Food Quality and Preference 65 (2018) 101–109

Contents lists available at ScienceDirect

Food Quality and Preference

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

Is fish worth more than meat? – How consumers' beliefs about health and nutrition affect their willingness to pay more for fish than meat

L. Emilio Morales[a,*], Angie Higuchi[b]

[a] UNE Business School, University of New England, Armidale, Australia
[b] Department of Management, Universidad del Pacífico, Lima, Peru

ARTICLE INFO

Keywords:
Fish consumption
Willingness to pay extra
Consumers' beliefs
Health campaigns
Zero-inflated negative binomial

ABSTRACT

Scientific research has demonstrated that fish consumption has positive effects on human health. Consequently, governments have invested resources to promote fish consumption, but does this investment changed consumer preferences so they are willing to pay more for fish than meat? Consumer survey data collected in Modern Metropolitan Lima, Peru, were analyzed to assess the influence of selected variables on consumers' willingness to pay extra for fish over beef, chicken and pork. The results demonstrate that females, older and more educated respondents are more likely to be unwilling to pay premiums for fish respect to meat. In addition, belief factors do not affect the odds of being unwilling to pay more for fish in preference to meat. Household income and years of education are statistically significant variables increasing the willingness to pay more for fish than meat. In contrast, household size reduces the amount consumers could pay extra for fish. A taste preference for fish has a positive effect on the propensity to pay higher prices for fish than meat. Finally, the beliefs that fish is healthy and nutritious for the family positively affect the willingness to pay more for fish than other meats studied. These findings support the use of campaigns to promote fish consumption and suggest that additional information about the health benefits for the family and nutrition derived from eating fish could affect consumers' preferences, and ultimately their willingness to pay.

1. Introduction

Several scientific studies have confirmed positive effects of regular fish and other seafood consumption on human health, including Mozaffarian and Rimm (2006), Sioen, Matthys, Backer, Van Camp, and De Henauw (2007) and Pieniank, Verbeke, and Scholderer (2010). The main benefits of fish intake reported, apart from being a source of protein, are a reduction in the risk of sudden cardiac death (Albert et al., 1998), a decrease in the incidence of cardiovascular disease (Kris-Etherton, Harris, & Appel, 2002) and high blood pressure (Chrysohoou et al., 2007), a decrease in the incidence of depressive symptoms (Tanskanen et al., 2001) and Alzheimer's disease (Morris et al., 2003). In contrast, meat consumption, an alternative source of protein, has been correlated with several health risks, including diabetes mellitus type 2 (Micha, Wallace, & Mozaffarian, 2010; Song, Manson, Buring, & Liu, 2004), coronary heart disease and stroke (McAfee et al., 2010; Micha et al., 2010), colorectal cancer (Chao et al., 2005; McAfee et al., 2010) and other types of cancer (McAfee et al., 2010).

The World Health Organization (WHO) (2015) indicated that "unsaturated fats found in fish, avocado, nuts, sunflower, canola and olive oils, are preferable to saturated fats found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard". Supporting this view, a previous report developed by the Food and Agriculture Organization of the United Nations (FAO) and WHO (2011) recommended that member states promote fish consumption. Strong evidence of the positive effects of eating fish regularly on human health has led several governments to develop campaigns to promote regular fish intake.

Consumers' beliefs about the health benefits derived from consuming particular foods can result in the sacrifice of flavor, and such beliefs have the strongest impact on willingness to compromise on taste (Trondsen, Braaten, Lund, & Eggen, 2004). Olsen (2003) and Trondsen et al. (2004) found that consumer preferences and seafood consumption are determined by lifestyle and environmental influences. In addition, consumer health and nutritional knowledge is an important determinant of fish consumption (Pieniank et al., 2010; Trondsen et al., 2004), as are taste preferences, convenience and price (Olsen, 2003; Olsen, Scholderer, Brunsø, & Verbeke, 2007).

