The Migratory Pull of Natural Hazards:

An Examination of Foreign-Born Latinos in the United States*

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Over the past two decades or so, evidence of global climate change and spectacular environmental disasters have conjoined to stimulate new research in a field known loosely as environmental demography (see Pebley 1998; Tierney 2007). Drawing from disaster studies and eschewing vulgar geophysical determinism, this work emphasizes the highly unequal social contexts in which environmental hazards play out. In this way, emphasis falls not on the exacting forces of nature per se but on how they entwine with the stratifying forces of society to influence demographic processes, especially migration. Early on, this line of research focused heavily and understandably on involuntary displacement associated with extreme cases, paying particular attention to how dramatic events such as tsunamis, hurricanes, and floods can devastate local settlement areas and dislodge marginalized inhabitants. More recent research has continued in this vein but now also calls for further study of the full range and depth of complexity involved in interactions between local environmental and demographic processes (e.g., Black, et al 2011; Hugo 2011; McLeman and Smit 2006; Perch-Nielson, Bättig, and Imboden 2008). The present study contributes to this effort through a combination of theoretical reorientation and novel empirical analysis.

Theoretically, we broaden recent work on environmental hazards to conceptualize them not as exceptional events but rather as common socio-environmental processes that occur regularly across the country (as well as the planet). This approach means understanding environmental hazards such as storms, earthquakes, and fires not as rare, isolated events but rather as common, ongoing inputs into local environments that are continually under construction. Indeed, more than 90 percent of U.S. counties recorded significant property damage from some type of environmental hazard during the past decade (Schultz and Elliott 2013). This reorientation also means paying more attention to how such socio-environmental interactions can filter through existing state and market institutions to *pull* as well as push migrants to affected areas. In the present study we do just that, turning attention from involuntary out-migration associated with local hazards and recovery to voluntary in-migration. In so doing, we demonstrate how reorienting research in this way need not mean abandoning traditional focus on social inequality and marginalized groups. Instead, an important task of ongoing research in environmental demography is to understand how these dynamics all connect, that is, how social vulnerabilities rooted in inequalities of wealth, power and status interact with ongoing environmental forces to influence the *circulation* – not just outflow – of marginalized groups through local areas.

To develop this line of work empirically, the present study pursues a novel line on investigation: It focuses on the internal migration of foreign-born Latinos in the United States and the extent to which this migration is pulled disproportionately to destinations with greater economic losses from recent environmental hazards. In this way, we turn the usual case-study approach of disaster sociology on its head to treat a specific group, rather than a specific place or event, as our "strategic research site" (see Merton 1969). Several factors make foreign-born Latinos particularly worthy of such attention. First, they comprise among the largest and most mobile minority subpopulations in the United States. Indeed, many more foreign-born Latinos now move within U.S. borders than across them. Second and as result, a large literature has emerged

to make sense of their migratory flows, often emphasizing the importance of coethnic networks and new job opportunities for resettlement in traditional and nontraditional U.S. destinations. This established literature means that a focus on foreign-born Latino migration towards areas of environmental destruction can contribute new insights not only to environmental demography but also to migration studies more generally, thereby strengthening connections between the two fields.

To generate these insights we pursue a novel research design that many scholars have deemed critical for studying environmental migration but have yet to carry out (Fussell and Elliott 2010; Myers, Slack and Singelmann 2008: 288; see also Hunter, White, Little and Sutton 2003). This design involves linking individual-level data on household migrants from the U.S. population census with place-level data on economic losses from recent environmental hazards assembled in the Spatial Hazard Events and Losses Database for the United States (henceforth, SHELDUS). This data linkage allows us to dig beneath aggregate statistics of net migration to investigate who exactly is migrating towards more damaged areas, and how this migration is amplified (or not) by pre-existing conditions in respective destinations. In short, results show that economic losses from recent environmental hazards join with coethnic populations already in place to pull foreign-born Latino migrants disproportionately to respective destinations. Results also indicate that this pull occurs across long distances for a broad cross-section of group members, thereby contributing to redistribution of foreign-born Latinos in general across not just local areas but the nation as a whole. The implication is that social and environmental forces work together to pull as well as push minority migrants in ways largely undocumented in prior research.

To contextualize these findings, we organize the rest of the study as follows. First, to establish our group-specific "research site," we review recent research on the internal migration of foreign-born Latinos within the United States. This discussion underscores the double disadvantage of immigrant-minority status and how this status influences patterns of domestic migration once in the country. Next, to bring environmental hazards into the discussion, we turn to recent research on the political economy of associated damage and recovery. This discussion emphasizes how hazard damage can both disrupt and grow local economies in ways that not only dislodge marginalized residents but open new opportunities to socially vulnerable in-migrants. We then discuss the data and methods used to assess these claims and present results from respective place- and person-level analyses.

INTERNAL MIGRATION OF THE U.S. FOREIGN-BORN POPULATION

The geographic mobility of the U.S. foreign-born population since the 1990s, especially among Latin American origin groups, has generated a lively debate over causes of its dispersion. Prior to the 1990s, the U.S. foreign-born population concentrated in six just states: California, Florida, Illinois, New Jersey, New York, and Texas. Since then scholars have focused on location-specific push and pull factors to explain their dispersal to new, or non-traditional, destinations in the South, mid-West, and East Coast.

