**A Structural Approach to Racial Wage Inequality: The Dynamics of Segregation and Metropolitan Labor Markets**

**Abstract**

The gap in wages between blacks and whites has grown wider since 1979, despite a concurrent racial convergence in educational attainment (Wilson and Rodgers 2016). This study examines the impact of segregation, the spatial configuration of whites and blacks in metropolitan areas, on racial wage inequality in metropolitan labor markets. The goal is to determine if segregation, a racialized structure that enables inequality in metropolitan areas, explains the residual race wage gap typically found in studies of the wage gap even after individual characteristics are controlled. Previous work examining the impact of segregation on economic disparities has focused on distance between black neighborhoods to jobs. Here, to capture the structural dimension of spatial inequality, I use the structural measure of segregation to assess the association between structural segregation and wage inequality in 94 metropolitan labor markets. The analyses employ a multilevel estimation technique to capture both individual and structural sources of wage inequality. The analyses also examine segregation’s influence on racial wage inequality at the metropolitan-level using OLS and fixed-effects regression to test these associations both *across* different metropolitan areas and *within* metropolitan areas over time. The analyses reveal that the residual effect of race that persists after individual characteristics are controlled becomes non-significant once residential segregation is added to the model for black women, but not black men. Segregation also has a moderating effect on wages for blacks (i.e. there is a differential effect of segregation for whites and blacks). The examination of racial wage inequality across and within metropolitan labor markets revealed that the racial wage gap is significantly associated with variations in segregation, across place and over time.

**Key words**—residential segregation, wage gaps, wage inequality, employment, racial labor market inequality, gender

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The wage gap between whites and blacks has increased since 1979, while at the same time racial disparities in educational attainment and test scores have decreased (Wilson and Rodgers 2016; Vanneman et al 2009; Jencks and Phillips 1998). The portion of the racial wage gap explained by individual characteristics like education has decreased in the past 30 years, while the portion of the gap left *unexplained* has grown in the same time period (Cajner et al. 2017).

While much of the wage inequality literature has emphasized individual characteristics to explain racial wage gaps, other explanations suggest that wage inequality is produced by wage-setting practices which are shaped by institutions both internal and external to the labor market (Tilly and Tilly 1998). A large sociological literature has investigated the role of institutions internal to the labor market on the production of wage inequality (Grodsky and Pager 2001); however, there is less work examining the role of institutions external to the labor market on the production of wage inequality.

A key institution external to the market underlying racial economic stratification is residential segregation (Dickerson 2007; Massey and Denton 1993). Residential segregation is a racialized structure that influences labor market inequality by enabling mechanisms that create unequal access to work and channel blacks and whites to different positions in the labor market. This structure provides a framework for the unequal allocation of resources, particularly those associated with labor market outcomes, like education and poverty (Krysan and Crowder 2017).

Previous work assessing the role of segregation in labor market outcomes has focused on spatial mismatch, or the distance of minority neighborhoods to job-dense areas of metropolitan areas. However, spatial mismatch is only one mechanism by which inequality is created in metropolitan labor markets (Ihlanfeldt and Sjoquist 1998). There is less attention to the role of the *structure* of residential segregation in structuring racial inequality in metropolitan labor markets.

The current study extends that literature by focusing on the *structural dimension* of segregation by using a structural measure of segregation at the metropolitan-level that specifically measures the spatial inequality between racial groups in a metropolitan labor market to examine its role in wage inequality between racial groups. The goal is assess whether the spatial configuration of groups relative to one another affects racial disparities in wages in metropolitan labor markets.

The connection between segregation and employment has primarily been explored in the spatial mismatch and neighborhood effects literatures. Elliott argues this work “…refracts broad structural processes, such as residential segregation and economic polarization, back through neighborhoods and localized social relations in order to understand their effects on individual-level outcomes (Elliott 1999, pp.200-201).” The approach used in the current study shifts the focus to those “broad structural processes.” Shifting the focus from individuals to characteristics of place, such as segregation, will further elucidate the processes of inequality in local labor markets.

The mechanisms sustaining inequality are largely structured within, and consequently vary across metropolitan labor markets (Huffman and Cohen 2004, Beggs and Villemez 2001). Previous work studying patterns at the metropolitan level has added to our understanding of inequality by considering the role of place in the production of inequality (McCall 2001, Quillian 2014, Dickerson vonLockette 2010, Dickerson 2007). A metro-level analysis across multiple metropolitan labor markets is particularly important in distinguishing between contextual sources of wage inequality in addition to important variation at the individual level, and may capture the effects of a wide range of mechanisms beyond physical distance by which segregation creates inequality. This structural measure of segregation may explain the unexplained or residual effect of race commonly found in racial wage disparity studies.

The analyses employ two approaches to assess the contribution of both individual characteristics and residential segregation to black/white wage disparities. First, I use multilevel analyses to assess the impact of both conventional individual-level factors and metropolitan-level factors, including segregation, on the racial wage gap to estimate these two different sources of wage inequality. Secondly, I examine segregation’s influence on black/white wage inequality at the metropolitan-level both *across* different metropolitan areas and *within* metropolitan areas over time. The goal is to test this association at the metropolitan-level to capture variation of this dynamic across metropolitan areas.

**Racial Wage Inequality**

The wage gap between minorities and whites continues to persist despite racial convergence in educational attainment over the last 40 years (Kristal, Cohen, and Navot 2018, Mandel and Semyonov 2016, Pettit and Ewert 2009). The racial gap in wages between blacks and whites has grown wider since 1979 (Wilson and Rodgers 2016). During this period the gap grew for both men and women; however, the gap between black and white men was much larger.

The literature to explain racial wage inequality encompasses macro-structural and micro-individual theoretical and empirical approaches. The bulk of the literature is chiefly concerned with identifying characteristics of individuals and occupations, industries, and jobs to explain wage inequality (Grodsky and Pager 2001). A large part of that literature, particularly in economics, has emphasized human capital differentials to explain wage gaps. However, individual-level human capital inputs like education did not fully explain the increase in the gap. Black male college graduates started the 1980s with less than a 10 percent disadvantage relative to white male college graduates and end with almost a 20 percent deficit in 2015. Moreover, the gap is worse at the top of the occupation/wage distribution; that is the racial wage gap is highest for college graduates and those at the highest occupational status (Wilson and Rodgers 2016, Huffman and Cohen 2004).

Other explanations focus on the overall wage structure of the labor market to better understand wage inequality. For example, Juhn et al. (1993) found that changes in wage determinants such as education and experience reduced the black/white wage gap for men, whereas changes in the *returns* on education and experience enlarged the gap by a similar amount. That is, black and white men were not receiving the same return on inputs like education and experience. Structural reasons such as the retreat from anti-discrimination laws and affirmative action during the 1980s, deterioration in the manufacturing sector, and a decline in union representation have been cited as causes of the wage gap (Bound and Freeman 1992, Wilson and Rodgers 2016).

