Migration Patterns and Mover Characteristics from the 2005 ACS Gulf Coast Area Special Products

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Introduction

Hurricane Katrina devastated the New Orleans and Mississippi Gulf Coast areas when it struck land on August 29, 2005. Almost four weeks later, on September 24, Hurricane Rita made landfall near the Louisiana-Texas border. The widespread damage caused by Katrina, and to a lesser extent Rita, uprooted thousands of people and changed the demographic, social, and economic face of the areas in the paths of the storms as well as those areas that saw great influxes of people escaping the destruction.

In order to measure the effects the hurricanes had on the population and housing in the area, the U.S. Census Bureau released the 2005 American Community Survey (ACS) Gulf Coast Area Special Products in June 2006. Two sets of estimates were produced to provide a picture of the population and housing units for Alabama, Louisiana, Mississippi, and Texas for the 8 months before and 4 months after Katrina and Rita. The migration estimates produced at that time were for where people currently lived and did not contain information on the specific location of their previous residences.

This analysis uses data from the 8-month (before) and 4-month (after) period data sets to determine the migration patterns of those displaced by the hurricanes. We will look at people whose residence 1 year ago was in specific county groups within the Federal Emergency Management Agency (FEMA) areas of the four states most affected by the hurricanes and determine mobility rates to other areas within the FEMA areas, the remainder of each of the four states, and the remainder of the U.S. Along with the migration flows, mover characteristics will be examined. Additional analysis will focus on the quality of the data by comparing the 8-month estimates to the 2004 ACS.

Data

The ACS gathers data from every county in the United States in order to produce annual estimates of population and housing characteristics for places with a population of 65,000 or more. The annual initial sample size is about 3,000,000 addresses that are allocated to the 12 months of the sample year, so it is possible to create estimates for partial years. For the Gulf Coast Area Special Products, the national sample size consists of approximately 1,945,000 addresses for the data collected for January through August and approximately 977,000 addresses for September through December. Both samples were weighted to give estimates for a full year period. In this product, only areas with 300 or more interviewed housing units were published.

The ACS Special Products focuses on the 117 counties and parishes in Alabama, Louisiana, Mississippi, and Texas designated by the FEMA as receiving "individual and public assistance" as of October 7, 2005 for Hurricane Katrina and October 20, 2005 for Hurricane Rita. Also included are estimates for the remaining counties outside the FEMA designated areas for each of the four states.

The 2005 ACS only surveyed people in households and not in group quarters. People who were incarcerated or living in nursing facilities, mental hospitals, college or

university housing, homeless shelters, or other group quarters facilities are not included in the estimates.[1] Also, the 2005 ACS sample was selected from an address list developed early in 2005 and therefore the estimates do not reflect any housing added to the address list after that date. Those people who moved out of the area and into shelters or makeshift housing are not represented in the estimates.

Normally, ACS household population totals are controlled at the county level to the annual mid-year estimates produced independently from ACS by the Census Bureau. Since the 2005 population estimates are for July 1, well before either hurricane occurred, the ACS Special Products household populations are not controlled. Instead, the estimates are calculated by summing the final weights for each person or household. Whenever possible, ratios will be used for comparisons rather than the number of people or households.

The mobility question on the ACS asks where the respondent lived 1 year ago. The normal collection period for ACS is a complete year, and therefore the seasonality of moving does not have to be considered when comparing annual estimates. This is not the case with the special products estimates that cover partial years. Changes in residences covered by the 8-month estimates occurred between January 2004 and August 2005 while the changes in residences for the 4-month estimates occurred between September 2004 and December 2005. According to the 1996 Survey of Income and Program Participation, most moves occur between June and October, but about 67 percent of moves take place in the first 8 months of the year and 33 percent take place in the last 4 months.[2] Therefore, the seasonality of moves should have little effect on the comparability among the 2005 ACS special products estimates for mobility. However, the 4-month estimates do include moves that occurred before Hurricane Katrina was even formed.

Comparison Between 2004 ACS and 2005 ACS Special Products Estimates

It is expected that the mover rate will not significantly change between the 2004 ACS and the pre-hurricanes 2005 ACS estimate. Conversely, for the areas directly hit by Katrina and Rita as well as the main destination points of evacuees, we expect sharp changes in the mover rates between the 2005 ACS pre- and post-hurricanes estimates.

