

# Reassessing the Relationship Between Mortgage Loan Investment and Crime Across Race/Ethnicity, Disadvantage, and Instability

Lyndsay N. Boggess and Thomas D. Stucky

## Introduction

Despite considerable criminal justice interventions over time, disadvantaged communities continue to be plagued by high crime. However, the recent surge in housing prices coupled with a dearth of affordable rental housing has drawn renewed attention to factors outside of the criminal justice system that have implications for neighborhood safety. Research has shown that investing in homeowners and their neighborhoods through mortgage loans (Bunting, 2020; Vélez et al., 2012; Vélez & Richardson, 2012) or renovation grants (South et al., 2021) can reduce crime. Saporu, Patton, Krivo, and Peterson's (2011) impactful *Race and Justice* article found that investing in minority, disadvantaged, or high crime neighborhoods may be particularly beneficial for crime reduction and reap more "bang" for the buck (Saporu et al., 2011, pg. 83). This suggests that policies encouraging homeownership, particularly in low-income or minority neighborhoods, may be an especially powerful tool for combatting crime in neighborhoods.

Further, although prior research has looked at racial composition and economic status, understanding the pivotal role of residential instability in neighborhoods and how it may impact the effectiveness of housing investment to curb crime, has not been studied as extensively. Residential stability is particularly salient for crime control (e.g., Morenoff et al., 2001; Sampson et al., 1997). Neighborhoods with higher rates of residential stability tend to have lower violent and property crime rates (e.g., Kasarda & Janowitz, 1974). As such, strategies to increase residential stability should also indirectly contribute to crime reduction. Given that homeowners are key factors in stabilizing neighborhoods (Dietz & Haurin, 2003; Rohe & Stewart, 1996), and more mortgage loans often equate to more homeowners, this suggests that investment plays a

---

This is the author's manuscript of the article published in final edited form as:

Boggess, L. N., & Stucky, T. D. (2022). Reassessing the Relationship Between Mortgage Loan Investment and Crime Across Race/Ethnicity, Disadvantage, and Instability. *Race and Justice*, 21533687221140550. <https://doi.org/10.1177/21533687221140554>

crucial role in neighborhood safety. However, historic discrimination in the housing market and disparities in lending have left minority communities more disadvantaged than White areas, with lower rates of homeownership and lower property values. On one hand, this suggests that because poor or minority neighborhoods need the most resources even modest investment has the potential to make significant noticeable improvements, such as increasing stability associated with homeowners or cleaning up visible disorder. On the contrary, even proportionally large increases in investment may be insufficient to counteract years of neglect or disinvestment (Peterson & Krivo, 2010a; Rothstein, 2017).

Therefore, the current study replicates and builds on Saporu and colleagues' (2011) conclusions. Saporu et al. (2011) used a measure of absolute investment despite substantial differences in housing prices – and therefore loan amounts – which exist across neighborhoods and across cities, and excluded aggravated assaults from their dependent variable despite it being the most common type of violent crime (see Thomas & Drawve, 2018) and is often included macro-crime studies (e.g. Browning et al., 2010; Stucky & Ottensmann, 2009). As such, we examine the robustness of Saporu et al.'s (2011) conclusions by addressing the aforementioned limitations and we extend their study by assessing the impact of residential stability on the investment-crime relationship. We use the National Neighborhood Crime Study (NNCS; Peterson & Krivo, 2010b) data for census tracts in a large sample of U.S. cities and hierarchical negative binomial regression models. The NNCS data is a crucial data source for comparing meso-level crime processes across cities (Hipp & Williams, 2020). In line with Saporu and colleagues, we find that investment is generally associated with fewer violent and property crimes, and the effect of investment is not moderated by residential instability. However, the finding that investment is more efficacious in disadvantaged neighborhoods is not robust across

mortgage indicator or dependent variable specification. These findings underscore the importance of replication for ensuring strong and effective housing and anti-crime policies.

## **Literature Review**

### **Mortgage Loans and Crime**

Research has shown that investment via residential mortgage loans made by private banks is specifically linked to lower crime (Kubrin & Squires, 2006; Saporu et al., 2011; Vélez et al., 2012), including intimate partner violence (Bogges & Chamberlain, 2021). Studies by Squires and Kubrin (2006) and Vélez (2009) find that larger loans decrease violent crime specifically, while Peterson and Krivo (2010a) show that a one standard deviation increase in the dollar amount of loans can contribute to a 9% reduction in both property and violent crime. A rigorous longitudinal study of Seattle neighborhoods by Vélez and colleagues (2012) found that the mortgage dollar amounts of loans originated and the number of mortgage loans per owner occupied unit contributed to lower violent crime up to two years after the investment. More recently, Gill et al. (2022) showed that investment through renovation and refinance loans is associated with a reduction in violent crime, although the benefits are tempered in predominately Black neighborhoods.<sup>i</sup>

External investment indirectly effects crime by impacting informal social control. One critical way that mortgage loans do so is through increasing residential stability. Within a social disorganization theoretical framework, neighborhoods characterized by residential instability, poverty, racial/ethnic heterogeneity, and family disruption, have fewer social ties because these characteristics discourage social interactions among residents (Bursik & Grasmick, 1993). Social interactions facilitate shared behavioral norms and expectations of collective action, such as a willingness to intervene to for the common good of the community (Sampson et al., 1997).

Without strong social connections among residents, neighborhoods lack the capacity to collectively address problems, such as crime (e.g., Morenoff et al., 2001; Sampson et al., 1997). In residentially unstable neighborhoods these social connections are undermined (Silver & Miller, 2004). Indeed, neighborhoods with greater residential stability tend to have lower crime rates (e.g., Kasarda & Janowitz, 1974).

Mortgage loans often increase the number of homeowners in a neighborhood, who are associated with lower crime rates. Homeowners tend to reside in neighborhoods for longer durations than renters (Dietz & Haurin, 2003; Rohe & Stewart, 1996; Rohe et al., 2002), strengthening neighborhood stability. Owners also attach greater sentimental value to the neighborhood and are more likely to participate in local organizations and local politics (McCabe, 2013; Rohe & Stegman, 1994). Further, property owners' financial stakes in the neighborhood provide incentives for property maintenance and general neighborhood upkeep (e.g., Haurin et al., 2013), as property values are generally contingent on the quality of the local amenities, including low crime (Hipp et al., 2009). External investment through loans can reduce physical disorder (Dietz & Haurin 2003; Galster, 1987) and refinance or home improvement loans may ward off potential deterioration or decline (Branic & Hipp, 2018). This also reduces visible signs of disorder making the neighborhood more attractive to future residential and commercial investment. Indeed, neighborhoods may be able to leverage this investment and "worthiness" for resources (Squires & Kubrin, 2006), such as increased police coverage or leaning on banks to specifically finance investment in more disadvantaged or minority neighborhoods (see Squires, 1992). Notably, maintaining safe and attractive neighborhoods promotes residential stability, as residents are less likely to leave neighborhoods that they feel are safe and worthy of investment (Ellen and O'Regan, 2010).

## **Unequal Investment**

There is reason to believe that the benefits of economic investment vary by neighborhood type and racial/ethnic composition (e.g., Boggess & Chamberlain, 2021; Shrider & Ramey, 2018). Cities tend to have an uneven distribution of investment across neighborhoods, with White or more advantaged communities typically receiving a disproportionate amount of loan dollars (Rothstein, 2017; Squires & Kubrin, 2006). Historically, investment in minority neighborhoods was considered risky (Rothstein, 2017); evidenced by fewer loans (Squires & O'Connor, 2001) and disproportionate subprime loans to buyers in minority neighborhoods (Faber, 2013). Non-White neighborhoods are also often devalued compared to predominantly White communities (e.g., Faber & Ellen, 2016; Mallach, 2019), even in predominantly Black cities (Perry, 2020). However, Saporu and colleagues (2011) found that lower levels of investing in disadvantaged or Black, White, or integrated neighborhoods yield larger crime reductions, and South, MacDonald, and Reina (2021) showed that modest repair grants to low-income homeowners were associated with reductions across several different types of crimes, particularly on high crime blocks.

