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RESEARCH ARTICLE

Does price gouging happen in the lodging industry? Case of Hurricane Florence

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Abstract
This study examined price gouging in the lodging industry using the case of Hurricane Florence made landfall in North Carolina. Performance percentage differences were used to determine whether hotels charge exceptionally high room rates in the wake of an emergency. The study supported the notion of price gouging in the lodging industry in the name of the application of revenue management even though price gauging is illegal and prohibited. Extreme increases in room rates were apparent in Wilmington where the Hurricane Florence made landfall and nearby areas in a response to a higher demand, thus resulting a higher revenue. In addition, the closer to Wilmington the hurricane made landfall, higher price increases were detected. The moderating effect of the month on the relationship between distance from landfall and ADR changes was also observed. However, the term of price gouging is often associated with exploitation, so hoteliers should be mindful whether unpredicted additional revenue generated after the hurricane is enough to offset criticism price gouging receive, especially in its legal terms and ethical considerations.

Keywords Revenue management · Price gouging · Ethics · Lodging industry · Hurricane

Introduction

A hurricane is a tropical cyclone, a rapidly rotating storm system characterized by a low-pressure center, a closed low-level atmospheric circulation, strong winds, and a spiral arrangement of thunderstorms that produce heavy rain (Simpson and Weiner 1989). In the Northern Atlantic Ocean, a distinct cyclone season occurs from June 1 to November 30, sharply peaking from late August through September (Atlantic Oceanographic and Meteorological Laboratory (AOML) 2019). Significant damage is possibly triggered by strong winds and rain, high waves, storm surges, and the potential of spawning tornadoes. Strong winds and rain may cause considerable structural damage to buildings, roads, and crops as well as extensive flooding and landslides in sloped areas. High waves due to winds pushing on the ocean's surface often cause the water near the coast to rise higher than the usual sea level, resulting in storm surges, salt contamination of agricultural areas, and possibly considerable coastal erosion (AOML 2019; Granvorka and Strobl 2013).

While hurricanes frequently cause severe property damage and destruction, ironically, for some, times of crisis such as natural disasters and hurricanes can be a business opportunity. Times of crisis bring about increased demands on businesses as shortages (Ferguson et al. 2011). Dealing with an unprecedented natural disaster, hotels can become a heart for the visitors waiting until the roads cleared or flights resumed, and for the residents evacuated from their homes (Henderson 2005). There will be hotels closed due to extensive physical damage, presenting opportunities to those that are fully functioning. Hotels that decide to remain open during a storm or natural calamity can often earn unforeseen revenue by selling rooms to those awaiting repatriation, journalists and television crews covering the catastrophe, rescue teams, construction workers, government officials, tour operators, travel agents, and residents escaped from their homes. Government aids such as Federal Emergency

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Management Agency producing long-term arrangements to evacuees often results in up to a year of hotel consumption.

Revenue management (RM) is applied by dividing customers into different segments based on their purchase intentions and allocating capacity to the different segments at the right time to maximize a firm's revenue (Jauncey et al. 1995; Kimes 1989; Kimes and Wirtz 2003). In the lodging industry, RM is considered as an essential instrument (Ivanov and Zhechev 2012). RM implements economic theories in which equilibrium exists when the supply equals the demand in each market (Mankiw 2004). A disaster potentially results in a reduction of supply and spike in demand for some or all goods (Snyder 2009). Following the dynamic functioning of the market, economic principles of supply and demand claim that, when demand for a given product rises, prices will rise. In other words, there is a thin line between price gauging and revenue management that imposes a higher rate to maximize revenue in facing a higher demand.

Price gouging occurs when sellers of certain necessary goods sharply raise their prices beyond the level needed to cover increased costs (Zwolinski 2008). Most people think that price gouging is immoral (Zwolinski 2008) and gouging takes the form of a specific failure of respect for persons by undercutting equitable access to essential goods (Snyder 2009). Even more prominently, most states in U.S. have laws rendering the practice a civil or criminal offense (Zwolinski 2008). However, this research paper argues that price gouging still happens in the name of the application of revenue management even though price gauging is illegal and prohibited. The purpose of this study was to examine price gouging in the lodging industry using the case of Hurricane Florence made landfall in North Carolina.

Literature review

Natural disasters and the tourism industry

Natural disasters illustrate chaotic situations and exemplify the complex interrelationships between human and natural systems (Faulkner 2001). Because service businesses in tourism industry are vulnerable to electrical, communication, and other critical infrastructure failures, natural disasters can disrupt the supply and distribution chains more evidently (Lee and Harrald 1999). In the tourism industry, hurricanes can cause the destruction of infrastructure and coastal degradation, leading to lower the quality of the location as a tourist destination, at least in the short run (Granvorka and Strobl 2013). Hurricane strikes increase tourists' perceived probability or reoccurrence of future hurricanes, further discouraging tourists who are on the margins of choosing the affected destination relative to alternatives, as well as reducing future investment in the tourism industry (Granvorka and Strobl 2013). A hurricane with tremendous damage, destruction, or loss of life may create a long-lasting image that it is a dangerous and risky destination to visit and vacation (Mahon 2006). In the long run, restoring confidence among businesses and destination and convincing tourists that it is safe to visit would remain challenging (Henderson 2005).

