Enhancing Community Safety through Urban Demolition: An Exploratory Study of Detroit, Michigan

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Justice Policy Journal • Volume 17, Number 1 (Spring 2020)

Abstract

During the past several decades, the population of Detroit, Michigan declined. This decrease resulted in an increase in the number of vacant buildings. Today, an estimated 100,000 structures in Detroit are abandoned. One potential consequence of abandoned properties is higher reported crime. To reduce the number of vacant properties and eradicate blight, in 2013 the city introduced the *Detroit Blight Removal Task Force* (DBRTF). Financially supported by the United States Department of Treasury's *Hardest Hit Fund* (HHF), vacant buildings were demolished to increase property values, reduce the number of foreclosures, and improve community safety. The purpose of this study was to investigate whether demolitions fulfilled the third objective of community safety. Using a retrospective longitudinal design, selected criminal offenses (arson, burglary, drug-related crimes, and property-damage crimes) were assessed 1 year before demolitions took effect (January 1, 2013- December 31, 2014) and for 21 months after the demolition program began (January 1, 2014- September 22, 2015). T-tests initially were used to assess changes in the mean number of daily criminal offenses from January 1, 2013- September 22, 2015. With the demolition program in effect, selected criminal offenses decreased significantly by 10.46 daily acts. Multivariate regression models also were implemented. Controlling for monthly unemployment rates and daily property sales, the first regression model illustrated that demolitions correlated with 9.981 fewer daily crimes. Decreases in reported burglaries and property damage crimes, in particular, were associated with the demolition program occurring.

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Introduction

Like other cities in the Midwest, Detroit, Michigan has experienced a steady population decline. From 2000-2010, Detroit lost a quarter of its population (Safransky, 2017; Vojnovic et al., 2014). As the city's population decreased, the number of vacant buildings increased. Today, more than 100,000 structures are abandoned within Detroit (Martelle, 2014; Safransky, 2017). Prior research revealed that vacant buildings are suitable venues for wide-ranging illicit activities, including arson, drug-related offenses, burglary, and property-damage crimes (Fuentes & Hernandez, 2014; Raleigh & Galster, 2014; Wheeler, Kim, & Phillips, 2018; Yin & Silverman, 2015). To stabilize home values, reduce the number foreclosures, and improve community safety, Detroit began demolishing vacant structures in 2014. The purpose of this study was to investigate whether selected reported crimes decreased with the demolition program in effect, and if demolitions correlated with this reduction.

Trends in Detroit

Detroit was once a major industrial city producing thousands of manufactured goods (LeDuff, 2013). During World War II, Franklin D. Roosevelt cited Detroit as the "arsenal of democracy" for its war-related efforts and contributions (Haimerl, 2016). Beginning in the 1950s, however, manufacturing began to decline as factories relocated to neighboring suburbs. Suburbs offered lower taxes and larger pieces of land to operate. By the 1970s, more jobs began relocating, this time overseas.

From 1970-2005, the number of jobs within Detroit decreased by 62% (Martelle, 2014). That trend continued through the 2008 recession, when auto manufacturing declined and the production of cars was cut in half from 2007-2009 (Martelle, 2014). By 2009, the city reported a 27.4% unemployment rate, one of the highest in the country (Martelle, 2014).

With limited employment opportunities, local residents began defaulting on their mortgage payments. From 2005-2015, 140,000 Detroit homes were foreclosed due to mortgage back-payments (Anderson, 2016). Citizens also lacked sufficient savings to pay their property taxes. As a result, nearly 25,000 homes were seized and auctioned by the city in October 2015 alone (Anderson, 2016). More than 8,000 of these homes were occupied at that time.

While many foreclosed homes were auctioned off, a significant percentage were never sold (Dewar, 2015). As a result, these unsold properties were defaulted to the city, a municipality that lacked the financial means to maintain these properties

(Dewar, 2015; Dewar, Seymour, & Druta, 2015).[3] As the number of foreclosed properties increased, property investment declined and the vacancy rate increased (Dewar et al, 2015). By 2009, 41% of all Detroit homes were in poor condition and/or needed to be demolished (Dewar et al, 2015).

