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Economic Impact of Crimes on Tourism in New Orleans: A Causality Analysis

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Abstract: The tourism industry is a significant contributor to the overall economic outlook of New Orleans, which is one of America's most favorable destination spots for visitors worldwide. In 2017, New Orleans welcomed 17.7 million visitors who spent more than $8.7 billion in the city, according to New Orleans and Company (2019). Tourism spending in 2021 was estimated to have created 90,000 direct jobs and direct earnings of $2.4 billion. However, increased crime rates over time could serve as a significant deterrent to economic prosperity in the city. According to the City Data crime index, the 2020 crime rate in New Orleans was 726 per 100,000 residents, representing approximately three times higher than that of the U.S., with the crime rate rising by 6% in 2020 from its 2019 level. With such a discouraging data, tourists may choose other destinations with less chance of being victimized. Using annual data, the paper adopts the Johansen cointegration model and Granger-causality test within the Vector Error Correction Model (VECM) framework to evaluate the relationship between crime and tourism. Our findings suggest no causal relationship between crime and tourism in the case of New Orleans.

Keywords: Crimes, Tourism, Causality, New Orleans

1. Introduction

Tourism has always been generally welcomed by tourist destinations worldwide, as it allows tourists to interact with residents to learn about different cultural values and cuisines and, of course, spend money impacting local economies positively. It will also enable tourists to broaden their way of thinking and give them a chance to escape from their regular daily routine at home. New Orleans, nicknamed “The Big Easy”, inhibited its influences from Europe, the Caribbean, Latin America, Africa, and indigenous people, which have made enjoying life with ease through music, food, and major festivals significant aspects of the cities’ culture (Haner, 2018). The “Big Easy” way of life became the main attraction to potential visitors, as tourists aim to have an enjoyable experience with less stress during their stay. The tourism industry continues to be a significant contributor to New Orleans' overall economic outlook. In 2017, for example, New Orleans welcomed 17.7 million visitors who spent more than $8.7 billion in the city, according to New Orleans and Company (2019). Visitors' economic contributions help support the local economy's leisure and hospitality sector. According to the U.S. Bureau of Labor Statistics, over 13% of the total nonfarm employment in New Orleans is in the leisure and hospitality sector of the economy as of July 2023, representing a 12-month growth of 3% from July 2022 to July 2023.

Tourism in destination spots, by its nature, tends to cluster strangers from different backgrounds together in a relatively small area. This situation tends to increase the opportunity for crime to be committed. For example, according to the City Data crime index, the 2020 crime rate in New Orleans was 726 per 100,000 residents, which represented approximately three times that of the U.S., as the crime rate in the city rose by 6% in 2020 from its 2019 level. With such discouraging data, tourists may choose other destinations with less chance of getting victimized. The reputation of the destination city would likely be damaged in terms of safety, attractiveness, and comfort by negatively affecting visitors' perceptions of that destination, thus causing a downturn in the tourism economy (Sönmez et al., 1994). Of course, visiting any tourist destination anywhere involves some level of risk. However, where the risk is perceived to outweigh the benefits, then a rational decision would be not to embark on such trips.

1.2. Hurricane Katrina's Impact on Tourism

New Orleans is below sea level, making it susceptible to easy flooding. On August 29, 2005, New Orleans experienced the most damaging and deadliest Category 5, Hurricane Katrina, which flooded over 80% of the city, killed over 1,800 citizens, and, of course, devastated its tourism industry (Meyersohn, 2017). In the wake of Katrina, the number of tourists dwindled to 3.7 million between 2004 and 2006, representing a startling 63 percent drop. Spending numbers also reduced, with visitors spending 42 percent less in 2006 than in 2004. Ten years later, however, the city bounced back. In 2014, more than 9.5 million visitors traveled to New Orleans, spending over $6.8 billion in the local economy (Whitten, 2015; Pettus and Sinclair, 2022). Much of the rebounding success of the tourism industry has been attributed, in the literature, to the rebranding of New Orleans as a "come back city" even after such a major disaster. Much of the numerous festivals continued to be held annually; vigorous efforts were put forth to restore the downtown areas, including the French Quarter. Tourists were not only able to continue to enjoy the usual events (French Quarter, Mardi Gras, Essence Festivals, etc.) but, as an added attraction spot, they were also able to witness the resilient of the City as it recovered from the disaster caused by the Hurricane (Gotham, 2007; Robbie, 2008).

