

# Cost Redundancies for Combating Washington, D.C. Crime

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## Abstract

During a time of budget challenges, the Washington, D.C. government has needed to increase appropriations to the public safety and justice title while reducing appropriations to other municipal services. The need to increase policing costs by \$1 million to \$469.7 million in fiscal year 2012 diverges from the city's efforts to improve underserved neighborhoods through urban renewal. Although the District's vision to improve underserved neighborhoods has many goals, reducing crime is a major component. Efforts to reduce crime through policing and urban renewal could overlap if crime is related to several components of urban renewal, and a correlation between lower crime rates and urban renewal projects could advise future budget decisions as to the opportunity cost of funding short term policing efforts at the cost of long-term infrastructure development. To determine if there is a relationship, the numbers of adult arrests in all 431 unit blocks were tested against four major components of urban renewal: the number of bus stops per square mile, commercial development percentage, unemployment percentage, and vacant lot percentage. The four variables were found to be weakly correlated to the number of adult arrests. However, crime was found to increase in areas with higher levels of commercial development and greater number of bus stops. These findings appear to contradict the belief that urban renewal lowers crime in the immediate community.

As urban renewal has a mixed impact on crime, District officials may need to consider moving forward with planned projects during a time of increased police costs.

## Introduction

The challenging economic climate has forced governments experiencing a budget shortfall to take creative steps to cut costs. The United States Congress' jurisdiction over the District of Columbia puts Washington in a unique situation compared to other American cities. The situation stems from Washington's annual budget, which is dictated by legislation approved by Congress, and tends to reflect the positions of the party controlling Congress. For example, efforts to pass a federal spending deal through Congress in April 2011 could have included a proposal that would have prohibited the use of municipal tax funds to pay for abortions for low-income women in the District.<sup>1</sup>

Controlling the national debt will most likely dominate the attention of federal lawmakers for the next several years. Despite budget cuts since 2007, the District may have to deal with tighter budgets in the future that will make further program cuts necessary. Of the District's eight budget appropriation titles, the public safety and justice allocation was the only category to increase in actual expenditures in fiscal year 2010.<sup>2</sup> As the District budget's fourth largest appropriation title for fiscal year 2012, officials plan to allocate \$1.1 billion to public safety and justice representing 10.4 percent of the budget.<sup>3</sup> The Metropolitan Police and Fire and Emergency Medical Services departments represent 66.2 of the allocation.<sup>4</sup> With the operating costs of the Metropolitan Police Department (MPD) projected to increase \$1 million in fiscal year 2012 to \$469.7 million, the increase in policing costs have played a role in the increases for the public safety and justice title.<sup>5</sup>

The increases in operating costs for MPD are an area of concern because of the District's emphasis on urban renewal. The District of Columbia Home Rule Act of 1973 stipulates city officials develop a comprehensive plan to improve the city over time. The Comprehensive Plan, first adopted in 1984 and fully revised in 2006, allowed city and federal officials to develop a strategic plan to guide government decisions over several decades.<sup>6</sup> Projects such as the restoration of Columbia Heights, the construction of the Walter E. Washington Convention Center and Nationals Park, and planning of the H Street and Anacostia streetcar lines are all results of the plan. The comprehensive plan encompasses many targets and indicators for success in each policy area, and helps to guide city officials in coordinating action over a broad range of policies. Like many areas of public administration, however,

1 Ben Pershing, "Issa Attaches Abortion Ban to D.C. Budget Autonomy Bill," *The Washington Post*, November 14, 2011, accessed January 22, 2012, [http://www.washingtonpost.com/local/dc-politics/issa-attaches-abortion-ban-to-dc-budget-autonomy-bill/2011/11/14/gIQA5FW7LN\\_story.html](http://www.washingtonpost.com/local/dc-politics/issa-attaches-abortion-ban-to-dc-budget-autonomy-bill/2011/11/14/gIQA5FW7LN_story.html).

2 "Operating Expenditures," Office of the Chief Financial Officer, accessed January 22, 2012, [http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/lib/cfo/budget/fy2012/Operating\\_Expenditures.pdf](http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/lib/cfo/budget/fy2012/Operating_Expenditures.pdf).

3 "Introduction to the FY2012 Budget and Financial Plan," Office of the Chief Financial Officer, accessed January 22, 2012, <http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/lib/cfo/budget/fy2012/Introduction.pdf>.

4 "Operating Expenditures," Office of the Chief Financial Officer, accessed January 22, 2012, [http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/lib/cfo/budget/fy2012/Operating\\_Expenditures.pdf](http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/lib/cfo/budget/fy2012/Operating_Expenditures.pdf).

5 "Proposed FY2012 Budget for the Metropolitan Police Department," Metropolitan Police Department, accessed January 22, 2012, [http://newsroom.dc.gov/show.aspx?agency=mpdc&section=4&release=21753&year=2011&file=fi le.aspx%2frelease%2f21753%2ftestimony\\_040811.pdf](http://newsroom.dc.gov/show.aspx?agency=mpdc&section=4&release=21753&year=2011&file=fi le.aspx%2frelease%2f21753%2ftestimony_040811.pdf).

6 "2006 Comprehensive Plan," Office of Planning, accessed January 22, 2012, <http://planning.dc.gov/DC/Planning/Across+the+City/Comprehensive+Plan/2006+Comprehensive+Plan>.

initiatives may overlap or contradict one another and require careful consideration from city officials. The Comprehensive Plan of 2006's section on Neighborhood Enhancement Areas in particular states that projects falling under this section are intended to "improve the real estate market, reduce crime and blight, and attract complementary new uses and services that better serves the needs of existing and future residents."<sup>7</sup>

The urban renewal initiative and the need to increase the policing budget appear to contradict each other, as policing costs draw scarce resources away from urban renewal projects. If urban renewal and crime are related, renewal projects could serve as a solution to Washington's crime concerns. District officials may be able to decrease current annual policing costs which amount to more than \$469 million and redirect the savings to other municipal programs. If urban renewal and crime are unrelated, District officials may need to reconsider moving forward with projects in planning stages.

Since urban renewal is intended to attract new people and development to help improve underserved neighborhoods, this study considers whether crime is related to several components of development. Specifically the study focused on commercial development and vacant lot percentages, unemployment rates and the number of public transportation options. Although the four components were found to be related to the number of adult arrests, the tests for commercial development percentage and public transportation options have results that appear to contradict the stated intent of renewal projects.

