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LONGITUDINAL ASSESSMENT OF RACIAL AND SOCIOECONOMIC CHANGES OF NEIGHBORHOODS IN THE DETROIT REGION FROM 1970 TO 2000

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Since the publication of William Wilson's influential book, Truly Disadvantaged (1987), many scholars have taken interest in the concentration of poverty found in US inner city neighborhoods which in turn led to the spatial concentration of underclass neighborhoods therein. There have been, however, few studies examining the process of neighborhood change in a single metropolitan area. Based on the study of Morenoff and Tienda (1997), this study examines racial and socioeconomic changes of census tracts in the Detroit Metro area. Relying on the Neighborhood Change Database from 1970 to 2000, this study finds that the number of underclass neighborhoods greatly increased after 1970. Furthermore, once they become underclass neighborhoods, it has been rare for them to become non-underclass in subsequent decades. Selective out-migration and residential segregation appear to be significant predictors of whether neighborhoods become or remain underclass. Policy implications are suggested based on those findings.

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INTRODUCTION

Since the publication of Wilson's (1987) influential book, *Truly Disadvantaged*, many scholars have taken an interest in the concentration of poverty found in U.S. inner city neighborhoods, which in turn led to the spatial concentration of underclass neighborhoods. Deindustrialization, the exodus of the non-white middle class, and residential segregation are considered the key reasons poverty has concentrated in this way. Many subsequent studies have examined whether the non-white middle class has indeed departed from inner city neighborhoods and whether such a departure resulted in the concentration of poverty. Many scholars also have examined whether residential racial segregation is responsible for the concentration of poverty. However, there are only a few studies examining neighborhood change in a single metropolitan area. Morenoff and Tienda (1997), for example, examine the growth of the urban underclass in Chicago by relying on U.S. Census housing and population data from 1970 to 1990. Based on cluster analysis, they find that underclass neighborhoods in Chicago dramatically grew in the 1970s: while there were twenty-two underclass neighborhoods in 1970, there were 187 in 1980. However, no middle-class neighborhoods became underclass neighborhoods. The authors also note that few underclass neighborhoods later became non-underclass neighborhoods.

Using Morenoff and Tienda's study as a starting point, this study examines racial and socioeconomic conditions of census tracts in the Detroit metropolitan area, with three major improvements. First, whereas that study examined the city of Chicago proper, this study assesses the Detroit region including suburbs. The inclusion of suburbs is important because the socioeconomic disparity between inner cities and suburbs increased during the latter decades of the 20th century (Orfield 1997). Further, this study expands the examination by a decade, ranging from 1970 to 2000. Inclusion of the 1990s is also crucial, as the poverty level declined in U.S. inner cities during this decade (Jargowsky 2003). It is thus interesting to probe whether the national economic boom of the 1990s reduced underclass neighborhoods in the inner city. Finally, this study employs statistical analyses to seek out significant predictors of underclass neighborhoods' creation.

LITERATURE REVIEW

Wilson (1987) claims that the concentration of poverty in the inner city neighborhoods is responsible for the emergence of underclass neighborhoods. This concentration arose from two sources – deindustrialization and desegregation of minorities. That is, the civil rights movement of the 1960s and subsequent passage of affirmative action laws opened up social opportunities for minorities, especially for African Americans. To take advantage of these opportunities, most working and middle-class African Americans left their inner city neighborhoods for the suburbs to take advantage of improved housing and social opportunities. The exodus of the working and middle classes from inner city neighborhoods in turn created a social vacuum in which remaining residents suffered from a lack of social institutions and role models. The lack of social buffers makes juveniles particularly vulnerable to adverse influences, given the lack of adults who can function as role models. Thus, inner city neighborhoods were seen to suffer from sociological pathology, as evidenced in a disproportionately high rate of teen pregnancy

outside of wedlock, subsequent single motherhood, and high unemployment rates (Harding 2003).

Wilson (1987) further argues that deindustrialization is also responsible for the concentration of poverty in inner city neighborhoods. During the 1960s and 1970s, the U.S. economy shifted from manufacturing to a service base. Along with the trend towards globalization that saw companies relocating to suburbs, other states, or even other countries, this economic shift deprived inner city residents of decently paid jobs. Inner city residents have since suffered from severe joblessness, which led to serious levels of poverty.

Taken together, Wilson (1987) sees that the exodus of the working and middle classes from inner city neighborhoods and their resulting economic shifts generate a so-called "concentration effect": the development of undesirable or antisocial behavior resulting from social isolation from mainstream white culture. Later, Wilson (1996) identifies social network deficiency as a reason for the serious joblessness levels of inner city residents. In other words, residents who are gainfully employed can provide valuable information about employment (e.g., what employers expect from employees, how job applicants should approach the interview, and where jobs are available). Residents of inner city neighborhoods therefore have a more difficult time taking advantage of employment opportunities.

