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Abstract

This paper examines the decision of Hurricane Katrina evacuees to return to their pre-Katrina areas and documents how the composition of the Katrina-affected region changed over time. Using data from the Current Population Survey, we show that an evacuee's age and the severity of damage in an evacuee's county of origin are important determinants of whether an evacuee returned during the first year after the storm. Blacks were less likely to return than whites, but this difference is primarily related to the geographical pattern of storm damage rather than to race per se. The difference between the composition of evacuees who returned and the composition of evacuees who did not return is the primary force behind changes in the composition of the affected areas in the first two years after the storm. Katrina is associated with substantial shifts in the racial composition of the affected areas (namely a decrease in the percentage of residents who are black) and an increasing presence of Hispanics. Katrina is also associated with an increase in the percentage of older residents, a decrease in the percentage of residents with low income/education, and an increase in the percentage of residents with high income/education.

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1. Introduction

Hurricane Katrina, which struck the Gulf Coast in August 2005, has had lasting and far-reaching effects. Katrina caused massive flooding in the city of New Orleans and catastrophic damage along the Gulf coasts of Louisiana, Mississippi, and Alabama. Before making landfall and in its wake, Katrina caused one of the largest and most abrupt relocations of people in U.S. history, as approximately 1.5 million people aged 16 years and older evacuated from their homes (Groen and Polivka 2008a). Katrina was responsible for an estimated $96 billion worth of property damage (The White House 2006) and more than 1,800 deaths (Knabb, Rhome, and Brown 2005), making it the costliest and one of the deadliest hurricanes to ever strike the United States.

The sheer magnitude of the physical destruction and evacuation makes the effects of Katrina worth studying. Analyzing these effects is also important for the study of disasters more generally. Disaster research has long acknowledged that natural disasters evolve into social disasters based on the interaction of individuals and social structures with natural events (Fothergill, Maestas, and Darlington 1999; Fritz 1961; Kreps 1984; Quarantelli and Dynes 1977). Studies of previous disasters have found that socio-economic status and being a member of a minority group are significant predictors of individuals suffering severe physical and psychological impacts (Bolin and Stanford 1998; Fothergill et al. 1999; Peacock and Girard 1997). Disaster research has also documented that socio-economic status plays an important role during the recovery from a disaster—with more advantaged groups being able to recover more quickly and more completely (Bolin and Bolton 1986; Peacock, Morrow, and Gladwin 1997)—and that disasters tend to increase the concentration of poorer, more socially disadvantaged populations on less-desirable land (Girard and Peacock 1997; Pais and Elliott 2008).

An understudied aspect of disasters is the analysis of who returns to an area after evacuating. Given the scale of the evacuation both before and after Katrina, analysis of return migration is crucial to understanding the impact of the storm on the well-being of evacuees and on the social and economic structure of areas affected by the storm. Evacuees who decide not to return have the opportunity to restart their lives in new areas, but they may find themselves in unfamiliar labor markets and may have lost potentially important social networks and support structures. At the same time as evacuees are deciding whether to return, individuals who never lived in the affected areas may decide to migrate to these areas. The decisions of evacuees and potential in-migrants influence the demographic composition of the storm-affected areas and thus may change community priorities and the cultural milieu of these areas.

This paper examines the decision of evacuees to return to their pre-Katrina areas (through October 2006) and documents how the composition of the Katrina-affected region changed over time (through November 2007). Our empirical analysis has two primary components. First, we investigate the roles of demographic characteristics (such as age, race, and education), public and private services, home ownership, and hurricane damage in the decision of evacuees to return. Second, we examine the characteristics of the entire resident population before and after the storm, in terms of demographic characteristics and family income.

Using data from the Current Population Survey, which is representative of all Katrina evacuees and contains information about evacuees' actual decisions to return, we show that age, homeownership, and the severity of damage in an evacuee's county of origin are important determinants of whether an evacuee returned. That older residents and homeowners are more likely to return is consistent with these individuals being more closely tied to an area and making decisions based on the relative cost of living in a particular area. We also show that blacks are

less likely to return than whites, but this difference is primarily related to the geographical pattern of storm damage rather than to race per se.

We show that the difference between the composition of evacuees who returned and the composition of evacuees who did not return is the primary force behind changes in the composition of the affected areas in the first two years after Katrina. Katrina is associated with substantial shifts in the racial composition of the affected areas (namely a decrease in the percentage of residents who are black) and an increasing presence of Hispanics. Katrina is also associated with an increase in the percentage of older residents, a decrease in the percentage of residents with low income/education, and an increase in the percentage of residents with high income/education. These changes are generally larger for the high-damage areas than for the entire affected area, which is consistent with the magnitude of population shifts induced by the storm.

The remainder of the paper proceeds as follows. The next section outlines a conceptual framework for understanding the decision of evacuees to return to their pre-Katrina areas and the potential role for various factors in that decision. Section 3 describes the data from the Current Population Survey that is the basis for our empirical analysis. Section 4 examines the pattern of evacuation rates by geographic area and demographic characteristics. Section 5 examines the roles of demographic characteristics, public and private services, home ownership, and hurricane damage in the decision of evacuees to return. Section 6 examines how the composition of the entire resident population of the Katrina-affected areas changed over time in terms of demographic characteristics and the distribution of family income. Section 7 discusses the longer-term prospects of the storm-affected areas and how individuals' decision to return (or

newly migrate) to these areas may affect these prospects. Section 8 summarizes our main findings.

2. Conceptual Framework

Despite the attention paid to many aspects of Katrina's aftermath (e.g., Frey and Singer 2006; Frey, Singer, and Park 2007; Liu and Plyer 2008), there have been only a few studies of the decision of individuals to return to the areas from which they evacuated. Furthermore, these studies have concentrated on single aspects that might influence the decision to return, such as an individual's assessment of the risk of a hurricane striking an area (Baker et al. forthcoming), race and class (Elliott and Pais 2006), and the effect of the storm on an individual's ties to an area (Paxson and Rouse 2008) or sense of place (Falk, Hunt, and Hunt 2006). By contrast, in this paper we take a more comprehensive approach to the decision of evacuees to return.

Moreover, the dataset used in our empirical analysis consists of a representative sample of evacuees from all geographic areas affected by the storm and information on whether these evacuees actually did or did not return to the areas from which they evacuated. Previous analysis have been based on evacuees' intentions to return (e.g., Landry et al. 2007) or have been restricted to certain geographic areas or particular subpopulations (e.g., Paxson and Rouse 2008).

In order to motivate the empirical work that follows, we present a simple conceptual model that includes a variety of factors that might influence the decision to return. This model draws heavily on standard human-capital investment models of geographic mobility within the United States (Greenwood 1975, 1985) and of international migration (Borjas 1989) in which individuals decide whether to migrate based on the utility they would receive from living in each area. We expand and modify the standard model to account for several circumstances specific to Katrina evacuees. First, evacuees deciding whether to return migrated initially as part of a mass

evacuation rather than for career or personal reasons. Second, the storm destroyed many aspects of evacuees' lives that may have tied them to an area. Third, the financial cost an evacuee would bear to return to an area could be substantial if a great deal of rebuilding and clean-up is necessary. Finally, evacuees experienced a great deal of uncertainty about the regulatory environment in storm-damaged areas and questions about what type of communities would be allowed to exist.

We model the decision to return as a comparison of the utility that individuals expect to receive living in one area versus another. Let o denote the location from which an individual evacuated (say, New Orleans) and d denote the area to which an individual migrated (say, Houston). Then an individual will return if her expected discounted utility of living in location o is greater than the sum of her expected discounted utility of living in location d and the cost of returning:

$$\sum_{t=1}^{n} U_{ot} /(1+r)^t > \sum_{t=1}^{n} U_{dt} /(1+r)^t + c,$$

where U_{ot} represents the expected utility at time t of living in location o, U_{dt} represents the expected utility at time t of living in location d, r is the discount rate, and c is the full cost of returning (measured in utility units). Time runs from the period in which the decision is made $(t = 1)$ to the expected end of life $(t = n)$.

The full cost of returning includes not only the direct expenses associated with moving back (e.g., cost of renting a U-Haul or hiring a moving company, food, lodging, and the opportunity cost of travel time) and the monetary costs of rebuilding or repairing the home (net of insurance payments and public assistance), but also the potentially huge time and monetary costs associated with the relocation process (e.g., dealing with contractors and local public

officials from a distance). The "hassle" factor of rebuilding and moving back may be an important psychic cost as well. The consideration of returning costs is important because even if people would derive more utility living at the origin than the destination, the high cost of moving back may prevent them from doing so.

Factors that influence the expected utility of living in any given area include the amount of real income an individual can expect to receive, an individual's stock of location-specific capital associated with the area, the area's amenities, locally produced public and private services, and an individual's sense of place. In addition, factors that specifically influence the expected utility of living in an area directly affected by the storm include uncertainty in the regulatory environment and questions about the degree of storm protection that the government will provide in the future. In what follows, we briefly discuss each of these factors.[1]

Real Income

In light of research on geographic mobility within the United States (Borjas, Bronars, and Trejo 1992; Greenwood 1975; Sjaastad 1962), we anticipate regional differences in average wages and relative wages of workers with various skill levels to heavily influence evacuees' decisions to return. However, because the evacuation was weather-related and widespread (including those in age groups for which both moving and employment are rare), the effect of such differences in wages is likely to be somewhat attenuated. The widespread nature of the evacuation also means that the focus on wages needs to be expanded to encompass other aspects of income, including transfer payments (e.g., Social Security benefits and welfare payments) and the likelihood that an individual with a certain skill level can obtain suitable employment in an

[1] For simplicity the model considers the return decision in an individual context. A family's decision to return could be modeled using an aggregation of the individual utility (and returning costs) of all family members.

area.[2] Finally, to account for regional differences in prices, the utility comparison is assumed to be based on real as opposed to nominal income. (Real income incorporates the purchasing power of a given level of nominal income in a given area.) For those receiving fixed transfer payments, differences in prices are the primary component of differences in expected income between places.

Location-Specific Capital

Location-specific capital is a generic term for factors that "tie" someone to a particular place (DaVanzo and Morrison 1981; Paxson and Rouse 2008). This concept includes concrete assets and other features specific to a place that are more valuable to an individual in one location than in another, such as job seniority, an established clientele (as in the case of a doctor or carpenter), a license to practice a particular profession in a certain area, personal knowledge of an area, community ties, and social networks.

Ordinarily, location-specific capital would tend not to depreciate over time. However, Hurricane Katrina potentially destroyed a great deal of location-specific capital (Paxson and Rouse 2008). Consequently, an individual's decision to return depends on her stock of location-specific capital before the storm, the degree to which that stock was destroyed by the storm, and the extent to which location-specific capital can be restored. The restoration of some types of location-specific capital, such as social networks, is influenced by the previous and concurrent behavior of others, in a manner that can be self-reinforcing. The larger proportion of an individual's social network that has already returned or is currently planning to return, the more attractive returning is to an individual who has not yet returned. Other types of location-specific capital will simply deteriorate the longer the individual is away from her pre-Katrina location. On the flip side, the amount of all types of location-specific capital associated with the area to

[2] For an analysis of the effect of Katrina on the labor market outcomes of evacuees, see Groen and Polivka (2008b).

which an individual relocated unambiguously increases with the length of time that she resides in that area.

Amenities

Amenities are positive attributes associated with a specific area that cannot be influenced by an individual (Roback 1982; Sjaastad 1962). Amenities include physical attributes such as temperature, air quality, and recreational opportunities. Amenities may also include goods and services that are differentially available across areas, such as restaurants, professional sports teams, and museums. Disamenities are negative attributes such as smog and crime. Having lived through Katrina, evacuees might consider a particular disamenity in their evaluation of where to live: the risk of another hurricane striking the area from which they evacuated (Baker et al. 2009).