### **Existing Research**

When considering urban revitalization, many in Washington, D.C. look to the transformation of Columbia Heights since 2000. Located in Northwest D.C., Columbia Heights was a predominately African American neighborhood during the last half of the 20<sup>th</sup> century. When Martin Luther King, Jr. was assassinated in 1968, the neighborhood broke out in riots that destroyed a considerable number of homes and businesses. The riot's destruction forced many to leave the neighborhood, creating many vacant lots. Since the riots occurred before the establishment of District Home Rule the Nixon administration assumed responsibility for restoring Columbia Heights.<sup>8</sup>

As projects worked through the federal legislative process, the Columbia Heights neighborhood had the highest percentage of murders, assaults, burglaries and robberies in the District.<sup>9</sup> The transfer of city affairs to the municipal government enabled local authorities to create redevelopment policies faster. Although Columbia Heights received considerable focus for 20 years after home rule establishment, policies intended to help improve the area failed. Crime in the neighborhood remained a top priority for city officials.

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<sup>7</sup> "Framework Element," Office of Planning, accessed January 22, 2012, <http://planning.dc.gov/DC/Planning/Across+the+City/Comprehensive+Plan/2006+Comprehensive+Plan/Volume+1+Acknowledgements,+Introduction+and+Citywide+Elements/Framework>.

<sup>8</sup> John Rodrigues, "District of Columbia Policy Decisions and the Redevelopment of the Columbia Heights Neighborhood," (MCP diss., University of Cincinnati, 2005).

<sup>9</sup> Rodrigues, "District of Columbia Policy Decisions and the Redevelopment of the Columbia Heights Neighborhood."

In 1999, the Washington Metropolitan Area Transit Authority opened a Metro rail station at Columbia Heights. District officials targeted several neighborhoods along the rail system's Green Line, including Columbia Heights, as areas in need of improvement.<sup>10</sup> After the Metro station opened, private builders developed vacant parcels for residential and commercial purposes. Additionally, developers rehabilitated older properties. Columbia Heights attracted a greater number of people to the area when the DC USA shopping center opened in 2008, creating 1,600 new jobs.<sup>11</sup>

District officials stated that the steps taken in the late-1990s to redevelop Columbia Heights would alleviate crime in the neighborhood. According to a District of Columbia Crime Policy Institute study, aggravated assault in Columbia Heights' police district decreased from an estimated range of 121-160 assaults per kilometer in 2000 to 41-80 assaults per kilometer in 2009.<sup>12</sup> Alternatively, theft in Columbia Heights increased during the same period. According to another District of Columbia Crime Policy Institute study, thefts increased from 426-850 thefts per kilometer in 2000 to 2,126-2,550 thefts per kilometer in 2009.<sup>13</sup>

Despite mixed crime results in the neighborhood, the Columbia Heights redevelopment process consisted of several important components. District officials attracted new commercial development to the neighborhood which in turn increased employment opportunities. Some commercial development previously focused vacant lots to eliminate unsightly and potentially dangerous areas of the neighborhood. A new Columbia Heights Metro rail station on the Green Line also provided transportation access and increased mobility to and from the neighborhood. Although all neighborhoods are unique, District officials designed projects after those in other cities around the world aimed at improving underserved neighborhoods. Urban renewal experts have attempted to decrease crime rates by focusing on projects involving commercial development, transportation, unemployment and vacant lot percentages.

Although the new Columbia Heights Metro station helped increase the mobility to the neighborhood, the station also helped the area emerge from an underserved status. Social policy research group, the Urban Institute notes that residents of underserved neighborhoods are typically subjected to "violent and unhealthy environments [with] few social protection mechanisms."<sup>14</sup> Since public transportation service in violent neighborhoods is costly,

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10 Rodrigues, "District of Columbia Policy Decisions and the Redevelopment of the Columbia Heights Neighborhood."

11 Rodrigues, "District of Columbia Policy Decisions and the Redevelopment of the Columbia Heights Neighborhood."

12 "Aggravated Assault in the District of Columbia: Patterns and Trends, 2000-2009," District of Columbia Crime Policy Institute, accessed January 22, 2012, <http://www.urban.org/UploadedPDF/1001451-dcpi-assault-brief.pdf>.

13 "Theft in the District of Columbia: Patterns and Trends, 2000-2009," District of Columbia Crime Policy Institute, accessed January 22, 2012, [http://www.dccrimepolicy.org/Briefs/images/DCPI\\_TheftBrief\\_1.pdf](http://www.dccrimepolicy.org/Briefs/images/DCPI_TheftBrief_1.pdf).

14 Aysha Faiz, "Transportation and the Urban Poor," *Institute of Transportation Engineers Journal* 81.12 (2011): 40.

residents have limited income and employment opportunities.<sup>15</sup> District officials believed that the opening of a Metro station would help increase accessibility to other public services, which would in turn help increase employment opportunities for low income residents.<sup>16</sup>

Although public transportation helps neighborhoods emerge from underserved status, cities with extensive networks have seen crime increase as a result of expanded public transportation. The city of Philadelphia for example, has noted higher crime levels in areas serviced by public transportation, as increased mobility between neighborhoods rose at the same time that shootings, theft and burglary rates increased in those areas.<sup>17</sup> The Washington's Columbia Heights Metro station has also been the site of shootings and thefts, though it is unclear if the crimes were related to public transportation.<sup>18</sup>

Since public transportation provides greater access to services, commercial development is the next step in the urban renewal process. Although commercial development and greater access to services may reduce crime, the reduction may not occur immediately. In order for urban renewal to be successful, conservative advocate Eli Lehrer posits that crime reduction projects undertaken by police must occur before initiating commercial development.<sup>19</sup> When city officials are successful in reducing crime in a targeted neighborhood, commercial development helps maintain the stabilized crime rates by attracting foot traffic. Cities like New York City, Boston, Providence and Los Angeles have taken similar steps and have been successful in maintaining a reduced crime level.<sup>20</sup>

For cities dealing with budget difficulties, increases in policing to attract commercial development may not be practical. Although District policing costs have increased, the city may not have the budget capacity to devote resources to a specific neighborhood at the start of a revitalization initiative. An alternative to policing increases is to encourage corporations to open locations in targeted areas through tax incentives, though as Lehrer argues, tax breaks alone may not result in crime reductions without a concurrent increase in policing efforts. District officials have historically used tax incentives for this purpose, and the city announced in November 2011 that officials are negotiating a tax deal with Wal-Mart to open new locations in Anacostia.<sup>21</sup> Commercial development and the ensuing improvements to the employment market is a major component of redevelopment goals. In a study of Hong

15 Faiz, "Transportation and the Urban Poor."

16 Rodrigues, "District of Columbia Policy Decisions and the Redevelopment of the Columbia Heights Neighborhood."

17 Laura Francis, "For Public Transport Areas, Greater Crime Rates," *The Daily Pennsylvanian*, February 23, 2011, accessed January 22, 2012, [http://thedp.com/index.php/article/2011/02/for\\_public\\_transport\\_areas\\_greater\\_crime\\_rates](http://thedp.com/index.php/article/2011/02/for_public_transport_areas_greater_crime_rates).