Some authors have suggested that tourism destinations, by themselves, might also be a culprit in attracting perpetrators from outside the region during special events. Many potential criminals will tend to go to the destinations to seek tourists to victimize (Grinols, Mustard, and Staha, 2011). Section 2 of this paper investigates the theoretical linkage between crime and tourism. Section 3 presents an analysis of crime and tourism, specifically as it pertains to New Orleans. Section 4 presents the literature review of empirical studies. Section 5 presents the methodology and data used for the study. Section

6 outlines the empirical findings for the period of the study. Section 7 presents the diagnostic results, and section 8 provides the conclusion.

2. Theoretical Linkage between Crime and Tourism

In the literature, three generally analyzed theoretical approaches have been put forward to explain the linkage between crime and tourism: 1) routine activity theory, 2) hot spot theory, and 3) the economic theory of crime. The routine activity theory (Cohen and Felson 1979; Harper, Khey, & Nolan, 2013) is based on the notion that three elements must converge for a crime to occur. The three elements are 1) a likely offender must exist, 2) a suitable target to be victimized, and 3) a lack of guardianships (e.g., law enforcement officers) who can prevent the victimization. Tourists are considered suitable targets because they tend to have valuables (cash, jewelry, etc.) with them. Furthermore, tourists have limited time to spend in the area and may not be willing to pursue any kind of criminal case against the perpetrators, which is usually time-consuming. However, if any of the three elements do not occur, a successful criminal activity would be prevented. Thus, the theory suggests that a crime will likely occur when an offender comes in contact with a suitable target in an appropriate environment where no guardian exists.

The hot spot theory, developed by Crotts (2003), explains that relatively few places are highly susceptible to increased opportunities for crimes to occur. Tourist victimization tends to be concentrated in susceptible places, generally referred to as hot spots. As such, the theory would suggest that the French Quarter in New Orleans, as a “hot spot,” would attract criminal activities because of its popularity with tourists. For example, reportedly, according to New Orleans and Company, estimates show that between 80% and 90% of tourists to New Orleans visit the French Quarter at some point during their stay (Brand, 2022). Unsurprisingly, however, over 40% of the crimes committed in New Orleans reportedly occurred in the French Quarter in 2021. Furthermore, in an interview conducted by WGNO-TV, Louisiana reporter McAllister (2021), a local entrepreneur in the French Quarters lamented that “the recent chaos in the French Quarter (where at least ten people were shot two weeks earlier) was taking a toll on local businesses, including his own” with the suggestion that if high crime rates persist, tourists were going to start looking elsewhere to visit.

Becker (1968) introduced the economics theory of crime based on the rational thinking concept of making choices in the marketplace. Looking at crimes as products, a potential criminal would apply logic in deciding whether or not to engage in criminal activities. The increased presence of law enforcement officers in any environment is expected to increase the potential cost of engaging in criminal activities for fear of being arrested and incarcerated. However, where the perceived cost is outweighed by the perceived direct benefits, then criminals would not be deterred from committing crimes. Criminals are not necessarily concerned about the negative externalities resulting from their selfish acts, such as possibly turning potential victims' lives upside-down and increasing the stress level of the general public. The motivation to commit a crime may be based on one of the aforementioned theoretical frameworks. Notwithstanding, this paper aims to empirically examine the impact of crimes on tourism, which is a significant contributor in the growth of the New Orleans economy.

3. Tourism and Crime in New Orleans

3.1. Tourism Impact

The number of annual visitors to New Orleans ranged from approximately 9.5 million in 2014 to 19.8 million in 2019, doubling visitors within five years (see Table 1, below). In 2023, according to the U.S. Bureau of Labor Statistics, the tourism sector employed over 79,000 workers in New Orleans, representing an increase of 3% from its 2022 level. The sector's total employment amounted to approximately 14% of the total nonfarm employment in New Orleans, surpassed by only two other sectors (trade, transportation, and utilities; and education and health services).