Much of the research on push factors focuses on California, the state with the largest foreign-born population, over half of which originally came from Latin America and a third from

Mexico. Three "pushes" have been identified. The increase in border enforcement after the 1986 Immigration Reform and Control Act (IRCA) and subsequent restrictive legislation, especially at the traditional Tijuana-San Diego crossing point where close to 90% of Mexican immigrants entered the U.S., diverted unauthorized entrants toward other border states (Massey, Durand, and Malone, 2001). This political development combined with California's economic downturn and its rising anti-immigrant sentiment – manifested in the passage of Proposition 187 in 1994 – to push many Latino/a immigrants out of California to other U.S. destinations (Massey, Durand, and Malone, 2001; Zuñiga and Hernández-León 2005). Simultaneously, the saturation of the immigrant labor and housing markets in California pushed immigrants to search for out-of-state employment and more affordable housing markets (Light 2005). While these forces pushed Latino immigrants out of California, the largest destination for unauthorized Latino immigrants (Espenshade 1995), additional research explains that a different set of pull factors attracted them to specific areas throughout the Unites States.

Studies in this area focus on two pull-related dynamics: the search for better economic opportunities, and relocation to areas with existing concentrations of co-nationals or co-ethnics (Bartel and Koch 1991; Kritz and Nogel 1994; Singer 2004). Regarding economic opportunities, Gurak and Kritz (2000) found that in the late 1980s most foreign-born groups were more likely than their native-born counterparts to migrate to states with higher rates of economic growth, even after controlling for human capital and nativity group concentration in the destination state. In more recent research, the authors (Kritz, Gurak and Lee 2013) also find that although national origin groups vary in their propensities to migrate in accordance with a wide range of individual- and place-level characteristics, Central Americans are now migrating within the United States in response to "niche economic opportunities that have opened up in new destinations in agriculture and blue collar occupations" (Kritz, Gurak, and Lee 2013: 542). Mexicans are similar, but because they constitute 40% of the study's sample and are one of the most dispersed foreign-born groups, there is more heterogeneity in their internal migration patterns. Thus, the general pattern for immigrants over the past couple of decades is to move increasingly to new destinations, even ones where they have few compatriots.

Given these high rates of mobility and a tendency toward geographic dispersion among foreign-born Latinos, case-studies of immigrants in new destinations provide fuller explanations of why they move to new destinations and whether they stay. New labor demand in specific locations and occupations is the most common explanation, with most case studies focusing on Mexican-origin groups or pan-ethnic Latino/a immigrants. Nationally, Latino/a immigrants concentrate in four economic sectors: agriculture; meat, poultry and seafood processing; construction; and, low-skill occupations in low-wage services (Hagan 2004; Hudson 2007; Pew Hispanic Center 2006, 2007). Thus, when meat and poultry processors sought to cut labor costs by relocating operations from urban to rural areas of the mid-West and South, Latino/a immigrants relocated as well (Griffith 2005; Gouveia, Carranza, and Cogua 2005; Kandel and Parrado 2005; Marrow 2011; Stull, Broadway, and Erickson 1992; Stull and Broadway 2001). Increased low-skill service sector demand across the country as busboys, dishwashers, housekeepers, and gardeners has also been satisfied disproportionately by Latino/a immigrants (Hagan 2004; Ramirez and Hondagneu-Sotelo 2009). The demand for construction labor to build the Olympic village in Atlanta, Georgia in1996 instigated the rapid growth of a Latino immigrant population there (Neal and Bohon 2003). After Hurricane Katrina struck the Gulf Coast, the intense demand for low-skill laborers

to clear hurricane debris and install blue tarps on damaged roofs combined with the federal government's suspension of immigration enforcement to make Latino immigrants the ideal rapid response labor force (Donato, Trujillo-Pagán, Bankston, & Singer 2007; Fussell 2010). These studies are consistent with Kritz, et al's (2013) conclusion that Latino migrants are responding to niche blue collar labor demand in new destinations and show that Latino immigrants often search for "immigrant jobs" in new places.

Immigrants' concentration in these jobs is associated with employer preferences for a compliant labor force (Bonacich 1972; Sassen-Koob 1981). These preferred traits are virtually guaranteed by employing unauthorized migrants whose short-term earnings goals and intention to return to their origin country distinguish them from native-born workers. Employers express their preference for Latino migrants in coded language, referring to their "work ethic" and "manageability" but avoiding reference to their legal status since employers are breaking the law by knowingly hiring an unauthorized immigrant (Maldonado 2009; Shih 2002; Waldinger and Lichter 2004). Unauthorized Latino migrants conform to employers' expectations to avoid detection and deportation (Chavez 1992; De Genova 2002; Gleeson 2010; Gomberg-Muñoz 2010; Menjívar and Bejarano 2004; Nuñez and Heyman 2007). The ever present threat of deportation excludes unauthorized immigrant from legal protections and makes them vulnerable to labor exploitation, crime victimization, and other unfavorable outcomes (Fussell 2011). In this way Latino immigrants' attraction to new destinations hinges on their vulnerable status. Having reviewed evidence that foreign-born Latino internal migration is widespread and generally considered to be a job search strategy, we consider how disaster recovery provides a location-specific attractive pull for this group in particular.

THE POLITICAL ECONOMY OF ENVIRONMENTAL HAZARDS & RECOVERY

Environmental hazards have grown to become one of the largest and least understood redevelopment programs in the United States, whereby billions of dollars of public and private capital flow annually to affected areas to help property owners – home and business – rebuild (Perrow 2011). In the United States this type of redistribution dates back to at least 1803, when Congress helped Portsmouth, New Hampshire recover from extensive fires by waiving federal duties and tariffs on imported goods – a recovery effort that helped local business owners but not necessarily local workers (Davies unpublished ms; Dauber). This *de facto* policy of federal disaster assistance continued more or less unchecked until 1950, when Congress finally codified the practice into law with the federal Disaster Relief Act. This legislation gives the president legal authority to issue disaster declarations and enables federal agencies to assist state and local governments with hazard response and recovery. Such assistance now includes underwriting hazard insurance programs that payout billions of dollars annually; rebuilding damaged infrastructure; providing housing subsidies; and, coordinating low-interest business loans – all of which are aimed largely at restoring and expanding private property in affected areas with little government oversight.