18 Maria Glod & Katie Rogers, "Shots Fired Near Columbia Heights Metro," *The Washington Post*, accessed January 22, 2012, [http://www.washingtonpost.com/blogs/crime-scene/post/shots-fired-near-columbia-heights-metro/2011/04/08/AFNYpT1C\\_blog.html](http://www.washingtonpost.com/blogs/crime-scene/post/shots-fired-near-columbia-heights-metro/2011/04/08/AFNYpT1C_blog.html).

19 Eli Lehrer, "Crime-Fighting and Urban Renewal," *Public Interest* 141 (2000): 96.

20 Lehrer, "Crime-Fighting and Urban Renewal," 93-95.

21 Nikita Stewart & Jonathan O'Connell, "Wal-Mart Plans to Open Six New Stores in the District," *The Washington Post*, November 15, 2011, accessed January 22, 2012, [http://www.washingtonpost.com/local/dc-politics/wal-mart-plans-to-open-six-stores-in-the-district/2011/11/15/gLQAcUjfPN\\_story.html](http://www.washingtonpost.com/local/dc-politics/wal-mart-plans-to-open-six-stores-in-the-district/2011/11/15/gLQAcUjfPN_story.html).

Kong's sustainable urban renewal design, researchers grouped commercial development and employment opportunities together in the social sustainability category for successful development. Researchers found that employment opportunities increase social well-being in neighborhood while reduced crime, stating, "employment opportunities help contribute to social well-being as the public can generate income from the works to support their life and the working place can offer an area for social contact and interaction."<sup>22</sup> Empirical studies have found communities with high unemployment rates have higher divorce and suicide rates, and alcoholism.<sup>23</sup> Meanwhile, communities with lower unemployment rates have less poverty, social exclusion, welfare dependence, psychological problems, family disputes and social disorders.<sup>24</sup> According to this principle, improving the employment market for residents in targeted neighborhoods should decrease the prevalence of crime.

If officials fail to find residential or commercial builders to develop vacant parcels, cities can opt to turn the parcels into public spaces. New public areas developed on vacant parcels could be designed to increase visibility across the neighborhood to prevent crimes like drug trafficking and prostitution.<sup>25</sup> New York City used this technique in Bryant Park, a notorious site for prostitution and drug dealings because of poor visibility throughout the park. After the park's redesign in 1988, the annual robbery rate declined from 170 to 10.<sup>26</sup>

Cities across the globe have successfully utilized urban revitalization to bring about crime reduction. One prominent example, Khayelitsha, South Africa, the third largest township in the country, recently completed redevelopment initiatives to help reduce crime. Before the redevelopment, the town of 800,000 had 24 crime hot-spots. Most hot-spots were public walkways and parks controlled by gangs, and had little or no development. A \$53 million pilot program to erect public buildings near the hot-spots led to a 20% decrease in violent crime and a 33% decrease in murder.<sup>27</sup>

### Hypotheses

To test if urban redevelopment in Washington, D.C. has an impact on crime, the study focuses on the relationships between adult arrests and four components used by other cities for similar projects. The four components are commercial development percentage, unemployment percentage, vacant lot percentage, and the number of bus stops in all 431 unit blocks of the city.

**H<sub>1</sub>: There is a relationship between the number of bus stops per square mile and the number of adult arrests.**

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22 Grace Lee & Edwin Chan, "Evaluation of the Urban Renewal Projects in Social Dimensions," *Property Management* 28.4 (2010): 259.

23 Lee & Chan, "Evaluation of the Urban Renewal Projects in Social Dimensions," 259.

24 Lee & Chan, "Evaluation of the Urban Renewal Projects in Social Dimensions," 259-260.

25 Neal Kumar Katyal, "Architecture as Crime Control," *The Yale Law Journal* 111.5 (2002): 1097.

26 Katyal, "Architecture as Crime Control," 1097-1098.

27 Kristin Palitza, "Urban Renewal Reduces Crime in South African Township," Inter Press Service, May 19 2010, accessed January 22, 2012, <http://ipsnews.net/news.asp?idnews=51502>.

Increasing accessibility to public services and increasing mobility to underserved neighborhoods through public transportation helps start the urban renewal process. This hypothesis tests if there is a correlation between numbers of bus stops for block units and the number of adult arrests. Metro rail stops are not considered because bussing options have lower planning costs and can operate sooner than subways.

**H<sub>2</sub>: There is a relationship between the unemployment percentages of residents in unit blocks and the number of adult arrests.**

If people are gainfully employed, they should in theory rely less on crime for income. If underserved neighborhoods are developed, residents will have a larger opportunity for employment. This hypothesis tests if there is a positive correlation between unemployment percentages and the number adult arrests, similar to Lee and Chan's findings.

**H<sub>3</sub>: There is a relationship between the commercial development percentages of unit blocks and the number of adult arrests.**

Since areas with higher levels of commercial development attract greater numbers of foot traffic throughout many hours of a day, crime may be deterred because there is an increased chance of multiple people witnessing a crime. This hypothesis tests if there is a negative correlation between the commercial development percentages of unit blocks and the number of adult arrests. Arguments could be made that so-called "tourist traps" attract crime. However, this test implies that revitalization attracts both tourists and residents.

**H<sub>4</sub>: There is a relationship between the vacant lot percentages of unit blocks and the number of adult arrests.**

This hypothesis builds off the commercial development and unemployment tests. Unit blocks with higher percentages of vacant lots should provide greater opportunities for crime. This hypothesis tests if there is a positive correlation between the vacant lot percentages of unit blocks and the number of adult arrests.