Relatedly, the occupational segregation approach emphasizes the importance of occupational position and mobility in the labor market (Hout 1984). Blacks are overrepresented jobs at the bottom of the wage and job distributions; these jobs experience substantial wage rigidity and low mobility (Kristal, Cohen, and Navot 2018). Dickerson vonLockette and Spriggs (2016) also find a significant role of occupational segregation in shaping wage disparities among black, Latino and white less-educated men in metropolitan low-wage markets. However, the black-white gap in earnings has increased over recent years despite improvements in black occupational mobility (Grodsky and Pager 2001). Clearly, there is more to this story than dynamics internal to the market alone. An important next step in this line of research is to account for the residual effect of race on wages that persists after individual characteristics are controlled.

I argue there are social structures *external* to the labor market that dynamically interact with mechanisms in the market to produce inequality. The interaction between these two systems of inequality exemplifies Granovetter’s (1973) theory of the social embeddedness of labor markets, in which social hierarchies external to the market structure hierarchies and inequality in the market. Segregation continues to be a major feature of metropolitan labor markets.

**Residential Segregation as an Enabling Structure**

Below I highlight the literature that suggests segregation structurally enables mechanisms that we know affect wage inequality. The objective is to outline a theoretical framework and make a case for examining the association between segregation in metro labor markets and racial wage inequality.

Similar to the persistence of wage inequality, residential segregation remains solidly rooted in the landscape of major metropolitan areas. The decline in black/white segregation since the end of the civil rights era has been weak; most reductions in segregation are in areas where the black population is low (Logan 2013). Sharkey (2013) found that 70% of African-Americans who live in the poorest, most racially segregated neighborhoods are from the same families that lived in those ghettos in the 1970s, indicating a particular stability to the structure of segregation. In 2010, 52% of blacks lived in areas where segregation is high (Krysan and Crowder 2017).

The improved economic status of some blacks resulting from the civil rights movement does not exempt most from the experience of segregation. The neighborhood attainment literature reveals that improved socioeconomic status for blacks does not eradicate segregation or offer access to white neighborhoods. Adelman (2005) showed that middle-class blacks and whites live, for the most part, in separate neighborhoods. Moreover, Logan (2013) found that low-income whites have better access to low-poverty neighborhoods than do blacks and Latinos. Even outside of individual resources segregation maintains spatial separation by race which in turn entrenches racial inequality. Neighborhoods that are predominantly black have less access to resources that mostly white or Asian neighborhoods do, even if residents have similar socioeconomic levels(Logan 2013).

So, how is this system of inequality, segregation, connected to labor market inequality? Space is a site of the reproduction of inequality, providing a framework to enable access or exclusion that I argue may explain the persistent effect of race on wages. In the section below, I focus on specific mechanisms that link these two systems of inequality. While the current study focuses on the broader connection of structural segregation to wage inequality and not the testing of these specific mechanisms discussed below, the following discussion establishes the framework for why we might expect a relationship between segregation and wage inequality.

The spatial mismatch literature is the body of work most explicitly connecting segregation to labor market outcomes. Studies have found that employment inequality is caused by spatially limited access to jobs due to physical isolation of minority neighborhoods (Kneebone and Holmes 2015); this isolation is enabled by the structure of segregation. The average unemployment rate is 60% higher in neighborhoods occupied by blacks (Krysan and Crowder 2017). This lack of access to jobs from minority dense neighborhoods has worsened over time (Kneebone and Holmes 2015).

The spatial mismatch literature has yielded important insights to understanding how space affects labor market inequality. However, the focus on the physical isolation of minority neighborhoods misses other important mechanisms beyond distance that connect segregation to labor market inequality. Distance to jobs does not pick up school segregation, policing and neighborhood surveillance, all of which can impact work.

Residential segregation enables another key factor associated with wage inequality: racial disparities in educational attainment and achievement. Residential segregation provides the spatial framework for school segregation by organizing school catchment areas which dictate which school children can attend based on the neighborhood in which they live. School funding is generated by local property taxes creating disparate funding of schools (Condron et al. 2013). Education scholars have observed the increase in segregation of public schools since the civil rights era; the percentage of predominantly black public schools (75-100%) grew between 2000-14 (General Accounting Office 2016). Most importantly, school segregation affects labor market and related outcomes. Rucker Johnson (2011) found school desegregation significantly increased adult labor market, educational attainment, and health status outcomes. It also reduced levels of poverty and incarceration for blacks when they reached adulthood.

School segregation also creates labor market disadvantage and exclusion via a “pipeline” of students to incarceration in many cities. Strict punitive policies in schools, over policing and surveillance form a steady conduit of minority students channeled to the justice system as well as increasing dropout rates (American Civil Liberties Union 2008; Shedd 2015).

Relatedly, another source of racial wage disparity is persistent joblessness caused by cyclical incarceration, as well as the excessive criminalization of black men in general (Pager 2007, Western and Pettit 2005). The phenomenon of US mass incarceration is marked by stark racial patterns: in 2010 the black/white male incarceration ratio was 6.4:1. There are significant racial disparities among women as well, just much smaller (Drake 2013). By demarcating space by race in metropolitan areas, segregation plays a significant role in enabling racial/ethnic disparities in incarceration, particularly through localized, targeted police surveillance (Rios and Vigil 2017; Shedd 2015). Even for those who are never incarcerated, there is evidence that many employers operate under a perception that any young black man they encounter has a criminal record, further depressing employment rates and wages for black men (Pager 2007, Moss and Tilly 2001)

Given large racial disparities in joblessness caused by incarceration and employer bias, Western and Pettit (2005) and others have argued that the distribution of wages in studies of wage inequality is severely truncated due to sample selection effects. Excluding the jobless from wage analyses distorts the remaining wage distribution because of the large racial disparity in incarceration and joblessness, creating a truncated distribution in the left-tail. Researchers have corrected for this truncation by using various forms of imputation (Western and Pettit 2005, Chandra 2003, Blau and Beller 1992). This study addresses that using the same correction methods other studies have. This adjustment allows for the inclusion of the most marginal populations that would otherwise be removed from the analysis distorting the full range of economic inequality among white and black men.

Another mechanism linking residential segregation and employment is the role of social networks in the job search process. Social networks are segregated by race, and since racial groups are spatially segregated, by space as well (Oliver and Lichter 1996). Blacks who rely on these networks for job leads tend to experience higher levels of unemployment and lower wages (Melendez and Falcon 2001, Green, Tigges, and Diaz 1999).

Because of important gender differences in labor market outcomes (i.e. pay disparities, occupational segregation), the analyses are conducted separately for women and men. The standard practice in wage analyses is to conduct gender-specific analyses. However, typically analyses are only conducted for men. Dickerson (2007) found that that segregation has a differential impact on black women and men’s employment (Dickerson 2007). Many of the key mechanisms connecting segregation to work are gendered. For example, gender differences in commuting could affect the impact of residential segregation on wages for women and men and spatial access to jobs. Women’s commutes are shorter than men’s and they are less likely to drive (Pardo and Echavarren 2010; Uteng 2011; Lu 2020). Additionally, there is evidence that the racialized perceptions of job candidates held by some employers are gendered (Kennelly 1999).

