Ethnic Diversity, Income Inequality and the Social Distance of Face-to-Face Crimes[1]

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Abstract

Using a novel data set comprising the universe of reported crimes in Los Angeles County from 2000-2007, we examine race victimization patterns among face-to-face crimes at the neighborhood level. We develop a set of testable predictions derived from existing empirical and theoretical research regarding criminal outcomes of race interactions and income inequality across groups. Our research confirms some of these predictions, but we also find evidence that challenges previous research and general expectations. Perhaps most surprisingly, we observe consistent patterns of violence committed by White individuals against Blacks and Hispanics. Specifically, Whites are more likely to assault and use weapons against Blacks and Hispanics than Blacks and Hispanics are to assault or use weapons against Whites. Consistent with previous work, we confirm that Blacks and Hispanics are typically more likely to commit robbery, crimes often characterized by economic motives, against Whites. We estimate these effects across race distributions of neighborhoods, examine how changes in the race composition of neighborhoods over time affects crime outcomes as well as account for income inequality across neighborhoods in Los Angeles County.

Keywords: Victimization, Inequality, Race, Ethnicity and Social Distance

JEL: K4, J1, R3, I3

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1. Introduction

Crime and the fear of crime have significant effects on economic factors like the profitability of a business, firm location, the composition of workers that a firm can attract, worker productivity, and population migration. These externalities are not borne equally across geographic locations, however, as crime rates vary substantially across geography and demography, with higher crime rates within city boundaries, for poorer individuals, ethnic minorities, males, and youth offenders. As a result, race-based violence in particular geographies has become a common topic of media attention. Various accounts have been offered to explain this variation, including research on crime in urban and rural areas (Glaeser et al., 1996; Cullen and Levitt, 1999), within cities (Freeman et al., 1996; Glaeser and Sacerdote, 1999; Zenou, 2003), and across races (Sampson and Lauritsen, 1994; Verdier and Zenou, 2004), socioeconomic backgrounds (Case and Katz, 1991; O'Flaherty and Sethi, 2010a, 2010b), age (Levitt, 1998; Lee and McCrary, 2010; Bushway et al., 2012), and gender (Freeman, 1996; Kling et al., 2005). In addition, DeAngelo (2012) finds that law enforcement can lead certain types of criminals to clump together if they are similar, "low efficiency" offenders while others note that the choice of where to commit a crime is often determined by forces such as a gang's turf (Tita and Ridgeway, 2007; Tita et al., 2005; Ratcliffe and Taniguchi, 2011).

Research examining the details of homicide incidents in particular locations has documented that victims and offenders often have much in common (Lederman et al., 2002; O'Flaherty and Sethi, 2010a, 2010b). In Boston homicides of young people in the early 1990s, for example, 75 percent of victims and known killers had criminal histories, while 22 percent of victims and 33 percent of killers were on probation at the time of the homicide (Kennedy et al.,

1996). This finding of extensive participation in the criminal justice system among those involved in homicide has been replicated in Minneapolis, Cincinnati, and other locations (Kennedy, 2011). Not only are victims and offenders frequently of the same social milieu (e.g., age, race, sex, neighborhood), homicide incidents often involve repeated interactions among people in close social relationships, many of which are reasonably characterized as vendettas (Kennedy et al., 1996). This line of research turned over previous notions of high, and increasing, prevalence of "random" violence (Braga et al., 1999).

While focusing on homicides has the benefit of complete information regarding victims, it accounts for only 1.2 percent of all violent crimes in 2012.[2] Alternatively, assault and robbery account for 91.8 percent of all violent crimes and therefore ascertaining a greater understanding of the dynamics of these crimes is of importance. As data availability improves, one possibility is to examine whether social distance - defined as the relationship between the races of the victim and perpetrator - is similar across a larger subset of criminal activity. While data sets such at the National Crime Victimization Survey (NCVS) do have demographic characteristics of suspects and victims, geographic identifiers in the public use data are very coarse and fail to account for substantial detail regarding locational heterogeneity of where people live.[3] The National Incident Based Reporting System (NIBRS) also gathers information about criminal activity at the incident level, but participation in the program is quite low – especially amongst larger agencies/jurisdictions - making it difficult to obtain full coverage of reported crime in a geographic region. While NIBRS is capable of identifying perpetrator/victim specific information, these accounts are linked to the agency that the incident was reported to, making it

[2] See http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2012/crime-in-the-u.s.-2012/violent-crime/violent-crime
[3] NCVS, NIBRS, and UCR also fail to identify respondents as Hispanic or Latino until relatively recently, an issue that our data set has overcome for our entire sample.

difficult if not impossible to attach disaggregated information regarding income, racial composition, and any other census-tract specific information.[4]

A novel aspect of our paper is that our data are able to consider the social distance as we define it between victims and their alleged offenders at the neighborhood level measured by census tracts in Los Angeles.[5] Through a research agreement with the Los Angeles Police and Sheriff's departments (LAPD and LASD) we are able to examine all reported crime incidents at the census tract level, providing the ability to account for neighborhood demographic and economic attributes. Given the nature of our data, we can examine the social distance for three different face-to-face crimes: robbery, assault and crimes that involve weapon use. Crimes that fall into more than one category are based on the primary classification by the responding officer. Disaggregating by crime type has the advantage of allowing us to separate crimes that likely have economic motives (robbery) from others that are less likely to have this characteristic (assault and weapon use). Since these crimes are personal in nature and face-to-face, the suspect and victim have the ability to identify each other's race and have links to issues regarding social distance. Moreover, by matching crimes to census tracts, we are able to examine the role of social distance using neighborhood-level measures in discerning the likelihood of a criminal incident occurring by/against a particular race.[6]

Our paper not only extends the previous research regarding homicide to the more frequent, yet lesser studied, crimes of robbery, assault and weapons use, but the geographic detail

[4] For a well-documented detail of the benefits and shortcomings of the many crime databases, see Tabarrok et al. (2006) and MacDonald (2002).
[5] For the purposes of this paper, we will use race as a catchall term to refer to both race and ethnicity, with no offenses intended.
[6] In examining the role of social distance we will consider the role of networks as well as "vulnerable" populations in our analysis.

of our data allow us to make several additional innovative contributions to the literature.[7] For example, our data can be linked to Decennial Census data and the American Community Survey to estimate the propensity of specific crime outcomes for every type of race interaction across neighborhoods that vary in racial composition and income inequality. Therefore, we are able to not only determine the likelihood of violence occurring between two groups, but we can identify the incidence of race matched violence conditional on, for example, which group belongs to the majority population in that neighborhood. In addition, we are able to measure demographic changes in population for each neighborhood over time and see how these population dynamics affect criminal propensities for certain races to victimize each other. For example, we know whether the majority population in a neighborhood became more or less dense, whether the neighborhood converged or diverged from being racially mixed, and in some cases whether the minority and majority population flipped. Furthermore, within each census tract we can measure the level of income inequality across different races. We hypothesize that income inequality within and across neighborhoods, defined at the refined geographic level that we are able to achieve here, may be a determining factor of the incidence and dynamics of economic versus non-economic based crimes.

Empirical, observational and theoretical explanations for the variation in criminal behavior have been present in the literature for quite some time. Sutherland (1939) offers one of the earliest accounts to explain variation in crime through differential association. More recent explanations for the spatial variance in criminal activity have been presented by Glaeser et al. (1996) and O'Flaherty and Sethi (2007). These papers find that social interactions and segregation play a fundamental role in determining the location of criminal activity such as

[7] Zimring and Zuehl (1986), for example, do examine victim race and personal relationships between victim and offender for a case study of robbery in Chicago. The authors state that robbery is more likely than assault to be experienced by victims of large social distance from their alleged offenders.

robbery and homicide. O'Flaherty and Sethi (2007) theoretically argue that "robbers prey disproportionately on Whites, believing them to be more compliant, and Whites protect themselves by moving disproportionately to safer neighborhoods." Glaeser et al. (1996) predicts that the severity of crime will vary with the extent of social interactions experienced by criminals, such that the least severe types of crime will be most common when indices of social interaction are high and the most severe types of crime will be most common when the extent of social interaction is low.

While space, segregation and social interactions are predicted to play significant roles in determining the variation of crime rates and composition of criminal activity, there is also reason to believe that race and other socioeconomic variation will show similar spatial segregation. O'Flaherty and Seth (2010) provide a theoretical justification for the presence of higher murder rates in largely Black communities in comparison to White communities, noting that "disputes can escalate dramatically in environments (endogenously) perceived it be dangerous, resulting in self-fulfilling expectations of violence for particular dyadic interactions, and significant racial disparities in rates of murder and victimization." Phillips (2002) confirms that homicide rates are significantly higher in Black communities as compared to White communities, but also notes that there is a considerable difference in the homicide rate between Latino and White communities, although the difference is smaller than what is seen between Black and White communities.

Lederman et al. (2002), in addition to other research cited above, considers social capital's relationship to homicide events across countries. The authors define social capital as "the set of rules, norms, obligations, reciprocity, and trust embedded in social relations, social structures, and society's institutional arrangements that enables members to achieve their individual and community objectives." While this notion of social capital differs somewhat from

our ideas of social distance (which we analyze based on similarities and differences in demographic characteristics), insights from the study are relevant to our work. Specifically, the authors argue that the relationship between crime and social capital is bidirectional and find that indicators of community trust are negatively related to homicide crime (results for religion and church activity, in contrast, are sensitive to specification).

The paper proceeds as follows. In Section 2, we outline specific predictions from the theoretical literature as well as empirical regularities found in other research. Section 3 describes our data and outlines its benefits over alternative data. Section 4 describes our methodology and main empirical specification. Section 5 presents our results and Section 6 provides discussion and concluding remarks focused on the relevance of our work for understanding spatial distributions of poverty, inequality, and crime in light of social distance between the involved parties.

2. Predictions from the Literature

There is a considerable amount of research that addresses the role of income, segregation, social networks and work force participation on crime in urban locations. This work is both theoretical and empirically descriptive at both aggregated and disaggregated levels. This body of work – which is far too expansive to thoroughly survey - has resulted in a variety of predictions/expectations about criminal behavior that we will briefly outline, while referring the interested reader to the referenced research for specific details. For expositional purposes we will break these predictions into property versus violent criminal predictions, then discuss components of geographic variation across cities.

Property crime typically comprises burglary, larceny, theft, arson, shoplifting and vandalism. Determinants of property crime rates are overwhelmingly linked to races that have lower income and fewer employment opportunities. Research that examines criminal behavior through epidemic models of social reinforcement about arrests[8], police and crime have provided insights about the composition of social environments that appear to generate higher crime locations (see Sah, 1991, Cook and Goss, 1996 and Glaeser et al., 1996, Alesina et al., 1999).[9] More specific work that attempts to crack into the driving factors behind higher crime locations have unearthed findings that are repeated in the literature. Specifically, Cozzi (2010) develops a general equilibrium model and shows that lower income individuals who work fewer hours (typically consisting of Black and Hispanic populations) and have lower income are more involved in criminal activity, a point that is reinforced in Gould et al. (2006) and Machin and Meghir (2004). Levitt (1999) reinforces this finding, but also notes that the poor could also become victims as relatively wealthier populations spatially separate. Zenou (2003), Verdier and Zenou (2004), Calvo-Armengol and Zenou (2004) and Calvo-Armengol et al. (2007), add to this literature by discussing the role of social networks, beliefs about who is involved in criminal activity and distance to employment.[10] Taken together, this work finds that poorer, Black individuals are more likely thought to be criminal, leading to fewer job opportunities. Additionally, poorer individuals tend to live further from their work, which decreases the opportunity cost of engaging in criminal activity. Patacchini and Zenou (2008) builds on this work by identifying the link between social interactions/networks and crime, noting that

[8] This could include the stigma associated with arrest, the perceived likelihood of arrest.
[9] Alexander (2011) has highlighted that while the observed crime rates could be a function of lack of opportunity, income and education, it might also be a system that is strategically rigged to permit profiling and segregation.
[10] Cook and MacDonald (2011) also note that crime can be deterred merely by its proximity to business improvement districts.

networks with even weak ties to crime will induce more transitions from non-criminal to criminal behavior.