There are some limitations in comparing 2004 ACS with 2005 ACS Special Products data. Unlike the 2005 ACS, data for the 2004 ACS were collected in only 1,240 counties and the total initial sample size was about 838,000. Because of the smaller sample, estimates are available for only those counties with a population of 250,000 or more. Another difference is that the 2005 ACS uses 2004 metropolitan area definitions while the 2004 ACS uses 1999 metropolitan area definitions. In the case of New Orleans Metropolitan Area, the 1999 definition includes St. James Parish, but the 2004 definition

[1] For a complete list of group quarters definitions see the *2006 ACS/PRCS Group Quarters Definitions* located at http://www.census.gov/acs/www/UseData/GQ/def.htm.
[2] Schacter and Kuenzi. *Seasonality of Moves and the Duration and Tenure of Residence.*

does not. Because of these differences, the comparison between 2004 ACS and 2005 ACS Special Products estimates is limited to the state level.

Table 1 shows the estimated number of people living in the four Gulf States and the remainder of the United States 1 year ago and currently living in a household within the United States. The percentage distribution is given by the type of move for the population: nonmovers, movers within the same area, and movers to a different area. For comparison purposes, movers from different areas and movers from abroad are included also as a percentage of those who lived in an area 1 year ago and currently in the United States.

The 2004 and 2005 8-month estimates for those who lived in an area 1 year ago are statistically different because the 2004 data are controlled to independent population estimates and the 2005 Gulf Coast estimates are not controlled. The percent of nonmovers and movers within Texas do have significant changes at the 90 percent confidence level of 0.9 percentage point each, but a slight change is not unexpected. Neither set of numbers is significant at the 95 percent level.[3]

The comparison between the 2005 8-month and 4-month estimates does show a change in migration patterns. The percent of the people who lived in Louisiana 1 year ago that moved differed from 15.4 percent for the pre-hurricanes estimates to 23.1 percent for the post-hurricanes estimates. Mississippi showed a similar change from 14.8 percent to 19.5 percent. Both states had significant changes in percent of movers to a different area and within the same area. The percent of movers from Louisiana to a different area increased from 2.1 percent to 8.1 percent and for Mississippi, the percent of movers to a different state increased from 2.5 percent to 4.4 percent. The percent of movers within Louisiana increased from 13.3 percent to 15.0 percent while the percent of movers within Mississippi increased from 12.3 percent to 15.1 percent. Texas and the remainder of the United States experienced the opposite trend. Texas showed an increase in the percentage of movers from a different state from 2.0 percent to 2.9 percent. The U.S. showed an increase in the percentage movers from the four Gulf States from 0.2 to 0.3. As expected, the estimates do record a change in migration patterns between the 2005 ACS 8-month and 4-month estimates with an increase in movers from the states directly hit by the hurricanes to other states, especially Texas.[4]

Migration Patterns of Selected Areas

Since it is established that the ACS estimates are robust enough to show the change in migration patterns caused by the storms at the state level, the next step is to determine what information the estimates can provide at geographic levels below that. The Special Area Products divided the 117 designated FEMA counties into 59 areas of which some overlapped. For this analysis only a few of the Gulf Coast Special Area Products areas or

[3] All significant testing is done at the 90 percent confidence level unless otherwise notes.
[4] There is no significant difference between the 8-month ACS estimates for percent of movers in Louisiana and Mississippi as well as the percent of movers within the state for Louisiana and Mississippi for both the 4-month and 8-month estimates.

combination of the areas will be examined. Two of the areas are the New Orleans Metropolitan Area and the three Mississippi Gulf Coast counties that were struck by Hurricane Katrina. Lake Charles, Louisiana and Beaumont-Port Arthur, Texas Metropolitan Areas are included because they were in the path of Hurricane Rita. The Houston area and the Baton Rouge Metropolitan Area are included due to the large number of people settling there from those areas hardest hit. The other areas consist of the remaining designated FEMA counties in each of the four states, the remaining counties in those states, and the rest of the United States for a total of 15 areas. Table 2 lists the FEMA designated counties within each area along with the January 1, 2006 population estimates published by the Census Bureau.

Table 3 shows similar estimates for the 15 areas that Table 1 shows for the states: namely, the percent of nonmovers, movers within the same area, movers from a different area within the same state, movers to a different area within the same state, movers from a different area of a different state, movers to a different area of a different state, and movers from abroad based on the estimated number of people living in an area 1 year ago and currently living in a household within the United States.