Lately, these efforts have attracted the interest of scholars who draw increasing attention to what Gotham and Greenberg (2008) call the "market centered" – as opposed to "government led" – approach to hazard recovery in the United States. Drawing on similar ideas, Pais and Elliott

(2008) argue that contemporary hazard recovery policies end up infusing local pro-growth coalitions with material and symbolic capital that is used more to promote local real estate development and shore up land-based rents than to help socially vulnerable residents respond and recover in place. As a result, local populations and economies tend to grow after natural hazards even as renters and minority residents become displaced. Understanding how these dynamics might pull foreign-born Latino migrants to particular areas requires recognizing two important things about this political economy of hazard recovery.

First, the extent to which environmental hazards bring large sums of taxpayer and insurance money to affected areas depends greatly on the amount of development, or property value, already in place. This social fact means that the same hurricane that hits metro Miami and rural Louisiana will bring vastly different sums of outside capital because the two areas have vastly different sums of fixed capital already in place and at risk of damage and reinvestment. In this way, local development and hazard recovery feedback on each other, generating successively costlier damages – and reinvestments – with each subsequent hazard. Second, as this process unfolds, it can have the twin effect of dislodging locally vulnerable residents – especially renters – thereby opening new housing and job opportunities to in-migrants. We argue that these opportunities stem not just from short-term booms in reconstruction work but extend throughout local employment and residential markets, as local damages disrupt the status quo and open opportunities to newcomers, especially those willing to work long hours for low pay and who have coethnic connections already in place to help them find jobs and housing in disrupted local markets.

The latter point brings us back to the internal migration of foreign-born Latinos. If the above arguments hold empirically, they suggest that the migratory pull of foreign-born Latinos to areas with more costly damage from recent environmental hazards is particularly strong – in both absolute and relative terms, compared with other groups. This hypothesis rests on the presumption that, all else equal, more costly damage reflects more development, more capital inflow, and more disruption – all of which are particularly attractive to foreign-born Latinos looking for new opportunities in a new country where they have few political or economic advantages. The above arguments also suggest that this selective pull is likely to be amplified in areas where group members are already in place to assist with finding jobs and housing. In this way, social and environmental determinants of migration come to overlap and entwine in ways largely undiscussed and uninvestigated until now. The result, we suspect, is active and ongoing redistribution of large numbers of foreign-born migrants, not just within affected states but across longer distances throughout the United States.

DATA

To assess our ideas empirically, the present study links individual-level data on place of residence at two points in time with data on cumulative economic losses from local environmental hazards over the same period. Individual-level data come from the 2000 5-percent Public Use Micro Sample (PUMS), which is well-suited to the present study for several reasons. First, it provides data on place of residence in 1995 and 2000. This five-year span means that analyses are less likely to pick up temporary movers, thereby focusing attention on

longer-term resettlement. Second, the 1995-00 period avoids extreme outliers in hazardous events, including Hurricane Katrina in 2005 and the Northridge Earthquake in 1994 – two of the costliest natural hazards in U.S. history. Third, the data offer a spatially and demographically comprehensive sample of the U.S. population, including sufficient counts of foreign-born Latinos for comparative analysis. Finally, the data contain information on individual- and household-level traits crucial for proper analysis of residential mobility.

Data on economic losses from natural hazards during 1995-00 come from the Spatial Hazard Events and Losses Database for the United States (SHELDUS), which is a government-funded database containing nearly 700,000 records on natural hazards that caused at least one death or $25,000 in local property or crop damage since 1960 (Hazards and Vulnerability Research Institute 2012). Assembled from existing federal data sources, including the National Climatic Data Center's monthly Storm Data publications, SHELDUS currently provides the most comprehensive and detailed record of natural hazards available to U.S. researchers. For 1995-00, it contains information on 29,118 events within the continental United States, which caused an estimated $65 billion in property damage (in constant 2011 dollars). This damage reflects direct economic losses associated with the physical impact of local hazards and does not include indirect disruption to commerce and production. Thus, values are highly conservative and best interpreted as approximations of general social impact rather than as literal measures of total economic loss (Preston 2013).

Matching local hazard data to individual respondents from the 2000 census requires standardizing the former to the level of 1995 Public Use Micro Areas (PUMAs), which are the smallest unit of geography available in the PUMS and which include roughly 100,000 inhabitants. For this standardization, weights were created using Geographic Information Software (GIS) and Master Area Block Level Equivalency Files to determine how much of a county's population fell within a respective PUMA. Local hazards data were then weighted and assigned accordingly. For example, if County A's population fell entirely within PUMA 1 and half of County B's population did as well, then all hazardous events and damages recorded for County A and half of those recorded for County B were assigned to PUMA 1. Any error introduced by this weighting strategy is assumed to be spatially random, with the final dataset containing information on a representative sample of individuals living in 1,028 PUMAs covering the entire continental United States.

Sample

The 2000 PUMS contains data from more than 12 million respondents. From this total, a 10 percent random sample was drawn from each PUMA of residence in 1995. From this sample, only household heads in 2000 were retained because this criterion avoids counting as unique and distinct those changes in residence made by members of the same family who stayed within the same household. (Individuals who became new household heads between 1995 and 2000 are included in the sample.) The resulting database consists of 509,948 household heads who lived in the continental United States in 1995 and 2000.