This is a finding that is echoed in a fair amount of research, including Sampson et al. (1997), O'Flaherty and Sethi (2008), Bjerk (2010) and Levitt (1999). Additionally, Sampson et al. (1997) conduct a multilevel longitudinal analysis in 180 Chicago neighborhoods and find that the odds of violence are 85% higher for Blacks compared to Whites, whereas Latino violence is about 10% lower. Kling et al. (2005) evaluate the impact of a housing voucher that permits an individual living in a poverty-stricken area to be moved to a lower poverty region, finding that females reduce their overall criminality. Males, on the other hand, reduce their violent crime behavior, but experience increases in problem behaviors and property crime arrests.

From the above referenced work, we highlight two propositions that we intend to examine in our data. Proposition 1 highlights the fact that, with regards to property crimes, we expect to see higher rates of property crime committed by lower income individuals, especially against higher income individuals.

> ***Proposition 1*: The propensity to commit property crime will be highest amongst lower income populations - predominately Black and Hispanic - and will be committed against relatively higher income populations.**

In our data, Whites on average have higher incomes than both Blacks and Hispanics, while Blacks have higher incomes than Hispanics. Our next proposition develops an expectation for criminal activity across race, it does not speak directly to the racial composition of locations. As pointed out in O'Flaherty and Sethi (2007) "geographic concentration in robbery rates can lead to segregation (in excess of levels that would emerge under neighborhoods that sort by

income) because robbers prey disproportionately on Whites, believing them to be more compliant, and Whites protect themselves by moving disproportionately to safer neighborhoods." This point is further addressed in Zenou (2003), who notes that in addition to being involved in a network of individuals who commit crime, spatial segregation will result in poorer populations having to travel further to find work, thereby reducing their opportunity cost of crime. Taken together, these theoretical contributions are the driving forces of Proposition 2.

> ***Proposition 2*: As regions become more segregated, areas with lower income populations (Black or Hispanic) will have higher incidences of crime against lower income individuals. In addition, higher income locations will have higher incidences of property crime being committed against higher income (White) individuals.**

Behavior regarding property versus violent crimes can display similar patterns, but the underlying mechanism that explains the criminal patterns will likely differ. Specifically, as noted in the Uniform Crime Reports, violent crime rates are highest amongst Black (38.3%) and Hispanic (38.7%) populations.[11] The reasons for these differences have been explored both theoretically and empirically. As noted in Cubbin et al. (2000), urbanization is a major component in explaining the variation in homicide rates, but sociostructural factors significantly mattered in this study, as poorer locations lead to higher homicide rates for both Blacks and Whites (see also Rogers et al., 2002). Stolzenberg et al. (2006), Messner and Golden (1992) and Blau and Schwartz (1984) examine the role of socioeconomic factors (namely, inequality) in explaining White-Black violent crime rates. Stolzenberg et al. (2006) determines that intraracial inequality has no significant impact, but that interracial inequality was a strong predictor of the

[11] Figures computed from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2013/crime-in-the-u.s.-2013/tables/table-43

overall and Black-on-Black violent crime rates.[12] This reinforces the findings in Messner and Golden (1992) and Blau and Schwartz (1984). Two potential rationales are used to explain White-Black crime rates in higher inequality regions. First, the inability of the disadvantaged to get a fair redistribution of resources, or more open access to wealth, generates anger and frustration, which ultimately generates more crime. Second, Messner and Golden (1992) and Wadsworth and Kubrin (2004) suggest that increasing heterogeneity amplified the probability of intergroup contact, which increased the opportunity to commit interracial crimes.

While income inequality can lead to greater segregation, this appears to deepen the violent crime issue, as Feldmeyer (2010) finds that racial segregation (especially segregation away from White populations) contributes to Black and Hispanic homicide rates, which are largely similar. Cullen and Levitt (1999) show evidence that this divide will persist, noting that each additional reported crime is associated with a roughly one-person decline in city populations. Finally, Kling et al. (2005), as part of a Moving-to-Opportunities housing-mobility experiment, found that being systematically moved to neighborhoods with lower poverty reduced violent behavior by teens.[13]

The following propositions therefore are derived from the race-spatial literature on crime. This literature utilizes a mix of survey and observational data, as well as a large in-the-field experiment in arriving at these predictions about the race-spatial property and violent crime rates.

***Proposition 3a*: The incidence of violent crime will be higher for lower income populations (Black and Hispanic) and will be highest amongst**

[12] Fajnzylber et al. (2002) examines the role of inequality across both developed and developing countries and finds that greater income inequality leads to higher violent crime rates.

[13] Peterson and Krivo (2009) find significant racial-spatial differences across 36 U.S. cities, noting that proximity to either disadvantaged or racially privileged (White) areas accounts for the large and visible difference in violence across races.

poorer neighborhoods, not across lower and higher income neighborhoods.

***Proposition 3b*: The incidence of violent crime will be higher within areas that are predominately lower income or where higher levels of income inequality exist, with lower income populations committing violence amongst themselves and against higher income individuals.**

We now turn our attention to empirically testing these propositions using a unique data set from Los Angeles County.

3. Data

We utilize the data from LAPD and LASD to determine the effect of racial diversity and income inequality on criminal interactions. We are specifically motivated by previous research, which finds that greater income inequality and poor, Black communities suffer from higher criminal activity – especially assault, robbery and homicide. In what follows, we will separate results into race pairs and examine how these dyads interact in a criminal space.

The data from LAPD/LASD are novel and contain information on the universe of reported crimes in Los Angeles County between January 2000 and December 2007.[14] Each reported crime identifies the race, sex and age of both the victim and the suspect as well as the type of crime committed. The location of each crime is identified by a Los Angeles County reporting district, which we then map into census tracts in order to merge on socioeconomic characteristics from the Decennial Census and American Community Survey.

[14] While one might be concerned that certain populations are less willing to report criminal activities, the Bureau of Justice Statistics found that reporting rates for Black, White and Hispanic populations were 54.7%, 47.7% and 52.1% from 2001-2005 (see http://www.bjs.gov/content/pub/pdf/bvvc.pdf).

These data provide rich information regarding criminal interactions between victims and suspects across detailed geographic areas and over time. Since our focus is on racial interactions and criminal outcomes, we narrow our analysis to three "face-to-face" crimes: robbery, assault and weapon use. While robbery is a crime involving a financial transfer and therefore may be described as being economically motivated, assaults involve a level of violence between the victim and suspect and may be less related to differences in economic variables. Additionally, we include weapons related incidents, as both robberies and assaults could include the use of weapons.[15] Our data also include homicide and rape crimes, but there are too few of them (in total and within census tracts) to meaningfully include in our analysis.

Our data yield significant advantages over other alternatives such as the previously described NCVS public use data. While the NCVS covers a longer time frame (1973-2013), it has very coarse geographic identifiers.[16] Specifically, the NCVS is a national survey that only identifies the region of the respondent and whether or not the individual lives within a Metropolitan Statistical Area (MSA), the central city of an MSA or not in an MSA.[17] Unlike our data, the NCVS public use data are not detailed enough to perform a neighborhood-level analysis. Neighborhood-level identifiers are crucial for our analysis since our research question is cast in the context of "social distance", and neighborhood characteristics reflecting social distance vary tremendously within an MSA or across regions.

3.1 Characteristics of the LA County Reported Crimes Data

[15] While it is possible to distinguish instances when these outcomes occur together (Robbery and an Assault) from instances when only one crime occurs (Assault only), our outcome measures in the empirical analysis (Robbery, Assault, Weapon Use) are not conditional on whether additional crimes occurred at the same time.
[16] Detailed geographic identifiers in the NCVS are only attainable when granted special permission to use the data in one of the Census Bureau's Research Data Centers.
[17] Documentation and survey methodology for the NCVS can be found at the Bureau of Justice Statistics website: http://www.bjs.gov/index.cfm?ty=dcdetail&iid=245.

The universe of the reported crimes comes from 1,452 unique reporting districts in LA County, which are mapped into 1,257 census tracts.[18] Annually, we observe an average of 943 census tracts reporting some positive number of crimes each year, ranging from 917 census tracts in 2000 to 983 census tracts in 2007 (the number of census tracts reporting crimes is not linearly increasing over time however). The annual average number of robberies, assaults and crimes involving weapons are 192,075, 82,000, and 3,918, respectively. The total number of reported crimes in the data is 4,979,049 or about 622,381 crimes per year.

Critical to our analysis is the ability to identify the race of both the suspect and the victim, although it is sometimes the case that either the race of the suspect or the victim is not reported. Our data cleanly matches an annual average of 33,291 Black-on-Black crimes per year, 18,328 White-on-White crimes per year, 67,805 Hispanic-on-Hispanic crimes per year, 9,159 crimes involving Blacks and Whites per year, 19,017 crimes involving Blacks and Hispanics per year, and 17,979 crimes involving Hispanics and Whites per year. This accounts for a total of 1,324,633 matched crimes between Blacks, Hispanics and Whites in our data, or about 165,579 crimes per year in Los Angeles County. For perspective, the NCVS data surveys approximately 160,000 individuals per year using a national sampling frame.

Table 1 reports additional characteristics about the data, including data merged in from the Decennial census and ACS. The unit of observation is a reported crime and the table is split into three panels reflecting the estimation samples of our main analysis – reported crimes involving Black/White interactions, crimes involving Black/Hispanic interactions and crimes

[18] There were a total of 1,652 census tracts in 1990 but not all of tracts reported crimes in our data. See the data appendix for details regarding mapping the reporting districts to census tracts.

involving Hispanic/White interactions.[19] The population ratios show that the racial composition of neighborhoods in our data is highly skewed. The average Black/White population ratio is 2.99 Black individuals per White individual but the median is 0.115. The average Black/Hispanic population ratio is 0.562 with a median of 0.140, while the average Hispanic/White ratio is 2.765 with a median of 1.837. Overall, this suggests that Black and Hispanic populations tend to live in more population dense neighborhoods relative to White individuals.

With regards to crime, committing a crime against one's own race is significantly more likely than committing a crime against someone of a different race. Additionally, Black and Hispanic offenders are more likely to victimize White individuals than vice versa. Assaults appear to be most prevalent when Black individuals are involved in the criminal interaction, while robberies appear to occur less frequently when Hispanic individuals are not involved. Weapons related criminal activities appear to occur at roughly the same frequency across the racial dyads, but comprise less than one percent of all criminal activities that we observe in our data.

We will also incorporate earnings inequality into our analysis. Hispanics tend to have the lowest median earnings and Whites having the highest. The median White/Black earnings ratio shows Whites earn about 17 percent more than Blacks across neighborhoods in LA County, Blacks earn about 41 percent more than Hispanics, and Whites earn about 50 percent more than Hispanics.