In fact, Granvorka and Strobl (2013) studied negative impacts of hurricane strikes on tourism-dependent Caribbean economies and found that an average hurricane translates into a 2% loss in tourist arrivals for the average destruction due to hurricanes, while in contrast the very largest event caused up to a 20% reduction. In another study, Lamanna et al. (2012) assessed their resiliency handling the effects of Hurricane Gustav at the Greater New Orleans hotels. Their results indicated that 88% of hotels closed to the general public before the hurricane and were closed for an average of 4 days. Approximately 13% of hotels lost power, 17% lost telephone services, and 42% lost the minimum base of employees needed to continue providing full guest service. Moreover, Liu (2014) found that after the typhoon Morakot the Taiwanese nation park lost over 700,000 visitors in the year and a half, representing a loss of NT$1.39 billion in tourism businesses.

Right after the Indian Ocean tsunami in 2004, the hotel on the Thai island of Phuket suffered loss in revenue due to high cancellations and 'no shows.' Some guests who wanted to travel were advised not to do so because their presence would hinder rescue efforts. The hotel industry in Phuket was dependent on airlines and overseas tour operators and travel agents. Many of these cancelled flights and tours, halted sales, and ceased advertising tsunami-struck locations with customers able to defer trips or switch destinations (Henderson 2005).

Burrus et al. (2002) claimed that the strike frequencies of low-intensity hurricanes are orders of magnitude greater than those of stronger storms, so the cumulative impact of frequent "business interruption" may be significant. They examined low-intensity hurricanes striking Wilmington, N.C. region and found that the average, per-storm regional impacts of business interruption, including direct, indirect, and induced impacts, are equivalent to between 0.8 and 1.23% of annual regional output, between 1.11 and 1.63% of regional employment, and between 1.21 and 1.81% of annual indirect business taxes. While these per-storm losses may appear small, the high strike frequencies of low-intensity hurricanes produce a cumulative (in expectation) impact equivalent to a high-intensity hurricane strike causing approximately $3.7 billion in damage. Sectors dependent on tourism suffer the longest business interruption times as evacuated tourists do not generally return to the region immediately following a hurricane.

Even if there is no direct cost of hurricanes, indirect cost may occur such as agriculture or manufacturing, and there may nevertheless be spill-over effects through increased prices. Consequently, wage rises could further reduce the profit margin of tourist enterprises (Granvorka and Strobl 2013). There were also human resource difficulties to face. Exceptionally few tourist arrivals mean that tourism entities ended up being over-staffed, and tourism entities were forced to cut into working hours, reduce salaries and encourage employees to take unpaid leave until the situation improved (Henderson 2005). Employees also lost their share of the service charge and income from tips. In some cases, many employees had been released or chose to leave the affected area (Lamanna et al. 2012). Staff shortages would be likely even after recovery is more advanced because many workers left the destination to seek jobs elsewhere, precipitating fears about a labor shortage when visitor arrivals returned to normal (Henderson 2005).

Considering tourism industry deeply influenced by climatic conditions (Gómez-Martín 2005; Amelung et al. 2007; Contrady and Bakan 2008; Shih and Nicholls 2012; Taylor and Ortiz 2009; Liu 2014), limited discussion on the impact of extreme weather conditions is surprising. Crisis management, disaster recovery, and organizational continuity are important competencies for managers in both the public and private sector (Lee and Harrald 1999). Still, there is a lack of interest and research on crisis or disaster phenomena in the tourism industry, the impacts of such events, and the responses of the tourism industry to such incidents (Faulkner 2001; Liu 2014).

Revenue management

In the lodging industry, revenue management (RM) is an essential tool for firms to match supply and demand by dividing customers into different segments based on their purchase intentions and allocating capacity to the different segments at the right time to maximize revenue (Jauncey et al. 1995; Kimes 1989; Kimes and Wirtz 2003). The application of RM requires information about hotel's average daily rate (ADR), revenue per available room (RevPar), gross operating profit per available room, occupancy, etc. (Barth 2002; Lieberman 2003). RM also requires other information that relates to the demand, supply, revenues, and financial results of the hotel such as speed of booking (lead time), group sales, competitors' rates and strategies, information regarding changes in legislation, special events to take place in the destination, and any other data/information (Ivanov and Zhechev 2012).

Revenue management applies economic theories in which equilibrium exists when the supply equals the demand in each market (Mankiw 2004). According to economic principles of supply and demand, when demand rises, prices for a given product will rise. Price elasticity of demand reveals how much room demand changes in response to a change in price. If demand is price elastic, a certain price cut brings greater demand. In contrast, if demand is price inelastic, changes in price will have a small effect on demand.

Lodging demand is influenced by several factors, such as the target market, the intensity of competition, the local market, and customers' perceptions of the available substitutes (Abbey 1983). The microeconomics of a firm's financial performance within a geographic location contributes greatly to hotels' pricing strategies (Jeffrey et al. 2002). The number of hotels in the same category and the average geographical distance to these direct competitors in each location have a strong effect on pricing (Becerra et al. 2012; Lee and Jang 2013). Actions of local competitors in changing room prices lead to significant changes in demand at the local level (Olsen et al. 2008; Relihan 1989; Lee 2016).

