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Overcoming the barriers to the market performance of green consumer goods



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ABSTRACT

Environmentally-friendly (“green”) products face a unique set of market barriers. I develop a dynamic model of observational learning and costly search wherein a green consumer product enters a market to challenge an established “dirty” product. Purchase decisions depend on price and quality differences, consumers’ willingness-to-pay to protect the environment, and the cost of obtaining information. Using both theoretical analyses and simulations, I solve for the long-term market performance of the green product. Conditions are provided for when it is socially optimal to encourage green purchases with public policy. Comparative statics predict the effectiveness of various policy tools used to improve market performance. Permanent financial incentives are shown to be more effective than informational campaigns at encouraging green purchases if the green product is inferior to the dirty substitute. Temporary financial incentives are shown to be an ineffective tool to encourage the long-term market success of any green product. Numerical market simulations are used to test and supplement the theory.

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1. Introduction

Traditional economic analysis predicts that rational consumers will not voluntarily contribute to the provision of public goods such as environmental protection. However, recent studies have shown

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that, in fact, consumers display a willingness to pay significant premiums for products that benefit the environment (Camacho-Cuena et al., 2004; Brecard et al., 2009; Garcia-Gallego and Georgantzis, 2009). This trend in consumer preferences has spurred the entrance of an increasing number of environmentally-friendly (“green”) alternatives to established products in consumer goods markets. Energy-efficient light bulbs, recycled paper and biodegradable cleaning products are just a few examples of the types of green products this paper will discuss.

Green products gain a competitive advantage from offering environmental benefits, but they also face a unique set of barriers when entering a market to compete with established “dirty” products (Bonini and Oppenheim, 2008). For instance, they are often priced significantly higher due to the higher costs of production. Consumers are also relatively uninformed about both the existence and the characteristics of entrant green products. All new products face this information barrier, but it is particularly problematic for green products. First, green products carry a stigma of lower quality with some consumers. This stigma is sometimes well deserved – the early versions of green products often perform worse than their “dirty” counterparts. Second, corporations often make misleading claims of environmental benefits. Consumers have therefore become hesitant to believe such claims. A final barrier is the high degree of consumer heterogeneity in their willingness-to-pay to protect the environment (GfK Roper Consulting, 2007; Loureiro and Lotade, 2005; Garcia-Gallego and Georgantzis, 2009), which forces green producers to target a subset of the full population.

It is often beneficial to society for green products to overcome these barriers and succeed in their markets because widespread green consumption is a substitute for costly (and politically contentious) government spending on environmental protection. It is therefore crucial that we understand what causes green consumer goods to achieve success in their markets. For instance, are financial incentives or informational campaigns more effective at encouraging green product purchases? Economists have said surprisingly little on the issue, outside of certain studies of the moral motivations or social norms that lead to green purchasing behavior (Clark et al., 2002; Nyborg et al., 2006; Stern, 1999). In this paper, I begin to fill that void by developing a simple economic model that predicts the effectiveness of various public policy options of encouraging the long-term market performance of green products.

The premise of the model is that a green consumer good enters a market to challenge an established “dirty” good. The characteristics of the established dirty product are well known, while the entrant green product’s characteristics are uncertain. A dynamic model of observational learning is used to predict the long-term market performance of the green product. Observational learning models (also known as “social learning” or “Bayesian learning” models) are often used to depict environments in which a large number of consumers sequentially make decisions whether to purchase a product with uncertain characteristics, and consumers update their perceptions of the product based on the purchase decisions of others.¹ In such situations, it has been shown that consumers will engage in inefficient “herd” behavior in which they simply copy the purchase decisions of others (Banerjee, 1992), and that this conformity of actions can occur based on a very small amount of information (Bikhchandani et al., 1992). The practical consequence of such behavior is that a large number of consumers can collectively arrive at incorrect conclusions about product characteristics, which explains why high quality products can fail and low quality products can succeed.

The critical assumption in these models is that consumers are aware and responsive to the actions of others, and various empirical studies and experiments have confirmed that this type of learning does occur in a variety of situations (Munshi, 2004; Cai et al., 2009; Anderson and Holt, 1997). The market performance of green products is an important new application to the literature on observational learning because consumers pay particularly close attention to the prevailing social norms in these markets. Indeed, a primary motivating factor of consumers’ willingness-to-pay to protect the environment is their desire to be seen either publicly or introspectively as conscientious citizens (Clark et al., 2002). Buenstorf et al. (2008) describe green purchasing behavior as a dynamic process in which consumers make choices based not on utility maximization but instead on the gradual cultural

¹ Observational learning models are sometimes referred to as a subset of the larger literature on the diffusion of technologies (Young, 2009; Geroski, 2000).

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