### **Data**

The tests are based off Washington, D.C. crime data compiled in 2008. The data set was compiled to measure the alcohol availability throughout the District. The data set was organized by measuring the 431 unit blocks of the city. The District unit block system breaks the city down into measureable divisions within each quadrant. The unit block system is a subunit of neighborhoods.

### **Variables**

One dependent variable and four independent variables are used to conduct the tests. The dependent variable is the number of adult arrests, and the independent variables are the number of bus stops per square mile, unemployment percentage, vacant parcel percentage, and commercial development percentage.

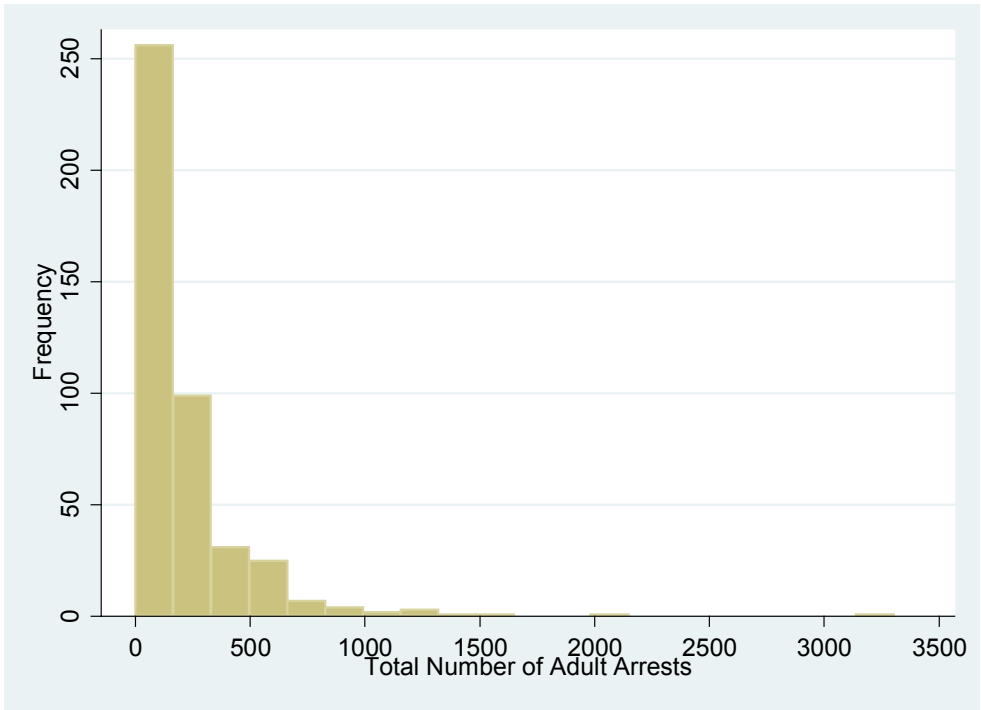
**Table 1: Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>S.D.</b>	<b>Min.</b>	<b>Max.</b>	<b>Mode</b>
Number of Adult Arrests	213.271	128	281.883	1	3,201	71
Number of Bus Stops per Square Mile	76.158	66.667	53.128	0	466.667	100
Unemployment Percentage	11.401%	8.530%	11.960%	0%	88.630%	0%
Commercial Development Percentage	3.824%	1.690%	7.567%	0%	73.430%	0%
Vacant Parcel Percentage	7.754%	3.940%	10.475%	0%	76.190%	0%

The adult arrests variable was measured at the interval/ratio level and was based off the total number of adult arrests for each unit block. Each unit block had at least one arrest with a maximum value of 3,302 arrests. With a median of 128 arrests and a mean of 213.271 arrests, the variable was positively skewed. The variable's mode was 71, which was observed six times. The number of adult arrests had a standard deviation of 281.883 arrests, which suggested that the observations have a higher level of dispersion. With the variable positively skewed, the number of adult arrests centered on lower numbers of arrests.