Another influential scholar with respect to concentration of poverty is Douglas S. Massey. Massey and Denton (1993) argue that concentration of poverty does not result from selective out-migration of working and middle-class African Americans from inner city neighborhoods, but that residential segregation concentrates poverty. Though Massey and Denton disagree with Wilson as to the effect of the exodus of the working and middle classes, they agree with Wilson that deindustrialization is a reason for this concentration. Either way, why did these factors have a disproportionate impact on African Americans as compared to whites? According to Massey and Denton, residential segregation effectively locked impoverished residents in a geographically confined area, the inner city. Thus, because of segregation, they were unable to follow the jobs. The spatial mismatch hypothesis contends that a high level of inner city joblessness often results from residents' inability to relocate with manufacturing jobs from the 1960s onwards, which creates a mismatch between where people live and where employment opportunities are. Advocates of this hypothesis often claim that residential segregation is the most important reason for this mismatch (Beggs et al. 1997). Several studies confirm the belief that there is a persistent level of residential segregation in U.S. metropolitan areas (Alderman 2005; Daren and Kamel 2000; Freeman 2000).

The exodus of non-white working and middle-class residents from inner city neighborhoods or persistent residential segregation are both persuasive explanations of the spatial concentration of poverty, but does one explain it better than the other? Or do they both exert an effect? The answer lies in studies of residential mobility. For one, Crowder (2000) examines the pattern of white out-migration using the Panel Study of Income Dynamics (PSID) from 1979 to 1985 in conjunction with the 1970 and 1980 U.S. Census data, with person-year as the unit of analysis. Crowder finds that the proportion of Asian and Hispanic population is not a statistically significant predictor of white out-migration. However, an increase in African American population does increase the log-odds of white out-mobility, and the odds are even stronger when social and economic characteristics are controlled for. Though this study does not directly test for whether African Americans are residentially segregated in U.S. metropolitan areas, the

results imply that it is the influx of African Americans and not Hispanics and Asians that impact on out-migration of whites. However, the results of this study with respect to Hispanics and Asians may result from the small sample size of these racial groups, lessening the apparent impacts of Hispanics and Asians on white out-migration. Another study by Crowder and South (2005) finds that the rates of African Americans escaping from poor neighborhoods to non-poor neighborhoods have been similar to those of whites. Nonetheless, no clear evidence suggests that out-migration of middle-class African Americans has increased from 1970 to 2000. Additionally, race is still a significant predictor of the likelihood of entering or remaining in impoverished neighborhoods.

Morenoff and Sampson (1997) examine the relationship between population loss and violent crime in Chicago from 1970 to 1990, taking into account the concentration of socioeconomically disadvantaged people. Using the 1970, 1980, and 1990 U.S. Census data and homicide records with geographic identifiers, the authors employ multivariate analysis. To avoid spatial and temporal autocorrelation, the authors use lagged variables for homicide (temporal autocorrelation) and two-stage least squares (population and homicide). Their results suggest that homicide is a significant predictor of population change, when controlling for the concentration of socioeconomic disadvantage and ecological factors (e.g. percentages of Hispanics and owner-occupied housing units). Furthermore, multivariate analysis reveals that population loss can be observed for neighborhoods beset by a high incidence of homicide and a high concentration of socioeconomic disadvantage regardless of race. The incidence of homicide in adjacent neighborhoods provides an interesting insight: while the white population declines in neighborhoods with a high incidence of homicide, the African American population increases in such locales. Both Wilson's (selective out-migration from the core of the ghetto) and Massey and Denton's (inability of African Americans to escape from proximity to homicide) theses are supported. "[T]he apparent contradiction between Wilson's depopulation hypothesis and Massey's segregation argument may be reconciled by (1) taking violent crime into account as well as the concentration of disadvantage, and (2) recognizing that both dynamics can coexist in a geographically systematic fashion based around the core/periphery distinction" (Morenoff and Sampson 1997, 57).

