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Labor Market Assimilation: Evidence from Hurricane Katrina Evacuees

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Labor Market Assimilation: Evidence from Hurricane Katrina Evacuees

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ABSTRACT

The objective of this paper is to use the mass migration to Houston after Hurricane Katrina as a natural experiment to estimate the effect of migration on employment (i.e., the effects of being an outsider rather than a native to a certain area). The use of this natural experiment helps control for the usual endogeneity of studying effects of immigration; it is safe to assume away the possibility that the migration was mainly because of higher wages or better employment opportunities, a possibility present in most empirical studies on the subject, which makes it hard to say how the actual migration itself affects employment In addition, this paper explores how these effects differ for whites and nonwhites, as evidence of discrimination in the labor market. I utilize linear probability models for the likelihood of employment, labor force participation, and unemployment based on whether or not the individual was an evacuee from Hurricane Katrina (controlling for other observable characteristics). I find evidence that the migration increased the likelihood of unemployment in Houston by 6.6 percentage points. When broken down by race, I find that, while the estimation results for white evacuees are not statistically significant, there is strong evidence supporting the idea that nonwhite evacuees were more adversely affected by the migration, having experienced an increase in the probability of unemployment by 12.2 percentage points. This difference is suggestive of statistical discrimination in Houston's labor market in the years immediately following Hurricane Katrina.

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I. Introduction

The first objective of this paper is to examine how migration affects employment. As people immigrate for a variety of reasons, such as new job opportunities and higher wages, it is important to separate these characteristics from the actual impact of the immigration and the time it takes to assimilate in a new community. Hence, it is valuable to look at immigration that is clearly noneconomic in nature, such as natural disasters. This paper examines the immigrants forced out of their homes because of Hurricane Katrina and looks at their performance in the labor market, as compared to the native populations of their new places of residence. The data used for this examination are from the year of the hurricane and the following year only, implying that this study focuses on the short-term effects of immigration. The use of this natural experiment and the exogeneity of Hurricane Katrina help correct for most of the selection bias present in general studies of immigration, in that we can assume the main reason for the migration was not higher wages or better employment opportunities, but rather a migration of convenience and immediacy. The people who went to Houston likely did so because it was somewhat nearby and they needed a place to go and, moreover, many of their fellow evacuees also fled there.

The second objective of this paper is to analyze the differences in effects between white immigrants and nonwhite immigrants, providing preliminary evidence for the theory of statistical discrimination in the labor market.

This paper focuses on Houston, Texas, because it contained the largest number of evacuees from the hurricane outside of the Gulf Coast area. So the comparisons made are between the native Houstonians and the evacuees in Houston.

Using the Current Population Survey Merged Outgoing Rotation Groups, I estimate several linear probability models of labor supply. I found that, controlling for many observable characteristics (age, race, citizenship, sex, education, etc.), Hurricane Katina evacuees in Houston's labor force were approximately 6.6 percentage points more likely to be unemployed than native Houstonians.

I also found a significant difference in the impact of the migration when disaggregating the sample into white and nonwhite evacuees. Nonwhite evacuees were 12.2 percentage points more likely to be unemployed than their nonwhite native counterparts, significantly higher than the 1.8 percentage point difference between white evacuees and white natives. It is important to note that, while this second figure was not statistically significant, this paper focuses on the differential effects across whites and nonwhites, finding that the coefficient estimates are statistically significantly different with 93 percent confidence. The estimated difference in the effects for white and nonwhite migrants suggests the existence of statistical discrimination. Statistical discrimination is rational discrimination by an employer in a situation of imperfect information in hiring. If two candidates are otherwise equal, then a characteristic such as race may used as an indicator of unobservable variables.

In a classic example, an employer may know that, statistically speaking, women need to take more time off of work for childbirth. Not being allowed to ask whether a woman is or is not planning to have a child, the employer logically decides an equally qualified man to be a less risky investment, so in the short-term labor market, different genders (or races) are treated differently. An important feature of statistical discrimination that distinguishes it from taste-based discrimination is that statistical discrimination decreases over time. Once people are hired, they are able to show their value as employees not related to their genders or races (in other words, the imperfect information in hiring becomes less imperfect over time). So statistical discrimination predicts that, the longer an employee is employed, the smaller the disparity should be between the different genders or races. In the context of my paper, statistical discrimination would imply that, in the short term, nonwhites are a statistically riskier investment, but in the long run they are able to prove their merit based on skill and performance, and so a significant equalization occurs over time between the races (controlling for all other variables). As the comparisons made are short-term labor market comparisons, and since nonwhites fared significantly worse *compared to the native nonwhite population*, we know that equalization between whites and nonwhite migrants should happen over time, which is suggestive of statistical discrimination.