New Orleans, Gulfport-Biloxi, and the remainder of the U.S. had significant decreases in the percent of nonmovers between the 8-month and 4-month estimates. The largest difference was New Orleans, which went from 86.5 percent to 55.1 percent. Gulfport-Biloxi decreased by from 83.6 percent to 67.1 percent and the remainder of the U.S. from 84.9 to 84.3. Beaumont-Port Arthur decreased between the 8-month and 4-month estimates; however, the difference was not statistically significant.[5]

Movers from a different area within the same state changed significantly for four of the five areas in Louisiana. New Orleans had the only decrease from an 8-month percent of 1.0 to 0.3 percent for the 4-month. Baton Rouge increased from 1.4 to 7.6, the other designated FEMA counties in Louisiana increased from 1.4 to 3.8, and the remainder of Louisiana increased from 0.7 to 2.8.[6]

Four areas had significant differences in the movers from a different area in a different state between the two sets of estimates. The other designated FEMA counties in Mississippi increased from 1.8 percent for the 8-month to 3.3 percent for the 4-month, the Houston area increased from 2.0 percent to 3.4 percent, the remainder of Texas increased from 2.1 percent to 2.7 percent, and the remainder of the U.S. increased from 0.2 percent to 0.3 percent.[7]

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[5] The percent of nonmovers for New Orleans, Gulfport-Biloxi, and the remainder of the U.S. are not significantly different from each other for the 8-month estimates.

[6] The percent of movers from a different area within the same state for Baton Rouge, New Orleans, other designated FEMA counties in Louisiana, and the remainder of Louisiana are not significantly different from each other for the 8-months estimates. The percent of movers from a different area within the same state are not significantly different between other designated FEMA counties in Louisiana and the remainder of Louisiana for the 4-month estimates.

[7] The percent of movers from a different area in a different state for other designated FEMA counties in Mississippi, Houston, and the remainder of Texas are not significantly different for either the 8-month or 4-month estimates.

New Orleans, the only area to show a significant change for movers to a different area of the same state, went from 0.9 for the 8-month percentage to 8.0 for the 4-month percentage. New Orleans, along with Gulfport-Biloxi, had significant increases for movers to a different state. New Orleans increased from 2.1 for the 8-month percentage to 24.1 for the 4-month percentage. Gulfport-Biloxi increased from 4.1 to 10.7.[8]

In order to examine exactly where people left and relocated, Table 4 shows the mover flows between the 15 areas. There were significant positive increases between the 8- and 4-month percent of movers from New Orleans to Houston, Baton Rouge, the remainder of Texas, and the remainder of the United States. The 8-month estimates showed that 78.1 percent of movers who lived in the New Orleans MSA stayed in the New Orleans area, but only 28.4 percent of movers in the 4-month estimates did so. The 4-month estimates also showed that 20.6 percent of the movers went elsewhere in the U.S., 14.5 percent went to the Houston area, 11.6 percent went to the remainder of Texas, and 8.1 percent went to the Baton Rouge MSA. The percent of movers who lived in New Orleans 1 year ago and currently live in the remainder of Alabama also was significant, but the percent increased only from 0.1 for the 8-month estimates to 1.2 for the 4-month estimates.[9]

The other significant difference was the percent of movers who lived in the other FEMA designated counties in Texas and currently live in the Houston area. The percent decreased from 17.7 for the 8-month estimates to 4.4 for the 4-month estimates. This could indicate that because of an increase in housing demands by the influx of movers from New Orleans into the Houston area, people from other nearby parts of Texas could not find housing as readily in the Houston area as before.

The ACS migration patterns in and out of the selected areas do show the effect that Hurricane Katrina had on both the New Orleans and Gulfport-Biloxi areas and the movement to elsewhere in Louisiana and Texas. The same cannot be said of the areas that were hit by Hurricane Rita. Neither the Beaumont-Port Arthur area nor the Lake Charles MSA had changes that were significant at the 90 percent level. When determining where the movers relocated, the ACS estimates were robust enough to register those from the New Orleans MSA but not for any of the other areas.

Mover Characteristics for New Orleans

There were enough movers that lived in New Orleans 1 year ago for the 4-month ACS to examine some characteristics of those movers. To produce reasonable estimates, the Gulf

[8] There is no significant difference in the percent of movers to a different state for New Orleans and Gulfport-Biloxi for the 8-month estimate.