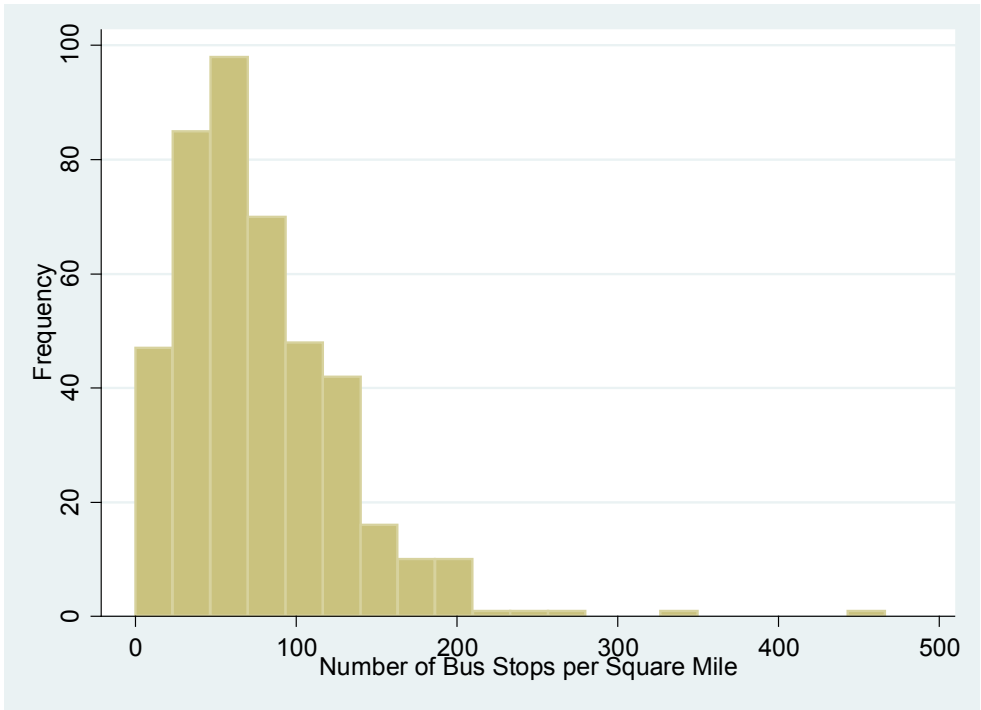


**Figure 1: Histogram of Total Number of Adult Arrests**



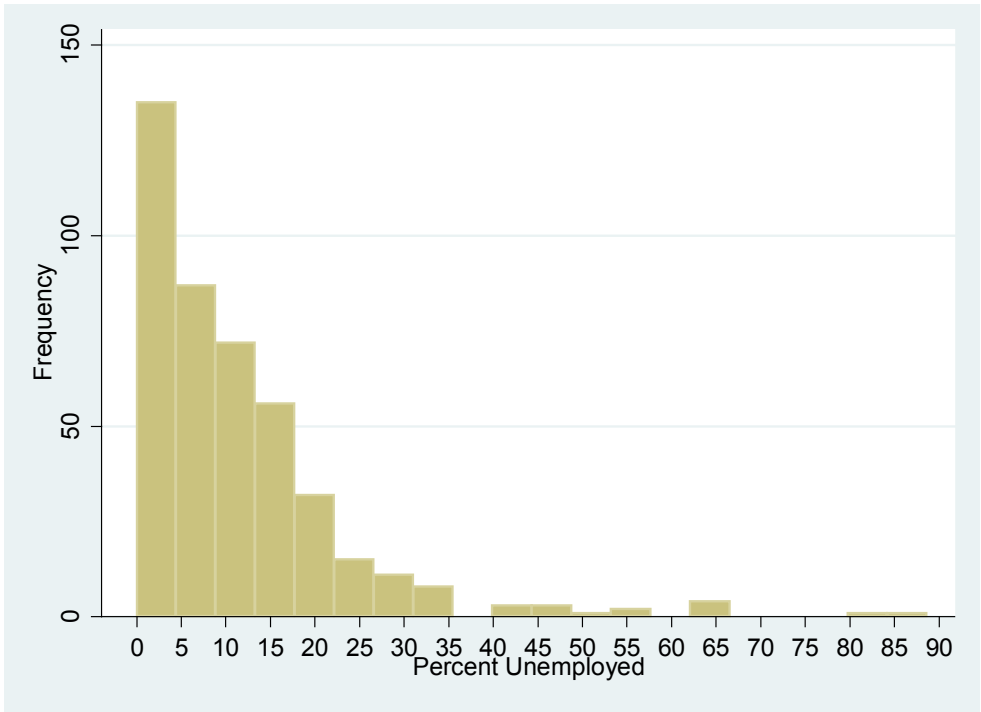
The number of bus stops per square mile was measured at the interval/ratio level. The variable did not contain the number of bus stops per each unit block because it measured the average number per square mile. However, unit blocks with a higher number of bus stops had a higher density than unit blocks with fewer bus stops. With a mode of 100 that was observed 30 times, most unit blocks were serviced by the bus system. There were nine observations of unit blocks having no bus service at all. Although the distribution was positively skewed, the median of 66.667 bus stops and a mean of 76.158 bus stops suggested that the variable was close to normal distribution.

**Figure 2: Histogram of Number of Bus Stops per Square Mile**



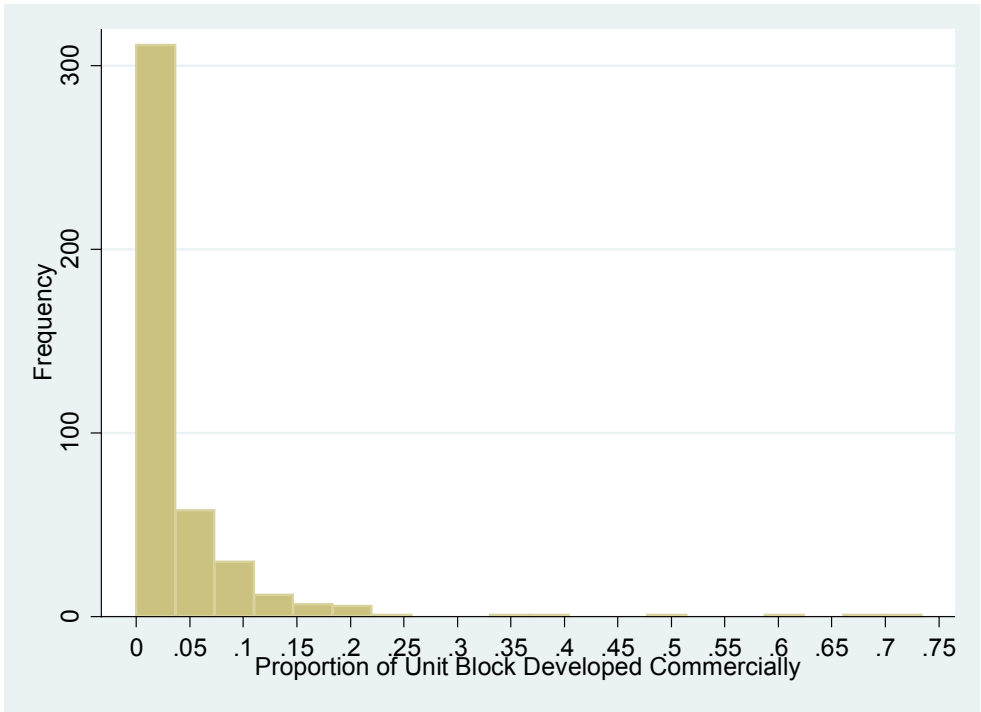
A standard deviation of 11.960% and a range of 88.630% suggested that the unemployment percentage for each unit block had a high level of dispersion. The frequency distribution was skewed positively with a mean of 11.401% and a median of 8.530%. The variable's mode was 0 and was observed 35 times. The interval/ratio level variable, measured the unemployment rate for each unit block. Despite an extreme range and a frequently observed mode, the median's proximity to the mean suggested that unemployment percentages were concentrated around 10%.