My analysis has also shown that nonwhite evacuees were significantly less likely to participate in the labor force in general, as compared to white evacuees. However, due to the countless possible reasons (unobservable

differences in preference, correlation between race and disability, correlation between federal payments for survivors and race, etc.) for this disparity and the lack of data to test them, no explanations are explored in this paper regarding why this is the case.

II. Background Information

A. Theoretical Model

First, it should be noted that selection bias in inherent in all studies of immigration. When people choose to move, whether it is from one country to another or simply to the next state over, they are making a choice of not only that they want to move, but also *to where* they wish to move. Since people can, in theory, move to an infinite number of places, where they choose to move is a product of comparison between current wages (or, to include noneconomic reasons, overall utility) and potential wages/utility in the new location. (Borjas 1986)

Analyses involving the study of immigration are often very clouded in results, since the mechanism for desiring to immigrate can vary from person to person. If, for example, a large number of people find jobs elsewhere in the country and immigrate to take that job, it would falsely appear that immigration somehow decreased unemployment since these people went from being unemployed to being employed. It is difficult, therefore, to separate the effects of the assimilation into a new environment from the underlying

mechanisms that created the desire to immigrate in the first place, and the effects often, to a degree, cancel one-another out.

The use of the exogenous event Hurricane Katrina helps to correct for some of the selection bias. Since those who had to evacuate did have a choice of where to go, and, to some degree, whether or not to return to their hometowns afterward (if they had a home to go back to), not all the selection bias has been accounted for. However, the exogeneity of the hurricane inherently accounts for many of the problems in estimating the outcomes of migration patterns. For instance, it is reasonable to assume that the main reason for migrating to Houston was not because one had a job lined up there or because one thought it had immense employment opportunities.

Hurricane Katrina effectively lowered the relative cost of migration by reducing both wages and noneconomic utility at home. For example, if a hurricane survivor's home was destroyed, the utility gained from living in his or her home (comfort, familiarity, etc.) is reduced to zero, lowering the overall costs of moving. If his or her place of work was destroyed, then his or her monetary wages were effectively reduced to zero.

When looking at the theory behind a difference in the effects between races, one relevant theoretical model is that of statistical discrimination. The model of statistical discrimination says that non-work-related characteristics, such as race and gender, may be used as indicators for unobservable variables in hiring, such as likelihood of childbirth or time needed to take off of work to take care of the household. It is important to note that, once an employee is

hired, their unobservable work-related characteristics become observable in what they accomplish, and hence the discrimination should decrease the longer the employment. Over time, in a market free of taste-based discrimination, and controlling for other variables, there should be no difference between the nonwhite natives and nonwhite evacuees. So employment differences in the short term may indicate statistical discrimination. Due to the inherent differences in mean age, education, etc., assuming a firm has incomplete information in hiring, it may be a riskier investment to hire a nonwhite employee than a white employee, even if the two are otherwise equal. In the long term, able nonwhites are able to find and hold jobs since they can prove their actual abilities once hired. In an extreme example, if an employer knows nothing about its two candidates except their race, then, knowing that, on average, whites are better educated, they will be much more likely to hire the white candidate. However, as new jobs open up or are created in the long term, as soon as the nonwhite candidate is hired, he or she can prove his or her merit based on actual performance rather than race. So, ceteris paribus, the races will even out in employment rates over time.

