EXAMINING THE RESEARCH EFFICACY OF FINCH, EMRICH, AND CUTTER AND PEACOCK, VAN ZANDT, ZHANG, AND HIGHFIELD

A Review of Published Articles

Abstract

This paper examines two published studies exploring how pre-existing social vulnerability in New Orleans, Louisiana (NOLA) impacted recovery after Hurricane Katrina in 2005 and that the differences in housing recovery trajectories after 1992's Hurricane Andrew in Miami-Dade, Florida and 2008's Hurricane Ike in Galveston, Texas.

These studies explore how natural disasters disproportionately impact historically disenfranchised communities versus more affluent areas of a jurisdiction or area. This evaluation explores whether both the internal validity and generalization of both studies and whether there is a correlation between how a community recovers after a major natural disaster and its social conditions prior to the disaster.

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Can a community's socio-economic status, or social vulnerability, predict how fast and well it recovers after a major natural disaster? Two empirical studies attempted to answer this very question. The first study, by Finch, Emrich, and Cutter (2010), examined how pre-existing social conditions in New Orleans, Louisiana (NOLA) impacted residents' recovery after Hurricane Katrina in 2005. The second study, conducted by Peacock, Van Zandt, Zhang, and Highfield (2014), investigated the differences in long-term housing recovery trajectories after 1992's Hurricane Andrew in Miami-Dade, Florida and 2008's Hurricane Ike in Galveston, Texas. Ultimately, both studies sought to identify whether a causal relationship existed between vulnerable communities and disparate recovery efforts within presidentially declared disaster regions. Vulnerable communities were largely typified by high levels of concentrated poverty and historically disenfranchised racial/ethnic groups. In an effort to determine the efficacy of each study, this paper evaluated their respective research methods, data analysis, findings, and limitations.

Finch et al. (2010) explored whether vulnerable communities in NOLA were disproportionately impacted by high floods during Hurricane Katrina. The vulnerable communities in the study had a history of disparate socio-economic demographics based on race/ethnicity, age, and quality of housing stock. This work questions whether these pre-Katrina social vulnerabilities, coupled with corresponding high levels of flooding, also led to socio-spatial patterns of recovery. In order words, did NOLA's low-income, minority concentrated areas both 1. Experience more flooding and 2. Recovered differently compared to white, affluent neighborhoods. disaster versus neighborhoods that are less vulnerable or were higher income and predominately white. Finch et al's work in this article examines whether these socio-economic and spatial factors ultimately led to slower, inequitable, recovery post-disaster as well. We will

see how the writers utilize existing data resources to identify the level of vulnerability experienced throughout NOLA's communities and evaluate the rate of recovery by tracking the rate of NOLA's repopulation after the Hurricane. Finch used residential postal-delivery data from the USPS to measure the rate of return to communities following the storm. However, the team did not evaluate whether it was the same residents receiving mail at these addresses pre-and post-disaster. Finally, to test these assertions, the writers evaluate data on grant-making through the Road Home Program, funded by the US Department of Housing and Urban Development but administered by the State of Louisiana, to discover whether this data shows a correlation between whom and where these funds were disbursed and whether the neighborhoods aided by these programs saw a negative or positive impact on repopulation.

The second article this paper will evaluate is Peacock et al's, "Disparities in Long-Term Housing Recovery After Disasters" (2015). Utilizing a case study approach, these writers will also examine whether social vulnerability indexes predict disparate housing recovery post-disaster. For example, do a neighborhood's housing stock with low income residents who are predominately Black or Hispanic, see significantly slower redevelopment post disaster? Peacock et all will do this by centering their studies on neighborhoods in Galveston, Texas impacted by Hurricane Ike and in Miami-Dade County, Florida after Hurricane Andrew. Through gathering parcel-level data available through 1990 and 2000 Census data and overlaying it with local appraisal values of various housing types pre-and post-hurricanes, the writers will identify whether higher vulnerability ultimately lead to slower recovery.

Both these articles conduct observational studies in response to evaluate whether socio-economic data, the independent variables, impacts recovery trends, the dependent variable. Using these variables, the study examines whether pre-disaster demographics of a neighborhood

has a negative relationship to recovery trends post disaster. Finch et al and Peacock et al's research heavily rely on secondary data from the U.S. Census Bureau, with Finch utilizing flood administrative record data from FEMA. In addition to the Census and FEMA data, Finch et all also uses consumer transaction data from LA's CDBG-DR funded Road Home program to test their findings.