This suggests that loan dollars may go further in impoverished and/or minority communities given the generally lower cost of housing and the relatively greater impact of purchases. That is, because poor and/or minority neighborhoods often need the most resources but have the least access to them, even modest investment has the potential to make significant noticeable improvements. If the physical condition of housing in disadvantaged communities is poor, investment to fix up properties may have a more noticeable impact than minor improvements in neighborhoods that are already in fairly good condition. More advantaged or predominately White neighborhoods, however, tend to be resource rich and more likely to have

established mechanisms in place to control disorder and crime. As such, marginal increases in investment are likely less noticeable and therefore less potent in terms of disorder reduction or increases in social control.<sup>ii</sup> Ultimately, investment may be particularly crucial in neighborhoods that are both disadvantaged and minority because these neighborhoods may have the largest room for improvement, especially in light of historical housing discrimination. Despite this, in a study of Seattle neighborhoods, Vélez and colleagues (2012) did not find any evidence that the benefits of loans on crime are differentially affected by racial or composition or disadvantage. And Gill and colleagues (2022) found that home improvement and renovation loans had significantly larger crime reduction effects in non-Black neighborhoods in Cleveland.

### **The Current Study**

We primarily focus on two of Saporu and colleagues' (2011) major conclusions. Their examination of loan dollars into Black, White, Hispanic, and integrated neighborhoods showed that (1) higher amounts of mortgage loan dollars contribute to more substantial reductions in crimes in Black and Hispanic communities than in White or integrated ones, even if the overall dollar amount is lower and (2) for Black, White, and integrated neighborhoods there were larger violent crime reductions in more disadvantaged communities than their more economically advantaged counterparts. They also found that across all models, the impact of loans diminished with progressively larger dollar amounts. Subsequent studies, however, have not found a similar pattern. We rely on the same data and models used by Saporu et al. (2011) but improve upon their analyses in several important ways.

First, we test whether the benefits of investment for crime reduction are robust to variable specification by updating two key variables from the versions that Saporu and colleagues used. One, their study used total loan dollars into a neighborhood as the indicator of investment, but

the extent to which investment affects crime reduction is likely contingent on the *relative* value of the loan. Therefore, we adjusted the neighborhood investment value as it relates to the neighborhood median home value, which accounts for differences in housing costs across neighborhoods within and across cities. This is a more valid comparison of investment than using the absolute dollar amount of loans, where \$5,000,000 in investment may be a substantial amount of investment in some cities (e.g., Cleveland, OH) but fairly meager in others (e.g., San Francisco, CA). Two, we use a more expansive definition of violent crime that includes aggravated assaults in addition to homicide and robbery. These crimes are often examined in criminological research and captures the most common forms of violent crime. For both of these updates, we compare models using our modified variables to those using Saporu et al.'s (2011) original variable specifications.

Second, there is a strong relationship between crime, residential instability, and housing (e.g., Branic & Hipp, 2018; Hipp et al., 2009), which is not fully investigated in the Saporu paper. Given that residential stability is a key component of informal social control and that instability is particularly detrimental in high crime (Johnson, 2021) or Black communities (Boggess & Hipp, 2010), external investment that encourages stability may be especially impactful in those communities. Given the limited research addressing this issue, however, it is not clear whether mortgage investment will play out in the same “more bang for the buck” pattern in highly unstable neighborhoods as it does in a disadvantaged one. In fact, investment may be *less* impactful in unstable communities because residential turnover could undermine the benefits associated with investment, and this may particularly be the case in minority neighborhoods. Research on the lasting effects of redlining found that neighborhoods classified as red (“hazardous”) or yellow (“definitely declining”)—both classifications typically reserved

for non-White areas—lost population at a substantially faster rate over time than neighborhoods with better ratings (Rutan & Glass, 2018). This suggests that a high rate of instability in minority neighborhoods is specifically associated with residential out-migration, that investment may be insufficient to counteract. On the contrary, residentially unstable minority neighborhoods also probably have the most room for improvement such that higher rates of mortgage investment may reduce crime by stabilizing the population, encouraging long-term residency, and ultimately increasing informal social control. This would predict more bang for the buck in neighborhoods with high instability relative to those that are more stable.

This leads to the following research objectives: (1) test whether housing investment through home loans into neighborhoods contributes to fewer violent and property crimes, (2) examine whether and how the investment – crime relationship is moderated by neighborhood racial/ethnic composition, economic disadvantage, or residential instability. We examine these relationships using sub-samples of neighborhoods that are integrated or comprised predominantly (70% or more) of residents who are Black, White, or Hispanic.

### **Data and Methods**

We use data from the National Neighborhood Crime Study (NNCS; Peterson & Krivo 2010b). The NNCS compiles tract level sociodemographic data from the 2000 U.S. Census, housing data from the Home Mortgage Disclosure Act (HMDA; Federal Financial Institutions Examination Council, 2001), and 1999 to 2001 Uniform Crime Reports (UCR) Part 1 crime data from a national sample of police departments. Our unit of analysis is the census tract (our proxy for neighborhood) nested in the city. In the NNCS there are 9,593 census tracts in a representative sample of 91 large cities, however, we exclude tracts with missing data, no residential population, or no owner-occupied housing units. Similar to Saporu, we identified

tracts as predominantly Black, White, or Hispanic when 70% or greater of the residential population was that specific racial or ethnic group. For the violent crime models, this resulted in 3,149 tracts in 84 cities for the predominately White tracts, 1,466 tracts in 42 cities for the predominately Black tracts, 679 tracts in 34 cities in predominately Hispanic tracts, and 3,692 in 83 cities tracts that were “integrated” with less than 70% White, Black or Hispanic residents.

### **Dependent Variables**

Our dependent variables are violent and property crime counts for census tracts reported through the FBI’s Uniform Crime Reports. We first measure violent crime as the average number of homicides and robberies reported to the police between 1999 and 2001 to directly replicate the approach used by Saporu et al. However, their operationalization is somewhat uncommon in that most studies using violent crime indices also include aggravated assaults (e.g., Browning et al., 2010; Stucky & Ottensmann, 2009), which also tends to be the most common form of violent crime (see Thomas & Drawve, 2018). Therefore, we also estimate alternative models with aggravated assaults included in the dependent variable.<sup>iii</sup> Many studies assessing the impact of home loan investment on crime including Saporu et al (2011) focus on violent crimes (e.g., Vélez, 2009; Vélez & Richardson, 2012; Vélez et al., 2012). To improve comparability with prior studies, we do the same, but we also examine how investment impacts property crime in supplementary analyses discussed in Appendix B.

The average numbers of crimes vary substantially across tracts with differing predominate racial/ethnic compositions (shown in Table 1). For example, including only homicide and robbery in the dependent variable (as Saporu et al. did), there are, on average, 18.5 violent crimes in predominately White tracts, 61.6 in Hispanic tracts, 78.0 in Black tracts, and

54.0 in integrated tracts. These numbers increase to 45.5, 166.1, 204, and 130.7 respectively when including aggravated assault.

