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The Impact of Hurricane Katrina on Crime in Louisiana

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by

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Abstract

The literature surrounding variables affecting crime is infinite; however, little of that research, especially in economics, focuses on how hurricanes affect crime. In addition, much of the research that has been conducted on this is conflicting. Thus, this paper seeks to shed light on this topic using Hurricane Katrina's impact on Louisiana as a case study. Using crime data from the FBI UCR and ICPSR from 1995-2014, I employ a differences-in-differences (DD) strategy to estimate the hurricane's effect on burglary, larceny, motor vehicle theft, robbery, aggravated assault, and murder. My findings suggest burglary, larceny, and robbery increase following the hurricane, while other crime rates (motor vehicle theft, aggravated assault, and murder) do not change. The results of this study have multiple implications and present numerous avenues for future research.

Acknowledgements

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List of Abbreviations

CDC   Centers for Disease Control and Prevention

DD   Differences-in-Differences

FBI   Federal Bureau of Investigation

LA   Louisiana

Chapter 1: Introduction

One factor that researchers have sought to investigate is how hurricanes impact the crime rates of affected communities. Unfortunately, economists have conducted little research on the effects that hurricane landfalls have on communities. In the most recent memories of many Americans, Hurricane Katrina stands out as a natural disaster of biblical proportions. Louisiana has consistently been impacted by natural disasters of similar magnitude. Thus, Louisiana serves as an excellent case study for this topic, since it has been plagued with hurricanes throughout its existence. From 1851 to 2004, Louisiana has been hit by 49 hurricanes, and out of those, 18 were at least a category 3 hurricane (Blake, Jarrell, and Rappaport).

On August 23, 2005, Hurricane Katrina began as a tropical depression over the Bahamas. It made its initial landfall as a category 1 hurricane in Florida before passing over the warm waters of the Gulf of Mexico and making its second landfall as a category 3 hurricane in Plaquemines Parish, Louisiana on August 27th. An analysis conducted by the Federal Emergency Management Agency (FEMA) indicates that Orleans Parish and St. Bernard Parish suffered from extreme flooding (Hurricane Katrina, 2019). Although New Orleans was not directly hit by the hurricane, its levees were destroyed by the hurricane, and over 80 percent of the city was flooded for two weeks (Frailing and Harper, 2007). Consequently, law enforcement was occupied with search and rescue missions, leaving the city in a state of chaos (Frailing and Harper, 2007). Katrina has proven to be one of the costliest hurricanes in US history, with the Office for Coastal Management estimating reparation costs totaling approximately $161 billion. The exact death toll from Hurricane Katrina is still not known to this day.

In light of this, my research investigates how hurricanes have contributed to crime in Louisiana, and more specifically, how Hurricane Katrina impacted various crime rates in this historic state. The findings from this study will have numerous implications and will help to provide some clarity on a complex topic.

Chapter 2: Literature Review

The attempt to determine what affects crime is one of the most popular, and seemingly straightforward, topics in economics that researchers have attempted to address. Yet upon closer investigation, it becomes much more complicated and complex to tackle than upon initial evaluation. Corman and Mocan (1999) succinctly explain the economic conceptual theory behind crime: "Optimizing individuals engage in criminal activities depending upon the expected payoffs of the criminal activity, the return to legal labor market activity, tastes, and the costs of criminal activity, such as those associated with apprehension, conviction and punishment" (1).

The causes and implications of crime have relevance to many sectors of the economy, from education to healthcare. In addition, there is a plethora of variables that can affect crime, from economic recessions and governmental policies to environmental conditions. Consequently, much research has been conducted as to how specific factors affect various types of crimes in a variety of fields. However, much of the findings from this research are conflicting or inconclusive.

Crime has both direct and indirect costs to not only the victim of the offense, but also to the economy. Deterrence efforts and law enforcement must be funded, which are paid for through taxes (Gibbons, 2004). The U.S. Department of Education reported an 89

percent increase on state and local spending on corrections 1989 to 2013. In addition to this, crime has also been found to have effects on the labor market, such as unemployment rates, and can lead to wage inequality among homogenous workers (Burdett, Lagos, and Wright, 2001). Thus, it is relevant to everyone to examine the possible variables affecting crime, as more and more of the government's budget is diverted towards paying for the costs of crime and less is spent on other important areas of the economy, such as education and healthcare.

It is not unreasonable to predict that some types of crime may increase in response to the chaos and destruction hurricanes cause, and there is literature to support that. Although the literature in the field of economics regarding crime and natural disasters is sparse, there is a considerable amount of research on this topic in crime and geography journals. Spencer and Strobl (2019) find that hurricanes cause crime to rise by 35 percent. More specifically, they find that aggravated assault, break-ins, and shootings increase during hurricanes, while murder, rape, and robbery decline. Spencer and Strobl assert that the response of crime to hurricanes is largely determined by whether there is a storm warning. However, Leitner, Barnett, Kent, and Barnett (2011) provide support for the contrary and find that crime rates remain stable or even decline in areas that receive evacuees.

According to Walker, Sim, and Keys-Mathews (2012), using data from Hurricane Ivan in Alabama, larceny declines during the landfall of hurricanes, while burglary tends to increase. Zahran, Shelly, Peek, and Brody (2009) find that property crimes (burglary, larceny, and motor vehicle theft) decrease in response to natural disasters as well. Varano, Schafer, Cancino, Decker, and Greene (2010) on the other hand, find little to no

relationship between crime and hurricanes. Thus, it is not quite clear whether to expect crime to increase or to decrease in response to hurricanes and other natural disasters.