While both studies are observational studies, each one uses vastly different approaches. Peacock et al conducts a longitudinal study, using multiple regression analysis for its single-family data, yet used descriptive analysis to compare various housing types for both case studies. Additionally, Peacock's works tracks parcel-level appraisal values pre-hurricanes and post hurricane across a number of year to gauge the rate of recovery within both areas. For their Miami-Dade County study, they tracked this data on single-family, duplex, and multifamily parcels from 1992 to 1996, while their Galveston, TX study tracked appraisal data for the same housing elements between 2008-2012. Finch et al's research uses existing measurements established by Susan L. Cutter's work on social vulnerability. As described in Finch et al's article, Cutter also uses existing 2000 Census Tract level data to collect nominal level of measurement of several socio-economic variables in order to rank the level of vulnerability ("SoVI-NO") of NOLA's communities. SoVI-NO ultimately used this data to assigned nominal measurements of low, medium or high vulnerability to neighborhoods, pre-Katrina, to prepare and respond to a disaster.

The writers used these factors to identify specific socio-special correlations between the extent of damage from the storm also using existing data collected from the Federal Emergency Management Agency (FEMA) on flooding data post-Katrina. To test their theory in how well flood damage and higher social vulnerability predicts recovery trends, they compared this model

to population changes within each community to track repopulation in NOLA, Finch et al, conducted a pre-and post-test of USPS data on active residential deliveries and matched this with the SoVI-NO and flood data. The pretest measured this data tow months before Hurricane Katrina and then three years afterward.

The Findings

In Finch et al's work found that Hurricane Katrina devastated all communities, regardless of pre-existing vulnerability. All levels of income and race, regardless of SoVI-NO level were greatly impacted. However, what the researchers did discover was that SoVI –NO score did determine the rate at which communities evacuated. Increased social vulnerability definitely changes how communities react to an impending disaster and the rate at which it can prepare for it. The article goes on to identify a difference in the rate of recovery among the ordinal SoVI-NO categories, yet flood height was more of a predictor of the rate of recovery within an area than its level of vulnerability.

Furthermore, after evaluating the postal delivery data against the SoVI-NO categories, the study found a weak, negative correlation between highly vulnerable areas and return rates post-hurricane. The most telling outcome of this study was discovering that neighborhoods with the highest SoVI-NO score had slower return rates than those with lower scores. Yet, in the areas with the highest level of flooding, it was the medium SoVI-NO category that has the slowest rate of return over all. It is here where the study makes what could be its most telling finding: its not the most vulnerable communities struggling to recover, but instead those in the middle-income bracket who don't qualify for assistance but who don't have enough of their own resources to efficiently recover.

As for the distribution of governmental support for recovery, Finch et al's research of LA's Road Home Program questions the government overall ability to address the highest need areas. It identified that the program did assist NOLA's highest flood areas with the most damage, as it found a strong, positive correlation between the Road Home Option 1 set and the state' buyout program. Yet, once the Road Home's data was compared against NOLA's SoVI-NO categories, the researchers found it did not serve the neighborhoods with the highest vulnerability variables. Instead, the strongest correlation between Road Home's assistance and NOLA's neighborhoods were in medium vulnerable areas. The reason for this correlation, the writers suggest, is that residents living within highest socially vulnerable neighborhoods in NOLA were predominately renters, not homeowners. NOLA's Road Home program targets homeowners. This was one of the most telling outcomes of testing this hypothesis against governmental programing; the Road Home program, LA's most significant housing-related recovery program, did not assist neighborhoods who were most socially vulnerable.

Peacock's research found that Hurricane Andrew's damage on housing recovery was long lasting, which indicates more effort should be placed on mitigating future disaster verses responding to the current one. For example, the researchers found that every percentage point of damage lead to a home's decreased value of 8% during the year Hurricane Ilk hit Texas. By the 4^{th} year it dropped only to 6.6% by the 4^{th} year. Both studies also confirmed that U.S disaster recovery policies significantly favor and target owner-occupied housing, versus renting households. In Hurricane Andrew's case study, Peacock et al found, that owner occupied housing was consistently assessed at 4% higher than rental homes. For Ike, owner-occupied housing was assessed more than 90% higher than rental housing. Another important finding these studies identified are upper income neighborhoods were more prepared for disasters and

are also more resilient in the end. Research showed that upper income areas were more often able to maintain their baseline assessments, while lower-income areas suffered greater damage.