Similarly, Quillian (1999) examines migration patterns of African Americans and whites by using PSID from 1970 to 1974 and from 1978 to 1990 in conjunction with 1970, 1980, and 1990 U.S. Census data using person-year as the unit of analysis. The transition probabilities reveal that non-poor African Americans move in to non-poor white neighborhoods 0.337% more often than move out, and this level of influx is large enough to increase – gradually yet substantially – the presence of relatively wealthy African Americans in the neighborhoods, which supports Wilson's thesis. Considering neighborhood change, the influx of African Americans leads to decreased white population in white neighborhoods, and this decrease occurs quickly enough to change these neighborhoods into racially mixed or African American neighborhoods, which supports Massey's thesis. Results of this study support both Wilson and Massey, and Quillian (1999) notes, "migration has been a key mechanism through which the middle and affluent have sought to segregate themselves from the poor, whites have sought to avoid black neighbors, and workers have adjusted to changes in urban job markets" (32).

Finally, South and Crowder (1997) examine differences in intra-metropolitan mobility between African Americans and whites. Using the PSID from 1979 to 1985, the author tests

three hypotheses with respect to intra-metropolis residential mobility: human capital/life-cycle, place stratification, and housing availability. Human capital/life-cycle refers to the socioeconomic conditions of individuals, hypothesizing that if individuals improve their human capital (e.g. achieve higher education) or advance their life cycle (e.g. accumulate wealth) they are more likely to move into socioeconomically superior neighborhoods. Place stratification refers to hierarchy of places on the basis of race, meaning that racial minorities tend to be segregated from whites. Housing availability refers to residential mobility that can be a function of the number of housing units available in a region.

The results support all three theories. The human capital/life-cycle model is supported on the basis of the fact that those moving from poor neighborhoods to non-poor neighborhoods show a higher level of socioeconomic characteristics. The place stratification model is supported on the basis of the fact that race remains a significant predictor of mobility. The housing availability model is supported on the basis of the fact that mobility is influenced by the supply of new housing units. Particularly, the authors note that African Americans often require more resources than do whites to escape from poor neighborhoods to non-poor neighborhoods and are more vulnerable to disruptive life-cycle events that lead to relocating to poor neighborhoods from non-poor neighborhoods.

Taken together, contemporary residential mobility studies support both selective out-migration and residential segregation. The African American working and middle classes do leave the core areas of inner cities (selective out-migration), but they do not go far enough to escape the influence of violent crime (Morenoff and Sampson 1997). Further, the influx of working and middle-class African Americans into white suburbs prompts whites to leave for other metropolitan suburbs, which has the effect of maintaining residential segregation for working and middle-class African Americans (Quillian 1999). Crowder and South (2005) test whether a higher degree of selective out-migration can be found with African Americans than with whites. The authors find that differences in selective out-migration between African Americans and whites are not significant enough to support Wilson's hypothesis. That is, African American selective out-migration occurs, but white selective out-migration can also be found. While Wilson does not take into account the process of neighborhood change (in particular, how African American influx influences white out-migration), Massey and Denton do not consider the prior racial composition of African American working and middle-class neighborhoods which they claim now to be segregated. They note that neighborhood socioeconomic changes might be glacial in nature, but racial change in locales appears to be faster than socioeconomic change. In short, residential mobility studies suggest that the exodus of middle and working-class African Americans from inner city neighborhoods precipitates the concentration of poverty. In the meantime, residential segregation locks impoverished and non-white residents in inner city neighborhoods.

Based on previous studies, this study has three hypotheses. First, if deindustrialization and exodus of middle-class African Americans resulted in the creation of underclass neighborhoods, the number of underclass neighborhoods in 1970 (after manufacturing in Detroit began its initial decline) should be lower than 1980, 1990, and 2000. Second, because neighborhoods became underclass neighborhoods due to exodus of the middle class, neighborhoods becoming underclass neighborhoods should go through decreases in the numbers of persons and African Americans, as well as household income. Third, based on the persistent level of residential

segregation, the percentage of minorities should be positively associated with the probability that neighborhoods will become underclass.

DATA AND METHOD

The unit of analysis of this study is census tracts in the tri-county area (Macomb, Oakland, and Wayne) in the Detroit region. Census data came from the Geolytic neighborhood change database, in which the 1970, 1980, and 1990 census tracts were normalized by 2000 census tracts, thereby enabling researchers to conduct longitudinal analyses. Cluster analysis (specifically, two-step cluster with the log-likelihood distance method by use of SPSS 11.5) categorized census tracts from 1970 to 2000. Though cluster analysis tends to employ arbitrary cutoff points in group census tracts that share similar characteristics, this approach is widely used (Morenoff and Tienda 1997). Nonetheless, categorizations of neighborhoods in this study are suggestive rather than conclusive. To increase accuracy of grouping, this study employed the multi-dimensional aspect of neighborhood characteristics (socioeconomic status, demographic status, and residential stability). Variables for socioeconomic status include the percentage of individuals below the poverty line; the percentage of individuals in management, professional, and managerial occupations (managerial occupations); the percentage of households receiving public assistance; and the percentage of individuals holding a Bachelor's degree or higher. Variables for demographic status include percentage of individuals under 18 and over 65. Finally, variables for residential stability include percentage of individuals living in the same house for the last five years, percentage of owner-occupied housing units, and percentage of vacant housing units.