4. Empirical Specification

Our objective is to estimate variations in the propensity of selected violent and non-violent crimes conditional on the race specific match of the suspect and victim in the interaction,

[19] Note that White-on-White interactions appear in two estimation samples (Black/White sample and Hispanic/White sample) as the base category. Similarly, Black-on-Black interactions appear in two estimation samples as well. We will separately estimate each sample, however, so these observations are not duplicated.

and also to allow for these propensities to vary across the race distribution of neighborhoods in LA County. To do so, we first construct a measure of social distance specific to each neighborhood (census tract) using ratios of the population counts for Whites, Blacks and Hispanics and then identify each neighborhoods position in the distribution of this measure across neighborhoods in LA County.

Population estimates are not available annually at the census tract for each year of our data. Therefore, for the Black and White population, we construct the average Black-to-White population ratio for each census tract in the county from 2000 Decennial Census data and 2009 American Community Survey data (the first year annual census tract level estimates are available).[20] This will approximately reflect the Black-to-White population ratio in each year of our data (2000-2007). Using this average ratio, we assign each census tract a quintile that identifies its position in the racial distribution across all census tracts in LA County. Quintile 5 identifies the neighborhoods with the greatest number of Black individuals per White individuals, Quintile 3 identifies the neighborhoods that are relatively equal in composition among Blacks and Whites, and Quintile 1 identifies the neighborhoods that are significantly more White than Black. Quintiles 2 and 4 identify neighborhoods that are not equally mixed nor in the extremes.

We do the same to calculate the average the Black-to-Hispanic population ratio (Quintile 1 is mostly Black, Quintile 5 is mostly Hispanic) and the average Hispanic-to-White population ratio (Quintile 1 is mostly White, Quintile 5 is mostly Hispanic). These measures of social distance proxy for the frequency in which race groups are likely to interact face-to-face within a

[20] We proxy for 2007 information on racial composition, income, etc. using data from the American Community Survey in 2009.

very small geographic area (neighborhoods measured at the census tract level).[21] Constructing the measures in this way will allow us to identify the propensity of face-to-face crimes (robbery, assault, weapon use) across these neighborhood population characteristics for each type of suspect/victim interaction among race matches.

To identify the neighborhood-specific propensity of crime outcomes for each type of suspect/victim interaction, we specify the following model (for the case of Black-White interactions):

$$Y_{cnt} = \alpha + \sum_{q=1}^{5} I_n^q \left(\sum_{\substack{i\in\{B,W\},\\ j\in\{B,W\}}} \beta_{ij}^q \{s^i v^j\}_{cnt} \right) + \mu_{nt} + \varepsilon_{cnt} \quad (1)$$

where $Y_{cnt} \in \{0,1\}$ is an indicator for the type of reported crime, *c*, committed (robbery, assault, or weapon use) in neighborhood *n* in year *t*. I_n^q is an indicator variable equal to 1 if neighborhood *n* is in quintile *q* of the population ratio. The term $s^i v^j$ is an indicator for the type of suspect/victim interaction that takes place in which there are four possibilities. For example, $s^B v^B$ is an interaction in which both the suspect and the victim are Black. Black-on-White and White-on-Black crimes are identified by $s^B v^W$ and $s^W v^B$, respectively, and $s^W v^W$ identifies White-on-White crimes. The four indicators are collinear, so $s^W v^W$ is omitted as the base category. Unobserved heterogeneity is represented by μ_{nt}, which are neighborhood-year specific fixed-effects, and ε_{cnt} is an i.i.d. error term. The model is estimated by least squares with clustering at the neighborhood-year (*nt*) level. Our parameters of interest are the β_{ij}^q, which identify the propensity of a specific type of crime occurring in each quintile *q* of the population ratio distribution and for each type of interaction, $s^i v^j$.

[21] Later we will integrate income inequality to deepen our identification of social distance among racial groups.

The extraordinary detail in our data that allows for the inclusion of neighborhood-by-year effects is crucial to the interpretation of our results. The μ_{nt} parameters account for all unobservable variation specific to each neighborhood/year combination. This, of course, absorbs more unobserved heterogeneity than including only neighborhood and year fixed effects, separately. Specifically, μ_{nt} will capture overall levels of crime in the neighborhood that vary over time; arrest rates and policing strategies in the neighborhood that vary over time; economic conditions and demographic changes in the neighborhood that vary over time; overall racial attitudes in the neighborhood that may vary over time; and any other variables one may think to include at the neighborhood level that vary over time. That leaves few factors that could be in ε_{cnt} and also correlated with both $\{s^i v^j\}_{cnt}$ and Y_{cnt}.

Upon estimation, the parameters of the model take on straightforward interpretations. Suppose $Y_{cnt} \in \{0,1\}$ identifies a robbery among all reported crimes, c, in neighborhood n and year t. Then the estimated μ_{nt} reflects the overall propensity for a robbery to occur in the neighborhood/year, and the β_{ij}^q are parameters that identify the average i,j race-specific deviations from that propensity across neighborhoods and over time. Conditional on μ_{nt}, we are testing the hypothesis that the race match of the suspect and victim does not matter in the likelihood of a robbery occurring ($\beta_{ij}^q = 0$) for each neighborhood type q.

One concern with our empirical model is that increases in criminal activity (represented by Y_{cnt}) affects the choice of where people live – White or high-income populations moving out of high crime neighborhoods. If so, the Black/White population ratio changes as criminal activity changes and therefore our β_{ij}^q will be biased for each quintile assignment q. Our research design significantly mitigates this concern because the quintile assignment is constant over time (based on the average population distribution over our sample period). Therefore, even if the propensity

of violent crime increases in a specific neighborhood over time, the assigned quintile for the population ratio is not affected by construction.

We estimate an identical specification for Black-Hispanic and Hispanic-White interactions. For the Black-Hispanic interactions, $i, j \in \{B, H\}$ and $s^H v^H$ is the base category. For the Hispanic-White interactions, $i, j \in \{H, W\}$ and $s^W v^W$ is the base category.

5. Results

Effect of Racial Integration/Segregation on Crime

Our main results are the product of estimating equation (1) above for Black-White, Black-Hispanic and Hispanic-White interactions. As discussed in our estimation strategy, we control for unobserved census tract-year variation. By estimating these effects across quintiles of the distribution of racial population density, we can observe how sorting amongst race impacts the likelihood of victimization/perpetration for each specific race interaction.

Tables 2 – 4 present our first set of results and illustrate the framework that we will use in presentation henceforth. Table 2 highlights the relationship between Black-White dyads across five quintiles of the Black/White population ratio. Construction of the quintiles is explained in the previous section.

Equation (1) above is estimated separately using data only on Black/White matched interactions for each crime separately: robbery, assault and weapon use. The first three rows in Table 2 all pertain to the same estimated model that predicts robbery as a potential crime outcome. The next three rows pertain to the model that predicts assault, and the final three rows pertain to the model that predicts weapon use as a crime outcome. Entries are estimated

coefficients and standard errors. Each coefficient entry pertains to a β_{ij}^{q} from the model, for q = 1…5.

For the Black/White interactions, $s^W v^W$ is the omitted category. Therefore, the estimated parameters in Table 2 show the propensity of a specific crime occurring for Black-on-Black, Black-on-White, and White-on-Black interactions relative to a White-on-White matched crime. For example, in the first quintile (representing neighborhoods with the most White individuals per Black individuals), when a Black-Black perpetrator-victim match occurs in our data, this is associated with a 2.4 percent higher likelihood that this interaction results in a robbery when compared to a White-White perpetrator-victim match.[22] Similarly, Black-Black interactions are 1.2 percent less likely to result in robbery than White-White matches in Quintile 3 (neighborhoods where Whites and Blacks are more equally distributed) but are 5.4 percent more likely to result in robbery in Quintile 5 (mostly Black neighborhoods). Blacks are consistently more likely to rob Whites (21-30 percent more likely) than Whites are to rob Whites across all neighborhoods regardless of the neighborhood placement in the distribution of the Black/White population ratio. Similarly, Whites are more likely to rob from each other than rob Blacks in mostly White neighborhoods (Quintiles 1-3) but rob from Blacks more frequently than Whites in mostly Black neighborhoods (Quintile 5).

Rows 2 (Black-White) and 3 (White-Black) are both relative to White-White interactions. Therefore, the difference between those coefficients across columns yields the difference in propensity for Blacks and Whites to rob from each other. For example, in neighborhoods with the greatest density of White individuals (Quintile 1), Blacks are 33.5 percent (30 - (-3.5)) more

[22] For simplicity, we will refer to crimes as, for example, White-Black throughout our discussion, which refers to White perpetrators and Black victims.

likely to rob from Whites than Whites are to rob from Blacks, but Blacks are only 18.3 percent (22.3 - 4.0) more likely to rob from Whites in very Black neighborhoods (Quintile 5).

The results for assaults are consistent across all neighborhood types. Black-Black interactions are 4.6 to 6.7 percent more likely to result in assault than White-White interactions, and occur with the greatest frequency in mostly White neighborhoods. Furthermore, Blacks are significantly *less* likely to assault Whites than Whites are to assault Whites and Whites are significantly *more* likely to assault Blacks than Whites. Comparing the estimates for Black-White and White-Black suggests that Blacks are less likely to assault Whites than Whites are to assault Blacks. The estimates range from Blacks being 24.4 percent (-13.1 - 11.3) less likely to assault Whites than Whites assault Blacks in very White neighborhoods (Quintile 1) to 11.8 percent (-8.2 - 3.6) less likely to assault Whites than Whites assault Blacks in very Black neighborhoods (Quintile 5).

For crimes involving the use of a weapon, Blacks are more likely to use weapons against each other than Whites are to use weapons on each other and Blacks infrequently use weapons against Whites. However, Whites are more likely to use weapons against Blacks than against themselves in all neighborhoods and are also more likely to use weapons against Blacks than Blacks are to use weapons against Whites. Again, taking the difference between the coefficients for Black-White and White-Black shows that Whites are statistically significantly more likely to use weapons against Blacks in all neighborhoods than Blacks use weapons against Whites. Furthermore, Whites are most aggressive in weapon use against Blacks in more White neighborhoods (Quintiles 1-4).[23]

[23] The magnitudes are small however, ranging from 0.3 percent in Quintile 5 (0.006 - 0.003) to 1 percent more likely in very White neighborhoods in Quintile 1 (0.010 - zero).

In Table 3 we compare interactions amongst Black and Hispanic populations. Quintile 1 reflects mostly Hispanic neighborhoods and Quintile 5 reflects mostly Black neighborhoods. Again, these models are estimated only on the subset of suspect-victim matches in our data involving Blacks and Hispanics. Similar to the Black-White matches in Table 2, the omitted match category for all models in Table 3 is $s^H v^H$ (Hispanic-on-Hispanic crimes).

The results in Table 3 indicate a consistent and significant effect of fewer Black-Black robberies in all neighborhoods, but higher robbery incidents between Blacks and Hispanics in all neighborhoods. However, the point estimates of Black-Hispanic robbery incidents are significantly larger than the Hispanic-Black estimates, indicating that Blacks are more likely to rob from Hispanics than Hispanics are to rob from Blacks in all neighborhoods. These results are both consistent and statistically significant across all quintiles.