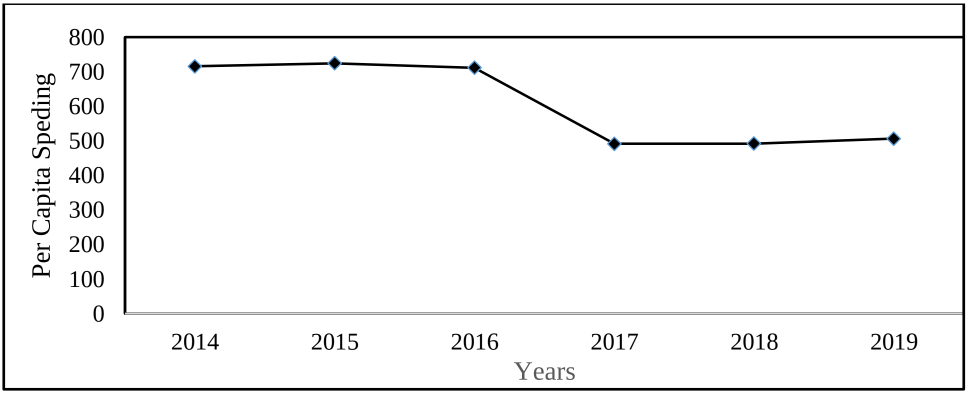
Table 1: Number of New Orleans Visitors 2014-2019

Year	Number of Tourists (millioins)	Amount of Money Spent (millions)
2014	9.6	$6800
2015	9.8	$7100
2016	10.4	$7400
2017	17.7	$8700
2018	18.5	$9100
2019	19.8	$1005

Sources: www.statista.com

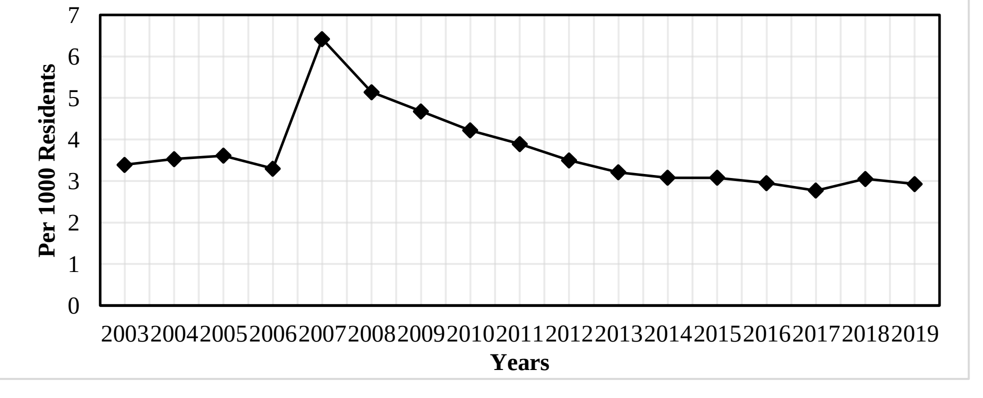
The growth rate of the total number of tourists was over 108% from 2014 to 2019, while the amount spent by tourists grew by only 32% for the same period. The annual growth rate between 2014 and 2016 remained relatively low until 2017, when it increased tremendously to 17.7 million visitors (Vultaggio, 2020). Chart 1 below shows that the per capita spending dropped significantly from approximately $716 in 2014 to $507 in 2019. This suggests that, even though more visitors were being welcomed to the city from year to year, the dollar amount spent by each person visiting continued to drop. More demands were being placed on the city services to provide a hospitable environment for visitors but with reduced resources. The drop in per capita spending impeded the city's ability to provide the number of police officers to guard special events, such as Mardi Gras and Essence Festivals. According to Baker and Stockton (2014), the lack of an adequate number of police could create an environment with increased opportunities for tourist victimization. Chart II shows that the number of police officers per 1000 residents in New Orleans dropped from a high of 6.42 in 2007 to 2.93 in 2020. Amid this shortage of police officers, the City tends to bring in out-of-town police officers for support in significant events during the carnival season to deter crime (Maccash, 2023). In addition, due to the most recent rampant crime waves in 2024 in the French Quarter chronicled widely by the local and national news and social media, the State of Louisiana declared a state of emergency and then established a new permanent state special police force in New Orleans called "Troop NOLA", to assist in curbing violent crime in the French Quarter – the most prominent tourists' destination spot in New Orleans.