In addition to cluster analysis, the percentage of African Americans, percentage of Hispanics, average household income, and average owner-occupied housing value are compared between groups of neighborhoods for the periods 1970-2000. If selective out-migration and residential segregation are both culprits in the spatial concentration of poverty in U.S. inner cities, racial variables – percentage of African Americans and percentage of Hispanics – should be statistically significant when income and housing values are controlled. Logistic regression (one group is neighborhoods that became or remained underclass between two periods; the other is neighborhoods that escaped from underclass or remained non-underclass between two periods) is employed to determine whether race is a significant predictor of a neighborhood becoming underclass.

RESULTS

Cluster analysis of all census tracts 1970-2000 yields four different types of neighborhoods (see Table 1). Two groups of neighborhoods (Middle-Class and Highly Educated) show relative affluence, while another group (Working-Class) is relatively impoverished. The final group (Underclass) is extremely impoverished. For example, Middle-Class and Highly Educated neighborhoods show a higher percentage of persons holding a Bachelor's degree or higher, persons in managerial occupations, and owner-occupied housing units than do Working-Class and Underclass neighborhoods. These neighborhoods also show a lower percentage of persons living in poverty, households receiving public assistance, unemployed persons, and vacant housing units. The differences between Middle-Class neighborhoods and Highly Educated

neighborhoods are the percentage of persons holding a Bachelor's degree or higher, persons living in the same house for the last five years, persons in managerial occupations (all higher in Highly Educated neighborhoods), and owner-occupied housing units (higher in Middle-Class neighborhoods). These differences suggest that Highly Educated neighborhoods have lower residential stability than Middle-Class neighborhoods. Furthermore, those neighborhoods may be more newly developed, possibly located in suburbs.

Table 1: Descriptive statistics of neighborhoods by employing cluster analysis

		Area-Wide	Middle-Class	Highly Educated	Working-Class	Underclass
Total Population under 18	Mean	29.33%	30.73%	25.16%	29.61%	31.46%
	STD	(0.082)	(0.080)	(0.085)	(0.057)	(0.085)
Persons Older than 65	Mean	10.55%	9.51%	11.68%	10.79%	11.93%
	STD	(0.064)	(0.057)	(0.077)	(0.047)	(0.073)
Female-Headed Family with Children	Mean	10.90%	5.21%	4.63%	16.40%	34.02%
	STD	(0.114)	(0.030)	(0.038)	(0.071)	(0.105)
Persons 5+ Years Old Residing in the Same House Five Years Ago	Mean	56.67%	59.34%	51.70%	56.48%	56.49%
	STD	(0.133)	(0.131)	(0.150)	(0.107)	(0.112)
More than BA Degree	Mean	16.42%	11.62%	38.72%	7.86%	5.92%
	STD	(0.148)	(0.061)	(0.132)	(0.050)	(0.053)
Managerial occupations	Mean	27.52%	24.30%	48.34%	17.21%	16.66%
	STD	(0.143)	(0.075)	(0.096)	(0.069)	(0.089)
Unemployment Rates	Mean	8.80%	6.03%	3.73%	11.85%	23.11%
	STD	(0.074)	(0.027)	(0.019)	(0.045)	(0.086)
Persons below Poverty	Mean	10.86%	4.69%	3.68%	15.76%	38.15%
	STD	(0.126)	(0.025)	(0.034)	(0.068)	(0.106)
Households with Public Assistance Income	Mean	8.57%	3.52%	2.57%	12.38%	31.35%
	STD	(0.105)	(0.023)	(0.024)	(0.059)	(0.091)
Vacant Housing Units	Mean	5.00%	2.81%	4.49%	5.65%	12.64%
	STD	(0.050)	(0.025)	(0.038)	(0.033)	(0.073)
Owner-Occupied Housing Units	Mean	72.42%	84.12%	75.92%	61.94%	40.52%
	STD	(0.220)	(0.102)	(0.246)	(0.153)	(0.172)
Variables are not included in clustering						
African Americans	Mean	21.04%	3.41%	6.58%	40.20%	80.36%
	STD	(0.351)	(0.130)	(0.161)	(0.394)	(0.263)
Hispanics	Mean	1.88%	1.28%	1.26%	3.12%	3.29%
	STD	(0.046)	(0.013)	(0.011)	(0.070)	(0.087)