If, in general, nonwhite immigrants do worse in the labor market than white immigrants, it may be a simple difference in mean skills, education, and other variables between the two groups. As shown in Chart 1, this is indeed the case: nonwhite immigrants, in general, are older, less educated, more likely to have children, etc. However, by controlling for these differences, we can look at a cleaner comparison between the two groups. Moreover, by

controlling for race when comparing evacuees against the native Houston population, we can see how, in theory, the immigration affected them in the short term, since this would involve a comparison of white immigrants to white natives and nonwhite immigrants to nonwhite natives. In other words, when we control for other baseline differences, we can think of the nonwhite natives as the nonwhite evacuees several years down the road, once their labor market outcomes should be largely based on their actual value in the market (rather than race). Hence, significant differences in the labor market outcomes in the short run between nonwhite migrants and nonwhite natives would be suggestive of statistical discrimination.

B. Setting and Related Literature

It is important to discuss a few important facts about Hurricane Katrina to better understand the analysis in this paper. Hurricane Katrina struck the US's Gulf Coast on Monday, August 29, 2005, at which point it had become a Category 3 Hurricane. According to estimates by the Bureau of Labor Statistics, approximately 1.5 million people over the age of 16 were forced to evacuate their homes because of the hurricane. Of those who evacuated, about 410,000 had not returned to their homes by October 2006, and of these, approximately 280,000 had not even returned to the counties in which they were living prior to Katrina. Groen and Polivka (2008) estimate that, "thirty-seven percent of Katrina evacuees from Louisiana who did not return to their pre-Katrina parishes went to Texas, and so did 9 percent of evacuees from

Mississippi who relocated outside their pre-Katrina counties." Frey and Singer (2006) claim that Houston, in particular, saw large population gains, and indeed McIntosh (2008) estimates a 3 to 4 percent increase in Houston's overall population as a result of the storm. Thus, it is meaningful and worthwhile to look at how well the evacuees in Houston are assimilating into their new areas of living.

III. Methodology

A. Empirical Model

My first analysis examines how the immigrants (Katrina evacuees) fared in terms of employment, in comparison to native Houstonians. To do this, I estimate the following linear probability model:

(1) $Employed = \alpha + \beta_1 Evacuee + \beta_2 X + \varepsilon$,

where α is a constant, the *Employed* is an indicator of being employed in Houston's labor market, and *Evacuee* is an indicator variable for a Hurricane Katrina survivor who evacuated to Houston. The analytic sample is the set of all Houston residents in 2005 and 2006, the years for which the Hurricane Katrina evacuee indicator variable was available in the CPS data. *X* is a vector of control variables, including age, sex, education, race, country of birth, citizenship status, veteran status, whether or not they have children, and several interaction terms created from these variables. The coefficient of interest, β_1, represents the effect in percentage points that being an immigrant had on the likelihood of employment in Houston.

A concern with using only this model specification is that the desire to participate in the workforce may differ between immigrants and native Houstonians. To understand the full picture, I estimated two additional linear probability models:

(2) $LFP = \alpha + \beta_1 Evacuee + \beta_2 X + \varepsilon$

(3) $Unemployed = \alpha + \beta_1 Evacuee + \beta_2 X + \varepsilon$,

where *LFP* and *Unemployed* are indicators of labor force participation and of being unemployed, respectively. Since unemployment, by definition, excludes those not in the labor force, the estimated β_1 from the third model is a more accurate measure of the effects that immigration had on those in the labor market. The second regression is harder to interpret, as a difference in desire to participate in the labor force could either be attributed to the effects of the immigration or simply an unobservable difference in preferences between Houstonians and those on the Gulf Coast forced to evacuate their homes.

B. Data and Sample Summary

The data used for my analysis comes from the Current Population Survey Merged Outgoing Rotation Groups. Each household entering the CPS is administered 4 monthly interviews, then ignored for 8 months, and then interviewed again for 4 more months. Since 1979, only households in months 4 and 8 have been asked their usual weekly earnings/usual weekly hours. These are the outgoing rotation groups, and each year the Bureau of Labor

Statistics gathers all these interviews together into a single Merged Outgoing Rotation Group file. The advantage of these data over the regular CPS data is larger sample sizes, as well as the inclusion of the variable indicating whether or not an individual had to evacuate his or her home due to Hurricane Katrina.

My data were limited to residents of Houston according to FIPS Metropolitan Area (CBSA) Codes. Houston was chosen because it contained the largest population of Katrina Evacuees outside of the Gulf Coast area. As I imagine the hurricane had large effects in general on the labor market along the Gulf Coast, I wanted to separate these effects from the effects of immigration on labor market outcomes, which is the focus of my analysis.

