Economic Inequality and Stratification after a Natural Disaster

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INTRODUCTION

Climate scientists predict increasing frequencies and magnitudes of significant weather events, including tornadoes which are particularly economically costly in terms of both property and infrastructure damage and lives lost (Elsner, 2015). Disaster events then can be viewed as abrupt, exogenous shocks to communities that impact economic and social outcomes. These impacts, however, are not necessarily uniform within communities. Instead, differences in vulnerabilities and their consequences can be a function of socioeconomic characteristics.

While disasters themselves do not discriminate in terms of the place and timing of an event, disaster impacts have been shown to vary by race and ethnicity substantially and systematically (e.g., Fothergill (1999) for an early summary of literature; Bolin and Kurtz (2017) for a more recent summary). Recent work even coins the term "disaster racism" as an alternative to descriptions of "social vulnerabilities" to acknowledge the roles of systemic racism and historical processes more explicitly (Breem, 2021).

The economics of disasters as a field largely has been concerned with impacts on aggregate, community-level outcomes (e.g., assets, infrastructure, local GDP, etc.) (e.g., Kellenberg and Mobarak, 2011; Botzen et al., 2019). These measures and others are also at the forefront of work on disaster management by major policy agencies. The National Institute of Standards and Technology (NIST), for example, models natural catastrophes as part of its research program designed to inform codes and standards that can impact health and safety in disaster instances (McAllister, 2015). NIST measures community-level disaster resilience using population, economic, social services, physical services and governance stability goals linked to community characteristics. Within the economic stability core focus area, income inequality (in addition to absolute income levels themselves) is included.

The growing subfield of stratification economics within the economics discipline purports that relative group position and intergroup differences are economically meaningful in a way not captured by traditional modeling (e.g., Darity, 2005; Darity et al., 2015; Darity, 2022). Economic wellbeing then is a function of levels of resources as in traditional approaches but also is a function of where one stands in a broader distribution. Following from this perspective, individuals are envisioned to maximize wellbeing by acquiring and consuming resources but also by adopting strategies to maintain or grow their distributional position. The resulting steady state after these incentives are realized can be viewed as an (unequal and discriminatory) equilibrium of sorts.

Using illustrative data from the American Community Survey (ACS), we present a case study linking the economics of disasters to stratification economics in this paper. The case study is

drawn from the experience surrounding the large tornado event in Joplin, Missouri in 2011. Representative micro data is used to examine distributional outcomes of individuals and their public policy-relevant socioeconomic correlates after large disaster events relative to the profiles of communities beforehand. We present (reduced form) models of both the probability of being in a specific income group (an economic wellbeing outcome) and of the probability of employment (a labor market outcome) before verses after the tornado for within and outside of Joplin and for those identifying as being part of minority versus nonminority demographic groups. Tying to the tenets of stratification economics, the models reflect not just own position but also relative group positions. This shows how growing inequalities after a disaster may be viewed as related to social stratification dynamics of the sort described in the burgeoning stratification economics subfield.

Understanding features of and changes in economic inequality after disasters is relevant to forecasting the magnitude and extent of disaster-induced disruptions to communities' systems and also is relevant to the fine-tuning of community resilience concepts that embody capacity to prepare for anticipated hazards, to adapt to changing conditions, and to withstand and recover quickly. Results for Joplin are broadly consistent with community context-specific dependence noted elsewhere in the literature. Beyond this validation, baseline models in this paper contribute to a framework that can be extended to additional income distribution concepts and to more sophisticated identification methodologies to further continued NIST evaluation. Furthermore, this exercise illustrates how post disaster data is consistent with features of the theories proposed in stratification economics and thereby contributes to how we think about appropriate and complete theoretical framing in economic studies of disasters. At the time of this writing, this is the first paper known to the author to start to make this connection.

The rest of the paper is organized as follows. The section "Literature and Background" offers summary of representative articles in the economics of disaster and in stratification economics respectively. This is followed by a section on "Data and Estimation Strategy" followed in turn by "Results" and "Discussion and Conclusion."