Using data on hurricanes Bertha and Fran that hit North Carolina, Ewing and Kruse (2005) find that hurricanes cause unemployment rates to rise. In addition, using data on hurricanes that impacted Florida, Belasen and Polacheck (2008) find that in counties directly hit by hurricanes, employment decreases and wages increase. Belasen and Polacheck attribute this increase in earnings to demand shocks in the labor market triggered by the hurricane in counties directly hit. However, neighboring counties see a decrease in earnings in wake of hurricanes, according to their study. These findings, though, present another possible relationship to be examined.

According to Becker (1968), rational economic agents will decide whether to engage in criminal activity in response to economic incentives, such as legal and illegal market opportunities, that will maximize utility. Consequently, this leads to the expectation that a decrease in legal real wages will lead to an increase in crime (Mocan et al., 2005). Supporting this theory are Machin and Meghir (2004), who find that increased wages have significant and large impacts on crime rates using data from England and Wales. Doyle, Ahmed, and Horn (1999) also establish a negative relationship between wages and property crime. In addition, Bignon, Caroli, and Galbiati (2016) state that "individuals with high reservation wages are unlikely to commit property crimes as a result of an unemployment spell" (27). If they have a higher opportunity cost, they are less likely to commit the crime.

Mocan and Unel (2011) note an asymmetric relationship between crimes and wages, in that a decrease in earnings has a stronger impact on crime when compared to an

increase in earnings of the same size. They also find no impact of wages on violent crime. In addition, Williams and Sickles (2002), find no statistically significant relationship between crime and wages. They note that one possible reason for this is that current wages may not serve as the best measure of the opportunity cost of crime.

As with wages, the relationship between crime and unemployment can vary drastically when discussing different types of crime. Much of the research conducted on the relationship between property crime and unemployment points to a positive relationship between these two variables. Edmark (2005) finds a positive relationship between unemployment and property crime, which she defines as burglary, robbery, car theft, bike theft, theft/pilfering from motor vehicles and shops respectively, and fraud. Moreover, research conducted by Raphael and Winter-Ebmer (1998), Lin (2008), and Bignon et al. (2016) provide further support for a positive relationship between property crime and unemployment. Prescott and Pyle (2019) confirm Raphael and Winter-Ebmer's findings as well.

The relationship between unemployment and violent crimes is unclear. Many researchers find no relationship between unemployment and violent crimes, while others find a positive relationship, and yet others find even a negative relationship. For example, Tsushima (1996) finds a positive relationship between unemployment and homicide. Similarly, Frailing, Harper, and Serpas (2015) suggest that Katrina's effect on the drug market indirectly impacted New Orleans' murder rate, noting that the murder rate in New Orleans increased immediately after the hurricane. They mention that another possible cause for this increase in murder is due to the dramatic decrease of emergency medical facilities during this period. Supporting the positive relationship between unemployment

and violent crimes are Nordin and Almén (2011), who find that long-term unemployment leads to an increase in violent crimes. These findings suggest that the motivational perspective has a stronger effect here.

In regards to the relationship between unemployment and larceny, the literature is inconclusive. In Bijou Yang Lester's paper (1995), a positive relationship between the two is established, and Cantor and Land (1985) provide compelling support for this as well. However, others find a negative relationship between unemployment and larceny, such as Britt (1994). Also establishing a negative relationship between unemployment rates and larceny is Lee (2018).

Chapter 3: Data

The crime data utilized for this project has been collected from the FBI Uniform Crime Reporting Program (UCR) through the Inter-University Consortium for Political and Social Research (ICPSR). The data from the ICPSR is a part of the UCR county-level detailed arrest and offense data series consisting of yearly observations from 1995 to 2014 for all states at the county level. Data used from this series include counts of arrests and offenses for murder, rape, robbery, aggravated assault, burglary, larceny, auto theft, and arson and counts of arrests for forgery, fraud, embezzlement, vandalism, weapons violations, sex offenses, drug and alcohol abuse violations, gambling, vagrancy, curfew violations, and runaways, according to the UCR. From these, I limit the crime types to murder, robbery, aggravated assault, burglary, larceny, and auto theft since those are most commonly used in the literature. I subsequently use these counts to calculate the

rates at parish level per 100,000 people for each year to control for parish and county size.

Data reported to the FBI's UCR Program is submitted on a voluntary basis. For those agencies that choose to participate in the program, reports on crimes known to the police and on persons arrested are provided to the UCR. The data is typically collected annually with uniform crime definitions that are sent to a centralized repository within the state, which are subsequently forwarded to the UCR. Crime rates included in this study are at the county and parish level for all states from 1995 to 2014. Since my paper is only concerning parishes[1] within Louisiana, I limit the sample data to Louisiana for the main analysis.

Unemployment information is collected from the Bureau of Labor Statistics. Variables collected from the BLS are at the parish level and are yearly estimates from 1995-2014; US territories are excluded. Demographic variables are collected from the CDC and include total white population per county and total female population per county.

Table 1 presents the summary statistics and descriptions of the main variables, which are separated based on whether the area was a parish affected by Hurricane Katrina. Most variables in parishes affected by Katrina have higher rates than in those not affected by Katrina. Aggravated assault is the only exception. In addition, I conducted a t-test to compare the true means between parishes affected by Katrina and parishes not affected by Katrina for all of the variables. Burglary, motor vehicle theft, larceny,

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[1] Louisiana has a parish system rather than county system.

robbery, and murder have statistically different means between those parishes affected by Katrina and those not affected by Katrina.