Key Variables

Empirical analyses of the migratory pull of natural hazards focus on two key variables. The main one, which serves as a dependent variable in PUMA-level analyses and an independent variable in individual-level analyses, is a dummy indicator of internal migration across PUMA boundaries between 1995 and 2000. In individual-level analyses, this variable is also analyzed as a three-category ordinal indicator of *relative distance migrated*, which takes the following values: 1= migrated to a different PUMA within the same state; 2= migrated to an adjacent state; and 3= migrated to a non-adjacent state. The other key variable is a continuous measure of cumulative *economic losses from hazard-related property damage* at destination during 1995-00, with all damages measured in constant 2011 values before taking the natural logarithm.

Because hazard-related economic losses reflect pre-existing levels of social development, we also compute and examine a proxy for this confounding variable. Although no direct measure exists, recent research argues for the log-transformed value of total annual income of all residents in the local area (Preston 2013). Because PUMAs are constructed to be of similar demographic size, this measure corresponds to the relative affluence of the local area, which ranges from a logged value or 7.9 (or $32 million) in northern Mississippi to 20.9 (or $12 billion) in an affluent area of Los Angeles. Supplemental analyses (not shown) affirm that this variable correlates strongly with economic losses from recent hazards, with every 1.0% increase in an area's total income corresponding to a 0.7% increase in recent hazard-related property damage.

To assess the independent and joint effects of coethnic presence on destination selection, we re-assign all households back to their place of residence in 1995. We then sum the number of households in each area for respective ethnic groups, including foreign-born Latinos, as well as native-born Latinos, native-born African Americans, and native-born (non-Hispanic) whites. These statuses are assigned based on foreign-born status (yes=1; 0=no); and four mutually exclusive ethnoracial categories: Latinos (regardless of racial categorization); non-Latino whites (hereafter "whites"); non-Latino African Americans (hereafter African Americans or "Blacks"); and non-Latino Asians (hereafter "Asians").

Control variables in individual-level analyses follow closely from prior research on selective residential mobility (see Crowder and Downey 2010). Ascribed characteristics include age measured in years and age squared to account for the variable's nonmonotonic association with migration. Gender is measured as a dummy indicator equal to 1 for females and 0 for males. Achieved characteristics include family income, measured as total reported family income in 1999 ($000); years of school measured as imputed years of school completed by 2000; marital status, measured as a dummy indicator equal to 1 for those married in 2000, and 0 otherwise; and parenthood, measured as the number of related children under 18 years of age living in the household in 2000. In addition to these common control variables, a dummy indicator of renter status is also included. This variable is observed in 2000, after migrants have resettled.

RESULTS [IN PROCESS]

1. Destination Analyses

Table 1: Negative Binomial Regression Results Predicting Group-Specific Counts of In-Migrants, 1995-00

Main findings:

- An area's level of hazard-related property damage appears to exert no *direct* pull on migrants of any group; instead, findings confirm the pull of coethnic members already in place for all groups of in-migrants.

- However, when we examine the interaction of coethnic presence and hazard-related losses at destination, we find a strong positive effect for foreign-born Latinos. This effect implies that group presence and hazard damage work in concert to amplify each factor's pull on foreign-born Latino migrants.

- These initial findings affirm prior research's emphasis on the pull of coethnic presence but also offer new insight by showing how this pull is amplified by hazard-related economic losses for one group in particular: foreign-born Latinos.

➢ To see this effect more clearly, we graph the marginal effects of each factor – coethnic presence and hazard damage – on predicted counts of foreign-born Latino in-migrants. Results appear in Figure 1.

Figure 1. Graphical Display of Interaction Effects of Hazard-Related Property Losses and Group Presence on In-Migration of Foreign-Born Latino Households, 1995-00

Main finding:

- These graphs clearly show how the relative pull of each factor depends on the level of the other – each amplifying the other.

2. Individual-Level Analyses

Figure 2. Mean Observed Hazard-Related Property Damage at Destination for Internal Migrants by Group, 1995-00.

Main findings:

- For the next analyses we shift from places to people – or destinations to migrants. Initial results in Figure 2 show that foreign-born Latino migrants tend, on average, to move to areas with more hazard-related damage than other groups of migrants.

➢ To examine these patterns at the individual level, we fit a series of Heckman selection models predicting the log of recent hazard-related property losses at destination,

controlling for the non-random likelihood of migration. The intent is to examine group differences in damage at destination with and without statistical controls for other destination and individual-level factors. Findings from such analyses shed further light on group differences in the pull of hazard damage and reveal mediating factors that might help to explain these differences. With this type of analysis, we can also examine how the pull of hazard damage varies by relative distance for different groups.

Table 2: Regression Results from Heckman Selection Models Predicting Hazard-Related Property Damage at Destination, Conditional on Migration, 1995-00.

Main findings:

- Model 1 – without controls – affirms the pull of property damage on minority migrants, especially foreign-born Latinos.

- Model 2 shows that when group presence and total income at destination are controlled two things happen to group differences in hazard-related pull: minority rates roughly double, relative to whites; and, differences between native- and foreign-born Latinos dissipate. Together these findings affirm that the pull of hazard damage on foreign-born Latinos is influenced by the number of group members already in place at destination. So, when this factor is controlled in model 2, the unique pull of hazard-related losses on foreign-born Latinos dissipates somewhat. Findings in Model 2 also indicate that when group presence and total income are controlled, the pull of hazard-related losses on minority migrants is even stronger than we might otherwise expect (since the magnitude of coefficients for all minority groups increases). The implication is that, if minority and white migrants had the same range of observed destinations available to them with respect to coethnic presence and total income, the relative pull of hazard-related losses would be even greater for minorities than observed in Model 1.