LITERATURE AND BACKGROUND

Much of the economics literature on tornadoes focuses on accurately calculating damage (e.g., Simmons et al., 2013) and on the cost-benefit analysis of interventions (e.g., Merrell et al., 2015, on tornado shelters; Wang et al., 2021a, on wind retrofits). Other work focuses on times series changes to employment totals and growth (e.g., Ewing et al., 2003; Ewing et al., 2004; Ewing et al., 2009; Ewing et al., 2021). From a theoretical perspective, resilience frameworks focus on community assets that support livelihood (for example, dating back to Chambers and Conway, 1992). More recent research on resiliency and community recovery examines the

experiences of infrastructure, industries, and regional economic activity (e.g., Prevatt, 2012; Wang et al., 2021b).

Disaster Discrimination and Tornadoes?

In a primarily descriptive and qualitative methods study, Weber and Lichtenstein (2015) describe a "stratified" recovery with unevenness in terms of outcomes such as foreclosures across racial and ethnic groups following the 2011 Tuscaloosa, Alabama tornado. These authors document the absence of net change in local population size but significant compositional changes where neighborhoods become whiter, population patterns consistent with gentrification and re-segregation dynamics. They compare the Tuscaloosa tornado case to insights from the literature on uneven recovery following Katrina.

Also in the context of the Tuscaloosa case, Senkbeil et al. (2014) used a small sample survey of risk perceptions with focus on ethnicity. These authors documented that many minority respondents had poor perceptions of tornado risk prior to the event and that this was interrelated with poor or limited preparation. In a complementary descriptive study, McKinzie (2017) compared Joplin and Tuscaloosa recoveries in terms of intersectionality of race, gender, and class. That study relied on interviews and links patterns to histories of inequalities in these communities prior to the disaster events.

In quantitative analysis, Lim et al. (2017) documented how vulnerabilities to tornado-related risk decrease with human capital and with income and how government investments can serve to mitigate some risks. These authors describe risk conceptually as both a function of physically defined natural hazards as well as social constructs. The authors estimate a series of death count models where county-level income distribution features (measured using both income levels at points in the distribution and poverty rates) and demographic factors such as female-headed households, educational attainment, and housing characteristics with particular attention to the presence of mobile homes. They find that income is a critical determinant of tornado-related deaths, as are income inequality measures and housing characteristics in further analysis. These authors use the top 10% of the income distribution and the poverty rate as variable measures of economic inequality.

In another paper drawing from econometric and demographic statistical methodology, Raker (2020) exploits block group exposure in a differences-in-differences framework. This author finds that severe tornadoes correlate to subsequent compositional changes in population but not to population size overall. Communities are shown to become whiter and to become wealthier. These patterns have implications for displacement and gentrification dynamics and are consistent with those of the Weber and Lichtenstein (2015) study described above.

In addition to these findings regarding population sorting, empirical evidence also suggests consumption and expenditure changes across demographic groups which is also reflective of impacts to economic wellbeing following disaster. A recent paper by Paudel (2022) found that "energy poverty" disparities between whites and non-whites measured in terms of energy-related expenditures differences following tornado shocks are significant.

Relative Position and Stratification Economics

Stratification economics stresses the importance of relative group position and intergroup gaps as being meaningful in economic decision-making (e.g., Darity, 2005; Darity et al., 2015; Darity, 2022). Economic wellbeing then is a function of levels of resources as in traditional approaches but also is a function of position in a broader distribution. This observation has the implication that group-based stratification is an outcome of self-interest and of a form of maximizing behavior by those who receive rents related to their inclusion in these favored groups. Stratification economics therefore as a theory envisions individuals as maximize wellbeing by acquiring and consuming resources, but also from the act of adopting strategies to maintain or grow their distributional position. The resulting steady state after these incentives are realized can be viewed as an (unequal and discriminatory) equilibrium of sorts characterized by segregations in the population.

Applying insights from stratification economics to the case of a shock from a natural disaster, we envision a community with an existing level of poverty (poor economic wellbeing) before a disaster. Furthermore, we envision this level of (equilibrium) poverty to be higher for minority individuals and households relative to non-minorities as this is well-documented statistically in a variety of contexts.