To maintain the scope of the study, the main emphasis is to examine racial disparities while acknowledging that it would be inaccurate to not account for important gender variations in the key variables of interest. The focus is not to explain gender differences in the association between segregation and work, simply to identify and account for them.

These dynamics demonstrate a multitude of ways segregation may impact labor market outcomes. However, the majority of empirical treatments of the relationship between residential segregation and employment outcomes fall under the body of work of spatial mismatch, which assesses the physical access or distance of minority communities to jobs. This study utilizes a structural measure of segregation at the metropolitan-level that specifically measures spatial inequality between racial groups in a metropolitan labor market to determine if the structural dimension of segregation can inform our understanding of racial wage inequality.

Few studies have used metropolitan-level segregation indices to explain racial wage disparities. Some exceptions include Cutler and Glaeser’s (1997) examination of the effect of segregation on earnings of young workers, which focused on individual-level outcomes. Kerr and Walsh (2014) examine the effect of metropolitan segregation on racial wage gaps between black and white men. Their analysis examines group disparities rather than both group and individual level analyses using 1990 and 2000 census data. They address the joblessness truncation thesis by including incarceration rates for blacks disproportionate to their representation in the population. vonLockette and Spriggs (2016) use residential segregation as a control in their study of the impact of occupational segregation on wage inequality among less-educated white, black and Latino men.

The spatial concept of segregation as *structure* used in this study moves the focus from predominantly black neighborhoods to an approach that highlights the relational aspect of segregation. Neighborhoods that have fewer resources—such as access to jobs, school funding, public services—are taken out of context when studied in isolation. A structural approach assesses the consequences of the unequal resources of certain neighborhoods in a city in relation to those neighborhoods that have more resources; this is especially salient when examining economic inequality between groups who are spatially segregated. There have been only modest reductions in black/white segregation in over 70 years, school segregation has worsened, and there is a $23 billion school funding disparity between minority and white school districts (Logan 2013, General Accounting Office 2016, EdBuild 2019). These trends point to a resilient and deeply entrenched structure.

The approach taken in this study enhances our understanding of the role segregation in labor market disparities in a number of ways: it examines this effect across *multiple* metropolitan labor markets rather than one or a few to identify variation *across* metropolitan areas. It does so for men *and* women, not just men as is commonplace in studies of wage inequality. This current study also includes a longitudinal analysis over multiple time points. The longitudinal approach identifies patterns of *how* this association varies over time, which is of particular importance given changes in both wage inequality and residential segregation during this time-period. While this study tests for the association between metro-level segregation and black/white wage inequality and does not specifically analyze the mechanisms discussed in the previous section, I argue that the effects of some of these dynamics may be captured in the structural measure of residential segregation used here. This broad macro view of segregation as structure misses the detail offered by studies that examine mechanisms, but it offers us a view into larger patterns of inequality across and within metro labor markets.

**Data, Measures and Methods**

*Data*

The dataset is drawn from the 1980, 1990, 2000 and 2010 US decennial Census accessed through Integrated Public Use Microdata Series (IPUMS) produced by the Minnesota Population Center. This large population survey has socioeconomic data on 5% of the US population allowing for a sufficient number of cases among racial groups critical for assessing group disparities. I used this data to create a multi-level dataset using individual-level data and constructing metropolitan-level data by aggregating demographic, employment, educational, occupational, and industrial characteristics to the metropolitan level.

Additionally, residential segregation indices for 1980, 1990, 2000 and 2010 were merged to the IPUMS data (indices published by the Housing and Household Economics Statistics (HHES) Division of the U.S. Census Bureau). The 2010 segregation data is provided by the Spatial Structures in the Social Sciences Center at Brown University (S4). To allow for comparability across metropolitan areas (MSAs) over time and changes in MSA boundaries over time and between datasets, HHES and S4 calculated the segregation indices using constant metropolitan area boundaries as defined on Jun 30, 1999 and imposed them back to 1990 and 1980, but allowed the census tract boundaries to vary.

The 2010 analyses include 281 MSAs. For the over-time analyses, only 94 MSAs could be matched and consistently defined between 1980 and 2010[[1]](#footnote-1). However, the resulting set of cities includes only medium and large-sized metropolitan areas, where a large majority of urban blacks reside. The ninety-four cities in this study account for over two-thirds of the black population and half of the white US population. The individual-level sample is limited to the adult working age population (18-64) and non-Latino whites and blacks; with case deletions for valid data the resulting sample size is 449,538.

*Measures*

The outcome variable for the multilevel models is the natural log of wages (hourly). The multilevel models control for other standard controls conventionally used in wage regressions (education dummies [less than high school, high school, some college, college and above excluded categories], age (18-64), usual hours worked, foreign born=1, and married=1). The outcome variables in the fixed effects analyses are racial wage ratios calculated for each MSA separately for women and men. Residential segregation of the metropolitan area is measured using the index of dissimilarity. The dissimilarity index compares “the weighted mean absolute deviation of every unit’s minority proportion from the city’s minority proportion” (Massey and Denton 1988: 284); segregation is at its lowest when all tracts in the city reflect the same relative number of minority and majority members as the entire city.



where

n = the number of census tracts

ti = the total population of tract i

T = the sum of all ti (the total population)

pi = the ratio of the xi to the ti (proportion of tract i’s that is minority)

P = the ratio of X to T (proportion of the population that is minority)

T1 = the sum of all ti in tract 1 up to tract n1

T2 = the sum of all ti in tract n2 up to tract n

Other metropolitan characteristics used in the metropolitan-level analyses are measured as follows. Industrial employment is measured as the percentage of workers in the city who are employed in the city’s manufacturing, public sector, and retail industries. Skills disparity is assessed by the percentage of residents who have less than a high school degree and the percentage who have a college degree or higher. Minority concentration is measured by the percentage of the city’s population that is black.

Table 1 presents unadjusted mean wages for each race/gender group, as well as racial wage gaps. The wage ratios are constructed with black earnings in the numerator: lower numbers reflect lower black earnings relative to whites. The mean wages reflect the typical hierarchical order with men of both groups out-earning their female counterparts and white wages out-earning black wages.

The wage ratios also indicate that black men show the highest deprivation relative to their white counterparts. Black and white women came the closest to parity, with black women actually earning more on average than white women in 1980, but the gap widened and favored white women through 2010. The wage ratios are increasing over time; that is, the wage gap among whites and blacks is increasing over time. This pattern contradicts the assumption that the wage gap would independently, on its own over time progress toward economic parity. Figure 1 maps black/white male wage inequality across metro areas to illustrate the variation in racial wage inequality across metro areas: the darker areas reveal more inequality and are more concentrated in the Northeast, Midwest and South than in the West, which tracks with the historical patterns of black migration and settlement. The substantial variation across metropolitan labor markets in the wage ratios suggest that racial wage inequality varies across metropolitan areas and may be explained by structural features of metropolitan areas, such as residential segregation.