Table 2 presents the summary statistics and descriptions of the main variables. It is apparent from these statistics that nearly all types of crimes rates in Louisiana are substantially higher than the US average, specifically the murder rate (7.08 per 100,000 compared to 3.26), larceny rate (1,901 compared to 1,465), robbery rate (65.1 compared to 37.96), motor vehicle theft rate (168.89 compared to 142.43), burglary rate (709.04 compared to 527.64), and the aggravated assault rate (409.47 compared to 188.55).

Chapter 4: Empirical Strategy

A differences-in-differences (DD) model is used to estimate the effect that Hurricane Katrina had on crime in New Orleans. Hurricane Katrina can be considered an exogenous, or random, event because of its unpredictable nature, as most people have little warning and only a short amount of time to prepare for the hurricane. The treatment group in this model is comprised of the parishes in Louisiana affected by Hurricane Katrina, and the control group consists of parishes in Louisiana that were not affected by Katrina. The estimation equation for the DD model is as follows:

$$Crime_{ct} = \alpha_0 + \alpha_1 Katrina_c + \alpha_2 Post_t + \alpha_3(Katrina_c \times Post_t) +$$
$$\alpha_4 U_{ct} + \alpha_5 W_{ct} + \alpha_6 F_{ct} + \mu_t + \eta_c + \pi_{ct} + \varepsilon_{ct},$$

where $Crime_{ct}$ represents the crime rate in the particular parish c in year t, $Katrina_c$ is a dummy variable signifying the parishes that were affected by Katrina, $Post_t$ is a dummy

variable to represent the years after Hurricane Katrina, U_{ct} is the unemployment rate, W_{ct} is the percent of whites in a parish, and F_{ct} is the percent of females in a parish. Also included in the regression are time trends, μ_t, parish fixed effects, η_c and parish-level time trends, π_{ct}. The error term in the equation is represented by ε_{ct}. Standard errors are clustered at parish level. The parameter of interest in the equation is the coefficient of the interaction term, $\alpha_3(Katrina_c \times Post_t)$, which is created from the Katrina parish dummy and post-Katrina dummy. This signifies the differences-in-differences estimate, and it shows the impact of Katrina on crime in parishes after the fact based on whether they were impacted by the hurricane.

Chapter 5: Results

Main Results

The results from the regression estimating the effect of the hurricane on crime in Louisiana are presented in Table 3, and the interpretation of the interaction term is of particular interest. The *Katrina County*Post Hurricane* interaction term coefficient is positive for all of the crime rates; however, not all are statistically significant. For burglary, the DD coefficient is 332.4 and is statistically significant at the 5 percent level. In other words, in parishes hit by Katrina after the hurricane hit, the burglary rate increased by 332.4 per 100,000 people. This appears to coincide with the findings presented in Figure 1, as the burglary rate sees a sharp increase right after Hurricane Katrina. Moreover, these results support the findings presented by Walker, Sim, and Keys-Mathews (2012) that the burglary rate increases in response to hurricanes. One possible explanation for the increased burglaries in the wake of the hurricane is lack of

law enforcement during this time of chaos and that much of this type of crime is a crime of opportunity. During chaotic times like the period following a hurricane, much of law enforcement efforts are diverted to rescuing civilians from the flooding. It is then possible that criminals recognize this and use this as an opportunity to steal and burglarize, which would explain the increase in burglary. In addition, during this time, people lose their jobs, decreasing the opportunity cost of committing crime.

Larceny also increases by 506.4 per 100,000 people when regressed against the differences-in-differences estimate, and it is statistically significant at the 10 percent level. This finding is somewhat supported by the graph, as larceny does increase some after the hurricane. One possible explanation for this increase in the larceny rate is that Hurricane Katrina caused many people to lose everything, including their jobs and their homes. As many people had no way to earn an income, they resort to crimes like larceny which explains the increase seen here. In addition to larceny and burglary increasing, robbery increases in response to the interaction variable as well by 59.57 per 100,000 people, and is statistically significant at the 10 percent level. It certainly plausible for larceny to increase for similar reasons as burglary and larceny.

The DD coefficient for motor vehicle theft, however, is not statistically significant, so it does not appear to be responsive to the hurricane. This matches the graph presented for motor vehicle theft, as the slope does not appear to change for affected parishes after the hurricane; it merely continues downward. One plausible explanation is due to the fact that since many people evacuated prior to Katrina, there were probably fewer cars left to steal or many of the cars that remained were damaged, and thus the motor vehicle theft rate does not change.

Although the coefficients for aggravated assault and murder are both positive, neither are statistically significant, meaning that the DD coefficient is to be interpreted as 0. In other words, aggravated assault and murder neither increase nor decrease in response to the hurricane, so I am unable to provide evidence that supports the literature in regards to these two crimes.

The Katrina variable is positive and statistically significant for all crimes except for larceny and murder. For motor vehicle theft and burglary, it is positive and statistically significant at the 10 percent level. It is statistically significant at the 1 percent level for aggravated assault, and it is statistically significant at the 10 percent level for robbery. For both of these crimes just mentioned, this implies that crime is higher in counties hit by Hurricane Katrina than in counties not hit by Katrina, independent of time.

The post-hurricane variable is statistically significant for motor vehicle theft and aggravated assault, whose coefficients are -23.16 and 114.1, respectively. This means that crime is higher in parishes after Hurricane Katrina hit, regardless of whether it was affected by Katrina. Race does not appear to play a role in crime based on these results, as none of the coefficients are statistically significant. As for the female coefficient, it is positive and statistically significant for burglary and robbery. In other words, the more females there are in a parish, the higher rates of burglary and robbery we see. This could suggest that more females are the victims of burglary and robbery, possibly because they are targeted for these kinds of crimes more often.