External factors occur outside the control of management, and yet such factors can either help or hurt the performance of an organization (Hitt and Tyler 1991). The degree and rate of change occurring in the environment reflect the level of uncertainty within the environment (Olsen et al. 2008). Uncertainty results from a wide range of activities emanating from the actions of competitors, suppliers, customers, and regulators. In a stable environment, changes are continuous, and conditions are well understood and can easily be factored into decisions. However, the rate of change in the environment can be extreme when a change is rapid and discontinuous in terms of demand, competitors, technology, and/or regulation (Bourgeois and Eisenhardt 1988). Effective decision making can be challenging in this rapid, unstable environment not only because a change is so dramatic, but also because it is difficult to predict the significance of a change as it is occurring (Sutton et al. 1986). This extant study focuses on hotels' pricing strategies during uncertain times such as hurricanes that occur outside the control of management.

Price gouging

Although there is no federal anti-gouging legislation, about thirty-four states have laws against price gouging including North Carolina (Zwolinski 2008; North Carolina Department of Justice 2019). Most state statues define the act of price gouging in terms of normative concepts such as unreasonable or unconscionable; their restrictions are necessary in order to prevent merchants from taking unfair advantage of consumers (Zwolinski 2008). For example, North Carolina's price gouging law is triggered by the declaration of a state of emergency or disaster such as a hurricane, tornado, winter storm, or flooding. North Carolina statute states that during states of disaster, states of emergency, or abnormal market disruptions, it is unlawful "for any person to sell or rent or

offer to sell or rent any goods or services which are consumed or used as a direct result of an emergency or which are consumed or used to preserve, protect, or sustain life, health, safety, or economic well-being of persons or their property with the knowledge and intent to charge a price that is unreasonably excessive under the circumstances" (North Carolina Department of Justice 2019).

A disaster potentially results in a reduction of supply and spike in demand for goods which are essential to the well-being of the customer (e.g., food, water, shelter). The resulting shift in the equilibrium point between supply and demand certainly creates an upsurge in prices for essential goods that have inelastic demand, without any untoward manipulation of the market (Snyder 2009). It is assumed that when natural disasters occur, the time is uncertain, substitutes are limited, competitors remain closed due to physical damage and destruction, and demand becomes price inelastic. Since demand is price inelastic, increases in price will have a small effect on demand. This shift can easily be explained and justified by the rules of the market. From the standpoint of the dynamic functioning of the market, these higher prices should be allowed as the market can be trusted to maintain itself (Kahneman et al. 1986).

Price gouging is defined as 'a practice in which prices on certain kinds of necessary items are raised in the wake of an emergency to what appear to be unfair or exploitatively high levels' (Zwolinski 2008, p. 349). In a gouging situation following a disaster, both merchant and customer benefit from the exchange. Even if the price customers being charged is extraordinarily high and more than customers would ideally like to pay for, the fact that the customers are willing to pay shows that they understand the exchange to their advantage. Since exchange of the purchased good/service is likely to be something essential to the well-being of the customer (e.g., shelter), the exchange is likely to provide correspondingly greater utility to the customer than the merchant even at the higher than usual price (Zwolinski 2008; Snyder 2009). In fact, studies of previous spikes in the price of gasoline after natural disasters such as Katrina and Rita have found that price increases were due to the normal operation of supply and demand and not price manipulation (Montgomery et al. 2007). Price controls neither benefit consumers nor the economy because the apparent monetary savings to consumers are transformed into costs of waiting or other forms nonmarket rationing that exceed the monetary savings (Deacon and Sonstelie 1985). Until the pricing signals created by the new equilibrium increase supplies of essential goods (e.g., nearby hotels which are badly damaged are rebuilt and back in business), supplies may be insufficient to meet demand and prices will remain high (Snyder 2009).

Successful application of revenue management (RM) relies on several factors such as volume, structure, and characteristics of demand and forecasts for occupancy, number of arrivals, cancellations, no shows, RevPar, ADR, and other operational statistics (Ivanov and Zhechev 2012), and the influence of its competitors' decisions and actions and developments in the external environment (YüKsel 2007; Lee 2016). Following the dynamic functioning of the market and RM, it makes sense to raise prices in the wake of an emergency. It is unclear the act is considered as price gauging or the application of revenue management maximizing revenue in facing a higher demand. This research paper argues that price gouging happens in the name of revenue management even though price gauging is illegal and prohibited. The purpose of this study was to examine price gouging in the lodging industry.

Methodology

Hurricane Florence

The historic legacy of Hurricane Florence is record breaking storm surge of 9 to 13 feet and devastating rainfall of 20 to 30 inches, which produced catastrophic and life-threatening flooding (AOML 2019). According to National Weather Service (2018), originated from a strong tropical wave that emerged off the west coast of Africa on August 30, 2018, Florence became a tropical depression near Cape Verde on August 31 and progressed west-northwest, becoming a Tropical Storm on September 1. Florence strengthened rapidly on September 4–5, becoming a Category 4 storm on the Saffir-Simpson wind scale with maximum sustained winds of 130 mph. With the threat of a major impact in the Southeastern and Mid-Atlantic United States becoming evident by September 7, the governors of North Carolina, South Carolina, Virginia, Georgia, and Maryland, and the mayor of Washington, D.C. declared a state of emergency. Although Florence gradually weakened to a tropical storm by September 7, it regained strength on September 9 and major hurricane status with winds of 140 mph on September 10. By the evening of September 13, Florence had been downgraded to a Category 1 hurricane. Hurricane Florence made landfall near Wrightsville Beach early on Friday September 14 and weakened further as it slowly moved inland as shown in Fig. 1.