[9] The percent of movers from New Orleans to the remainder of the U.S. is not significantly different from the percent of movers who stayed in New Orleans or the percent of movers to the remainder of Texas for the 4-month estimates. The percent of movers from New Orleans to the remainder of Texas is also not significantly different from the percent of movers to Houston or the percent of movers to Baton Rouge for the 4-month estimates.

Coast Area Special Products used the criterion of only publishing profiles for areas that had a sample size of 300 or more households. The same criterion was used when selecting the subgroups of movers based on their current residence. In New Orleans, there were enough movers in the 4-month period to examine characteristics for nonmovers, movers within the New Orleans MSA, movers to the remainder of the FEMA designated area, and movers to the remainder of the United States. Table 5 shows the results for those groups along with the population 1 year and over for the 8-month period. This gives a picture of the population of the New Orleans MSA before Hurricane Katrina hit, as well as those that lived in the MSA 1 year prior and moved to nearby areas and areas further away. Table 6 is a condensed version of Table 5 in which the nonmovers and movers within the New Orleans MSA are combined and the movers to outside the MSA are also combined.

Not surprisingly, the population that stayed in the New Orleans area is older. The median age based upon the 8-month estimates was 38.5. The median age for those who stayed in the New Orleans MSA was 42.2 and those that moved outside the MSA was 29.5.

Those who stayed in the New Orleans MSA also had a difference in median ages between the movers and nonmovers. The median ages were 44.3 for nonmovers and 32.2 for movers.

Relationship to the householder varied between those that stayed and those that moved. For any person who stayed, a higher percentage, 39.8 percent, were householders than the 31.9 percent of those who moved out of New Orleans who were householders. Among those who left, a higher percentage was extended family members (19.0 percent) or nonrelatives (9.7 percent) than those who stayed (9.1 and 5.4, respectively).

Relationship also varied for those who did not leave New Orleans. Before Katrina came, 11.4 percent of the population 1 year and over were extended family or nonrelatives for the nonmovers. After Katrina, 8.1 percent of the nonmovers were extended family or nonrelatives while 42.8 percent of the movers within New Orleans were extended family or nonrelatives.

The vast majority of households in New Orleans before Katrina hit contained only people that lived in the New Orleans MSA 1 year prior. This was also the case for those that stayed in the New Orleans area in the 4-month estimates. However, 26.2 percent of those who moved outside the MSA have at least one person in the current household that lived outside New Orleans 1 year ago.

The data before Katrina hit showed that the average household size was 2.42. After the hurricane, the average household size for those who stayed in New Orleans was not significantly different, but for those who left the area, it was 3.16. Of the 3.16, an average of 2.21 persons in those households actually lived in New Orleans one year ago. There is an overlap between households with nonmovers and movers within New Orleans. Of the households with movers within New Orleans, 43.5 percent also

contained nonmovers, and those households are included in the calculations for both groups.

Before Katrina, 68.2 percent of the population 1 year and over lived in an owner-occupied housing unit. After Katrina, a larger proportion of the population, 78.3 percent, were living in an owner-occupied housing units in New Orleans MSA. Only 23.6 percent of those who moved out of the area were living in an owner-occupied housing unit. This suggests that people in owner-occupied housing units were more likely to stay than those in renter-occupied housing units.

Those who were married or widowed tended to stay more than those separated or never married. Before Katrina, 46.3 percent of the population 15 years and over were married, 7.7 percent were widowed, and 31.8 percent never married. Except for those never married, there was not a significant difference in distribution for those who stayed. The percentage of those who never married decreased to 26.2. Of those who moved away, the percentages for married decreased to 34.6 and widowed decreased to 4.7. The percentage for never married increased to 43.9.

Those who stayed in the area were more likely to be unemployed or not in the labor force. Before Katrina hit, 41.0 percent of the population 16 years and over were unemployed or not in the labor force. After Katrina, New Orleans had a higher percent, 47.8 percent, of people who were unemployed or not in the labor force. Of those who moved elsewhere, 63.8 percent were unemployed or not in the labor force. Likewise, a higher percentage of the movers were in poverty. The percent of people who lived in poverty for those who stayed was 12.9 and for those who left was 32.2.

