Sustainable Entrepreneurship and the Effects of Climate Change

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Introduction

Sustainable entrepreneurship is the field of study and practice that explores opportunities to exploit market failures in a sustainable manner, particularly when environmental challenges arise (Dean & McMillen, 2007; Dean & Winn, 2007). Entrepreneurship researchers primarily focus on opportunities to mitigate climate change, not opportunities to exploit the effects of climate change. It takes widespread collaborative efforts to mitigate climate change (George, Howard-Grenville, Joshi, & Tihanyi, 2016). However, the resultant daily, weekly, monthly, and seasonal impacts of climate change can be managed by businesses and potentially exploited (Craig, 2019). Accordingly, we present a camping case to study the effects of climate change on tent and RV sales at a for-profit campsite in Shepherdsville, Kentucky. The campsite is located in the central climate region of the United States (Karl & Koss, 1984) in close geographic proximity to a popular tourism destination, Mammoth Springs National Park.

Literature Review

Sustainable entrepreneurship involves the exploitation of market failures, especially those with adverse environmental consequences like climate change (Dean & McMillen, 2007; Dean & Winn, 2007). Researchers have conceptualized how entrepreneurs can contribute to climate change mitigation within the context of sustainable entrepreneurship (e.g., Dean & Winn, 2007; x & York, 2011). But it remains widely unstudied how entrepreneurs can exploit the consequences of climate change. To address this gap, we operationalize climate change using the Camping Climate Index (CCI; Ma, Craig, & Feng, 2020a), a composite tourism climate index developed and validated using camping occupancy.

We utilize a climate index approach because most outdoor activities (e.g., camping) are sensitive to multiple weather variables and variable combinations are unique dependent on activity (Scott, Rutty, Amelung, & Tang, 2016). For instance, the Weather Channel (weather.com) provides a GoRun index that includes four weather variables that influence running favorability including temperature, humidity, wind, and precipitation. Comparably, the CCI consists of three weather variables (i.e., mean temperature, dew point temperature, and sunshine hours) and four weather extremes (i.e., maximum temperature, minimum temperature, precipitation, wind) that influence camping favorability. CCI conditions have significantly changed over the past four decades across the contiguous United States (Ma, Craig, & Feng, 2020b) warranting the use of the index as a proxy for climate change. Additional details about the CCI are provided in the methods section.

Camping is a form of tourism and recreation (Brooker & Joppe, 2013) that represents a useful case to study the effects of climate change because of the industry's susceptibility to weather and weather extremes (e.g., Craig & Feng, 2018; Craig, 2019; Hewer et al., 2018; Ma et al., 2020a; Verbos, Altschuler, & Brownlee, 2018). This susceptibility provides businesses opportunities where conditions are improving and threats where conditions are worsening (Craig, 2019). Yet, effects of weather and climate on camping remain understudied (Verbos et al., 2018), a second research gap we address. Using a camping case study at a for-profit campsite located in

Shepherdsville, Kentucky, we are interested in the potential for outdoor tourism businesses in the region to exploit the climate change market failure:

Research Question 1: How is the CCI related to tent camping sales?

Research Question 2: How is the CCI related to RV camping sales?

Methods

Daily tent and RV sales data (USD$) were provided for the for-profit camping business location from January 1, 2007 to October 31, 2016 (n=7,182 observations). There were 10 days missing from the RV data (January 1 to 10, 2007). Rather than omit the days from the time series, the dates were populated using the average sales of corresponding days from 2008 to 2016. To maintain confidentiality, we do not provide any additional information about the business.

The CCI equally weights (i.e., 50%) thermal comfort (i.e., mean temperature and dew point temperature) and daily sunshine hours. The CCI contains a mechanism to force the index score to unfavorable (0-3) if daily extreme weather thresholds are exceeded for maximum temperature, minimum temperature, heavy precipitation, or high winds. In addition to unfavorable, the CCI also indicates acceptable (3-5), good (5-7), and favorable camping conditions. Daily data for weather variables needed to calculate the daily CCI was retrieved from NASA (2021). For full explanation of the CCI is calculated, including scale weights, sub-rating systems, and thresholds, see Ma et al. (2020a).

