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Green markets, eco-certification, and equilibrium fraud

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Abstract

Consumers voluntarily pay significant price premiums to acquire unobservable environmental attributes in green markets. This paper considers the performance of eco-certification policy under circumstances where consumers cannot discern environmental attributes in goods, but are able to form rational expectations regarding the extent of illicit activities in the green market. The main results are: (i) fraud is less prevalent in green markets when entry barriers limit the number of firms; (ii) conventional environmental policies on polluting techniques increase the incidence of fraud, and can even preclude the use of non-polluting techniques which would otherwise emerge in green markets; (iii) voluntary eco-certification policies can decrease fraud, increase output, and raise profits per firm; and (iv) in cases where the socially optimal resource allocation can be supported, the optimal policy involves negative unit certification fees, positive fixed certification fees and is revenue-generating for the certifying agent.

JEL classification: L13; Q58; K42

Keywords: Environmental policy; Oligopoly; Monopolistic competition; Vertical differentiation

1. Introduction

Markets for environmentally-friendly goods and services are becoming increasingly common. Eco-certification programs now govern the sale of thousands of products in more than 20 countries [18,27] and green products account for approximately 9% of all new-product introductions in the United States [13]. Consumers pay significant price premiums for organic foods, for "green electricity", for shade-grown and fair-trade coffee, and for various environmental attributes such as sustainable, recycled, non-toxic, biodegradable, and cruelty-free. One reason why consumers buy environmentally-friendly versions of products instead of cheaper, but otherwise equivalent versions is that consuming products that contain environmental attributes is gratifying. Consumers prefer environmental attributes in their products much like they prefer any other desirable product quality attribute in market goods.

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Green markets for environmental attributes are nevertheless different from other markets where product quality attributes are exchanged in two essential ways. First, consumer preferences for environmental attributes often depend on an aspect of production technology, for instance an inverse measure of pollution emissions, and this need not relate to any fungible consumptive qualities of the good. Unlike product quality attributes such as appearance, flavor and durability, which are generally revealed either pre-purchase or post-purchase, environmental attributes may never be perceived at all. This creates an opportunity for fraud in green markets that motivates third-party certification.[1] Second, the products exchanged in green markets are frequently unbranded, as when fruit and vegetables from different producers are sold under a common organic label. This makes collective reputation issues important in green markets.

This paper examines the performance of eco-certification policy in green markets with the potential for fraud. There are three key elements of the analysis: (i) consumer willingness-to-pay premiums exist for environmentally-friendly products; (ii) certification policy agglomerates firms in quality space under a common eco-label; and (iii) consumers are unable to discern environmental attributes in products, but can nonetheless form rational expectations regarding the overall extent of fraud in the market.

Considerable evidence exists that fraud indeed occurs in green markets. The use of misrepresentative labels has been documented for "GMO-free" foods [3], for "ecofish" and "antibiotic-free" meats [7], and a number of firms have faced criminal prosecution for engaging in fraudulent sales of conventional products as organic (see, e.g., [8,10,14,23]).[2] Information often also exists for consumers to form inferences on the overall quality of environmental attributes traded in green markets. A 1997 study by *Consumer Reports* detected traces of synthetic pesticides on 25% of organically-labeled tomatoes, peaches, green bell peppers, and apples [4], and the *Seattle Post-Intelligencer* recently reported a mix of 4–5% ordinary fish with environmentally sound seafood under a retailer's "ecofish" label [7].

Our analysis of fraud in green markets is framed by a vertical differentiated market structure in which a conventional good and an eco-friendly good differ according to a single, unobserved production attribute. This structure, which follows Mussa and Rosen [16], has several precursors in the literature on environmental quality provision under oligopoly. Ronnen [20] and Crampes and Hollander [5] consider minimum quality standards with a single low-quality firm and a single high-quality firm. A minimum quality standard, which forces the low-quality firm upwards in quality space, reduces the extent of product differentiation in the market, and this leads to pro-competitive effects. Amacher et al. [1] extend this framework to consider a technology investment stage. As is the case under a minimum quality standard, eco-certification policy generates socially beneficial effects by reducing product differentiation, which occurs when the low-quality firm is more efficient at investing than the high-quality firm. Here, we depart from this structure to consider two vertically differentiated *markets*—a "brown" market and a "green" market—each of which is comprised of multiple firms. Moreover, because our main focus is on collective reputation and fraud in the green market, we suppress the usual strategic duopoly interaction in vertical differentiation models by considering perfect competition among firms in the brown market.

The model also relates to the literature on common traits (see, e.g., [2,26,15]). In these models, collective reputation develops among members of a group and becomes a public good. Unobserved shocks generate informational externalities among members of the group, but these externalities disappear over time as the common trait is learned. That is, individuals develop reputations. The present paper relates to this literature in the sense that firms sharing a common eco-label develop a collective reputation; however, the element of individual reputation is notably absent. This is because firm-specific information is never revealed to consumers, even through repeated purchase.[3]

[1]Eco-certification is an important aspect of green markets, and eco-labels such as the German "Blue Angel", the U.S. "Green Seal" and the Nordic Council "White Swan" encompass broad categories of goods. Other significant eco-certification programs exist for individual products, such as "USDA Certified Organic".

[2]The founder of the nonprofit certification organization Certified Naturally Grown (CNG) states it thus: "a surprising number of USDA certified organic growers use prohibited substances on their own farms in an emergency, (and) other USDA organic growers do everything right on their own farms, but on the way to market stop by and 'top off' the truck with produce from a conventional farm" [24].

[3]This parallels the distinction made in the literature between experience goods and credence goods. For experience goods, revelation of quality attributes occurs through repeated purchase, whereas, for credence goods, both pre-purchase and post-purchase costs of determining whether or not an attribute truly exists are high (see, e.g., [6,22,19]).