As in Lim et al. (2017)'s disaster modeling, we consider measures of the bottom (poverty rate) and of the top of the income distribution as indicators reflecting inequality. Considering the case of the poverty rate, let Mpov be the probability of poverty for a minority member of the community and NMpov be the analogous calculation for a non-minority community member. We assume Mpov>NMpov and are ultimately interested in the magnitude of the difference between Mpov and NMpov and how this gap changes after a disaster. If this difference is increasing post disaster then the community can be hypothesized to be moving toward more stratification relative to its initial position pre-disaster. This would be consistent with the "stratified recovery" case described by Weber and Lichtenstein (2015). Furthermore, we are interested in whether the impact of this gap influences individual outcomes at a differential rate following disasters. This pattern would be consistent not just with the tenets of stratification economics but also with a nuance in our understanding of what happens during a community rebuilding process.

The Case Study: Joplin, May 22, 2011

Joplin is located between Jasper and Newton counties in Missouri. The 2010 U.S. Census estimated the Joplin population at 50,150 making this the fifth-largest metropolitan area for Missouri. NIST summary documentation of the tornado incident indicates:

> The May 22, 2011, Joplin tornado, rated EF–5 on the Enhanced Fujita tornado intensity scale, caused 161 fatalities and more than 1,000 injuries, making it the deadliest single tornado on record in the U.S. since official records were begun in 1950. The damage to the built environment made this the costliest tornado on record as well, with losses approaching $3 billion. The Joplin tornado damaged 553 business structures and nearly 7,500 residential structures; over 3,000 of those residences were heavily damaged or completely destroyed.[1]

The Joplin tornado was considered a "warned" event in that weather predictions and information dissemination of forecasts did allow some preparation time. However, the tornado grew faster than anticipated.

DATA AND ESTIMATION STRATEGY

Data are from the American Community Survey (ACS) from 2006 until 2019[2] with a geographic restriction to the state of Missouri. These data are published as the Integrated Public Use Microdata Series (Ruggles et al., 2022). The Joplin metropolitan area is identifiable as a subsample.

We start by summarizing relevant samples of the baseline data and then estimate the probability of several individual-level economic outcome variables using linear regression (linear probability model). Specifically, we model the probability of (1) being at or below the poverty threshold, (2) being above 500% of the poverty threshold,[3] and (3) being employed (relative to both unemployed and not in the labor force) respectively. The 500% of the poverty threshold cutoff creates a sample for which the probability of a positive outcome (being above this level) is similar to the probability of being below the 100% of threshold level that is created by the first outcome variable. We can therefore think of these as being similar cut points of the

[1] https://www.nist.gov/disaster-failure-studies/joplin-tornado-ncst-investigation

[2] Although the 2020 1-year ACS PUMS file is available at the time of this writing there are data collection and quality concerns and "experimental weights" due to COVID-19 that influence the decision to end the sample in 2019 for this paper.

[3] We use above 500% of the threshold to derive results for the top end of the distribution in an analogous fashion to how we examine the lower end using below 100 percent. This is similar to Lim et al. (2017)'s treatment.

income distribution on the low and high ends respectively, while also being functions of (and therefore scaling for) family size via family size's relationship to poverty threshold calculations.

Using state-level pooled cross-sections of ACS data, we model each of the three outcome variables (y_{it}) of person *i* observed in ACS sample from time period *t* following a basic specification:

$$y_{it} = \beta_1 white_{it} + \beta_2 AfterT_t * white_{it} + \beta_3 NW/W_Pov_t * AfterT_t * white_{it} + \gamma' X_{it} + \delta_t + \varepsilon_{it}$$

We consider race as a primary variable of interest and construct an indicator for non-Hispanic white (non-minority) verses all others (approximating minority). The variable $white_{it}$ is a binary variable for whether person *i* observed in ACS sample from year *t* is identified as a non-minority. The variable is defined based of combining race and ethnicity responses from the survey. If those of non-minority race are less-likely to be in poverty all else equal, then we expect the coefficient on this variable to be negative. Likewise, we would expect this variable to be positive for the probability of being in the upper tail of the income distribution and for the probability of being employed respectively.

