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Assessing a voluntary environmental initiative in the developing world: The Costa Rican Certification for Sustainable Tourism*

JORGE RIVERA
George Mason University

Abstract. The public policy literature has paid little attention to evaluating the ability of voluntary environmental programs to generate economic benefits for firms. Yet, given their voluntary nature, provision of economic benefits to firms is a necessary condition for these programs to become effective environmental policy instruments. Additionally, little is known about why firms operating in developing countries would participate in these initiatives.

This paper provides some of the first cross-sectional empirical evidence about voluntary environmental programs established in developing countries. Specifically, the paper focuses on studying hotel participation in the Costa Rican Certification for Sustainable Tourism (CST program). The CST program is probably the first performance-based voluntary environmental program created by a developing country government. Results indicate that hotels with certified superior environmental performance show a positive relationship with differentiation advantages that yield price premiums. Participation in the CST program alone is not significantly related to higher prices and higher sales. The evidence also indicates that participation in the CST program was significantly related to government monitoring, trade association membership and hotels' focus on 'green' consumers.

1. Introduction

Voluntary environmental programs are gaining currency in developing countries as an incentive-based alternative to the concerns over costly, inflexible, and seldom enforced mandatory regulations. In industrialized nations, these initiatives are also an increasingly popular environmental policy instrument (Highley and Leveque, 2001; Welch, Mazur and Bretscheneider, 2000; Andrews, 1998). The growing use of voluntary programs has led policy makers to debate their effectiveness. Important questions remain regarding the environmental effectiveness of voluntary environmental initiatives, the reasons why firms participate, and the benefits obtained by participants (Khanna, 20001; Highley and Leveque, 2001; Andrews, 1998; Kollman and Prakash, forthcoming). A few studies have evaluated firm participation in U.S. voluntary environmental programs leading to mixed evidence about motives for participation and about the environmental effectiveness of these programs (Welch, Mazur and Bretscheneider, 2000; King and Lenox, 2000; Khanna and Damon, 1999; Arora and Cason, 1996).

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Little attention has been paid in the public policy literature, however, to assessing firm economic benefits derived from participation in voluntary environmental programs (Khanna, 2001). This lack of attention arises perhaps because estimating firm benefits is seen more as a business management topic. Yet, given their non-mandatory nature, voluntary programs have to generate short-term economic gains to promote beyond compliance environmental protection by profit driven firms (Andrews, 1998; Highley and Leveque, 2001; Kollmand and Prakash, forthcoming). Therefore, assessing private economic benefits generated by voluntary programs becomes critical for their effective use as environmental policy tools. Similarly, for policymakers it is also important to begin gathering evidence about why firms operating in developing countries participate in these initiatives.

This study intends to contribute to the debate on voluntary environmental programs by providing evidence from the experience that developing countries have with these voluntary environmental programs. First, it intends to identify factors and firm characteristics related to higher levels of participation in these initiatives. Second, it aims to determine if higher performance in voluntary environmental programs is related to differentiation advantages that yield higher prices or higher sales for participants. Finally, it also seeks to determine key conditions that have to be met by voluntary programs in order to generate these differentiation advantages. Data were gathered from a sample of hotels participating in the Certification for Sustainable Tourism (CST), a voluntary environmental program recently established in Costa Rica.

Results indicate that participation in the CST program alone is not significantly related to higher prices and higher sales. Only hotels with higher environmental performance show a significant relationship with price premiums. The findings also suggest key conditions that are met by the CST program to selectively generate differentiation advantages that yielded price premiums. First, the CST program targets a market with a significant segment of environmentally aware consumers. Second, it provides clear and credible indications of firms' superior environmental performance. This allows environmentally aware consumers to differentiate the most environmentally proactive firms from the least proactive. The evidence also indicates that participation in the CST program was significantly related to government monitoring, trade association membership and hotels focused on 'green' consumers.

2. The Costa Rican Hotel Sector and the Sustainable Tourism Certification Program

The Costa Rican hotel sector has grown by more than 400% from 433 hotels in 1987 to about 1800 in 2000 (INCAE, 2000). This expansion is attributed to a significant increase in the number of tourists from about 250,000 in 1987 to 1 million in 1999. Hotels and other tourism related businesses have become the second most important sector of the Costa Rican economy, generating about

20 percent of its foreign income, approximately 5 percent of its gross domestic product and employing about 12 percent of the country's labor force (Rivera, 1998). Since the late 1980s, new hotels and related businesses have also attracted approximately one third of the total foreign direct investment to the country, about U.S. $1 billion (Rivera, 1998).

The biggest and most luxurious hotels are mainly located in or near the capital, San Jose, and serve both the business travel and tourism markets (ICT, 1999). However, more than 75% of the hotels in Costa Rica have less than 20 rooms and offer very basic services. They compete primarily based on price and location close to national parks or beaches along the Pacific and Atlantic oceans (INCAE, 2000). National parks are the major tourist destinations in the country. Their protection, and in some cases creation, has been supported by the growth of tourism. On average, tourists visit three national parks and about 87 percent consider the rainforest to be the most important place to visit in the country (INCAE, 2000). Tourism has also helped to promote the creation of about 75,000 acres of private reserves owned mostly by hotels (Bien, 1999; Wildes, 1998).

The growth in the number of tourists and hotels has, nevertheless, generated detrimental effects on the environment. The magnitude and extent of these environmental problems has become part of an ongoing debate in Costa Rica. The business community argues that significant environmental problems are limited to a few hotels. Moreover, representatives of the industry also argue that hotels are major partners in the conservation and management of national parks and their buffer zones. Environmentalists, however, contend that hotels are significantly contributing to the degradation of the environment (Rivera, 1998; Boo, 1990). Empirical evidence generally supports the view that most hotels have played a key role as partners of the national park system. Yet, this evidence also indicates that the rapid growth of the industry is exacerbating environmental problems around the most popular national parks (Jones et al. 2001; INCAE, 2000; Rivera, 1998; Davies and Cahill, 1999). For example, hotel growth is associated with landscape and wetland alteration, deforestation of buffer zones, pollution of rivers, lakes and beaches, and changes in wildlife behavior (Rivera, 1998; Boo, 1990).

Certification for Sustainable Tourism (CST)

Responding to these environmental problems the Costa Rican Ministry of Tourism established in 1997 the CST program for hotels. The CST is probably the first performance-based voluntary environmental program created by a developing country government (Lizano, 2001; Jones et al., 2001). It aims to verify the implementation of beyond compliance environmental practices that are known to be valued by the large percentage of 'green' tourists visiting Costa Rica. The CST program was designed in partnership with leading academic institutions, the major hotel trade association, environmental organizations,

and hotel managers. Representatives of these groups are also members of the independent National Accreditation Commission that regulates the CST standards and supervises the hotel certification process (Lizano, 2001; Jones et al., 2001).