Assaults amongst Hispanic and Black populations follow largely the same pattern as our White/Black results. That is, Black-Black assaults are much more likely than Hispanic-Hispanic assaults, while Black-Hispanic assaults are significantly lower than Hispanic-Hispanic assaults. Furthermore, the coefficients for Black-Hispanic assaults are routinely negative while the Hispanic-Black coefficients for assault are positive (or zero), indicating that Hispanics are more likely to assault Blacks than Blacks are to assault Hispanics (magnitudes larger than 10 percent more likely). Finally, as these populations share the same space, we find significant evidence that Hispanic-Black assaults become increasingly likely. This can be seen by comparing the Black-Hispanic and Hispanic-Black coefficients across columns for assaults: In Quintile 1, Hispanics are 12 percent more likely to assault Blacks (2.4 + 9.6) and become more aggressive toward Blacks in Quintiles 2 and 3 (15.5 percent more likely to assault Blacks in Quintile 3, 5.8 + 9.7). Weapons related crimes amongst these populations indicate that Hispanics are much more likely

to use a weapon on a Black individual than another Hispanic individual and are more likely to use weapons on Blacks than Blacks are to use weapons on Hispanics, while all other interactions seem to be equally prevalent.

The results amongst Black/White interactions are largely similar to those amongst Hispanic/White interactions, which are depicted in Table 4. Quintile 1 identifies predominantly White neighborhoods and Quintile 5 identifies predominantly Hispanic neighborhoods. There are, however, three consistent and statistically important results that are present amongst the Hispanic/White interactions that we do not observe in the Black/White interactions. First, White-Hispanic robberies occur more than White-White robberies, especially in predominately Hispanic areas, while White-Black robberies occurred less frequently in Table 2. Second, and also in more predominately Hispanic areas, we see a higher rate of Hispanic-White weapons related crimes, which we did not observe regarding Black-White weapons use. However, consistent with the Black-White interactions in Table 2, the White-Hispanic coefficients for weapon use are more positive than the Hispanic-White coefficients in all neighborhoods but those in Quintile 5 (areas with the largest number of Hispanic to Whites). As before, this indicates that Whites are more likely to use weapons against Hispanics than Hispanics are to use weapons against Whites.

With the set of results in Tables 2-4, we can evaluate the first three of our propositions. *Proposition 1* claimed that Blacks and Hispanics will have a higher propensity to commit property crimes and will do so against higher income populations. Consistent with this proposition, we find that Black-White robbery incidents are much higher than White-Black incidents. One possible exception to *Proposition 1* is that we find that Whites rob more from Blacks in predominately Black areas (Quintile 5) than they do Whites. However, this may still be

consistent with *Proposition 1* because Whites who live in predominantly Black neighborhoods may be extremely poor. Further affirmation of *Proposition 1* is the trend in the propensity of Blacks to rob Whites versus Whites robbing Blacks across quintiles: Blacks are almost twice as likely to rob from Whites in mostly White neighborhoods than they are in mostly Black neighborhoods (33.5 percent versus 18.3 percent), likely reflecting relative income differences across quintiles. The proposition is equally confirmed in Table 4 regarding Hispanic and White interactions as Hispanics are more likely to rob Whites in all quintiles and they do so more frequently in more White neighborhoods.

Proposition 2 claims that in segregated areas, poorer populations (Blacks and Hispanics) will have higher incidents of crime against themselves, but that there will be more crime against Whites in higher income neighborhoods (White census tracts). Our data provided mixed evidence regarding this proposition. Quintile 5 in Table 2 (Table 4) identifies the most Black (Hispanic) neighborhoods in LA County, and therefore poorer on average relative to more White neighborhoods. According to the first part of *Proposition 2*, we should see more Black-Black and Hispanic-Hispanic crime than Black-White and Hispanic-White crime. In Table 2, we see this is the case for assaults where Blacks are more likely to assault each other than Whites, but not for robbery where Blacks are more likely to rob Whites than each other. The propensity for Black-Black and Black-White weapons use is about the same in Quintile 5. In Table 4 we see similar results regarding *Proposition 2*: the proposition is affirmed for assault, but not robbery where Hispanics still steal more from Whites in poor neighborhoods and where Hispanics use weapons against Whites more than each other. The second part of Proposition 2 can be evaluated by looking at Quintile 1 (mostly White neighborhoods and relatively higher income locations) in

Tables 2 and 4. Here, we see this part of the proposition is confirmed as both Blacks and Hispanics are more likely to rob from each other than Whites.

Proposition 3a/3b claims that the incidence of violent crime will be higher for lower income populations and the propensity for violent crime among these groups will be highest in the poorest neighborhoods. This proposition can again be evaluated using Tables 2 and 4. The first part of the proposition is uniformly rejected since White individuals are more likely to assault and use weapons against Blacks and Hispanics than Blacks and Hispanics are to assault or use weapons against Whites (comparing rows 5 to 6 and rows 8 to 9 in those tables). As discussed earlier, the estimates are not only statistically significant but the magnitudes reflecting this difference are large, especially for assaults. To sum, Whites are 12 to 24 percent more likely to assault Blacks and 0.6 to 1 percent more likely to use weapons against Blacks than Blacks are against Whites. From Table 4, Whites are 9.5 to 19.6 percent more likely to assault Hispanics. To evaluate the second portion of the proposition, we would expect to see the magnitude of the coefficients regarding crimes where Blacks and Hispanics are the perpetrator to become larger as one moves from Quintile 1 to Quintile 5. In Table 2, this appears to be true for Black-Black robbery and Black-White assault but not for Black-White robbery or Black-Black assault. The magnitude of the coefficients for weapons use among Blacks is either statistically zero or remains very small across the quintiles. For crimes where Hispanics are the perpetrator in Table 4, there is some support for the proposition regarding Hispanic-Hispanic robbery and Hispanic-Hispanic and Hispanic-White weapons use as the estimated parameters become slightly larger from Quintile 1 to Quintile 5. However, the coefficients decrease in size from Quintile 1 to Quintile 5 for both Hispanic-Hispanic and Hispanic-White assault.

5.1 Population Dynamics

The previous results show how specific race interactions lead to differences in the propensity for certain crime outcomes to occur and how those propensities vary by the population composition of neighborhoods. Here we take advantage of the time dimension of our data and that we can identify changes in the composition of neighborhood populations over the sample period. This part of our analysis addresses two interesting questions: 1) How are race interactions and crime outcomes affected when a majority population becomes more or less dense in a neighborhood? 2) How are race interactions and crime outcomes affected when neighborhood populations become more mixed, less mixed or remain the same?

To answer these questions, we create two measures that describe how neighborhood populations evolved over our sample period. Using the same census tract population counts for 2000 and 2009, we create census tract-specific population ratios for Black/White, Black/Hispanic and Hispanic/White in 2000 and 2009, separately. For years 2000 and 2009 individually, we assign every census tract a decile based on its location in the distribution of population ratios for that year. For example, a census tract in decile 1 of the Black/White population ratio in 2000 would be a neighborhood that was predominately White and a census tract in decile 10 of the Black/White population ratio in 2000 would be a neighborhood that was predominately Black. Then, by comparing a census tract's location in the distribution in 2000 to the location in 2009, we are able to assign categorical descriptions of how that population evolved relative to other census tracts in LA County. Our two measures are created as follows (using the Black/White data as an example).

Simple Changes in Population Density: For each census tract *n*, define $Diff_n = Decile_n^{2009} - Decile_n^{2000}$ and assign categories below based on the value of $Diff_n$.

Much More White: $Diff_n < -2$

Slightly More White: $Diff_n = -2$

Stayed the Same: $Diff_n \in \{-1, 0, 1\}$

Slightly More Black: $Diff_n = 2$

Much More Black: $Diff_n > 2$

The cutoffs are somewhat arbitrary but are based largely on the distribution of the data. For example, it is rare for a census tract to move more than three positions in the distribution. We identify "Stay the Same" as $Diff_n \in \{-1, 0, 1\}$ to make sure that when we identify a change it is somewhat substantial and not driven by, for example, a small population change in a census tract that was already close to a neighboring decile. Using this algorithm for the Black/White population, 73 percent of census tracts "Stayed the Same", 9 percent became a "Slightly More White", 7 percent became a "Slightly More Black", 5 percent became "Much More White" and 6 percent became "Much More Black".

While the above measure does identify population dynamics over the sample period, it does not account for the relative position the population started from. That is, with the above algorithm we cannot distinguish a neighborhood that became more White but was already fairly White from a neighborhood that became more White but was predominately Black. Put differently, the algorithm cannot identify whether becoming more White is a neighborhood moving further to the extreme or moving closer to the middle and becoming more heterogeneous. Our second measure of population dynamics does identify these movements, however.

Population Convergence/Divergence to/from a Mixed Neighborhood: As with the previous measure, we identify transitional changes that occur with a movement of two deciles or more. A one-decile movement will be treated as no change.

Stayed in the Middle: $Decile_n^{2009} \in \{4,5,6,7\}$ and $Decile_n^{2000} \in \{4,5,6,7\}$ or

$Decile_n^{2009} = 3$ and $Decile_n^{2000} = 4$ or

$Decile_n^{2009} = 8$ and $Decile_n^{2000} = 7$

Diverged from Middle: $Decile_n^{2009} < 4$ and $Decile_n^{2000} \in \{5,6,7\}$ or

$Decile_n^{2009} > 7$ and $Decile_n^{2000} \in \{4,5,6\}$ or

$Decile_n^{2009} \leq 2$ and $Decile_n^{2000} = 4$ or

$Decile_n^{2009} \geq 9$ and $Decile_n^{2000} = 7$

Converged to Middle: $Decile_n^{2009} \in \{4,5,6,7\}$ and $Decile_n^{2000} \in \{1,2\}$ or

$Decile_n^{2009} \in \{4,5,6,7\}$ and $Decile_n^{2000} \in \{9,10\}$ or

$Decile_n^{2009} \in \{5,6,7\}$ and $Decile_n^{2000} = 3$ or

$Decile_n^{2009} \in \{4,5,6\}$ and $Decile_n^{2000} = 8$

Stayed in the Extreme: $Decile_n^{2009} \in \{1,2,3\}$ and $Decile_n^{2000} \in \{1,2,3\}$ or

$Decile_n^{2009} \in \{8,9,10\}$ and $Decile_n^{2000} \in \{8,9,10\}$ or

$Decile_n^{2009} = 4$ and $Decile_n^{2000} = 3$ or

$Decile_n^{2009} = 7$ and $Decile_n^{2000} = 8$

Minority Pop Flipped: $Decile_n^{2009} \in \{1,2,3\}$ and $Decile_n^{2000} \in \{8,9,10\}$ or

$Decile_n^{2009} \in \{8,9,10\}$ and $Decile_n^{2000} \in \{1,2,3\}$ or

Since moving more than three positions in the distribution is rare, we identify very few neighborhoods that flip the minority population. So few in fact that once we include the race matching identifiers for the model there is no variation in crime outcomes for the Hispanic-White

models. Again, using the Black/White population as an example, the algorithm produces 31 percent of census tracts "Staying in the Middle", 9 percent "Diverged from Middle", 8 percent "Converged to Middle", 50 percent "Stayed in the Extreme" and 1 percent of census tracts had "Minority Pop Flipped" (predominantly White became predominantly Black or vice versa).

To estimate the effect of population dynamics on race matched crime outcomes, we restrict the data to 2007 crime outcomes (our most recent period in the data) and formulate a model similar to equation (1) above but replace the quintiles with categorical identifiers for the type of population change in the measures above. Now the estimated effects of a specific type of race match (Black-on-Black, Black-on-White, White-on-Black, etc.) are specific to the type of demographic population change experienced by a neighborhood. The results for *Simple Changes in Population Density* are presented in Tables 5-7 and the results for *Population Convergence/Divergence to/from a Mixed Neighborhood* are presented in Tables 8-10.