Chart 1: Per Capita Spending by Visitors in New Orleans, 2014-2019



Sources: www.statista.com

Chart II: Officers in New Orleans, 2003-2019



Sources: https://www.city-data.com/crime/crime-New-Orleans-Louisiana.html

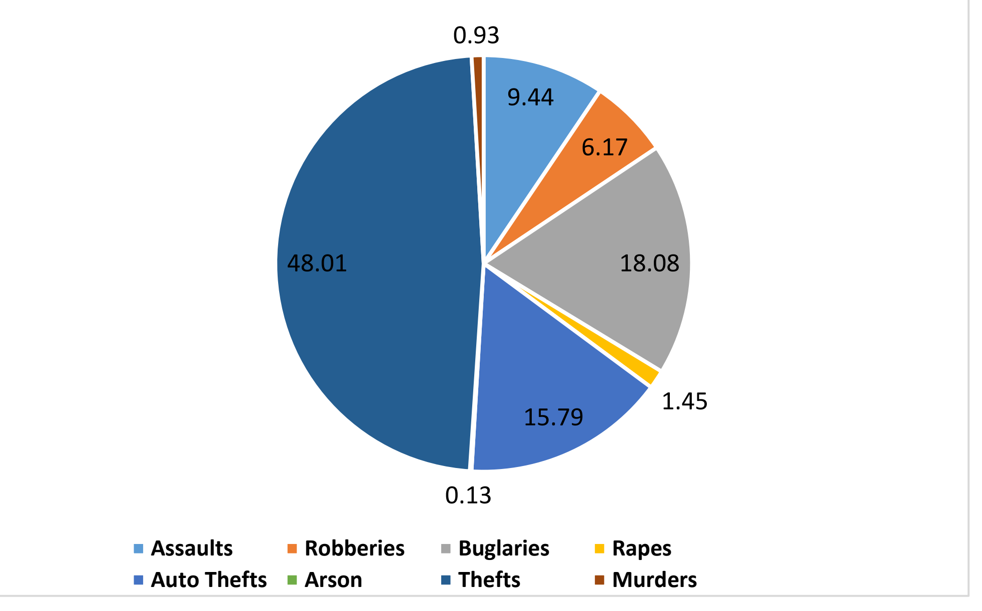
3.2. Crime Impact

Unfortunately, New Orleans' reputation for crime has been discouraging in recent history. Chart III below provides the crime rates in New Orleans by type from 2003 to 2020, which suggests that the most prevalent crime types in New Orleans were theft (48%) followed by burglaries (18%), auto theft, and assaults (6.9%). Generally, these are the types of crimes that are committed against visitors, as they are perceived to have significant amounts of money and other valuables on hand (Lisowska, 2017). Tourists tend to engage in activities such as staying out late at night (in nightclubs, bars, etc.) - the types of behavior they refrain from in their home environment. Furthermore, visitors' language barrier could increase the risk of being more vulnerable to potential criminals. Many visitors go on vacations to their chosen destinations to enjoy themselves. However, some tourists tend to attract unnecessary attention from criminals by engaging in careless behaviors with their safety and belongings in strange surroundings. Criminals can quickly identify these types of visitors in a crowd, thus increasing the chances of being victimized. This is especially true when the visitors show signs of being intoxicated. According to the New Orleans Police Department, French Quarter's thefts and pickpocketing increased by nearly 70%, and that 44% of the increase occurred on Bourbon Street (Cummings, 2024). Bourbon Street in the French Quarter is the most prominent tourist spot in the City, akin to what "The Strip" is to Las Vegas and what "Beale Street" is to Memphis. In recent years however, federal, state, and city officials have embarked on various proactive policing strategies, such as increased police presence from various agencies in crowded surroundings, creation of several crime-fighting task forces, etc., in an attempt to curb overall crimes. These strategies appear to be yielding the desired outcome. For example, in June 2024, one of the task forces named "Operation Clean House" spearheaded by the FBI, along with 18 other state and local law enforcement agencies, completed a month surveillance effort to identify and arrest New Orleans' most violent offenders which resulted in 155 arrests and the seizures of 54 firearms (Wilkinson, 2024).