Florence produced extensive wind damage that caused catastrophic damage in the Carolinas in September 2018. By mid-morning on September 14, rescuers had already evacuated more than 200 people from floodwaters, with about 150 more awaiting rescue. Thousands of downed trees caused widespread power outages to nearly all eastern North Carolina. The storm had reportedly cut power to more than 500,000 customers in North and South Carolina by the time of landfall and caused the roof of a hotel in Jacksonville, North Carolina to collapse that morning (AOML 2019).

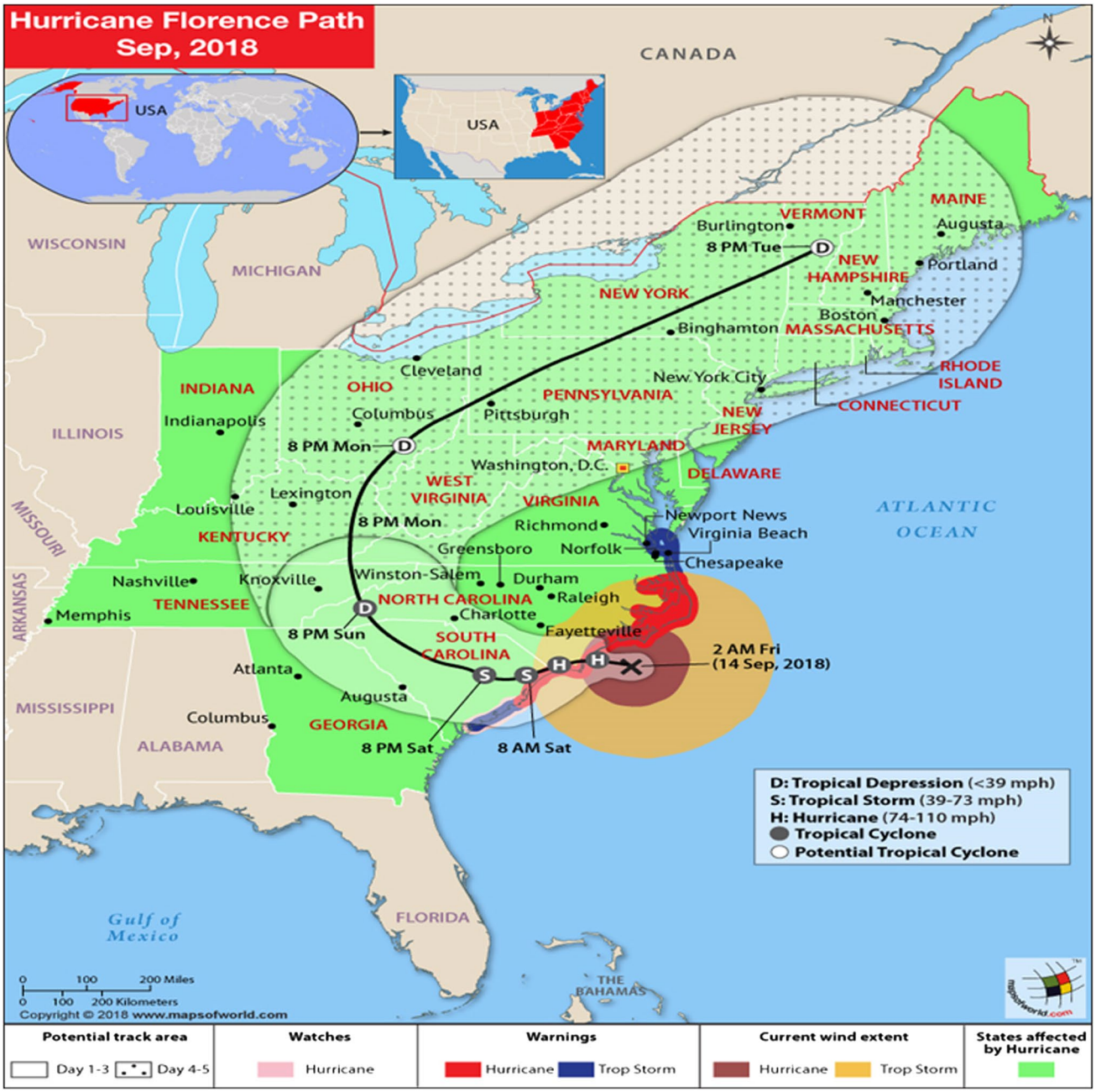

Fig. 1 Hurricane Florence path. *Source* https://www.mapsofworld.com/hurricane/hurricane-florence-path-map.html