>>> Insert Table 1 here <<<<

### **Housing Investment Variables**

The key independent variable of interest is investment in a neighborhood. We measure investment in two ways: one to replicate Saporu et al. (2011) and a second way that we argue is perhaps a more valid indicator of investment. First, Saporu et al. (2011) captured the *absolute* value of loan investment as the total dollars of loan investment in each tract. This measure includes all loan dollars originated for single or multi-family housing units purchased through conventional, Federal Housing Administration (FHA), and Veterans Affairs (VA) loans. It includes all loans for new purchases, refinances, and home improvement loans that were applied for, approved, and accepted (i.e., originated) by the applicant in 2000. Saporu et al. (2011) argued that more investment in a neighborhood should be associated with less crime and the effect should be *greater* in tracts with *low* investment, and they included a squared term to account for the possibility that the effect would decline as dollar amounts of loans increased. On average, a predominately White tract received over \$21 million in mortgage loans, whereas Hispanic tracts averaged closer to \$6 million and Black tracts averaged \$4.8 million. However, there is marked variation in housing values across tracts within and across cities which cannot be captured in an overall loan amount. Therefore, second, we also measure investment as the total amount of home mortgage loan dollars in a tract *relative* to the median home value within each specific tract.<sup>iv</sup> This strategy minimizes the impact of large dollar value differentials in housing prices (and therefore loan amounts) that may exist across neighborhoods and across cities. Table 1 shows that in predominantly Black tracts, the average total amount of home loan dollars

originated are 64 times the tract median home price, 67 times in Hispanic tracts, 104 times the median home value in integrated tracts, and 122 times the median home value in White tracts. Another way to interpret these values would be that in the average Black neighborhood, one could purchase 64 properties priced at the median value of homes in that tract whereas, in contrast, one could purchase 122 median priced homes in a predominately White neighborhood. Additionally, to control for variation in the number of loans to tracts, we include the percentage of loan applications for owner-occupied housing.

>>> Insert Table 2 here <<<

Table 2 breaks down the values of the absolute and relative investment measures by tract race/ethnicity even more. There are stark differences in investment across neighborhoods. For example, \$3.1 million of mortgage loans in Black tracts would be the 50<sup>th</sup> percentile for Black tracts, below the 10<sup>th</sup> percentile for White tracts, below the 25<sup>th</sup> percentile for integrated tracts, and between the 25<sup>th</sup> and 50<sup>th</sup> percentile in Hispanic tracts. The 90<sup>th</sup> percentile for White tracts (46.3) is more than twice the 90<sup>th</sup> percentile for integrated tracts (27.8), 4.4 times greater than the 90<sup>th</sup> percentile for Black tracts (10.6) and 3.8 times greater than Hispanic tracts (12.1). Table 2 also includes skewness values for the variables within each subsample. These values range from 2.7 to 9.7 and indicate that that the investment variables are highly skewed (values greater than 1 normally are considered highly skewed), which supports the use of the squared term. <sup>v</sup>

### **Additional Neighborhood-Level Explanatory Variables**

To replicate the prior models as closely as possible, we include a similar set of additional tract-level variables to those in the Saporu et al. study. We measure of disadvantage created by Peterson and Krivo (2010b) which is the average of the standardized scores of six variables:<sup>vi</sup>

percent of employed civilian population age 16 and over in management, professional, & related occupations, percent of households that are female-headed, percent of adults age 25 and over who are at least college graduates, percent of the population in poverty, percent of total population age 16-64 who are unemployed or not in the labor force, percent of total employed civilian population age 16 and over employed in the six occupations with the lowest mean incomes. The disadvantage index is centered such that higher positive values represent above average disadvantage and negative values indicate lower than average disadvantage.

To assess whether housing investment is moderated by residential instability, we include the residential instability index provided in the NNCS data (Peterson & Krivo 2010b) which is comprised of the percent of the population who resided in a different house five years prior to the Census and the percent of renter-occupied housing units ( $\alpha = .69$ ). This is the same measure of residential instability used in Saporu et al. (2011). To control for the population most likely to engage in crime, we include the percentage of young males age 15 to 34 out of the total tract population. Finally, we include an index of immigrant concentration comprised of the average of the standardized score for the percent of population that is foreign born, percent of population that is foreign born and arrived in United States in 1990 or later, and the percent of households in which no one age 14 or over speaks English well. As with other indices, the immigrant concentration variable was created by Peterson and Krivo (2010b).

### **Additional City-Level Explanatory Variables**

Similar to Saporu et al. (2011) we include city-level measures that are associated with crimes, including the population in 2000, the racial/ethnic composition measured as the percent Black residents, and binary variables indicating whether the city is located in the South or the West (with all other locations as the reference category). Given that city-level economic

disadvantage exerts an independent effect on crime above and beyond the neighborhood level (Chamberlain & Hipp 2015), we include the city equivalent measure of the disadvantage index described above. We also include the percent of the total population that is foreign born, the percent of the employed civilian population age 16 and over who worked in manufacturing industries in 2000, and the percent of population ages 5 and over who lived in a different house in 1995. Finally, we include a measure of residential segregation, white-black dissimilarity, which is a common measure of residential racial segregation (see Massey & Denton 1988). The dissimilarity score ranges from 0 to 100 where higher values indicate less interaction and more segregation. The mean dissimilarity score in our sample ranged from 59.8 in predominately White tracts to 74.7 in predominately Black tracts.<sup>vii</sup> Descriptive statistics for all variables across different tract groups by race/ethnicity are shown in Table 1 (pg. 10).

### **Analytic Strategy**

To account for tracts clustering within a city, we employ hierarchical negative binomial models of crime counts in census tracts (Level 1) within a city (Level 2). This modeling technique allows us to control for tract and city-level factors that are likely to impact the frequency of crime within a tract. The negative binomial model is based on the Poisson distribution. However, when there is overdispersion of the variance relative to the mean the negative binomial model is more appropriate because it includes a parameter to account for the overdispersion (see Gardner et al., 1995 and Osgood, 2000 for discussions). To account for the possibility that crime counts could simply be a function of variation in tract populations, we include tract population as an exposure variable. Additionally, because tracts within the same city will share variation, we include a random effect for the city. Saporu et al. (2011) relied on a similar modeling strategy.

Our analyses begin with an investigation of whether mortgage investment is associated with lower violent crime, net of controls and assess whether the effect of investment is linear using a squared term. We then proceed to consider whether there is a disproportionate benefit of investment in disadvantaged or residentially unstable neighborhoods of differing predominate race and ethnicity. Next because our study ultimately builds on Saporu et al.'s (2011) research, we estimate analogous models to replicate their analyses. Then, we estimate models which employ our alternative measures of (1) violent crime and (2) mortgage investment to explore the robustness of the mortgage investment-crime relationship and whether and how it is conditioned by disadvantage. Finally, we test whether the investment-crime relationship is also moderated by residential instability. We use *menbreg* in Stata 15 to estimate all models.

## Results

We begin with a close replication of Saporu et al. (2011), using their original measures of absolute investment dollars and violent crime, shown in Table 3. Table 3 shows the results of the hierarchal negative binomial models for violent crime by tract predominate race/ethnicity. Due to space constraints, we limit our discussion of the findings to our key variables of interest, namely mortgage investment. The direct and nonlinear effects of mortgage investment are statistically significant in the majority of models in Table 3. However, because we include interaction terms, Mustillo, Lizardo, and McVeigh (2018) argue that relying on only the magnitude or statistical significance of the coefficient for an interaction term leads to erroneous conclusions in nonlinear models. As such, we follow best practices for interpreting interaction effects in nonlinear models (established by Mize 2019) and estimate average marginal effects (AMEs) using the post-estimation command *margins* in Stata, which, importantly, also conducts statistical comparisons for significant effects between these predicted values.<sup>viii</sup> Therefore, we estimated AMEs in Stata

comparing the effect of investment on violent crime at different levels of investment: \$2,000,000 vs. \$4,000,000; \$4,000,000 vs. \$6,000,000, and \$6,000,000 versus \$8,000,000, with all other variables at their means.<sup>ix</sup> In all cases, the effects of the different investment amounts were statistically significantly different from each other (results not shown), confirming that the effect of mortgage investment on violent crime is nonlinear. Thus, we conclude that greater absolute investment dollars is associated with fewer violent crimes, but the effect is tempered at higher loan values.