The racial makeup of the MSA also changed after Katrina. Before Katrina, non-Hispanic Whites made up 54.6 percent of the MSA population 1 year and over. Of those who stayed within the MSA, 66.8 percent of the population 1 year and over was non-Hispanic White, but those that moved out of the MSA were 32.1 percent non-Hispanic White. Likewise the Black or African American population dropped from 35.7 percent of the population 1 year and over to 21.5 percent. African Americans represented 59.3 percent of the movers out of the MSA. Other race and ethnic groups were too small to show any significant change.

There are no significant differences in percent disabled, school enrollment, and educational attainment between those who relocated outside the New Orleans MSA and those who stayed.

Mover Characteristics for Whites and Blacks or African Americans in New Orleans

The sample sizes of non-Hispanic Blacks or African Americans alone and non-Hispanic Whites alone are large enough that estimates for characteristics for those who stayed in the New Orleans area and those who left can be produced for these groups. However, because of the smaller populations, the margins of errors tend to be greater.

Tables 7 and 8 show in general, the differences between non-Hispanic Whites who stayed and moved are more pronounced than the differences between non-Hispanic African Americans who stayed and moved. There is no significant difference between the median age for the African Americans who stayed in the New Orleans area and those who moved out of the area. Whites who stayed tended to be older with a median age of 45.2 years than those who left with a median age of 31.8 years.

The estimates for household relationship had similar results. For Whites, a smaller percent of people who moved outside New Orleans were considered householders (31.9 percent) than those who stayed (42.6 percent). There were larger percentages for movers outside the area who were extended family members or nonrelatives of the householder. Among those who moved out of the area, 29.8 percent were extended family members or nonrelatives compared with 12.6 percent for those who stayed in the area. African Americans had no significant differences in household relationship between those who left and stayed.

Both groups had differences in housing tenure, but the percent of African Americans who moved out of New Orleans and lived in renter-occupied housing (85.1 percent) was greater than Whites (60.9 percent).

Marital status also varied between Whites who moved and stayed in the area. The percentage of the population 15 years and over who stayed and were married is 55.2 compared to 40.2 for those who moved. Those people that never married represented 23.0 percent of those who stayed and 40.3 percent of those who moved. The estimates for African Americans are comparable but not significantly different. Married people make up 36.5 percent of those that stayed and 30.3 of those that left, while African Americans that never married represent 37.4 percent of those who stayed and 46.5 of those who left.[10]

White have higher percentages of unemployed than those who remained in the New Orleans area. For those who stayed, 5.7 percent were unemployed while 13.1 percent who left the area were unemployed. For African Americans, while there was not a significant difference in the percent unemployed between those who remained and those who left, there was a significant difference in the percent employed. Of the African Americans who stayed, 45.6 percent were employed while 28.5 percent of those who moved out of New Orleans were employed.

The percentage of Whites in poverty was greater for those that moved outside the New Orleans area than those that stayed. For those that moved, 21.4 percent were in poverty while 8.9 percent of those that stayed were in poverty. The percentage in poverty for African Americans was not significantly different.

Summary

[10] There is no significant difference between the percent married and never married for Whites who moved out of the New Orleans MSA.

The American Community Survey has a large enough sample within a survey year to track migration changes caused by major disasters. In the case of Hurricane Katrina, the 8-month and 4-month estimates from the 2005 ACS were able to show the change of migration patterns from the New Orleans MSA and the Mississippi Gulf Coast to other locations. However, the relocation of people from areas affected by Hurricane Rita was not significant enough for ACS to track.

For an area the size of the New Orleans Metropolitan Area, the sample is robust enough to look at characteristics for large subgroups of the population. The 2005 ACS found that for New Orleans, those that moved out of the area tended to be more able to leave and had less invested in the area. Those who moved were younger, more likely to be single or separated, less likely to be employed or in the labor force, more likely to be in poverty, and living in renter-occupied housing. Also, within the New Orleans area and outside, households tended to be combined as people moved in with extended family members and nonrelatives. The racial makeup of the area changed as a larger percentage of African Americans moved out of the area than Whites. Part of the reason is that larger proportion of Whites may have stayed is because they owned houses and had jobs that were not lost due to the hurricane. The demographic composition of the New Orleans Metropolitan Area changed in the months following Hurricane Katrina. Future ACS data will tell whether or not those changes are temporary or permanent.

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