant except body mass index and political attitudes.

Each month Oklahoma State University conducts a survey on consumers called Food Demand Survey (FooDS). Its primary purpose is to track awareness, concern, and consumer preferences for various foods and food issues, with a particular interest in meat demand. Administered online, it surveys at least 1000 different individuals every month, chosen to be representative of the U.S. in terms of certain demographics (FooDS, 2015; Lusk and Murray, 2014). For example, the respondents are selected to contain approximately half of each gender, to be around 17% over the age of 65, and to be about 77% white, in order to match the demographics of the U.S. population. Other survey demographics closely mimicking the U.S. population are income, other age groups, other ethnicities, education level, regional location, and household size (Lusk and Tonsor, 2015).

The FooDS survey can also be used to assess the cost of vegetarian and non-vegetarian diets. It asks respondents, "Are you a vegetarian or vegan?" This allows us to sort individuals according to whether they belong to a vegetarian/vegan category. Studies show that 3–6% of Americans are vegetarians and 1–2% define themselves as vegans (Newport, 2012; Stahler, 2009; Vegetarian Journal, 2003). This category can thus be thought of a representative person, who is about two-thirds vegetarian and one-third vegan. To prevent verbosity, the vegetarian/vegan category is shortened to simply "vegetarian".

It is not unusual for some respondents to say they are vegetarians but to also say they sometimes eat or purchase meat (Dietz et al., 1995). Haddan and Tanzman (2003) report that 2.5% of their sample self-identified as vegetarians, but when they exclude individuals who also reported eating meat, the percentage falls to 0.9%. Self-reported vegetarians do tend to eat less red meat and chicken than their counterparts, Haddan and Tanzman find, but they eat more fish, and so if self-reported vegetarians are found to pay higher food costs it could be because they eat a more expensive meat.

Part of the FooDS survey includes some hypothetical choice experiment questions, where individuals evaluate several different meat and non-meat options at different prices and indicate the one product they are most likely to purchase. A "true" or consistent vegetarian would not only self-identify as a vegetarian but would also select non-meat options or the "none" option in the choice experiments. These individuals are placed in the group *true* vegetarian, whereas one who self-identifies as vegetarian but choose meat products in the choice experiments is assigned the group *partial* vegetarian. Separate statistical analyses are conducted for true and partial vegetarians.

Our data set consists of a total of 24,537 respondents who participated in FooDS over the two year period from May 2013 to May 2015. Of the total, 733 respondents (or about 3%) are partial vegetarians and 541 (or about 2.2%) are true vegetarians.

Respondents are also asked to estimate their average weekly food expenditures, separately for food at home and away from home, using similar language that the Bureau of Labor Statistics uses in its Consumer Expenditure Survey. Individuals are given a list of ranges and asked to select the one range that contains their grocery store purchases, and then in a different question the range containing food purchased elsewhere. All survey questions relevant to this article are shown in Appendix A, but the expenditure question is shown below in Fig. 1.

These are self-reported data, and such data likely to suffer from recall bias and social desirability bias. Self-reported data on people's eating behaviors in particular are known to contain error, as people often under-report the amount of food they consume in certain categories (Bopp, 2015). With these weaknesses are some advantages. The expenditure data are not an amalgamation of different datasets as in most studies, but data on actual individuals as reported by the individual, and so long as the recall and social desirability bias are roughly the same for vegetarians and their counterparts, the two biases will not affect estimates of how switching to a vegetarian diet impacts food costs.

By providing information on the range of food expenditures for food purchased in grocery stores and food purchased elsewhere, the respondents provide a lower- and upper-bound for total food expenditures which can be used in an interval-censored model. First they indicate expenses for grocery store shopping (M_S), and then all other purchases (M_O). This means that total food expenses for individual i is $M_i = M_{i,S} + M_{i,O}$. They do not provide a point-estimate of $M_{i,S}$, but a lower and upper bound, denoted ($L_{i,S}$) and upper-bound ($H_{i,S}$). Note that if they select the first category then $L_{i,S}$ equals zero and if they select the last category then $H_{i,S}$ equals infinity. Similar bounds are provided for other food expenses and are denoted $L_{i,O}$ and $H_{i,O}$.