>>> Insert Table 3 here <<<

Our primary interests include testing whether the benefits of investment for crime reduction are robust to variable specification by updating two key variables from the versions that Saporu and colleagues used. Therefore, we next estimated three models analogous to those in Table 3 (results not shown due to space constraints). One using Saporu's original measure of absolute mortgage investment variable (*oriamt*), but adding aggravated assault to the dependent variable. We then ran two additional models substituting the relative mortgage investment variable (*ori2valu*) for both their original violent crime variable and ours including aggravated assault. To facilitate comparison with Saporu paper's original findings, we graph predicted values from these models in Figure 1. Figure 1 illustrates the percentage difference in predicted violent crimes at low and higher levels of absolute and relative mortgage investment for each of the four models (bars) and each of the four predominate racial and ethnic tracts (across the x-axis).<sup>x</sup> To estimate these differences, we separated *absolute* investment into low (\$2 million) versus high (\$7 million) investment dollars. Low *relative* investment is 40 times the tract median home value, whereas high relative investment is 80 times the tract median home value. All values are within the range of the data.

>>> Insert Figure 1 here <<<

The first, and perhaps most important point to highlight in Figure 1 is that in all models, regardless of how investment or the dependent variables are measured, predicted violent crime is lower when investment is higher. Within each set, the model closely analogous to the Saporu et al. study, and what we showed in Table 3, is the solid light gray bar on the far left. Here, the percentage difference in violent crime is substantially larger in Black (-16.5%) and Hispanic (-20.7%) tracts than in White (-9.5%) or integrated (-8.2%) ones. This is in line with Saporu et al.'s "more bang for the buck" conclusion that there is greater net benefit in violent crime reduction in Black and Hispanic tracts. However, adding aggravated assault reduces these differences across all but integrated tracts (second bar from left, cross-hatch pattern). In this set of estimates, the range is from 6.8% to 17.6% fewer predicted violent crimes at the higher investment level. The final two bars show the percentage differences using our measure of relative investment; first with Saporu's violent crime variable (second bar from right, diagonal lines) and second with aggravated assault included in the dependent variable (far right bar, solid darker gray). Changing to a relative mortgage investment variable reduces these differences substantially in Black and Hispanic tracts. This is especially the case in the models with aggravated assault included: In predominantly Black tracts, the percentage difference in crime reduction between low and high investment drops (from -16.5% in the Saporu models) to -8.8%, and in Hispanic tracts (from -20.7% in the Saporu models) to -10.6%. Thus, the magnitude of the "more bang for your buck" in minority tracts argument depends a great deal on how investment and the dependent variable are measured.

### **Moderating Effects of Neighborhood Disadvantage**

We next explore whether our models reproduce the Saporu et al. (2011) conclusion that investment produces more bang for the buck in disadvantaged tracts. Notably, Saporu did not report coefficients for their final models with interaction terms that they used to generate the predicted values shown in their Figure 3 (Saporu et al., 2011: 94), which precludes direct comparison of model coefficients. However, we estimated models (shown in Appendix A) that are analogous to their final set of models in which they demonstrate that loans to socio-economically disadvantaged Black, White, and integrated areas have the biggest impact on crime reduction. We then used the same procedure described above to predict percentage changes in violent crime counts at varying levels of tract investment (with other variables set to mean values), shown in Table 4. The rows represent average disadvantage (which we refer to as average socioeconomic status, or SES) (i.e., disadvantage index = 0) and disadvantaged (index = 2) in Black, White, Hispanic, and integrated tracts. The columns are split such that models using absolute investment in line with Saporu et al. are shown on the left and our revised measure of relative investment on the right. Columns “A” and “C” represent Saporu et al.’s original definition of violent crime (homicide and robbery only) and columns “B” and “D” use our operationalization of violent crime including aggravated assaults, homicide and robbery. Note, predicted values are only included when there are statistically significant differences in the overall effect of mortgage investment between average and disadvantaged tracts when comparing the AMEs.

>>> Insert Table 4 here <<<<

Table 4 generally indicates that greater investment is associated with lower violent crime, but that the magnitude of predicted differences varies by model specification. We discuss the models that most closely reflect the Saporu paper, shown in Column A, first. The top line shows

that in Black disadvantage tracts the predicted percentage difference in violent crimes between high investment (\$7 million) and low investment (\$2 million) is -37.5%, or 37% fewer predicted violent crimes. Comparatively, in Black tracts with average SES, the predicted difference in the number of violent crimes between high and low investment would be only -12.7%. Thus, greater investment dollars in *disadvantaged* Black neighborhoods goes further in reducing crime than the same investment in average SES tracts (-37.5% v. -12.7%). This difference in difference (1) is 24.8% and given this model most closely replicates Saporu et al's, we will use this as the primary comparison point when discussing our revised models.

We find similar patterns in White and integrated tracts, but the magnitude of the differences is smaller. For White tracts, the difference in difference (2) is 17.4%, and only 10.1% (difference in difference (4)) in integrated tracts. The effects of different levels of investment were not statistically significantly different between disadvantaged and average SES Hispanic tracts (shown in Table 4). These results largely reproduce the findings of Saporu et al. (2011).

Next, we explore whether this finding is robust to model specification. Column B uses our more comprehensive dependent variable including aggravated assaults. For Black tracts the difference in difference (1) drops from 24.8% to 5.3%. Thus, just by adding aggravated assault to the dependent variable, the crime reduction benefit of higher investment dollars in disadvantaged tracts drops dramatically. The difference in difference scores for White and integrated tracts are also lower in the models with aggravated assaults. Interestingly, when using our alternative measure of violent crime, the impact of investment is significantly different in Hispanic tracts as well: The difference in difference (3) is 44.2%. While one should view this result cautiously, as it is the only model that showed significant differences between Hispanic average SES and disadvantaged tracts, it suggests that investment may be particularly impactful on reducing

aggravated assaults specifically in disadvantaged Hispanic neighborhoods. In our next sets of models, we find additional differences in the patterns of findings when we substitute our measure of relative loan investment (Columns C and D). First, for predominantly Black tracts, the substantive conclusion one would draw is completely different. Using the relative investment indicator, the difference between high and low loan amounts is either not statistically significantly different (Column C) or is actually statistically significantly *smaller* in disadvantaged tracts (Column D). The difference in difference is -15.1%, which indicates that the predicted reduction in violent crimes is *greater* in Black average SES tracts than Black disadvantaged ones, and is contrary to the “more bang for the buck” argument. Second, the strongest evidence supporting a larger impact of investment in disadvantaged tracts would appear to be in White tracts, where both Columns C and D show statistically significantly larger differences in expected violent crime in disadvantaged tracts than in average tracts. However, the magnitude of the difference declined dramatically in our models with relative home loans (4.3% and 2.3%) than in the absolute loan models (17.4% and 13.4%). Third, there is no evidence that greater relative investment contributes to a proportionately larger difference in violent crime in Hispanic or integrated tracts with or without aggravated assaults included.

### **Moderating Effects of Neighborhood Residential Instability**

Finally, we run models including an interaction term between residential instability and absolute and relative tract loan investment. As with disadvantage models, we compared AMEs to determine whether there are statistically significant overall marginal effects of investment in relatively residentially unstable tracts (2 standard deviations below the mean stability index value) versus average residential stability tracts.

>>> Insert Table 5 here <<<

As can be seen in Table 5, we find relatively limited evidence that the effect of investment varies across tracts by residential stability. In ten of sixteen violent crime models the overall AME was not statistically significantly different. Where we do see significant effects, they varied by model specification. We point out a few key findings. First, in Black tracts (Column D, difference in difference 1) and White tracts (Column C, difference in difference 2) one model each showed that the predicted effect of higher investment on violent crime was *greater* in average residential stability tracts compared to residentially unstable tracts. Second, in Hispanic tracts (Column A, difference in difference 3), there was a substantial difference (45.2%) in predicted violent crime percentage differences between unstable (-71.9%) tracts and average residential stability tracts (-26.7%). Third, while there are more significant differences in estimated violent crimes in integrated tracts across the different model specifications, the differences were very modest, ranging from -0.3% to 2.0%. This suggests that while mortgage loan investment is beneficial for unstable integrated tracts, it is almost equally as beneficial in tracts with average levels of instability.