Decreases in home ownership further hampered the city's tax base, negatively affecting city services (Tabb, 2015). Lost revenue forced the mayor's office to cut Detroit's public workforce by 36% from 2002-2009, which deeply affected the police and fire departments (Anderson, 2016). In 2009, police response time was approximately thirty minutes per call, with some emergency responses taking more than twenty-four hours (Haimerl, 2016; LeDuff, 2013; Martelle, 2014). In 2013, the financial situation worsened when Detroit filed for Chapter 11 bankruptcy after it could not recover from an $18 billion debt (Haimerl, 2016; Tabb, 2015).

As jobs and city services declined, the population followed suit (Haimerl, 2016). With 1.85 million occupants and a population density of 13,249 people per square mile, in 1950 Detroit was the fifth most populous American city (Glaeser, 2012; Haimerl, 2016; Vojnovic, et al, 2014). By 2010, population density decreased to 5,170 people per square mile, and only 700,000 citizens resided within the city limits (Anderson, 2016; Glaeser, 2012; Vojnovic, et al., 2014). Detroit was one of the fastest declining cities nationally in terms of population loss, experiencing a 62% reduction in just 60 years (Vojnovic, et al, 2014).

As the Detroit population declined, residential vacancy rates increased (Haimerl, 2016; Montgomery, 2011; Philp, 2017). Within a 10-year period (2000-2010), the number of vacant homes increased by 100% (Raleigh & Galster, 2014). Recent evidence suggests that one-third of the city, or 40 square miles, is completely vacant (Binelli, 2012; Safransky, 2017). At least 100,000 structures are abandoned (Martelle, 2014; Safransky, 2017). With an increase in the number of vacant structures, property values also declined (Binelli, 2012). Desperate to gain tax revenue and repopulate the city, Detroit began selling select homes for as little as $1 (Anderson, 2016).

Detroit is not an isolated case. Other cities, such as Youngstown (Ohio), Dayton (Ohio), Buffalo (New York), Flint (Michigan), and Liverpool (United Kingdom) have reported similar population and vacancy statistics (Glaeser, 2012; Sykes, Brown, Cocks, Shaw, & Couch, 2013; Vojnovic et al., 2014; Yin & Silverman, 2015; Young, 2013). To illustrate, in Buffalo, New York, the number of vacant residential structures increased from 10.2% (15,540 homes) to 15.7% (22,854 homes) between

[3] According to Dewar (2006), Detroit retained 63,000 homes or 15% of all unsold properties from 1973-2004.

1990 and 2000 (Yin & Silverman, 2015). In 2011, 14.5% of the city was classified as vacant (Wheeler et al., 2018).

Typically, as city vacancy rates increase, property values decrease. In Detroit, homes situated within 500 feet of a vacant and tax-foreclosed home reported an average property value loss of 2.9% (Dynamo Metrics, 2015b). Philadelphia (Pennsylvania) and Buffalo (New York) experienced a similar relationship between increased vacancy rates and declining property values (Yin & Silverman, 2015). Research also has found that occupied homes situated near vacant properties are more likely to be abandoned as well. Yin and Silverman (2015), for instance, conducted a study on vacancy rates in Buffalo and reported that homes situated near vacant properties were 29.3% more likely to be abandoned in 2009.

As vacancy rates increase, the likelihood of additional foreclosures increases as well. Additionally, research also discovered a relationship between foreclosed properties and crime (Katz et al., 2013; Wheeler et al., 2018). Katz et al. (2013), for example, identified a positive correlation between the number of foreclosed homes and reported crime in Glendale, Arizona, from 2003-2008. Using regression analysis, the authors concluded that an increase in the number of foreclosed homes resulted in higher rates of violent and property crime (Katz et al., 2013).