We are interested in what happens after a tornado event in terms of determining individual economic well-being and how this relates to group membership as defined by observable race/ethnicity. As such, we construct a variable $AfterT_t$ as a dummy variable that equal 1 if the observation is from a year *t* that is after the tornado event. Since we are examining general equilibrium outcomes using a reduced-form approach and since the literature is suggestive of population movement and compositional changes across subgroups of the population after a disaster, whether the coefficient on the interaction between this variable and the race indicator ultimately is an empirical question. The interaction variable allows us to further explore group-based disparities in distributional outcomes following these disaster events that were alluded to in the described literature.

Finally, we are interested in whether our not the recovery dynamic can be seen as relating to an indicator of the theories advanced in stratification economics. For this, we define NW/W_Pov_t as the non-white to white poverty ratio in the larger population. This can therefore be thought of as an indicator of relative group economic position. For the Missouri sample, this is defined based on this ratio at the state level. For the Joplin sub-sample, this is defined based on this ratio computed for the smaller geographic area. We ultimately ask whether the post-disaster economic experience (measured via the individual probability of being in poverty, of being in the upper tail of the income distribution, and of being employed) depends in a meaningful way on local-level relative economic inequalities and in a way that is stratified by race.

The matrix X_{it} includes a set of basic demographic controls that include age in years, a dummy variable for female, a dummy variable for married, the total number of own children in the respondent's household, and a dummy variable for having at least high school education level.

δ_t are year-specific fixed effects, and ε_{it} is an error term.

RESULTS

Summary Statistics

Summary statistics for all outcome and control variables appear in Table 1 separately for each of three samples. The first sample corresponds to the state of Missouri as a whole. Summary statistics are reported for the full data period from 2006 to 2019 (column (1)). Columns (2) and (3) then divide the state-level sample into years prior to the major tornado event and after the major event respectively. The year 2011 is excluded given ACS sampling happening throughout the year and the inability given limitations of the public-use data to determine which observations were collected before and which observations were collected after May of that year. Columns (4)-(6) present analogous tabulations for Joplin. Finally, columns (7)-(9) do the same for the rest of the state (excluding the Joplin metropolitan area).

We note that the fraction of residents who were at or below the poverty threshold increased (marginally) between the pre- and post-tornado periods. At the same time, there is suggestion that the fraction in the highest income group (above 500% of the poverty threshold) also increased marginally. Together, this is suggestive of increasing economic inequality and an expanding income distribution overall. Employment on average remained the same or decreased slightly over the two periods (though not to a statistically significant extent).

All summary statistics (and regression results to come) utilize person-level weights provided by the ACS. From the point of view of summary statistics, we note that the unconditional probability of being at or below the poverty threshold declines after the tornado in Joplin and rises elsewhere in the state. This is suggestive of some extent of displacement (of the poor) and changes in the composition of communities following disaster. The fraction of the population that is identified to be non-Hispanic Black race is fairly constant across time periods but is notably lower in Joplin in comparison to the rest of the state. In contrast, the fraction of the population that is estimated to be of Hispanic origin is higher in Joplin, more substantially after the tornado event. This also could be related to changing population and occupational concentrations during rebuilding, though this aspect is not explored fully within the scope of this paper in the current draft.

Basic Regressions

Linear probability model regressions for the probability of poverty, the probability of being above 500% of poverty, and the probability of being employed are presented without and with survey wave fixed effects for Missouri (Table 2), Joplin (Table 3), and non-Joplin areas of Missouri (Table 4).

From Table 2, we see the probability of being below the poverty threshold is lower for non-Hispanic whites (non-minorities) in comparison to minorities all else equal as we hypothesized given demographic-based income distribution statistics elsewhere. The analogous correlation is positive for the probability of being above 500% of the poverty threshold and for being employed respectively. These are again patterns that we expected.