I used the years 2005 and 2006, since these were the only years for which the variable indicating a hurricane evacuee was available. The results presented below include people of all ages; I reran all of the regressions by restricting age to various categories (over 18 years, under 65, etc.), and this did not affect the results in any significant way besides increasing the standard errors. There were 6,658 people in the sample altogether, 95 of which were evacuees from Hurricane Katrina.

IV. Results

A. General Results of Immigration

In regards to the first three linear probability models (Equations 1-3), the coefficient estimates for the explanatory variables are presented in Chart 2. According to the *Employed* model, being an evacuee from Hurricane Katrina

decreased the probability of being employed by approximately 10.2 percentage points, a figure significant at the 5 percent level.

This value may have been made up, in part, by a smaller participation in the labor force. The estimation for the coefficient of the *Evacuee* variable in the *LFP* model is negative but statistically insignificant, so it is difficult to draw any conclusions about the effects that being an immigrant has on labor force participation. So, in this case, it is more valuable to look at the coefficient estimates for the *Unemployed* model. Since the definition of unemployment excludes those out of the labor force, we need not worry about any differences in the desire to participate in the labor force. Looking at the results from that regression (shown in the third column of Chart 2), we see that there is a 6.6 percentage point increase in the probability of unemployment for Katrina evacuees, a figure which is significant at the 1 percent level. So we can conclude with over 99 percent confidence that being an evacuee from Hurricane Katrina raised the chances of unemployment.

The difference between the estimate for the effect on employment (10.2 percentage points) and the effect on unemployment (6.6 percentage points) can then be interpreted, in theory, as the difference in the desire or ability to participate in the labor force. So there likely does exist some disparity between the labor force participation of Katrina Evacuees and the labor force participation of Houston natives. As already mentioned, this number is hard to interpret, as a difference in labor force participation could

either be the effects of the immigration or general differences between natives and evacuees.

We may interpret the effect of immigration on employment as a result of short-term labor contracts and sticky wages. An influx in Houston's labor supply was a shock in the market that it could not immediately adjust to. The long-term effect of the positive shock to the labor supply would be a drop in wages. De Silva, McComb, Moh, Schiller, and Vargasa (2010) find evidence that the average payroll of firms in low-skilled industries in Houston decreased by 0.7 percent relative to firms in high-skilled industries when compared to the same group of industries in Dallas before and after Hurricane Katrina. But in the very short term, wages are usually fixed in contracts and not susceptible to immediate price drops like regular goods. So even if the evacuees are identical to the natives in terms of skill, it is unlikely that the evacuees would immediately be employed (not to mention the investments of job training already put into the current employees). This frictional unemployment is only natural in the immediate aftermath of such a labor supply shock.

B. Differential Effects Between Races

To observe how the above estimated effects differed between whites and nonwhites, three additional linear probability models were estimated:

(4) $Employed = \alpha + \beta_1 WhiteEvacuee + \beta_2 NonwhiteEvacuee + \beta_3 X + \varepsilon$ -,

(5) $LFP = \alpha + \beta_1 WhiteEvacuee + \beta_2 NonwhiteEvacuee + \beta_3 X + \varepsilon$

(6) $Unemployed = \alpha + \beta_1 WhiteEvacuee + \beta_2 NonwhiteEvacuee + \beta_3 X + \varepsilon$.

WhiteEvacuee is a dummy variable for a white Hurricane Katrina survivor who evacuated to Houston and *NonwhiteEvacuee* is a dummy variable for a nonwhite Hurricane Katrina survivor who evacuated to Houston. All other variables are the same as in the previous models. Note that *X* still includes race, meaning the comparison is not simply how whites and nonwhites comparatively fared in Houston's labor market, but how white immigrants fared against the native white population and how nonwhite immigrants fared against the native nonwhite population.

A comparison between coefficients β_1 and β_2 gives us the differences in labor market outcomes between white evacuees and nonwhite evacuees. If $\beta_2 > \beta_1$ in the unemployment probability regression, we know that, for whatever reason, nonwhites fared worse than whites in terms of employment post-Katrina (and vice-versa).

The coefficient estimates from these regressions are in Chart 3. Effectively, being a nonwhite evacuee decreased the probability of being employed by approximately 33 percentage points.