Event-Study Analysis

One of the main assumptions of the differences-in-differences estimate is the parallel trends assumption, which assumes that in the absence of treatment (Hurricane Katrina), the control and treated groups would have continued in a parallel fashion. To test this assumption, I conducted an event-study analysis in which I allowed the treatment (the hurricane) to have an effect in the years prior to its impact. As explained by Altindag, Filiz, and Tekin (2020), "If these placebo effects are statistically significant…then we would worry that the "parallel trends" assumption fails" (17). The results from the event-study are most easily represented graphically and are presented in Figure 3. The point estimates of the interaction are represented by the bars, and the lines signify the 95 percent confidence interval. As Katrina occurred in 2005, the omitted year is 2004.

Based on Figure 3, we can see that for all crime rates there are no pre-existing differences between affected and non-affected parishes. In other words, the interaction term between Hurricane Katrina and years before Katrina are not statistically different than one another. For burglary, larceny, and motor vehicle theft, there is a clear difference between parishes before and after the hurricane. I also conducted the same analysis on the total crime rate, which is the summation of the crime rates in this study. The same pattern is observed for total crime as well. These results suggest that the parallel trends assumption holds for most of the outcome variables and that Hurricane Katrina is an exogenous event, allowing for a causal interpretation in the main results.

The Continuing Impact of Hurricane Katrina

To evaluate the continuing impact of Katrina on the parishes it hit, I create a post-Katrina dummy variable first for the year 2006, where it is set to equal 1 if the year is 2006 and 0 for all other years, then 1 for 2006 and for 2007 and 0 for all other years, and so on until 2011. Interacting each of these post-Katrina year dummies with the Katrina county dummies allows us to specifically see the impact of Katrina each year after its landfall in affected parishes in more detail. The results from this are presented in Table 4. Every row for each crime variable represents a separate regression where the linear time trend, parish level time trends, and parish fixed effects are controlled for. Based on the table, it appears that Katrina has the longest lasting impact on burglaries, as its coefficient is positive and statistically significant for all six post hurricane variables I create. Consequently, this can be interpreted as Hurricane Katrina causing burglary to increase for several years after its landfall. Katrina also appears to have caused all but murder to increase; however, the result is not long-term.

Comparing the Effect of Hurricane Katrina to Other Hurricanes

In Appendix Table 1, I run a model in which the interaction terms represent various hurricanes rather than just Hurricane Katrina to compare the effect of Katrina to other hurricanes.

The first panel in this table, Panel A, presents the main results from Table 3 and is shown here for comparison purposes. In Panel B, the interaction term is created from all category 3 hurricanes that hit Louisiana within the designated time period. Burglary, motor vehicle theft, robbery, and murder increase in response to the interaction term,

Hurricane County*Post Hurricane. All but motor vehicle theft are statistically significant at the 1 percent level; motor vehicle theft is statistically significant at the 10 percent level. As for Panel C, only aggravated assault and murder are statistically significant, and it is at the 10 percent and 1 percent level, respectively. Aggravated assault decreases in response to the interaction term, while murder continues to increase. All other crime rates remain stagnant when regressed against the interaction variable. One possible explanation for these differences is that the different hurricanes have varied effects on crimes depending on how the counties or parishes prepared for the hurricane.

Chapter 6: Conclusion

This study has sought to investigate the impact of hurricanes on crime using Hurricane Katrina's impact on Louisiana as a case study. Given that there is such sparse literature in economics on this topic specifically, this paper contributes significantly to the literature by filling that gap in it. Consequently, much of the literature included in my research comes from geography sources; however, even the literature that does exist in other fields is conflicting. Some predict particular crimes to decrease in response to hurricanes, while others predict no response or even an increase for those same crime rates.

The results presented in this study suggest that Hurricane Katrina caused burglary, larceny, and robbery to increase following its landfall. These findings hold even after controlling for numerous specifications and provide compelling evidence for the sparse literature. The extensions I conduct in this study suggest that Hurricane Katrina had a lasting impact on Louisiana, especially on the burglary rate, which saw an increase for

years after the landfall of Katrina. This coincides with what can be seen of places that received the worst of the hurricane, like New Orleans, which has never fully recovered from the hurricane. My findings from this study partially support those from Walker et al.'s (2012) study, which predicts a decrease in larceny and increase in burglary. Future research on this topic in economics could further examine the effect of hurricanes on other types of crime.

There are several implications that follow as a result of this study, the main of which being on law enforcement policies in areas affected by hurricanes. As the results of my research lend support to the opportunity perspective, law enforcement policies should consequently be focused at increasing the opportunity cost to committing crimes, especially in the wake of natural disasters like hurricanes.

References

Altindag, D. T., Filiz, E. S., & Tekin, E. (2017). Does it Matter how and how Much
Politicians are Paid? (No. w23613). *Economica*.

Becker, G. S. (1968). Crime and Punishment: An Economic Approach. In *The Economic
Dimensions of Crime* (pp. 13-68). Palgrave Macmillan, London.

Belasen, A. R., & Polachek, S. W. (2008). How Hurricanes Affect Wages and
Employment in Local Labor Markets. *American Economic Review*, *98*(2), 49-53.

Bignon, V., Caroli, E., & Galbiati, R. (2016). Stealing to Survive? Crime and Income
Shocks in Nineteenth Century France. *The Economic Journal*, *127*(599), 19–49.
doi: 10.1111/ecoj.12270

Blake, E. S., Jarrell , J. D., & Rappaport, E. D. (n.d.). U.S. Mainland Hurricane Strikes by
State, 1851-2004. Retrieved September 30, 2019, from
https://www.nhc.noaa.gov/paststate.shtml.