Previous research has investigated the influence of consumers' socio-demographic characteristics, food involvement, food-health beliefs, food motives and lifestyle on seafood consumption, including

* Corresponding author.
E-mail addresses: emilio.morales@une.edu.au (L.E. Morales), a.higuchi@up.edu.pe (A. Higuchi).

https://doi.org/10.1016/j.foodqual.2017.11.004
Received 5 April 2017; Received in revised form 18 November 2017; Accepted 19 November 2017
Available online 21 November 2017
0950-3293/

Myrland, Trondsen, Johnston, and Lund (2000), Olsen (2003), Trondsen et al. (2004), Verbeke, Vermeir, and Brunsø (2007), Sveinsdóttir et al. (2009), Carrillo, Varela, Salvador, and Fiszman (2011), Gaviglio, Demartini, Mauracher, and Pirani (2014), Carlucci et al. (2015), and Thong and Solgaard (2017), among others. In addition, Thong, Haider, Solgaard, Ravn-Jonsen, and Roth (2015) determined willingness to pay for quality attributes of fresh food, though not with respect to alternative food products. Because consumer beliefs about positive health effects of eating fish play a critical role in its consumption, it is expected that promotional campaigns can modify existing beliefs about the benefits of eating fish, and encourage a more regular intake. However, there is no evidence that consumers are willing to pay more for fresh fish as a healthier alternative than meat.

The objective of this study is to assess the impact of various determinants, in particular consumer beliefs about health and nutrition, on willingness to pay more for fish than meat. This research, focused on a case study undertaken in Modern Metropolitan Lima, Peru, provides valuable insights for government investment in campaigns aimed at modifying consumers' perception about fish, highlighting its contribution to a healthy diet, to promote an increase in its consumption and frequency of intake.

The rest of this paper is organized as follows: Section 2 provides a brief outline of the determinants influencing fish consumption, including consumers' beliefs and government policies to promote fish intake. The data and the econometric model used in this study are then described in Section 3. The main results of the factor analysis of beliefs and the willingness to pay extra models for fish compared to beef, chicken and pork are presented in Section 4. Finally, the discussion and conclusions are contained in Section 5.

2. Fish consumption determinants and food policies

Although fish has been promoted as a healthy food and an important source of nutrients (Gaviglio et al., 2014), studies by the FAO (2012, 2016), showed the consumption of meat worldwide slightly increased from 42.5 kg in 2010 to 43.4 kg per capita in 2016, which is more than double the global fish consumption per capita. In contrast, the studies found that, as a result of strong supply and demand, record haul levels and reduced wastage, fish consumption increased from 18.6 to 20.6 kg per capita between 2010 and 2016.

Food preferences are affected by several factors, including product properties, influences of the environment and consumer characteristics (Froehlich, Carlberg, & Ward, 2009; Furst, Connors, Bisogni, Sobal, & Falk, 1996). Consumers assess several attributes of food products when determining their appeal, such as sensory characteristics, nutritional value, convenience and the impact on the consumer's health (Hanson, Herrmann, & Dunn, 1995; Muñoz, 1998). Olsen (2003), Niva (2007) and Pieniak, Verbeke, Scholderer, and Brunso (2008) confirmed that product health benefits are a key consumer preference determinant. Additionally, Olsen (2003) and Can, Günlü, and Can (2015) found that psychological and socio-demographic factors also affect seafood consumption. Thong and Solgaard (2017) concurred with these effects, reporting that high income and elderly consumers are more likely to choose fish and other seafood products frequently, compared to young people and those with a low income.