Public and Private Services

The quality and amount of locally provided government services can influence where individuals decide to live, especially within specific regions or labor markets. These services include schools, libraries, parks, the transportation infrastructure (including streets and public transportation), hospitals, and public safety (including police protection and protection from flooding). Similarly, the provision and dependability of privately provided services can influence the decisions of evacuees to return. Services such as electricity, phone connections, and retail-trade outlets (such as grocery stores) are available in most areas, but in the wake of Katrina these services were not available in many of the affected areas.

Sense of Place

The term “sense of place” has been used by sociologists to explain why some blacks have moved back to the south (Falk 2004; Gieryn 2000; Hummon 1990). They define “place” as a

geographical unit in which one's identity is "grounded" and further argue that people usually have a place-based identity of some kind. People are, for example, "Southerners," "New Yorkers," or "Texans"—even if they no longer reside in these areas. Much of the area affected by Hurricane Katrina, it could be argued, had a unique sense of place. The Gulf Coast and especially New Orleans have been known for a relaxed lifestyle. To the extent that evacuees are tied to their pre-Katrina areas by a sense of place and cannot reconstitute this elsewhere, they will want to return to these areas.[3]

Government Regulations, Storm Protection, and Rebuilding Funds

Evacuees partially base their decision to return on the type of communities and housing structures they can anticipate living in after the storm, and on the future risk of storm damage in a particular community. In turn, these factors, particularly for homeowners from heavily damaged areas, depend on government regulations about whether and how residences can be rebuilt, the existence of accurate information about the potential flood risk of residing in an area subject to flooding, and (for those with incomplete homeowners insurance and lower levels of wealth) the amount of government funds they can expect to receive to rebuild.

In the wake of Katrina, uncertainty on all of these dimensions was widespread. Updated flood-hazard maps (which affect elevation standards as well as insurance requirements) were not issued for any areas until early 2008 (although the Federal Emergency Management Agency [FEMA] did release elevation advisories starting in April 2006).[4] State-funded programs in Louisiana and Mississippi designed to provide homeowners with financial assistance to rebuild were plagued by complicated applications, policy changes, and low payout rates (Norcross and

[3] Chamlee-Wright and Storr (forthcoming) emphasize the role of sense of place as a reason for returning to the Ninth Ward of New Orleans. In qualitative interviews, returning residents suggested that the characteristics of New Orleans and their Ninth Ward neighborhoods, when taken together, could not be found or replicated elsewhere.
[4] FEMA's "Hurricane Season 2008 State Fact Sheets" for Louisiana and Mississippi (http://www.floodsmart.gov/floodsmart/pages/media_resources.jsp; accessed September 9, 2008).

Skriba 2008).[5] And comprehensive community-design plans were slow in being issued or subject to frequent changes. For example, as of August 2007, New Orleans was on its fifth discrete process of rebuilding planning in less than two years (Chamlee-Wright and Rothschild 2007).[6]

3. Data

Our empirical analysis is based primarily on data from the Current Population Survey (CPS), a nationally representative, monthly survey of approximately 60,000 occupied housing units. The CPS was modified in the wake of Hurricane Katrina to include questions that identify Katrina evacuees, the county (or parish) from which they evacuated, and if and when these individuals returned to their pre-Katrina residences (Cahoon et al. 2006). We use the responses to these questions, which were part of the CPS from October 2005 to October 2006, in combination with demographic and economic information collected in the CPS on a monthly basis. Information on evacuees' counties of origin is used to merge the CPS data with data on damage from the storm, homeownership rates before the storm, and the availability of public and private services during the recovery.

The battery of Katrina questions opens with a question for the respondent for each household: "Is there anyone living or staying here who had to evacuate, even temporarily, where he or she was living in August because of Hurricane Katrina?" If the answer is "yes" then the

[5] For example, as of August 2007 only 23 percent of applicants to the Louisiana Road Home program had received grants (Norcross and Skriba 2008) and some reports indicate that as of September 2006 less than 0.25 percent of applicants to Mississippi's program had received relief (Chamlee-Wright and Rothschild 2007). Funding from the FEMA Hazard Mitigation Grant Program for homeowners to elevate their properties was also subject to delays and changing regulations.

[6] One plan, proposed in November 2005, recommended dramatically reducing the city's "footprint" and transforming some low-lying neighborhoods into green spaces and industrial parks by subjecting neighborhoods where 50 percent of residents had not returned (or committed to returning) to forced buyouts. To allow time for an assessment, a four-month moratorium was proposed on the issuance of rebuilding permits in neighborhoods that had experienced at least two feet of flooding—approximately 80 percent of New Orleans (Chamlee-Wright and Rothschild 2007). Although the public outcry led the city's mayor to reject the building moratorium, the initial proposal is a salient example of the confusing and uncertain environment in which evacuees were making decisions.

respondent identifies who among those listed as being at the current address is an evacuee. The respondent is then asked about the pre-Katrina location of each evacuee using the question: "In August, prior to the hurricane warning, where (was NAME/were you) living?" Pre-Katrina locations are recorded in terms of state and county, parish, or city.[7] The location of each household at the time of the interview can be obtained directly from the sample frame.[8]

We define an evacuee as anyone who was identified as such in any of the months that his household was interviewed. Researchers interested in safety, disaster planning, and emergency responses typically define evacuees as those who leave before a natural disaster strikes (e.g., Gladwin and Peacock 1997; Haney, Elliott, and Fussel 2007; Perry, Lindell and Green 1981; Smith and McCarty 2009), whereas researchers interested in the recovery of an affected area, relocation decisions of individuals, and the effect of disasters on an area's demographic composition define evacuees as those who leave either before or shortly after a natural disaster strikes (e.g., Elliott and Pais 2006; Girard and Peacock 1997; Landry et al. 2007). Given the large amount of destruction caused by Hurricane Katrina, the protracted nature of the disaster, and the focus of our paper, we choose to define evacuees as those who left before or after the storm made landfall.

To more carefully focus our analysis on those directly affected by Hurricane Katrina we also require that, before the hurricane, evacuees lived in Louisiana, Mississippi, or Alabama in counties designated by FEMA as eligible for both public and individual disaster assistance as a result of damages due to Hurricane Katrina.[9] Applying this definition to the CPS data, we estimate that approximately 1.5 million individuals aged 16 years and older evacuated from their

[7] For ease of exposition, in the remainder of the paper we often use the term "county" to refer to parishes in Louisiana.
[8] The complete set of Katrina questions is documented in Cahoon et al. (2006) and Groen and Polivka (2008a).
[9] For details on this definition of evacuees, see Groen and Polivka (2008a).

homes because of Hurricane Katrina. We estimate that 75 percent of evacuees were living in Louisiana before the storm, 19 percent were living in Mississippi, and 6 percent were living in Alabama.

CPS data have several advantages in examining return migration among evacuees. First, the sample of evacuees is relatively large and representative of individuals who evacuated to places throughout the country. Second, CPS data record whether evacuees actually returned to their pre-Katrina residences (or counties), as opposed to whether evacuees intended to return. Third, CPS data identify the county from which an individual evacuated. Finally, CPS data contain a myriad of demographic measures that can be used to explore the decision to return. Unfortunately, CPS data do not contain direct measures for many of the components of the utility function discussed in our conceptual framework. Consequently, proxies for several of these components are used in our analysis. Another limitation of the CPS data is that for evacuees who returned, there is no indication of the locations to which they evacuated.

4. Evacuation Rates

To set the stage for the analysis of return migration among evacuees, we address a related issue: among pre-Katrina residents of areas affected by the storm, who evacuated? We estimate evacuation rates using CPS data for October 2005–October 2006 on evacuees and on non-evacuees, who are defined as individuals living in these areas at the time of the CPS interview but who did not identify themselves as evacuees. The samples of evacuees and non-evacuees consist of individuals aged 19 years and older; persons aged 16 to 18 are included in the CPS but excluded from our analysis because their migration behavior presumably depends on their parents' decisions. Our estimates of evacuation rates represent the number of evacuees divided

by the combined number of evacuees and non-evacuees. The sample consists of 21,666 monthly observations on 6,692 individuals.

Over the entire region based on FEMA designations, which is a large area of 91 counties in Louisiana, Mississippi, and Alabama, the estimated evacuation rate is 30 percent. Evacuation rates are much higher in areas near the Gulf Coast. In the set of 12 counties situated near the Gulf Coast within 100 miles of the storm path, an estimated 85 percent of pre-storm residents evacuated. By contrast, evacuation rates are considerably lower for areas farther away from the storm path: 32 percent in counties situated along the Gulf Coast within 100–200 miles of the storm path and 8 percent among counties located further inland or near the Gulf Coast but more than 200 miles from the storm path.[10]

Given the geographical pattern of evacuation rates, we focus our analysis of return migration on evacuees who came from counties near the Gulf Coast within 100 miles of the storm path. (Henceforth, we refer to these counties as "areas affected by Katrina" or "the entire affected area.") We further distinguish among these counties by defining high-damage areas (four counties) and low-damage areas (eight counties). The estimated evacuation rate was 94 percent in high-damage areas (N=1,517 monthly observations) and 80 percent in low-damage areas (N=3,000 monthly observations). Figure 1 identifies the counties in high- and low-damage areas.

As shown in Table 1, evacuation rates do not vary greatly across demographic groups. In the entire affected area, the differences across subgroups for each characteristic are statistically

[10] Counties along the Gulf Coast within 100 miles of the storm center are listed in Figure 1. Counties along the Gulf Coast within 100–200 miles of the storm center are two counties in Alabama (Baldwin and Mobile), five parishes in Louisiana (Assumption, Iberia, St. James, St. Mary, and Terrebonne), and two counties in Mississippi (George and Jackson). The entire region formed by FEMA designations is shown in Groen and Polivka (2008a).

significant but relatively small in magnitude.[11] For example, evacuation rates by age group vary from 83 percent among those aged 25 to 39 years to 89 percent among those aged 19 to 24 years. In the high-damage areas, variation in evacuation rates across demographic groups tends to be smaller than in the entire affected area. For instance, evacuation rates for whites and blacks were 83 percent and 87 percent, respectively, in the entire affected area and 93 percent and 94 percent in the high-damage areas.

5. Determinants of Return Migration

This section examines the roles of demographic characteristics, public and private services, home ownership, and hurricane damage in the decision of evacuees to return to their pre-Katrina areas. The analysis proceeds in two steps. First, we relate each characteristic separately to the probability of returning. Second, we jointly consider all of the factors within a multivariate regression model of whether evacuees returned or not.

The sample used in this analysis consists of CPS data from all 13 months (October 2005–October 2006) covered by the Katrina questions. This sample contains 3,764 monthly observations on 1,232 evacuees aged 19 years and older who resided before Katrina in one of the counties near the Gulf Coast within 100 miles of the storm path (see Figure 1).[12] We define returning for this analysis based on whether an evacuee was living in the same county at the time of the post-Katrina CPS interview as she did before Katrina. On average over the entire 13-

[11] Notably, the variation in evacuation rates across demographic groups is small relative to the variation across demographic groups in return rates among evacuees. As a check on the sensitivity of our findings on return migration to the potential selectivity of evacuation, we added non-evacuees to the sample and treated them as returnees. When we did this, the regression results were qualitatively similar to the ones we report.

[12] The CPS uses a 4-8-4 sample design in which an address is scheduled to be interviewed for 4 consecutive months, not interviewed for the next 8 consecutive months, and then interviewed again for the subsequent 4 months. Each calendar month a new group of residential addresses starts this rotation pattern. No attempts are made to interview individuals or households that move away from an address. As a result, our dataset typically contains more than one monthly observation on a given evacuee. Evacuees are observed in the CPS sample for a maximum of 5 months and for an average of 3 months. In the regression estimates, we adjust the standard errors to account for the existence of multiple observations per individual.

month period covered by the CPS data on evacuees, we estimate that about 63 percent of evacuees returned to their pre-Katrina counties.[13] An alternative way to view returning is at the metropolitan level. About 70 percent of evacuees returned to their pre-Katrina Metropolitan Statistical Area (MSA). Of those who did not return to their pre-Katrina counties, only 17 percent relocated to another county within their MSA; the remaining 83 percent relocated outside their MSA.