Data

Data were obtained from Smith Travel Research (STR), which collects monthly room demand, room supply, and room revenue by property for more than 98% of the population of branded lodging properties in the United States. In cooperation with STR, we obtained data from 19,561 hotel in Wilmington North Carolina and nearby cities mainly within 91 miles radius from Wilmington NC for the years of 2017 and 2018. STR requires a minimum of four properties to constitute a competitive set. Some areas that only had 1 or no hotels reporting were excluded from the data set. The sample size was 9653 hotels in 2017 and 9908 hotels in 2018 located in Wilmington, Jacksonville, Lumberton, Havelock, Fayetteville, New Bern, Goldsboro, Smithfield, Raleigh, Lexington, Charlotte, and Dunn in the state of North Carolina and North Myrtle Beach SC, Myrtle Beach SC, Augusta GA, and Knoxville TN. The data contained monthly area-level performance data—average

daily rate (ADR), occupancy, and revenue per available room (RevPar) for 2017 and 2018.

Analysis

The key variables of interest in this study were the percentage differences on ADR, occupancy, and RevPar between 2017 and 2018 to see an impact of the Hurricane Florence. To calculate percentage difference in ADR, the monthly ADR of hotels in each city in 2017 was subtracted from the monthly ADR of 2018 and compared to the monthly ADR of 2017, expressed as a percentage. This process can be illustrated through the example of Fayetteville that shows a monthly ADR of $77.97 in September 2017, and the ADR of 2018 presents $86.48: the percentage variance is + 10.9% ([$86.48 − $77.97]/$77.97] × 100). Since ADR charged by the area in 2018 was higher than the previous year, we would say that ADR has positively increased by 10.9% compared to the previous year. The percentage differences in RevPar and occupancy were computed similarly (See Table 4 in Appendix for descriptive statistics by area). For data analysis, descriptive analysis, *t* test, analysis of variance (ANOVA), and regression analysis were used.

Results

Hurricane Florence made landfall in Wrightsville Beach, North Carolina on September 14, 2018. Wrightsville Beach is part of the Wilmington Metropolitan Statistical Area. Fig. 2 illustrates that drastic ADR percentage changes along with occupancy and RevPar changes in Wilmington compared to the previous year. September ADR of 2018 has been increased by 16.3%; October ADR by 27.6%; November ADR by 22.5%; and December ADR by 19.5% compared to the previous year. September occupancy of 2018 has been up by 19.3%; October occupancy by 46.7%; November occupancy by 54.7%; and December occupancy by 66.4% compared to the previous year. In response, their RevPar has been increased by 38.8%, 87.2%, 89.5%, and 98.9%, respectively.

In Fig. 3, ADR percentage changes in the sampled areas between 2017 and 2018 were presented. Although it is difficult to pinpoint price gouging due to lack of specific guidelines (e.g., it is unclear what price point is determined to be unfair or exploitatively high levels), it appears an extreme ADR change (4.2%) in the areas considering U.S. annual average percentage change being 2.5% between 2017 and 2018 ($t = 3.067$; $p = 0.002$); specifically U.S. average percentage changes were 1.9% for September (vs. 9.9% in the sampled areas), 2.7% for October (vs. 13.0% in the sampled areas), 1.2% for November (vs. 9.9% in the sampled areas), and 2.0% for December (vs. 8.5% in the sampled areas) in 2018 (STR 2019). Similarly, occupancy change in the areas (6.5%) seems apart from U.S. annual occupancy percentage change which was 0.4% between 2017 and 2018 ($t = 5.357$; $p < 0.001$). RevPar percent change in the areas (11.9%) appears distinguished from U.S. annual RevPar percentage change which was 2.9% between 2017 and 2018 ($t = 4.873$; $p < 0.001$).

The impact of the hurricane on hotel performances was examined using analysis of variance (ANOVA). Months were regrouped into quarters. It was found that ADR percent change significantly differed between the quarters ($F = 18.460$, $p < .001$) as shown in Table 1. Using Tukey's HSD test, the results revealed that fourth quarter recorded higher ADR percent change compared to other quarters ($M_{\text{first}} = 1.64$, $p < .001$; $M_{\text{second}} = 1.07$, $p < .001$; and $M_{\text{third}} = 3.78$, $p < .001$ vs. $M_{\text{fourth}} = 10.44$). The results also showed that occupancy percent changes and RevPar percent changes differed between the quarters ($F = 26.841$, $p < .001$; $F = 26.246$, $p < .001$, respectively). Using Tukey's HSD test, the results showed that fourth quarter recorded higher occupancy percent change ($M_{\text{first}} = -2.48$, $p < .001$; $M_{\text{second}} = 2.17$, $p < .001$; and $M_{\text{third}} = 5.74$, $p < .001$ vs. $M_{\text{fourth}} = 20.39$) and higher RevPar percent change compared to other quarters ($M_{\text{first}} = -0.72$, $p < .001$; $M_{\text{second}} = 3.31$, $p < .001$; and $M_{\text{third}} = 10.03$, $p < .001$ vs. $M_{\text{fourth}} = 34.91$).