This was, in part, due to a notably smaller participation in the labor force, as the chart shows being a nonwhite evacuee decreased the probability of being in the labor force by approximately 21 percentage points. Unlike the corresponding estimate in the previous section, this estimate (for nonwhites) is significant at the 5 percent level. However, the difference between these two coefficients still represents a significant gap in performance in Houston's

labor market. So it is unlikely that a smaller desire to participate in the labor force was the sole cause of a lower employment rate among nonwhite evacuees. We can verify this by looking at the third column in Chart 3, which represents the regression on the probability of being unemployed. For a nonwhite evacuee, the probability of being unemployed increased by approximately 12.2 percentage points.

If these effects were the same for the white evacuees, we could conclude that these were simply the effects of being an evacuee, not specifically the effects of being a *nonwhite* evacuee. However, there is a noticeable difference between the overall effect of being an evacuee from the first three models (approximately a 6.6 percentage point increase in the probability of unemployment) and the effects when we narrow it down to just nonwhites (an approximate 12.2 percentage point increase). This is indicative of a greater effect on the nonwhites than whites.

Unfortunately, because the effects of the immigration on white evacuees are not statistically significant for any of the three regressions (see Chart 3 for details), it is impossible to draw a conclusion from this analysis regarding the actual effect on this population. Rather, it is relevant instead to look at the statistical significances of the differences between the white and nonwhite evacuee coefficients. These values are shown in Chart 4. The difference between the likelihood of being employed for white and nonwhite evacuees is approximately 36 percentage points. Part of this was due to a difference in the labor force participation of the races, as there is a statistically

significant 25 percentage point difference in the likelihood of being in the labor force between the races. But even after taking this into account, there is still a difference of over 10 percentage points in the probability of being unemployed between whites and nonwhites. It is important to note that this is figure is not quite significant at the 5 percent level, but is significant at the 10 percent level. So, while it is difficult to say anything directly about the effect of the evacuation on labor market performance of whites, it is likely that nonwhite evacuees were more likely than white evacuees to be unemployed and were also less likely to participate in the labor market, in general.

These results are consistent with the theoretical implications of statistical discrimination. The native nonwhite Houstonians can be seen as a representation of the nonwhite evacuees several years after settling in. If the two groups are otherwise identical, then over time they should have similar performance in the labor market. As shown in Chart 5, the nonwhite evacuees and the nonwhite Houston natives differ in significant ways besides immigration and hence the two groups may not be directly comparable. However, my empirical models *controlled* for these differences, and the nonwhite evacuees can still be seen to be worse off in the labor market.

V. Conclusion

This paper had two main objectives: to determine how migration affects employment and to explore the differences in the effects between races. Using the exogenous variable of Hurricane Katrina, and the large migration of

hurricane evacuees to Houston, Texas, as a direct implication, I was able to explore the effects of migration separately from the incentives to migrate in the first place, since the reason for migration in this case is ostensibly noneconomic in nature. I utilized CPS data for 2005 and 2006 and several linear probability models to see how being an evacuee affected the overall probability of employment, unemployment, and labor force participation. I then re-estimated these models, separating the effect on white migrants from the effect on nonwhite migrants, to look at the differences in effects between the races.

It was shown that a migrant is 10.2 percentage points less likely to be employed and 6.6 percentage points more likely to be unemployed. The difference between these two estimates can be thought of as the estimate of the effect of the migration on labor force participation, though this may simply be a result of unobservable differences correlated with work force participation between Houstonians and those on the Gulf Coast. These results may be interpreted in the context of short-term contracts in the labor market, as well as the investment in those already employed in Houston of on-the-job training of the hiring firms.

In terms of different effects between races, it was shown that a *nonwhite* migrant is 32.9 percentage points less likely to be employed, 20.7 percentage points less likely to be in the labor force, and 12.2 percentage points more likely to be unemployed. While the estimates for white evacuees were not statistically significant, we can say with some confidence that the

effect on nonwhites was indeed larger than the effect on whites. This difference may be interpreted as short-term statistical discrimination, as the native whites and nonwhites do not share the same disparity in employment, controlling for other variables.