According to a report released by the United States Department of Justice, New Orleans saw one of the largest declines in violent crime nationwide from 2022-2023. The data shows homicides down by 27%, rapes down by 12%, robberies down by 31%, and aggravated assaults down by 16% (Strahan, 2024). To continue on this aggressive path towards crime reduction, effective July 4, 2024, the carrying of a concealed gun by a non-felon became legal without a permit in New Orleans, courtesy of a new law passed by the Louisiana State legislature. Many residents of the City are skeptical of the overall impact the law would have on reducing crime. Skeptics questioned whether more guns on the streets of New Orleans, especially in the French Quarter, is a good message to send to tourists, especially with the recent uptick on shootings occurring in the French Quarter

(Kerth, 2024). Since the State of Louisiana lawmakers could not be convinced to make the French Quarter an exception of the law, local leaders of New Orleans creatively found a loophole in State law that allows for the exception by converting the 8th district of the New Orleans Police Department, located in the French Quarter, into vocational technical school. State law prohibits anyone from carrying concealed weapons within 1,000 feet of such a facility, which in this specific case, includes significant portion of the French Quarter (McGill, 2024). However, many other residents argue that carrying a gun is a constitutional right that must not be violated and believe that the carrying of concealed gun carry law will deter crime in New Orleans. As the debate rages on, given that the French Quarter is a major economic driver to New Orleans tourism industry, it is unsurprising to see different crime reduction strategies put forth by stakeholders, with the idea that, if successful, a safer and secure environment will follow, which will eventually lead to a boost in the tourism industry and increased level of economic activities.

Chart III: Average Annual Crime Rates in New Orleans by Type, 2003-2020



Sources: https://www.city-data.com/crime/crime-New-Orleans-Louisiana.html.

4. Literature Review of Empirical Studies

The literature on the nexus between crime and tourism suggested some attributes of the potential tourist who is most likely to experience crime victimization. The attributes include the background of the tourist, travel experience, and knowledge of the culture, and region of the tourist destination of choice. For example, age and gender have been postulated to be significant factors for criminals when choosing their victims (Brunt, and Shepherd, 2004). Young and elderly individuals are more likely to be targeted by criminals, especially when vacationing alone. Safety issues are paramount in the process of deciding where to visit (Pizam, Tarlow & Bloom, 1997). As such, the expectation is that a safe environment, as perceived by the visitor, would tend to lead to increased visits. However, the results of many empirical studies have found that this has not always been the case. On the one hand, a consensus among many authors is that increased crime rates do impact tourism negatively (De Albuquerque and McElroy, 1999; Levantis and Gani, 2000; Alleyne and Boxill, 2003; Nkosi, 2010; Lorde and Jackman, 2013; Moyo and Ziramba, 2013; Muzib and Banerjee, 2016; Parida, Bhaardwau and Chowdhury, 2018; Matakovic and Matakovic, 2019). As such, tourists would be more likely to be drawn to a destination with a low crime rate. It is assumed that visitors are not likely to want to visit an area with a high chance of being victimized. Alleyne and Boxill (2003), for example, in empirically testing the crime-tourism nexus in Jamaica using data from 1962 and 1999, found that crime rates have an adverse influence on tourism arrivals. Businesses that rely on tourism would tend to suffer. Harper's (2001) findings support the consensus among scholars that tourists are more likely to be victimized in high-crime areas. Moyo and Ziramba (2013) found that crimes, such as carjacking and murder, have a negative relationship with the number of tourists in South Africa.

On the other hand, few other studies found no significant relationship between crime and tourism in tourist destinations (Baker and Stockton, 2014; Njoloma and Kamanga, 2019). Baker and Stockton (2014) stipulated that crimes, per se, are not significantly related to tourism as the introduction of increased tourism in a low-crime destination would not result in increased tourist victimization. However, when tourism is introduced in already high-crime destinations, there tends to exist a significant impact on the rate of crimes committed against tourists. In their study, Njoloma and Kamanga (2019), surmised that there is an insignificant relationship between crime rates and tourists in Malawi. Our purpose is to expand the literature, using annual data, to examine whether crime and tourism are related in New Orleans from 1995 to 2019 with the Johansen cointegration model and the Granger causality tests procedure.