Tabulating the CPS data separately by month provides evidence on lengths of evacuation. In October 2005 (approximately two months after the storm), 53 percent of evacuees had returned to their pre-Katrina counties. As shown in Figure 2, the proportion of evacuees who had returned increased gradually from January 2006 (58 percent) to October 2006 (73 percent). These proportions suggest that the majority of those who returned (through October 2006) did so relatively quickly. This suggestion is supported by information on the month and day that individuals who returned to their pre-storm addresses reported returning. These returnees were away an average of 38 days. However, that the timing of returning was quite different in high- and low-damage areas (Figure 2). The proportion of evacuees who had returned as of October 2005 was much lower in high-damage areas than low-damage areas, and the proportion returning to high-damage areas remained low until August 2006, when it began to increase.

Descriptive Patterns

Personal and family characteristics. Although evacuation rates do not vary greatly across demographic groups (as discussed in Section 4), the probability of returning varies

[13] By contrast, 56 percent of evacuees returned to their pre-Katrina residence. We use the broader definition of returning (based on county) in this paper because individuals who relocated within the same county, but who changed residences, are arguably more comparable to individuals who returned to their residences than to individuals who relocated to a different county or to a different state. Despite changing residences, relocating within the same county usually allows one to maintain social ties and employment opportunities. Further, the broader definition of returning is more appropriate from the perspective of local leaders and planners.

considerably by demographic group. Table 2 shows the percentage of evacuees in various demographic groups who returned to their pre-Katrina counties; the differences across subgroups are statistically significant for each characteristic for both the entire affected area and high-damage areas. The probability of returning increases with age: among evacuees from the entire affected area, only 50 percent of evacuees 19 to 24 years old returned to their pre-Katrina counties, compared with 69 percent of evacuees 45 to 54 years old and 74 percent of evacuees aged 55 and older. This pattern is consistent with an individual's location-specific capital and sense of place increasing with age. For evacuees who are retired, a high probability of returning also is consistent with these individuals not being affected by relative wages and with a relatively low cost of living in many of the areas affected by the storm.[14] Lower costs of living would make returning more attractive for those receiving Social Security payments and other forms of fixed pension payments because the purchasing power of these payments would be higher.

The estimates in Table 2 also indicate that blacks were much less likely to return than were individuals in other racial groups. Specifically, only 38 percent of black evacuees from the entire affected area returned to their pre-Katrina counties, compared with 76 percent of white evacuees.[15] In addition, evacuees with lower levels of education and family income were less likely to return than were other evacuees. For example, only 53 percent of evacuees without a high school diploma returned, whereas 70 percent of evacuees with a college degree returned. Among evacuees with family incomes of less than $15,000 a year, only 38 percent returned, whereas 74 percent of evacuees with incomes of $75,000 or more returned.[16]

[14] Among evacuees aged 63 and older, 72.9 percent returned, which is similar to the return rate for evacuees aged 55 and older. We use age 55 as the age cutoff in order to maintain sample size in the oldest age group.
[15] Racial differences in returning among Katrina evacuees have been documented in other datasets (e.g., Elliott and Pais 2006; Paxson and Rouse 2008; Sastry forthcoming[a]).
[16] The income data come from a question asked every month in the CPS: "Which category represents the total combined income of all members of this family during the past 12 months?" After reading this question, an interviewer lists the sources of income to be included in "total combined income" and lists 16 income categories,

Public and private services. For evacuees who lived in the New Orleans metropolitan area before the storm, we are able to link the CPS data to measures of services available during the recovery. As part of its Katrina Index, the Brookings Institution collected information on the proportion of various types of facilities that were in operation at particular points in time in particular parishes (Liu, Fellowes, and Mabanta 2006). We use their measures for public schools, public libraries, major hospitals, and child-care centers as of February 2006. As shown in Figure 3, for each type of facility there is a positive relationship between the percentage of evacuees who returned and the proportion of facilities in operation. This pattern suggests that public and private services are important factors in the decision to return. However, other interpretations are possible since causation also may run the other way—residents may choose to return for other reasons and create demand for these facilities to open.

Housing damage. Data on the physical damage to local areas caused by the hurricane are desirable because they speak directly to the housing and employment situations of evacuees and because damage occurred before evacuees began considering whether to return. We link the CPS data to county-level measures from FEMA on damages to real property and personal property not covered by insurance. These estimates of housing damage were based on direct inspection of housing units to determine eligibility for FEMA housing assistance.[17] Analysts at the U.S. Department of Housing and Urban Development categorized the inspection results into three categories: minor damage (less than $5,200), major damage (between $5,200 and $30,000), and severe damage (greater than or equal to $30,000).

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ranging from "less than $5,000" to "150,000 or more." Given the period covered by our sample, this measure of income typically includes some months before Katrina and some months after the storm. We consider it to be a useful measure of a family's resources after the storm.

[17] U.S. Department of Housing and Urban Development (2006). Due to flooding in some areas (primarily the New Orleans metropolitan area), direct inspection was not feasible and the level of damage was estimated based on the depth of flooding in the area.

We divided the number of housing units in each damage category by the total number of occupied housing units in a county before Katrina (according to the 2000 Census) to compute the percentage of housing units in the county that are in each damage category.[18] The scatter plots in Figure 4 indicate a negative relationship between the percentage of evacuees who returned to a county and the percentage of housing units in the county with damage. The magnitude of this relationship is similar regardless of how we define damage, but the fit of the regression line is best when damage is measured as the percentage with severe damage.

More generally, we interpret these measures of housing damage as reflecting the overall physical impact of the storm. Counties with extensive housing damage are also likely to contain damage to businesses, schools, and transportation systems. As a result, evacuees who came from such counties are less likely to return even if some of these evacuees did not personally experience severe damage to their homes.

Home ownership. People who own their homes often have stronger ties to their communities than do people who rent their homes; thus, home ownership is considered a signal of location-specific capital. Therefore, we expect that evacuees who owned their homes before Katrina would be more likely to return than evacuees who rented their homes, all else equal.

Ideally, we would measure home ownership at the individual level. Unfortunately, CPS data on evacuees, which was collected after the storm, contains incomplete information on whether evacuees owned their homes before Katrina. The CPS asks respondents whether they own the homes in which they are living at the time of the interview; therefore, data on pre-Katrina ownership is available only for evacuees who returned to their pre-Katrina residences. Among these evacuees, an estimated 85 percent owned their homes, which is greater than the

[18] The number of occupied units is used because only occupants of housing units were eligible for FEMA housing assistance. The Census Bureau published county-level estimates of housing units for July 2005, but these estimates are inappropriate for this purpose because they include both vacant and occupied units.

homeownership rate of 74 percent among all residents of Katrina-affected areas before the storm (January 2004–July 2005). This comparison suggests that returnees are disproportionately homeowners compared with non-returnees.

For a more complete measure of pre-Katrina home ownership, we use data from the 2000 Census to construct the rate of home ownership in each county from which evacuees originated. Figure 5 shows that a higher rate of home ownership in a county is associated with a larger percentage of evacuees returning to the county. This relationship might reflect, in addition to location-specific capital, the simple fact that it is easier to rebuild a home that you own than to induce someone else to rebuild a place that you rent.

Multivariate Analysis

The preceding analysis identifies several factors that might explain evacuees' decision to return to their pre-Katrina areas. However, several of the characteristics likely are related to one another. (For instance, younger evacuees may be less likely to be homeowners. In addition, the racial composition of evacuees varies by county of origin and thus might be related to housing damage.) To account for these inter-relationships, we estimate logit models in which the dependent variable is an indicator for whether an evacuee had returned to his or her pre-Katrina county by the time of the CPS interview. All of these models include month-year time dummies to control for changes over time in the probability of returning (see Figure 2).

We first consider a specification that includes only personal and family characteristics as explanatory variables, in addition to the time controls. Column 1 of Table 3 reports estimated marginal effects of these characteristics on the probability of returning. Similar to the descriptive estimates in Table 2, the regression estimates highlight the roles of age and race as determinants of returning. Older evacuees were more likely to return than younger evacuees,

and a joint test that the marginal effects of the age variables are zero can be strongly rejected (χ^2=22.85; *p* value=0.00). Black evacuees are much less likely to return than white evacuees; the difference is statistically significant and the point estimate reflects a difference of 31 percentage points.

The second specification includes housing damage, home ownership, and sense of place along with the time controls and the personal and family characteristics. The measure of sense of place is the percentage of residents (aged 5 and older) in 2000 of the evacuee's county of origin that lived in the county in 1995, based on data from the 2000 Census. We anticipate that individuals who have lived in an area less than 5 years would have less sense of place because they have had less time to adopt the lifestyle of an area. Adding housing damage, home ownership, and the measure of sense of place to the regression does not affect age differences but dramatically reduces racial differences in returning (Table 3, column 2): the estimated difference in returning between black and white evacuees falls from 31 percentage points to 13 percentage points (but remains statistically significant). This change is driven almost entirely by the inclusion of the damage variable, not the homeownership or sense of place variables.[19] The change in the estimated effect of race suggests that blacks were more likely to live in areas that suffered severe damage because of the storm, and to a large extent it is differences in the amount of damage rather than race per se that influences return migration. Indeed, the correlation at the county level between the percentage of evacuees who are black and the percentage of housing units with severe damage is 0.80.

Damage exerts a strong influence on returning even when personal and family characteristics are held constant: a 10-percentage-point increase in the percentage of housing

[19] When damage alone is added to the baseline specification, the estimated difference in returning between black and white evacuees falls from 31 percentage points to 12 percentage points.

units in a county with severe damage is associated with a statistically significant decrease of 8.9 percentage points in the probability of an evacuee returning. The marginal effects of home ownership and sense of place are negative (opposite of the expected direction) but not statistically significant.

Since the level of location-specific capital (associated with evacuees' home areas) after the storm depends on both the pre-storm stock of location-specific capital and the degree to which that stock was destroyed in the storm, the pre-storm stock may not influence the return behavior of evacuees who experienced high levels of damage (Paxson and Rouse 2008). Among these evacuees, homeowners may be more affected than renters by uncertainty in the regulatory environment surrounding rebuilding and delays in receiving financing to pay for repairs. These factors would further mute the effect of the pre-storm stock of location-specific capital on returning and discourage homeowners from returning, perhaps to the point at which the probability of returning among homeowners would be little different from that among renters.

To examine these hypotheses, we split the sample of evacuees into those from high-damage areas and those from low-damage areas. High-damage areas are the four counties with at least 20 percent of housing units classified as severely damaged; low-damage areas are the remainder of the affected counties (see Figure 1). On average over the 13 months of our sample, 84 percent of evacuees from low-damage areas returned, but only 31 percent of evacuees from high-damage areas returned. (Figure 2 shows the time pattern of returning to high- and low-damage areas.) Taking home ownership as a signal of location-specific capital, the estimated marginal effects shown in Table 3 are consistent with the hypothesis that the destruction of location-specific capital reduces the probability of returning: home ownership does not encourage returning to high-damage areas but does encourage returning to low-damage areas. In

fact, in high-damage areas home ownership is negatively associated with returning; this pattern is consistent with the hypothesis that uncertainty in the regulatory environment and the inability to accurately assess the risk of incurring future rebuilding costs discouraged homeowners from returning.

