Crime Watch: Hurricanes and Illegal Activities

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Abstract

- We investigate the relationship between hurricane strikes and crime for Jamaica
- Intensity of conflicts, including criminal acts, will increase with climate change
- We construct hurricane damages and daily recorded criminal activities.
- Hurricanes are found to significantly impact crime, where the impact is stronger for more damaging storms.
- Findings 1: crime against property decline - break-ins increase during a hurricane
- Findings 2: crimes against people decline - murders, rapes and robberies except for shootings and aggravated assault
- Crucially, the impact of any crime depends on the existence of a storm warning
- Our results also show that **high frequency (daily) data** more accurately estimates the impact of hurricanes on crime.

Models

Hurricane destruction index

$$V_{i,k,t} = GF\left[V_{m,k,t} - S\left(1-\sin\left(T_{i,k,t}\right)\right)\frac{V_{h,k,t}}{2}\right]\left[\left(\frac{R_{m,k,t}}{R_{i,k,t}}\right)^{B_{jt}}\exp\left(1-\left[\frac{R_{m,k,t}}{R_{i,k,t}}\right]^{B_{jt}}\right)\right]^{\frac{1}{2}}$$

V_m is the **maximum sustained wind velocity** anywhere in the hurricane

V_h is the **forward velocity of the hurricane**,

R_m is the **radius of maximum winds**

T is the **clockwise angle** between the **forward path of the hurricane** and a **radial line from the hurricane center** to the pixel of interest

Gust factor G and the scaling parameters F, S, and B, for **surface friction**, **asymmetry** due to the forward motion of the storm, and the **shape of the wind profile curve**

Models

Econometric Estimation

$$log(Crime_{it}) = \alpha + \beta_1 H_{it-d} + \beta_2 X_{ijt} + \beta_3 D_{jt} + d_t + m_m + y_y + u_{it}$$

- Crime type for each geographical location (parish)
- H - parish specific hurricane destruction index
- D – holiday and weekend indicators
- X – climatic controls: rainfall, rainfall during storm, temperature
- d-daily m-monthly y-yearly dummy variables

	Average hurricane	More damaging hurricane	Storm warning
Total Crime	+ 34%	+ 288%	Effect disappears
Aggravated Assault	+ 0.6%	+ 4.5%	Effect disappears
Break-In	+ 33%	+ 272%	Reduces effect; by 29%, 241%
Murder	- 6%	- 50%	Reduces effect; by 6%, 50%
Rape	- 3.9%	- 32%	Effect disappears
Robbery	- 6.6%	- 54.7%	Increases effect; by 5%, 39%
Shooting	+ 28.9%	+ 239%	Effect disappears

Remarks

Storm warnings when hurricanes are imminent plays a role in influencing crime

Crimes against people: murder, rape and robbery **decline**

Assault and **shooting** appear to be the main criminal activities for policy makers to address when a natural disaster is imminent or immediately once it occurs

Crime against property: break-in, largest increase

Data

Hurricane

HURDAT Best Track Data

- which provides six hourly data on all tropical cyclones in the North Atlantic Basin, including the position of the eye of the storm and the maximum wind speed

- we linearly interpolate these to 3 hourly positions in order to be in congruence with our rainfall data

Other Data

- daily rainfall: satellite derived TRMM-adjusted merged-infrared precipitation (3B42 V7) product

- daily temperature and daily crime data: Jamaican institutions