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EXPLORING US CONSUMERS UNDERSTANDING OF CARBON OFFSETS

Michael Jay Polonsky, Deakin University, Australia
Stacy Landreth Grau, Texas Christian University, United States
Romana Garma, Victoria University, Australia

ABSTRACT

This study found the relationship between general environment knowledge and carbon offsets knowledge is inversely related and no significant differences in general environment or carbon offset behavior exists between levels of knowledge. The findings lend support that consumers may misunderstand 'carbon offset' claims thus public policy intervention is required.

INTRODUCTION

Consumer knowledge and commitment to environmental issues has grown over the years (Ottman 1998, GfK Roper 2007). The impact of consumption by humans on the natural environment has contributed to global warming (Nisbet and Myers 2007), so consumers are increasingly considering their actions (GfK Roper Consulting 2007). Likewise, governments have developed initiatives to help curb the production of carbon by firms introducing carbon taxes and carbon trading (UN Framework Convention on Climate Change 2008, Kyoto 2008). Another initiative is the development of carbon offsets which allow firms to limit their production of carbon or allow them to offset carbon produced with carbon savings elsewhere (Ramseur 2007). Carbon offsets have become a new green marketing tool, whereby firms promote carbon offsets as 'attributes' of goods and services that includes the cost of a carbon saving programs (the offset) as an integral component of its products or as a voluntary added feature that consumers can purchase. Arguably, carbon offsets are an industry or product in their own right whereby firms' market carbon offsets to other firms or the final consumers (Ramseur, 2007).

Green marketing claims have been used to target consumers but regulators in the US and elsewhere are concerned that these claims have the potential to be misleading (Kangun and Polonsky 1995). The Federal Trade Commission (FTC) is presently reviewing the green marketing guidelines which were first developed in 1992 (Rosch 2008). These guidelines highlight the complexity of environmental claims which are often difficult, if not impossible, for consumers to assess. While the use of carbon offsets would be regulated within the FTC regulations, there has been recognition that offsets are extremely complex. Given the relative newness of carbon offsets, there is limited academic investigation as to whether consumers understand claims related to them or how consumer knowledge impacts on environmental behavior. This paper seeks to explore these issues. The following sections will briefly overview green marketing from a regulatory perspective, we then briefly overview the literature on green consumer behavior before discussing the methodology, results, discussion and implications.

A Brief Overview of US Green Marketing Regulation

The FTC environmental marketing guidelines are focused on five principles: (1) environmental claims should be able to be substantiated; (2) "open ended" environmental broad unqualified claims are generally inappropriate; (3) comparative claims must provide the basis of comparison; (4) environmental claims cannot be exaggerated; and (5) claims must also be understood by the average consumer (Rosch 2008). The evolution of our understanding of environmental problems and solutions has meant that environmental marketing practice has evolved as well, whereby firms are now discussing broader life-cycle issues associated with their activities, which takes a system-wide view of firms' environmental impacts (Rosch 2008; FTC 1999, 2000). Managed effectively, this does improve firms' environmental performance, but communicating system-wide changes to consumers may be substantially more difficult for marketers. Another environmental issue, which has also become a green marketing claim, is the concept of carbon offsets which is related to the desire to reduce carbon dioxide firms produce. Unfortunately, carbon offsets are highly complex with extensive scientific debate regarding aspects of these 'products'. These can take a number of forms (see Ramseur 2007). The use of carbon offsets as a green marketing claim has the FTC so concerned that they recently convened a one day workshop exploring the implications of their use in marketing activities (Mojaras 2008), which may result in guidelines which have already been developed in other countries such as Australia (ACCC 2008). Given the 'newness' of carbon offsets as a green marketing tool this paper seeks to explore whether consumers understand claims regarding carbon offsets and how these might impact on consumers' behavior.

Consumer Responses to Green Marketing

Extensive research exists into various aspects of consumers undertaking environmentally responsible behaviors

(Diamantopoulos, Schlegelmilch, Sinkovics and Bohlen 2003). Much of the literature examines the links between consumers' environmental knowledge and various environmental behaviors (e.g., recycling). The suggestion is that consumers who are well informed will be better able to integrate environmental considerations into their decision making. Traditional consumer behavior literature suggests that knowledge shapes attitudes that, in turn, shape behavior (Ajzen and Fishbein 1977). This framework has been used to explore aspects of environmental behaviors (Bang, Ellinger, Hadjimarcou and Traichal 2000; Kaiser, Wolfing, and Fuhrer 1999, Kalafatis, Pollard, East, and Tsogas 1999) with the foundation of the model on the direct link between consumers' level of knowledge and their actions, where those who are more knowledgeable are more likely to respond positively to environmental marketing (Pickett-Baker and Ozaki 2008, Thøgersen 2000).