Britt, C. L. (1994). Crime and Unemployment Among Youths in the United States, 1958
1990. *American Journal of Economics and Sociology*, *53*(1), 99–109. doi:
10.1111/j.1536-7150.1994.tb02680.x

Burdett, K., Lagos, R., & Wright, R. (2001). Crime, Inequality, and
Unemployment. *Penn Institute for Economic Research*, 1–37. Retrieved from
file:///Users/ellie/Downloads/SSRN-id339160.pdf

Cantor, D., & Land, K. C. (1985). Unemployment and crime rates in the post-World War
II United States: A theoretical and empirical analysis. *American Sociological
Review*, 317-332.

Corman, H., & Mocan, N. H. (1999). A Time-Series Analysis of Crime, Deterrence and

    Drug Abuse in New York City. *SSRN Electronic Journal*. doi:

    10.2139/ssrn.159028

Doyle, J., Ahmed, E., & Horn, R. (1999). The Effects of Labor Markets and Income

    Inequality on Crime: Evidence from Panel Data. *Southern Economic*

    Journal, 65(4), 717-738. doi:10.2307/1061272

Edmark, K. (2005). Unemployment and Crime: Is There a Connection? *Scandinavian*

    Journal of Economics, *107*(2), 353–373. doi: 10.1111/j.1467-9442.2005.00412.

Ewing, B. T., & Kruse, J. B. (2005). Hurricanes and Unemployment. *The Center for*

    National Hazards Research, 1–11.

Frailing, K., Harper, D. W., & Serpas, R. (2015). Changes and Challenges in Crime and

    Criminal Justice After Disaster. *American Behavioral Scientist*, *59*(10), 1278–

    1291. doi: 10.1177/0002764215591184

Frailing, K., & Harper, D. W. (n.d.). Crime and Hurricanes in New Orleans. In *The*

    Sociology of Katrina: Perspectives of a Modern Catastrophe (pp. 55–74).

Gibbons, S. (2004). The Costs of Urban Property Crime. *The Economic*

    Journal, *114*(499), F441-F463.

Hurricane Katrina. (2019, August 16). Retrieved October 14, 2019, from

    https://www.britannica.com/event/Hurricane-Katrina.

Hurricane Costs. (2019, July 10). Retrieved December 5, 2019, from

    https://coast.noaa.gov/states/fast-facts/hurricane-costs.html.

Lee, K. (2018). Unemployment and Crime: The Role of Apprehension. *European*

Journal of Law and Economics, *45*(1), 59–80. Retrieved from

http://search.ebscohost.com.lynx.lib.usm.edu/login.aspx?direct=true&db=ecn&A

N=1696392&site=ehost-live

Leitner, M., Barnett, M., Kent, J., & Barnett, T. (2011). The Impact of Hurricane Katrina

on Reported Crimes in Louisiana: A Spatial and Temporal Analysis. *The*

Professional Geographer, *63*(2), 244-261.

Lester, B. Y. (1995). Property Crime and Unemployment: A New Perspective. *Applied*

Economics Letters, 159–162. doi: doi:http://www.tandfonline.com/loi/rael20

Machin, S., & Meghir, C. (2004). Crime and Economic Incentives. *Journal of Human*

Resources, *39*(4), 958-979.

Melick, M. D. (2003). The relationship between crime and unemployment. *The Park*

Place Economist, *11*(1), 13.

Mocan, H. N., Billups, S. C., & Overland, J. (2005). A Dynamic Model of Differential

Human Capital and Criminal activity. *Economica*, *72*(288), 655-681.''

Mocan, N. H., & Unel, B. (2011). *Skill-Biased Technological Change, Earnings of*

Unskilled Workers, and Crime (No. w17605). National Bureau of Economic

Research.

Nordin, M., & Almén, D. (2011). Long Term Unemployment and Violent Crimes-Using

Post 2000 Data to Reinvestigate the Relationship between Unemployment and

Crime.

Prescott, J. J., & Pyle, B. (2019). Identifying the Impact of Labor Market Opportunities

on Criminal Behavior. *International Review of Law and Economics*.

Raphael, S., & Winter-Ebmer, R. (2001). Identifying the Effect of Unemployment on

Crime. *The Journal of Law and Economics*, *44*(1), 259–283. doi: 10.1086/320275

Spencer, N., & Strobl, E. (2019). Crime Watch: Hurricanes and Illegal

Activities. *Southern Economic Journal*, *86*(1), 318–338. Retrieved from

http://search.ebscohost.com/login.aspx?direct=true&db=ecn&AN=1782840&site

=ehost-live

Tsushima, M. (1996). Economic Structure and Crime: The Case of Japan. *Journal of*

Socio Economics, *25*(4), 497–515.

https://doi.org/http://www.sciencedirect.com/science/journal/10535357

Uniform Crime Reporting (UCR) Program. (2018, September 10). Retrieved September

30, 2019, from https://www.fbi.gov/services/cjis/ucr.

Walker, W. C., Sim, S., & Keys-Mathews, L. (2012). The Impact of Hurricane on Spatial

Temporal Patterns of Crime in Mobile, Alabama. *Proceedings from GeoScience*.

Varano, S. P., Schafer, J. A., Cancino, J. M., Decker, S. H., & Greene, J. R. (2010). A

Tale of Three Cities: Crime and Displacement After Hurricane Katrina. *Journal of*

Criminal Justice, *38*(1), 42-50.