Prior Theory and Research

Historically, declining neighborhoods have been associated with higher rates of reported crime. Shaw and McKay (1942), founders of Social Disorganization Theory, revealed that the Zone of Transition (an area with high out-migration, widespread poverty, and a heterogeneous or mixed population) had a higher concentration of reported juvenile crimes. Neighborhoods situated within the Zone of Transition were characterized as experiencing rapid social changes, low levels of financial investment, widespread abandoned structures, and a prevalence of criminal activity. Subsequent research validated these theoretical ideas, including a positive correlation between crime and abandoned properties (Fuentes & Hernandez, 2014; Katz et al., 2013; Raleigh & Galster, 2014; Wheeler et al., 2008; Yin & Silverman, 2015). Vacant properties, overall, are associated with higher occurrences of theft, drug crimes, and arson (Wheeler et al., 2018; Yin & Silverman, 2015).

Abandoned buildings are also at particular risk for property damage (Fuentes & Hernandez, 2014). Wilson and Kelling's (1982) Broken Windows Theory incorporates the idea that vandals often target abandoned structures. Once vandalized, these structures are ripe for further criminal activity. Given the low risk of apprehension, abandoned properties are suitable venues to engage in crime and for which to

conduct other illicit activities (Raleigh & Galster, 2014). In 2010, Detroit (a city with 100,000 vacant buildings) had the 11th highest property crime rate nationally (Martelle, 2014; Raleigh & Galster, 2014).

Detroit's Abatement Initiative

In 2014, Detroit obtained federal assistance to combat the building vacancy issue (Dynamo Metrics, 2015a; Dynamo Metrics, 2015b). Through the United States Department of Treasury's *Hardest Hit Fund* (HHF), $7.6 billion was allocated to 18 states to reduce foreclosures, stabilize property values, and improve community safety (i.e., reduce crime). In seeking to achieve these objectives, Detroit decided to demolish vacant buildings (Dynamo Metrics, 2015a; Dynamo Metrics, 2015b).

Prior to this time, former Detroit Mayor David Bings (2009-2013) saw demolitions as a high priority for his administration (Binelli, 2012). He helped establish the *Detroit Blight Removal Task Force* (DBRTF) in 2013, as well as the demolition program commencing the following year.[4] By the end of the 2014, 3,560 structures were demolished (City of Detroit, 2018a). Detroit spent an estimated $195 million on demolitions, with each demolition costing an average of $14,855 (Anderson, 2016; Dynamo Metrics, 2015b).[5]

The initial results of the demolition program funded by HFF have been promising. Neighborhoods selected by HHF have reported homes selling for 13.8% more compared with homes not the within HHF areas (Dynamo Metrics, 2015b). HFF also has stabilized property values, as homes within 500 feet of demolished properties saw a 4.2% increase in their property values (Dynamo Metrics, 2015b). Little research, however, has assessed whether community safety was improved as a result of eliminating vacant structures in Detroit.

Prior studies have focused on the relationship between demolitions and crime in other cities. Plerhoples Stacy (2018) evaluated this relationship in Saginaw, Michigan, from 2008-2009. Using a Poisson Fixed Effect Model, the author found that each demolition resulted in a 7.5% decrease in crime within neighborhoods documenting demolitions (Plerhoples Stacy, 2018).[6] Moreover, this research also

[4] In 2014, DBRTF reported 40,077 structures as blighted and another 38,429 in near blight condition (Dynamo Metrics, 2015b).

[5] Other cities such as Liverpool (United Kingdom), Buffalo (New York), and Saginaw (Michigan) also have started demolishing vacant buildings (Plerhoples Stacy, 2018; Sykes et al., 2013; Wheeler et al., 2018; Yin & Silverman, 2015). Buffalo demolished 2,107 structures from 2010-2015, and Saginaw demolished 254 structures from 2008-2009 (Plerhoples Stacy, 2018; Wheeler et al., 2018).