### **Results Summary**

Taken together, our findings show clear evidence that higher investment is associated with lower violent crime and this finding is relatively robust to model specification. The effect of investment, however, does not appear to be consistently disproportionately beneficial in disadvantaged or unstable areas. So, although the findings do replicate some of the prior study by Saporu et al (2011) for Black and White tracts when using their measures, the patterns of findings is less consistent when aggravated assault and relative investment are included. Thus, one does not appear to get “more bang for the buck” in investing in disadvantaged or unstable areas. However, there does not appear to be robust evidence that one gets *less* either.

## Discussion and Conclusions

We investigated the relationships between housing investment and crime by reassessing and building on Saporu and colleague's (2011) *Race and Justice* article that concludes that mortgage investment goes further in disadvantaged or minority neighborhoods. We also extended their study and examined whether residential instability moderates the benefits of investment. We drew two major conclusions. First, there is consistent evidence that economic investment through home loans is associated with fewer violent crimes, but there is less evidence that the value of the loan goes further in terms of crime reduction in disadvantaged neighborhoods. Second, greater mortgage investment is nearly universally associated with lower violent crime regardless of the level of instability, but mixed evidence whether the crime reduction benefits are greater in more or less stable areas. Thus, while our study replicates the findings of Saporu et al. (2011), it also introduces caveats related to variable measurement.

Confirming a large body of prior literature (e.g., Squires & Kubrin, 2006; Vélez & Richardson, 2012; Vélez et al., 2012), mortgage loans into neighborhoods is consistently associated with fewer violent crimes. Across our analyses, tracts receiving greater absolute or relative loan amounts experienced fewer crimes, controlling for a host of crime-related neighborhood characteristics, including predominant racial or ethnic group. However, our findings provide inconsistent evidence about whether these crime reduction benefits are larger in disadvantaged tracts. While prior research suggests that loan dollars are associated with larger reductions in crime in Black, White, and integrated neighborhoods (Saporu et al., 2011), we tested this conclusion using a more inclusive violent crime indicator, and a housing investment measure that accounts for tract-specific housing values. We found Saporu et al.'s conclusion to be most consistently true in *White* neighborhoods and with some limited support for this conclusion

in Black tracts. And in our model substituting relative loan investment and adding aggravated assaults to the dependent variable, we actually found greater crime reduction in Black average SES tracts than in disadvantaged Black tracts. This means that for Black tracts, the more bang for the buck argument is contingent on the measure of investment and there is no such disproportionate benefit in disadvantaged tracts once accounting for median home value.

The consistent evidence in predominantly White neighborhoods relative to the other neighborhood compositions suggests that investment benefits may play out over time. That is, predominantly White neighborhoods historically have higher property values and homeownership rates. It may be that it takes longer before the beneficial effects of housing investment are evident in these other communities. For example, Black neighborhoods have historically lower property values and may have older or dilapidated homes which may take longer to repair. Further, lower quality housing stock may require more financial capital to renovate such that high investment dollars may mean more loans into the neighborhood, but do not immediately result in noticeable reductions in disorder or improvements to neighborhood quality. Investment into predominantly minority neighborhoods may also not translate into greater wealth for the homeowners, as homes appreciate at a slower rate in Black communities than in White ones (Markley et al., 2020) and Black buyers were disproportionately targeted for subprime loans (Faber, 2013) that were more likely to be foreclosed on during the housing crisis. This means that Black communities likely develop the economic and political capital needed to reduce crime more slowly than White neighborhoods and suggests a future avenue for research.

Nonetheless, our analyses provide encouraging evidence that investment is advantageous for neighborhoods. Economic investment through mortgage loans underscores the importance of external investment into neighborhoods and can potentially signal to other outside stakeholders

that this neighborhood is worthy of investment (Logan & Motolch, 1987; Vélez & Richardson, 2012). Further, a greater presence of homeowners may be more committed to neighborhood beautification efforts that could translate into higher property values overall. Over time this may lead to increased tax revenue that can be leveraged to better schools, improve policing, and attract private investment (e.g., coffee shops; Papachristos et al., 2011). Mortgage investment may also ameliorate high rates of housing abandonment and foreclosure that occurred post-housing crisis and which were associated with higher neighborhood crime (e.g., Chamberlain et al., 2018; Stucky et al., 2012).

We also examined whether residential instability moderates the relationship between investment and violent crime. One model produced evidence that predominantly Hispanic neighborhoods with high rates of residential instability saw significantly fewer crimes than their more stable counterparts. This replicates prior research that highlights the protectiveness of large Hispanic populations even in light of residential turnover (e.g., Boggess & Hipp, 2010). It may be that the instability in predominantly Hispanic tracts represents an influx of migrant residents, who relocate into established ethnic enclaves. Indeed, research has shown that increases in Hispanic migrants who settle in more traditional areas are associated with less violence (Harris & Feldmeyer, 2013). However, the effect is limited to the Saporu models using absolute investment and only homicide and robbery outcomes. More generally, our analyses failed to uncover a more “bang” benefit in residentially unstable tracts. There continued to be the large negative relationships with mortgage investment, but the magnitude of the relationship was largely unaffected by the level of residential stability. Indeed, in some models, investment either had similar effects regardless of stability, or went further in more stable neighborhoods, reiterating the importance of residential stability for crime reduction generally.

Despite our in-depth engagement into the relationships between housing investment, racial and ethnic composition, and crime, there are a few limitations worth mentioning. First, we are unable to specifically identify the mechanisms through which investment affects crime. Future research should move beyond secondary data: by asking owners and renters about social ties specifically or tracking homeownership rates we can potentially develop a clearer picture of how housing investment reduces crime. Second, we do not differentiate between housing loans for new home purchases versus purchased for renovation. Both types of loans are likely advantageous to neighborhoods in terms of crime reduction (Branic & Hipp, 2018; Gill et al., 2022), but the mechanisms through which they operate may be different. Future research that teases apart differences in the impacts of purchase versus renovation loans may help understand the mechanisms through which investment reduces crime. Third, although we did not investigate the race or ethnicity of the loan-holder, future research should examine the effects of race-specific investment particularly over time, paying attention to racial and ethnic transition in neighborhoods.<sup>xi</sup>

In conclusion, although we find that the relationship between home loans and crime is nuanced by how one defines violent crime, investment, and disadvantage, our study confirmed that investment was associated with lower violent crime. Moving forward, policies facilitating investment and homeownership may contribute to lower crime rates. While such policies may not be more effective in minority, disadvantaged, or residentially unstable neighborhoods, they are not any less either. Solving the crime problem in American cities, therefore, may require broader policy-change than just those in the criminal justice system.

## References

- Boggess, L. N., & A. W. Chamberlain. 2021. "Investing in neighborhoods: the mitigating role of home mortgage loans on intimate partner violence." *Journal of Interpersonal Violence* 36: NP12783–NP12806. <https://doi.org/10.1177/0886260519900312>.
- Boggess, L. N., & J. R. Hipp. 2016. "The spatial dimensions of gentrification and the consequences for neighborhood crime." *Justice Quarterly* 33: 584-613.
- Bunting, W. C. 2020. "Does increased access to home mortgage money reduce local crime rates? evidence from San Diego County." *Regional Science and Urban Economics* 84: 1-16.
- Bursik, R. J., & Grasmick, H. G. (1993). *Neighborhoods and crime: The dimensions of effective community control*. Lexington Books.
- Branic, N., & J. R. Hipp. 2018. "Growing pains or appreciable gains? latent classes of neighborhood change, and consequences for crime in southern California neighborhoods." *Social Science Research* 76:77-91.
- Browning, C. R., Byron, R. A., Calder, C. A., Krivo, L. J., Kwan, M. P., Lee, J. Y., & Peterson, R. D. 2010. Commercial density, residential concentration, and crime: land use patterns and violence in neighborhood context. *Journal of Research in Crime and Delinquency* 47: 329-357.
- Chamberlain, A. W. & J. R. Hipp. 2015. "It's all relative: concentrated disadvantage within and across neighborhoods and communities, and the consequences for neighborhood crime." *Journal of Criminal Justice* 43:431-443.
- Chamberlain, A. W., D. Wallace, D. Pfeiffer, & J. Gaub. 2018. "Housing disinvestment and crime in a phoenix suburb: exploring the differential effects of investors and owner-occupants." *Urban Affairs Review* 54: 190-224.
- Dietz, R. D. & D. R. Haurin. 2003. "The social and private micro-level consequences of homeownership." *Journal of Urban Economics* 54:401–50.