Williams, J., & Sickles, R. C. (2002). An Analysis of the Crime as Work Model:

Evidence from the 1958 Philadelphia Birth Cohort Study. *Journal of Human*

Resources, 479-509.

Witte, A. D. (1980). Estimating the Economic Model of Crime with Individual Data.

Quarterly Journal of Economics, 94(1), 57–84. https://doi-

org.lynx.lib.usm.edu/https://academic.oup.com/qje/issue

Zahran, S., Shelly, T. O., Peek, L., & Brody, S. D. (2009). Natural Disaster and Social

Order: Modeling crime outcomes in Florida. *International Journal of Mass*

Emergencies and Disasters, 27, 26-52.

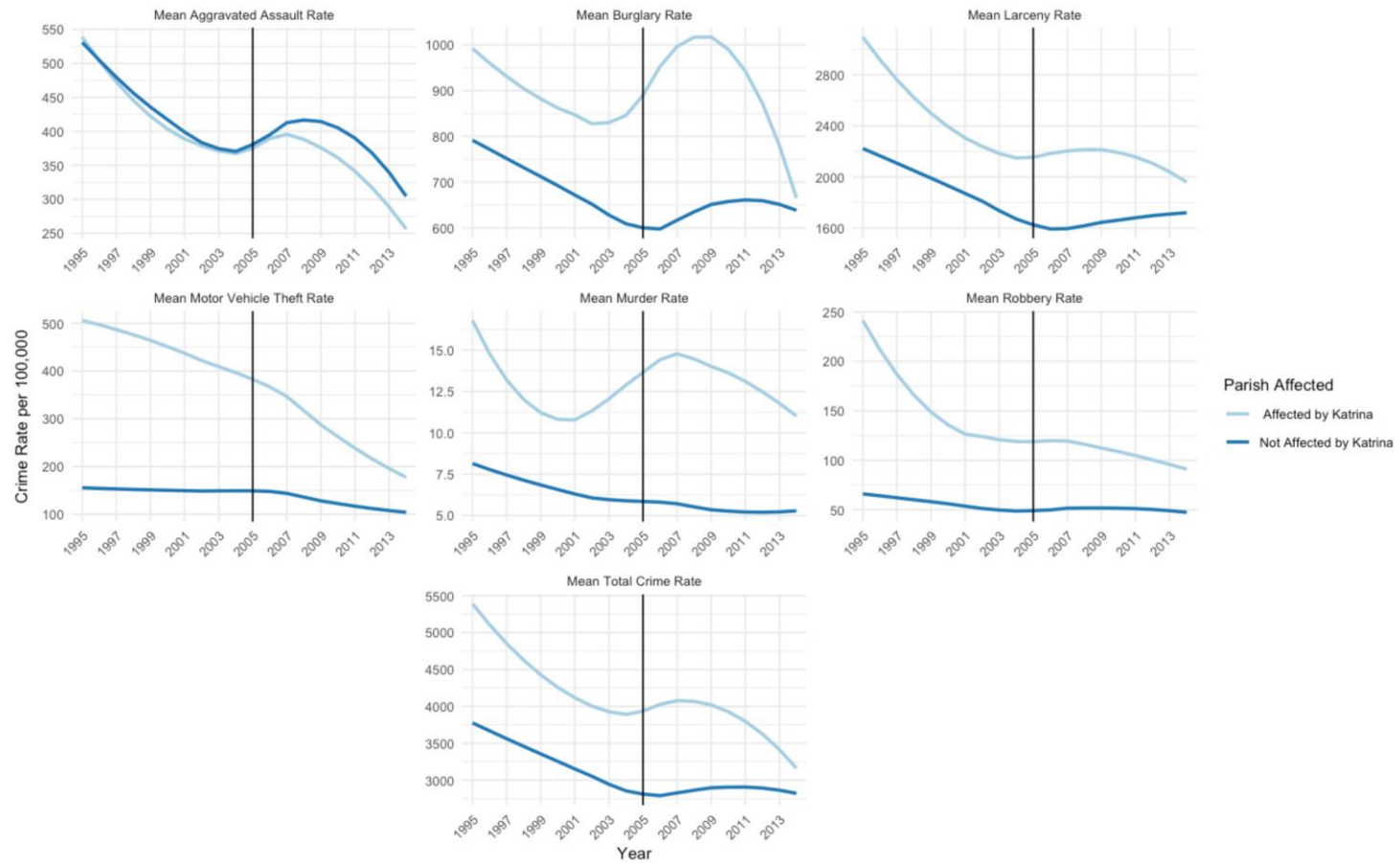# Figure 1: Mean Crime Rate for Parishes in LA (1995-2014)
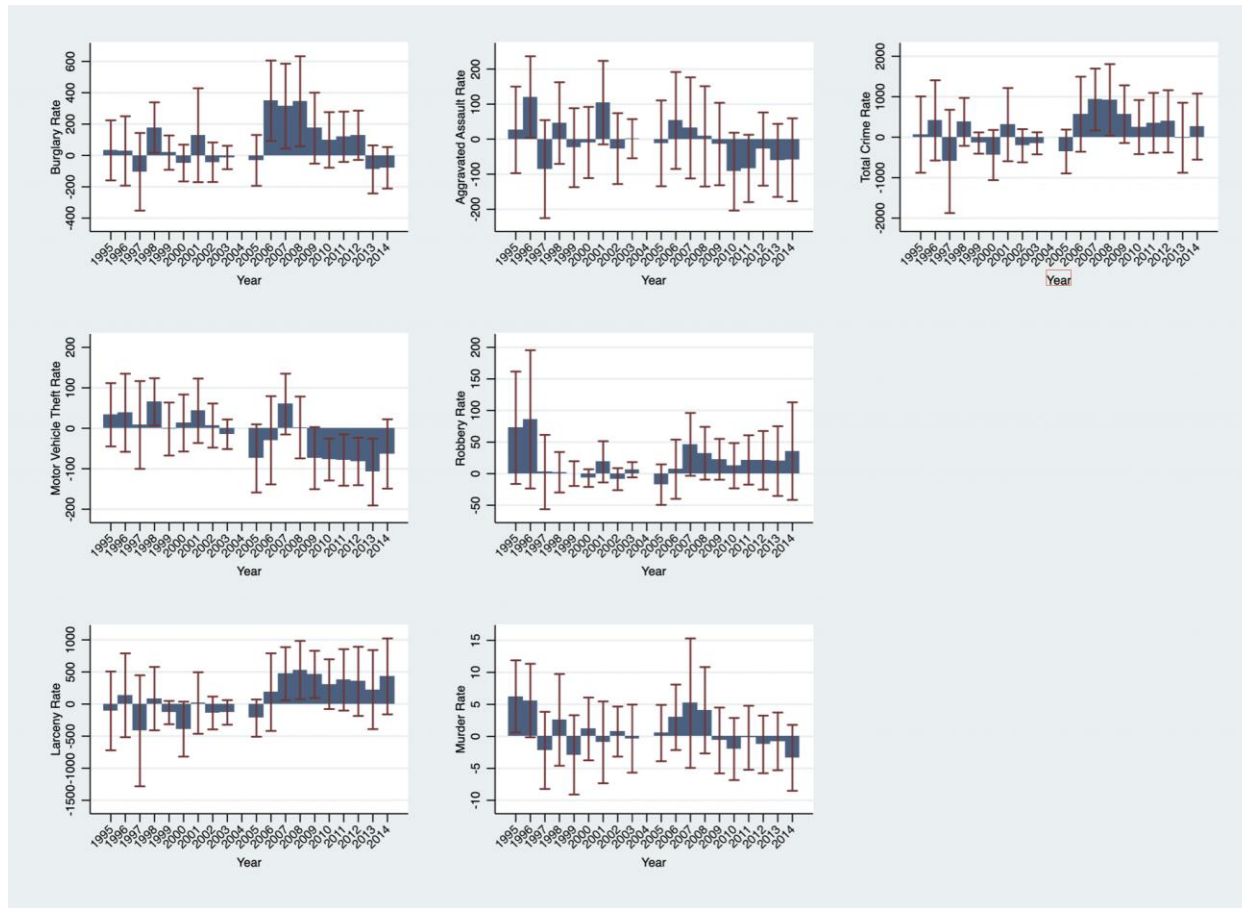
Figure 2: Event-Study