The effects of several demographic characteristics on returning are different among evacuees from high-damage areas than among those from low-damage areas. In particular, age differences in returning are larger among evacuees from high-damage areas. Among evacuees from high-damage areas, evacuees with children are less likely to return than evacuees without children; among evacuees from low-damage areas, by contrast, there is no difference between these groups in the probability of returning. The impact of children on returning to high-damage areas might reflect the fact that public schools in many of these areas were closed for many months after the storm.[20]

Differences in returning by education group among evacuees from high-damage areas are of an opposite pattern than the differences among those from low-damage areas. Compared with high school graduates, college graduates were more likely to return to high-damage areas but less likely to return to low-damage areas.[21] These differences likely reflect a combination of factors. The pattern among evacuees from low-damage areas is consistent with college graduates having better access to job opportunities in other areas through geographically disperse networks based on their education and/or occupation (Greenwood 1975). Although this factor is also relevant among evacuees from high-damage areas, other factors may work in the opposite direction and tip the balance to produce the observed pattern. For instance, there is some evidence that more-

[20] In Orleans, Plaquemines, and St. Bernard parishes combined, there were 153 public schools open before Katrina. In January 2006 only 15 percent of these schools were open, and only 38 percent of them were open in August 2006 (Liu and Plyer 2008).

[21] A joint test that the marginal effects of the education variables are zero can be strongly rejected for both high-damage (χ^2=399.70; *p* value=0.00) and low-damage (χ^2=81.62; *p* value=0.00) areas.

educated evacuees were more likely to evacuate to nearby locations, which reduced the costs of returning. In addition, more-educated evacuees might have had greater wealth and/or homeowners insurance before the storm. (See Section 6 for further discussion of these factors in the context of income differences.)

Older evacuees were more likely than younger evacuees to return to both high-damage and low-damage areas, but these age differences are greater in high-damage areas. (A joint test that the marginal effects of the age variables are zero can be strongly rejected for both high-damage [χ^2=7723.73; *p* value=0.00] and low-damage [χ^2=78.16; *p* value=0.00] areas.) The conceptual framework outlined in Section 2 suggests several reasons why older evacuees were more likely to return. At the time of the storm, older evacuees may have lived in their neighborhoods longer and thus may have accumulated a greater stock of location-specific capital before the storm. In addition, they may have a greater sense of place and a shorter time horizon over which to establish themselves in a new area. Finally, since older individuals are more likely to be on fixed incomes (due to receiving Social Security benefits), older evacuees may prefer to live in low-cost areas—including many of the areas affected by Katrina.

Differences by Race and Education in Returning to New Orleans

Our analysis of CPS data indicates differences by race and education in returning to high-damage areas. In this section we address whether these differences reflect differences across groups in the amount of storm damage. It is difficult to address this issue using our CPS data because 80 percent of the evacuees in the high-damage sample came from Orleans Parish (i.e., the city of New Orleans) and the Katrina questions on the geographic origins of evacuees did not request information below the parish level.

Therefore, we turn to data from the Displaced New Orleans Residents Pilot Study (DNORPS), which was a survey of former New Orleans residents conducted for the RAND Corporation in September–November 2006. DNORPS is based on a stratified, area-based probability sample of pre-Katrina dwellings in the city of New Orleans (Sastry forthcoming[b]). Individuals who had resided at one of the sample dwellings before Katrina were interviewed, regardless of where they were currently living. The DNORPS questionnaire requested information on individual and family background characteristics (similar to those used in our analysis of the CPS data), whether each individual was currently living in New Orleans, whether the sampled dwelling was owned or rented, and the extent of damage to the dwelling from Katrina and the subsequent flooding.

DNORPS drew a sample of 344 pre-Katrina residences in New Orleans. The sample was selected at random and stratified into three groups according to flood depth after Katrina. About two-thirds of the sampled cases were located, and 79 percent of the located cases were successfully contacted. The DNORPS questionnaire was successfully completed by 88 percent of the contacted cases. Among the 147 households that were interviewed, the DNORPS recorded information on 386 individuals. We analyze data from a sample of 287 individuals aged 19 years and older, following the age restriction of our CPS sample. Among the individuals in the DNORPS sample, 54 percent had returned to New Orleans by the time of the interview. This rate is higher than the rate of returning to New Orleans over the entire 13 months of our CPS sample (32 percent), but it is comparable to the figure when the CPS sample of evacuees from Orleans Parish is limited to September–October 2006 (51 percent), which roughly corresponds to the period of the DNORPS interviews.

In our analysis we use the DNORPS sample weights, which account for the stratification by flood depth. The DNORPS accords well with the CPS sample of evacuees from Orleans Parish, both in terms of the distribution of background characteristics and in a baseline regression in which returning is a function of time controls (for the CPS only) and background characteristics (Table 4, columns 1 and 2). Notably, the differences in returning by age, race, and education that are present in our CPS data are also present in the DNORPS sample. Column 3 of Table 4 shows the results of adding to the DNORPS regression an indicator for the sampled dwelling being owned by the occupants. This addition does not change the marginal effects of the other variables in the model; the estimated marginal effect of homeownership on returning is small and not statistically different from zero.

Housing damage from Katrina is recorded by the DNORPS as falling in one of four categories: destroyed, uninhabitable, damaged but habitable, and undamaged.[22] When indicator variables for these damage categories (undamaged being the omitted category) are added to the regression, the estimated differences by age are essentially unchanged (columns 3 and 4). By contrast, racial differences in returning are reduced dramatically, from a statistically significant black-white difference of 23 percentage points to a statistically insignificant difference of 4 percentage points.

This finding reflects two things. First, blacks experienced greater housing damage than whites, on average. According to our DNORPS sample, 81 percent of blacks reported that their homes were destroyed or rendered uninhabitable by Katrina, compared to 37 percent of whites. Second, the degree of housing damage exerts a powerful influence on returning, as we found in our analysis of CPS data. The pattern of marginal effects is jointly significant and monotonic

[22] The middle two categories are phrased in the questionnaire as "damaged so badly that you couldn't live in it" and "damaged, but someone could still live in it."

with respect to damage, with those whose homes were destroyed being 61 percentage points less likely to return than those whose homes were undamaged, all else equal. Consequently, the finding of the lack of a racial difference in returning once damage is controlled for indicates that it is damage, not race per se, that is driving racial differences in returning. This finding from the DNORPS, based on within-county variation in damage, is consistent the pattern of our findings in the CPS analysis, which involves cross-county variation in damage.

Further evidence on the racial pattern of hurricane damage across New Orleans neighborhoods is provided in Figure 6, which relates race and damage for the city's 13 planning districts, which are groups of neighborhoods (see Liu and Plyer 2008). For each district, the figure plots the percentage of the pre-Katrina population that is black (using data from the 2000 Census) and the percentage of housing units that experienced severe damage from Katrina (using the FEMA damage data). The general pattern shown in the figure—that districts with a larger percentage black tended to have more damage—is consistent with the pattern observed in the DNORPS data.

Unlike the racial differences, differences by education in returning to New Orleans are not affected by adding the damage variable to the DNORPS regressions. With or without damage in these regressions, college graduates were approximately 9 percentage points more likely to return than high school graduates, although the difference is not statistically significant. The lack of a change in education differences in returning when damage is added reflects that there is essentially no relationship within race between education and housing damage. This pattern of damages may arise if New Orleans neighborhoods, which were segregated on the basis of race (Brookings Institution 2005), were integrated by education within race.

6. Changes in Affected Areas

In this section we shift from analyzing evacuees' decisions to return to understanding how the aggregate effect of those decisions is reflected in changes over time in the composition of affected areas. At the macro level, migration is one of the three components of population change, along with births and deaths. In the case of Katrina, migration is likely to be the main component of population change for the geographic areas directly affected by the storm.

For changes over time in the composition of affected areas, the primary forces are the migration flows associated with Katrina evacuees who returned or did not return to their pre-Katrina counties during the first year after Katrina (through October 2006). In principle, there could also be a role for migration flows associated with non-evacuees (individuals not classified as evacuees) moving into or out of the Katrina-affected area after the hurricane. However, the number of such migrating non-evacuees appears to be relatively small because we have defined the affected area such that the evacuation rate is quite high.[23] Thus, changes in the demographic composition of the Katrina-affected areas depend primarily on the differences between returning and non-returning evacuees.

Table 5 reports the demographic composition of returnees and non-returnees, both for the entire affected area and for high-damage areas. Consistent with the findings on the determinants of returning, the demographic composition of evacuees who returned differs significantly from that of evacuees who did not return. Among evacuees from the entire affected area, 70 percent of returnees are white compared with only 38 percent of non-returnees. By contrast, only 20 percent of returnees are black compared with 55 percent of non-returnees. Returnees as a group

[23] We estimated the number of non-evacuees who moved into or out of Katrina-affected areas using data from the 2006 CPS Annual Social and Economic Supplement, which covers moves over the one-year period from March 2005 to March 2006. The estimated number of out-migrants was only about 50,000. The number of in-migrants in the sample was too small to estimate the number of in-migrants.

are older than non-returnees; for instance, 34 percent of returnees are aged 55 and older compared with only 21 percent of non-returnees.[24] Furthermore, non-returnees had lower family incomes than returnees; for instance, 32 percent of non-returnees had incomes less than $15,000, compared with only 13 percent of returnees. Table 5 also indicates differences in the demographic distribution of returnees and non-returnees by education, marital status, and the presence of children.

Differences between the composition of returning and non-returning evacuees suggest that Katrina may have altered the composition of the geographic areas in the storm path. Table 6 contains distributions of the demographic characteristics and family income of all residents (not just evacuees) of the entire affected area and of the high-damage areas, both before and after the storm. Table 7 contains these estimates for the New Orleans MSA and for the Mississippi Gulf Coast.[25] The estimates are based on monthly CPS data and cover one time period before the storm (January 2004–July 2005) and two time periods after the storm (October 2005–October 2006 and November 2006–November 2007).

In general, the changes over time are larger for the high-damage areas than for the entire affected area. This is because the magnitude of the population shifts induced by Katrina was larger in the high-damage areas. The evacuation rate was higher in high-damage areas (94 percent, compared to 85 percent in the entire affected area; see Table 1) and thus high-damage areas were more affected by patterns of return migration.

Katrina is associated with substantial shifts in racial composition. These shifts are statistically significant and primarily represent a decrease in the percentage of residents who are

[24] The median age of returnees is 47 compared with 38 for non-returnees.

[25] The New Orleans MSA consists of seven parishes: Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany. The Mississippi Gulf Coast is defined for this analysis as the combined area formed by Hancock, Harrison, and Jackson counties, which are the southernmost counties in the state and situated from east to west along the Gulf of Mexico. These counties include the cities of Biloxi, Gulfport, and Pascagoula.

black and a corresponding increase in the percentage of residents who are white—which follows from the lower rate of returning among black evacuees. Specifically, in high-damage areas the percentage of residents who are black decreased from 52 percent before the storm to 41 percent in the year after the storm before rebounding to 45 percent the following year. This pattern of change in racial composition is also present in the New Orleans MSA, but the Mississippi Gulf Coast exhibits the reverse pattern, with the percentage black increasing after Katrina before falling back to near its pre-Katrina level.

The rebounding of the percentage black in high-damage areas and the New Orleans MSA suggests that among evacuees who returned during the first two years after Katrina, blacks returned more slowly than whites. Consistent with this notion, the black-white difference in the probability of returning is smaller in the last three months of the period covered by the Katrina questions (20 percentage points) than in the first ten months of this period (34 percentage points), according to baseline regressions (analogous to Table 3, column 1) estimated separately for each of these time periods. The reduction in the black-white difference appears to be related to the reopening of public schools in Orleans Parish in August 2006.[26]

Our estimates of changes in demographic composition also indicate an increasing presence of Hispanics in the areas affected by Katrina. In both the New Orleans MSA and the Mississippi Gulf Coast, the percentage of residents who are Hispanic increased sharply over time. In the New Orleans MSA, for instance, this percentage increased from 3.2 percent before

[26] In the raw data there is a clear break between July and August 2006 in the time trend of the black-white difference in the probability of returning. From October 2005 to July 2006, the black-white difference for data collected in a given month varies from 34 to 44 percentage points. From August 2006 to October 2006, this difference varies from 24 to 30 percentage points. The reduction in the black-white difference between July and August 2006 is driven entirely by evacuees with children and appears to be related to the reopening of public schools in Orleans Parish. The number of open public schools in Orleans Parish, whose enrollment is nearly 90 percent black, increased from 25 in May 2006 to 53 in August 2006, and enrollment in these schools increased from 12,103 to 25,651 over this period (Liu and Plyer 2008).

the storm to 4.9 percent in the year after the storm and 6.6 percent the following year.[27] This increase appears to be driven by migration into the affected areas after Katrina rather than by differential returning among evacuees.