Using SPSS v. 25, stepwise linear regression was conducted to test the research questions. The dependent variables in the models are tent and RV sales, the independent variable CCI, and a control variable is included for weekends (i.e., Friday or Saturday or not). Using the "enter" method, weekends were entered a step prior to CCI, and the entire dataset was sorted by season, a differencing technique to remove non-linearity.

Results

Results demonstrate that the CCI significantly explains variability in tent and RV sales for 80% of the observations with the exceptions of tent camping in the winter and RV camping in the summer. There are only two instances out of the eight where the CCI explains the greatest variability in sales including fall (Adj. r^2=.186, p=.000) and winter (Adj. r^2=.021, p=.000) for RV camping, though the winter model only explains a small percentage of variability. Weekend effects (i.e., Friday or Saturday or not) are significant at the $p < .01$ level for all but one model, winter for RV sales. Weekends explain the majority of variability in sales for six of the eight observations. Because there are a limited number of campsites (n=11), the dollar value effects of CCI on tent sales is minimal but significant. With 140 RV campsites, the effects of CCI and weekends are more salient. For instance, a one-unit change in CCI in the fall represents $185.60 in daily RV sales (β=185.60, p=.000) and the weekend effect in the summer represents $1,127.05 in daily RV sales (β=1,127.05, p=.000).

Table 1. Stepwise linear regression for daily tent and RV sales from January 2007 to October 2016

KY Tent	*Adj. r^2*	*β*	*SE*	*t*	*Sig.*
Spring					
Weekend	.097	149.29	14.83	10.07	.000
CCI	.105	8.14	2.80	2.91	.004
Summer					
Weekend	.310	134.07	6.56	20.43	.000
CCI	.319	4.63	1.27	3.64	.000
Fall					
Weekend	.150	58.72	4.34	13.54	.000
CCI	.229	7.92	.83	9.57	.000
Winter					
Weekend	.014	1.54	.43	3.58	.000
CCI	.016	.29	.16	1.77	.077
KY RV	*Adj. r^2*	*β*	*SE*	*t*	*Sig.*
Spring					
Weekend	.157	116.04	85.37	13.61	.000
CCI	.210	127.31	16.12	7.90	.000
Summer					
Weekend	.288	1127.05	58.34	19.32	.000
CCI	.288	-11.86	11.31	-1.05	.295
Fall					
Weekend	.151	921.31	61.84	14.90	.000
CCI	.337	185.60	11.80	15.73	.000
Winter					
Weekend	.006	37.55	15.94	2.36	.019
CCI	.027	26.41	6.01	4.40	.000

Conclusions and Discussion

This study explores the effects of an environmental market failure, climate change, on tent and RV sales at a for-profit campsite. Like previous studies, we find that weather and extreme weather are related to camping, but unlike the studies we also find that it is not the most salient factor for the focal campsite (e.g., Craig & Feng, 2018; Hewer, Scott, & Gough, 2018). Controlling for weekends, we observe that an institutional factor (i.e., the weekend effect) is the strongest predictor of sales, but that the CCI is also a significant predictor for tent and RV sales for the majority of observations. One of the seasons where the CCI is not significant is summer for RV sales, a possible indication of the summer holiday institutional effect, when travelers tend to take vacations to national parks because of the availability of leisure time (Hewer et al., 2018). The six observations where the CCI is significant indicate that the for-profit campsite is able to exploit the daily weather conditions in a sustainable manner (i.e., it did not add additional camping capacity during the study period). Granted, during the study period weather conditions were not managed, so the daily dollar values represented by β can potentially increase with active management. Compared to all other regions from 1984 to 2019, the central region where the focal campsite is located experienced the greatest improvement in favorable CCI days (Ma et al., 2020b). Based on significant findings for CCI and sales, we assert that campsites and other outdoor ventures are capable of exploiting favorable weather conditions that are increasing as a byproduct of climate change.

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