**Figure 3: Histogram of Unemployment Percentages**



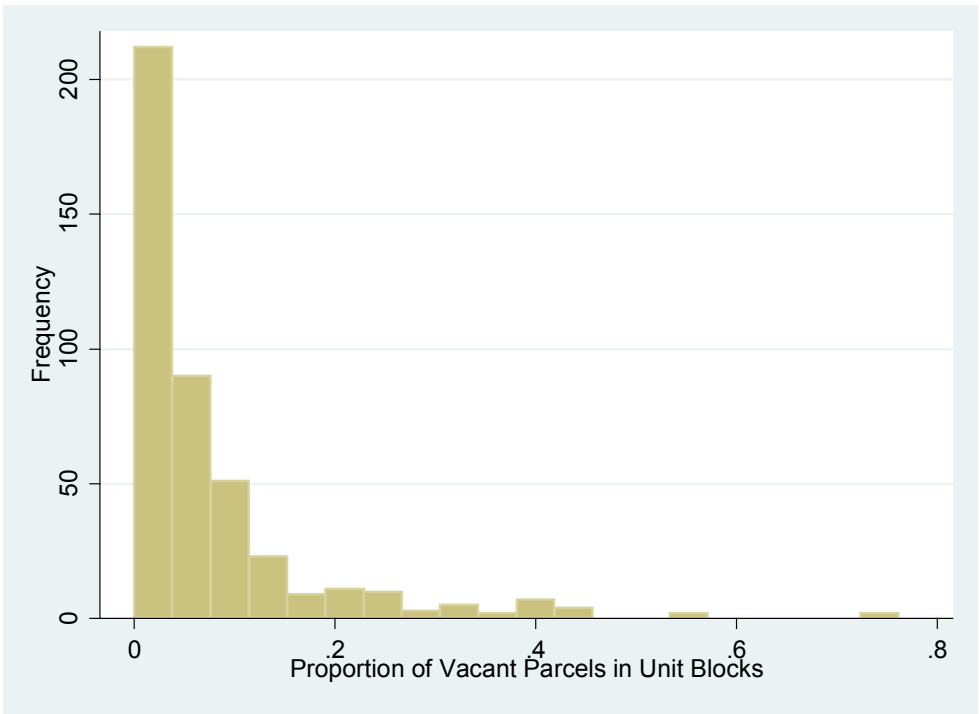
The commercial development percentage variable was measured at the interval/ratio level. The variable measured the commercial development percentage for each unit block. Commercial development includes retail, entertainment, lodging, and restaurants. The variable had a positive skew with a mean of 3.824% and a median of 1.690%. With a range of 73.430%, the variable had a standard deviation of 7.567%. The mode of 0% was observed 97 times.

**Figure 4: Histogram of Commercial Development Percentage**



The vacant parcel percentage variable, measured at the interval/ratio level, calculated the percentage of vacated developed land per unit block. With a mean of 7.754% and a median of 3.940%, the distribution was also positively skewed. The variable also had a high standard deviation of 10.475% because the range was 76.190%. The variable also had a mode of 0%, which was observed 10 times. Since the mean and median were more separated compared to other variables, the high level of dispersion suggested that there were unit blocks with higher observations of vacant parcel percentage.

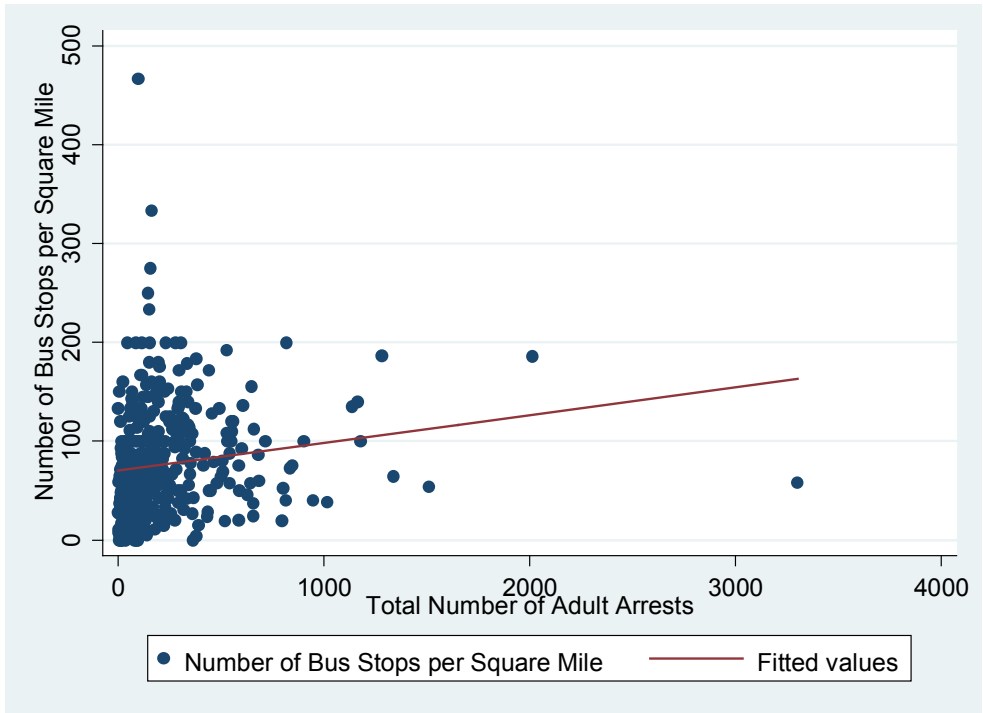
**Figure 5: Histogram of Vacant Parcel Percentage**



### **Analysis and Findings**

Several stops along Metro’s Green Line were placed in urban renewal areas targeted by District officials. In theory, Metro would make neighborhoods like Columbia Heights more accessible to the rest of the city. By increasing accessibility, a neighborhood could attract new residents, shoppers, and diners. Thus, alleviating crime in the area due to increased traffic flow. However, cities with extensive public transportation networks are observing that transit access does not necessarily reduce crime. In the case of Columbia Heights noted earlier, assaults decreased over a ten year period while theft increased over the same time period. Because the crime response to the Columbia Heights stop differed from observations in other cities, the number of adult arrests is measured against the number of bus stops per square mile to determine if any relationship exists. The numbers of Metro stops in each unit block are not included in this study because of the resources required to construct new stations. Busses provide planners greater flexibility if there is a need to increase transportation service.