Trends in other demographic and family characteristics are consistent with our findings on the determinants of evacuees returning to their pre-Katrina counties. For instance, the percentage of residents aged 55 and older increased after Katrina, as older evacuees were much more likely to return than younger evacuees. For age and most of the other demographic and family characteristics, the time trend consists of a sharp change after Katrina (in the direction predicted by the findings on returning) followed by a shift back towards the pre-Katrina value during the second year after the storm.

The distribution of family income (in all four areas examined) and the distribution of education (in every area examined except the Mississippi Gulf Coast) shifted to the right over this time period, with the percentage of residents with high income/education increasing and the percentage of residents with low income/education decreasing. In the New Orleans MSA, these shifts were particularly large. For instance, the percentage of residents with incomes of less than $15,000 a year decreased from 19.3 percent before the storm to 12.6 percent in the second year after the storm, and the percentage with incomes of $75,000 or more increased from 20.8 percent to 31.3 percent.[28] In terms of education, the percentage of residents without a high school degree

[27] Our estimates are consistent with trends in school enrollment. The number of Hispanic students in public schools in the New Orleans MSA has increased each year after Katrina, reaching 5.9 percent of total enrollment by spring 2008, up from 3.9 percent before the storm (Liu and Plyer 2008). Official population estimates from the Census Bureau for the New Orleans MSA also show an increase in the percentage of the residents who are Hispanic, albeit at a slower rate than in our CPS estimates, from 5.2 percent in July 2005 to 6.2 percent in July 2007.

[28] These trends in the distribution of income in the New Orleans MSA are consistent with trends observed in data from the American Community Survey (ACS) (Frey and Singer 2006). Moreover, ACS data on indicators of low-income status provide further evidence for the income shifts we document. In the New Orleans MSA after the storm, the following indicators all declined sharply: the poverty rate (especially among female-headed families), the percentage of households that do not own a vehicle, and the share of owner-occupied homes valued under $100,000 (Frey and Singer 2006).

decreased from 15.7 percent to 10.4 percent and the percentage of residents who attended college increased from 51.5 percent to 58.1 percent.

One explanation for the shift in the income distribution is that low-income evacuees were more likely than high-income evacuees to evacuate to distant locations, which increased the financial cost of returning and made it harder to learn about the recovery of their pre-Katrina areas.[29] In addition, the areas that experienced extensive damage became more expensive places to live in the aftermath of Katrina. In the city of New Orleans, for instance, the price of housing increased by about 50 percent from 2004 to 2006.[30] Finally, the shift may reflect that higher-income evacuees had greater wealth and/or homeowners insurance, making it easier for them to rebuild and return.

The homeownership rate increased sharply in the high-damage areas after Katrina, from 62 percent before the storm to 71 percent in the year after the storm. Over the second year after Katrina, however, the homeownership rate in the high-damage areas fell back to its pre-Katrina level. The time trend in the homeownership rate might reflect a variety of factors, including the desire of different types of evacuees to return, the timing and extent of government subsidies to rebuilding owner-occupied and rental housing, and government regulations regarding demolition of damaged properties and construction of new housing.

[29] There is evidence of this pattern among evacuees from the city of New Orleans (Frey et al. 2007). According to Internal Revenue Service data for 2005 and 2006, evacuees with lower incomes were more likely to move to distant locations, such as Dallas and Atlanta. By contrast, those with higher incomes tended to move to nearby locations, such as Baton Rouge and the New Orleans suburbs. This pattern could reflect that many low-income evacuees did not evacuate the city until after the storm (often in forced evacuations to distant locations), whereas high-income evacuees tended to plan their evacuations before the storm.

[30] According to data from the American Community Survey, the median cost of renting, including contract rent and utilities, in Orleans Parish increased from $566 per month in 2004 to $838 in 2006, an increase of 48 percent. The median price for owner-occupied units in Orleans Parish increased from $131,400 in 2004 to $208,500 in 2006, an increase of 59 percent. For more discussion of the New Orleans housing market in the aftermath of Katrina, see Vigdor (2008).

In general, our findings concerning the economic and demographic shifts that occurred in areas recovering from Katrina are consistent with an analysis of four areas affected by major hurricanes in the 1990s. Pais and Elliott (2008) found that as areas recovered they did not retain the demographic and economic profile that they had before the storm. Rather, as areas recovered they became more "exclusive" (in terms of income and education), albeit with increases in potentially vulnerable subpopulations such as foreign-born citizens.

7. Longer-Term Prospects

Our estimates in the previous section cover changes in the affected areas in the first two years after Katrina. Also of interest are the longer-term prospects of these areas, particularly New Orleans and the Mississippi Gulf Coast. Disaster research documents many instances in which cities and areas have recovered economically from catastrophic disasters and restored their populations (Friesema et al. 1979; Pais and Elliot 2008; Vidgor 2008; Wright, Rossi, and Wright 1979). Indeed, after a disaster the full recovery of an area's population and long-term growth appears to be the norm rather than the exception. A review of the disaster literature indicates the main determinants of whether an area recovers are the strength of an area's economic justification for existence before the disaster (Fothergill et al. 1999; Vidgor 2008), the cause of the disaster (natural, technological, or both) (Erikson 1976; Picou and Marshall 2007), and the amount of governmental and private resources available for recovery as well as the allocation of those resources (Bolin and Bolton 1986; Peacock and Girard 1997).

The evidence for New Orleans on these determinants is mixed. On the negative side the city and the surrounding area were in a somewhat precarious situation before the storm. The city's population had been declining since the 1960s and its economic justification for existence had greatly diminished over time (Vidgor 2008). At least one economist has argued that the

New Orleans area maintained a relatively large population only because a sufficiently large supply of housing built in more robust economic times kept housing prices low. These below-average housing prices, it is argued, compensated workers for the lack of economic opportunity in the area and allowed the relatively low-wage tourist sector to maintain its size and vibrancy (Vidgor 2008). Katrina destroyed or seriously damaged much of the affordable housing in New Orleans, thus eliminating the advantage New Orleans possessed in the housing market. Furthermore, rebuilding funds from federal and state governments have been directed primarily to owners of single-family homes rather than to owners of rental units or to the construction of subsidized housing.[31]

Others have argued that for New Orleans, Katrina was not only a natural disaster but also a social and technological disaster due to the slow and uncoordinated rescue and relief effort, the breaching of the levees, and the contamination of the area with oil, toxic chemicals, and other hazardous materials (Picou and Marshall 2007). Media coverage in the aftermath of the storm left the impression that New Orleans was a blighted, dangerous place that lacked many of amenities and institutions that made it an attractive place to visit. This coverage may make tourists reluctant to visit New Orleans (Davidson 2006; Oberman 2006). In addition, technological disasters frequently cause residents to blame and distrust individuals within the community, the government, and other social institutions. This distrust and blame often results in corrosive social cycles that impede the recovery of an area and may ultimately lead to an area's demise (Erikson 1976; Picou and Marshall 2007).

On the positive side, the two other mainstays of the New Orleans economy (aside from tourism)—oil extraction and shipping—remain tied to the area. New Orleans is in close

[31] The lack of housing that can be afforded by low-income workers has been identified as a leading cause of staffing shortages in the restaurant and hotel industry and other low-wage sectors (Davidson 2006; Whelan 2006).

proximity to offshore oil rigs in the Gulf of Mexico. Louisiana ranks eighth among U.S. states in oil reserves and in 2008 had 17 percent of the nation's crude-oil refinery capacity.[32] The New Orleans area is home to the Port of South Louisiana and the Port of New Orleans, which rank third and fourth, respectively, among U.S. ports in total trade to all world ports (Cieslak 2005). Although automation and containerization decreased the number of jobs associated with the port during the 1980s and the 1990s (Whelan 2006), it is likely that these effects had been fully reflected in employment before Katrina.

In contrast to New Orleans, the prospects for the recovery of the Mississippi Gulf Coast appear brighter and more certain. When Katrina struck, the Mississippi Gulf Coast areas affected by the storm—particularly the Gulfport-Biloxi MSA—were enjoying robust population and job growth. The combined population of the three Gulf Coast counties that include the cities of Gulfport, Biloxi, and Pascagoula (Hancock, Harrison, and Jackson counties) grew 16 percent between 1990 and 2000 (compared to 14 percent for the entire nation) and grew 52 percent between 1960 and 2000.[33] Total non-farm wage and salary employment in the Gulfport-Biloxi MSA grew 58 percent between 1990 and 2004, while nationally during the same time period non-farm wage and salary employment grew only 20 percent.[34]

An important stimulus to employment growth in the Gulfport-Biloxi MSA was the rise of the gaming and hospitality industry after the Mississippi legislature passed a law in 1990 permitting casinos on floating barges. Gulfport-Biloxi's employment in leisure and hospitality more than tripled between 1990 and 2004, growing from 8,800 to 29,700. In 2004, 26 percent of non-farm wage and salary employment in Gulfport-Biloxi was in leisure and hospitality,[35] and in

[32] Statistics from the Energy Information Administration, U.S. Department of Energy.
[33] Authors' calculations using Census Bureau population estimates.
[34] Authors' calculations using Bureau of Labor Statistics employment estimates.
[35] Authors' calculations using Bureau of Labor Statistics employment estimates.

Harrison County—the largest county in the Gulfport-Biloxi MSA—14 percent of employment was specifically in casino hotels (Garber et al. 2006). Rebuilding of the casinos occurred relatively rapidly in the wake of the storm—perhaps encouraged by legislation permitting casinos to be built on dry ground—thus ensuring casinos as an economic base for the Gulfport-Biloxi area (Davidson 2006).

8. Conclusion

Although the longer-term prospects of the areas affected by Hurricane Katrina are somewhat uncertain, the short-run effects of the storm and the patterns of return migration are relatively clear. Overall, the results presented in this paper indicate that in the wake of Katrina there were sharp differences between those who returned to their pre-Katrina areas and those who did not. Using data from the Current Population Survey, which is representative of all evacuees and covers all areas affected by the storm, we establish that age, the extent of damage, and home ownership are important determinants of whether an evacuee returned during the first year after Katrina. The probability of returning increases with age, decreases with the severity of damage in an evacuee's county of origin, and increases with the pre-Katrina homeownership rate in the evacuee's county of origin.

Black evacuees were less likely to return than white evacuees. This racial difference in returning reflects, to some extent, that black evacuees disproportionately came from high-damage areas—especially Orleans Parish (i.e., the city of New Orleans). Even among evacuees from Orleans Parish, blacks were less likely to return, and the racial difference in returning is due to greater housing damage experienced by blacks. Thus it is damage, not race per se, that is driving racial differences in returning.

Within high-damage areas, evacuees with children were less likely to return than those without children. In addition, for evacuees who originated in the New Orleans metropolitan area, a larger percentage of evacuees returned to parishes in which a larger proportion of public schools, public libraries, major hospitals, and child-care facilities were in operation after the storm. It is impossible to determine from these relationships whether more of these facilities were open because more evacuees had already returned to a parish, or if the availability of these facilities encouraged evacuees to return, or both. Nevertheless, the results do suggest that local officials should be cognizant of demand for public services when prioritizing reconstruction projects and directing public funds in the wake of a disaster.