Additionally, Hurricane Andrew left minority concentrated areas more damaged, yet with slower recovery rates. The data uncovered a negative correlation between the ethnic makeup of a community and its housing values: for everyone percent point increase of the Hispanic or Black populations within in a neighborhood, housing value assessments were .33% or .3% lower. Within the 3 follow years, the effects remained negative, even though the disparity lessened. However, Hurricane Ike case study data displayed a very different scenario, minority areas actually fared better than white. Yet, the study discovered that while this outcome was different for both studies, the age of the housing stock was a sure predictor of how an area was damaged and subsequently recovered. Furthermore, Peacock et all's work highlights the gravest disparities are among renters and homeowners, which often impacts minority populations disproportionately. For example, in Galveston, owner-occupied housing reaches 50% of its pre-impact value two years following the hurricane, however rental housing reached only 36% by the 4^{th} year.

Internal Validity

Internal validity must be considered when assessing the efficacy of a study. Remler and Van Ryzin (2015) defined internal validity as the strength of a causal relationship between variables. With that said, Finch et al. (2010) did not achieve satisfactory internal validity due to flaws in certain data sources and research methods. On the positive side, Finch et al. (2010) obtained floodwater data from FEMA. Although it was not ideal to use a secondary data source,

it was acceptable because Hurricane Katrina occurred more than 15-years ago. FEMA was also a reliable source in this case because they used remote sensing imagery to track Hurricane Katrina before it landed in NOLA. As a further testament of the data's credibility, it was also used by the Greater New Orleans Community Data Center (GNOCDC) to create a flood extent map (Finch et al., 2010). By contrast, it was problematic for Finch et al. (2010) to base residents' return/recovery on USPS data collected two months before and three years after Hurricane Katrina. Not only did researchers fail to verify whether the same residents resided at the address pre-and post-disaster, but three years was not enough time to adequately measure their return. For comparison, Hurricane Sandy happened eight years ago, yet many residents have just begun to reoccupy their homes, while others are still waiting for their homes to be rebuilt (Mikle, 2020). Lastly, reducing the SoVI-NO from census to tract level resulted in a diluted data source that failed to capture important measures of social vulnerability, such as disability status. As a result of these issues, the Finch et al. (2010) study did not establish a solid causal relationship between socially vulnerable communities in NOLA and their disaster recovery.

The Peacock et al. (2014) study fared much better in regard to internal validity. For starters, Peacock et al. (2014) did an excellent job collecting the pre-disaster state and value of single-family, multifamily, and duplex homes affected by Hurricane Andrew and Hurricane Ike. Peacock et al. (2014) accomplished this feat by using data from county appraisal offices and census block group data from both hurricane sites. This data was crucial to discerning the baseline housing disparities typically found among affluent communities, commonly occupied by White residents, versus dilapidated neighborhoods, frequently inhabited by low-income, minority residents. From there, Peacock et al. (2014) was able to develop data sets that tracked the damage, repair, rebuilding, and improvements made to homes in the affected areas. These

data sources and collection processes enabled Peacock et al. (2014) to feasibly uncover changes in housing recovery trajectories, as stated in their initial research question. One area of concern, however, was that Peacock et al. (2014) did not account for any of the larger structures, beyond housing, that drive local economies. Since economic structures, like farming, fishing, mining, manufacturing, tourism, employment, and technology can influence a community's ability to withstand or recover from major natural disasters, it would have been best practice to address the ones that were most fitting to each locale. Doing so would have eliminated the possibility of confounding variables. At the same time, this oversight did not completely diminish the causal relationship Peacock et al. (2014) did manage to uncover. Rather, it suggested areas for future research, perhaps in a larger study focused on only one region.

Generalizability

Generalizability, or external validity, is an element usually found in successful studies. Remler and Van Ryzin (2015) described generalizability as a subtle, albeit complex, circumstance that makes the findings of a study applicable to broader populations. While generalizability is a valuable asset for a study to have, it should not necessarily be the primary objective. After all, some population samples, or variables, may be useful in a study, but not representative of the public at large. In those cases, rigorous research methods should never be sacrificed in an effort apply study results to the biggest audience possible. This important distinction was made clear by the Finch et al. (2010) and Peacock et al. (2014) studies. Each study provided valid methodologies that could be used to either replicate the studies analyzed in this paper or launch new studies with similar aims. However, it would be irresponsible to claim that the results of the Finch et al. (2010) or Peacock et al. (2014) studies were generalizable because natural disasters differ in scale and communities vary according to many traits, like their

history, geography, infrastructure, politics, economic drivers, resources, citizens, goals, etc. For instance, Hurricane Andrew and Hurricane Irma both struck communities in Florida, but the damage they caused and the disaster management strategies they required were not the same. For these reasons, the results of the Finch et al. (2010) and Peacock et al. (2014) studies should not be generalized to all other hurricanes or communities, unless, of course, there are many shared features that make it viable to do so, which is unlikely.

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