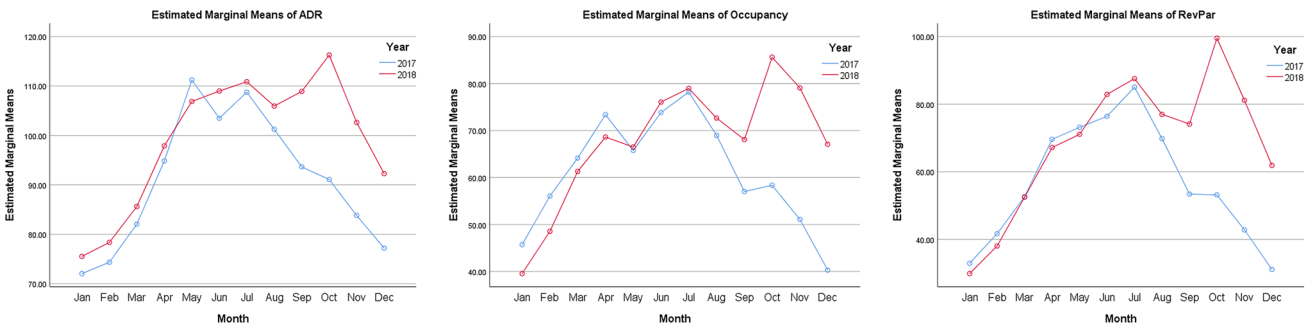

Fig. 2 Performance comparisons between 2017 and 2018 in Wilmington NC

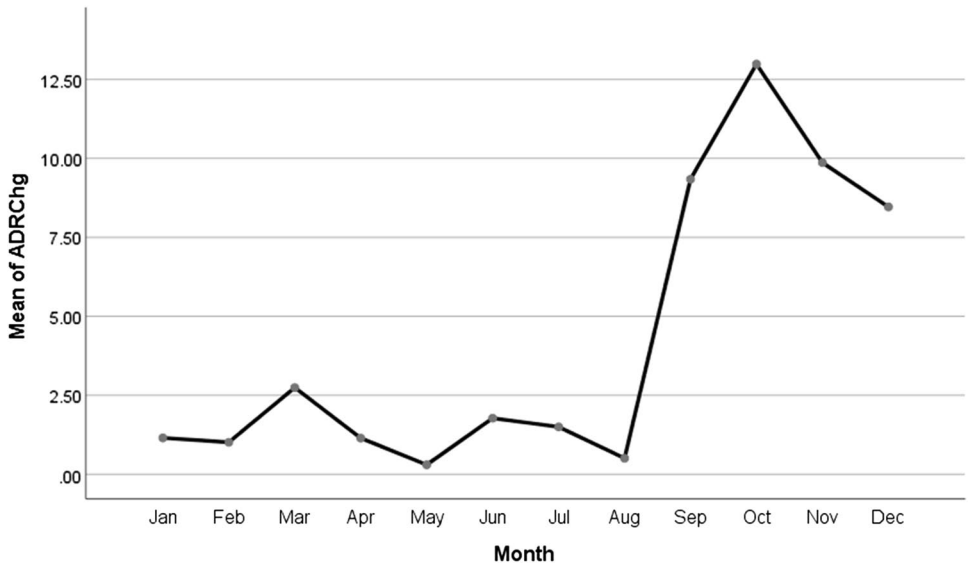

Fig. 3 Average daily rate percentage changes between 2017 and 2018

Table 1 Performance percentage changes by quarters

	Mean	Std	*F* value	Sig.
ADR % change				
January–March	1.64	3.33	18.460	0.000**
April–June	1.07	3.32		
July–September	3.78	7.28		
October–December	10.44	10.82		
Occupancy % change				
January–March	− 2.48	10.82	26.841	0.000**
April–June	2.17	6.17		
July–September	5.74	8.90		
October–December	20.39	21.53		
RevPar % change				
January–March	− 0.72	12.72	26.246	0.000**
April–June	3.31	7.46		
July–September	10.03	14.95		
October–December	34.91	37.77		

** $p < .001$

Following Hurricane Florence, hotels appear to have higher occupancy and raise their rates at higher levels, which resulted in higher RevPar. It is also observed that average lodging prices increase last even four months after the hurricane landfall. After a severe hurricane, many hotels remain closed for several months due to reconstruction and renovation, and constructions workers are flowed to the town due to their ongoing projects. It is worth noting that high standard deviations indicate not every hotel participates in a *so-called* gouging act that takes an advantage of the natural disaster.

Areas were regrouped into less than 75 miles, 75 miles–95 miles, 95 miles–130 miles, and further than 130 miles from Wilmington NC where landfall occurred. Four categories were classified based on its sample size. Table 2 depicts that ADR percent change significantly differed between the areas ($F = 3.112$, $p = .028$). Using Tukey's HSD test, the results revealed that the areas located less than 75 miles radius from Wilmington recorded higher ADR percent change compared to the areas further than 130 miles ($M_{<75} = 6.91$, vs. $M_{\text{further than 130m}} = 2.21$, $p = .017$). The results of ANOVA also showed that occupancy percent changes and RevPar percent changes differed between the areas ($F = 5.151$, $p = .002$; $F = 4.556$, $p = .004$, respectively). Using Tukey's HSD test, the results showed that the areas located less than 75 miles radius from Wilmington recorded higher occupancy rate percent change ($M_{75\text{m}–95\text{m}} = 1.87$, $p = .008$; $M_{\text{further than 130m}} = 2.62$, $p = .016$ vs. $M_{<75} = 11.89$) and higher RevPar rate percent change compared to other areas ($M_{75\text{m}–95\text{m}} = 6.52$, $p = .020$; $M_{\text{further than 130m}} = 4.88$, $p = .008$ vs. $M_{<75} = 21.34$).