The difference between the composition of returnees and the composition of non-returnees is the primary force behind changes in the composition of the affected areas in the first two years after the storm. Katrina is associated with substantial shifts in racial composition (namely a decrease in the percentage of residents who are black), an increasing presence of Hispanics, and an increase in the percentage of older residents. Moreover, the distribution of family income and the distribution of education both shifted to the right over time in the affected areas (i.e., the percentage of residents with low income/education decreased and the percentage of residents with high income/education increased). These changes are generally larger for the high-damage areas than for the entire affected area, which is consistent with the magnitude of population shifts induced by the storm.

These findings have important implications not only for the individuals and areas affected by this particular storm but also for those responsible for managing recoveries from future natural disasters. When formulating expectations about who will return after a natural disaster, our results suggest that the geographic pattern of damage, the proportion of residents of the

affected area who own their homes, the age distribution of these residents, and their needs for public services should all be considered. The results also suggest that disasters may affect the overall demographic composition of an area and increase the overall levels of family income and educational attainment in the affected areas—specifically, these areas may lose some of their more disadvantaged residents.

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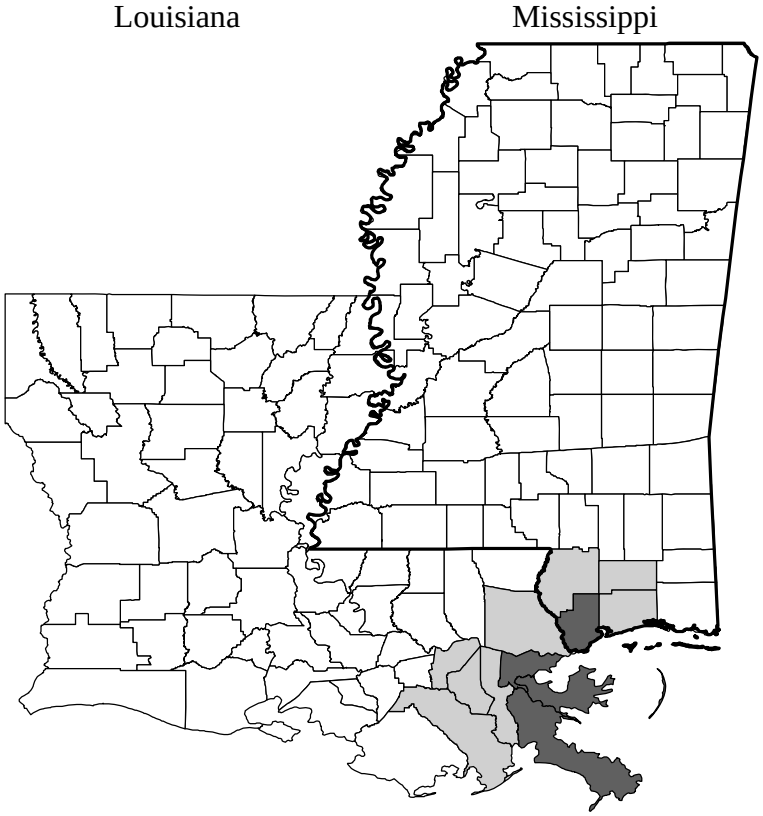
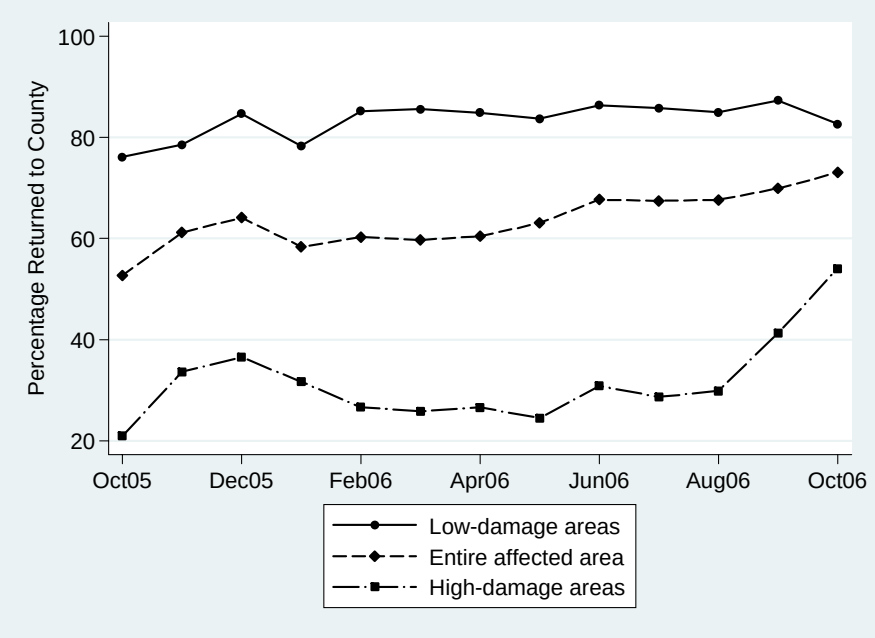
Figure 1. Geographic Areas Affected by Hurricane Katrina



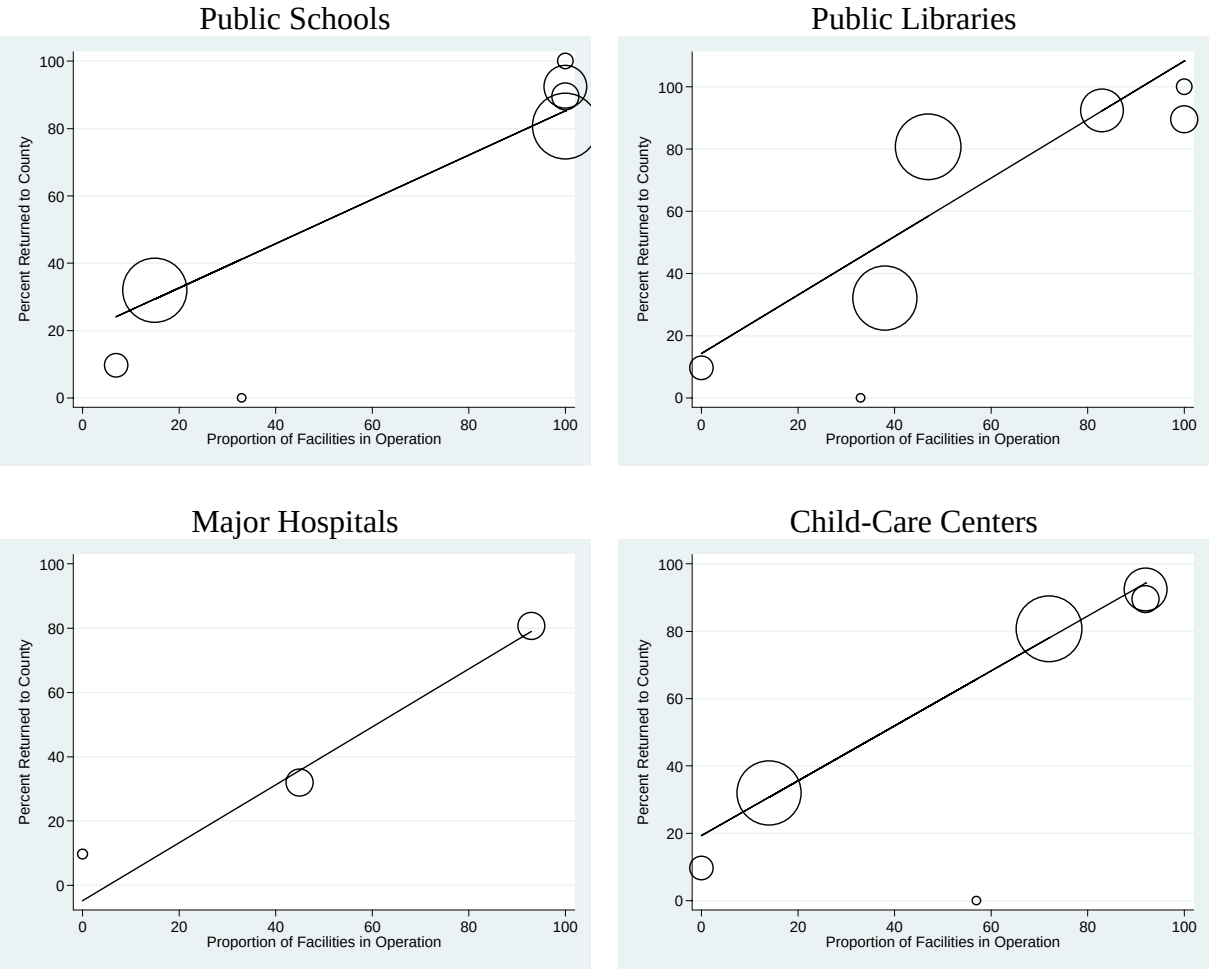
Notes: Shading indicates counties near the Gulf Coast within 100 miles of the storm path. The darker shading indicates the high-damage areas used in our analysis: Orleans, Plaquemines, and St. Bernard parishes in Louisiana and Hancock County in Mississippi. The lighter shading indicates the low-damage areas used in our analysis: Jefferson, Lafourche, St. Charles, St. John the Baptist, and St. Tammany parishes in Louisiana and Harrison, Pearl River, and Stone counties in Mississippi.

Figure 2. Percentage Returned to County by Month and Geographic Area



Source: Current Population Survey, October 2005–October 2006.

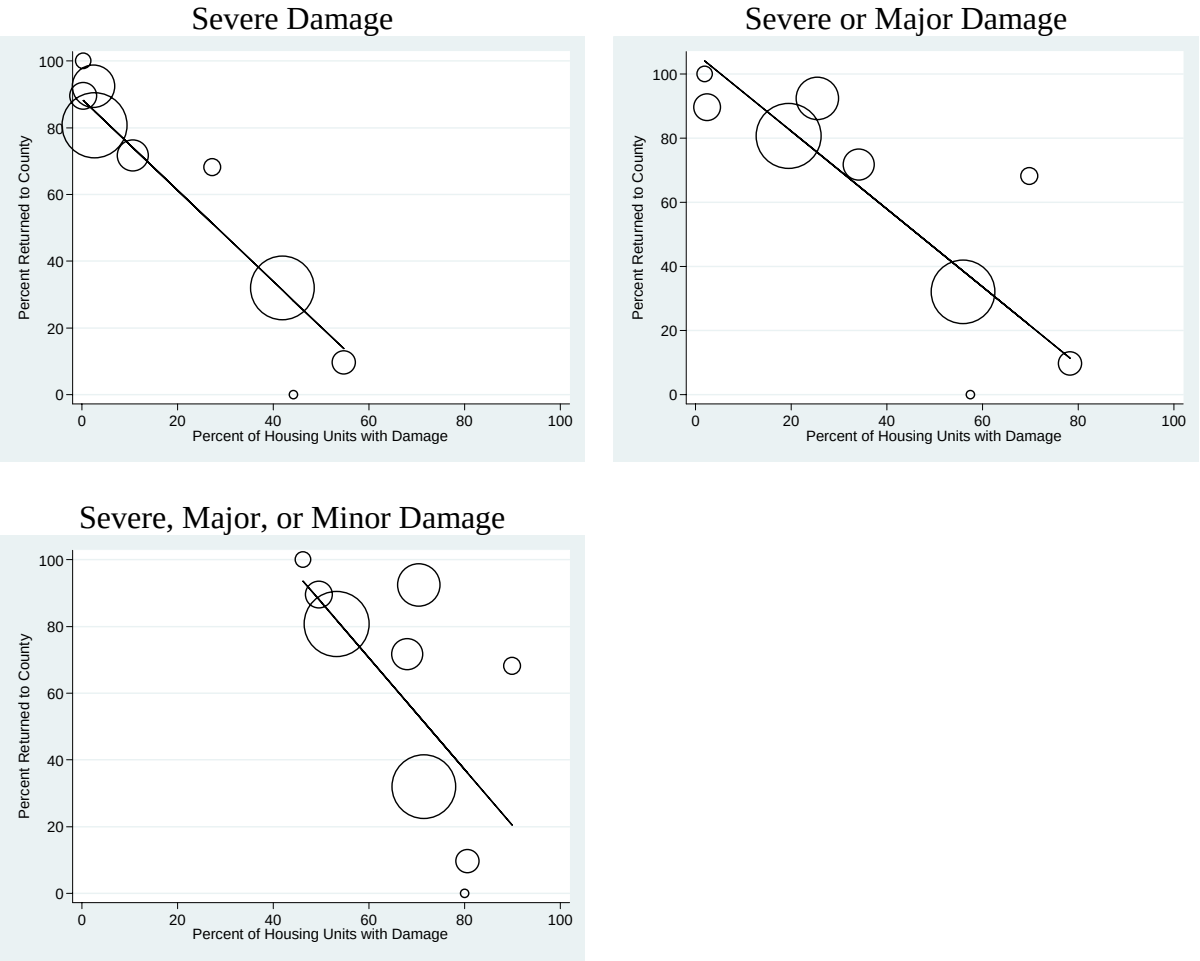
Figure 3. Public and Private Services and Returning