Tables 5-7 build on the previous tables by examining the changes in racial composition that occurred between 2000 and 2007. In Table 5, Black-White robberies are more likely than White-White robberies in all neighborhoods. However, as areas become a Slightly More White, stay the same or become a Slightly More Black, we observe increases in propensity of Black-Black robberies. This is likely due to areas experiencing more racial mixing in these census tracts and/or gentrification. Interestingly, racial mixing appears to generate desirable outcomes for more violent crimes. Specifically, as areas become a Slightly More White or Black, we observe consistent and significant decreases in Black-White assaults relative to White-White assaults. No consistent changes in weapons related crimes appear to occur after the compositional changes.

Table 6 shows similar patterns for Black-Hispanic interactions. Black-Hispanic robberies were more likely than Hispanic-Hispanic robberies regardless of the population dynamics.

Black-Black robberies were less prevalent in neighborhoods that stayed the same or became slightly more Black, and Hispanic-Black robberies were generally more likely than Hispanic-Hispanic robberies. Comparing rows 2 and 3 identifies the relative prevalence Black-Hispanic robberies. In every neighborhood, Blacks are more likely to rob from Hispanics than Hispanics are to rob from Blacks. However, the difference in magnitude between the coefficients becomes much larger as neighborhoods transitions from much more Hispanic to staying the same, 13.8 percent to 27.7 percent. This suggests that as neighborhoods became more Hispanic, Hispanics were more likely to rob from each other than rob from Blacks. For assaults, Hispanics were more likely to assault each other than be assaulted by Blacks in neighborhoods that became more Hispanic. No clear patterns appear regarding population dynamics and weapons crimes with Black-Hispanic interactions.

Table 7 explores the impact of the compositional changes in Hispanic and White populations on criminal activity. Similar to Table 5 regarding Black-White interactions, Hispanics are more likely to rob from Whites in all neighborhoods and are also more likely to rob from each other than Whites are to rob from each other. Areas that stayed the same or became a Slightly More Hispanic saw an increased incidence of Hispanic-Hispanic assaults and a decrease in Hispanic-White assaults. Neighborhoods that became a Slightly More White also saw a decrease in the propensity of Hispanic-White assaults relative to White-White assaults.

The rather large transition of the composition of neighborhood demographics in Los Angeles county (discussed in greater depth in Allen and Turner, 2011) from 2000-2010 leads one to question the cohesion of neighborhoods that are experiencing large influx and change during our sample. In this vein, our results are similar to Sampson et al. (1997), who find that collective efficacy, defined as social cohesion among neighbors combined with their willingness to

intervene on behalf of the common good, is linked to reductions in violence. As such, we are not surprised to find that areas experiencing transition are more likely to experience increases in criminal activity.

The results regarding compositional changes in census tracts hint at the possibility that integrating populations of different races could lead to reductions in the propensity of some criminal interactions. Whether these populations changed in the direction of becoming more or less diverse is of critical interest. To address this issue we determine whether the compositional changes between 2000 and 2007 discussed earlier resulted in a census tract becoming more/less racially diverse, remained the same or experienced such a massive change that the minority population became the majority.

Tables 8 and 10 display the results for convergence and divergence in Black/Hispanic-White interactions. These results uncover a significant finding regarding the role of racial segregation and crime. Notably, when areas remained diverse or remained segregated, Black-Black and Hispanic-Hispanic robberies persisted and even increased. Additionally, as areas became more balanced or remained either balanced or segregated Black-White and Hispanic-White robberies increased. Consistent with previous results and comparing the second and third rows of Tables 8 and 10, Blacks and Hispanics are more likely to rob Whites than Whites are to rob Blacks and Hispanic regardless of nearly any type of compositional change. This lends support to the idea that poorer populations will have higher robbery rates regardless of the composition of the living space.

The patterns for assault are interesting. In Table 8, Black-Black assaults are more likely than White-White assaults only in neighborhoods that diverged from equality or the minority population became the majority. Black-White assaults are significantly less likely than White-

Black assaults Comparing rows 5 and 6, with these estimates in the range of Black-White assault being 16.5 percent less likely than White-Black assault in neighborhoods that remained very segregated to 7.9 percent less likely in neighborhoods that remained equally mixed or converged to equality. Furthermore, the estimates in row 6 on their own suggest that Whites were more likely to assault Blacks than other Whites in neighborhoods that became more segregated or remained very segregated. We see statistically insignificant estimates for weapons crimes in nearly all neighborhood types regarding Black-White interactions.

For Black-Hispanic interactions in Table 9, we find that the robbery results uncovered in the previous section persist when we examine convergence and divergence toward diversity. Specifically, Black-Hispanic robbery is much more likely than Hispanic-Hispanic and Hispanic-Black robbery, except when the minority population becomes the majority population. In those neighborhoods, Hispanic-Hispanic robbery is more likely than both Black-Hispanic and Hispanic-Black robbery. Additionally, Black-Hispanic assaults are significantly lower than Hispanic-Hispanic assaults regardless of whether the census tract became more or less diverse or remained diverse or segregated. Black-Black assault is more likely than Hispanic-Hispanic assaults in neighborhoods that remained equally diverse or remained very segregated. On the other hand, Hispanic-Hispanic assaults are more likely than Black-Black assaults in neighborhoods where the minority population flipped.[24]

For violent crimes among Hispanic-White interactions, Table 10 shows that Hispanic-Hispanic and Hispanic-White assaults are less likely than White-White assaults in neighborhoods that converged in population distribution and became more equally diverse. Hispanic-White assaults are also less likely than White-White assaults in areas that remained equally diverse or

[24] Outcomes for Hispanic-on-Black weapons crimes were not estimable in neighborhoods where the minority population flipped because there were not enough weapons crimes in those neighborhoods, which are few to being with.

very segregated. Comparing rows 5 and 6, it is also the case that Hispanic-White assaults are less likely than White-Hispanic assaults in all neighborhoods except those that diverged from equality.

Tables 8-10 speak to *Proposition 2* regarding segregated neighborhoods. Specifically, the proposition states that Blacks and Hispanics should have higher propensities to commit crime against themselves in segregated neighborhoods. Tables 2-4 addressed this part of the proposition by examining the results in Quintile 5, neighborhoods with the largest number of Blacks and Hispanics per White individuals. Tables 8-10 identify neighborhoods that remained very segregated over time. In Table 8 regarding Black individuals, we see this proposition is confirmed for assault and weapons use but not for robbery (where Blacks still rob from Whites more frequently than themselves in segregated neighborhoods). In Table 10 regarding Hispanics, the proposition is confirmed for assault but not for robbery (where Hispanics still rob from Whites more frequently than themselves in segregated neighborhoods).

Table 9 addresses the proposition regarding neighborhoods that are either highly segregated Black or Hispanic neighborhoods. The proposition is soundly rejected for robbery crimes as Blacks are more likely to rob from Hispanics than themselves and Hispanics are more likely to rob from Blacks than themselves in segregated neighborhoods. For assaults, however, the proposition is confirmed for Blacks as Blacks are more likely to assault each other than Hispanics. Hispanics, on the other hand, are equally likely to assault themselves and Blacks in segregated neighborhoods. For weapons use, Blacks and Hispanics assault themselves with equal propensity, but Hispanics are more likely to use weapons against Blacks than themselves. In both cases, weapons crimes amongst Blacks and Hispanics violate *Proposition 2*.

"Earnings Inequality and Race Interactions" or "Impact of Earnings Inequality on Crime"

As depicted in (Levitt 1999) and Fajnylber et al. (2002), income inequality could play a critical role in explaining criminal behavior. It could be the case that – especially in the case of robbery – criminal activity acts as a form of supplemental income. Additionally, it could be the case that higher crime areas drive businesses to locate further away from these areas, thereby driving down the likelihood of a person living in a high crime area from getting a job (Zenou, 2003 and Wilson, 1996). This results in greater income inequality in areas with higher criminal activity. Our empirical model already captures the effects of neighborhood income inequality through the inclusion of neighborhood-year fixed effects (μ_{nt}). Nevertheless, we can speak to this issue by estimating our model on neighborhoods with high-income inequality and those with low-income inequality separately. Using race-specific data on median earnings in each census tract from the American Community Survey in 2009, we compute the following ratios for each census tract n $Earnings_n^{white}/Earnings_n^{black}$, $Earnings_n^{black}/Earnings_n^{hisp}$, and $Earnings_n^{white}/Earnings_n^{hisp}$ and then compute the median of each ratio across all census tracts. We then estimate the specification in equation (1) on two sub-samples: 1) neighborhoods where the respective earnings ratio is greater than the median (high earnings inequality) and 2) neighborhoods where the respective earnings ratio is less than the median (low earnings inequality).[25]

The results presented in Tables 11-13 provide the breakdown of crime across racial segregation and income inequality. The left panel shows the estimates from the subsample of neighborhoods with high earnings inequality and the panel on the right shows the estimates from the subsample of neighborhoods with low earnings inequality. Table 11 shows the results for

[25] From the summary statistics in Table 1, it is clear that on average Whites earn more than Blacks and Hispanics and Blacks earning more than Hispanics.

Black-White interactions, and the coefficient entries and statistical significance is largely the same in high inequality and low inequality neighborhoods. Two important differences exist however: 1) Blacks steal from each other less than Whites steal from each other in the more racially diverse, low inequality neighborhoods. 2) Whites stop assaulting Blacks as the population becomes more Black (Quintiles 4 and 5) in low inequality neighborhoods but assault Blacks with greater frequency than Whites in all neighborhoods when inequality is high.

Table 12 examines the effect of income inequality amongst the poorer populations in our sample. Again, the left and right panels are virtually identical with the exception of two outcomes: 1) Blacks are less likely to rob Hispanics in the most Black neighborhoods (Quintile 1) when inequality is low and 2) Hispanics assault Blacks less often where inequality is high and neighborhoods are either mostly Black or mostly Hispanic (Quintiles 1, 4, 5).

In Table 13, we observe that the entries for robbery are nearly identical in both the left and right panels for Hispanic-White interactions. However, the propensities for assault and weapons use are different in high inequality neighborhoods versus low inequality neighborhoods. First, Hispanics and Whites assault themselves with the same frequency in high inequality neighborhoods that are mostly Hispanic (Quintile 5 in the left panel) but Hispanics are less likely to assault members of their own group than are Whites likely to assault Whites in low inequality, largely Hispanic populations (Quintile 5 in the right panel). Secondly Hispanics assault each other in low inequality White neighborhoods (Quintiles 1-3 in the right panel) but assault each other in high inequality Hispanic neighborhoods (Quintiles 4-5 in the left panel). Also, Hispanics frequently use weapons against Whites in high inequality neighborhoods but do not frequently use weapons against Whites in neighborhoods where Hispanics and Whites are more likely to have similar earnings. The last row of Table 13 indicates that Whites are more

likely to use weapons against Hispanics in all high inequality neighborhoods but do not do so in low inequality, mostly Hispanic neighborhoods.

Proposition 4 claimed that the incidence of violent crime will be higher in high inequality neighborhoods and that lower income populations will be the ones committing violence against both themselves and the higher income population. This proposition is largely refuted for both White -Black and White-Hispanic assaults and weapons crimes. In the Tables above, we see that Whites are more likely to assault (rows 5 and 6) and use weapons (rows 7 and 8) against both Blacks and Hispanics, regardless of income inequality.