[TABLE 1 AND FIGURE 1 ABOUT HERE]

*Methods*

The multivariate analyses involve two approaches: an individual-level model to simultaneously test individual and structural-level influences on wages using multilevel analysis, and a metropolitan-level analysis of race/gender wage inequality using OLS and fixed-effects regression.

To account for the multilevel character of the data, the analyses utilize a two-level hierarchical linear models. This estimation technique uses iteratively reweighted likelihoods to fit the model (Wolfinger and O’Connell 1993). This technique accounts for correlated errors due to the nested structure of the data (individuals are clustered in MSAs) and properly estimates the effects at two levels of analysis, avoiding biased estimates.

$$\begin{matrix}Y\_{ij}\\\\\end{matrix}\begin{matrix}=\\\\\end{matrix}\begin{matrix}β\_{00}+β\_{1j}\left(x\right)+γ\_{01}\left(RS\right)+U\_{0j}+r\_{ij}+β\_{Blkj}\\\\\end{matrix}$$

where Y1j = ln wages for the ith person in the jth MSA

Blkj= +

00=model intercept

1j=level-1 slope of individual-level predictors

X=matrix of individual-level (level-1) predictors (age, education, sex, race, marital-status, foreign-born status)

=level-2 slope of MSA-level predictors including segregation

U0j=MSA-level residual (level-2)

rij=individual-level (level-1) residual for i-th person in j-th MSA

This model assesses whether segregation explains the race gap in wages by estimating a cross-level interaction effect of segregation on the race gap. In the level-2 model, the race coefficient, reflected in theBlkj equation, becomes an outcome creating a cross-level interaction term to determine if residential segregation has a differential impact on wages for blacks and whites. The race coefficient represents the mean black/white difference in wages (the race gap) once everything else is controlled for.

There are separate models for women and men.

In line with previous research on wage inequality between white and black men, I impute wages to jobless men to correct for the truncated wage distribution in the lower tails of the wage distributions that results from the high prevalence of labor market exclusion among black men caused by higher unemployment and incarceration (Western and Pettit 2005). In the long tradition of controlling for this distortion in economics and sociology, researchers have taken multiple approaches to addressing this problem (Brown 1984; Smith and Welch 1989; Welch 1990). I use multiple imputation (Rubin 1976) to predict the hypothetical wages of nonworkers by matching those to observed wages of workers with similar human capital characteristics (Western and Petit 2005, Chandra 2003). The multiple imputation algorithms use race, age, gender, and education to impute wages to black men with missing employment data. It imputes data iteratively (N=5) and computes estimates across each of the five datasets creating multiples estimates, and pools these estimates to generate more precise final estimates. This adjustment allows for the inclusion of the most marginal populations that would otherwise be removed from the analysis and distort the full range of economic inequality among white and black men.

The fixed-effects regression analyses address the second research question by examining the effect of change in segregation over time in metro areas on change in the wage gaps thereby shifting the focus specifically to group inequality. Fixed-effects analysis is a transformation of standard OLS regression that estimates variation *within* an individual unit (MSA) over time. For each individual unit the mean of all the observations for that individual across time is subtracted from the value for each variable (Kennedy 2006). This technique is designed to remove the effects of unmeasured characteristics of MSAs that are fixed or stable by subtracting the MSA mean from each observation permitting me to examine whether changes over time in segregation *within* a MSA affect changes in wage inequality. The outcomes in these models are the racial wage ratios calculated for each MSA. I conducted fixed-effect models utilizing four years (1980, 1990, 2000 and 2010) of MSA data.

The model is represented as follows:



where:



*i*=cities

*k*=observed independent variables

*t*=time

*u*=city component of error

*v*=time component of error

*w*=random error component

Although the analysis is motivated by an understanding of the mechanisms connecting segregation to wage disparities, this analysis does not aim to estimate the mechanisms themselves or their effect on the wage gap. Rather the following analyses examine the connection between spatial patterns of racial residential segregation to patterns of racial economic inequality across U.S. metropolitan labor markets; the mechanisms provide the theoretical framework for interpreting the results.

*Residential Segregation and the Racial Wage Gap: A Multi-level Approach*

To examine the impact of residential segregation on racial wage inequality,

the analyses in Table 2 use multilevel analysis to estimate the contribution of both individual and metropolitan factors to wages for blacks and whites. The goal of the analysis is to determine if residential segregation explains the racial gap in wages, or the residual effect of race after individual characteristics are controlled, and whether there are racial differences in the effect of segregation on wages.

Each block in Table 2 shows an analysis of wages for a race/gender group pooled with its white counterpart (e.g. the first panel includes black and white men). Model 1 (shown in the appendix) revealed that the race coefficient is significant and negative for men and women; that is, the wage disparity between blacks and whites persists after controlling for individual characteristics, replicating the common finding in conventional wage models. Model 2 adds the coefficient for residential segregation, and Model 3 adds the segregation\*race cross-level interaction. The coefficients on residential segregation in Model 2 reveal the direct effect of residential segregation on wages after controlling for individual factors. The coefficient on the cross-level interaction term indicates whether the effect of segregation on wages is different for black men and women in contrast with their white counterparts, or whether residential segregation moderates the race effect on wages. This interaction determines if there is a different effect of segregation for the different race groups and whether segregation explains the residual, significant effect of race on wages.

The race coefficient in model 3 tells us the impact of the race variable on wages when the segregation variable is set to a value of zero, while the interaction term keeps track of the change in the relationship between race and wages when the segregation variable shifts from a value of zero to a value of 1. Focusing on the column for white and black men, the race coefficient is negative and the interaction is negative (both are significant). This suggests to that the wage gap favors White men in non-segregated contexts, and this White-over-Black gap worsens slightly as segregation increases with severity.

For black men the race effect (wage disparity between black and white men) remains significant across all three models, and the cross-level interaction of residential segregation and race is significant. For black women the race effect denoting the wage disparity between black and white women becomes non-significant in model 2 and the cross-level interaction of residential segregation and race is significant and negative in model 3. The race effect on wages is moderated by residential segregation for black women, but not entirely for black men (it is attenuated by the addition of the interaction term in model 3). The significance of the interaction term indicates that segregation also has a moderating effect (both direct and indirect effect) on wages for blacks (there is a differential effect of segregation for whites and blacks). A subsequent likelihood ratio test for model fit compared the two female models and indicated the model with the interaction explains significantly more variance in wages than the model without the interaction. It was not possible to run this same diagnostic for the male models because imputation violates assumptions of the likelihood ratio test; however, a simple comparison of the model fit statistic reveals that even though the interaction achieved significance, it did not improve the model fit (i.e. it did not explain significantly more variance in wages than the model without the interaction). This finding highlights the importance of studying gender differences in understanding how segregation impacts outcomes for individuals and groups.

The significant race effect in estimating the black/white male wage disparity was not attenuated by segregation in subsequent models: the wage disparity between white and black men persisted even after controlling for segregation. Segregation may be conflated with other mechanisms discussed earlier in the paper such as school inequality, policing, and employer bias. Evidence of discrimination targeted specifically toward black men may help make sense of this finding: specifically, in employer bias and profiling (Kasinitz and Rosenberg 1996; Moss and Tilly 2001), excessive punishment of black boys in schools (Mizel et al 2016), discriminatory channeling to low-status jobs (Royster 2003), and overrepresentation in the justice system (Pettit and Western 2004). It is difficult to tease out the mechanisms underlying these complex relationships at this broad level of analysis. Different analytic approaches (i.e. qualitative, ethnographic) would be particularly useful in future work to further elucidate these relationships.