Notes: The area of each symbol is proportional to the number of evacuees who came from the county. Each data point refers to one of the seven parishes in the New Orleans MSA (Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany). The regression line is estimated by weighted least squares with the number of evacuees in each county as weights. The slopes of the regression lines are: 0.659 (s.e.=0.070) for schools; 0.940 (s.e.=0.348) for libraries; 0.900 (s.e.=0.159) for hospitals; and 0.816 (s.e.=0.090) for child care.

Source: Returning measure is based on Current Population Survey, October 2005–October 2006. Services data are from Liu, Fellowes, and Mabanta (2006), Tables 28, 32, 33, and 34. Timing of services data: schools, February 2, 2006; libraries, February 2006; hospitals, February 14, 2006; child care, February 2006.

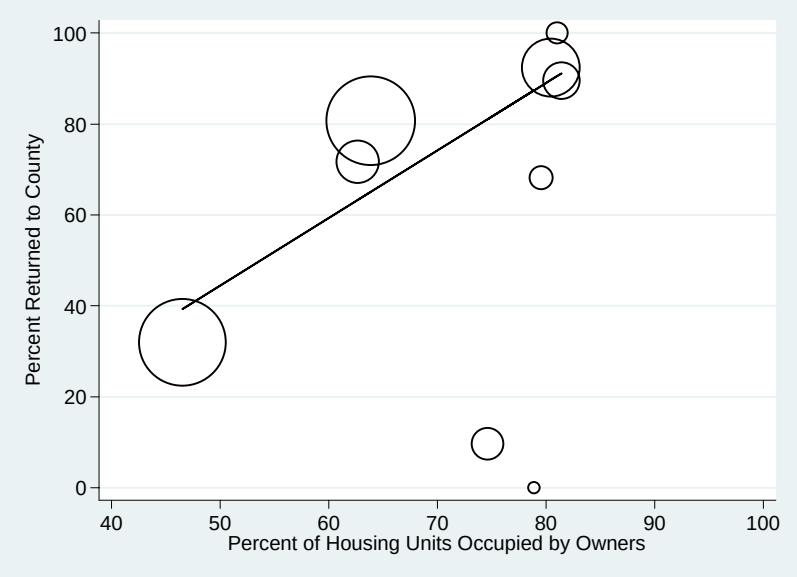
Figure 4. Housing Damage and Returning



Notes: The area of each symbol is proportional to the number of evacuees who came from the county. The regression lines are estimated by weighted least squares with the number of evacuees in each county as weights. The slopes of the regression lines are: –1.366 (s.e.=0.102) for severe; –1.213 (s.e.=0.206) for severe or major; and –1.674 (s.e.=0.763) for severe, major, or minor.

Source: Returning measure is based on Current Population Survey, October 2005–October 2006. Damage data are from U.S. Department of Housing and Urban Development (2006).

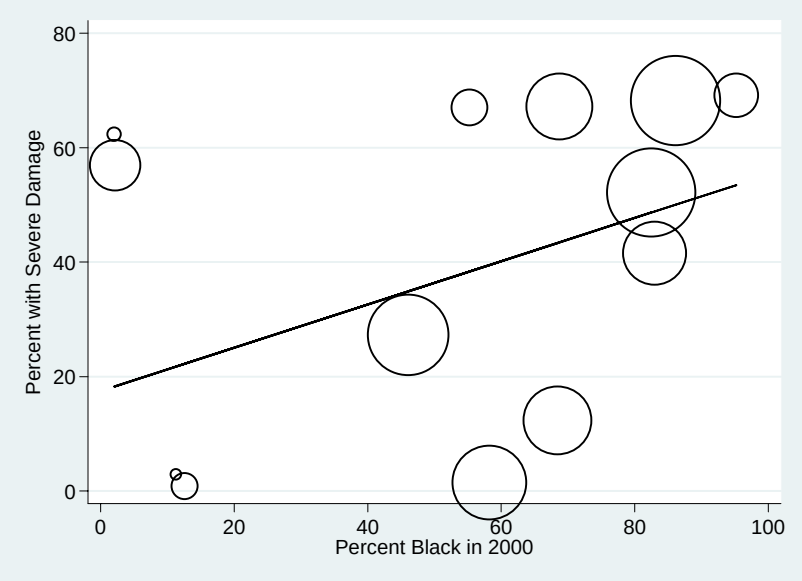
Figure 5. Home Ownership and Returning



Notes: The area of each symbol is proportional to the number of evacuees who came from the county. The regression line is estimated by weighted least squares with the number of evacuees in each county as weights. The slope of the regression line is 1.485 (s.e.=0.565).

Source: Returning measure is based on Current Population Survey, October 2005–October 2006. Homeownership rates are based on data from the 2000 Census (Summary File 1).

Figure 6. Race and Housing Damage in New Orleans



Notes: The figure plots data for each of the 13 planning districts in the city of New Orleans. The area of each symbol is proportional to the population of the district in the year 2000. The regression line is estimated by weighted least squares with the district populations as weights. The slope of the regression line is 0.378 (s.e.=0.299). The race measure is the percentage of all individuals who are black but not Hispanic.

Source: The damage measure is based on data from U.S. Department of Housing and Urban Development (2006). The race measure is based on data from the 2000 Census (Summary File 1). Census blocks were converted to planning districts using a mapping provided by the Greater New Orleans Community Data Center.

Table 1. Evacuation Rates by Personal and Family Characteristics

Characteristic	Entire Affected Area		High-Damage Areas	
	Evacuation Rate	N	Evacuation Rate	N
Age	*		*	
19 to 24	88.5	523	98.9	212
25 to 39	82.9	1,105	92.3	401
40 to 54	85.3	1,416	95.8	397
55 and over	83.3	1,473	90.5	507
Race/Ethnicity	*			
White[a]	82.9	2,766	92.6	650
Black[a]	87.2	1,359	94.2	796
Hispanic	83.6	221	94.3	33
Other[a]	89.0	171	100.0	38
Gender	*		*	
Female	87.0	2,471	94.2	872
Male	81.8	2,046	93.1	645
Education	*			
Less than high school	85.5	746	94.3	345
High school	81.8	1,526	93.8	431
Some college	84.6	1,274	93.2	435
College graduate	88.1	971	93.6	306
Marital Status	*			
Not married	86.5	2,212	94.0	898
Married	82.5	2,305	93.3	619
Children Under Age 18	*			
Without children	84.2	3,292	93.6	1,155
With children	85.4	1,225	94.1	362
Family Income	*		*	
Less than $15,000	90.8	680	95.3	347
$15,000 to $74,999	86.0	1,938	92.8	706
$75,000 or more	83.8	860	90.4	227
Not reported	78.5	1,039	96.6	237
Total	84.5	4,517	93.7	1,517

Notes: Sample sizes (N) are the number of person-month observations.

Source: Current Population Survey, October 2005–October 2006.

[a] Non-Hispanic.
* Differences in evacuation rates across subgroups for the specified characteristic are statistically significant (at the 5% level), based on a Pearson χ^2 test.

Table 2. Percentage Returned to County by Personal and Family Characteristics

Characteristic	Entire Affected Area		High-Damage Areas	
	Percentage Returned	N	Percentage Returned	N
Age	*		*	
19 to 24	49.8	458	16.9	209
25 to 39	52.2	915	20.5	370
40 to 54	69.3	1,192	33.3	379
55 and over	73.9	1,199	47.0	460
Race/Ethnicity	*		*	
White[a]	76.2	2,256	46.1	601
Black[a]	38.3	1,181	22.4	748
Hispanic	73.8	176	24.3	31
Other[a]	68.4	151	2.5	38
Gender	*		*	
Female	61.7	2,134	28.7	825
Male	65.6	1,630	34.0	593
Education	*		*	
Less than high school	53.3	628	23.6	324
High school	62.8	1,219	20.9	400
Some college	65.6	1,065	35.7	406
College graduate	69.5	852	49.2	288
Marital Status	*		*	
Not married	57.9	1,891	27.6	840
Married	69.5	1,873	36.8	578
Children Under Age 18	*		*	
Without children	66.1	2,718	36.0	1,077
With children	56.9	1,046	15.6	341
Family Income	*		*	
Less than $15,000	38.3	607	20.3	329
$15,000 to $74,999	62.4	1,649	31.2	654
$75,000 or more	74.2	714	52.3	206
Not reported	75.3	794	30.3	229
Total	63.5	3,764	31.1	1,418

Note: Sample sizes (N) are the number of person-month observations.

Source: Current Population Survey, October 2005–October 2006.

[a] Non-Hispanic.
* Differences in return rates across subgroups for the specified characteristic are statistically significant (at the 5% level), based on a Pearson χ^2 test.

Table 3. Determinants of Returning to County

	Entire Affected Area		High Damage		Low Damage	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Age 25 to 39	0.026	0.031*	0.077	0.069*	0.014	0.029
	(0.048)	(0.014)	(0.081)	(0.019)	(0.045)	(0.018)
Age 40 to 54	0.144*	0.135*	0.200*	0.205*	0.105*	0.109*
	(0.047)	(0.023)	(0.078)	(0.029)	(0.044)	(0.023)
Age 55 and over	0.184*	0.173*	0.278*	0.248*	0.128*	0.133*
	(0.048)	(0.036)	(0.077)	(0.022)	(0.041)	(0.036)
Black[a]	–0.311*	–0.127*	–0.101	–0.159*	–0.119*	–0.101
	(0.049)	(0.059)	(0.063)	(0.006)	(0.054)	(0.067)
Hispanic	0.002	–0.054	–0.087	–0.121*	–0.029	–0.036
	(0.078)	(0.059)	(0.112)	(0.040)	(0.075)	(0.058)
Other[a]	–0.098	–0.099	–0.288*	–0.297*	–0.012	–0.028
	(0.111)	(0.071)	(0.044)	(0.002)	(0.078)	(0.088)
Male	0.024	0.029*	0.054	0.047*	0.004	0.008
	(0.020)	(0.014)	(0.032)	(0.003)	(0.017)	(0.020)
Less than high school	–0.023	0.029*	0.040	0.045*	0.053	0.049*
	(0.046)	(0.010)	(0.068)	(0.003)	(0.039)	(0.023)
Some college	0.020	0.029	0.113	0.073*	–0.005	–0.007
	(0.037)	(0.018)	(0.059)	(0.016)	(0.035)	(0.010)
College graduate	–0.035	–0.006	0.156*	0.095*	–0.097*	–0.102*
	(0.046)	(0.067)	(0.073)	(0.029)	(0.044)	(0.030)
Married	–0.018	–0.049	–0.030	–0.062	–0.056	–0.053*
	(0.037)	(0.028)	(0.059)	(0.050)	(0.036)	(0.023)
With children	–0.019	–0.059	–0.153*	–0.129*	–0.010	–0.019
	(0.041)	(0.034)	(0.060)	(0.047)	(0.039)	(0.025)
Less than $15,000	–0.119*	–0.112*	–0.028	–0.049*	–0.206*	–0.185*
	(0.058)	(0.054)	(0.081)	(0.021)	(0.073)	(0.031)
$75,000 or more	0.042	0.024	0.132	0.132*	0.010	0.001
	(0.057)	(0.044)	(0.101)	(0.006)	(0.045)	(0.026)
Severe damage (%)		–0.0089*				
		(0.0009)				
Homeownership (%)		–0.0015		–0.0087*		0.0091*
		(0.0021)		(0.0007)		(0.0023)
Persistence in county (%)		–0.0069		–0.0351*		0.0027
		(0.0062)		(0.0033)		(0.0016)
Pseudo R^2	0.15	0.32	0.16	0.21	0.14	0.18
N	3,764	3,764	1,418	1,418	2,346	2,346
Percentage returned	63.5	63.5	31.1	31.1	83.6	83.6