While it may not be shocking that Hurricane Katrina caused unemployment, the results of this paper are valuable when considering other natural disasters or even the consequences of global warming. If people are forced to immigrate, there is an inherent difficulty for them in terms of finding new employment. Keep in mind that, in the aftermath of Hurricane Katrina, these evacuees decided on Houston as their best option for a new location. So in the context that Houston is the best the migrants could do, we are able to analyze how they fared as a result. It is beneficial to have an estimate of the degree to which such a forced migration has on the individual to better understand consequences of disasters, both natural and otherwise. The likelihood of being unemployed after such an event is increased by 6.6 percentage points, and while this may vary depending on many different factors, it is a useful framework to work with when calculating both the social and economic costs of large-scale disasters.

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APPENDIX: DATA CHARTS

Chart 1

Sample Summary 2

	White Evacuees	*Nonwhite Evacuees*	*Difference*
Average Age (years)	43.54386 (2.7139)	35.42105 (2.6387)	8.12281 (3.7852)
No High School Diploma	21.05263 (5.4478)	44.73684 (8.1742)	23.68421 (9.8233)
High School Diploma, No College	26.31579 (5.8843)	44.73684 (8.1742)	18.42105 (10.0720)
Some College	52.63158 (6.6722)	10.52632 (5.0452)	42.10526 (8.3650)
Male	52.63158 (6.6722)	39.47368 (8.0357)	13.1579 (10.4447)
Veterans	15.78947 (4.8727)	5.26316 (3.6709)	10.52631 (6.1008)
Born in the US	87.7193 (4.3859)	100 (0)	12.2807 (4.3860)
Citizen	98.24561 (1.7543)	100 (0)	1.75439 (1.75439)
Has Children	26.31579 (5.8843)	31.57895 (7.6417)	5.26316 (9.6448)
Number of Observations	57	38	

These numbers represent sample means and their corresponding standard errors for the variables in the leftmost column for the white evacuees of Hurricane Katrina in Houston and the nonwhite evacuees. Other than Average Age, all figures are in percentages.

Chart 2

	Employed	*Labor Force Participation*	*Unemployed*
Katrina Evacuee	-0.1016 (0.0433)*	-0.0355 (0.0420)	0.0661 (0.0192)**
Age	0.0447 (0.0016)**	0.0428 (0.0015)**	-0.0018 (0.0007)*
Age²	-0.0005 (0.0000)**	-0.0005 (0.0000)**	0.0000 (0.0000)
High School Diploma	0.1650 (0.0300)**	0.1843 (0.0290)**	0.0193 (0.0133)
Some College Education	0.2743 (0.0276)**	0.2580 (0.0267)**	-0.0162 (0.0122)
Male	0.1800 (0.0105)**	0.1873 (0.0102)**	0.0072 (0.0047)
White	0.0945 (0.0253)**	0.0741 (0.0245)**	-0.0203 (0.0112)
Vet	-0.0623 (0.0243)**	-0.0588 (0.0235)*	0.0035 (0.0107)
Born in the US	-0.0448 (0.0178)*	-0.0330 (0.0172)	0.0117 (0.0079)
Citizen	0.0131 (0.0215)	0.0168 (0.0209)	0.0037 (0.0095)
White × High School Diploma	-0.0159 (0.0339)	-0.0304 (0.0329)	-0.0144 (0.0150)
White × Some College Education	-0.0731 (0.0311)*	-0.0643 (0.0301)*	0.0087 (0.0138)
Has Children	0.0190 (0.0119)	0.0003 (0.0115)	-0.0186 (0.0052)**
Constant	-0.4380 (0.0405)**	-0.3270 (0.0392)**	0.1109 (0.0179)**
Number of Observations	6658	6658	6658

This table presents coefficient estimates and standard errors for three separate linear regressions: one modeling the probability of employment, one modeling the probability of being in the Houston labor force, and one modeling the probability of unemployment (i.e. in the labor force but not employed). The sample used for these estimates is CPS data on the population of Houston in 2005 and 2006, both those who were and were not evacuees from Hurricane Katrina. All variables, with the exception of Age and Age², are indicator variables. Note that the indicator variables omitted due to collinearity are high school drop outs, females, nonwhites, nonveterans, those not born in the US, and those without children. A single asterisk represents significant at the 5 percent level; a double asterisk represents significant at the 1 percent level.