- Model 3 shows that when individual-level controls are added to the analysis, the story changes little from Model 2. This relative stability in group-specific coefficients indicates that group differences in hazard-related pull have relatively little to do with socio-demographic differences among groups. However, such differences do appear to matter generally. For example, results indicate that the pull of hazard-related losses is strongest for less-educated, lower-income migrants who are members of married and/or male-headed households. Results also indicate that the average pull of hazard-related losses correlates positively with longer-distance migration. In other words, the pull of hazard losses increases rather than decays, over space.

- To investigate the latter finding further, Model 4 assesses whether this dynamic is stronger for some groups than others by interacting group status with relative distance migrated. Results indicate that the long-distance pull of recent hazard losses is especially strong among foreign-born Latinos. To illustrate this pattern,

we display the predicted hazard-related damage at destination for the different relative distances observed (in-state, adjacent state, and non-adjacent state destinations).

Figure 3: Predicted Hazard-Related Property Damage at Destination for Foreign-Born Latino Migrants, 1995-00.[a]

Main findings:

- Figure 3 shows that, all else equal, as hazard losses increase they tend to pull foreign-born Latino migrants longer distances, thereby uniquely contributing to the group's spatial redistribution across the country. The dynamic runs counter to the usual distance-decay function; instead, of dissipating over space, the pull of hazard losses on foreign-born Latino migrants actually increases.

- Finally, to assess whether more heavily damaged areas tend to pull certain types of foreign-born Latinos migrants, we fit a series of Heckman models just for this group. Narrowing our focus in this way allows us to add additional variables not examined in Table 2, namely citizenship status, time in the United States, and English language ability. In addition, we also stratify analyses by relative migratory distance – i.e., in-state, to adjacent states, and to non-adjacent states – to assess whether the selective pull of local hazard-related property losses varies by relative distance migrated.

Table 3. Regression Results from Heckman Selection Models Predicting Hazard-Related Property Damage at Destination for Foreign-Born Latinos, Conditional on Migration, 1995-00 (with Robust Standard Errors in Parentheses)

Main findings:

- Table 3 indicates that, among foreign-born Latinos, there is relatively little intra-group selectivity towards more hazard-damaged areas, conditional on migration.

- This general pattern is particularly evident for migrants to nonadjacent states, for whom there are no statistically significant covariates with or without Heckman selection.

- Overall, these findings suggest that the pull of more damaged areas – particularly across longer distances – attracts a wide cross-section of foreign-born migrants, which brings us back to the general proposition that hazard-related damage doesn't trigger entirely new migratory flows but instead tends to interact with and amplify demographic processes already in motion.

CONCLUSION [PRELIMINARY]

Findings indicate that economic losses from recent environmental hazards do not exert a direct pull on U.S. migrants but rather work in concert with coethnic presence to pull disproportionately large shares of foreign-born Latinos to affected areas. Findings also indicate that this pull tends to increase with distance migrated, thereby contributing to the redistribution of foreign-born residents regionally and nationally, not just locally or in-state. Finally, findings indicate that this type of redistribution tends to be relatively random with respect to group members involved. So, it is not a particular type of foreign-born Latino who is drawn longer distances to areas with strong coethnic presence and costly damage from recent hazards. Rather, it is a broad and relatively representative cross-section of group members already migrating internally within the United States.

These results add further nuance and complexity to ongoing discussions of "environmental migration" and begin to conjure a certain image. That image is one in which a "market led" political economy of hazard recovery does not just displace locally vulnerable groups but also intersects with migratory processes already in motion to amplify the pull of foreign-born Latinos to affected areas and to pull them to more distant places in the process. In this way hazard damage and recovery – along with pre-existing levels of local development that such damage and recovery presupposes – come together to play key roles in redistributing growing numbers of foreign-born Latinos over longer distances throughout the country. The broader implication is that hazard damage and recovery contribute to but never quite determine contemporary population redistribution with the United States. This image differs from that of the "hurricane chaser" who is typically a male, low-wage construction laborer who shows up briefly to help rebuild but then quickly moves on, as local reconstruction work wanes and related opportunities open elsewhere with the next hazard.

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Table 1: Negative Binomial Regression Results Predicting Group-Specific Counts of In-Migrants, 1995-00 (with Robust Standard Errors in Parentheses)[a]

Independent Variables[b]	Foreign Born		Native Born					
	Latino		Latino		African American		White	
	1	2	1	2	1	2	1	2
1. Property Losses from Natural Hazards, 1995-00	.017	.667	.025	-.175	-.036*	.032	-.003	-.526
	(.032)	(.732)	(.024)	(.532)	(.018)	(.503)	(.011)	(.293)
2. Number of Group Members in Residence in 1995	.922***	.369	.834***	.947***	.752***	.725***	.656***	1.135**
	(.038)	(.260)	(.032)	(.245)	(.029)	(.206)	(.050)	(.415)
3. Area's Total Income in 1999	.025	.618	.218***	.038	.189**	.252	.143	-.457
	(.068)	(.634)	(.059)	(.457)	(.057)	(.466)	(.041)	(.325)
4. 1 x 2		.038*		-.007		.002		-.030
		(.017)		(.015)		(.013)		(.026)
5. 1 x 3		-.038		.011		-.004		.037
		(.038)		(.028)		(.027)		(.020)
6. Constant	-2.595*	-12.769	-6.201	-2.978	-4.445	-5.578		6.180
	(1.201)	(12.149)	(1.106)	(8.801)	(1.099)	(8.827)		(4.753)
alpha	.580	.573	.444	.445	.447	.447	.190	.189
	(.095)	(.093)	(.074)	(.074)	(.056)	(.059)	(.017)	(.016)
N (PUMAs)	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024
Wald Chi-Squared	767.9	827.8	868.1	880.9	948.0	956.4	687.6	705.3