5. Methodology and Data

In our analysis, we recognize that there are several types of crimes (assaults, auto thefts, robberies, etc.) that impact tourists differently in various destinations worldwide (Ferreira and Harmse, 2000; Moyo & Ziramba, 2013). This paper will examine the impact of the selected types of crime on tourism in New Orleans. As a trending model, Johansen cointegration is expressed in equation 1 because it is an explicit function of time. It thus allows us to determine the existence of a long-run relationship between crime and tourism. The model is specified as follows:

$$T_t = \alpha_o + \alpha_1 A_t + \alpha_2 L_t + \alpha_3 AT_t + \alpha_4 B_t + \alpha_5 R_t + \varepsilon_t \qquad (1)$$

All variables are converted into natural logarithm form since we assumed the model follows a linear form. T_t represents the number of tourists to New Orleans at time t as the dependent variable. $A_{t,}$ L_t, AT_t, B_t and R represent assaults, larceny, auto thefts, burglaries, and robberies at time t as the explanatory variables, respectively and ε_t is the error term. If we can show that a long-run relationship exists among the variables in the model, then the Granger causality in the framework of the VECM would be used to determine whether a causal relationship exists between crime and tourism. A precondition to proceed with this approach, however, is that unit root tests must first be conducted to determine the stationarity of the variable series in the model. This is because the use of non-stationary data series to conduct empirical testing would lead to misleading results (see, Nelson and Plosser, 1982). The Augmented-Dickey Fuller (ADF) unit root tests approach will be used to ascertain the stationarity of the variable series in Equation 1 (Dickey and Fuller, 1979). The general ADF test model is expressed as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \beta Y_{t-1} + \sum_{i=1}^{n} \delta_i \Delta Y_{t-i} + \varepsilon_t \qquad (2)$$

Y_t represents each of the data series in Equation 1. Δ is the first difference operator, α_0 is constant, α_1 is the coefficient of the time trend, ε_t is the error term, and n represents the number of lags, which is chosen to ensure the errors are uncorrelated and determined by the suggestion of Akaike Information Criterion (AIC). In this case, for the period of analysis for the study of equation 1, the suggested optimal number of lags is 2. The null hypothesis of the existence of a unit root in the variable series is tested against the alternative hypothesis of no unit root. Where the null hypothesis cannot be rejected, then we can surmise that unit root exists and conclude that the series is non-stationary. The next step, then, would be to test the first difference of the nonstationary data. If the series is stationary after first differencing for all series, I(1), then the requirement to use the Johansen cointegration methodology has been met, as all series in the model are stationary of the same order. The Johansen cointegration method allows for further testing to determine if a long-run relationship exists among the variables in the model (Johansen and Juselius, 1990).

5.1. Johansen Cointegration Model

The Johansen cointegration model can be expressed as follows (Chang, Liu, and Caudill: 2004):

$$Y_t = u + B_1 Y_{t-1} + B_2 Y_{t-2} + \ldots + B_k Y_{t-k} + \varepsilon_t,\ t = 1, 2, \ldots, T, \tag{3}$$

where Y_t represents the p number of variables that have been determined to be I(1) and $\varepsilon_i, \ldots, \varepsilon_t$ are $i.i.d.N_p$ $(0,\Omega)$. After first differencing the levels, Equation 3 can then be re-specified in the VECM framework as follows:

$$\Delta Y_t = u + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{k-1} \Delta Y_{t-k+1} - \Pi Y_{t-1} + \mathcal{E}_t, \tag{4}$$

where $\Gamma_i = B_1 + \ldots + B_i - I$ for $i = 1,2,\ldots, k-1$ and $\Pi = I - B_1 - \ldots - B_k$

There are two types of statistics (trace and maximum-eigenvalue) of Johansen tests for examining the number of cointegrating vectors among the p-variables. The trace statistic is defined as:

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n}\ln(1-\hat{\lambda}_i), \tag{5}$$

While the eigenvalue statistic is computed as:

$$\lambda_{\max}(r,\ r+1) = -T\ln(1-\hat{\lambda}_{r+1}), \tag{6}$$

The maximum-eigenvalue test is considered superior to the trace test when the sample size is large. To test a model empirically, the inclusion or non-inclusion of a trend component could lead to different results. However, Perron & and Campbell (1993) showed that in some cases the inclusion of a trend component is necessary. They outlined several advantages of including a trend component, especially within the cointegration testing framework. Once the existence of cointegration is established among the variables, the next step would be to apply Granger causality tests using the Vector Error Correction Models (VECM) to ascertain whether a Granger causal relationship exists among the variables.