 In model 3, I focus on the relationship between segregation and wage inequality. The race\*segregation interaction is significant for black men and women. This interaction indicates that there is a different effect of segregation on wages for blacks than whites; or in other words, the effect of segregation on wages is moderated by race. Model 4 adds other metropolitan characteristics to the interaction model for context. For black men, the race\*segregation interaction remains significant with the addition of the other metro characteristics. For black women, the race\*segregation interaction becomes non-significant with the addition of the other metro characteristics. I conducted a sensitivity analysis to test this (not shown). The addition of each of the other metro characteristics rendered the interaction non-significant for black women. This suggests segregation’s impact on wages may operate through other mechanisms. The correlations among the metro characteristics, including segregation, are small to moderate. The coefficients from Model 4 are used to graph the race\*segregation interaction in Figure 2. It shows a positive for white men and women (a larger slope for white men than women), and a flat slope for black men and women, indicating a slight positive effect of wages for whites and no effect for blacks.

It is important to note that interpreting the findings from the multilevel analysis these estimates give us the effect of segregation when all things are equal. It might be useful to think of this as a bound—if all things are equal. The reality of substantial structural disparities between black and white contexts is well-established and provides important context for interpreting these results.

Segregation may reflect the effects of related racialized structures (e.g. school segregation and unemployment). The *interdependence* among discriminatory systems like segregation and other racialized structures may more accurately reflect how racial inequality is reproduced (Reskin 2012). The patterns in this table may reflect intercorrelations between these interrelated metropolitan factors.

Some of the dynamics that create racial inequality may differ across cities; the segregation measure may not pick up these effects. Their effect may be absorbed in the factors measured here or omitted. For example, the effect of segregation will be less clear in cities that have higher levels of incarceration or greater employer aversion to hiring black workers, but lower levels of segregation. The complexity of these relationships points to the importance of a structural approach.

The next analyses move from individual-level analysis by examining these dynamics at the metro-level, to offer a more macro examination of metropolitan labor markets.

[TABLE 2 AND FIGURE 2 ABOUT HERE]

*A Metropolitan-Level Approach to Assessing the Impact of Segregation on the Wage Gap*

The second approach to assessing the impact of residential segregation on the racial wage gap will evaluate whether racial structural inequality explains wage inequality between blacks and whites at the metro-level. The key distinction between this approach and previous individual-level approach is to use metro-level measures of racial wage inequality as outcome variables in multivariate analyses. The next section approaches this two ways: 1) it employs OLS regression to determine if variation in this metropolitan-level racial wage gap is associated with variation in residential segregation across metropolitan labor markets, and then 2) it employs fixed-effects analysis to assess whether MSAs that experienced change in residential segregation over time also experienced change in racial inequality in wages.

First, the OLS analyses in Table 3 model the effects of structural characteristics of metropolitan labor markets including residential segregation on race/gender wage inequality *across* MSAs in 2010. The dependent variable is the ratio of black mean hourly wages to white mean hourly wages (by gender). As the ratio is constructed with white wages in the denominator, higher values will indicate a more positive outcome for blacks. The first block of Table 3 shows the model for the black/white male wage gap. The impact of residential segregation on the wage gap is significant and negative. A negative sign on the coefficient means there is more wage inequality benefiting whites as segregation increases. Additionally, the density of the black population was significantly and negatively related to the wage ratio. The density of retail employment was also negatively related to the wage ratio, likely related to lower wages in this sector.

Moving to the second block of Table 3, we find that residential segregation did not have a significant effect on the wage gap between black and white women. However, as was the case for black men, the density of the black population was significantly and negatively related to the wage ratio, as was the percent of black female high school dropouts. That is, in metro areas with higher percentages of blacks and black female dropouts, the wages of black women relative to white women’s were lower.

[TABLE 3 ABOUT HERE]

The next analyses use fixed-effects regressions to determine if changes in these structural factors over time *within* a metropolitan labor market influence changes in the black/white wage gap. Fixed-effects analyses estimate variation *within* an individual unit (MSA) over time; the coefficients on the independent variables indicate whether change in the variable (structural characteristic of the MSA) over time affects change in the dependent variable over time *within* that MSA. In the previous analyses, the variation measured was that *between* MSAs.

Table 4 reveals that in the models predicting change in wage inequality between black and white women, change in residential segregation over time (1980-2010) was not significantly related to changes in wage inequality. However, for black and white men changes in residential segregation over time was significantly related to changes in the wage gap between them. They were positively associated; decreases in wage inequality between black and white men was associated with decreases in segregation over time.

The black/white male wage gap is distinct from the female wage gap pattern. The different outcomes for women and men speaks to the importance of gender in the connection between segregation and the labor market. Black men earn more than black women; this gender gap is consistent across other U.S. racial/ethnic groups. Some of the gender difference in outcomes may be due to factors associated with wages not captured by the segregation measure: factors such as incarceration, gender segregation of jobs, industrial changes, and gender disparity in wages.

The results in the fixed effects and HLM analyses are different because the analyses are structured to answer different questions. Fixed-effects examines change within cities over time at the metropolitan-level by telling us if the black/white wage gap changes if the level of segregation changes in that city over time. Fixed-effects regression is a stringent test of the relationship between racial wage inequality and segregation. In addition to adding insight to how changes in segregation are associated wage inequality, it also serves as a robustness check of the association between segregation and wage inequality found in the previous two analyses.

The analyses were not designed to tease out the specific mechanisms behind these associations from these analyses, as that is outside the scope of this paper. Segregation provides a structural framework to enable the mechanisms; more work is needed to illuminate the ways segregation operates through these mechanisms to create economic inequality. The contribution here is the explanation of the residual race effect on racial wage inequality after individual characteristics by the introduction of a key structural arrangement in cities—segregation, in addition to finding a racial difference in the effect of segregation on wages. Future work is necessary to further tease apart these relationships.

[TABLE 4 ABOUT HERE]

One possible interpretation of these results is that the relationship between segregation and wage inequality may be a function of reverse causality; that is, wage disparities in the labor market may cause residential segregation. The neighborhood attainment literature has found that black middle-class households experience segregation, and that even when matched on socioeconomic characteristics, whites attain better quality with higher property values neighborhoods than blacks. The neighborhood preferences literature shows that blacks in general prefer mixed composition neighborhoods (Krysan and Crowder 2017, Rothstein 2017). Additionally, evidence of non-economic mechanisms underlying segregation, like steering by real estate agents and bias by lending institutions, point to dynamics that maintain segregation that are independent of the labor market.