Notes: The dependent variable is an indicator for returning to the pre-Katrina county. The numbers reported in the table are average marginal effects from logit models. Standard errors, in parentheses, are corrected for correlation in the error term at the household level (columns 1, 3, and 5) or at the county level (columns 2, 4, and 6) are reported in parentheses. Regressions also include month-year fixed effects and an indicator for observations without data on family income, and are estimated using CPS sampling weights. The omitted categories are: age 19 to 24; white; female; high school; not married; without children; and $15,000 to $74,999.
Source: Current Population Survey, October 2005–October 2006.
[a] Non-Hispanic.
* Significantly different from zero at the 5% level.

Table 4. Determinants of Returning to the City of New Orleans

	CPS	DNORPS		
Variable	(1)	(2)	(3)	(4)
Age 25 to 39	0.069	0.166	0.164	0.164
	(0.087)	(0.122)	(0.122)	(0.119)
Age 40 to 54	0.196*	0.256*	0.250*	0.251*
	(0.089)	(0.107)	(0.108)	(0.101)
Age 55 and over	0.290*	0.300*	0.296*	0.266*
	(0.086)	(0.104)	(0.104)	(0.098)
Black[a]	–0.213*	–0.228*	–0.225*	–0.037
	(0.078)	(0.091)	(0.091)	(0.092)
Hispanic/Other[a]	–0.250*	–0.011	–0.005	0.062
	(0.068)	(0.181)	(0.184)	(0.162)
Male	0.062	–0.102	–0.104	–0.077
	(0.039)	(0.055)	(0.055)	(0.051)
Less than high school	0.032	0.020	0.022	0.027
	(0.080)	(0.106)	(0.107)	(0.097)
Some college	0.080	–0.068	–0.071	–0.066
	(0.067)	(0.102)	(0.101)	(0.092)
College graduate	0.141	0.092	0.090	0.087
	(0.086)	(0.098)	(0.098)	(0.092)
Married	–0.088	–0.090	–0.093	–0.012
	(0.063)	(0.088)	(0.088)	(0.085)
With children	–0.093	–0.042	–0.040	–0.086
	(0.074)	(0.113)	(0.113)	(0.094)
Homeowner			0.025	0.035
			(0.091)	(0.088)
Destroyed				–0.610*
				(0.052)
Uninhabitable				–0.466*
				(0.074)
Damaged but habitable				–0.260*
				(0.080)
Pseudo R^2	0.17	0.11	0.11	0.23
N	1,136	287	287	287
Percentage returned	32.0	53.9	53.9	53.9

Notes: The dependent variable is an indicator for returning to the city of New Orleans (i.e., Orleans Parish). The numbers reported in the table are average marginal effects from logit models. Standard errors, in parentheses, are corrected for correlation in the error term at the household level. The regressions are estimated using sampling weights. The CPS regression also includes month-year fixed effects. The omitted categories are: age 19 to 24; white; female; high school; not married; without children; renter; and undamaged.

Source: Current Population Survey (CPS; October 2005–October 2006) and Displaced New Orleans Residents Pilot Study (DNORPS).

[a] Non-Hispanic.
* Significantly different from zero at the 5% level.

Table 5. Personal and Family Characteristics of Returnees and Non-Returnees (distributions in percent)

Characteristic	Entire Affected Area			High-Damage Areas		
	Returnees	Non-Returnees	χ^2	Returnees	Non-Returnees	χ^2
Age			*			*
19 to 24	11.4	19.9		9.4	20.9	
25 to 39	20.9	33.3		17.6	30.9	
40 to 54	33.9	26.1		27.9	25.3	
55 and over	33.9	20.8		45.0	22.9	
Race/Ethnicity			*			*
White[a]	70.2	38.1		57.6	30.5	
Black[a]	19.5	54.7		40.5	63.5	
Hispanic	5.9	3.6		1.7	2.4	
Other[a]	4.5	3.6		0.2	3.6	
Gender			*			*
Female	53.1	57.2		50.7	56.8	
Male	46.9	42.8		49.3	43.2	
Education			*			*
Less than high school	14.2	21.6		17.8	26.1	
High school	31.8	32.7		19.5	33.4	
Some college	29.7	27.1		32.5	26.5	
College graduate	24.4	18.6		30.1	14.1	
Marital Status			*			*
Not married	47.1	59.7		54.7	64.8	
Married	52.9	40.3		45.3	35.2	
Children Under Age 18			*			*
Without children	74.6	66.5		87.9	70.5	
With children	25.4	33.5		12.1	29.5	
Family Income			*			*
Less than $15,000	13.2	32.1		18.7	33.3	
$15,000 to $74,999	58.0	52.8		55.6	56.0	
$75,000 or more	28.8	15.2		25.7	10.7	
Number of individuals[b]	575.3	330.9		108.2	239.5	

Source: Current Population Survey, October 2005–October 2006.

Note: Distributions of family income are based on those who reported family income.

[a] Non-Hispanic.
[b] In thousands.
* The distribution of returnees is significantly different (at the 5% level) from the distribution of non-returnees, for the specified characteristic, based on a Pearson χ^2 test.

Table 6. Composition of Affected Areas Before and After Katrina: Entire Affected Area and High-Damage Areas (distributions in percent)

	Entire Affected Area				High-Damage Areas			
Characteristic	2004–05	2005–06	2006–07	χ^2	2004–05	2005–06	2006–07	χ^2
Age								
19 to 24	12.2	12.1	12.3	*	11.7	8.0	13.9	*
25 to 39	26.1	22.2	24.2		27.5	19.5	27.2	
40 to 54	30.0	32.7	30.8		28.3	27.3	25.2	
55 and over	31.7	33.0	32.8		32.4	45.2	33.7	
Race/Ethnicity				*				*
White[a]	66.1	70.1	68.5		45.0	57.0	51.4	
Black[a]	28.8	20.4	23.2		52.0	41.2	45.1	
Hispanic	3.2	5.4	6.7		1.7	1.7	1.7	
Other[a]	1.8	4.1	1.6		1.3	0.2	1.8	
Gender				*				*
Female	55.0	51.6	52.7		57.0	50.9	53.5	
Male	45.0	48.4	47.3		43.0	49.1	46.5	
Education				*				*
Less than high school	15.3	14.6	11.1		15.3	18.2	16.7	
High school	33.1	33.8	32.1		32.2	20.2	22.5	
Some college	27.8	29.3	31.2		26.7	32.9	28.3	
College graduate	23.9	22.4	25.7		25.8	28.8	32.6	
Marital Status				*				*
Not married	49.2	46.9	47.8		58.0	53.8	55.9	
Married	50.8	53.2	52.2		42.0	46.2	44.1	
Children Under Age 18								
Without children	73.8	74.2	72.8		77.5	83.6	75.6	
With children	26.2	25.8	27.2		22.5	16.4	24.4	
Family Income				*				*
Less than $15,000	18.8	13.0	12.8		24.3	17.9	21.7	
$15,000 to $74,999	60.5	57.2	57.1		61.9	56.1	57.5	
$75,000 or more	20.8	29.8	30.1		13.8	26.0	20.8	
Housing Occupancy				*				*
Owner	74.2	77.4	74.0		61.6	71.0	61.4	
Renter	24.6	20.8	23.5		37.3	26.4	33.4	
Occupied without payment	1.2	1.8	2.6		1.1	2.7	5.2	
Number of individuals[b]	1,128.9	805.6	878.2		383.1	138.3	196.3	

Source: Current Population Survey, January 2004–November 2007.

Notes: 2004–05 is January 2004–July 2005. 2005–06 is October 2005–October 2006. 2006–07 is November 2006–November 2007. Distributions of family income are based on those who reported family income.

[a] Non-Hispanic.
[b] In thousands.
* The distribution across subgroups for the specified characteristic is significantly different (at the 5% level) over time, based on a Pearson χ^2 test.

Table 7. Composition of Affected Areas Before and After Katrina: New Orleans MSA and Mississippi Gulf Coast (distributions in percent)

	New Orleans MSA				Mississippi Gulf Coast			
Characteristic	2004–05	2005–06	2006–07	χ^2	2004–05	2005–06	2006–07	χ^2
Age				*				
19 to 24	13.0	12.9	13.1		9.7	8.8	10.1	
25 to 39	25.7	21.9	24.0		27.8	26.3	26.9	
40 to 54	30.6	33.2	30.6		28.4	30.0	29.2	
55 and over	30.7	32.1	32.4		34.1	35.0	33.8	
Race/Ethnicity				*				*
White[a]	63.5	69.4	67.1		73.5	69.7	72.7	
Black[a]	31.7	20.9	24.7		20.7	25.1	21.3	
Hispanic	3.2	4.9	6.6		2.7	4.6	4.8	
Other[a]	1.7	4.7	1.6		3.1	0.6	1.2	
Gender								*
Female	55.1	53.0	53.5		55.5	49.3	50.2	
Male	44.9	47.0	46.6		44.5	50.7	49.8	
Education				*				
Less than high school	15.7	14.0	10.4		14.4	14.9	14.8	
High school	32.9	32.7	31.5		33.7	37.3	34.2	
Some college	26.9	29.5	31.5		32.5	30.9	31.9	
College graduate	24.6	23.8	26.6		19.4	17.0	19.1	
Marital Status								*
Not married	50.2	48.8	48.6		43.1	38.6	41.7	
Married	49.8	51.2	51.4		56.9	61.4	58.3	
Children Under Age 18								
Without children	74.2	73.6	72.6		69.3	69.3	71.3	
With children	25.8	26.4	27.4		30.7	30.7	28.7	
Family Income				*				*
Less than $15,000	19.3	12.9	12.6		20.0	14.7	10.8	
$15,000 to $74,999	59.9	57.7	56.1		60.1	56.9	60.0	
$75,000 or more	20.8	29.4	31.3		19.8	28.4	29.2	
Housing Occupancy				*				*
Owner	74.4	77.1	73.5		74.8	82.0	79.2	
Renter	24.7	21.6	24.4		21.6	13.7	16.7	
Occupied without payment	0.9	1.4	2.1		3.6	4.4	4.1	
Number of individuals[b]	958.4	677.6	757.8		293.8	263.1	261.8	

Source: Current Population Survey, January 2004–November 2007.

Notes: 2004–05 is January 2004–July 2005. 2005–06 is October 2005–October 2006. 2006–07 is November 2006–November 2007. Distributions of family income are based on those who reported family income.

[a] Non-Hispanic.
[b] In thousands.
* The distribution across subgroups for the specified characteristic is significantly different (at the 5% level) over time, based on a Pearson χ^2 test.