5.2. Granger Causality within the VECM Framework

The VECM allows for the testing of short-run and long-run causal relationships. Furthermore, it is imperative to note that the cointegration among variables does not necessarily mean a smooth movement of the variable series together toward equilibrium. The VECM model allows for the determination of whether the variables are on an equilibrium path and the speed of adjustment to get there. The VECM can be expressed as follows (see, Engle and Granger, 1987):

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n}\Delta Y_{t-i} + \sum_{i=1}^{n}\delta_i \Delta X_{t-i} + \varphi ECT_{t-1} + \epsilon_t \tag{7}$$

ECT is the error correction term which, in essence, is the OLS residuals obtained from equation 1. The coefficient of ECT, φ, is the dependent variable's speed of adjustment to equilibrium after changes occur in the explanatory variables. We expect the coefficient to be statistically significant with a negative sign. That means, in the case of the existence of disequilibrium in one direction, the negative sign of φ suggests the model would eventually be pulled back in the opposite direction to allow for equilibrium in the long run. Also, the short-run dynamics are ascertained by evaluating the coefficients of the explanatory variables. If we find the p-value of each coefficient to be statistically significant, we can reject the null hypothesis and conclude that there is a short-run Granger causality running from each of the explanatory variables to the dependent variable.

5.3. Data

Annual time series data were used for this study for the period between 1995 and 2019. Tourism data, specifically for the city of New Orleans, appears to be not readily available to allow for reliable empirical results. Therefore, as a proxy, we used statewide data from the State of Louisiana Tourism Office. New Orleans is the most dominant tourist destination spot in the State of Louisiana. Crime data for the State of Louisiana was obtained from the annual Uniform Crime Reports of the FBI for both violent and property crimes committed in New Orleans for the period under review.

6. Empirical Results and Discussion

The results of ADF unit root tests are presented in Table 2 (with constant only) and Table 3 (with constant and trend). The null hypothesis that each variable series has a unit root cannot be rejected at their level, meaning the variable is not stationary. However, after first differencing, the results show that we can reject the null hypothesis that each series has a unit root at the 5% level of significance which means we can conclude that all data series are stationary at the same order I(1). Therefore, the Johansen cointegration model is adopted to determine whether there is a long-run relationship among the variables.

Table 2: Augmented Dickey-Fuller Unit Root Test Results (with constant only)

Variables	ADF statistic Level	ADF statistic First Difference	Critical values	P-Values	Order of integration
ln T	0.21	-4.41*	-3	0.0003	I(1)
ln A	-1.47	-3.47*	-3	0.0009	I(1)
ln L	-1.36	-3.41*	-3	0.0106	I(1)
ln AT	-1.28	-3.08*	-3	0.0282	I(1)
ln B	-1.29	-3.18*	-3	0.0209	I(1)
ln R	-1.32	-3.32*	-3	0.0141	I(1)

Note: * denotes a 5% level of significance. *ln* denotes the variables are in natural logarithms form.

Table 3: Augmented Dickey-Fuller Unit Root Test Results (with constant and trend)

Variables	ADF statistic Level	ADF statistic First Difference	Critical values	P-Values	Order of integration
ln T	-1.34	-5.02*	-3.6	0.0002	I(1)
ln A	-3.47	-3.72*	-3.6	0.0009	I(1)
ln L	-3.41	-3.62*	-3.6	0.0106	I(1)
ln AT	-3.08	-3.18*	-3.6	0.0282	I(1)
ln B	-3.19	-3.40*	-3.6	0.0209	I(1)
ln R	-1.79	-3.47*	-3.6	0.0432	I(1)

Note: * denotes a 5% level of significance; *ln* denotes the variables are in natural logarithms form.