- Ellen, I.G., & K. O'Regan. 2010. "Crime and urban flight revisited: the effect of the 1990s drop in crime on cities." *Journal of Urban Economics* 68:247-259.
- Faber, J. W. 2013. "Racial dynamics of subprime mortgage lending at the peak." *Housing Policy Debate* 23: 328-349.
- Faber, J. W. & I.G. Ellen. 2016. "Race and the housing cycle: differences in home equity trends among long-term homeowners." *Housing Policy Debate* 26: 456-473.
- Galster, G. C. 1987. *Homeowners and Neighborhood Reinvestment*. Duke University Press.
- Gardner, W., E. P. Mulvey, & E. C. Shaw. 1995. "Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models." *Psychological Bulletin* 118: 392-404.
- Gill, L.M., L.N. Boggess, & A.W. Chamberlain. 2022. "Neighborhood fixer uppers: Do home improvement loans influence crime across race and over time?." *American Journal of Criminal Justice*. <https://doi.org/10.1007/s12103-022-09679-4>.
- Harris, C.T. & Feldmeyer, B. 2013. "Latino immigration and White, Black, and Latino violent crime: A comparison of traditional and non-traditional immigrant destinations." *Social Science Research* 42:202-216.
- Haurin, D. R., R. D. Dietz, & B.A. Weinberg. 2013. "The impact of neighborhood homeownership rates: a review of the theoretical and empirical literature." *Housing Policy Debate* 13:119–51.
- Hipp, J. R., G. E. Tita, & R. T. Greenbaum. 2009. "Drive-bys and trade-ups: examining the directionality of the crime and residential instability relationship." *Social Forces* 87: 1777–1812.
- Hipp, J. R., & S. A. Williams 2020. "Advances in spatial criminology: the spatial scale of crime." *Annual Review of Criminology* 3: 75-95.
- Johnson, L.T. 2021. "Modeling urban neighborhood violence: the systemic model and variable effects of social structure." *Urban Affairs Review* 57:128–152.

- Kasarda, J. D., & M. Janowitz. 1974. "Community attachment in mass society." *American Sociological Review* 39:328–39.
- Krivo, L. J. & R. L. Kaufman. 2004. "Housing and wealth inequality: racial-ethnic differences in home equity in the United States." *Demography* 41: 585-605.
- Krivo, L. J., R. D. Peterson, & D. C. Kuhl. 2009. "Segregation, racial structure, and neighborhood violent crime." *American Journal of Sociology* 114: 1765-1802.
- Mallach, A. 2019. "Over the edge: trajectories of African American middle neighborhoods in St. Louis since 2000." *Journal of Urban Affairs* 42:1063–1085.
- Massey, D. S. & N.A. Denton. 1988. "The dimensions of residential segregation." *Social Forces* 67: 281-315.
- McCabe, B.J. 2013. "Are homeowners better citizens? Homeownership and community participation in the United States." *Social Forces* 91: 929–54.
- Mize, T. D. 2019. "Best practices for estimating, interpreting, and presenting nonlinear interaction effects." *Sociological Science* 6: 81-117.
- Morenoff, J.D., R.J. Sampson, & S.W. Raudenbush. 2001. "Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence." *Criminology* 39: 517–58.
- Mustillo, S.A., O.A. Lizardo, R.M. McVeigh. 2018. Editor's Comment: a few guidelines for quantitative submissions." *American Sociological Review* 18:1281-1283.
- Papachristos, A. V., C. M. Smith, M. L. Scherer, & M. A. Fugiero. 2011. "More coffee, less crime? the relationship between gentrification and neighborhood crime rates in Chicago, 1991 to 2005." *City & Community* 10: 215-240.
- Perry, A. M. 2020. *Know your price: Valuing Black lives and property in America's Black cities*. Washington, DC: Brookings Institution Press.
- Peterson, R. D. & L. J. Krivo. J. 2010a. *Divergent social worlds: neighborhood crime and the racial-spatial divide*. New York: Russell Sage.

- Peterson, R. D. & Lauren J. Krivo. 2010b. *National neighborhood crime study (NNCS), 2000*  
 [Computer file]. ICPSR27501–v1. Ann Arbor, MI: ICPSR [distributor], 2010–05–05.
- Rohe, W. M., & M. A. Stegman. 1994. “The impact of home ownership on the social and political involvement of low-income people.” *Urban Affairs Quarterly* 30:152-172.
- Rohe, W. M., & L.S. Stewart. 1996. “Homeownership and neighborhood stability.” *Housing Policy Debate* 7: 37-81.
- Rohe, W. M., S. Van Zandt, & G. McCarthy. 2002. “Social Benefits and costs of homeownership.” in *Low-income homeownership: examining the unexamined goal*, edited by N. P. Retsinas & E. S. Belsky. Brookings Institution Press, Harvard University.
- Rothstein, R. 2017. *The color of law: a forgotten history of how our government segregated America*. Liveright, New York, NY.
- Rutan, D.Q. & M.R. Glass. 2018. “The lingering effects of neighborhood appraisal: Evaluating redlining’s legacy in Pittsburgh.” *The Professional Geographer* 70:339-349.
- Sampson, R. J., S. Raudenbush, & F. Earls. 1997. “Neighborhoods and violent crime: A multilevel study of collective efficacy.” *Science* 277: 918–924.
- Saporu, D., C. L. Patton III, L. J. Krivo, & R. D. Peterson. 2011. “Differential benefits? crime and community investments in racially distinct neighborhoods.” *Race and Justice* 1: 79-102.
- Shrider, E. A. & D. M. Ramey. 2018. “Priming the pump: public investment, private mortgage investment, and violent crime.” *City & Community* 17: 996-1014.
- Silver, E, & L.L. Miller. 2004. “Sources of informal social control in Chicago neighborhoods.” *Criminology* 42:551-583.
- Squires, G. D. ed. (1992). *From redlining to reinvestment: Community responses to urban disinvestment*. Philadelphia, PA: Temple University Press.
- Squires, G. D., & C. E. Kubrin. (2006). *Privileged places: Race, residence, and the structure of opportunity*. Boulder, CO: Lynne Rienner.

- Squires, G. D. and S. O’Conner. 2001. *Color and money: Politics and prospects for community reinvestment in urban American*. Albany: State University of New York Press.
- Stucky, T. D., & Ottensmann, J. R. 2009. “Land use and violent crime.” *Criminology* 47: 1223-1264.
- Stucky, T. D., J. R. Ottensmann, & S. B. Payton. 2012. “The effect of foreclosures on crime in Indianapolis, 2003–2008.” *Social Science Quarterly* 93: 602-624.
- Thomas, S. A., & Drawve, G. 2018. Examining interactive effects of characteristics of the social and physical environment on aggravated assault. *Journal of criminal justice*, 57: 89-98.
- Vélez, M.B. 2001. “The role of public social control in urban neighborhoods: A multilevel analysis of victimization risk.” *Criminology* 39: 837–864.
- Vélez, M.B. 2009. “Banks and the racial patterning of homicide: A study of Chicago neighborhoods.” *International Journal of Conflict and Violence* 3: 154–171.
- Vélez, M. B., C. Lyons & B. Boursaw. 2012. “Assessing the relationship between mortgage lending and crime: An analysis of Seattle neighborhoods (1981-2007).” *Criminology* 50:1025-1056.
- Vélez, M.B. & C.J. Lyons. 2014. “Making or Breaking Neighborhoods: Public Social Control and Political Economy of Urban Crime.” *Criminology & Public Policy* 13:225–235.
- Vélez, María B. & Kelly Richardson. 2012. “The political economy of neighborhood homicide in Chicago: The role of bank investment.” *British Journal of Criminology* 52: 490-513.