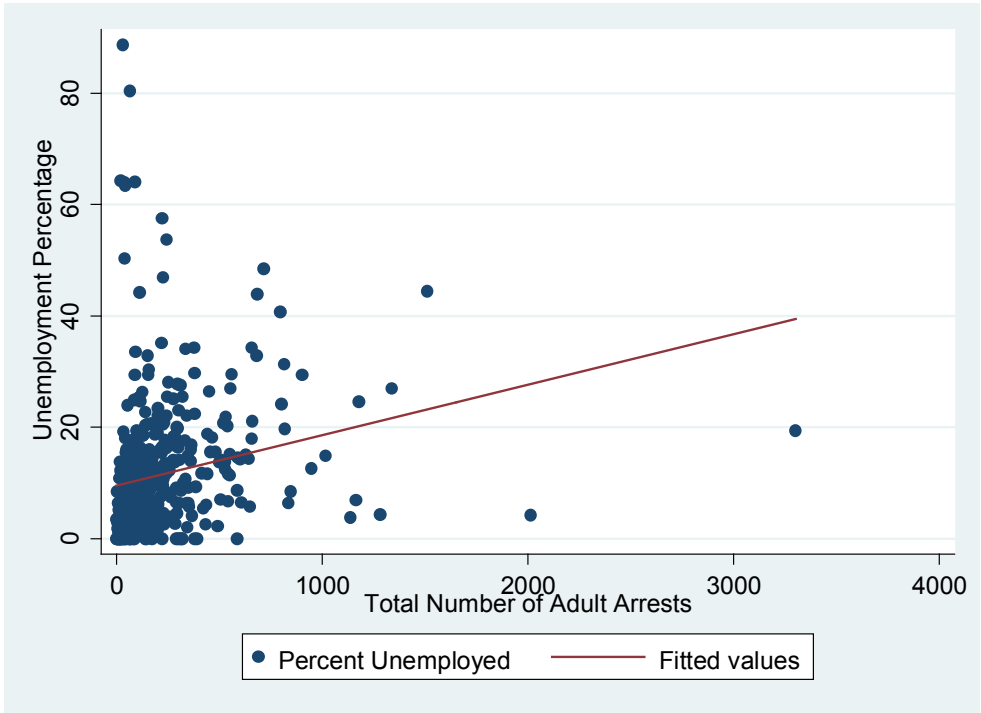
**Figure 6: Scatterplot of Number of Adult Arrests and Number of Bus Stops per Square Mile**



**R=0.149**

With a Pearson's  $r$  value of 0.149, the study found that there is a weak positive correlation between the number of adult arrests and the number of bus stops per square mile. Although the relationship is weak, the test finds that the number of adult arrests increased in areas with a higher number of bus stops. This finding follows observations in other cities that crime rates increase as access to transportation increases. Since the number of adult arrests is higher in neighborhoods with higher bus accessibility, the findings do not support claims that neighborhoods with higher transit accessibility leads to decreases in crime. Targeted neighborhoods for urban revitalization are typically underserved. With lower commercial development, neighborhood residents typically have to look to other areas in the city for employment opportunities. By revitalizing a neighborhood, city officials could increase residential and commercial options throughout the area. Opening commercial developments would bring new jobs to a neighborhood. As noted earlier, other researchers have found that crime reductions are related to positive neighborhood labor market. This study hypothesized that there is a positive correlation between unemployment percentages of unit blocks and the number of adult arrests.

**Figure 7: Scatterplot of Number of Adult Arrests and Unemployment Percentage**



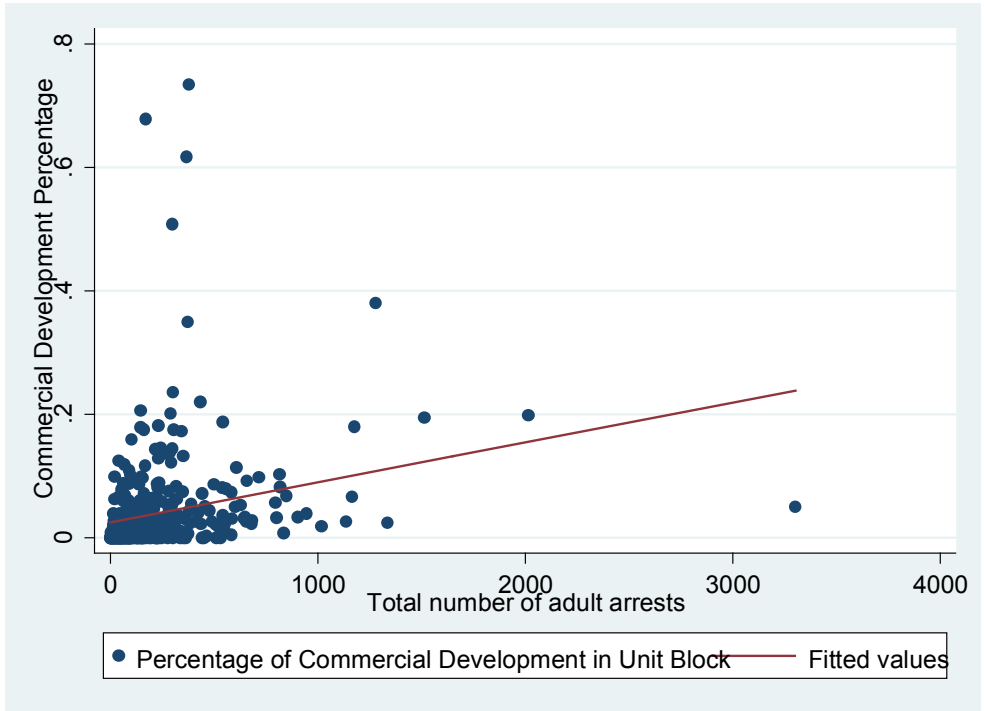
**R=0.214**

A Pearson's  $r$  value of 0.214 determines that there is a weak positive correlation between unemployment percentages of unit blocks and the number of adult arrests. The number of adult arrests increases when unemployment percentages increase. The correlation confirms both the hypothesis and the findings of other researchers.

Since creating new jobs is a goal of urban revitalization, increased commercial development must occur in order for the employment opportunities to exist. Additionally to bring new jobs to a neighborhood, urban revitalization seeks to attract a greater number of people to the area. By increasing the number of retail, entertainment, and dining options in a neighborhood, a higher number of people are attracted to the area. In theory, commercial development helps stabilize crime rates after city officials reduce crime over time.

The study hypothesizes that if a negative correlation existed between commercial development percentages per unit block and the number of adult arrests. A negative correlation is used because it would quantify the success of the specific goal of urban revitalization.