Table 1
Descriptive Statistics for Louisiana Parishes, Affected vs. Not Affected

Variable	Description	Parishes Affected by Katrina Mean (Std. Dev.)	Parishes Not Affected by Katrina Mean (Std. Dev.)	T-Test
Burglary Rate	Total count of burglaries per county divided by county population, multiplied by 100,000	903.472 (524.709)	672.843 (423.322)	***
Motor Vehicle Theft Rate	Total count of motor vehicle thefts per county divided by county population, multiplied by 100,000	365.904 (402.963)	138.353 (128.486)	***
Larceny Rate	Total count of larcenies per county divided by county population, multiplied by 100,000	2333.225 (1059.268)	1812.149 (1160.842)	***
Aggravated Assault Rate	Total count of rapes per county divided by county population, multiplied by 100,000	388.618 (251.613)	410.404 (301.756)	-
Robbery Rate	Total count of robberies per county divided by county population, multiplied by 100,000	132.755 (166.032)	53.920 (63.226)	***
Murder Rate	Total count of murders per county divided by county population, multiplied by 100,000	12.856 (16.496)	6.114 (6.999)	***
Unemployment Rate	Percent of unemployed individuals	6.693 (1.692)	7.37 (2.420)	***
White Population (%)	Percent of white population per county	67.488 (17.188)	66.57871 (13.89014)	-
Female Population (%)	Total female population per county divided by total county population, multiplied by 100	51.407 (4.098)	50.519 (3.138139)	***
Number Observations		179	1,093	

Notes: (1) *** p < 0.01; ** p < 0.05; * p < 0.1. (2) The last column, the t-test column, is presented here to test whether the means between parishes affected and unaffected by the hurricane are statistically different.

Table 2
Descriptive Statistics

Variable	Description	Louisiana Mean (Std. Dev.)	US Mean (Std. Dev.)
Burglary Rate	Total count of burglaries per county divided by county population, multiplied by 100,000	709.042 (445.388)	527.64 (424.07)
Motor Vehicle Theft Rate	Total count of motor vehicle thefts per county divided by county population, multiplied by 100,000	168.886 (208.292)	142.43 (171.97)
Larceny Rate	Total count of larcenies per county divided by county population, multiplied by 100,000	1901.105 (1162.688)	1465.02 (1130.12)
Aggravated Assault Rate	Total count of rapes per county divided by county population, multiplied by 100,000	409.468 (296.912)	188.55 (213.3)
Robbery Rate	Total count of robberies per county divided by county population, multiplied by 100,000	65.153 (90.545)	37.96 (71.45)
Murder Rate	Total count of murders per county divided by county population, multiplied by 100,000	7.085 (9.273)	3.26 (6.58)
Katrina State Dummy	=1 if state affected by Katrina and 0 if not	1 (0)	(.020) (.141)
Post-Katrina Dummy	=1 if years after Katrina and 0 for years before Katrina (including the year of Katrina)	0.059 (0.236)	0.002 (0.044)
Katrina County Dummy	=1 if county affected by Katrina and 0 if not affected	0.136 (0.343)	0.004 (0.065)
Unemployment Rate	Percent of unemployed individuals	7.224 (2.343914)	6.218 (2.879)
White Population (%)	Percent of white population per county	66.613 (14.243)	86.08 (16.22)
Female Population (%)	Total female population per county divided by total county population, multiplied by 100	50.543 (2.950)	50.15 (2.68)
Number Observations		1,272	52,843

Notes: (1) The data is from FBI UCR covering years 1995 to 2014. (2) All statistics are at county/parish level. (3) Louisiana sample includes 64 parishes of Louisiana. (4) US sample includes all states and District of Columbia.