**Table 1. Variable Means by Tract Predominant Race/Ethnicity (70% or greater)**

Variable	Black	White	Hispanic	Integrated
<b>Tract-level Variables</b>				
Percent Black Residents	90.6	4.6	2.6	21.8
Percent White Residents	4.5	83.8	5.7	39.9
Percent Hispanic Residents	4.4	8.7	83.6	27.4
Saporu et al Violent Crime (Homicide + Robbery)	78.0	18.5	61.6	54.0
Violent Crime (Homicide + Robbery + Agg. Assault)	204.0	45.5	166.1	130.7
Property Crime Index	619.4	543.6	650.8	759.3
Total Originated Loan Amt (000)	4,758.0	21,728.0	5,956.1	12,939.2
Tot Loan Amt (\$) / Median Value Own-Occ Housing	64.1	122.1	67.0	104.4
Population	3,108.3	3,869.4	4,688.2	4,263.7
Disadvantage Index (A) (incl. college students)	1.0	-0.7	0.8	0.1
Disadvantage Index (B) (includes HS students)	0.9	-0.7	0.9	0.1
Concentrated Disadvantage (C) Index	1.1	-0.7	0.7	0.1
Percent Housing Units with a Loan	5.9	8.4	4.5	6.7
Residential Instability Index	-0.2	-0.2	0.1	0.3
Immigrant Concentration Index	-0.7	-0.4	1.8	0.3
Percent Males 15-34	12.2	15.2	18.1	17.2
<b>City-level Variables</b>				
Population	1,189.0	765.3	1,974.9	1,161.2
Disadvantage Index	0.8	0.0	0.4	0.2
Percent Manufacturing Jobs	12.4	11.6	11.4	11.4
Percent Foreign Born	11.9	13.3	30.0	19.2
Percent Recent Movers	47.2	52.5	51.2	52.2
City in South	0.3	0.3	0.4	0.3
City in West	0.0	0.3	0.5	0.4
White-Black Index of Dissimilarity	74.7	59.8	67.1	62.8
Percent Residents who are Black	44.4	19.4	15.2	21.7
Percent Residents who are Hispanic	13.4	14.7	44.4	25.1

**Table 2. Percentile values of Loan Investment Variables by Tract Race/Ethnicity**

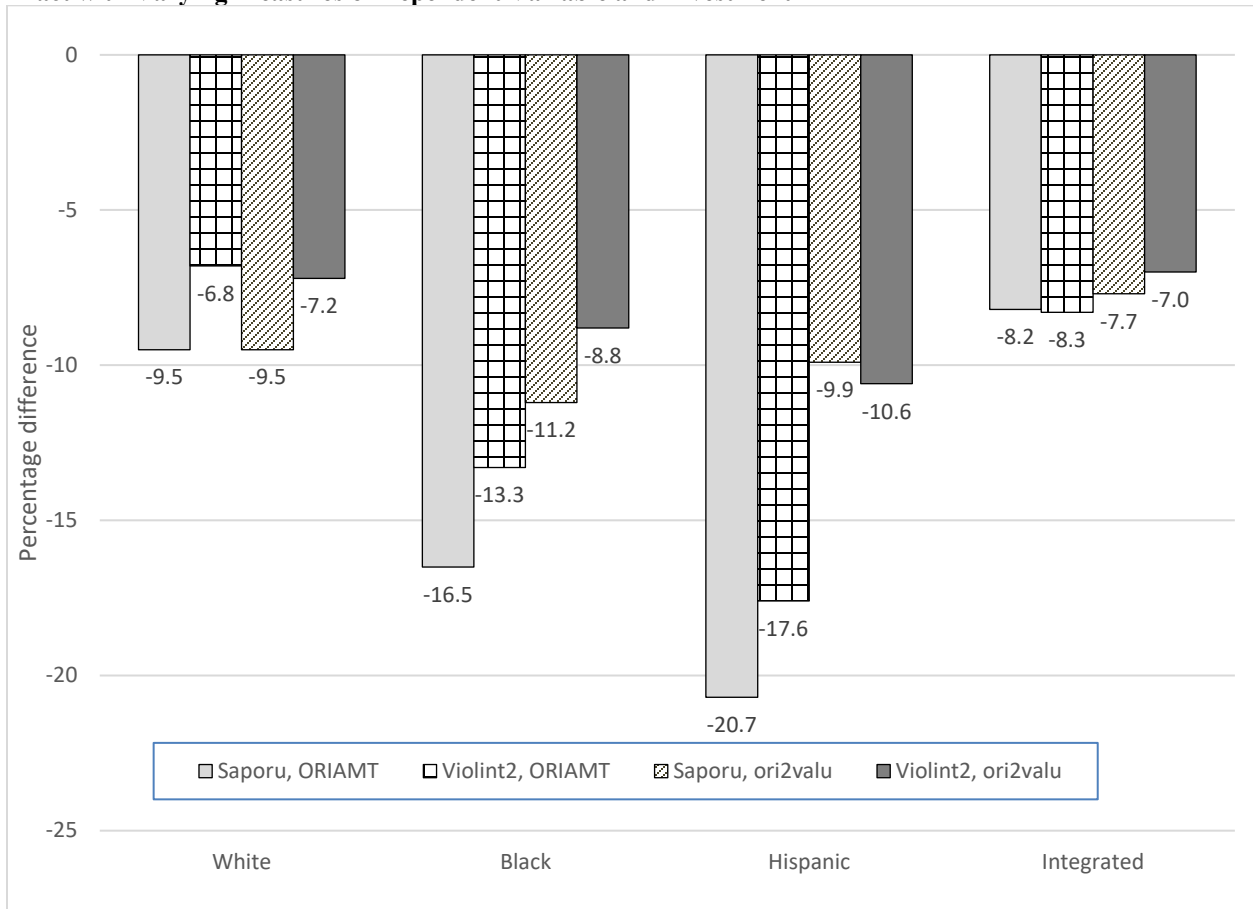
Percentile	Total Originated Loan Amt (\$ millions)				Total Loan Orig Amt (\$) / Med Value Own-Occupied Housing			
	Black	White	Hispanic	Integrated	Black	White	Hispanic	Integrated
10%	0.57	4.2	1.1	1.8	11.9	40.7	17.1	25.5
25%	1.4	7.6	2.3	4.2	27.2	65.3	28.7	47.7
50%	3.1	14.1	4.6	8.8	52.8	99.4	47.4	82.3
75%	6.0	26.6	7.7	16.6	85.0	147.5	80.5	129.2
90%	10.6	46.3	12.1	27.8	124.5	213.6	125.3	199.7
99%	23.7	122.0	28.6	71.9	255.8	542.3	338.9	497.9
Skewness	4.7	5.0	2.7	3.2	5.6	5.7	9.7	4.2

**Table 3. Hierarchical Negative Binomial Regressions of Housing Investment on UCR Violent Crime Counts in Census Tracts by Predominate Race/Ethnicity**