Table 2: Neighborhood changes from 1970 to 2000

Number of Neighborhoods changing Status from 1970-1980

		1970				
		Middle-Class	Highly Educated	Working-Class	Underclass	Total
1980	Middle-Class	487	6	0	0	493
	Highly Educated	95	127	3	1	226
	Working-Class	233	2	52	0	287
	Underclass	16	2	108	22	148
	Total	831	137	163	23	1154

Change of Neighborhood Status from 1980-1990

		1980				
		Middle-Class	Highly Educated	Working-Class	Underclass	Total
1990	Middle-Class	380	8	37	0	425
	Highly Educated	70	214	10	3	297
	Working-Class	43	1	158	3	205
	Underclass	0	2	82	142	226
	Total	493	225	287	148	1153

Change of Neighborhood Status from 1990-2000

		1990				
		Middle-Class	Highly Educated	Working-Class	Underclass	Total
2000	Middle-Class	300	10	29	0	339
	Highly Educated	106	280	13	1	400
	Working-Class	19	6	152	37	214
	Underclass	0	2	11	186	199
	Total	425	298	205	224	1152

Change of Neighborhood Status from 1970-2000

		1970				
		Middle-Class	Highly Educated	Working-Class	Underclass	Total
2000	Middle-Class	335	3	1	0	339
	Highly Educated	264	130	6	0	400
	Working-Class	173	2	39	0	214
	Underclass	58	4	116	21	199
	Total	830	139	162	21	1152

Working-Class and Underclass neighborhoods show a higher percentage of persons in poverty, households receiving public assistance, unemployed persons, and vacant housing units than Middle-Class and Highly Educated neighborhoods. Similarly, these neighborhoods show a lower percentage of persons holding a Bachelor's degree or higher, persons in managerial occupations, and owner-occupied housing units. Underclass neighborhoods show a higher degree of impoverishment than do Working-Class neighborhoods. For instance, while 15.76 percent of persons are under the poverty line in Working-Class neighborhoods, in Underclass it is 38.15 percent. Underclass neighborhoods are more residentially unstable than Working-Class neighborhoods – 40.52 percent of housing units are owner-occupied in the former, while in the latter it is 61.94 percent.

Middle-Class neighborhoods show the lowest proportion of African Americans (3.41 percent), followed by Highly Educated neighborhoods (6.58 percent) and Working-Class neighborhoods (40.20 percent). Underclass neighborhoods show the highest proportion of African Americans (80.36 percent). Difference in the percentage of Hispanics is noticeable between relatively affluent groups and relatively impoverished groups. In Working-Class and Underclass neighborhoods, Hispanics make up 3.12 percent and 3.29 percent, respectively; while in Middle-Class and Highly Educated neighborhoods, they are 1.28 percent and 1.26 percent, respectively. Demographic variables do not provide noticeable differences among groups.

Table 2 shows neighborhood changes by decade. Overall, the number of Underclass neighborhoods increased from 1970 to 1990 (23, 148, and 224 for 1970, 1980, and 1990, respectively). However, the number decreased slightly during the 1990s (224 in 1990 and 199 in 2000). Between 1970 and 1980, sixteen Middle-Class, two Highly Educated, and 108 Working-Class neighborhoods became Underclass. On the other hand, twenty-two out of twenty-three Underclass neighborhoods in 1970 remained Underclass in 1980, with one neighborhood improving to Highly Educated in this period. During the 1980s, two Highly Educated and eighty-two Working-Class neighborhoods – but no Middle-Class neighborhoods – became Underclass.

During the same period, 142 out of 148 Underclass neighborhoods remained Underclass neighborhoods in 1990, yet not one Underclass neighborhood in 1980 improved its status to become Middle-Class by 1990. Three neighborhoods each improved to Working-Class and Highly Educated in this period.

During the 1990s, the trend does not differ from previous decades. Only two Highly Educated and eleven Working-Class neighborhoods – and again, no Middle-Class neighborhoods – became Underclass. On the other hand, thirty-seven out of 224 Underclass neighborhoods in 1990 improved to Working-Class in 2000, and one improved to a Highly Educated neighborhood in this period. Note that no Middle-Class neighborhoods became Underclass during the 1980s and 1990s.