Table 3: Effect of Hurricane Katrina on Crime Rates, 1995-2014

Variables	Burglary	Motor Vehicle Theft	Larceny	Aggravated Assault	Robbery	Murder
	(1)	(2)	(3)	(4)	(5)	(6)
Katrina County	507.0**	145.0**	332.0	337.9***	75.50*	4.475
	(197.2)	(69.82)	(325.9)	(113.7)	(38.88)	(3.627)
Post Hurricane	59.87	-23.16*	46.08	114.1***	2.536	-0.00249
	(40.54)	(13.17)	(83.98)	(42.08)	(4.365)	(0.965)
Katrina County * Post Hurricane	332.4**	32.51	506.4*	31.66	59.57*	5.676
	(150.2)	(36.00)	(254.0)	(66.11)	(35.58)	(3.859)
Unemployment Rate	24.98***	-4.239*	59.33***	12.72*	2.018*	-0.0125
	(9.064)	(2.332)	(20.48)	(6.599)	(1.046)	(0.141)
White (%)	-7.504	-1.256	-2.365	6.426	-0.987	-0.354
	(12.40)	(5.707)	(25.86)	(8.475)	(2.143)	(0.258)
Female (%)	27.09*	10.11	43.43	6.516	5.907***	0.620
	(16.19)	(9.025)	(39.64)	(13.15)	(1.567)	(0.439)
Constant	-284.4	-353.0***	56.66	-588.5*	-219.2	-0.825
	(508.5)	(123.8)	(675.0)	(305.2)	(148.1)	(15.27)
Observations	1,264	1,264	1,264	1,264	1,264	1,264

Notes: (1) *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. (2) Linear trend is controlled for (3) Standard errors are clustered at county level (4) Parish specific time trends have been controlled for (4) Sample is only parishes in Louisiana.

Table 4: The Long-Term Impact of Hurricane Katrina

Variables	Burglary	Motor Vehicle Theft	Larceny	Aggravated Assault	Robbery	Murder
	(1)	(2)	(3)	(4)	(5)	(6)
Katrina County * Post 0	361.3*	81.48	428.8***	95.90**	30.59***	0.944
	(197.4)	(56.37)	(121.2)	(38.17)	(10.78)	(1.789)
Katrina County * Post 1	274.5***	65.77*	286.5	56.76	16.29	4.712
	(99.68)	(38.53)	(200.3)	(57.53)	(11.21)	(4.134)
Katrina County * Post 2	292.4***	28.11	289.1*	39.51	2.738	4.887
	(102.1)	(33.70)	(166.3)	(55.66)	(16.25)	(3.190)
Katrina County * Post 3	245.0**	-20.49	248.1	24.25	-8.994	3.447
	(102.9)	(49.55)	(183.1)	(60.03)	(22.81)	(2.594)
Katrina County * Post 4	204.5*	-50.06	185.8	-1.770	-18.56	2.436
	(111.5)	(63.91)	(218.0)	(63.60)	(26.94)	(2.122)
Katrina County * Post 5	188.6*	-72.68	162.4	-14.09	-23.63	2.386
	(112.4)	(75.17)	(236.4)	(61.49)	(29.84)	(1.914)
Observations	1,258	1,258	1,258	1,258	1,258	1,258

Notes: (1) *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. (2) Linear trend is controlled for. (3) Standard errors are clustered at parish level. (4) Parish specific time trends have been controlled for. (4) Sample is only parishes in Louisiana. (5) Every row for each crime variable represents a separate regression where the linear time trend, parish level time trend, and parish fixed effects are controlled for.

Appendix Table 1: Comparing Effect of Hurricane Katrina to Other Hurricanes

Variables	Burglary	Motor Vehicle Theft	Larceny	Aggravated Assault	Robbery	Murder
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Hurricane Katrina						
Katrina County * Post Hurricane	332.438**	32.508	506.364*	31.660	59.573*	5.676
	(150.215)	(35.996)	(254.016)	(66.107)	(35.578)	(3.859)
Panel B: Category 3 Hurricanes						
Hurricane County * Post Hurricane	194.200*	30.790	140.567	59.333	40.835**	5.325**
	(99.973)	(26.485)	(190.421)	(66.327)	(19.446)	(2.286)
Panel C: All Hurricanes						
Hurricane County * Post Hurricane	-66.956	9.624	-136.979	-84.554	11.313	3.675*
	(78.137)	(18.135)	(148.540)	(71.537)	(11.324)	(2.018)
Observations	1,264	1,264	1,264	1,264	1,264	1,264

Notes: (1) *** p < 0.01; ** p < 0.05; * p < 0.1. (2) Linear trend, unemployment rate, sex, and race are controlled for. (3) Standard errors are clustered at parish level. (4) Parish specific time trends have been controlled for. (4) Sample is only parishes in Louisiana.