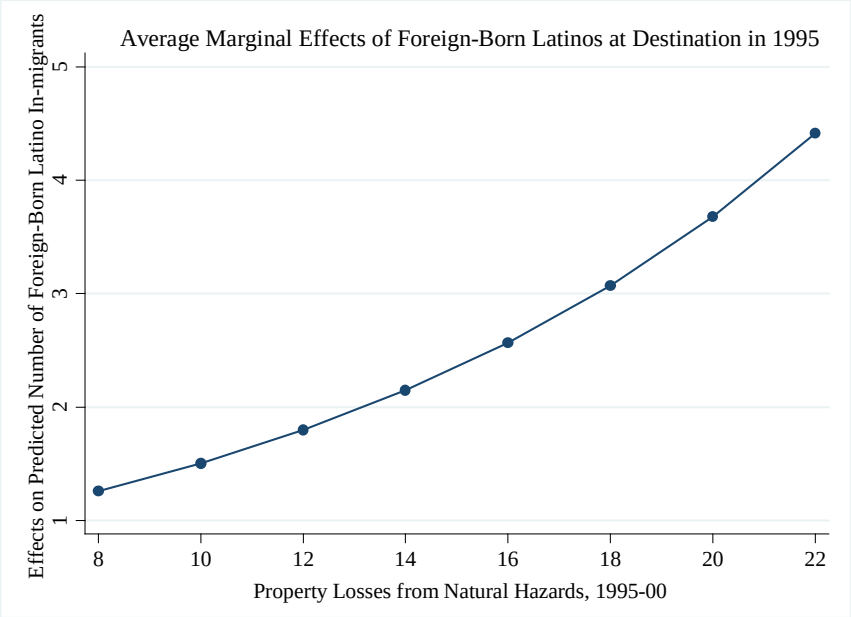
* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed test)

[a] Unit of Analysis: Public Use Micro Area (PUMA); sample: Household heads between ages 18 and 65 years old who changed PUMAs between 1995 and 2000.

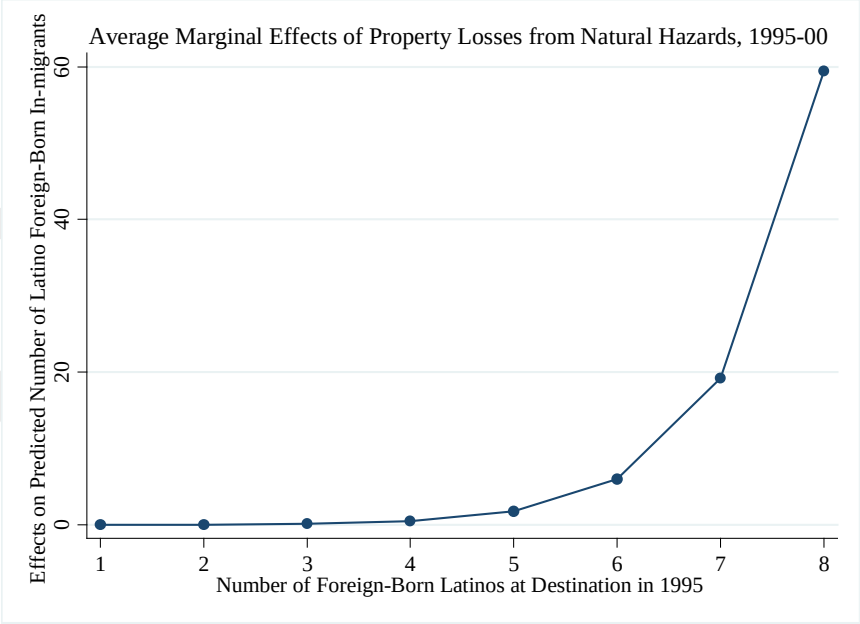
[b] All independent variables are log-transformed using their natural logarithm. For Number of Group Members in Residence in 1995, a constant of one was added to each PUMA prior to log-transformation to ensure no missing data.

Figure 1. Graphical Display of Interaction Effects of Hazard-Related Property Losses and Coethnic Presence on In-Migration of Foreign-Born Latino Households, 1995-00[a]

Panel A.