As seen in Table 3, when examining demographic changes for the neighborhoods that escaped from Underclass or remained non-Underclass (958 census tracts), these neighborhoods experienced a great increase in minority residents. White population declined by 5.92 percent, while African American and Hispanic population increased (155.77 percent and 140.70 percent, respectively) from 1970 to 2000. This finding is consistent with Wilson's selective out-migration hypothesis (Wilson 1987). Average household income and owner-occupied housing

Table 3: Descriptive statistics of neighborhoods between 1990 and 2000

All Neighborhoods 1970-2000 (N=1165)

	N	1970		2000		Change 70-00
		Number	Percent	Number	Percent	
Persons	1165	4152590	N/A	4043467	N/A	-2.63%
Whites	1165	3392779	81.70%	2829800	69.98%	-16.59%
African Americans	1165	740658	17.84%	1033719	25.57%	39.57%
Hispanics	1165	55933	1.35%	119338	2.95%	113.36%
Average Household Income	1165	$56335.91	N/A	$62012.28	N/A	10.08%
Average Housing Units values	1165	$86358.45	N/A	$129957.51	N/A	50.49%

Neighborhoods Escaping to or Remaining in Non-Underclass Neighborhoods 1970-2000

	N	1970		2000		Change 70-00
		Number	Percent	Number	Percent	
Persons	958	3169049	N/A	3491738	N/A	10.18%
Whites	958	2931056	92.49%	2757491	78.97%	-5.92%
African Americans	958	225489	7.12%	576738	16.52%	155.77%
Hispanics	958	39341	1.24%	94694	2.71%	140.70%
Average Household Income	958	$60598.27	N/A	$68389.19	N/A	12.86%
Average Housing Units values	958	$96591.53	N/A	$148563.28	N/A	53.81%

Neighborhoods Becoming Underclass Neighborhoods 1970-2000

	N	1970		2000		Change 70-00
		Number	Percent	Number	Percent	
Persons	178	855178	N/A	507879	N/A	-40.61%
Whites	178	432052	50.52%	65480	12.89%	-84.84%
African Americans	178	417357	48.80%	421100	82.91%	0.90%
Hispanics	178	14894	1.74%	24219	4.77%	62.61%
Average Household Income	178	$39222.65	N/A	$33545.04	N/A	-14.48%
Average Housing Units values	178	$42165.78	N/A	$42915.16	N/A	1.78%

Neighborhoods Remaining Underclass 1970-2000

	N	1970		2000		Change 70-00
		Number	Percent	Number	Percent	
Persons	21	124305	N/A	39241	N/A	-68.43%
Whites	21	26411	21.25%	3534	9.01%	-86.62%
African Americans	21	97070	78.09%	34836	88.77%	-64.11%
Hispanics	21	1038	0.84%	370	0.94%	-64.35%
Average Household Income	21	$26910.50	N/A	$29275.48	N/A	8.79%
Average Housing Units values	21	$25755.21	N/A	$51422.77	N/A	99.66%

value increased (12.86 percent and 53.81 percent, respectively). Magnitudes of change in average household income and owner-occupied housing value for these neighborhoods are slightly greater than magnitudes of change for the region as a whole.

Neighborhoods that became Underclass between 1970 and 2000 (178 census tracts), showed significant loss of population (a 40.61 percent decrease). In particular, the White population decreased (-84.84 percent), while the African American population remained increased slightly (0.9 percent) and the Hispanic population increased substantially (62.61 percent). The decline of total and white population in these neighborhoods suggests that becoming underclass is associated with being a non-white neighborhood, though it is difficult to pinpoint the causality of the association. For these neighborhoods, average household income declined between 1970 and 2000 (-14.48 percent). While average owner-occupied housing value increased (1.78 percent), the magnitude of such change is not greater than for the region as a whole.

Neighborhoods remaining Underclass between 1970 and 2000 (21 census tracts) also lost population (an overall decrease of 68.43 percent), but the losses came from all of the examined racial groups (a decrease of 86.62 percent, 64.11 percent, and 64.35 percent in the White, African American, and Hispanic populations, respectively). Unlike neighborhoods becoming Underclass, average household income and average owner-occupied housing value increased in neighborhoods remaining Underclass (8.79 percent and 99.66 percent, respectively). Though such increases can be viewed as noticeable improvements, neighborhoods remaining Underclass show lower average household income than any other neighborhood group, including neighborhoods becoming Underclass. However, average owner-occupied housing value for neighborhoods remaining Underclass ($51,423) between 1970 and 2000 is greater than it is for neighborhoods becoming Underclass ($42,915).