At the end of 1999, 115 hotels had decided to enroll in the program and the first 52 have been audited and granted environmental performance ratings. The detailed results of the CST program evaluations are available on the Internet in English and Spanish (http://www.turismo-sostenible.co.cr). In 2000 the Ministry of Tourism began highlighting the program in its international advertisements aimed at promoting tourism. These advertisements appear in National Geographic, the Discovery Channel, and CNN. Remarkably, the CST program is also expanding to other Central American countries and the World Tourism Organization recently adopted it as its voluntary environmental initiative for hotels.

3. Environmental policy instruments and voluntary programs

Governments have a wide range of instruments and mechanisms that can be used to achieve environmental policy goals. Arranged according to increasing level of state intervention, environmental policy instruments can be classified in three general categories (Howlett and Ramesh, 1995, 1993; Howlett, 1991; Schneider and Ingram, 1990; Salomon, 1981). The first category involves voluntary instruments, such as self-regulatory programs. The second category includes mixed instruments such as information provision, subsidies, and pollution taxes. Finally, the third category comprises compulsory instruments like mandatory regulations. Policy instrument choice is not only influenced by efficiency and effectiveness criteria but also by the political context, the resources available, and the culture of the implementation agency (Cashore and Vertinisky, 2000; Bressers and O'Toole, 1998; Howlett and Ramesh, 1995; Linder and Peters, 1989).

Traditionally, environmental policy has relied on a command-and-control approach that generally involves mandatory regulations as the preferred policy instrument for promoting environmental protection (Andrews, 1998; OTA 1995). Mandatory environmental regulations usually involve specific requirements for pollution control technologies, equipments, or inputs. In the United States, the use of this approach during the last three decades has led to significant progress in improving air and water quality (Kraft and Vig, 1997; Rondinelli and Berry, 2000). However, despite its environmental effectiveness, the command-and-control approach has been strongly criticized for being costly, inefficient, legalistic, and an obstacle to the improvement of business competitiveness (National Academy of Public Administration, 1995; Harrison, 1999; Kraft and Vig 1997; Rondinelli and Berry, 2000). Detractors also argue that mandatory command-and-control regulations discourage innovative environmental management technologies by forcing companies to use specific pollu-

tion control devices (Jaffe et al., 1995). To be sure, the criticism about mandatory regulations is seen as justified in some cases but broad generalizations attacking the command-and-control approach are still controversial (Andrews, 1998; Harrison, 1995, 1999; OTA, 1995).

Governments in Latin America and other developing countries have similarly enacted a wide variety of command-and-control regulations to protect the environment. However, very often these mandatory policy instruments are contradictory, lack clear standards and monitoring, and are seldom enforced (Wehrmeyer and Mullugetta, 1999; Gentry, 1998; Motta, Huber and Ruitenbeek, 1999). Public officials try to justify these problems based on a variety of arguments. First, they say governments lack the political support and the resources to monitor compliance and enforce mandatory regulations. Second, compliance with environmental regulations hinders economic development opportunities. Third, it is argued that local firms and consumers are unable to afford a clean environment. Fourth, they assume firms need to be internationally competitive before they can become environmentally proactive (Wehrmeyer and Mullugetta, 1999; Gentry, 1998; Motta, Huber and Ruitenbeek, 1999).

Voluntary programs as alternative environmental policy instruments

Voluntary programs are increasingly promoted as alternative policy instruments to mandatory environmental regulations. They can be classified in three different categories based on decreasing level of government involvement (Highley and Leveque, 2001). The first category is public voluntary programs established by government agencies to encourage beyond compliance environmental performance. For example, the Eco-Management and Audit Scheme (EMAS) established by the European Union in 1993. A second category includes negotiated agreements between governments and firms, such as the Costa Rican Certification for Sustainable Tourism. Finally, unilateral initiatives established by industry associations or third-party organizations like ISO-14001 constitute a third category.

It is argued that because voluntary programs provide economic benefits to participants, they can effectively promote beyond compliance environmental protection. Supporters also suggest that these initiatives are more cost efficient, improve regulatory flexibility, and promote technology innovation (Khanna, 2001; Lyon and Maxwell, 1999; Arora and Cason, 1996). However, critics remain suspicious of the effectiveness of voluntary initiatives to promote environmental protection. They posit that firms are motivated to participate because they want to prevent more regulations and disguise poor environmental performance. Additionally, critics doubt that voluntary initiatives can provide significant economic incentives to firms to promote beyond compliance environmental protection (Arora and Cason 1996; Harrisson, 1999; Andrews, 1998; Lyon and Maxwell, 1999; Kollman and Prakash, forthcoming).

There are a few studies that have evaluated the effectiveness of voluntary initiatives to promote enhanced environmental protection. Findings appear to be contradictory and limited in terms of their almost exclusive focus on U.S. manufacturing firms and voluntary programs such as EPA 33/50, Responsible Care, and the Climate Challenge program (Khanna, 2001; Welch, Mazur and Bretschneider, 2000; Videras and Alberini, 2000; Lyon and Maxwell, 1999). For instance, an assessment of the EPA's 33/50 program suggests that firms enrolled in this program showed a significantly higher reduction in toxic releases than non-participant firms (Khanna and Damon, 1999). On the other hand, a study of the Responsible Care Program, established by the Chemical Industry Association, indicates that participant firms did not show significantly higher environmental performance than non-members (King and Lenox, 2000). Similarly, evidence suggests that participation in the U.S. Department of Energy's Climate Challenge Program failed to improve firms' environmental performance (Welch, Mazur and Bretschneider, 2000).

Studies identifying the motivations and economic benefits of participation also tend to be limited to U.S. manufacturing firms and to the same voluntary initiatives as the ones mentioned above. Therefore, evidence from different voluntary programs and other sectors of the economy is required in order to reach stronger conclusions. Additionally, it is also necessary to study the same issues in the developing world. In these countries, voluntary initiatives are also beginning to be used as incentive based environmental policy instruments. Yet, little is known about why firms would participate in voluntary programs promoted in developing countries since these countries tend to have less stringent environmental regulations. Even less evidence exists about the economic benefits obtained by firms that participate in these initiatives.

This paper intends to contribute to the emerging literature on voluntary environmental programs by providing new evidence on these issues. First, it intends to identify factors and firm characteristics related to participation in voluntary programs established in developing countries. Second, it aims to determine if higher performance in voluntary environmental programs is related to differentiation advantages that yield higher prices or higher sales for participants. Finally, it also seeks to identify key conditions that have to be met by voluntary programs in order to generate these differentiation advantages.