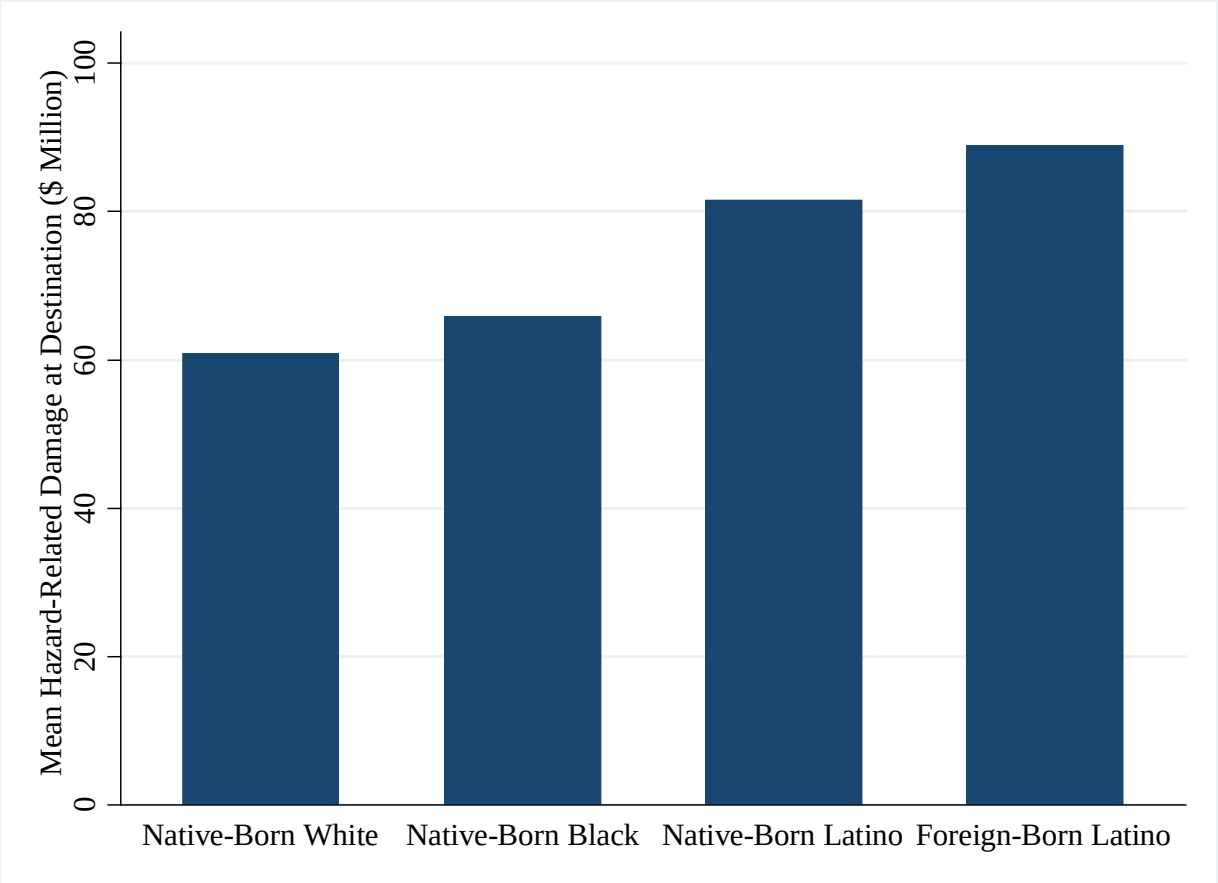
Panel B.



[a] Respective independent variables (Number of Group Residents in 1995 and Property Losses from Natural Hazards, 1995-00) are log-transformed.

Source: Table 1, Model 2 for Foreign-born Latinos, with all other covariates held constant at subsample means.

Figure 2. Mean Observed Hazard-Related Property Damage at Destination for Internal Migrants by Group, 1995-00.[a]



[a] T tests with log-transformed values of property damage at destination indicate that differences between successive groups (e.g., Native-Born Whites versus Native-Born Blacks, then Native-Born Blacks versus Native-Born Latinos) are all statistically significant at the .01 level.

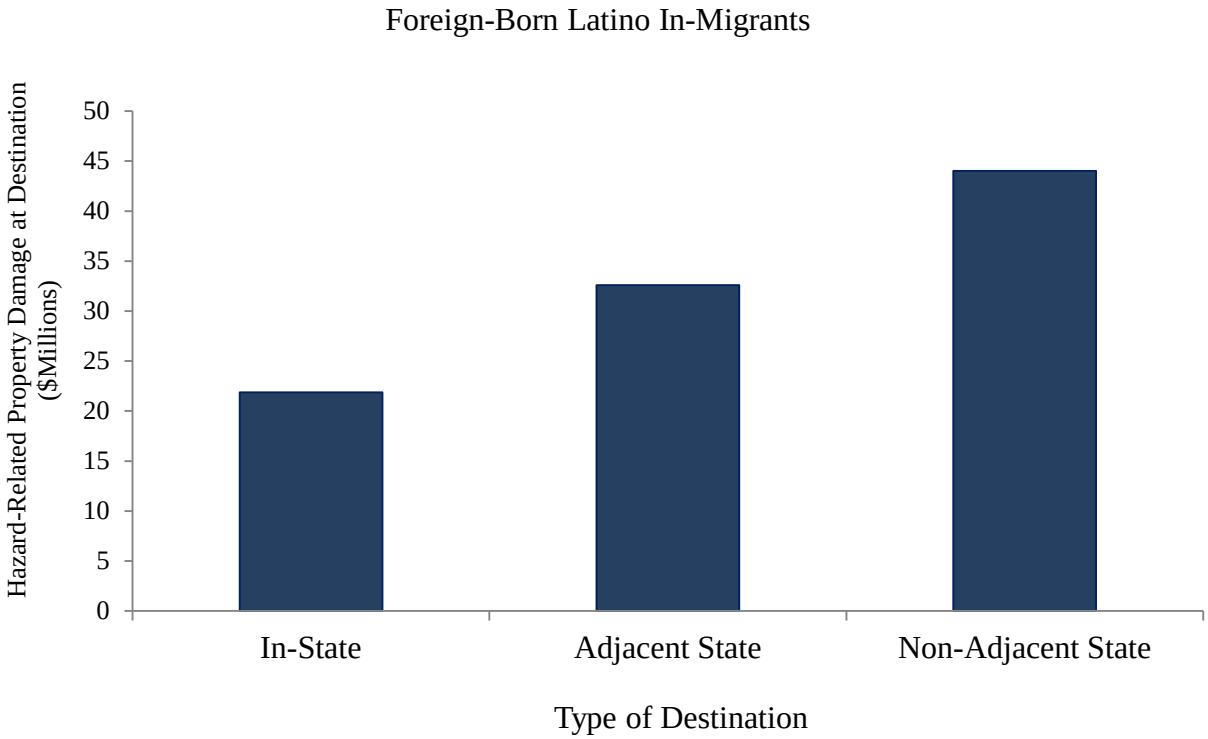
Table 2: Regression Results from Heckman Selection Models Predicting Hazard-Related Property Damage at Destination, Conditional on Migration, 1995-00 (with Robust Standard Errors in Parentheses) [a] [b]