	Predominately Black Tracts	Predominately White Tracts	Predominately Hispanic Tracts	Integrated Tracts
<i>Tract-level variables</i>				
Loan Investment	-0.00004*** (5.45e-06)	-0.00002*** (2.27.e-06)	-0.00005*** (0.00001)	-0.00002*** (2.43.e-06)
Loan Investment * Loan Investment	4.63e-10*** (1.15e-10)	9.76e-11*** (1.61e-11)	5.31e-10 (3.33e-10)	1.27e-10*** (2.75e-11)
Disadvantage Index A	0.111*** (0.030)	0.476*** (0.042)	0.254** (0.082)	0.440*** (0.024)
Percentage of Housing Units with a loan	0.001 (0.002)	0.003 (0.004)	0.029** (0.011)	0.001 (0.003)
Residential instability index	0.200*** (0.022)	0.522*** (0.034)	0.214*** (0.050)	0.391*** (0.021)
Immigrant Concentration Index	-0.016 (0.077)	-0.263*** (0.060)	0.010 (0.044)	-0.158** (0.019)
Percent Males 15-34	0.010* (0.005)	0.002 (0.004)	0.02* (0.009)	0.001 (0.003)
<i>Explanatory variables – city level</i>				
Population	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)	-0.00002 (0.00008)
Disadvantage Index A	-0.072 (0.110)	-0.040 (0.087)	0.116 (0.139)	0.027 (0.077)
Percent manufacturing	-0.007 (0.014)	-0.029** (0.011)	-0.021 (0.020)	-0.024* (0.010)
Percent foreign born	0.005 (0.006)	0.027*** (0.006)	0.001 (0.007)	0.009 (0.005)
Percent recent movers	0.005 (0.015)	-0.013 (0.009)	0.022 (0.024)	0.001 (0.011)
City in South	-0.107 (0.125)	0.024 (0.118)	-0.086 (0.313)	-0.191 (0.122)
City in West	0.274 (0.264)	0.224 (0.139)	0.275 (0.320)	0.137 (0.137)
Black-White Index of Dissimilarity	0.012 (0.007)	0.013** (0.004)	0.004 (0.007)	0.018*** (0.003)
Percentage of Residents who are Black	0.007 (0.005)	0.021*** (0.005)	0.015 (0.008)	0.013** (0.004)
N	1,466	3,149	679	3,692
Constant	-5.101*** (1.137)	-5.426*** (0.642)	-6.485*** (1.15)	-5.61*** (0.693)
LR test v. null model	134.5***	158.0***	30.9***	509.4***

Note: Standard errors in parentheses. \* p < .05, \*\* p < .01, \*\*\* p < .001 (2-tailed tests).

**Figure 1. Percentage Differences in Predicted Violent Crimes by Predominate Race/ Ethnicity of Census Tract with Varying Measures of Dependent Variable and Investment**



**Table 4. Percentage Difference in Predicted Violent Crime Counts by Tract Race and Ethnicity with Varying Measurements of Dependent Variable and Investment**

Level of Disadvantage	Absolute investment (ORIAMT)		Relative investment (ORI2VALU)	
	Pct difference \$2,000,000 to \$7,000,000		Pct difference Ori2valu 40 to 80	
	Saporu Violent Crime Measure (A)	+ aggravated assault (B)	Saporu Violent Crime Measure (C)	+ aggravated assault (D)
<b>Black disadvantaged tract</b>	-37.5%	-19.1%		-1.6%
<b>Black average SES tract</b>	-12.7%	-13.8%		-16.7%
<b>Difference in difference (1)</b>	<b>24.8%</b>	<b>5.3%</b>		<b>-15.1%</b>
<b>White disadvantaged tract</b>	-35.8%	-26.9%	-17.1%	-11.3%
<b>White average SES tract</b>	-18.4%	-13.5%	-12.8%	-9.0%
<b>Difference in difference (2)</b>	<b>17.4%</b>	<b>13.4%</b>	<b>4.3%</b>	<b>2.3%</b>
<b>Hispanic disadvantaged tract</b>		-56.3%		
<b>Hispanic average SES tract</b>		-12.1%		
<b>Difference in difference (3)</b>		<b>44.20%</b>		
<b>Integrated disadvantaged tract</b>	-20.9%	-19.7%		
<b>Integrated average SES tract</b>	-10.8%	-11.2%		
<b>Difference in difference (4)</b>	<b>10.1%</b>	<b>8.5%</b>		

Note: Positive difference in difference values indicate a larger change in disadvantaged tracts and therefore would suggest support for the “more bang for your buck” argument. Differences only included in table if the effect of the investment variable (i.e., ORI amount or the Ori2valu) was statistically significantly different at the 0.05 level comparing average SES versus disadvantaged (index = 2) using the AME test, with other variables at their means.

**Table 5. Predicted Percentage Differences in Tract Violent and Property Crime Counts by Predominate Race / Ethnicity, Investment Indicator and Residential Stability**

Level of Housing Stability	Absolute investment (ORIAMT)		Relative investment (ORI2VALU)	
	Pct difference \$2,000,000 to \$7,000,000		Pct difference Ori2valu 40 to 80	
	Saporu Violent Crime (A)	+ aggravated assault (B)	Saporu Violent Crime (C)	+ aggravated assault (D)
Black unstable tract				0.8%
Black average stability tract				-8.4%
<b>Difference in difference (1)</b>				<b>-9.2%</b>
White unstable tract			-3.8%	
White average stability tract			-10.1%	
<b>Difference in difference (2)</b>			<b>-6.3%</b>	
Hispanic unstable tract	-71.9%			
Hispanic average stability tract	-26.7%			
<b>Difference in difference (3)</b>	<b>45.2%</b>			
Integrated unstable tract	-10.0%	-11.2%		-7.2%
Integrated average stability tract	-8.9%	-9.2%		-7.5%
<b>Difference in difference (4)</b>	<b>1.1%</b>	<b>2.0%</b>		<b>-0.3%</b>

Note: Positive difference in difference values indicate a larger change in residentially unstable tracts and therefore would suggest support for the “more bang for your buck” argument. Differences only included in table if the effect of the investment variable (i.e.. ORI amount or the Ori2valu) was statistically significantly different at the 0.05 level comparing average residential stability tracts versus unstable tracts (index = 2) using the AME test, with other variables at their means.

## Notes

---

- <sup>i</sup> They also found a slight positive relationship with property crime, but the effect did not vary between Black and non-Black communities.
- <sup>ii</sup> To illustrate this point, consider two neighborhoods, each with 50 homes. In neighborhood A, there are 10 homes that are owned. In neighborhood B, there are 25 homes that are owned. Five additional home purchases in neighborhood A will be a 50% increase whereas in neighborhood B the increase will only be 20%. In this example, the 50% increase may be more apparent and therefore make a larger contribution to neighborhood order.
- <sup>iii</sup> Including aggravated assaults reduces the total overall sample size by 8.3% (745 cases) due to missing data.
- <sup>iv</sup> The relative investment value is calculated as (tract total dollar amount originated\*1000)/tract median housing value. The numerator is multiplied by 1000 to put it in the same metric as the denominator.
- <sup>v</sup> Likelihood ratio tests comparing models with and without the squared investment term for each subsample also confirmed that the model fit was statistically significantly better by including the squared term for absolute or relative investment. The likelihood ratio test is calculated as  $-2 * \text{the difference in the log likelihoods of the two models being compared}$  and is distributed as a chi-square distribution with degrees of freedom equal to the difference in the number of parameters (in this case 1). All models were statistically significant at the  $p < 0.01$  level.
- <sup>vi</sup> The alpha for the disadvantage index is 0.93 (Peterson & Krivo, 2010b).
- <sup>vii</sup> The dissimilarity index is not without its critics, as discussed in Massey and Denton (1988). We employ it here to maintain consistency with the approach used in the Saporu study.
- <sup>viii</sup> Using marginal effects avoids misinterpretation because (1) the probabilities can be expressed and interpreted in the original metric, (2) it avoids identification (scaling) issues in nonlinear models, and (3) predictions can account for linked coefficients (e.g., investment dollars and investment dollars squared) (Mize, 2019).
- <sup>ix</sup> These values are well within the range of the data for all tract racial and ethnic types examined here.
- <sup>x</sup> All percentage changes were calculated by subtracting the value of the predicted violent crime variable at the high level of investment from the value at the lower level of investment, dividing by the lower value and multiplying by 100 (i.e.  $[(\text{Value 1} - \text{Value 2}) / \text{Value 1}] * 100$ ).
- <sup>xi</sup> Unfortunately, a large-scale dataset of crime in multiple cities over time does not currently exist, as such, the current study takes a broad approach to examine these relationships in multiple cities as opposed to one specific city over time (i.e., Velez et al., 2012).