4. Motivations and firm characteristics related to participation in voluntary environmental programs

Supporters of voluntary programs contend that firms participate in these initiatives for three main reasons. First, they seek to reduce costs by using environmentally friendly-efficient technologies and processes. Second, they want to gain 'green' reputations that lead to price premiums and/or increase market share among green consumers. And third, they participate to respond to envi-

ronmentally conscious investors (Videras and Alberini, 2000; Montabon, 2000; Lyon and Maxwell, 1999; Porter and van de Linde, 1995a). Conversely, critics argue that firms engage in voluntary environmental initiatives not to improve their environmental practices but to: (1) conceal their inferior environmental performance; (2) avoid frequent and in-depth environmental monitoring; (3) preempt future mandatory environmental regulations or reduce their stringency, and (4) create barriers of entry for new competitors (Videras and Alberini, 2000; Lyon and Maxwell, 1999; Wu and Barbock, 1999; Jaffe, Peterson and Portney, 1995; Palmer, Oates and Portney, 1995).

Various studies of EPA 33/50, Responsible Care, and the Climate Challenge Program have focused on identifying motivations and firm characteristics related to participation in these programs (Videras and Alverini, 2000; King and Lenox, 2000; Welch, Mazur and Bretschneider, 2000; Khanna and Damon, 1999; Hoffman, 1999; Henriques and Sodorsky, 1996; Arora and Cason, 1996). Evidence suggests that higher *regulatory pressures* are significantly related to participation in voluntary initiatives. Threats of new environmental regulations, greater government oversight, or explicit government support for voluntary environmental programs have all shown to be significant incentives for firms to participate in these initiatives (Cashore and Vertinisky, 2000; Khanna, Quimio and Bojilova, 1998; Henriques and Sadorsky, 1996). Previous research has also found that *trade association membership* is significantly related to participation in voluntary environmental programs in the U.S. (King and Lenox, 2000; Hoffman, 1999; Khanna and Damon, 1999). In general, trade associations promote voluntary programs to maintain a positive industry-wide environmental reputation that helps avoid increased scrutiny from stakeholders and the likelihood of new regulations (King and Lenox, 2000).

Findings also indicate that firms *serving final consumers* and those *focused on 'green' consumers* are more likely to participate in voluntary environmental programs. These firms tend to obtain higher benefits from green reputations granted by voluntary programs than firms supplying industrial markets or those focused on the average consumer (Khanna and Damon, 1999; Arora and Cason, 1996; Klassen and McLaughlin, 1996; Henriques and Sadorsky, 1996). Results from several studies also show that *larger firms,* and those with *higher visibility* such as multinationals, are more likely to participate in voluntary initiatives (Arora and Cason, 1995; Videras and Alberini, 2000; King and Lenox, 2000). These firms are more likely to enjoy economies of scale when implementing these programs. They are also held to higher standards by their stakeholders and are expected to play a leadership role in voluntary environmental protection efforts.

5. Voluntary environmental programs and economic benefits to firms

Scant attention has been paid to assessing the financial benefits derived by firms from their participation in voluntary environmental programs. This is

surprising given the significant growth of the literature focusing on corporate environmental management issues. According to Margolis and Walsh (2001), more than 55 empirical studies have analyzed the relationship between environmental performance and firm profitability since 1972. Yet, hardly any has specifically looked at firms' economic benefits derived from participation in voluntary environmental programs. This issue has been overlooked to even greater degree in the public and environmental policy literature (Khanna, 2001; Andrews, 1998; Kollman and Prakash, forthcoming).

The lack of attention in the public policy literature may arise because assessing firms' economic benefits is seen as a business management topic. Nevertheless, given their non-mandatory nature, to effectively promote beyond compliance, voluntary environmental programs have to generate short-term financial gains for participant firms (Andrews, 1998; Highley and Leveque, 2001; Kollmand and Prakash, forthcoming). Some firms may show beyond compliance environmental performance for altruistic reasons (Andrews, 1998; Bansal and Roth, 2000). Most firms, however, are profit driven and would exhibit voluntary beyond compliance only if they can obtain net economic benefits (Andrews, 1998). Consequently, evaluating economic benefits generated by voluntary programs is critical for their effective use as environmental policy tools. Effective voluntary environmental programs also have to discourage 'free-riding' behavior by opportunistic firms (King and Lenox, 2000). So, it is also necessary to understand what conditions allow these programs to prevent 'free-riding' behavior.

Findings of an assessment of EPA 33/50 program indicate that participation had a negative impact on short-term profitability. Yet, investors perceived a positive effect for profitability in the long term (Khanna and Damon, 1999). Studies of consumers' willingness to pay for environmental quality also suggest that participation in voluntary environmental programs may allow companies to gain differentiation advantages that yield higher prices or higher sales (Khanna, 2001; Sen and Bhattacharya, 2001; Van Ravensway and Blend, 1999). Nevertheless, there is limited empirical evidence that directly links enrollment in voluntary environmental programs with price premiums or enhanced sales (Khanna, 2001; Lyon and Maxwell, 1999; Andrews, 1998). The following section uses the resource-based theory to develop a better understanding of the conditions under which voluntary environmental programs can lead to differentiation advantages that generate higher prices or higher sales.

Resource-based theory of the firm

The resource-based theory provides valuable insights into the competitive implications of firms' responses to environmental policy demands. This theory is concerned with the relationship between a firm's internal resources and its competitiveness relative to other firms (Barney, 1991; Conner, 1991; Wernerfelt,

1984). According to the resource-based view, firms gain competitive advantage by possessing and deploying heterogeneous and immobile resources that result in more efficient manufacturing processes and/or products-services with a higher value for customers (Barney, 1991). Firm resource heterogeneity refers to how physical, human, and intangible organizational resources differ among competitors. Conversely, in the traditional industrial organization (IO) business strategy model, firm resources are viewed as homogeneous across all the competitors of a specific industry (Barney and Hertersley, 1996). Firm resource immobility refers to the inability of competing firms to mimic or purchase resources from other firms. IO strategic theories, on the other hand, consider that firm resources are mobile and can be purchased or copied.

At the core of the resource-based view is the issue of what makes a competitive advantage sustainable. Sustainable competitive advantages are those that cannot easily be imitated and substituted by competitors (Barney, 1991). A firm resource that provides sustained competitive advantages must fulfill four necessary conditions (Barney, 1991). First, it must add positive value to the firm. Second, it must be unique or rare among current and potential competitors (Reed and DeFillippi, 1990). Third, it cannot be easily substituted with another resource by competing firms (Diericks and Cool, 1989). Finally, the resource must be imperfectly imitable because it possesses either path dependent, causally ambiguous or socially complex characteristics (Reed and DeFillippi, 1990). These criteria highlight the point that firms cannot expect to imitate or purchase resources to obtain sustainable competitive advantages. These advantages need to be generated based on the development of rare, imperfectly imitable, and non-substitutable resources and capabilities.