There is some evidence supporting the proposition as Blacks assault each other more frequently when income inequality is high (comparing the left and right panels, row 4 regarding Quintiles 1 and 5 of Tables 11) and use weapons against each other more often in some neighborhoods when inequality high (comparing the left and right panels, row 6 regarding Quintiles 1 and 3 of Tables 11). However, the other three quintiles suggest that Blacks assault and use more frequently when inequality is low. The evidence regarding inequality and assault using Black-Hispanic interactions (Table 12) and Hispanic-White interactions (Table 13) is similarly mixed. On the contrary, Hispanic-White weapons crimes in Table 13 supports the proposition, as Hispanics are more likely to use weapons against Whites when inequality is high but not when inequality is low.

6. Discussion and Conclusion

Empirical and theoretical research that examines the spatial distribution of crime has focused on the relationship between racial diversity and income inequality on crime. Conclusions from this research include that more racially mixed communities (especially in diverse

communities with above average sized Black populations) and regions with greater income inequality will have higher levels of cross-race/ethnicity property and violent crime rates. Most of the previous research draws from highly aggregated crime statistics that do not provide researchers with the ability to identify criminal interactions at finer levels of granulation. In light of potential shortcomings that could be associated with these research designs, we re-examine these issues utilizing a unique data set from of the universe of reported crimes in Los Angeles County between 2000 and 2007. This data set permits us to link criminal activity to specific neighborhoods (identified by census tracts) in each time period. Using the census tract identifiers, we merge on socioeconomic data that allow us to examine how racial diversity and income inequality are associated with race matched criminal behavior. Moreover, we exploit variation in the composition of races and income inequality over time within a census tract to determine how changes in the factors that previous research claims to be associated with crime actually impact changes in criminal behavior.

Drawing on existing theoretical research and previous empirical regularities found in other work, we formulate a series of propositions with testable predictions that outline expectations one should see in the data regarding race interactions and criminal outcomes. Our results support some aspects of these propositions but in many other ways refute them, providing evidence that may seem contrary to typically held beliefs about race and victimization patterns. Specifically, we find that traditionally poorer Black and Hispanic populations are significantly *more* likely to be victims of assault and weapons related crimes, but by an unlikely perpetrator – White individuals. Blacks and Hispanics are less likely to use violence against Whites than Whites are to use violence against Blacks and Hispanics. We observe this pattern of violence committed by White individuals across almost all types of neighborhoods in LA County.

Specifically, we observed Whites to be 12 to 24 percent more likely to assault Blacks than Blacks are to assault Whites, and 0.6 to 1 percent more likely to use weapons against Blacks than Blacks are against Whites. Whites are 9.5 to 19.6 percent more likely to assault Hispanics than Hispanics are to assault Whites, and Whites are also more likely to use weapons against Hispanics than Hispanics are to use weapons against Whites (although the magnitude is small). Black perpetrators are also less likely to commit assaults against Hispanic victims, while Hispanic perpetrators are significantly more likely to commit assault and weapons related crimes against Black victims. Consistent with theoretical predictions and existing research, we find that Black and Hispanic perpetrators are much more likely to commit robberies against White victims. We note that a fundamental difference between assault and weapons crimes and robbery crimes is that robberies can be viewed as often stemming from economic motives. These patterns therefore may highlight the importance of wealth distribution differences between groups defined on racial dimensions especially if there are notable differences in selection into crime over other types of activity.

Our ability to identify the neighborhoods that these crimes are committed adds important features to our analysis that are unique contributions to this paper. For one, we are able to account for unobserved neighborhood-year specific effects. Therefore, our specification captures many different neighborhood-specific factors that may vary over time such as arrest rates and policing strategies in the neighborhood, economic conditions and demographic changes in the neighborhood which may indicate differences in the opportunity costs of crime, overall racial attitudes and social norms in the neighborhood that may vary over time, and any other time-varying neighborhood level factors. Thus, we test many of the explanations for the aggregation of criminal activity that are provided in the current crime and economics literature. In addition,

being able to identify neighborhoods and merge in relevant data from the Decennial Census and American Community Survey allows us to estimate race-match propensities in victimization rates across neighborhoods with different characteristics such as population composition and income inequality. We are also able to observe how neighborhood populations evolve over time regarding their race densities and provide new insights on how population dynamics affect criminal activity.

One caveat is that our analysis is based on reported crime. We therefore cannot rule out the possibility that differences in reporting propensities by race may influence our results. As noted previously, however, reporting rates in a Bureau of Labor Statistics study are similar across races. Another potential concern may relate to possible correlations between crime, race, and gang activity in California during this time period. Our data, however, allow for analysis at the refined geographic level of census tract. We use this census tract information to construct neighborhood fixed effects for inclusion in our models, and we believe that any gang effects would be absorbed by these terms.

While our results are specific to Los Angeles County, we believe that they have implications for metropolitan regions where there is significant racial and economic diversity. The current work identifies strong relationships between races and crime, but we believe that this work would benefit from considering potential spatial spillovers from criminal activity that could occur from individuals in neighboring census tracts.

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Table 1
Summary Statistics

	Black/White Interaction Sample		
Robbery	0.191	White/Black Earnings Ratio	1.624

	(0.393)		(1.857)
Assault	0.458	Median: White/Black Earnings Ratio	1.165
	(0.498)		
Weapon	0.007	Black/White Pop Ratio	2.990
	(0.085)		(6.946)
Black-on-Black	0.548	10th Pctl Black/White Pop Ratio	0.021
	(0.498)		
Black-on-White	0.123	Median Black/White Pop Ratio	0.115
	(0.329)		
White-on-Black	0.028	90th Pctl Black/White Pop Ratio	2.633
	(0.164)		
White-on-White	0.301		
	(0.459)		
		Black/Hispanic Interaction Sample	
Robbery	0.262	Black/Hispanic Earnings Ratio	1.537
	(0.440)		(0.794)
Assault	0.427	Median: Black/Hispanic Earnings Ratio	1.407
	(0.495)		(0.000)
Weapon	0.008	Black/Hispanic Pop Ratio	0.562
	(0.087)		(1.774)
Black-on-Black	0.277	10th Pctl Black/Hispanic Pop Ratio	0.011
	(0.448)		
Black-on-Hisp	0.119	Median Black/Hispanic Pop Ratio	0.140
	(0.324)		
Hispanic-on-Black	0.040	90th Pctl Black/Hispanic Pop Ratio	0.727
	(0.195)		
Hispanic-on-Hisp	0.564		
	(0.496)		

Table 1 (Continued)

		Hisp/White Interaction Sample	
Robbery	0.250	White/Hispanic Earnings Ratio	1.802
	(0.433)		(1.002)

Assault	0.391	Median: White/Hispanic Earnings Ratio	1.498
	(0.488)		
Weapon	0.007	Hisp/White Pop Ratio	2.765
	(0.081)		(2.228)
Hispanic-on-Hisp	0.651	10th Pctl Hisp/White Pop Ratio	0.150
	(0.477)		
Hispanic-on-White	0.124	Median Hisp/White Pop Ratio	1.837
	(0.329)		
White-on-Hisp	0.049	90th Pctl Hisp/White Pop Ratio	6.248
	(0.216)		
White-on-White	0.176		
	(0.381)		

Note: N=485,971 for the Black/White sample. N=960,737 for the Black/Hispanic sample. N=832,461 for the Hisp/White sample. The unit of observation is a reported crime. Entries reflect the means and standard deviations (in parentheses).

Table 2
Crime Outcomes and Black/White Interactions

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5

Robbery					
Black on Black	0.024***	-0.000	-0.012*	-0.007	0.054***
	(0.008)	(0.007)	(0.006)	(0.005)	(0.010)
Black on White	0.300***	0.256***	0.210***	0.206***	0.223***
	(0.009)	(0.007)	(0.009)	(0.008)	(0.012)
White on Black	-0.035***	-0.022***	-0.024***	0.004	0.040***
	(0.010)	(0.007)	(0.008)	(0.010)	(0.013)
Assault					
Black on Black	0.067***	0.046***	0.046***	0.049***	0.051***
	(0.010)	(0.008)	(0.008)	(0.007)	(0.010)
Black on White	-0.131***	-0.091***	-0.078***	-0.089***	-0.082***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.012)
White on Black	0.113***	0.106***	0.087***	0.054***	0.036**
	(0.013)	(0.011)	(0.012)	(0.014)	(0.016)
Weapon					
Black on Black	0.006***	0.002	0.002*	0.003**	0.003**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Black on White	0.002	0.000	0.002**	0.002	0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
White on Black	0.010***	0.006***	0.007***	0.007***	0.006*
	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)

Note: N=485,971. The parameters are estimates from the model described by Equation (1) in the text and include neighborhood-year fixed-effects. Standard errors are clustered at the neighborhood-year level. The quintiles identify a neighborhood's positions in the distribution of the Black/White population ratio across all neighborhoods. Quintile 1 identifies neighborhoods that are mostly White and Quintile 5 identifies neighborhoods that are mostly Black. * p<0.1, ** p<0.05, *** p<0.01

Table 3
Crime Outcomes and Black/Hispanic Interactions

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Robbery					
Black on Black	-0.103***	-0.087***	-0.071***	-0.037***	-0.008**
	(0.007)	(0.005)	(0.005)	(0.005)	(0.004)
Black on Hisp	0.232***	0.248***	0.275***	0.353***	0.350***
	(0.010)	(0.007)	(0.008)	(0.009)	(0.008)
Hispanic on Black	0.053***	0.052***	0.036***	0.061***	0.061***
	(0.012)	(0.010)	(0.009)	(0.008)	(0.008)
Assault					
Black on Black	0.012***	0.043***	0.070***	0.063***	0.046***
	(0.010)	(0.007)	(0.006)	(0.005)	(0.005)
Black on Hisp	-0.096***	-0.100***	-0.097***	-0.158***	-0.147***
	(0.009)	(0.007)	(0.007)	(0.006)	(0.006)
Hispanic on Black	0.024*	0.050***	0.058***	-0.004	0.012
	(0.013)	(0.011)	(0.010)	(0.011)	(0.010)
Weapon					
Black on Black	0.001	0.000	0.001	0.001	0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Black on Hisp	0.002	0.001	0.001	-0.001	-0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Hispanic on Black	0.019***	0.015***	0.014***	0.014***	0.010***
	(0.006)	(0.004)	(0.002)	(0.002)	(0.002)

Note: N=960,737. The parameters are estimates from the model described by Equation (1) in the text and include neighborhood-year fixed-effects. Standard errors are clustered at the neighborhood-year level. The quintiles identify a neighborhood's positions in the distribution of the Black/Hispanic population ratio across all neighborhoods. Quintile 1 identifies neighborhoods that are mostly Hispanic and Quintile 5 identifies neighborhoods that are mostly Black. * p<0.1, ** p<0.05, *** p<0.01