Chart 3

	Employed	*Labor Force Participation*	*Unemployed*
White Evacuee	0.0279	0.0460	0.0181
	(0.0556)	(0.0539)	(0.0247)
Nonwhite Evacuee	-0.3293	-0.2072	0.1220
	(0.0886)**	(0.0859)*	(0.0393)**
Age	0.0449	0.0429	-0.0019
	(0.0016)**	(0.0015)**	(0.0007)**
Age²	-0.0005	-0.0005	0.0000
	(0.0000)**	(0.0000)**	(0.0000)
High School Diploma	0.1624	0.1826	0.0202
	(0.0299)**	(0.0290)**	(0.0133)
Some College Education	0.2654	0.2525	-0.0129
	(0.0277)**	(0.0268)**	(0.0123)
Male	0.1797	0.1871	0.0074
	(0.0105)**	(0.0102)**	(0.0047)
White	0.0835	0.0672	-0.0163
	(0.0255)**	(0.0247)**	(0.0113)
Vet	-0.0635	-0.0596	0.0039
	(0.0243)**	(0.0235)*	(0.0107)
Born in the US	-0.0428	-0.0318	0.0110
	(0.0177)*	(0.0172)	(0.0079)
Citizen	0.0112	0.0156	0.0044
	(0.0215)	(0.0209)	(0.0095)
White × High School Diploma	-0.0139	-0.0291	-0.0152
	(0.0339)	(0.0329)	(0.0150)
White × Some College Education	-0.0648	-0.0591	0.0057
	(0.0311)*	(0.0302)	(0.0138)
Has Children	0.0191	0.0004	-0.0187
	(0.0119)	(0.0115)	(0.0052)**
Constant	-0.4300	-0.3220	0.1079
	(0.0405)**	(0.0392)**	(0.0179)**
Number of Observations	6658	6658	6658

This table presents coefficient estimates and standard errors for three separate linear regressions: one modeling the probability of employment, one modeling the probability of being in Houston's labor force, and one modeling the probability of unemployment. These regressions are identical to those in Chart 2, except that the population of Katrina evacuees has been broken down by race (white and nonwhite). The sample used for these estimates is CPS data on the population of Houston in 2005 and 2006, both those who were and were not evacuees from Hurricane Katrina. All variables, with the exception of Age and Age², are indicator variables. Note that the indicator variables omitted due to collinearity are high school drop outs, females, nonwhites, nonveterans, those not born in the US, and those without children. A single asterisk represents significant at the 5 percent level; a double asterisk represents significant at the 1 percent level.

Chart 4

	Employed	*Labor Force Participation*	*Unemployed*
White Evacuee	0.0279 (0.0556)	0.0460 (0.0539)	0.0181 (0.0247)
Nonwhite Evacuee	-0.3293 (0.0886)**	-0.2072 (0.0859)*	0.1220 (0.0393)**
|White Evacuee - Nonwhite Evacuee|	0.3572 (0.1047)**	0.2534 (0.1014)*	0.1039 (0.0465)
Probability that the effect on nonwhites is larger than the effect on whites	99.36%	95.41%	92.61%
Number of Observations	6658	6658	6658

These values and probabilities were calculated from the regressions in Chart 3. The third row represents the absolute value of the difference between the coefficients of the two variables. Since this difference is not significant at the 5 percent level for the "Unemployed" regression, the penultimate row is a relevant look at the actual probabilities of significance (the likelihood that there is a significant difference between the effects on white migrants and the effects on nonwhite migrants). A single asterisk represents significant at the 5 percent level; a double asterisk represents significant at the 1 percent level.

Chart 5

	Houston Natives	*Evacuee*	*Difference*
Average Age (years)	42.53311 (0.4430)	35.42105 (2.6386)	7.11206 (2.6755)
No High School Diploma	22.51656 (1.0752)	44.73684 (8.1742)	22.22028 (8.2446)
High School Diploma, No College	29.2053 (1.1705)	44.73684 (8.1742)	15.53154 (8.2576)
Some College	48.27815 (1.2863)	10.52632 (5.0452)	37.75183 (5.2066)
Male	43.84106 (1.2773)	39.47368 (8.0357)	4.36738 (8.1366)
Veterans	4.83444 (0.5521)	5.26316 (3.6709)	0.42872 (3.7122)
Born in the US	76.62252 (1.0895)	100 (0)	23.37748 (1.0895)
Citizen	91.19205 (0.7295)	100 (0)	8.80795 (0.7295)
Has Children	29.53642 (1.1744)	31.57895 (7.6417)	2.04253 (7.7314)
Number of Observations	1510	38	

These numbers represent sample means and their corresponding standard errors for the variables in the leftmost column for the nonwhite evacuees of Hurricane Katrina in Houston and the nonwhite natives (non-evacuees) in Houston. Other than Average Age, all figures are in percentages.