Resource-based theory and voluntary environmental programs

Most scholarly articles on environmental protection and competitiveness have ignored the role of consumers by focusing mainly on cost-efficiency issues. Thus, the resource-based theory has traditionally been used to understand how internal environmental management resources can increase process efficiency and lead to cost advantages (Russo and Fouts, 1997; Sharma and Vredenburg, 1998). Nevertheless, this theory also highlights the importance of consumers' environmental perceptions and preferences (Hart, 1995). Consumer perceptions of a firm's environmental performance are critical for determining differentiation advantages that yield price premiums, and/or enhanced sales. Beyond compliance environmental performance does not guarantee that a firm can create superior value for consumers that result in differentiation advantages. Two necessary conditions need to be satisfied for a firm's superior environmental performance to produce differentiation advantages: (1) consumers' buying decisions and willingness to pay have to be positively affected by superior environmental performance (Christmann, 1997; Reinhardt, 1998); and (2) compared to its competitors, a firm has to be perceived by consumers as having

a credible reputation of superior environmental performance (Christmann, 1997; Reinhardt, 1998).

Businesses have found that it is very difficult to obtain and maintain the fidelity of 'true blue' environmentally aware consumers whose buying decisions and willingness to pay is positively affected by a firm's superior environmental performance. Only a handful of companies enjoy clearly recognized reputations of superior environmental performance (green reputations). Credible green reputations are rare, difficult to create and imitate because self-proclaimed promotion of superior environmental performance is typically met with strong suspicion by the public and increased scrutiny by the media and the environmental community (Klassen and McLaughlin, 1996; Hart, 1995). Hence, even when targeting environmentally aware consumers, superior environmental performance does not necessarily allow firms to gain price premiums or enhanced sales (Hart, 1995; Russo and Fouts, 1997).

Voluntary environmental programs can help to overcome lack of credibility problems intrinsic to self-reported environmental efforts. By granting eco-labels or environmental certifications, voluntary initiatives can distinguish firms with superior environmental performance. It is critical, however, that the programs themselves are perceived as somehow autonomous from participants in order to grant credible green reputations. Thus, they have to fulfill two basic requirements. First, they have to be controlled by an independent third-party. Second, based on performance-based standards, they have to provide a clear indication of a firm's superior environmental performance. Accordingly, green consumers can be able to differentiate the most environmentally proactive firms from the least proactive. The previous arguments suggest the following hypotheses:

> ***Hypothesis 1:*** *Higher environmental rating in a third-party performance-based voluntary environmental program is positively associated with higher product prices*.

> ***Hypothesis 2:*** *Higher environmental rating in a third-party performance-based voluntary environmental program is positively associated with higher product sales*.

6. Research methods

Sample selection

Survey and archival data were collected from a cross-sectional sample of 164 Costa Rican hotels.[1] The sample consisted of two groups. The first group included all 52 hotels enrolled and evaluated by the CST Program as of December 1999. The second group of 112 hotels was drawn from a stratified random survey of 250 hotels (44.8% response rate). The lack of a comprehen-

sive list of hotels operating in Costa Rica introduced limitations for identifying the general population of interest to this research. Thus, a sample frame of 649 hotels was developed from which a stratified random sample of 250 hotels was drawn.[2] Except for occupancy rate information, which was only available from survey interviews, all data were verified using archival information available at the Ministry of Tourism and other public sources .

Statistical analysis techniques

Firms that are more likely to receive economic benefits from voluntary programs are also more likely to self-select into them. Unless corrected, this self-selectivity leads to biased estimates of program benefits when simply comparing gains for participants and non-participants (Heckman, 1978, 1979; Hartman, 1988; Maddala, 1986). Thus, to test the hypotheses proposed, a recursive two-stage estimation method that corrects for self-selection bias and provides consistent estimates of participation benefits was used (Heckman, 1978, 1979; Lee and Trost, 1978; Hartman, 1988; Maddala, 1986). This methodology originally proposed by Heckman (1978) has been widely applied to evaluate the benefits of voluntary environmental programs (Khanna, 2001; Welch, Mazur and Bretschneider, 2000; Khanna and Damon, 1999; Arora and Cason, 1996).

Application of the two-stage methodology to assess the CST program

First, it is assumed that Y_i, the expected participation benefits for the *ith* hotel in the form of price premiums or higher sales, are determined by a vector of hotel characteristics X_i (e.g. location, size, quality), by its decision to participate in the voluntary environmental program, D_i, and by its environmental performance, Env_i.

$$Y_i = \alpha + a_i X_i + a_2 D_i + Env_i + u_i \,, \tag{1}$$

where: X_i = equal to location, quality, size, trade association affiliation, and transnational affiliation, D_i = the decision to participate in the voluntary environmental program, Env_i = hotel environmental performance, u_i = the random error term.

In this model D_i is treated as an endogenous variable because the decision to participate in the program is based on self-selection (Maddala, 1986). This also implies that D_i is likely to be determined by some of the same X_i characteristics that affect Y_i. To correct for self-selection bias the decision to participate in the program, D_i, is concurrently determined with Y_i (Khanna and Damon, 1999). Thus, in the first stage, a probit regression models the decision to

enlist in the CST Program, D_i. It is assumed that D_i is determined by the unobserved net benefit of participation for each individual hotel, E_i as follows:

$$D_i = \begin{cases} 1 & \text{if } E_i > 0 \\ 0 & \text{if } E_i \leq 0 \,, \end{cases} \tag{2}$$

Using the estimated probit model (2), the probability of participation in the CST program, P_i, is calculated. Next, Equation (1) is re-specified replacing D_i by P_i as a control variable:

$$Y_i = \delta + a_i X_i + a_2 P_i + Env_i + u_i \,, \tag{3}$$

Finally, in the second stage, Equation (3) is estimated using ordinary least-squares (OLS) regression.

When applying this two-stage methodology, it is sometimes argued that valid identifier variables for the probit model cannot be correlated with the dependent variable in OLS model (Maddala, 1986). This would imply that these two models could not share the same independent variables. However, econometric studies show that the two-stage methodology does not suffer from problems of identification even when the same set of independent exogenous variables is used for both the probit and the OLS regressions (Olsen, 1980: pp. 1818–1819; Maddala, 1986: pp. 267–271; Khanna and Damon, 1999). Given that the probit model involves a nonlinear function of its independent variables, problems of overidentification are avoided. Overidentification arises when using a linear probability model, instead of probit, for determining probability of participation (Olsen, 1980: pp. 1818–1819; Maddala, 1986: pp. 267–271).

Dependent variable measures

Enrollment in the CST program (first stage, probit model dependent variable) is coded as a binary variable equal to one for hotels participating in the program as of December 1999 and zero otherwise.

Hotel price and sales (second stage, OLS models' dependent variables). Average room price per night and occupancy rates are used as measures for hotel price and sales respectively.

Independent variable measures

Environmental performance. Dummy variables are created for identifying the environmental performance obtained by each hotel participating in the CST program, using hotels not participating in the program as a reference group.