Table 4: Johansen Cointegration Test Results

Null Hypothesis	**Test Statistic**	**5% Critical Value**
Num. of CE(s)		
λ_{trace} tests		
rank = 0	200.89	94.15
rank ≤1	66.5	68.52*
rank ≤2	38.34	47.21
λ_{max} tests		
rank = 0	134.39	39.37
rank ≤1	28.16	33.46*
rank ≤2	17.72	27.07

Note: * selected rank.

From Table 4, we conclude that the null hypothesis of no cointegration among the variables is rejected since the trace test statistic (λ_{trace}) of 200.89 is greater than the 5 percent critical value of 94.15 at rank = 0. However, at rank ≤1, we conclude that there is at least one cointegration vector in the model since the test statistic of 66.5 is less than the critical value of 68.52 at the 5 percent significance level.

A similar observation emerges when we examine the maximum-eigenvalue statistics (λ_{max}). The null hypothesis of no cointegrating vectors r = 0 against the specific alternative r ≤ 1 is rejected. However, the test of the null hypothesis r ≤1 against the specific alternative r ≤2 cannot be rejected. The implication, therefore, is that the variable series are cointegrated. It implies the variables will move closer together toward equilibrium in the long run.

VECM shows the speed at which the system will move toward equilibrium after a temporary disturbance in any one of the explanatory variables. We can also assess both the long-run causality and short-run causality among the variables. The results of the

VECM test, which allows for ascertaining the normalized cointegrating coefficients, are presented in Table 5.

Table 5: Vector Error Correction Model Results (Dependent Variable: $\Delta ln T_t$)

Variables	Coefficient	Standard Error	t-statistics	P-Value
ΔlnT	-0.175	0.266	-0.66	0.511
$\Delta ln A_{t-i}$	-0.003	0.035	-0.07	0.942
$\Delta ln L_{t-i}$	0.045	0.109	0.41	0.682
$\Delta ln AT_{t-i}$	0.522	0.466	1.12	0.262
$\Delta ln B_{t-i}$	0.188	0.262	0.72	0.481
$\Delta ln R_{t-i}$	0.206	0.787	0.29	0.771
ECT_{t-i}	-0.037	0.067	-0.55	0.584
Constant	0.055	0.035	1.56	0.118

The R^2 value of the VECM is 0.938. The result shows that if the VECM system is pulled away from equilibrium in the short run, it would eventually revert to equilibrium evidenced by the negative sign of the coefficient of the error correction term in Table 5. But, the speed at which it would revert to equilibrium is not statistically significant at the 5% level. As such, we cannot reject the null hypothesis that there is no long-run or short-run Granger causality among the variables in our model.

7. Diagnostic test

Table 6 provides the test results for serial correlation, normality, and heteroscedasticity as follows:

Table 6: Diagnostic test results

Items	Tests	p-value	Decision
Serial Correlation	Breusch-Godfrey LM test	0.3047	No serial correlation
Normality	Jarque-Bera test	0.4059	Residuals are normally distributed
Heteroskedasticity	Breush-Pagan Godfrey test	0.3209	No heteroskedasticity

The null hypothesis of no serial correlation, normality, and heteroscedasticity cannot be rejected since the probability values (p-values) > 0.05. As such, we can confirm the absence of serial correlation and heteroscedasticity in the model and that the residuals are normally distributed.

8. Conclusion

This study examines the causal relationship between crime and tourism in New Orleans. The types of crimes analyzed in the model included assault, larceny, auto theft, burglary, and robbery between 1995 and 2019. Using the Johansen cointegration model, we found that crime and tourism are related in the long run. However, based on our results using the VECM model, we cannot show that crime caused tourism either in the long or short run. Our findings suggest that tourism in New Orleans is not driven by crime as defined by the types of crime analyzed in this paper. This implies that tourists are primarily not dissuaded by the possibility of the existence of crime in the city when planning their visits. Instead, crime prevention behaviors may be adopted in an attempt to avoid being victimized. Our finding is consistent with that of Dimanche and Lepetic (1999), where it was concluded that many of the positive reasons for tourists to visit New Orleans are not likely to be outweighed by the possibility of being criminallyvictimized when proper precautions are taken.

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