**Conclusion**

This work employed an empirical approach which expanded space and work research by examining the social organization of the entire city, not just particular neighborhoods, to determine how the spatial configuration of groups relative to one another affects minority employment outcomes in metropolitan areas. This unique dataset allowed me to test space and work theories across multiple metropolitan labor markets, adding insight to this body of literature by assessing whether the relationships between residential segregation and access to work operate uniformly across metropolitan areas, or whether metropolitan areas differ such that these patterns vary across metropolitan labor markets.

This broad analysis of racial wage inequality offered insight into the impact of segregation on the race gap in wages in metropolitan labor markets, as well as how that process varies across local labor markets. The findings offered two ways of examining wage inequality in metropolitan labor markets. The multilevel approach accounting for individual and metro-level factors revealed that once residential segregation is added to the model the wage disparity between black and white women disappears (the race effect becomes non-significant indicating a mediating effect of segregation). The race effect in the model estimating wages for black and white men is attenuated, but not eliminated by the consideration of segregation. For black men and women, the cross-level interaction of residential segregation and race to determine if residential segregation moderates the race effect on wages is significant; that is, residential segregation reduces wages for blacks, part of the race effect on wages is moderated by residential segregation. The analyses assess important individual characteristics but also shift away from sole focus on individual-level factors to explain inequality among individuals to examining contextual factors and their ability to explain inequality among groups.

The salience of joblessness was evident as this association was revealed for black men after imputing wages to jobless black through multiple imputation to restore the typically truncated wage distribution for black men due to high rates of joblessness. These results underscore the idea of exceptionalism of black men. Not only does segregation potentially impact them in unique ways, but the persistence of the race effect for them after controlling for segregation speaks to the enormity of their structural dislocation relative to other groups. Segregation may influence their lives in distinct ways relative to the other race/gender groups. These differences between black men and women emphasize the complexities of the way racial inequality is configured and the importance of examining gender differences within groups. Further research would be valuable in teasing out these intersectional dimensions.

Residential segregation also affects the race/gender wage gap when examining group inequality across metro labor markets. Metropolitan areas that had more segregation, had greater wage inequality for all race/gender comparisons except black and white women. Fixed-effects analyses assessed this relationship over time and found that for black and white men MSAs that experienced decreases in segregation over time also saw decreases in wage inequality between black and white men; this effect was not significant for other race/gender groups. These findings offer evidence that the social organization of a metropolitan area (local labor market) informs group inequalities and employment outcomes in that labor market. It lends support to the idea that the allocation process in the market is influenced by macro-structures such as residential segregation and industry composition and demonstrated the utility of considering a wider set of structural factors.

Tilly and Tilly (1998) argue that labor market organization and social segregation are two different processes that become intertwined through supply and demand forces resulting from the maneuvering of job seekers and employers. Understanding the larger context in which workers are matched to jobs--the social processes and structures in which they navigate and exchange resources for jobs--is crucial to unpacking the increasingly complicated way in which racial economic inequality is reproduced. Examining the connection between segregation and the labor market is key to better understanding ongoing racial/ethnic economic inequality.

Policy interventions based on single-explanation solutions like education and training miss the complex nature of the problem. Anti-discrimination laws, which are the strongest polices that are in place to address racial inequality are aimed at individual discrimination, whereas the findings of this study point to the significant role of structures which sort individuals by their group membership and ignores individual characteristics. Further research should focus on the policy implications of changing patterns of residential segregation. Moss and Tilly (2001) declare, “Residential segregation is as important to labor market opportunity as it is to housing opportunity,” and consequently in their policy recommendations call for desegregation as a primary policy response to persistent racial employment inequality (p637). The significance of residential segregation after individual characteristics are controlled indicate that segregation as a structure continues to achieve its original mission to disadvantage one group over another and to sort individuals not by individual characteristics, but by group membership. Thus, to address this policies that are similarly target specific racial groups (independent of class) are necessary, despite their unpopularity. Broad economic policy designed to generally improve the economy and labor market may not necessarily help groups who are structurally marginalized.

The goal of this work is to extend our understanding of how segregation affects economic outcomes and group disparities in those outcomes, both theoretically and empirically, by shifting focus to the structural dimensions of segregation that shape disparities between groups. Exploring interconnections between multiple institutions such residential segregation and the labor market that generate these disparities, promises to offer greater insight into the dynamics of inequality.

*References*

Adelman, Robert M. 2005. "The Roles of Race, Class, and Residential Preferences in the Neighborhood Racial Composition of Middle-Class Blacks and Whites." *Social Science Quarterly* 86(1):209-28.

American Civil Liberties, Union. 2008. "Locating the School to Prison Pipeline." ACLU.

Ananat, Elizabeth Oltmans. 2011. "The Wrong Side (S) of the Tracks: The Causal Effects of Racial Segregation on Urban Poverty and Inequality." *American Economic Journal: Applied Economics* 3(2):34-66.

Beggs, John J. and Wayne J. Villemez. 2001. "Regional Labor Markets." Pp. 503-29 in *Sourcebook of Labor Markets*.

Blau, Francine D. and Andrea H. Beller. 1992. "Black-White Earnings over the 1970s and 1980s: Gender Differences in Trends." *The Review of Economics and Statistics* 74(2):276-86.

Cajner, Tomaz, Tyler Radner, David Ratner and Ivan Vidangos. 2017. "Racial Gaps in Labor Market Outcomes in the Last Four Decades and over the Business Cycle." Finance and Economics Discussion Series No. 2017-071. Washington: Board of Governors of the Federal Reserve System.

Catanzarite, Lisa. 2002. "Dynamics of Segregation and Earnings in Brown-Collar Occupations." *Work and Occupations* 29(3):300-45.

Chandra, Amitabh. 2003. *Is the Convergence in the Racial Wage Gap Illusory?*, Vol. 9476. Cambridge, Mass: National Bureau of Economic Research.

Condron, Dennis J, Daniel Tope, Christina R Steidl and Kendralin J Freeman. 2013. "Racial Segregation and the Black/White Achievement Gap, 1992 to 2009." *The Sociological Quarterly* 54(1):130-57.

Cutler, David M and Edward L Glaeser. 1997. "Are Ghettos Good or Bad?". *The Quarterly Journal of Economics* 112(3):827-72.

Dickerson, Niki T. 2007. "Black Employment, Segregation, and the Social Organization of Metropolitan Labor Markets." *Economic Geography* 83(3):283-307.

Dickerson vonLockette, Niki T. and Jacqueline Johnson. 2010. "Latino Employment and Residential Segregation in Metropolitan Labor Markets Metropolitan Labor Markets." *Du Bois Review: Social Science Research on Race* 7(1):151-84.

Drake, Bruce. 2013. "Incarceration Gap Widens between Whites and Blacks. Fact Tank - News in the Numbers." Pew Research Center.

Elliot, James R. 1999. "Social Isolation and Labor Market Insulation: Network and Neighborhood Effects on Less-Educated Urban Workers." *Sociological Quarterly* 40(2):199-216.

Falcon, Luis M and Edwin Melendez. 2001. "Racial and Ethnic Differences in Job Searching in Urban Centers." *Urban inequality: Evidence from four cities*:341-71.