The environmental rating assigned to each CST hotel is determined by independent audits performed by the CST program. These audits measure

Table 1. CST evaluation of environmental performance.

General area	Subcategories
A. Management of the physical and biological environment	1. Policies and programs 2. Emissions and wastes 3. Gardens 4. Natural areas 5. Protection of flora and fauna
B. Environmental management of hotel facilities	6. Formulation of policies 7. Water consumption 8. Energy consumption 9. General supplies consumption – Food and beverages – Cleaning and cosmetic supplies 10. Waste management – Organic waste – Inorganic waste – Final destiny 11. Employee training
C. Guest environmental education	12. Communication of environmental programs 13. Room information and management 14. Incentives for environmental awareness 15. Measurement of environmental satisfaction
D. Cooperation with local communities	16. Direct benefits to local communities 17. Indirect benefits to local communities 18. Contribution to local culture 19. Contribution to public health 20. Contribution to local infrastructure and safety

overall environmental performance based on a scale that grants hotels zero to five 'green leaves' of environmental excellence. The ratings are intended to be similar to traditional quality ratings of hotels in which higher general quality is indicated progressively from zero to five stars. The number of 'green leaves' obtained by a hotel is based on its score in four general areas of environmental management: (1) management of the physical and biological environment, (2) environmental management of hotel facilities, (3) guest environmental education, and (4) cooperation with local communities. These general areas are divided in 20 subcategories of environmental management (Table 1) that contain 153 yes/no questions. Each question evaluates compliance with a specific environmental practice (yes = compliance, no = non-compliance, N/A = not applicable) and was assigned a relative level of importance on a scale from one to three, three being the score for the most important yes/no questions.

The environmental rating for each general area is determined by adding the scores to all questions, within that area, and dividing it by the maximum possible score to create a percentage performance rate. Then, the final number

of green leaves of environmental excellence obtained by a hotel is determined by the lowest percentage performance rate among the four general areas as follows:

Green leaves obtained	Minimum percentage performance among the four general areas
0	< 20
1	20 to < 40
2	40 to < 60
3	60 to < 80
4	80 to 94
5	> 94

Competitive focus. Location is used as a proxy to measure hotel competitive focus. It is classified in three different categories: Park, Beach and City hotels. Park and Beach hotels are those located within 10 miles of a national park or the beach respectively. City hotels, on the other hand, are those located in the metropolitan area which includes Alajuela, San Jose, and Cartago, the three major Costa Rican cities.

Previous studies of the Costa Rican tourism industry have shown that hotel location provides a good indication of the main travel-purpose of guests staying at different hotels (INCAE, 2000; ICT, 1999; ICT 1995). For example, 'Park' hotels focus mainly on tourists that travel to Costa Rica to enjoy nature and visit the rain forest. On the other hand, 'City' and 'Beach' hotels cater to a more diverse type of guest that includes business and leisure travelers respectively.

Government monitoring. The level of general government monitoring is coded as a binary variable equal to one for those hotels that had an official 'Declaration' from the Ministry of Tourism and zero otherwise. 'Declared' hotels receive tax exceptions and free promotion at international tourism fairs from the Ministry of Tourism. Declared hotels are also more closely supervised by the government and have to submit periodic information on their operations to the Ministries of Tourism and to the Treasury.

Hotel Size. Hotel size is measured as the natural logarithm of the number of hotel rooms.

Hotel name recognition. Hotels affiliated or owned by an international chain are generally better known by tourists, travel agencies, and government officials. Hence, hotel name recognition is coded as a binary variable equal to one for those facilities that were either owned or managed by an international chain of hotels (e.g., Marriott, Best Western, Intercontinental) and zero otherwise.

Quality. It is measured by the number of stars assigned to each hotel by the Quality Classification System administered by the Ministry of Tourism. This quality rating system was reviewed in 1998 to reflect the standards used in the U.S. by AAA, Mobil, Michelin, and major hotel chains (Mesa and Inman, 1999).

Probability of participation in the CST program (CST probability). Both the price and occupancy models corrected for self-selection bias by introducing probability of participation in the CST program as a control variable. This variable was calculated using the probit model of participation determined in the first stage of the regression analysis.

Trade-association membership. Membership in the National Chamber of Tourism, the main trade association of the industry, is coded as a categorical variable equal to one for hotels affiliated with the Chamber of Tourism and zero otherwise.

7. Results

Factors related to participation in the CST program

Correlation values and other descriptive statistics such as means and standard deviations are reported in Table 2. As expected, the correlation matrix results provide preliminary evidence indicating that CST participation is positively correlated to government monitoring, trade association membership, hotel size, and hotel brand name recognition.

Table 3 presents the frequency distribution of CST audited hotels according to their level of environmental performance. The majority of CST hotels showed low levels of beyond compliance environmental performance. Almost 81 percent obtained between zero to two 'green leaves,' about 19 percent obtained between three and four 'green leaves,' and none obtained five 'green leaves.'

This preliminary evidence suggests that participants in the CST have different motivations for adopting the program. Some hotels may be trying to disguise their poor environmental performance and avoid increased attention from regulators and environmentalists (Khanna, 2001). Hotels may also be responding to pressures from stakeholders such as the industry association and environmental groups (King and Lenox, 2000). Other hotels may be expecting to gain 'green' reputations without actually improving their environmental performance (King and Lenox, 2000). On the other hand, truly 'green' hotels may be aiming to certify their superior environmental performance and gain differentiation advantages (Kollman and Prakash, forthcoming).

Probit regression results [3, 4]

Results of the probit regression analysis are displayed in Table 4. The probit model findings indicate that government monitoring, trade association membership, and park location are positively and significantly related to participation in the CST program ($p < 0.05$).

These results are generally consistent with the evidence from previous studies

Table 2. Correlation matrix and descriptive statistics.