Then regression analyses were performed to examine the moderating role of time (month) in relation to ADR changes and distance from landfall as shown in Table 3. Prior to conducting regression analysis, several tests were facilitated, and assumptions of regression were met (linearity, normality, independence, homoscedasticity, and multicollinearity). The first regression shows the strength of association between distance from landfall and ADR change. The R^2 was 0.029 and the model was statistically significant with $F = 5.738$ ($p < 0.05$). Distance from landfall significantly negatively explained the variation of ADR changes ($\beta = -0.171$, $p < .05$). The further out hotels are located from landfall, the less ADR changes occurred.

In the second step, the month variable was added to the model. This model explained 20.8% of the variation of the dependent variable. The Beta for distance from landfall was − 0.171, statistically significant at the 0.05 level. The effect

Table 2 Performance percentage changes by areas

	Mean	Std	*F* value	Sig.
ADR % change				
< 75 m	6.91	10.03	3.112	0.028*
75–95 m	4.09	5.80		
95–130 m	3.72	9.17		
Further than 130 m	2.21	4.30		
Occupancy % change				
< 75 m	21.34	34.18	5.151	0.002*
75–95 m	6.52	17.44		
95–130 m	14.79	30.74		
Further than 130 m	4.88	7.27		
RevPar % change				
< 75 m	11.89	20.43	4.556	0.000**
75–95 m	1.87	11.82		
95–130 m	9.43	18.16		
Further than 130 m	2.62	5.86		

*$p < .05$; **$p < .001$

of the variable "month" had a significant impact on ADR changes ($\beta = 0.422$, $p < .001$). The results further indicated that the latter time, the more ADR changes had occurred, which makes sense considering the hurricane Florence landfall happened in September 2018.

Subsequently, the third regression assessed distance from landfall, month, and the interaction—distance and month—on ADR changes. The model explained 27.3% of the variation of the dependent variable. The interaction term between the distance from landfall and month was found to be significant ($\beta = -0.637$, $p < 0.001$). In other words, compared to earlier months, during latter months the impact of distance from landfall had been strengthened on ADR changes. Figure 4 illustrates a significant moderating effect of month on the relationship between distance and ADR changes.

Step 1	ADR% changes = Distance	Significant
Step 2	ADR% changes = Distance + month	Significant
Step 3	ADR% changes = Distance + month + distance*month	Significant

Conclusion

The present study attempted to examine whether price gouging occurs in the lodging industry, in which hotels charge exceptionally high room rates in the wake of an emergency. Using the case of Hurricane Florence, the results of the study support the notion of price gouging in the lodging industry. With the threat of a major impact of Hurricane Florence, the governors of North Carolina and nearby states declared a state of emergency in September 7, 2018, which triggers anti-price gouging law in full effect. Although it is unlawful to charge a price that is unreasonably excessive under the circumstances, increases in room rates were apparent in Wilmington where the Hurricane Florence made landfall and nearby areas in a response to a higher demand (occupancy), thus resulting a higher revenue (RevPar). The fourth quarter (October to December) enjoyed highest performance percentage changes compared to the previous year. Since it is vague how much of a price increase, particularly beyond what can be justified by increases in business costs and risks of doing business, is allowed under anti-price gouging law (Zwolinski 2008; Snyder 2009), it is difficult to conclude price gouging occurred during the Hurricane Florence. However, compared with figures from the U.S. average, extreme room rate changes were observed immediately following the hurricane. In addition, the results of the study revealed that the closer to Wilmington the hurricane made landfall, higher price increases were detected. The latter month of the year, the higher price increases were also observed. The moderating effect of the month on

Table 3 Moderating effect of month on the relationship between distance from landfall and ADR changes

Independent variables	Step 1		Step 2		Step 3	
	β	*t*	*β*	*t*	*β*	*t*
Distance from landfall	− 0.171	− 2.396**	− 0.171	− 2.645**	0.311	2.347**
Month			0.422	6.525***	0.751	7.428***
Distance from landfall*month					− 0.637	− 4.120***
F statistics	*F* (1, 191) = 5.738**		*F* (2, 191) = 24.783***		*F* (3, 191) = 23.577***	
R^2	2.9%		20.8%		27.3%	
DW					0.746	

Dependent variable denotes ADR percentage changes between 2017 and 2018; *$p < .10$; **$p < .05$; ***$p < .001$