Summary of Capstone Project

The aim of my project is to study the effects migration and assimilation into a new environment have on employment. Most studies of the effects of migration are quite vague, since the effects of migration are deeply entangled in the initial reason for the migration. For example, if a large group of unemployed people migrate across the country to find occupations, then we could wrongly interpret that the "effects" of migration and a lack of assimilation into a new place are a positive impact on employment. People generally migrate when they perceive better opportunities elsewhere, in terms of both wages and nonmonetary incentives. Therefore, it is, in general, very difficult to look at how moving actually affects people.

To correct for this well-known selection problem, I study the natural experiment of the evacuees from Hurricane Katrina assimilating into Houston. As a result of the Hurricane, a large number of people were displaced. Many of these people went to Houston, TX. One economist estimated an approximate 3-4% increase in Houston's overall population, a rather significant number for such a short time. Since the mechanism that led these people to migrate is unlikely to be wage/occupation-based, we can look at how these people fare in Houston's labor market in the short term after their migration. This way, the *effects* of the migration are much more easily separable from the *reasons* for migration, and we can more easily reconcile and interpret the results.

The econometric method I used for measuring the effect of migration on employment is a series of linear probability models. In simple terms, I set up an equation for the probability of employment in Houston's labor market as function of whether a person is a hurricane evacuee, as well as many other variables (age, race, gender, citizenship status, number of children, etc.). Then, using data from the Current Population Survey (an annual study done by the Bureau of Labor Statistics), I estimate how each of these variables affects the likelihood of employment. This way, we are able to see the effects of being a hurricane evacuee (a migrant) on being employed, controlling for any differences between the evacuees and non-evacuees on the whole.

Regarding results, I find that a migrant is 10.2% less likely to be employed and 6.6% more likely to be unemployed (in the labor force, but not employed).

When we look at the linear probability models separated out by effect of being a white evacuee and the effect of being a nonwhite evacuee, our results become even more interesting. I find that a nonwhite migrant is 32.9% less likely to be employed, 20.7% less likely to be in the labor force in general, and 12.2% more likely to be unemployed.

In terms of comparison with the white evacuees, the effects of being a white evacuee on employment were inconclusive (too high of standard errors to be statistically significant. However, while we can't draw any conclusions directly about the effect of being a white migrant, my data analysis has shown that with over 99% confidence that the nonwhite migrants were less likely to

be employed (controlling for other variables) as compared to the white migrants. They also have a lower participation rate in the labor market in general. This suggests an unequal ability to assimilate post-migration between whites and nonwhites.

My findings are valuable in a number of ways. First and foremost, they enable us to predict the effects of large scale migrations, due to anything from natural disasters to nuclear meltdowns to even the long-term effects of global warming. My results may assist in predicting the effects of any such event that displaces a number of people, which is very valuable in terms of determining policy action to take after these kinds of events. We can also get a clearer picture for the actual value assimilation into a new environment has on performance in the labor market. This is useful for predicting the individual short-term effects of any given migration. Also, as my results find that migration has a significantly more negative impact on nonwhites, we can take that to mean nonwhites will logically be less likely to move from their homes than otherwise identical whites. This is valuable information in terms of government policy and also a staring point for further research (both economic and non-economic) into the mechanisms behind and the effects of racial discrimination and the differences between races.

My results are clear and significant, and provide answers for a few questions, while opening the doors for many more questions and further research. In the field of economics, most research is built on the research and analysis that has come before it, and serves as a building block for the

research and analysis to come. My paper has its roots in many prior papers published on migration, and can hopefully serve as a good starting point for more to come, as economists work towards ultimately increasing the spectrum of human knowledge and improving the human condition.