Interestingly, consumers motivated by healthy eating may choose chicken and other nutritional food as alternatives to seafood (Olsen, 2004). For example, in Cameroon, where fish is cheaper than chicken, some consumers pay more for chicken than for fish (Tambi, 2001), indicating that a high income provides greater overall discretion in choice. In their study, Thong and Solgaard (2017) found evidence that convenience-oriented consumers and those who live alone or have a large family eat seafood less regularly, while weight control-oriented consumers and those with high incomes eat seafood more regularly. Moreover, attitudes, involvement in healthy eating, and perceived convenience are also relevant predictors of seafood consumption frequency (Bredahl & Grunert, 1997; Carlucci et al., 2015; Olsen, 2003; Verbeke et al., 2007). Age is also a relevant determinant of seafood consumption behavior, where older consumers exhibit a higher seafood intake, as they are more health conscious than younger consumers (Olsen, 2003). Furthermore, Myrland et al. (2000) found that a healthy lifestyle also positively affects seafood consumption. Finally, Verbeke and Vackier (2005) and Gaviglio et al. (2014) reported that consumers' beliefs with respect to different fish species/types for sale have an important effect on fish consumption, while Thong et al. (2015) found differences in consumers' willingness to pay for quality attributes of fresh seafood.

Following the recommendations of the FAO and WHO (2011), several governments have introduced policies aimed at modifying consumers' beliefs about fish consumption to encourage an increase in its intake. In the last couple of decades, Peru has implemented food policies to promote regular direct human consumption of fish because of its health benefits. The Peruvian Government initiated a program to increase domestic anchovy consumption in the late 2000 s, which included subsidies and the distribution of anchovy surimi and hot dogs in primary schools via the National Program of Food Assistance (PRONAA). Half of the canned anchovy consumed was subsidized by the PRONAA project (Fréon et al., 2014). In addition, an "anchovy week" initiative encouraged the preparation and consumption of anchovy in public places and restaurants, and educated consumers about its high nutritional value.

Currently, the Peruvian Government's Ministry of Production is carrying out a program called "A comer pescado" (let's eat fish), which aims to stimulate production and raise regular fish consumption (Peruvian Government, 2017). These efforts have contributed to an increase in the intake of fish and other seafood, which in 2014 reached 15.4 kg of fish and seafood. However, this level remained lower than the amount of chicken consumed in that year, which reached 22.2 kg per person (Peruvian Government, 2015). According to Avadí and Fréon (2014), this was due to the competitive price of chicken, its lower perishability and more efficient distribution that made it preferable to other meat and fish. In contrast, beef consumption per person is around 5.8 kg and pork consumption has been substantially lower in Peru, which during 2013 reached only 4.5 kg per person (Peruvian Government & Irrigation., 2013). At the time of our study (August 2016), the price of fresh chicken breast fillet in Lima was 12.90 Peruvian Nuevos Soles (PEN) per kilogram, making it cheaper than fillets of fresh fish (PEN16.90) and beef (PEN15.50), but still more expensive than pork at PEN10.90 per kilogram[1] (Plaza Vea, 2016).

3. Data and methods

3.1. Willingness to pay extra model

Consumers prefer products with desirable attributes, influenced by their beliefs and socio-demographic characteristics, which maximize their utility (Ladd & Suvannunt, 1976; Lancaster, 1966). Based on the utility perceived from a product, the maximum amount that a consumer could be willing to pay for it will be equal to the sum of the marginal value perceived from each attribute of the product and the influence of socio-demographic characteristics of each consumer (Fan, Brown, Kowaleski-Jones, Smith, & Zick, 2007; Froehlich et al., 2009; Loureiro & Hine, 2002; Loureiro & Umberger, 2003; Tonsor, Schroeder, Fox, & Biere, 2005):

$$WTP_i(p) = \alpha + \theta B_i + \gamma C_i + \varepsilon_i \quad (1)$$

where $WTP_i(p)$ is the willingness to pay of consumer i for a food product p; α is a constant for food product p associated with the consumer's

[1] According to the Peruvian Central Bank (Banco Central de Reserva del Peru) (2017), the average exchange rate during August 2016 was 1 USD equal to 3.333 PEN.