**Figure 8: Scatterplot of Number of Adult Arrests and Commercial Development Percentage**



**R=0.241**

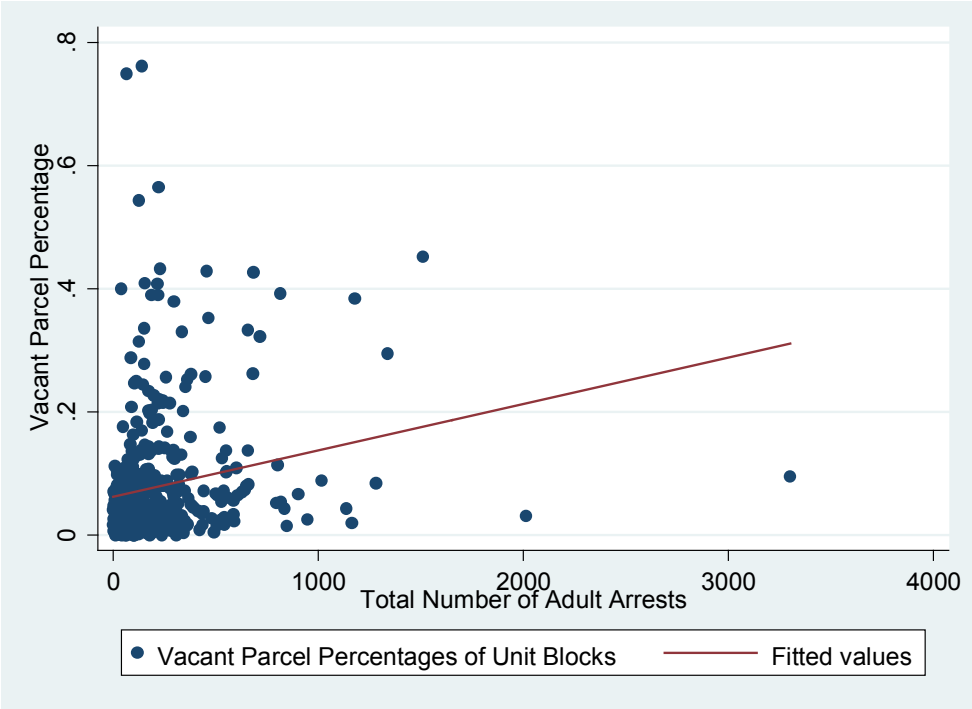
The study does not find a negative correlation between commercial development percentage and the number of adult arrests. Instead, a Pearson's  $r$  value of 0.241 reveals that there is a positive correlation between the two variables. In other words, the number of adult arrests increases when commercial development percentages increase. The findings do not necessarily refute Eli Lehrer's claim, noted earlier, that commercial development stabilizes crime. Lehrer states that lower crime levels are achieved when development starts after policing efforts to reduce crime.

Since it is unknown whether all commercial development sites in the District were subjected to increased policing efforts beforehand, the results do provide a warning to District officials. Efforts to incentivize corporations to develop in areas with high levels of crime may fail to lower crime and be costly to District taxpayers. Although District officials may argue that residents need increased services despite crime levels, crime could prevent corporations from opening additional sites in the future. If District officials wish to maintain healthy relationships with national corporations to do business within the city, they may need to consider crime reduction programs before offering incentives. Although this would require policing budgets to increase further, District officials would be able to apply savings from urban renewal projects put on hold.



When public spaces were initially designed, designers failed to consider that parks may facilitate crime. Parks are potentially an ideal location to conduct crime because of visibility reductions due to poor lighting at night, obstructions created by plants, and a lack of walkways. The same principle applies to vacant parcels. If city officials are unable to develop vacant parcels commercially or residentially, they have the option of clearing parcels to create public spaces. If officials opt to create or redesign public spaces, they can eliminate the vulnerabilities exploited by people committing crime, as New York City did in 1988. Although vacant parcels and parks are different, the visibility vulnerabilities posed by both are similar. The study hypothesizes that a positive correlation exists between unit blocks with higher percentages of vacant parcels and the number of adult arrests.

**Figure 9: Scatterplot of Number of Adult Arrests and Vacant Parcel Percentage**



**R=0.204**

Through a Pearson’s *r* value of 0.204, the study finds that there is a weak positive correlation between vacant parcel percentages of unit blocks and the number of adult arrests. The numbers of adult arrests are higher in unit blocks with higher vacant parcel percentages. The results confirm the earlier findings in New York City. The results also invite city officials to consider converting vacant parcels into public spaces if commercial and residential developers are not available.

## Conclusion

The study finds that the number of adult arrests in Washington, D.C. is related to the number of bus stops per square mile, unemployment, commercial development, and vacant lot percentages. However, the goals of urban revitalization depend on negative correlations between adult arrests and commercial development and the number of bus stops per square mile. The study finds an opposite relationship in those cases.

With only two of the tests aligning with existing research, it appears urban revitalization does not necessarily bring the intended positive impact on crime city officials would hope for. Additionally, the test implicating commercial development percentages contradicts the testing on unemployment percentages. Since urban revitalization brings new commercial development and employment opportunities to neighborhoods, adult arrests should be positively correlated to unemployment percentages and negatively correlated to commercial development. Both tests turn out to be positively correlated. With mixed results and weak correlations, city officials should not depend on urban revitalization as a cost saving measure on city policing cost, as the correlations are not substantial enough to base a decision on.

Although all four tests have positive correlations, the tests do not prove causality. For example, increasing the number of bus stops in a unit block would not be the single cause of increasing the number of adult arrests. The number of adult arrests per unit block depends on circumstances involving many variables. Additionally, the population demographics of each unit block are not exactly the same as another.

The failure to distinguish the types of crime in the adult arrest variable creates challenges with the findings. The District of Columbia Crime Policy Institute studies were able to distinguish the decrease in violent crime and the rise of property crime in Columbia Heights over a 10 year period. Since the adult arrest variable included all types of crimes, officials would not be able to determine if urban renewal helps reduce a specific type of crime. Officials considering the development of underserved neighborhoods with high levels of violent crime will need to develop specific methods of research to determine if the project will have an ideal effect.

Since no one unit block is the same, there are several challenges with the commercial development percentage variable. Of the unit blocks with low commercial development percentages, several unit blocks may not have ideal circumstances for development. For example, unit blocks could consist of mostly residential buildings or unit blocks may have geographic constraints, like Rock Creek Park, preventing commercial development. The commercial development tests do not take these aspects into account. Since the vacant parcel percentage variable measured parcels that have already been developed, the vacant parcel correlation carries more credibility than the commercial development correlation.

Washington's diverse neighborhoods are difficult to compare against one another. Certain neighborhoods have progressed much faster than others. District officials should continue to find ways to improve neighborhoods that are considered to be underserved. Comparing

an underserved neighborhood against the rest of the city may not necessarily provide the best information when making a decision. However, large scale projects requiring substantial investment of local taxpayer dollars should be avoided until budget challenges are resolved. Officials looking to improve a specific neighborhood should consider data solely related to that neighborhood and look to efforts undertaken in similar neighborhoods. Each neighborhood will carry its own solution for improvement.

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