Variable		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Affiliation to trade association	1.00																
2	Government monitoring	.38[d]	1.00															
3	Beach hotels	–.02	.02	1.00														
4	City hotels	.23[c]	.26[d]	–.31[d]	1.00													
5	Park hotels	–.16[b]	–.23[c]	–.66[d]	–.52[d]	1.00												
6	Occupancy	.05	.08	–.01	.11	–.08	1.00											
7	Quality	.44[d]	.92[d]	.02	.28[d]	–.24[c]	.13	1.00										
8	Price	.42[d]	.60[d]	.05	.11	–.12	.21[c]	.72[d]	1.00									
9	Size (log)	.57[d]	.45[d]	.12	.20[b]	–.27[d]	.11	.65[d]	.53[d]	1.00								
10	CST participation	.39[d]	.53[d]	–.10	.09	.02	–.11	.54[d]	.41[d]	.33[d]	1.00							
11	CST probability	.62[d]	.86[d]	–.16[b]	.15[a]	.02	.09	.88[d]	.65[d]	.73[d]	.62[d]	1.00						
12	Name recognition	.27[d]	.23[c]	.01	.13[a]	–.11	.13	.32[d]	.29[d]	.41[d]	.25[c]	.41[d]	1.00					
Environmental performance variables																		
13	Non-audited[e]	.01	–.01	–.10	–.16[b]	.22[c]	–.19[b]	–.06	.04	.06	.38[d]	.07	–.8	1.00				
14	0 Green leaves	.07	.18[b]	.02	–.01	–.01	–.04	.19[b]	.08	.13[a]	.23[c]	.19[b]	.09	–.06	1.00			
15	1 Green leaf	.18[b]	.32[d]	.11	–.10	–.02	-.13[a]	.32[d]	.18[b]	.22[d]	.47[d]	.33[d]	.12	–.12	–.08	1.00		
16	2 Green leaves	.30[d]	.28[d]	–.09	.35[d]	–.19[b]	.11	.30[d]	.09	.26[d]	.37[d]	.32[d]	.29[d]	–.10	–.06	–.12	1.00	
17	3–4 Green leaves	.14[a]	.18[b]	–.16[b]	.13[a]	.04	.01	.21[c]	.38[d]	.12	.31[d]	.21[c]	.04	–.08	–.05	–.10	–.08	1.00
	N	164	164	164	164	164	162	164	162	163	164	159	164	164	164	164	164	164
	Mean	N/A	N/A		N/A	N/A	58.44	1.70	56.17	31.08	N/A	0.40	N/A	N/A	N/A	N/A	N/A	N/A
	Std. Dev.	N/A	N/A		N/A	N/A	17.18	1.67	33.69	41.68	N/A	0.31	N/A	N/A	N/A	N/A	N/A	N/A

[a] Prob < 0.10, [b] Prob < 0.05, [c] Prob < 0.01, [d] Prob < 0.001.

[e] Non-audited are CST hotels whose environmental performance has not yet been evaluated as December 1999.

Table 3. Environmental performance of CST audited hotels.

Environmental performance (# of Green leaves)	Number of hotels	Percentage
0	6	11.5
1	22	42.3
2	14	26.9
3	9	17.3
4	1	1.9
5	0	0
Total	52	100
Non-audited hotels[a]	15	

[a] Non-audited are CST hotels whose environmental performance has not yet been evaluated as December 1999.

Table 4. Decision to participate in the CST program.

	Probit regression model[e] (stage one)	
Constant	–2.870[d]	(0.652)[f]
City	0.048	(0.374)
Government monitoring	1.336[b]	(0.608)
Name recognition	0.402	(0.656)
Park	0.947[c]	(0.326)
Quality	0.038	(0.192)
Size	0.344[a]	(0.197)
Trade association membership	1.077[c]	(0.396)
N	159	
–2 Log L	135.06	
$\chi 2$ for covariates	82.879[d]	
Percent correctly classified	88.2	

Chi square probability: [a] Prob $<$ 0.10, [b] Prob $<$ 0.05, [c] Prob $<$ 0.01, [d] Prob $<$ 0.001.
[e] Model significant at less than 0.001.
[f] Standard errors are in parentheses.

of participation in voluntary programs (Videras and Alverini, 2000; King and Lenox, 2000; Welch, Mazur and Bretschneider, 2000; Khanna and Damon, 1999; Hoffman, 1999; Henriques and Sodorsky, 1996; Arora and Cason, 1995). They highlight the importance of regulatory pressures such as government monitoring to promote participation in voluntary programs. Hence, more than alternative policy instruments, mandatory regulations and government oversight need to be considered as key complements to voluntary initiatives (Cashore and Vertinisky, 2000; Khanna, Quimio and Bojilova, 1998; Henriques

and Sadorsky, 1996). Likewise, the Costa Rican Chamber of Tourism, the main hotel trade association, appears to play a significant role in promoting the adoption of the CST program. A few poor performing firms can significantly reduce the perceived environmental reputation of the entire industry. Hence, industry associations exert significant influence on their members by diffusing environmental values and norms of conduct that promote standardized firm behavior (Hoffman, 1999; King and Lenox, 2000). Also, as predicted by self-interest economic rationality, park hotels that target environmentally aware tourist are more likely to participate in the CST program. Because of their competitive focus, these hotels can expect to obtain higher benefits (e.g. price premiums and/or higher sales) from certified 'green' reputations granted by CST program (Khanna, 2001; Videras and Alberini, 2000; Lyon and Maxwell, 1999; Andrews, 1998; Kollmand and Prakash, forthcoming).

Finally, findings from the probit regression analysis do not provide conclusive support that size and brand name recognition are significantly related with higher participation in the CST program. Previous studies suggest that larger firms and those with higher name recognition (e.g. large international chain hotels) are significantly more likely to adopt voluntary environmental initiatives (Arora and Cason, 1995; Videras and Alberini, 2000; King and Lenox, 2000).

To explain these surprising results, in depth personal interviews were conducted with the general managers of large, international chain, and/or high quality, hotels. Hotels with these characteristics are predominantly located in the metropolitan area of San Jose, the Costa Rican capital. They include hotels such as Marriott, Intercontinental, and Spanish-owned Melia and Barcelo. Managers of these hotels agreed that the CST program could probably help to improve the environmental reputation of their hotels. However, they argued that it was too expensive to adopt CST standards. Most importantly, these managers were not convinced of the appeal of 'green' reputations to business travelers, their main customer base.

CST environmental performance and differentiation advantage benefits price premium benefits

Findings from the correlation matrix (Table 3) suggest that hotel room price is positively correlated with higher environmental performance. Table 5 compares means for price at different levels of environmental performance. The t-tests indicate that at all levels of environmental performance, hotels participating in the CST program have average room prices that are significantly higher than the average price for non-participant hotels ($p < 0.05$). The average price premium varies between \$25.46 to \$60.59 for hotels with zero to 3–4 'green leaves' respectively.

It is interesting, however, to note that average price premiums for hotels with two green leaves are significantly smaller than the average price premiums for

Table 5. Comparing means of price and occupancy for CST and non-CST hotels.

