Quinoa quandary: Cultural tastes and nutrition in Peru

Andrew W. Stevens

Department of Agricultural Economics, Mississippi State University, United States

ARTICLE INFO

Keywords:
Quinoa
Nutrition
Price spikes
Culturally appropriate food

JEL codes:
D12
I12
O15
R22

ABSTRACT

Using a model of household food demand that incorporates regional preferences (tastes) for culturally appropriate food, I investigate whether tastes for quinoa in the Puno region of Peru reduced household nutrition intakes when quinoa prices dramatically increased between 2004 and 2012. Adapting a model from Atkin (2013) and utilizing data from a national Peruvian household survey (ENAHO), I am able to deconstruct regional changes in household nutrition over time into several general equilibrium effects; in particular, I isolate the effect of regional tastes for quinoa on nutrition outcomes. This effect is identified by an exogenous spike in quinoa prices driven by international demand for quinoa. While I find evidence that regional tastes for quinoa do exist in the Puno region, these tastes do not have a statistically significant impact on nutrition outcomes. My results lend support to the conjecture that tastes for culturally appropriate food do not meaningfully affect household nutrition if the food in question is a sufficiently small component of a household’s overall diet.

1. Introduction

In March 2011, the New York Times published an article titled Quinoa’s Global Success Creates Quandary at Home.¹ The article chronicles the rising popularity of quinoa – a native Andean grain high in protein – in the United States and Europe. This increasing international demand has driven up the price of quinoa over the past decade, and questions have arisen about how this price increase is affecting quinoa-growing communities in Peru, Bolivia, and Ecuador.² The New York Times article notes that while incomes are increasing for quinoa farmers, fewer and fewer native Andeans are able to afford quinoa at its current prices. The authors claim that rising quinoa prices are “hastening [Andeans’] embrace of cheaper, processed foods and raising fears of malnutrition.” Some anthropologists have expressed similar sentiments (Brett, 2010). In the time since the New York Times article was published, several other popular press articles have debated whether or not rising global demand for quinoa is good or bad for Andeans, and whether rising quinoa prices are exacerbating or ameliorating malnutrition among Andean communities (Friedman-Rudovsky, 2012; Blythman, 2013; Verner, 2013; DePillis, 2013; Aubrey, 2013).³ In this paper, I provide empirical evidence to address the latter question.

There are two primary pathways through which rising quinoa prices could lower household nutrition. The first is the idea that as quinoa prices rise, households may substitute away from quinoa to other less nutritious foods. The second pathway is more complicated: if households have a strong cultural preference to consume quinoa, then as quinoa prices rise, households may reduce their consumption of other cheap, nutrient-dense foods to pay for their continued quinoa consumption. This pathway is consistent with the story that quinoa is historically and culturally important to Andean communities. In this paper, I account for both pathways, but focus on the second. I aim to answer the specific question: between 2004 and 2012, how did regional cultural tastes for quinoa impact household nutrition in Puno – the primary quinoa-producing region of Peru?

¹ I would like to thank Max Auflhammer, Alain de Janvry, Thibault Fally, Larry Karp, Ethan Ligon, Elisabeth Sadoulet, Sofia Villas-Boas, my colleagues at UC Berkeley, and seminar participants at UC Davis, Columbia University, and USDA-ERS for feedback. I am grateful for helpful suggestions from Marc Bellemare and two anonymous referees. Lastly, I would like to thank James Gillan for sparking my interest in this topic. Any remaining errors are my own.
² Address: Department of Agricultural Economics, Mississippi State University, P.O. Box 5187, Mississippi State, MS 39762, United States.
4 Peru, Bolivia, and Ecuador are the only countries in the world that produce significant quantities of quinoa, according to the Food and Agriculture Organization of the United Nations (2014). Peru and Bolivia together produce over 92% of the world’s supply. Quinoa is grown at high altitudes in the Andes mountains and has found limited agronomic success elsewhere in the world. Small amounts of the crop are grown in the United States and Canada, but the quantities are insignificant.
5 In one particularly emphatic article from The Guardian, Joanna Blythman writes: “The appetite of [rich countries] for this grain has pushed up prices to such an extent that poorer people in Peru and Bolivia, for whom it was once a nourishing staple food, can no longer afford to eat it. Imported junk food is cheaper…In fact, the quinoa trade is yet another troubling example of a damaging north-south exchange, with well-intentioned health and ethics-led consumers here unwittingly driving poverty there. It’s beginning to look like a cautionary tale of how a focus on exporting premium foods can damage the producer country’s food security” (Blythman, 2013).
The fundamental challenge in answering this question is being able to account for general equilibrium effects as food prices and household incomes change simultaneously over time. To adequately analyze the problem, I require three things: (i) a model of food demand and household nutrition intake that accounts for both regional cultural food preferences and general equilibrium effects, (ii) fine-scale household-level food consumption and demographic data, and (iii) a source of exogenous price variation to identify how regional tastes for quinoa affect household nutrition. To satisfy my first requirement, I employ a model of food demand adapted from Atkin (2013) that includes regional taste measures. To satisfy my second requirement, I make use of a national household survey conducted annually by the Peruvian government. Finally, to satisfy my third requirement, I show that the rise in Peruvian quinoa prices between 2004 and 2012 was driven by an exogenous spike in international demand for quinoa and constitutes an exogenous price shock to Peruvian households.