Table 4

Crime Outcomes and Hisp/White Interactions

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Robbery					
Hispanic on Hisp	0.045***	-0.011	0.050***	0.063***	0.065***
	(0.005)	(0.040)	(0.005)	(0.005)	(0.010)
Hispanic on White	0.234***	0.267***	0.168***	0.167***	0.116***
	(0.006)	(0.084)	(0.006)	(0.008)	(0.013)
White on Hisp	-0.000	0.017***	0.035***	0.047***	0.080***
	(0.005)	(0.007)	(0.006)	(0.008)	(0.013)
Assault					
Hispanic on Hisp	0.035***	0.028***	0.007	0.006	-0.024
	(0.006)	(0.008)	(0.006)	(0.008)	(0.015)
Hispanic on White	-0.120***	-0.076***	-0.095***	-0.098***	-0.096***
	(0.005)	(0.013)	(0.008)	(0.010)	(0.018)
White on Hisp	0.076***	0.026***	-0.002	0.008	-0.053***
	(0.008)	(0.009)	(0.008)	(0.011)	(0.019)
Weapon					
Hispanic on Hisp	0.003***	0.002**	0.002**	0.002*	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hispanic on White	0.001	0.003***	0.004***	0.003**	0.006**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
White on Hisp	0.005***	0.005***	0.010******	0.006*	0.005**
	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)

Note: N=832,461. The parameters are estimates from the model described by Equation (1) in the text and include neighborhood-year fixed-effects. Standard errors are clustered at the neighborhood-year level. The quintiles identify a neighborhood's positions in the distribution of the Hispanic/White population ratio across all neighborhoods. Quintile 1 identifies neighborhoods that are mostly White and Quintile 5 identifies neighborhoods that are mostly Hispanic. * p<0.1, ** p<0.05, *** p<0.01

Table 5
Compositional Changes in Population on Crime Outcomes in 2007:
Black/White Interactions

	Much More White	Slightly More White	Stayed the Same	Slightly More Black	Much More Black
Robbery					
Black on Black	-0.015	0.077**	0.055***	0.083**	-0.002
	(0.026)	(0.037)	(0.012)	(0.044)	(0.030)
Black on White	0.175***	0.288***	0.235***	0.306***	0.159***
	(0.043)	(0.034)	(0.013)	(0.049)	(0.054)
White on Black	0.017	-0.049	0.018	0.008	0.028
	(0.061)	(0.033)	(0.014)	(0.041)	(0.104)
Assault					
Black on Black	0.087***	0.038	0.024**	0.007	0.193
	(0.032)	(0.032)	(0.011)	(0.039)	(0.121)
Black on White	-0.045	-0.095***	-0.096***	-0.098**	0.117
	(0.031)	(0.026)	(0.010)	(0.046)	(0.081)
White on Black	0.084	0.071	0.052***	-0.027	0.137*
	(0.067)	(0.050)	(0.018)	(0.072)	(0.072)
Weapon					
Black on Black	0.005	-0.008*	0.004**	0.006	-0.008
	(0.006)	(0.004)	(0.002)	(0.006)	(0.009)
Black on White	-0.003	-0.001	-0.001	0.001	-0.002
	(0.006)	(0.004)	(0.002)	(0.006)	(0.010)
White on Black	-0.007	-0.011	0.005*	-0.002	-0.020
	(0.011)	(0.008)	(0.003)	(0.010)	(0.020)

Note: N=55,912. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood fixed-effects. Standard errors are clustered at the neighborhood-year level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 6
Compositional Changes in Population on Crime Outcomes in 2007:
Black/Hispanic Interactions

	Much More Hisp	Slightly More Hisp	Stayed the Same	Slightly More Black	Much More Black
Robbery					
Black on Black	-0.021	-0.008	-0.025***	-0.107**	-0.058
	(0.025)	(0.037)	(0.007)	(0.050)	(0.047)
Black on Hisp	0.251***	0.305***	0.319***	0.201***	0.219***
	(0.035)	(0.049)	(0.011)	(0.033)	(0.027)
Hispanic on Black	0.113**	0.092**	0.042***	0.130**	0.043
	(0.057)	(0.037)	(0.012)	(0.060)	(0.055)
Assault					
Black on Black	-0.037	0.026	0.044***	-0.013	0.154
	(0.025)	(0.029)	(0.008)	(0.056)	(0.102)
Black on Hisp	-0.184***	-0.115**	-0.140***	-0.041	-0.129
	(0.054)	(0.045)	(0.008)	(0.032)	(0.021)
Hispanic on Black	-0.088*	-0.056	0.029*	0.028	-0.022
	(0.046)	(0.052)	(0.015)	(0.044)	(0.043)
Weapon					
Black on Black	0.004	0.001	0.001	0.001	-0.016
	(0.003)	(0.004)	(0.001)	(0.004)	(0.015)
Black on Hisp	-0.003	0.001	-0.000	0.004	-0.006
	(0.005)	(0.007)	(0.002)	(0.007)	(0.010)
Hispanic on Black	0.006	0.037	0.014***	0.019	0.047
	(0.013)	(0.027)	(0.003)	(0.014)	(0.043)

Note: N=112,018. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood fixed-effects. Standard errors are clustered at the neighborhood-year level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 7
Compositional Changes in Population on Crime Outcomes in 2007:
Hisp/White Interactions

	Much More White	Slightly More White	Stayed the Same	Slightly More Hisp	Much More Hisp
Robbery					
Hispanic on Hisp	0.166***	0.066***	0.071***	0.031**	0.021
	(0.051)	(0.017)	(0.010)	(0.014)	(0.054)
Hispanic on White	0.213***	0.217***	0.206***	0.141***	-0.056***
	(0.051)	(0.022)	(0.014)	(0.024)	(0.078)
White on Hisp	0.099***	0.033	0.045***	0.034**	0.131
	(0.037)	(0.021)	(0.014)	(0.017)	(0.105)
Assault					
Hispanic on Hisp	-0.042	-0.015	0.024**	0.060***	0.014
	(0.049)	(0.016)	(0.011)	(0.015)	(0.073)
Hispanic on White	-0.092	-0.122***	-0.091***	-0.076***	-0.019
	(0.062)	(0.023)	(0.013)	(0.020)	(0.084)
White on Hisp	0.039	0.016	0.046*	0.012	-0.062
	(0.060)	(0.024)	(0.024)	(0.021)	(0.069)
Weapon					
Hispanic on Hisp	-0.011	0.001	0.002	0.003	0.006
	(0.010)	(0.004)	(0.002)	(0.003)	(0.004)
Hispanic on White	0.009	-0.003	0.002	0.002	0.011
	(0.014)	(0.003)	(0.002)	(0.003)	(0.010)
White on Hisp	-0.018**	0.014**	0.006	0.011**	0.021
	(0.008)	(0.006)	(0.004)	(0.005)	(0.016)

Note: N=89,679. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood fixed-effects. Standard errors are clustered at the neighborhood-year level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 8
Convergence/Divergence of Population Composition
on Crime Outcomes in 2007: Black/White Interactions

	Remained Equally Mixed	Diverged from Equality	Converged to Equality	Remained Very Unequal	Minority Population Flipped
Robbery					
Black on Black	0.046**	0.054	0.017	0.058***	-0.002
	(0.019)	(0.038)	(0.040)	(0.015)	(0.012)
Black on White	0.258***	0.218***	0.272***	0.225***	0.094***
	(0.015)	(0.043)	(0.041)	(0.017)	(0.006)
White on Black	0.012	0.010	-0.012	0.012	0.030
	(0.019)	(0.052)	(0.027)	(0.019)	(0.082)
Assault					
Black on Black	0.023	0.089**	0.061	0.017	0.112***
	(0.018)	(0.042)	(0.037)	(0.013)	(0.009)
Black on White	-0.079***	-0.031	-0.079**	-0.112***	0.043
	(0.014)	(0.034)	(0.035)	(0.013)	(0.028)
White on Black	0.041	0.115**	0.014	0.056**	0.034
	(0.026)	(0.058)	(0.059)	(0.023)	(0.035)
Weapon					
Black on Black	0.002	-0.007	0.003	0.004*	0.014
	(0.002)	(0.005)	(0.005)	(0.002)	(0.010)
Black on White	0.001	-0.008	0.009*	-0.002	-0.001
	(0.002)	(0.005)	(0.005)	(0.002)	(0.013)
White on Black	0.001	-0.009	-0.002	0.006	0.000
	(0.004)	(0.008)	(0.010)	(0.004)	(0.025)

Note: N=55,912. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood fixed-effects. Standard errors are clustered at the neighborhood level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 9
Convergence/Divergence of Population Composition
on Crime Outcomes in 2007: Black/Hispanic Interactions

	Remained Equally Mixed	Diverged from Equality	Converged to Equality	Remained Very Unequal	Minority Population Flipped
Robbery					
Black on Black	-0.054***	-0.056	-0.030	-0.015**	0.010
	(0.014)	(0.034)	(0.031)	(0.008)	(0.041)
Black on Hisp	0.302***	0.233***	0.303***	0.324***	-0.132***
	(0.017)	(0.023)	(0.042)	(0.014)	(0.011)
Hispanic on Black	0.024	0.177***	0.052	0.052***	-0.131***
	(0.021)	(0.050)	(0.039)	(0.013)	(0.006)
Assault					
Black on Black	0.044***	0.048	0.038	0.042***	-0.305***
	(0.015)	(0.031)	(0.060)	(0.009)	(0.115)
Black on Hisp	-0.138***	-0.079**	-0.160***	-0.139***	-0.253
	(0.017)	(0.040)	(0.037)	(0.010)	(0.201)
Hispanic on Black	0.043	-0.024	-0.023	0.019	-0.018**
	(0.027)	(0.036)	(0.047)	(0.017)	(0.009)
Weapon					
Black on Black	0.003	-0.003	-0.008	0.001	--
	(0.002)	(0.003)	(0.009)	(0.002)	
Black on Hisp	0.002	-0.003	-0.006	-0.001	--
	(0.003)	(0.004)	(0.007)	(0.002)	
Hispanic on Black	0.013	0.033**	0.020	0.015***	--
	(0.005)	(0.023)	(0.028)	(0.004)	

Note: N=112,018. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood fixed-effects. Standard errors are clustered at the neighborhood level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 10
Convergence/Divergence of Population Composition
on Crime Outcomes in 2007: Hisp/White Interactions

	Remained Equally Mixed	Diverged from Equality	Converged to Equality	Remained Very Unequal	Minority Population Flipped
Robbery					
Hispanic on Hisp	0.059***	0.082	0.132**	0.062***	--
	(0.010)	(0.072)	(0.063)	(0.011)	
Hispanic on White	0.167***	0.034	0.242***	0.216***	--
	(0.013)	(0.080)	(0.079)	(0.016)	
White on Hisp	0.034***	0.165**	0.162**	0.042***	--
	(0.012)	(0.075)	(0.073)	(0.014)	
Assault					
Hispanic on Hisp	0.022**	-0.015	-0.091*	0.027**	--
	(0.010)	(0.084)	(0.049)	(0.013)	
Hispanic on White	-0.086***	-0.014	-0.231***	-0.100***	--
	(0.012)	(0.078)	(0.064)	(0.015)	
White on Hisp	0.010	-0.046	0.026	0.055	--
	(0.016)	(0.091)	(0.106)	(0.025)	
Weapon					
Hispanic on Hisp	0.002	-0.012	-0.025*	0.003	--
	(0.002)	(0.010)	(0.014)	(0.002)	
Hispanic on White	0.002	-0.014	-0.013	0.001	--
	(0.002)	(0.011)	(0.017)	(0.002)	
White on Hisp	0.009**	0.000	-0.030**	0.008**	--
	(0.004)	(0.018)	(0.013)	(0.004)	