Environmental performance	N	Price (year average)		Occupancy (year average)	
Not enrolled in CST (reference group)	96	44.71	(28.47)	59.97	(16.06)
Non-audited	15	60.50[a]	(32.54)	48.46[a]	(23.40)[e]
0 Green leaves	6	70.17[b]	(16.93)	54.94	(15.44)
1 Green leaf	20	71.22[d]	(34.12)	53.31[a]	(15.01)
2 Green leaves	13	66.04[d]	(15.05)[e]	64.92	(15.33)
3 Green leaves	9	108.39[c]	(46.03)[e]	60.90	(14.41)
3–4 Green leaves[f]	10	105.30[c]	(44.48)[c]	64.81	(18.37)
5 Green leaves	0	None had obtained 5 green leaves as of December 1999			

t-test: [a] Prob $<$ 0.10, [b] Prob $<$ 0.05, [c] Prob $<$ 0.01, [d] Prob $<$ 0.001. Test Ho: no significantly different means. Values in parenthesis are standard deviations.
[e] Test of equality of variances showed that variances are unequal for these data. Therefore the Satterthwaite's nonparametric approximation was used to compare the means (SAS, 1990).
[f] Only 1 hotel obtained 4 green leaves. This category was created for comparison purposes.

hotels with zero and one green leaf. The lack of a monotonic effect for 2 green leaves hotels can be explained by their predominant focus on business travelers. Most two green leaves hotels, 71 percent, are located in the capital of Costa Rica and cater to a more significant proportion of business travelers (INCAE, 2000; ICT 1999). Studies of willingness to pay for environmental quality, by visitors to Costa Rica, consistently show that that business travelers are not as willing to pay higher prices for environmental quality as tourist visiting national parks (DeSharzo and Vega, 1999; INCAE 2000).

These results provide preliminary evidence that CST hotels with higher environmental performance tend to have higher room prices. However, for these results to be conclusive, it is necessary to determine whether price premiums remain after controlling for basic hotel characteristics and self-selection bias. The price regression model described in the following section controls for these factors.

Price linear regression model[4, 5]

Model 1 on Table 6 displays the linear regression analysis for hotel room price. Findings indicate that CST affiliated hotels with higher levels of environmental performance (hotels receiving 3–4 green leaves) show a significant relationship with higher room prices. Yet, participation in the CST program alone, without showing a superior level of environmental performance, is not significantly

Table 6. CST performance and differentiation advantage benefits.

	Linear regression models (stage two)			
	Model 1[e]: Room price		Model 2[f]: Hotel occupancy	
Constant	11.027	(1.123)[g]	46.058[d]	(7.163)
City	–9.930[a]	(–1.800)	2.151	(0.507)
CST probability	5.990	(0.411)	–11.464	(–1.037)
Occupancy	0.238[b]	(2.193)		
Park	–3.027	(–0.584)	3.172	(0.806)
Quality	12.304[d]	(5.005)	1.328	(0.656)
Price			0.138[b]	(2.193)
Size (log)	3.681	(1.266)	2.539	(1.147)
Non-audited	11.639	(1.647)	–12.771[b]	(–2.402)
0 Green leaves	–9.393	(–0.939)	–7.726	(–1.016)
1 Green leaf	–2.933	(–0.459)	–10.663[b]	(–2.229)
2 Green leaves	–13.915[a]	(–1.788)	2.281	(0.381)
3–4 Green leaves	29.897[d]	(3.697)	–3.353	(–0.521)
N	154		154	
F-Value	20.603[d]		2.104[b]	
R2	0.615		0.140	
Adj-R2	0.585		0.073	

[a] Prob < 0.10, [b] Prob < 0.05, [c] Prob < 0.01, [d] Prob < 0.001.
[e] Model 1 significant at less than 0.001.
[f] Model 2 significant at less than 0.001.
[g] t-values are in parentheses.

related to price premiums. These results provide support for Hypothesis 1 argument that higher environmental rating in a third-party performance-based voluntary environmental program is positively associated with higher product prices. According to their regression coefficient, 3–4 green leaves hotels show room prices that are about $30 per night higher than the room prices of hotels not enrolled in the CST program. This finding, despite its significance ($p <$ 0.001), should be tempered by the fact that to date only 10 hotels have attained 3–4 green leaves of environmental excellence.

Overall these results are consistent with resource-based theory arguments that firms showing credible superior environmental performance and targeting 'green' consumers can gain differentiation advantages that yield price premiums (Christmann, 1997; Hart, 1995; Porter and van der Linde, 1995a). These conditions are satisfied in Costa Rica where: (1) the CST program provides a credible and clear indication of superior environmental performance for hotels, and (2) more than 85 percent of the tourists consider national parks and the rainforest the most important place to visit in Costa Rica (INCAE, 2000).

Sale benefits

Correlation values (Table 3) provide preliminary evidence indicating that higher environmental performance is not significantly correlated to higher hotel occupancy. Similarly, means comparisons suggest that hotels with more green leaves fail to show higher average occupancy (Table 5).

Occupancy linear regression model[4, 6]

According to Hypothesis 2, higher environmental rating in a third party performance-based voluntary environmental program is positively associated with higher product sales. Nevertheless, results suggest that, independently of the level of environmental performance achieved, participation in the CST program is not significantly related with enhanced sales as measured by hotel occupancy (see Model 2 on Table 6). Moreover, although only the coefficient for 1 green leaf hotels is significant ($p < 0.05$), all levels of environmental performance show a negative relationship with occupancy level.

These findings, however, should be considered with caution because the overall model fit of the occupancy model is very poor. The adjusted multiple correlation indicates that independent variables in the model explain only 7.3 percent of the variance in occupancy. This is particularly striking when compared to the price model for which 58.5 percent of the variance in price is explained by the independent variables.

The low explained variance for the occupancy model and the lack of significance for the environmental performance variables can be attributed to the problems encountered in obtaining reliable hotel occupancy data. Other hotel characteristics such as price, location, size, quality, and trade-association membership were verified using archival information available at the Ministry of Tourism and other public sources. Yet, hotel occupancy figures could only be verified for a handful of hotels. Additionally, face-to-face interviews with managers showed a great deal of variation in the quality and sophistication of occupancy data provided by hotels. The bigger and most well-known hotels, about 10% of the sample, provided very detailed monthly occupancy data. Nonetheless, the majority of hotels only provided six-month estimates of average occupancy levels.

8. Research limitations and implications for future research

Before elaborating on the conclusions, it is necessary to highlight the limited and preliminary nature of this study. First, the use of cross-sectional data prevents the analysis of any causal relationships between the variables of interest. Future research needs to overcome this limitation by collecting longitudinal information so that causal relationships can be tested. For example, it is

important to determine if hotels obtaining high environmental scores in the CST increase their room prices and/or occupancy as more information about the program is diffused among international tourists.

Second, the sample included only hotels operating in Costa Rica, a middle-income developing country that has obtained worldwide reputation for its leadership in the management of its national parks. This attracts a significant segment of environmentally aware visitors from industrialized nations. Hence, these findings cannot be generalized to other countries and other voluntary initiatives. Future research needs to collect data from voluntary initiatives established in other developing countries to improve the generalizability of these findings. Third, the sample size was small and the number of CST audited hotels ($n = 52$) is even smaller. In the future, as the number of hotels in each CST rating category continues to grow, it may be possible to arrive at more conclusive results. Finally, the use of survey methodology to obtain data on hotel basic characteristics introduced problems of common method variance and social desirability bias intrinsic to survey instruments. Archival information available in Costa Rica helped to reduce these problems by allowing verification of a significant proportion of the self-reported information. Nevertheless, further research should focus on developing and maintaining a reliable database on hotel basic characteristics.