[6] Violent crime reduced by 6.7% and property crime reduced by 9.7% (Plerhoples Stacy, 2018).

revealed that demolitions had a beneficial spillover effect on adjacent neighborhoods. Saginaw neighborhoods without any reported demolitions still experienced a crime reduction of 5.1%.[7]

Wheeler and colleagues (2018) conducted a second recent study assessing the impact of demolitions on crime. This particular research focused on Buffalo, New York, during the period of 2010-2015. Assessing the mean change in crime before and after demolitions occurred, Wheeler et al. (2018) found that there were 11.2 fewer weekly computer-automated emergency dispatches following the demolitions. The authors also used regression analysis and found further evidence to conclude that increases in demolitions resulted in fewer crimes.

A third study on demolitions and crime was conducted by Spader, Schuetz, and Cortes in 2016. The authors examined the effect of demolitions on crime in Cleveland (Ohio), Denver (Colorado), and Chicago (Illinois) during the period of 2008-2013. The findings indicated that demolitions resulted in fewer burglaries within Cleveland.

While these studies offer empirical support for demolition projects, there still is limited evidence available, and none to assess the relationship between demolitions and crime in Detroit. The purpose of the current research was to examine if selected reported crimes decreased in response to Detroit's demolition initiative. The findings can be added to the limited body of empirical research on this topic, in order to guide future policies, programs, and funding.

Data and Methods

As previously stated, one of the principal objectives of the demolition program was to improve community safety. This study evaluates whether demolishing vacant buildings is an appropriate tool to reduce specific criminal offenses. The criminal offenses chosen for this study were arson, burglary, property damage, and drug-related offenses, as these crimes are associated with neighborhoods containing vacant structures (Fuentes & Hernandez, 2014; Raleigh & Galster, 2014; Wheeler et al., 2018; Wilson & Kelling, 1982; Yin & Silverman, 2015).