To examine whether race is an independent predictor of whether neighborhoods become Underclass, multivariate analysis is employed. Because the intent of this article is to explore the associations between Underclass neighborhoods and racial and socioeconomic factors, recoding was done on the basis of neighborhood status between 1970 and 2000. If neighborhoods were not Underclass in 1970 but became Underclass by 2000, they were coded as one (1). In addition, neighborhoods that had been Underclass between the two time periods were also coded as one. The neighborhoods that had not declined were coded as zero (0). In other words, the dependent variable of multivariate analysis represents the probability of neighborhoods becoming or remaining underclass.

There are four independent variables:

- Percentage difference in total population
- Difference in the percentage of African Americans and Hispanics. Ideally, a ratio change between two periods would be used, but such a method is impossible because many census tracts contain 0 percent African Americans in 1970. Because many census tracts have 0 percent of African Americans, the difference in the percentage of African Americans between two periods is used.
- Percentage of African Americans and Hispanics in the later years of the decade. Sometimes percentage point change can be misleading. For example, assume that percentages of African Americans for neighborhood A between 1970 and 1980 are 20 percent and 40 percent, respectively, while those percentages for neighborhoods

B in the same period is 60 percent and 80 percent, respectively. While the difference for each is twenty percentage points, neighborhood B has a higher concentration of African Americans than neighborhood A. In order to control for the concentration factor, percentages of African Americans and Hispanics for the later decade are included. For instance, the percentage of African Americans and Hispanics in 1980 is included when racial change between 1970 and 1980 is examined.

- Percentage difference in average household income from 1970 to 2000. Because variables for socioeconomic status, demographic status, and residential stability were already included in cluster analysis, these variables were not included in multivariate analysis. Moreover, average household income for 1969, 1979, and 1989 were adjusted to 1999 dollars. The inflation ratios of 1969, 1979, and 1989 to 1999 dollars were 4.54, 2.29, and 1.34, respectively.

Table 4: Multivariate analysis of neighborhood change from 1970 to 2000

	Model 1 1970-2000	Model 2 1970-1980	Model 3 1980-1990	Model 4 1990-2000
	B	B	B	B
Total population[a]	-2.100***	-1.265**	-8.568***	4.514***
Difference in %African Americans[b]	-0.892*	-2.783***	3.427***	0.435
Difference in %Hispanics[b]	-4.495	-60.443***	-22.887	15.189**
% African Americans[c]	5.644***	7.097***	4.959***	5.561***
% Hispanics[c]	10.778**	53.704***	34.597***	0.865
Average household income[a]	-2.654***	-8.845***	-4.336***	0.827
Constant	-5.170***	-7.356***	-5.804***	-5.297***
Chi-Square	600.9***	587.5***	763.0***	576.0***

*p<0.05 **p<0.01 ***p<0.001
N=1165
Dependent variable: one referring to census tracts becoming or remaining in underclass between the two time periods and zero referring to census tracts remaining in underclass or escaping from underclass between the two time periods.
[a] This is a ratio between two periods (e.g., change in total person from 1970 to 1980 = [persons in 1980-persons in 1970]/persons in 1970)
[b] This is the difference in the percent (e.g., % difference in African Americans from 1970 to 1980 = % African American in 1980 – % African Americans in 1970)
[c] This refers to the percent in the later decade (e.g., for the model 1, %African Americans in 1980)

While differences in percentage of non-white residents between two time periods reveal whether becoming an Underclass neighborhood is associated with a proportional increase or decrease of non-white residents, the percentage of non-white residents in a later decade reveal that becoming and remaining an Underclass neighborhood is associated with the concentration of non-white residents in the neighborhood.

Table 4 presents the results of logistic regression for the four time periods. In the period between 1970 and 2000 (Model 1), logistic regression results reveal that percentage difference in total population (negative), difference in percentage of African Americans (negative), percentage of African Americans in 2000 (positive), percentage of Hispanics in 2000 (positive), and percentage difference in average household income (negative) are statistically significant predictors of whether a neighborhood will become or remain Underclass. A significant negative coefficient of the difference in the percentage of African Americans and percentage difference in average household income suggest that becoming or remaining Underclass might not result from racial turnover or influx of impoverished African Americans. Rather, it suggests that either relatively affluent African Americans have departed from those neighborhoods or impoverished non-African Americans have entered those neighborhoods. Given the persistent level of residential segregation, it is more likely that relatively affluent African Americans have left those neighborhoods. On the other hand, significant coefficients of the percentage of African Americans in 2000 (positive) and percentage difference in average household income (negative) suggest that selective out-migration of African Americans (departure of relatively wealthy African Americans) might result in neighborhoods becoming or remaining Underclass. For Hispanics, a significant coefficient of the percentage of Hispanics in 2000 (positive) indicates that selective out-migration of Hispanics appears to be responsible for neighborhoods becoming or remaining Underclass.