9. Conclusions

The public policy literature has paid little attention to assessing the ability of voluntary environmental programs to generate economic benefits for firms (Khanna, 2001; Andrews, 1998; Kollman and Prakash, forthcoming). Yet, because of their voluntary nature, provision of these benefits is a necessary condition for these programs to become effective environmental policy instruments. Given the weak regulatory environment, in developing countries the ability of voluntary initiatives to generate firm benefits is even more important to guaranteeing their environmental effectiveness.

This analysis provides some of the first cross-sectional empirical evidence about the relationship between participation in voluntary environmental programs and differentiation advantage benefits such as firm prices and sales. It identifies key conditions that have to be met by voluntary initiatives in order to generate these benefits. The research also identifies factors and firm characteristics related to participation in voluntary programs in developing countries. Data were gathered from hotel participation in the Costa Rican Certification for Sustainable Tourism. This program is also expanding to other Central American Countries and the World Tourism Organization recently adopted it as its voluntary environmental initiative for hotels. Thus, despite its limitations, this assessment can provide important insights to policy makers who are implementing the CST program in other countries.

Factors associated with participation in the CST program

Findings show that government monitoring, trade association membership and hotel focus on 'green' consumers are significantly related to higher participation in the CST program. This evidence points out how the CST program is complemented by the general regulatory environment, the policy network context, and the competitive dynamic prevailing in the Costa Rican hotel industry. Lack of general government monitoring would greatly reduce participation. Therefore, as predicted by previous studies, traditional mandatory pressures should be seen as a key ingredient to encourage voluntary behavior by firms (Cashore and Vertinisky, 2000; Khanna, Quimio and Bojilova, 1998; Henriques and Sadorsky, 1996). A policy network characterized by a history of cooperation between the government and the private sector has encouraged the proactive role of the Chamber of Tourism in promoting the CST program. Most importantly, these regulatory and industry association pressures are exerted in the context of a market with a significant segment of environmentally aware tourists ('green' consumers). The absence of this segment of 'green' consumers would significantly reduce incentives for participation in the CST program. Hence, it is not surprising that large international chain hotels that serve less environmentally conscious business travelers are less likely to enroll in the program.

It also important to note that despite the positive reinforcement of these factors in Costa Rica, less that ten percent of hotels operating in the country have decided to enroll in the CST program. Additionally, the majority of enrolled hotels show low levels of beyond compliance environmental performance. Although these results cannot be generalized beyond Costa Rica, promoters of the CST program in other countries can learn from this evidence. For instance, it would not be unreasonable to expect even lower levels of enrollment and environmental performance in countries that: (1) lack a significant segment of 'green' consumers, (2) fail to show minimum government oversight, (3) have less cooperative policy networks, or (4) lack organized hotel industry associations.

CST program and differentiation advantage benefits

Results show that participation in the CST program alone is not significantly related to differentiation advantages that yield higher prices or higher sales. Only CST affiliated hotels with higher levels of environmental performance show a significant association with higher room prices. These findings suggest that the CST program is taking advantage of market incentives in the form of price premiums to promote superior environmental performance. Firms that enrolled in the CST with 'free-riding' purposes are not gaining significant price premiums. Under the relatively weak regulatory context of Costa Rica, this is a basic condition that has to be fulfilled by the CST to be used as an effective environmental policy instrument.

According to the resource-based theory, voluntary initiatives have to fulfill specific necessary conditions to avoid 'free-riding' behavior and differentially grant price premium benefits to firms with the best environmental performance. First, they have to be controlled by an independent third party. Second, using performance-based standards, they have to provide a clear indication of a firm's superior environmental performance. Finally, they have to target industries that have a significant segment of 'green' consumers.

These necessary conditions are met in Costa Rica where: (1) the CST program is controlled by an independent National Accreditation Commission; (2) green leaves of environmental excellence are granted based on adherence to performance-based standards; (3) the hotel industry has a significant segment of 'green' consumers. Yet, the conditions met in Costa Rica suggest important limitations for the use of the CST program in other developing countries. For instance, the presence of a significant segment of 'green' tourists is critical for voluntary programs like the CST to succeed in generating price premiums.

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Notes

1. **Minimum sample size.** Results of a power analysis indicated that a sample of at least 138 observations was necessary to have an 80% chance of rejecting a false null hypothesis at 95% confidence (Cohen and Cohen, 1981, 59). This was assuming that environmental performance, the independent variable of interest, had a 'small' effect size on the regression model (about 5% unique variance of the dependent variable explained).
2. **Sample frame.** To prepare the sample frame, the following sub-lists of hotels were developed, with all duplications eliminated: (1) hotels receiving tax-exceptions from the Ministry of Tourism, (2) hotels that were members of the Chamber of Tourism, Chamber of Hotels, and Association of Small Hotels, (3) hotels listed in the Costa Rica phone book; and (4) hotels listed in the following travel guides: A New Key to Costa Rica (Blake and Becker, 1998), The Berkeley Guide to Central America (Nystrom and Smith, 1996); Lonely Planet (Rachowiecki, 1997); Fodor's Costa Rica 99 (Rockwood, 1999). The sample frame was then divided into 6 groups based on their location in the country: Atlantic coast, central metropolitan area (includes the cities of San Jose, Alajuela, and Cartago), central Pacific, north Pacific, south Pacific, and north central region. Finally, hotels were randomly drawn from each geographic group.
3. **Probit model of participation** (see Table 4). Three observations had missing data for the variables involved in the model and were excluded from the analysis. Regression diagnostic tests and index plots (see note 4 below) revealed the best model fit resulted after eliminating influential outlier observations 103 and 65. Additional regression diagnostic tests did not show more influential observations.
4. **Regression diagnostics.** Tests and index plots developed by Pregibon (1981) and by Belsley, Kuh

and Welsh (1980) were respectively used to identify influential and/or ill-fitted observations on the probit and ordinary least square models, they included: (1) Hat matrix diagonal to detect observations with extreme values in the independent variables. (2) Outlier points were detected using Studentized Residual measures. Dffits and Dfbetas were used to estimate the extent to which the omission of an individual case caused a change in the fitted regression equation.

5. **Price linear regression model.** Ten observations had missing data and were excluded from the analysis. Condition index and variance inflation measures for OLS Model 1 were not greater than the critical values suggested in the literature. This indicates that 'harmful multicollinearity' did not affect this model (Balsley et al., 1980: p. 105). White's chi-square test for heteroscedasticity was also insignificant indicating the lack of nonconstant error variance (White, 1980).
6. **Occupancy linear regression model.** Due to missing data, ten observations were excluded from this Model. Condition index tests showed lack of serious multicollinearity problems. Similarly, lack of heteroskedasticity problems was confirmed by an insignificant White's chi-square test.

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