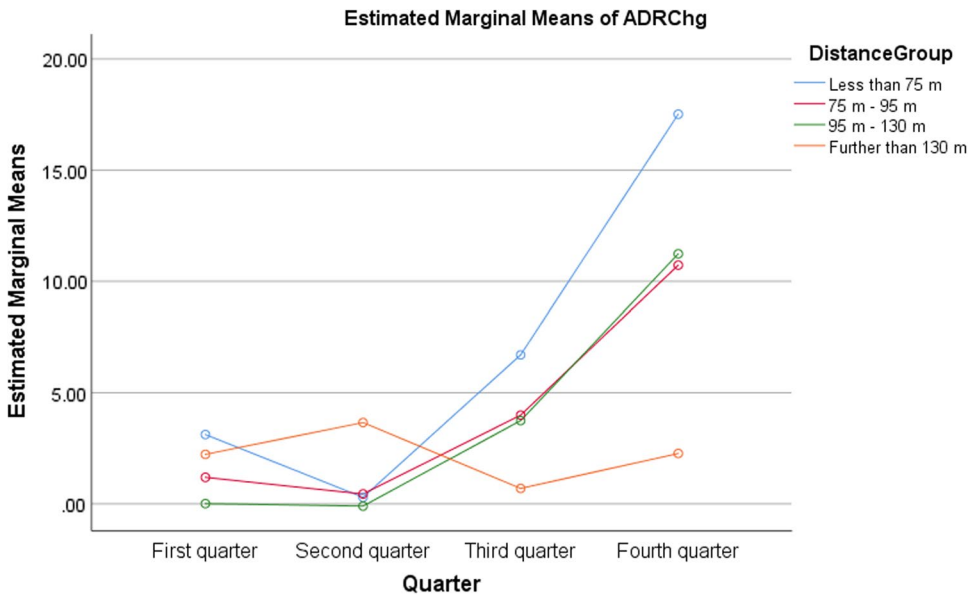

Fig. 4 Abridged interaction effect (by quarters)

the relationship between distance from landfall and ADR changes was observed.

Nevertheless, it is still difficult to conclude whether the increase in price is due to an increase in demand or price gouging. Given limited changes in supply, as people are disrupted by the hurricane made landfall, demand for lodging increases and thus price will still go up. Particularly, there are not specific criteria to detect price gouging in North Carolina, even though the state has laws against price gouging. Other states such as Florida where natural disasters are more frequent have established special fixed rates with hotels. Yet such a system has not been set up for North Carolina.

There are only few literatures on the legal aspects of hotel RM (Ivanov and Zhechev 2012) and limited to the perceived fairness of RM (e.g., Choi and Mattila 2004; Kimes 2002; Kimes and Wirtz 2003), RM trade secret leakages (Kimes and Wagner 2001), and overbooking (Hwang and Wen 2009; Noone and Lee 2011). This paper dealt with ethical issues of revenue management, thus contributing to the gap in the literature. RM guides hoteliers to raise prices when there is a higher demand and few substitutes (Lieberman 2003). It is a business opportunity for the hotels that survive through the hurricane to maximize revenue obtained from the visitors waiting until the roads cleared or flights resumed, the residents evacuated from their homes, the representatives from media following the footage of the storms, the rescue teams and policemen clearing the surrounding roads, the construction workers hired for reconstruction and repairs, and the government officials in the aftermath of the hurricane. However, the term of price gouging is often associated with exploitation and focuses on the vulnerability created by the disaster and the desperation of consumers to meet their basic needs (Snyder 2009). Some states describe price gouging as taking unfair, unreasonable, and unconscionable advantage of consumers (Zwolinski 2008). Thus, hoteliers should be mindful whether unpredicted additional revenue generated after the hurricane is enough to offset criticism price gouging receive, especially in its legal terms and ethical considerations. For a future study, fairness of price gouging from customers' point of view could benefit hoteliers. In addition, following previous scholars (Enz et al. 2009, 2012, 2015; Enz and Canina 2010), performance percentage changes were used to examine price gouging. Other metrics may be used to study price gouging in the lodging industry. Lastly, the case limited to the Hurricane Florence and its affected areas may not be representative of the population, so the results should be interpreted with caution.

Appendix

See Table 4.

Table 4 Descriptive statistics by area

	N	ADR change		Occupancy change		RevPar change	
		Mean	Std	Mean	Std	Mean	Std
Wilmington	12	13.31	27.46	9.30	9.66	25.97	41.76
Jacksonville	12	22.63	21.85	12.67	12.51	40.53	41.49
North Myrtle Beach	12	9.04	5.73	2.59	4.16	12.03	9.31
Lumberton	12	2.60	16.99	3.07	9.17	6.85	26.31
Myrtle Beach	12	1.10	5.76	1.73	2.89	2.88	6.77
Fayetteville	12	1.31	11.54	4.53	5.43	6.43	17.73
Goldsboro	12	0.97	16.74	4.26	6.34	6.08	23.34
Newbern	12	4.12	11.96	5.83	7.50	10.68	19.00
Havelock	12	18.00	30.01	9.88	16.33	33.53	53.92
Dunn	12	9.93	15.18	-0.22	3.80	10.03	18.48
Smithfield	12	7.32	10.36	2.18	3.73	9.97	14.69
Raleigh	12	2.48	5.70	3.04	1.63	5.64	7.02
Charlotte	12	− 0.40	3.88	0.98	3.87	0.68	7.20
Lexington	12	1.07	8.24	3.71	6.89	4.68	9.53
Augusta	12	5.69	5.52	1.34	1.43	7.08	5.13
Knoxville	12	4.13	2.78	2.81	3.04	7.08	5.19
Total	192	6.45	15.66	4.23	7.82	11.88	25.54

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