	1	2	3	4
Group				
1. Native-Born White [ref.]	---	---	---	---
2. Native-Born Black	.145	.468**	.493**	.667**
	(.082)	(.146)	(.142)	(.225)
3. Native-Born Latino	.258*	.896***	.901***	.627*
	(.101)	(.234)	(.230)	(.271)
4. Foreign-Born Latino	.396**	.848***	.781***	.211
	(.132)	(.238)	(.234)	(.359)
Destination Factors				
5. Ln(Number of Group Members Present, 1995)		.338***	.339***	.349***
		(.073)	(.072)	(.073)
6. Ln(Total Area Income, 1999)		.365***	.370***	.362***
		(.088)	(.087)	(.087)
Household Head Characteristics				
7. Years of Education			-.020***	-.019***
			(.005)	(.005)
8. Family Income ($000)			-.001**	-.001**
			(.0003)	(.0003)
9. Age			.008	.008
			(.005)	(.005)
10. Age^2			-.0001	-.0001
			(.0001)	(.0001)
11. Female (Headed Household)			-.086***	-.086***
			(.022)	(.022)
12. Married			.070**	.071**
			(.025)	(.025)
13. Number of Children			-.006	-.006
			(.012)	(.012)
14. Renter (1=yes; 0=no)			-.072	-.072
			(.047)	(.046)
15. Relative Distance Migrated			.138***	.129***
			(.033)	(.032)
Interaction Terms				
2 x 15				-.056
				(.047)
3 x 15				.111
				(.064)
4 x 15				.213*
				(.091)
Constant	16.418***	6.786***	6.641***	6.754***
	(.157)	(1.578)	(1.555)	(1.551)
Log Likelihood	-357,359.4	-352,502.4	-352,248.3	-352224.4

[a] All models are estimated with maximum-likelihood Heckman selection, using group membership, age, age squared, gender, marital status, number of own children in the household, renter status (1=yes; 0=no), and total family income ($000) to predict the latent probability of migration. N of uncensored observations = 477,349; N of censored observations = 78,192.

[b] Models that do not use Heckman correction for the nonrandom selection of migrant householders produce results that are substantively similar to those reported here.

Figure 3: Predicted Hazard-Related Property Damage at Destination for Foreign-Born Latino In-Migrants by Relative Distance of Migration, 1995-00.[a]



[a] *Source*: Table 2, Model 4, holding all other covariates constant at observed population means.

Table 3. Regression Results from Heckman Selection Models Predicting Hazard-Related Property Damage at Destination for Foreign-Born Latinos, Conditional on Migration, 1995-00 (with Robust Standard Errors in Parentheses) [a b]

		Foreign-Born Latino Migrants By Destination		
	All	In-State	Adjacent State	Nonadjacent State
Household Head				
Years in USA	.003	.002	.036*	-.004
	(.006)	(.007)	(.016)	(.007)
Citizen (0=no; 1=yes)	-.156	-.223	-.209	-.043
	(.107)	(.159)	(.339)	(.149)
English Ability (0=poor; 1=good)	.019	.028	-.172	.052
	(.092)	(.136)	(.247)	(.156)
Years of Education	.003	.0003	-.016	.014
	(.015)	(.017)	(.022)	(.022)
In Labor Force	.144	.154	.300	.096
	(.168)	(.223)	(.448)	(.255)
Family Income ($000)	.001	.003**	-.001	-.001
	(.001)	(.001)	(.003)	(.001)
Married (0:1)	.216*	.320*	.109	.122
	(.101)	(.136)	(.325)	(.149)
Number of Children	-.069	-.067	.032	-.080
	(.039)	(.047)	(.075)	(.057)
Female (0:1)	-.119	-.022	-.536*	.005
	(.122)	(.164)	(.273)	(.167)
Age	-.006	-.003	-.092	.014
	(.018)	(.025)	(.054)	(.027)
Age^2	.00004	-.0001	.0008	-.00004
	(.0002)	(.0002)	(.0006)	(.0003)
Constant	16.326***	15.965***	16.574***	16.269***
	(.513)	(.671)	(1.383)	(.869)
N (total)	24,149	24,149	24,149	24,149
N (uncensored)	3,515	1,915	415	1,185
Log Likelihood	-17,208.2	-10,634.3	-2,949.0	-7,099.6

[a] All models are estimated with maximum-likelihood Heckman selection, using group membership, age, age squared, gender, marital status, number of own children in the household, renter status (1=yes; 0=no), and total family income ($000) to predict the latent probability of migration.

[b] Models that do not use Heckman correction for the nonrandom selection of migrant householders produce results that are substantively similar to those reported here. The only exception involves the estimated coefficient for female-headed households, which is statistically insignificant in all models without Heckman correction.