Freeman, Richard B. and John Bound. 1992. "What Went Wrong? The Erosion of Relative Earnings and Employment among Young Black Men in the 1980s." *The Quarterly Journal of Economics* 107(1):201-32.

US Government Accountability Office. 2016. "Better Use of Information Could Help Agencies Identify Disparities and Address Racial Discrimination."

Gramlich, John. 2019. "The Gap between the Number of Blacks and Whites in Prison Is Shrinking.Fact Tank - News in the Numbers" Pew Rsearch Center.

Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6):1360-80.

Green, Gary Paul, Leann M. Tigges and Daniel Diaz. 1999. "Racial and Ethnic Differences in Job-Search Strategies in Atlanta, Boston, and Los Angeles." *Social Science Quarterly* 80(2):263-78.

Grodsky, Eric and Devah Pager. 2001. "The Structure of Disadvantage: Individual and Occupational Determinants of the Black-White Wage Gap." *American Sociological Review* 66(4):542-67.

Hout, Michael. 1984. "Occupational Mobility of Black Men: 1962 to 1973." *American Sociological Review* 49(3):308-22.

Huffman, Matt L. and Philip N. Cohen. 2004. "Racial Wage Inequality: Job Segregation and Devaluation across U.S. Labor Markets." *American Journal of Sociology* 109:902-36.

Jencks, Christopher and Meredith Phillips. 1998. *The Black-White Test Score Gap*: Brookings Institution Press.

Juhn, Chinhui, Kevin Murphy and Brooks Pierce. 1993. "Wage Inequality and the Rise in the Returns to Skills." *Journal of Political Economy* 101(3):410-42.

Kasinitz, Philip and Jan Rosenberg. 1996. "Missing the Connection: Social Isolation and Employment on the Brooklyn Waterfront." *Social Problems* 43(2):180-96.

Kennedy, Peter. 2006. *A Guide to Econometrics*. Cambridge, Mass: MIT Press.

Kerr, Craig and Randall Walsh. 2014. "Racial Wage Disparity in Us Cities." *Race and Social Problems* 6(4):305-27.

Kneebone, Elizabeth and Natalie Holmes. 2015. "The Growing Distance between People and Jobs in Metropolitan America." *The Brookings Institution, March*.

Kristal, Tali, Yinon Cohen and Edo Navot. 2018. "Benefit Inequality among American Workers by Gender, Race, and Ethnicity, 1982-2015." *Sociological Science* 5(20):461-88. doi: 10.15195/v5.a20.

Krysan, Maria and Kyle Crowder. 2017. *Cycle of Segregation: Social Processes and Residential Stratification*: Russell Sage Foundation.

Logan, John R. 2013. "The Persistence of Segregation in the 21st Century Metropolis." *City & Community* 12(2):160-68.

Mandel, Hadas and Moshe Semyonov. 2016. "Going Back in Time?: Gender Differences in Trends and Sources of the Racial Pay Gap, 1970 to 2010." *American Sociological Review* 81(5):1039-68.

Massey, Douglas S. and Nancy A. Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass*: Harvard University Press.

Massey, Douglas S. and Mary J. Fischer. 2006. "The Effect of Childhood Segregation on Minority Academic Performance at Selective Colleges." *Ethnic and Racial Studies* 29(1):1-26.

Mizel, Matthew L., Jeremy N. V. Miles, Eric R. Pedersen, Joan S. Tucker, Brett A. Ewing and Elizabeth J. D'Amico. 2016. "To Educate or to Incarcerate: Factors in Disproportionality in School Discipline." *Children and Youth Services Review* 70:102-11.

Moss, Philip and Chris Tilly. 2001. "Why Opportunity Isn't Knocking: Racial Inequality and the Demand for Labor." Pp. 444-95 in *Urban Inequality*.

Oliver, Melvin L and Michael Lichter. 1996. "Social Isolation, Network Segregation, and Job Search among African Americans." Pp. 8-9 in *Multi-City Study of Urban Inequality Conference on Residential Segregation, Social Capital, and Labor Markets, February*.

Orfield, Gary and Erica Frankenberg. 2014. "Increasingly Segregated and Unequal Schools as Courts Reverse Policy." *Educational Administration Quarterly* 50(5):718-34.

Pager, Devah and Lincoln Quillian. 2005. "Walking the Talk? What Employers Say Versus What They Do." *American Sociological Review* 70(3):355-80.

Pager, Devah. 2007. *Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration*: University of Chicago Press.

Pettit, Becky and Bruce Western. 2004. "Mass Imprisonment and the Life Course: Race and Class Inequality in Us Incarceration." *American Sociological Review* 69(2):151-69.

Pettit, Becky and Stephanie Ewert. 2009. "Employment Gains and Wage Declines: The Erosion of Black Women's Relative Wages since 1980." *Demography* 46(3):469-92.

Quillian, Lincoln. 2014. "Does Segregation Create Winners and Losers? Residential Segregation and Inequality in Educational Attainment." *Social Problems* 61(3):402-26.

Reskin, Barbara. 2012. "The Race Discrimination System." *Annual Review of Sociology* 38:17-35.

Rios, Victor M and James Diego Vigil. 2017. *Human Targets: Schools, Police, and the Criminalization of Latino Youth*: University of Chicago Press.

Royster, Deirdre A. 2003. *Race and the Invisible Hand: How White Networks Exclude Black Men from Blue-Collar Jobs*: Univ of California Press.

Rubin, Donald B. 1976. "Inference and Missing Data." *Biometrika* 63(3):581-92.

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas and Mathew Sobek. 2019. "Ipums USA: Version 9.0 [Dataset]." Minneapolis, MN:: IPUMS.

Sharkey, Patrick. 2013. *Stuck in Place: Urban Neighborhoods and the End of Progress toward Racial Equality*. Chicago: University of Chicago Press.

Shedd, Carla. 2015. *Unequal City: Race, Schools, and Perceptions of Injustice*. New York: Russell Sage Foundation.

Snipp, C. Matthew and Leonard E. Bloomquist. 1989. "Sociology and Labor Market Structure: A Selective Overview." *Research in rural sociology and development (USA)*.

Social and Pew Research Center Demographic Trends. 2013. "King's Dream Remains an Elusive Goal; Many Americans See Racial Disparities." in *Social & Demographic Trends, Pew Research Center, Aug 22 2013, 42 Pp*.

Stolzenberg, Ross M. 1975a. "Occupations, Labor Markets and the Process of Wage Attainment." *American Sociological Review*:645-65.

Stolzenberg, Ross M. 1975b. "Education, Occupation, and Wage Differences between White and Black Men." *American Journal of Sociology* 81(2):299-323.

Tilly, Charles and Christopher Tilly. 1998. *Work under Capitalism*. New York: Westview Press.