Consumers' environmental knowledge has been measured differently in the literature, however, factual knowledge, where consumers undertake knowledge tests to determine how knowledgeable they are is acceptable (Maloney, Ward and Braucht 1975, Tanner and Kast 2003). Within this paper we examine consumers' factual knowledge as it identifies what consumers actually know about the environment (Maloney, Ward and Braucht 1975) and the specifics of carbon offsets. Two issues have been raised in the research relating to factual knowledge: 1) there is often scientific debate about the 'facts' in regards to environmental information (Mostafa 2007), and 2) some researchers suggest that action related knowledge is more important in driving behavior than knowing about the technicalities of environmental science (Tanner and Kast 2003). We propose that specific environmental information can be related to specific decisions rather than broad generalities (Thøgersen 2000). There is some research to suggest that consumers' level of environmental knowledge and involvement varies across issues (Roberts and Bacon 1997). Given the relative newness of carbon offsets and their complexity we propose that:

H1: There will be no correlation between the level of general environmental knowledge and carbon offset knowledge.

Research suggests that more knowledgeable consumers undertake more pro-environmental behaviors (Diamantopoulos, Schlegelmilch, Sinkovics, and Bohlen, 2003, Franj-Andres and Martinez-Salinas 2007, Kaiser, Wolfing, and Fuhrer, 1999, Maloney, Ward and Braucht 1975, Ivy, Lee and Chuan 1998, Schlegelmilch, Bohlen, Diamantopoulos 1996). However, given that consumer knowledge across areas may vary (Stone, Barnes and Montgomery 1995), it is important to consider whether different types of knowledge affect different types of behaviors as someone may not undertake the entire range of environmentally responsible behavior (Kahn 2007). As such, we explore the links between general environmental knowledge and actions, as well as specific carbon offset knowledge and actions. Therefore,

H2a: Consumers with higher levels of general environmental knowledge will undertake more general environmental behaviors.

H2b: Consumers with higher levels of carbon offset knowledge will undertake more carbon offset related behaviors.

To explore this relationship in more detail we also examine the differences in the relationship between carbon offset knowledge and behaviors for consumers who have high levels of general environmental knowledge. While it might be reasonable to assume that greater environmental knowledge results in more positive behavior, this may not be the case for carbon offsets as the concept is fairly new. Given the alternative views we propose that:

H3: For consumers with high general environmental knowledge, there will be no difference in carbon related behaviors between high and low carbon knowledgeable sub-groups.

RESEARCH DESIGN

A survey was developed to explore consumers' factual knowledge of environmental issues using Maloney, Ward and Braucht's (1978) instrument, which has been used by others in the environmental area (Fraj-Andres and Martinez-Salinas 2007, Ivy, Lee and Chuan 1998). Additional items were developed to explore consumers' knowledge of carbon offsets, as these have not been explored previously in the marketing literature. These questions were crafted based on the discussion of carbon offsets in Ramseur (2007) and an investigation into issues relating to offsets being potentially misleading (ACCC 2008). Eight items each measuring general environmental issues and carbon offsets with true/false responses were developed. Consumers with more than half of the items correct were identified as being knowledgeable (i.e. they knew more than they did not know) and those who got 50% or less correct were identified as having low knowledge.

Environmental behaviors, specifically behavioral intentions rather than actual behavior, have been extensively explored (Schlegelmilch, Bohlen and Diamantopoulos 1996, Stone, Barnes and Montgomery 1995). Our research focused on actual behavior; that is, environmental activities consumers undertook (Fraj-Andres and Martinez-Salinas 2007, GfK Roper

Consulting 2007). We included matching items on specific activities related to carbon offsets, which enabled us to directly compare similar types of activities. The three behavioral items asked how often people undertook the following activities (scale: 1 Never to 7 Always): 1) I investigate the specific details of firms' environmental claims or behavior (or the carbon offset programs offered by firms); 2) I switch brands to ones that are less environmentally harmful (or offer carbon offsets); and 3) I choose to pay more for products because they are less environmentally harmful (or they offer carbon offsets). The survey was administered by a research company to an on-line panel of consumers, over the age of 18, across the United States. We received 403 responses of which 361 were usable. The distribution between genders was balanced. Respondent ages were relatively evenly spread ranging from 10.4% for 55-65 year old group to 24.4% for the 35-44% group. Fifty-four percent of respondents were married and 41% were in households with children present. Forty-six percent had completed some form of university education, 29% had some university education and 21% were high school graduates or had some high school education. Most people worked full-time (48.6%), with the remainder working part-time (15.9%) or were unemployed (33%). The high percentage of not working represented 39.8% retired or disabled, 19.5% of these were homemakers, 9.0% indicated they were students and 6.0% unemployed.