Note: N=89,679. The parameters are estimates from a model analogous to the one described by Equation (1) in the text and include neighborhood effects. Standard errors are clustered at the neighborhood level. The algorithm that classifies neighborhoods in the column categories is described in the text. * p<0.1, ** p<0.05, *** p<0.01

Table 11
Neighborhood Earnings Inequality: Crime Outcomes and Black/White Interactions

	High Inequality: W/B Earnings Ratio > Median in Sample					Low Inequality: W/B Earnings Ratio <= Median in Sample				
	Q 1	Q 2	Q 3	Q 4	Q 5	Q 1	Q 2	Q 3	Q 4	Q 5
Robbery										
Black on Black	0.015	0.029**	0.003	-0.003	0.066***	0.037***	-0.020***	-0.027***	-0.012*	0.026
	(0.011)	(0.011)	(0.010)	(0.007)	(0.012)	(0.013)	(0.008)	(0.008)	(0.007)	(0.017)
Black on White	0.297***	0.292***	0.218***	0.218***	0.214***	0.304***	0.222***	0.202***	0.189***	0.254***
	(0.011)	(0.011)	(0.013)	(0.013)	(0.015)	(0.013)	(0.010)	(0.011)	(0.010)	(0.022)
White on Black	-0.035***	-0.019*	-0.023*	0.001	0.040***	-0.034**	-0.023**	-0.025**	0.006	0.041
	(0.013)	(0.011)	(0.012)	(0.013)	(0.015)	(0.014)	(0.010)	(0.012)	(0.014)	(0.026)
Assault										
Black on Black	0.080***	0.046***	0.038***	0.044***	0.055***	0.047***	0.047***	0.053***	0.052***	0.039*
	(0.013)	(0.012)	(0.012)	(0.010)	(0.012)	(0.016)	(0.010)	(0.010)	(0.011)	(0.020)
Black on White	-0.129***	-0.116***	-0.085***	-0.098***	-0.073***	-0.132***	-0.068***	-0.073***	-0.081***	-0.109***
	(0.009)	(0.010)	(0.011)	(0.011)	(0.013)	(0.011)	(0.009)	(0.010)	(0.010)	(0.024)
White on Black	0.114***	0.094***	0.066***	0.080***	0.051***	0.112***	0.116***	0.108***	0.029	-0.006
	(0.017)	(0.016)	(0.016)	(0.019)	(0.019)	(0.021)	(0.015)	(0.018)	(0.019)	(0.028)
Weapon										
Black on Black	0.007***	0.001	0.003*	0.002	0.002	0.005**	0.002	0.001	0.004**	0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)
Black on White	0.003	-0.000	0.004**	0.002	0.002	0.002	0.000	0.000	0.003*	0.006*
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
White on Black	0.008**	0.010***	0.007**	0.006	0.006	0.013**	0.002	0.008**	0.008**	0.008
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.005)	(0.002)	(0.004)	(0.004)	(0.005)

Note: N=297,768 for high inequality and N=188,203 for low inequality. Q1 represents low values of the W/B earnings ratio while Q5 reflects high values Of the W/B earnings ratio. * p<0.1, ** p<0.05, *** p<0.01

Table 12
Neighborhood Earnings Inequality: Crime Outcomes and Black/Hispanic Interactions

	High Inequality: B/H Earnings Ratio > Median in Sample					Low Inequality: B/H Earnings Ratio <= Median in Sample				
	Q 1	Q 2	Q 3	Q 4	Q 5	Q 1	Q 2	Q 3	Q 4	Q 5
Robbery										
Black on Black	-0.110***	-0.087***	-0.088***	-0.051***	-0.001	-0.089***	-0.086***	-0.056***	-0.022***	-0.013**
	(0.008)	(0.006)	(0.006)	(0.006)	(0.005)	(0.011)	(0.009)	(0.007)	(0.006)	(0.005)
Black on Hisp	0.235***	0.248***	0.297***	0.330***	0.359***	-0.013***	0.249***	0.254***	0.376***	0.343***
	(0.013)	(0.010)	(0.011)	(0.011)	(0.009)	(0.005)	(0.010)	(0.009)	(0.013)	(0.011)
Hispanic on Black	0.060***	0.067***	0.039***	0.045***	0.083***	0.041**	0.035**	0.033***	0.078***	0.051***
	(0.015)	(0.013)	(0.013)	(0.011)	(0.010)	(0.019)	(0.015)	(0.011)	(0.011)	(0.012)
Assault										
Black on Black	0.065***	0.040***	0.082***	0.076***	0.047***	0.047***	0.047***	0.058***	0.051***	0.045**
	(0.014)	(0.008)	(0.009)	(0.007)	(0.007)	(0.015)	(0.012)	(0.009)	(0.007)	(0.006)
Black on Hisp	-0.100***	-0.102***	-0.100***	-0.140***	-0.141***	-0.088***	-0.098***	-0.093***	-0.176***	-0.153***
	(0.012)	(0.010)	(0.012)	(0.009)	(0.009)	(0.014)	(0.010)	(0.009)	(0.009)	(0.008)
Hispanic on Black	0.026	0.040***	0.064***	0.014	-0.003	0.021**	0.062**	0.053***	-0.023***	0.024***
	(0.016)	(0.014)	(0.016)	(0.015)	(0.013)	(0.020)	(0.017)	(0.014)	(0.015)	(0.013)
Weapon	0.002	-0.001	0.001	0.001	0.000	-0.001	0.002	0.001	0.000	0.000
Black on Black	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Black on Hisp	0.002	0.000	0.002	-0.001	0.000	0.002	0.002	-0.000	-0.001	-0.001
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
Hispanic on Black	0.021**	0.018***	0.016***	0.018***	0.012***	0.016***	0.011*	0.012***	0.011***	0.009***
	(0.008)	(0.004)	(0.004)	(0.004)	(0.003)	(0.005)	(0.007)	(0.003)	(0.003)	(0.002)

Note: N=489,804 for high inequality and N=470,933 for low inequality. Q1 represents low values of the B/H earnings ratio while Q5 reflects high values Of the B/H earnings ratio.* p<0.1, ** p<0.05, *** p<0.01

Table 13
Neighborhood Earnings Inequality: Crime Outcomes and Hisp/White Interactions

	High Inequality: W/H Earnings Ratio > Median in Sample					Low Inequality: W/H Earnings Ratio <= Median in Sample				
	Q 1	Q 2	Q 3	Q 4	Q 5	Q 1	Q 2	Q 3	Q 4	Q 5
Robbery										
Hispanic on Hisp	0.043***	-0.034	0.047***	0.052***	0.053***	0.046***	0.021***	0.053***	0.078***	0.101***
	(0.008)	(0.061)	(0.007)	(0.007)	(0.010)	(0.006)	(0.005)	(0.007)	(0.008)	(0.025)
Hispanic on White	0.226***	0.339***	0.167***	0.161***	0.107***	0.240***	0.154***	0.170***	0.176***	0.144***
	(0.009)	(0.118)	(0.009)	(0.011)	(0.014)	(0.007)	(0.009)	(0.010)	(0.012)	(0.030)
White on Hisp	-0.005	0.023***	0.049***	0.064***	0.105***	0.006	0.011	0.024***	0.035***	0.073***
	(0.006)	(0.009)	(0.010)	(0.011)	(0.032)	(0.008)	(0.010)	(0.008)	(0.011)	(0.014)
Assault										
Hispanic on Hisp	0.044***	0.026**	0.016*	0.024**	-0.002	0.029***	0.031***	-0.003	-0.017	-0.096***
	(0.008)	(0.011)	(0.008)	(0.011)	(0.016)	(0.008)	(0.008)	(0.009)	(0.012)	(0.034)
Hispanic on White	-0.121***	-0.059***	-0.087***	-0.089***	-0.071***	-0.119***	-0.101***	-0.102***	-0.110***	-0.176***
	(0.008)	(0.018)	(0.011)	(0.013)	(0.020)	(0.006)	(0.008)	(0.011)	(0.014)	(0.038)
White on Hisp	0.083***	0.035***	0.018*	0.014	-0.037*	0.071***	0.015	-0.025*	-0.000	-0.106**
	(0.012)	(0.012)	(0.011)	(0.015)	(0.020)	(0.010)	(0.013)	(0.013)	(0.015)	(0.042)
Weapon										
Hispanic on Hisp	0.003	0.001	0.000	0.002*	0.005***	0.002**	0.003**	0.004**	0.002	0.004
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)
Hispanic on White	0.001	0.003**	0.005***	0.005***	0.004**	0.001	0.002	0.001	0.002	0.013
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)	(0.009)
White on Hisp	0.004**	0.005**	0.010***	0.010*	0.005**	0.005**	0.005**	0.009***	0.001	0.004
	(0.002)	(0.002)	(0.002)	(0.006)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.006)

Note: N=471,230 for high inequality and N=361,231 for low inequality. p<0.1, ** p<0.05, *** p<0.01

Data Appendix

Mapping Reporting Districts to 1990 Census Tracts

A geographical map of reporting districts was provided by the Los Angeles Police Department (LAPD) and Los Angeles Sheriff's Department (LASD). This map was overlaid onto a geographical map of census tracts using data from the Los Angeles Neighborhood Services and Characteristics Database (L.A.NSCD)[26]. The variable in the data, *ctract*, reflects 1990 census tract boundaries. Using the geographical boundaries of these maps, reporting districts were allocated to 1990 census tracts. There are more reporting districts than census tracts and the geographical boundaries did not always align perfectly. As a result, the reporting district was assigned to the census tract where the majority of the reporting district overlaid.

2000 Decennial Census and 2009 American Community Survey Data

The L.A.NSCD data provide a mapping from 2000 to 1990 census tract boundaries that allow us to merge 2000 Census and 2009 ACS data to the *ctract* identifier in the L.A.NSCD data and ultimately to our crime data from LA County. In 2000, some 1990 census tracts were split into multiple tracts. The L.A.NSCD data identify 2000 census tracts and population weights to allocate Census and ACS data to 1990 census tract definitions.

Population Data:

The following files were downloaded from the Census Bureau website to obtain census tract total population counts for White only, Black only and Hispanic of Latino of any race:

2009 ACS (Black, White and Hispanic): ACS_09_5YR_B03002_with_ann.csv
2000 Census (Black, White and Hispanic): DEC_00_SF1_DP1_with_ann.csv

These data were used to create the following population ratios used in the analysis: Black/White, Black/Hispanic, and Hispanic/White. Note that the Hispanic/Latino counts are of any race, but the Census Bureau does not produce estimates for Hispanic/Latino "alone".

When necessary, if the ratio was calculated with a division by zero the denominator was replaced with a value of one.

Median Earnings Data:

[26] This data and its codebook can be found at: http://lasurvey.rand.org/data/contextual/lansc/

The following files were downloaded from the Census Bureau website to obtain census tract estimates of median earnings for White only, Black only and Hispanic of Latino of any race:

2009 ACS Black Median Earnings: ACS_09_5YR_B20017B_with_ann.csv
2009 ACS Hispanic Median Earnings: ACS_09_5YR_B20017I_with_ann.csv
2009 ACS White Median Earnings: ACS_09_5YR_B20017H_with_ann.csv

These data were used to create the following earnings ratios used in the analysis: White/Black, Black/Hispanic, and White/Hispanic. Earnings estimates that were flagged as falling into extreme intervals of the distribution were treated as given. As with the population data above, earnings data for Hispanic/Latino included individuals of any race.

When necessary, if the earnings estimate for the numerator or denominator was missing, that value was replaced with the median earnings for that group across all census tracts.