Vanneman, Alan, Linda Hamilton, Janet Baldwinn Anderson and Taslima Rahman. 2009. "Achievement Gaps: How Black and White Students in Public Schools Perform in Mathematics and Reading on the National Assessment of Educational Progress (Nces 2009-455)." Vol. Washington, DC: U.S. Government Printing Office: U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, U.S. Dept. of Education.

von Lockette, Niki Dickerson. 2010. "The Impact of Metropolitan Residential Segregation on the Employment Chances of Blacks and Whites in the United States." *City and Community* 9(3):256-73.

von Lockette, Niki Dickerson and William E. Spriggs. 2016. "Wage Dynamics and Racial and Ethnic Occupational Segregation among Less-Educated Men in Metropolitan Labor Markets." *Review of Black Political Economy* 43(1):35-56.

Western, Bruce and Becky Pettit. 2005. "Black‐White Wage Inequality, Employment Rates, and Incarceration1." *American Journal of Sociology* 111(2):553-78.

Wilson, Valerie and William M. Rodgers. 2016. "Black-White Wage Gaps Expand with Rising Wage Inequality." Washington, DC: Economic Policy Institute.

Wolfinger, Russ and Michael O'Connell. 1993. "Generalized Linear Mixed Models a Pseudo-Likelihood Approach." *Journal of Statistical Computation and Simulation* 48(3-4):233-43.

**Table 1: Unadjusted Mean Wages and Race/Gender Wage Ratios, 2010**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | N | 1980 | 1990 | 2000 | 2010 |
|  |  |  |  |  |  |
| Black Men | 67698 | 16.5(11.2) | 14.4 (3.3) | 16.2 (3.1) | 12.4 (16.9) |
| Black Women | 82509 | 11.9 (3.2) | 12.7 (5.4) | 16.1 (8.9) | 11.6 (13.5) |
| White Men | 666202 | 17.5 (2.1) | 20.5 (5.2) | 23.0 (4.1) | 17.0 (25.6) |
| White Women | 604826 | 11.5 (1.3) | 13.2 (2.1) | 16.6 (2.8) | 12.8 (17.6) |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Wage ratios: | MSAs |  |  |  |  |
| B/W men | 94 | .95 (.64) | .73 (.21) | .72 (.15) | .73 (.15) |
| B/W women | 94 | 1.05 (.29) | .98 (.50) | .99 (.56) | .84 (.13) |

**Figure 1:** Map of Black/White Male Wage Inequality

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**Table 2: Multi-Level Analysis of Wages, 2010**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Model 2 |  | Model 3 |  | Model 4  |  |
| *Individ. Level*: | Men | Women | Men | Women | Men | Women |
| age | .021(.000)\*\* | .018(.000)\*\* | .019(.000)\*\* | .018(.000)\*\* | .019(.000)\*\* | .018(.000)\*\* |
| married | .396(.003)\*\* | .171(.003)\*\* | .283(.004)\*\* | .171(.003)\*\* | .281(.004)\*\* | .172(.003)\*\* |
| Race | -.189(.005)\*\* | -.045(.004)\*\* | -.161(.033)\*\* | -.003(.029) | -.160(.033)\*\* | -.038(.029) |
| less than HS | -.515(.005)\*\* | -.556(.006)\*\* | -.375(.007)\*\* | -.555(.006)\*\* | -.315(.007)\*\* | -.551(.006)\*\* |
| college+ | .519(.003)\*\* | .448(.003)\*\* | .524(.003)\*\* | .449(.003)\*\* | .522(.003)\*\* | .446(.003)\*\* |
| hrs worked | .044(.000)\*\* | .058(.000)\*\* | .011(.000)\*\* | .058(.000)\*\* | .011(.000)\*\* | .058(.000)\*\* |
| foreign born | -.042(.000)\*\* | -.089(.005)\*\* | -.162(.005)\*\* | -.090(.005)\*\* | -.157(.005)\*\* | -.086(.005)\*\* |
|  |  |  |  |  |  |  |
| *Metro-Level*: |  |  |  |  |  |  |
| segregation | .003(.000) | .003(.001)\*\* | .002(.000)\*\* | .002(.000)\*\* | .002(.000)\*\* | .002(.001)\*\* |
| %public sector |  |  |  |  | .136 (.006) | .212 (.006) |
| %black |  |  |  |  | .000(.000) | .000(.000) |
| % black LTHS  |  |  |  |  | -.253 (.076) | -.223 (.086) |
| race\*seg |  |  | -.001(.001)† | -.001(.000)\* | -.001(.001)† | -.000 (.001) |
| constant | 7.052(.028) | 6.705(.027)\*\* | 8.859(.025) | 6.740(.026) | 9.006(.043) | 6.874 (.048) |

†p<.10,\*p<.05,\*\*p<.01, standard errors are in parentheses

**Figure 2**: Plotting Wages by Race/Gender at Varying Levels of Segregation

**Table 3: Metropolitan Characteristics Effects on Race/Gender Wage Gaps in 94 Metro Areas**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | B/W Men | B/W Women |
| Segregation | -.21†(.13)  | -.27\*(.13)  |
| % Minority | -.24†(.14) | -.23(.14) |
| %Lths (minority) | .11(.17) | -.72\*\*(.14) |
| %Manuf.  | -.22(.32) | -.33(.33) |
| %Pub. sect. | .90(1.23) | -1.52(1.26) |
| %Retail | -6.59\*\*(1.62) | -3.48\*(1.65) |
| Constant | 1.29\*\*(.17) | 1.64\*\*(.19) |

†p<.10,\*p<.05,\*\*p<.01, standard errors are in parentheses.

**Table 4: Fixed Effects Analysis of Black/White Wage Gaps in 94 Metropolitan Areas (1980-2010)**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | B/W Men | B/W Women |
| Segregation | 2.142\*(.89) | .924(1.12) |
| Minority | 1.303(1.40) | 1.089(1.74) |
| Less HS ratio | -.172(.20) | .522\*(.25) |
| College ratio | -.033(.04) | -.007(.05) |
| Manuf.  | 2.750(1.97) | -.879(2.45) |
| Pub. sect. | .034(1.66) | 1.089(2.07) |
| Services | 1.810(1.76) | -2.490(2.20) |
| Retail | -.751(1.24) | -.295(1.55) |

The education variables are ratios of the mean minority/white in each category.

†p<.10,\*p<.05,\*\*p<.01, standard errors are in parentheses.

APPENDIX

**Model 1: Multi-Level Analysis of Wages, 2010**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | White and Black Men | White and Black Women |
| Individ. Level: |  |  |
| Age. | .021(.000)\*\* | .018(.000)\*\* |
| married | .397(.003) \*\* | .172(.003) \*\* |
| Race | -.190(.004) \*\* | -.044(.004) \*\* |
| less than HS | -.516(.005) \*\* | -.557(.006) \*\* |
| college+ | .517(.003) \*\* | .447(.003) \*\* |
| hrs worked | .045(.000) \*\* | .058(.000) |
| foreign born | -.042(.004) \*\* | -.089(.005) \*\* |
| Constant | 7.211(.009) \*\* | 6.864(.009) \*\* |

†p<.10,\*p<.05,\*\*p<.01, standard errors are in parentheses

1. The census bureau changed the MSA definitions in 2000 necessitating significant adjustments to match MSAs before and after this change. [↑](#footnote-ref-1)