We present results without and with survey year (time) fixed effects. In the presence of the fully specified model in column (2) that includes time fixed effects, we note that the experience of whites after the 2011 tornado was in the direction of an increased probability of falling below the poverty threshold. This is notable as it speaks to a possible groupwise decline in economic wellbeing in the state after this period. The coefficient on the triple interaction (on the non-white to white poverty ratio*after 2011 period*individual observation of white race) is notably and statistically significantly negative (-0.262). This is suggestive of a story where the tornado decreased economic opportunity for whites (by increasing the probability of falling below the poverty threshold) relative to minority individuals and that higher non-white to white poverty (i.e., more economic inequality) acts in favor of whites by mitigating the negative positional impact of the tornado event. A similar dynamic is observed for employment (albeit with signs reversed due to the positive economic association with employment as opposed to poverty being a negative outcome). Results for the non-Joplin areas of Missouri (Table 4) parallel those for the larger Missouri sample (Table 2).

Results for the probability of being within the upper tail of the income distribution are more mixed and less clear in terms of any dynamic consistent with a story of stratification economics. This suggests that the happenings at the upper and lower tails of the income distribution follow different dynamics worthy of additional future exploration.

Table 4 repeats the exercise for the Joplin subsample. We would expect this sample to be somewhat selected in the post-tornado period due to migration out of the area and possibly into other parts of the state following the disaster event. Still, we observe a very similar pattern for the models of the probability of being in the lowest part of the income distribution. Findings for employment are largely insignificant.

DISCUSSION AND CONCLUSION

This paper relates to an effort to identify consistent and implementable measures to assist in forecasting the magnitude and extent of disaster-induced disruptions to community systems. The paper is therefore relevant for efforts to model community recovery, measure resiliency, and optimize risk management. Finally, the conceptual framework could be used to expand core metrics for disasters beyond tornadoes and for stability areas beyond the economic-based one considered in this paper. These efforts are particularly notable given that scientific evidence on climate change that suggests that tornadoes in the United States will increase in frequency and magnitude (Elsner et al. 2015).

Aside from the examination of resiliency measurement and economic outcomes broadly following a large weather event, which is relevant to the economics of natural disasters, this paper asks if disparities in recovery patterns across racial and ethnic groups which have been documented elsewhere are consistent with theoretical patterns predicted by the field of stratification economics. More specifically, the reviewed literature on tornado events, although limited, is suggestive of displacement processes after an event where economically disadvantaged residents are more forcibility mobile and where the more advantaged (often white) population rebuilds as opposed to being relocated. These observations suggest that more work needs to be done to better understand post-tornado population dynamics and their implications. A question left here is to what extent there are incentives to resort to previous community patterns that may be discriminatory in nature as there could be long run effects on communities.

Stratification economics is suggestive of incentives to differentiate to maintain power of one group relative to others. This theoretical framing may be relevant to the case studies presented here if there are group dynamics on racial or ethnic groups that relate to within group maximation during the recovery period. The presented specification in this early working paper version is highly descriptive and not causal. However, it points out areas warranting continued work both on the Joplin subcase and beyond.

The role of disaster relief monies and whether their distribution can be viewed as race-dependent or race-blind is also a topic for continued work.

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Table 1: Summary Statistics, Before and After Joplin Tornado Event (percentages, unless otherwise noted)