When examining neighborhood change patterns separately for the three decades, distinctive patterns for each decade become evident. For neighborhoods becoming Underclass during the 1970s (Table 4, Model 2), the pattern is similar to the overall pattern between 1970 and 2000, except that the difference in the percentage of Hispanics now becomes statistically significant (negatively).

In the 1980s, however, a distinctive pattern emerged to indicate that, though a decrease of average household income between 1970 and 1980 increases the probability of a neighborhood becoming or remaining Underclass, an increase in the percentage of African Americans in 1980 is a significant predictor of a neighborhood becoming or remaining Underclass. This finding suggests that the influx of African Americans or outflow of whites may lead to a neighborhood becoming or remaining Underclass.

In the 1990s, change in average household income is not a statistically significant predictor of the probability of neighborhoods becoming or remaining Underclass, which suggests that few neighborhoods become or escape from Underclass status. As shown in Table 2, only thirteen neighborhoods became Underclass in this decade – noticeably fewer than in the 1970s and 1980s (forty and eighty-four, respectively). In short, multivariate analysis suggests that race remains a significant predictor of neighborhoods becoming and remaining underclass.

CONCLUSION

First, temporal analysis of neighborhood change in the Detroit area yields consistent results to a similar study in the city of Chicago (Morenoff and Tienda 1997). In addition, all three of this study's hypotheses are supported.

It was hypothesized that the number of Underclass neighborhoods was lowest in 1970. In fact, there were only twenty-three Underclass neighborhoods in 1970, and the number grew to 148 and 226 by 1980 and 1990, respectively. Furthermore, no Underclass neighborhood in 1990 improved its socioeconomic status to become Middle-Class by 2000, and only one became a Highly Educated neighborhood. However, thirty-seven Underclass neighborhoods in 1990 became Working-Class neighborhoods by 2000. Therefore, though overall socioeconomic status in inner city neighborhoods improved in the 1990s, the U.S. economic boom did not greatly improve the socioeconomic status of Underclass neighborhoods.

It was also hypothesized that neighborhoods becoming underclass neighborhoods should go through decreases in the numbers of persons and African Americans, as well as household income. In fact, Underclass neighborhoods in the 1970s experienced a decrease in the percentage of African Americans and median household income. However, Underclass neighborhoods in the 1980s experienced an increase in the percentage of African Americans but a decrease in median household income. It can be inferred from the above results that selective out-migration of African Americans occurred in the 1970s.

Lastly, it was hypothesized that residential segregation is associated with neighborhoods becoming or remaining Underclass neighborhoods. Over the decades, the percentage of African Americans in census tracts is a statistically significant predictor of those census tracts remaining or becoming Underclass neighborhoods even after controlling for median household income.

Several important policy implications emerge from this study. First, once a neighborhood has become Underclass, it is difficult to escape from being Underclass. Furthermore, most vulnerable neighborhoods that become Underclass are Working-Class, a fact of which policy makers should be aware so policies can be more targeted to prevent neighborhoods from becoming Underclass. In addition, the fact that few Underclass neighborhoods improve their socioeconomic status suggests that previous economic development endeavors targeting economic revitalization in distressed neighborhoods in Detroit have been ineffective. Thus, policy makers should revisit previous programs with an eye to developing more effective urban policies that address economic revitalization of distressed neighborhoods.

Finally, substantially more research is needed to link various different types of inequality (i.e., social, economic, and environmental). For example, many environmental justice studies have found hazardous waste facilities to be located near impoverished and minority neighborhoods in urban areas (for review of environmental justice, see Mohai et al. 2009). Although environmental injustice could result from social or economic inequalities, the reason why environmental burdens have been imposed on impoverished and minority neighborhoods have not been clearly understood. That is, racially segregated Underclass neighborhoods could be a target for the siting of hazardous waste facilities for economic and sociopolitical reasons (see Mohai et al. 2009 for more detailed discussion). Alternatively, siting of hazardous waste facilities, which diminishes adjacent property values, may cause wealthy people to leave and impoverished people to move in to neighborhoods, referred to as post-siting demographic

change (Mohai et al. 2009). It is not clear to date whether disparity siting or post-siting demographic change (or possibly both) is the driving force of current environmental injustice. Although there is an obvious link among various types of inequality, this area of study has not been fully explored (Schweitzer 2007). An understanding of this link could lead to the development of more comprehensive urban policies to ameliorate social, economic, and environmental conditions of neighborhoods.

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