DATA ANALYSIS

The results identified that 71.8% of respondents were highly knowledgeable about general environmental issues and 39.8% highly knowledgeable about carbon offsets. There were 29.2% of respondents who had both high general environmental knowledge and high carbon offset knowledge, with 48.3% having high general knowledge and low carbon offset knowledge. The remainder of respondents had low knowledge of general environmental issues and carbon offsets (34.0%), and 7.6% who were knowledgeable about carbon offsets but not about general knowledge about the environment (See Table 1). Given the relative newness of the concept of carbon offsets and the complexity of the programs it is not surprising that respondents were statistically less knowledgeable about carbon offsets as compared to general environmental knowledge. The correlation between the two types of knowledge was negative ($r = -0.146$) and was statistically significant ($p = 0.006$). Thus the more people knew about the environment the less knowledgeable they were about carbon offsets. Thus H1 is not supported. Therefore, being environmentally knowledgeable does not make consumers more knowledgeable about carbon offsets.

The second phase explored whether there are differences in the two types of behaviors (general environment and carbon offset) for consumers based on their level of knowledge of these issues. Cronbach's alpha (general environmental behavior $\alpha = 0.72$; and carbon related behavior $\alpha = 0.70$) suggest the variables are reliable, hence a composite measures of behavior was created. While we hypothesized that consumers with higher levels of general environmental knowledge would undertake more general environmental related behavior we found that the difference was statistically insignificant ($t = -1.42$, $p = 0.09$) for high general environmental knowledge consumers (mean=3.88, std.=1.42) as compared to low general environmental knowledge consumers (mean=3.60, std.=1.26). Thus there is no statistically significant difference in behaviors for the two groups and thus H2a is not supported. With regard to carbon offset behaviors we found that the difference in behavior between groups was also statistically insignificant ($t = 1.90$, $p = 0.24$) between those with high carbon knowledge (mean=2.90, std.=1.52) and those with low carbon knowledge (mean=3.11, std.=1.67). Thus there is no difference in carbon related behavior based on consumer's level of carbon knowledge and H2b is not supported.

The final analysis explored the sub-sample of consumers who had a high level of general environmental knowledgeable ($n = 276$) to determine if there were differences in carbon related behaviors for those who had high carbon knowledge as compared to those with low carbon knowledge. The results indicate that there is no statistical difference in carbon related behaviors ($t = 1.59$, $p = 0.30$) for those with low carbon knowledge (mean=3.15, std.=1.72) compared with high carbon offset knowledge (mean=2.81, std.=1.59), therefore H3 is supported.

CONCLUSIONS AND IMPLICATIONS

The results indicate that consumers are less knowledgeable about carbon offsets than they are about general environmental issues and the significant relationship between the two types of knowledge is negative suggesting that the greater their general knowledge, they are less knowledgeable about carbon offsets. Given the relative newness of carbon offsets, this may suggest that consumers who are environmentally knowledgeable are making assumptions about carbon offsets, which appear to be misguided. Consequently, these consumers are more likely susceptible to dubious carbon offset claims made by firms.

Environmental behavior based on levels of environmental knowledge types does not appear to be related. A possible explanation would be that all consumers may believe that the environment is an important issue and thus believe that they need to modify purchases to behave more responsibly. In the case of general environmental behavior, those with high levels

of knowledge act based on having an understanding of the issues, whereas those with low levels of knowledge simply act because they know environmental issues are 'important'. One could therefore posit that inappropriate use of green marketing would mislead those with low levels of environmental knowledge and those with high levels of knowledge would be able to discern whether claims were meaningful. As such there is still a need for general environmental marketing regulations to protect the less knowledgeable consumer. Unfortunately, in the case of carbon related behaviors there is no difference in behavior based on consumers' knowledge. Thus it appears that even high knowledge consumers may act, because they think it's the right thing to do but do not understand the underlying complexities of carbon offsets. This was even true when focusing on consumers who have high levels of general knowledge. From a theoretical perspective it may be possible that an mediating variable such as environmental attitudes or belief system may be the missing link in the relationship.

Given the complexities of carbon offsets, it may warrant special regulatory attention to prevent consumers being misled by inappropriate claims about carbon offsets, even though it is acknowledged that this may be difficult given the complexity associated with the science and variety of carbon offset programs. Consumers will have limited ability to determine whether a firm is potentially double counting its offsets or whether offsets are appropriately issued. Extensive governmental intervention, most likely across nations, may be necessary as multiple accreditation bodies would only make consumers less able to assess the integrity of these bodies. Thus a globally agreed set of standards related to carbon offsets would then allow consumers to have confidence with any third party accreditation body. This is dependent on some general agreement of what constitutes an appropriate carbon offset program, which would require extensive global consultative processes before an acceptable standard could be developed. If such agreement can be reached certification then will enable consumers to have confidence in issues which will have exceptionally low credence value. Thus, this is one area where regulation of claims may be highly valuable, as these organizations will be able to determine the 'real' effect of a given carbon claim and verify its veracity for consumers.

Table 1: Knowledge Levels of Consumers

		General Knowledge		Total
		Low	High	
Carbon Offset Knowledge	Low	53 (14.9%)	172(48.3%)	225 (63.2%)
	High	27 (7.6%)	104 (29.2%)	131 (36.8%)
Total		80 (22.5%)	276 (77%)	356 (100%)

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