Variable	(1) Missouri	(2) Missouri-pre	(3) Missouri-post	(4) Joplin	(5) Joplin-pre	(6) Joplin-post	(7) non-Joplin	(8) non-Joplin-pre	(9) non-Joplin-post
At or Below Poverty Threshold	17.1039	16.7168	17.1572	19.2361	20.4805	19.0115	17.0398	16.6038	17.1016
	[37.6543]	[37.3127]	[37.7009]	[39.4163]	[40.3581]	[39.2405]	[37.5982]	[37.2116]	[37.6523]
Above 500*Poverty Threshold	21.9071	21.5206	22.2964	14.1614	13.6176	14.6585	22.1397	21.7578	22.5256
	[41.3617]	[41.0966]	[41.6235]	[34.866]	[34.2994]	[35.3704]	[41.5187]	[41.26]	[41.7751]
Employed	59.6861	60.3968	59.4667	59.3465	59.4369	59.2571	59.696	60.4251	59.4728
	[49.0529]	[48.9072]	[49.0957]	[49.1199]	[49.1048]	[49.1377]	[49.0509]	[48.9012]	[49.0945]
Age	38.3717	37.5494	38.8994	37.5847	36.9751	37.9508	38.3953	37.5666	38.9278
	[23.1824]	[22.9217]	[23.3345]	[23.3132]	[23.1615]	[23.3726]	[23.1781]	[22.9143]	[23.3328]
Female	51.0294	51.1671	50.948	50.8918	51.1006	50.7865	51.0335	51.1691	50.9529
	[49.9894]	[49.9865]	[49.9911]	[49.993]	[49.9906]	[49.9955]	[49.9893]	[49.9864]	[49.991]
Married	40.2865	40.9871	39.813	41.4237	41.0179	41.7399	40.2523	40.9862	39.7552
	[49.0474]	[49.181]	[48.9513]	[49.2599]	[49.1893]	[49.3146]	[49.0406]	[49.1809]	[48.9392]
Number of own children in the household	.4994	.5152	.4893	.54	.5484	.5426	.4982	.5142	.4877
	[.9653]	[.9735]	[.9605]	[1.0157]	[1.0171]	[1.0246]	[.9637]	[.9722]	[.9584]
White Non-Hispanic	80.6259	82.0178	79.7656	86.6779	89.4271	85.0641	80.4442	81.7953	79.6066
	[39.5228]	[38.404]	[40.1748]	[33.982]	[30.7507]	[35.6454]	[39.663]	[38.5884]	[40.2921]
Black Non-Hispanic	11.3752	11.2198	11.4804	1.5087	1.2998	1.5924	11.6715	11.5176	11.777
	[31.7509]	[31.561]	[31.8785]	[12.1902]	[11.3273]	[12.5187]	[32.108]	[31.9235]	[32.2336]
Hispanic origin	3.6417	3.131	3.9615	6.0026	4.3541	6.9783	3.5708	3.0943	3.871
	[18.7326]	[17.4155]	[19.5052]	[23.754]	[20.4083]	[25.4789]	[18.5562]	[17.3163]	[19.2902]
High School or Equivalent	68.7186	66.5208	70.1422	65.0347	63.2673	66.3559	68.8292	66.6185	70.2557
	[46.364]	[47.1918]	[45.7635]	[47.6869]	[48.2103]	[47.2508]	[46.3191]	[47.1575]	[45.7133]
Observations	858807	300793	495904	25917	9246	14829	832890	291547	481075

Standard deviations in brackets

Source and notes: Author's calculations from ACS files. "Before" is calculated over 2006-2010. "After" is calculated over 2012-2019.

Table 2: Placement in Income Distribution and Employment Models (Missouri State Sample)

VARIABLES	(1) Below Poverty	(2) Below Poverty	(3) Above 500% Poverty	(4) Above 500% Poverty	(5) Employed	(6) Employed
White Non-Hispanic	-0.105***	-0.118***	0.062***	0.069***	0.046***	0.054***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.004)
White*After 2011	-0.188***	0.520***	0.362***	0.104**	0.090***	-0.333***
	(0.018)	(0.053)	(0.020)	(0.042)	(0.024)	(0.066)
Non-White to White Poverty*After 2011* White	0.103***	-0.262***	-0.188***	-0.057**	-0.053***	0.165***
	(0.009)	(0.028)	(0.011)	(0.022)	(0.013)	(0.035)
Age	0.000***	0.000***	-0.001***	-0.001***	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.012***	0.012***	-0.013***	-0.013***	-0.064***	-0.064***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married	-0.177***	-0.177***	0.210***	0.210***	0.108***	0.108***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Number of own children in the household	0.021***	0.021***	-0.058***	-0.058***	0.043***	0.043***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High School or Equivalent	-0.042***	-0.042***	0.087***	0.086***	0.323***	0.323***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Constant	0.320***	0.332***	0.092***	0.082***	0.651***	0.650***
	(0.002)	(0.003)	(0.001)	(0.003)	(0.003)	(0.005)
Year fixed effects	no	yes	no	yes	no	yes
Observations	796,697	796,697	796,697	796,697	644,654	644,654
R-squared	0.073	0.074	0.077	0.077	0.194	0.194

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations from ACS files.