Beyond the specific case of quinoa, this paper addresses the larger empirical question about whether regional preferences (tastes) for historically or culturally important foods matter for nutrition outcomes. In a recent paper, Atkin (2013) argues that regional tastes for rice and wheat in different parts of India could lead to nutrition losses under trade liberalization. However, Atkin’s conclusion is based on a simulation of trade liberalization rather than on observed exogenous price changes. To my knowledge, this is the first paper to employ Atkin’s approach using exogenous price variation; I argue the increase in quinoa prices – driven by international demand – provides a natural experiment. Furthermore, in an effort to enrich the dialogue between the economics and anthropology literatures, I replace Atkin’s term “habit formed tastes” with “tastes for culturally appropriate food.” I discuss the motivation for this change while developing my model of food demand later in the paper. This paper contributes to two distinct literatures. First, it investigates the economic effects of cultural food preferences, thereby engaging the disciplines of both economics and anthropology. Second, it analyzes the impact of food price spikes on household nutrition, similar to recent work by D’Souza and Jollife (2014) and others.

While this paper focuses on the effect of quinoa prices on household nutrition, it leaves unanswered the broader question of how quinoa price fluctuations affect household welfare. Bellemare et al. (2016) address this larger question by analyzing a ten-year pseudo-panel treating household consumption as a proxy for household welfare, and carefully disentangling the effects on net producers and net consumers of quinoa. The authors find evidence that household welfare increases in areas with significant quinoa production, suggesting important general equilibrium spillover effects from higher sales prices. Taken together, the Bellemare, Fajardo-Gonzalez, and Gitter paper and this one paint a cohesive picture of the quinoa price boom in Peru and suggest that the boom was not systematically harmful to Peruvian communities when measured by either overall consumption or household nutrition.

Peru is the country of interest in this study. According to the Food and Agriculture Organization of the United Nations (2014), Peru produced over half the global supply of quinoa in 2012, followed closely by Bolivia. Within Peru, Puno – one of 25 administrative regions – produces 80% of the country’s quinoa (Ministerio de Agricultura y Riego, 2013). Fig. 1 shows a map of the Puno region within Peru. Puno the region of interest in this paper, and I expect preferences for quinoa to be stronger in Puno than in the rest of Peru.

There are many reasons to suspect that quinoa is a culturally appropriate food in the Puno region. Plentiful anthropologic evidence demonstrates that quinoa has historically been culturally and nutritionally important in the Andean highlands of Peru. Orlove (1987) writes that quinoa is one of the four most important grains in the traditional Andean diet along with barley, maize, and cañihua.4 As early as Orlove’s study in the 1980s, Andean diets were transitioning away from “traditional highland staples” such as potatoes and quinoa, and toward imported staples such as bread, noodles, and cooking oil (Orlove, 1987). This suggests that my quinoa taste measures are likely weak compared to what they would have been even two decades ago.

The remainder of this paper is organized as follows: in Section 2 I describe my data. In Section 3 I present my model of food demand with regional taste measures and list my testable predictions. In Section 4 I outline my empirical strategy. In Section 5 I present my results, and in Section 6 I conclude.

2. Data

In this paper, I utilize household data obtained from the Peruvian Encuesta Nacional de Hogares (ENAHO, National Household Survey), collected by the Instituto Nacional de Estadística e Informática (INEI, National Institute of Statistics). The INEI began implementing the current ENAHO data collection methodology in 2004, and has administered the survey annually since. I use data from the 2004 survey as a baseline, and compare them to data from the 2012 survey – the most recent data available. During the eight years between 2004 and 2012, an exogenous spike in international demand generated a severe positive shock to the price of quinoa.5 I make use of this price shock to identify the effect of tastes for a culturally appropriate food – quinoa – on household nutrition in the Puno region of Peru.

The INEI surveys approximately 22,000 households for the ENAHO each year, split roughly evenly between urban and rural areas.6 Households are selected randomly and are distributed proportionally according to population density across all 25 administrative regions of the country. Survey month is also randomly assigned. A subset of the

4 While cañihua is technically a distinct food from quinoa, it is reported as quinoa in the ENAHO data used in this study.

5 If quinoa’s dietary importance in Peruvians’ diets is falling over time, as this evidence suggests, my results will be an over-estimate of the importance to household nutrition of regional tastes for quinoa. However, since my empirical results suggest tastes for quinoa do not have a statistically significant effect on nutrition intakes, this concern actually strengthens my conclusion.

6 I present an argument for the exogeneity of this price shock in the empirics section later in this paper.

7 I drop households whose survey data was marked incomplete by the INEI. Thus, my total national sample size is 16,782 households in 2004, and 21,999 households in 2012.
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