Table 3: Placement in Income Distribution and Employment Models (Joplin Subsample)

VARIABLES	(1) Below Poverty	(2) Below Poverty	(3) Above 500% Poverty	(4) Above 500% Poverty	(5) Employed	(6) Employed
White Non-Hispanic	-0.126***	-0.116***	0.032***	0.034***	0.014	0.034
	(0.014)	(0.022)	(0.008)	(0.011)	(0.017)	(0.027)
White*After 2011	-0.022	0.233***	0.047**	0.164***	0.017	-0.169*
	(0.019)	(0.071)	(0.019)	(0.038)	(0.027)	(0.088)
Non-White to White Poverty*After 2011* White	0.000	-0.135***	-0.018**	-0.078***	-0.012	0.065
	(0.009)	(0.033)	(0.009)	(0.019)	(0.012)	(0.042)
Age	0.000*	0.000*	-0.000	-0.000*	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.024***	0.024***	-0.008	-0.008	-0.101***	-0.101***
	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.009)
Married	-0.186***	-0.185***	0.138***	0.139***	0.119***	0.118***
	(0.008)	(0.008)	(0.007)	(0.007)	(0.009)	(0.009)
Number of own children in the household	0.034***	0.034***	-0.048***	-0.048***	0.031***	0.032***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
High School or Equivalent	-0.079***	-0.079***	0.066***	0.065***	0.284***	0.283***
	(0.011)	(0.011)	(0.007)	(0.007)	(0.013)	(0.013)
Constant	0.400***	0.377***	0.048***	0.022*	0.730***	0.708***
	(0.014)	(0.025)	(0.007)	(0.013)	(0.022)	(0.033)
Year fixed effects?	no	yes	no	yes	no	Yes
Observations	24,075	24,075	24,075	24,075	19,002	19,002
R-squared	0.089	0.092	0.056	0.059	0.193	0.195

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations from ACS files.

Table 4: Income Distribution Placement and Employment Models, by Race (Non-Joplin Subsample)

VARIABLES	(1) Below Poverty	(2) Below Poverty	(3) Above 500% Poverty	(4) Above 500% Poverty	(5) Employed	(6) Employed
White Non-Hispanic	-0.105***	-0.118***	0.063***	0.070***	0.046***	0.055***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.004)
White*After 2011	-0.179***	0.512***	0.347***	0.084*	0.086***	-0.319***
	(0.018)	(0.055)	(0.021)	(0.044)	(0.025)	(0.069)
Non-White to White Poverty*After 2011* White	0.099***	-0.257***	-0.180***	-0.047**	-0.050***	0.158***
	(0.010)	(0.029)	(0.011)	(0.023)	(0.013)	(0.036)
Age	0.000***	0.000***	-0.001***	-0.001***	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.012***	0.012***	-0.013***	-0.013***	-0.063***	-0.063***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Married	-0.177***	-0.177***	0.213***	0.213***	0.107***	0.107***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Number of own children in the household	0.020***	0.020***	-0.058***	-0.058***	0.043***	0.043***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
High School or Equivalent	-0.041***	-0.040***	0.087***	0.086***	0.324***	0.324***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Constant	0.318***	0.331***	0.093***	0.083***	0.648***	0.649***
	(0.002)	(0.003)	(0.001)	(0.003)	(0.003)	(0.005)
Year fixed effects?	no	yes	no	yes	no	yes
Observations	772,622	772,622	772,622	772,622	625,652	625,652
R-squared	0.073	0.074	0.078	0.078	0.194	0.194

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations from ACS files.