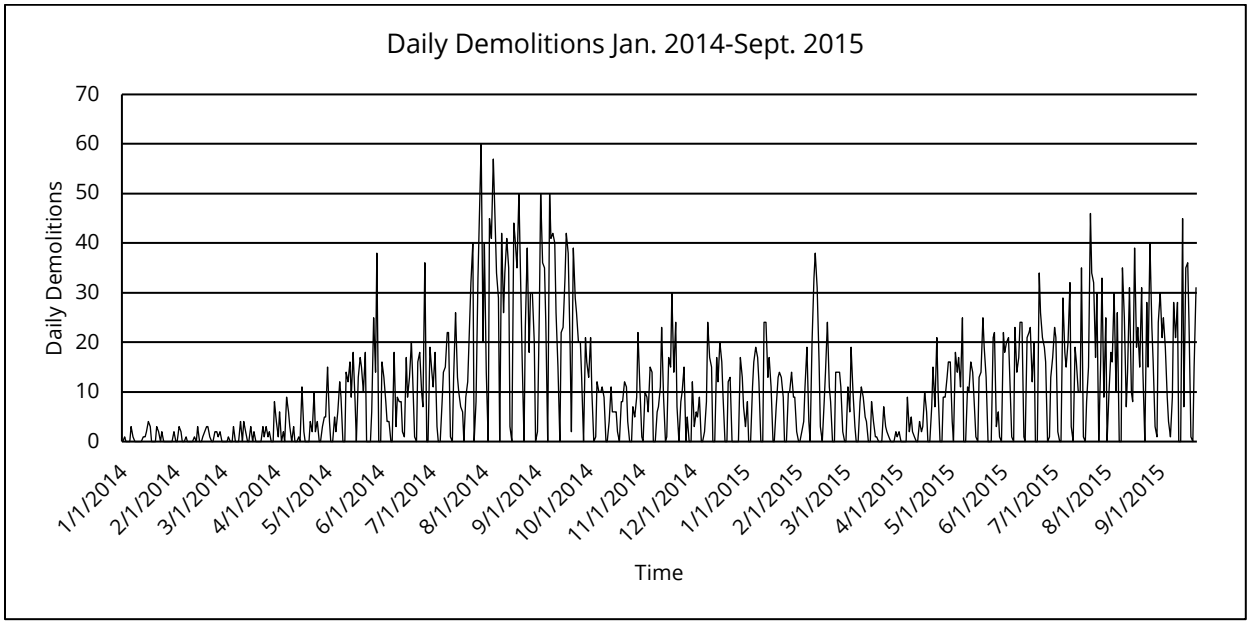
Data Source

Available crime and demolition data were collected from the *City of Detroit Open Data Portal*. Utilizing this online database, demolition data first were sorted to

[7] Violent crime reduced by 3.2% and property crime reduced by 7.1% (Plerhoples Stacy, 2018).

include only those events occurring between January 1, 2014 and September 22, 2015, the latest extent of available crime data. All other demolitions, including those not within Detroit and after September 22, 2015 were excluded from the study. Demolition data then were configured into a daily count. Daily count data were chosen to increase the number of observations (n = 630) and provide more fine-grained analyses over time. Overall, Detroit reported 6,599 demolitions. Figure 1 illustrates the longitudinal trend of these demolitions while Figure 2 provides a spatial examination of where these demolitions took place.

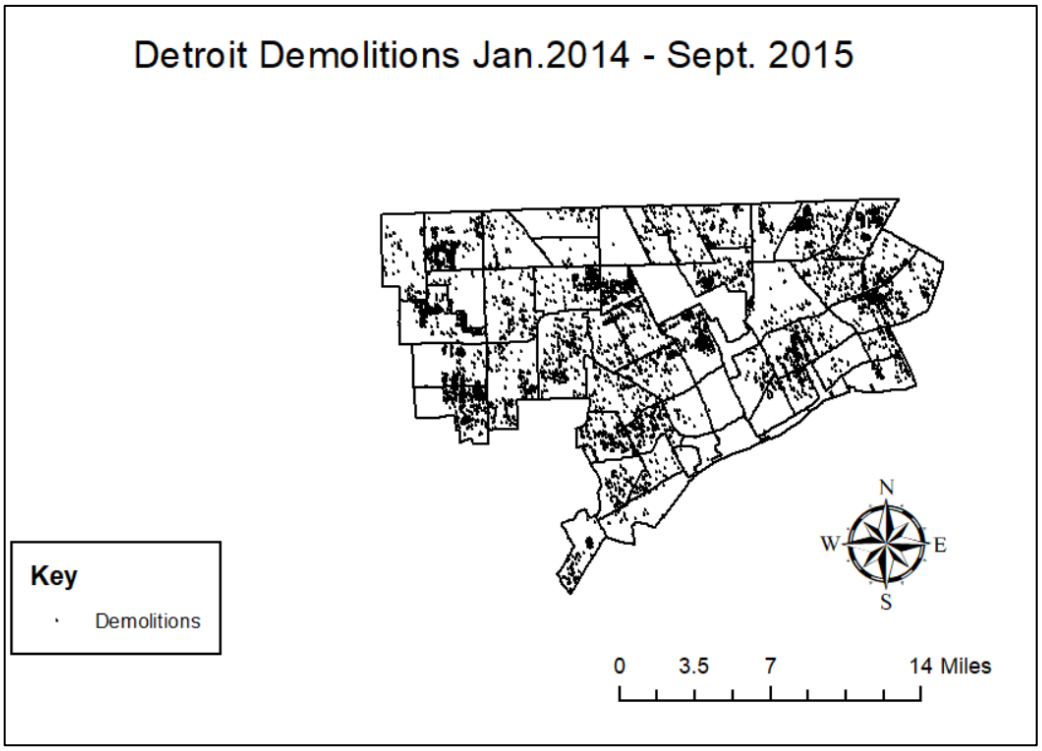
Figure 1. Reported demolitions in Detroit, MI. January 2014-September 2015



Source: City of Detroit, 2018a

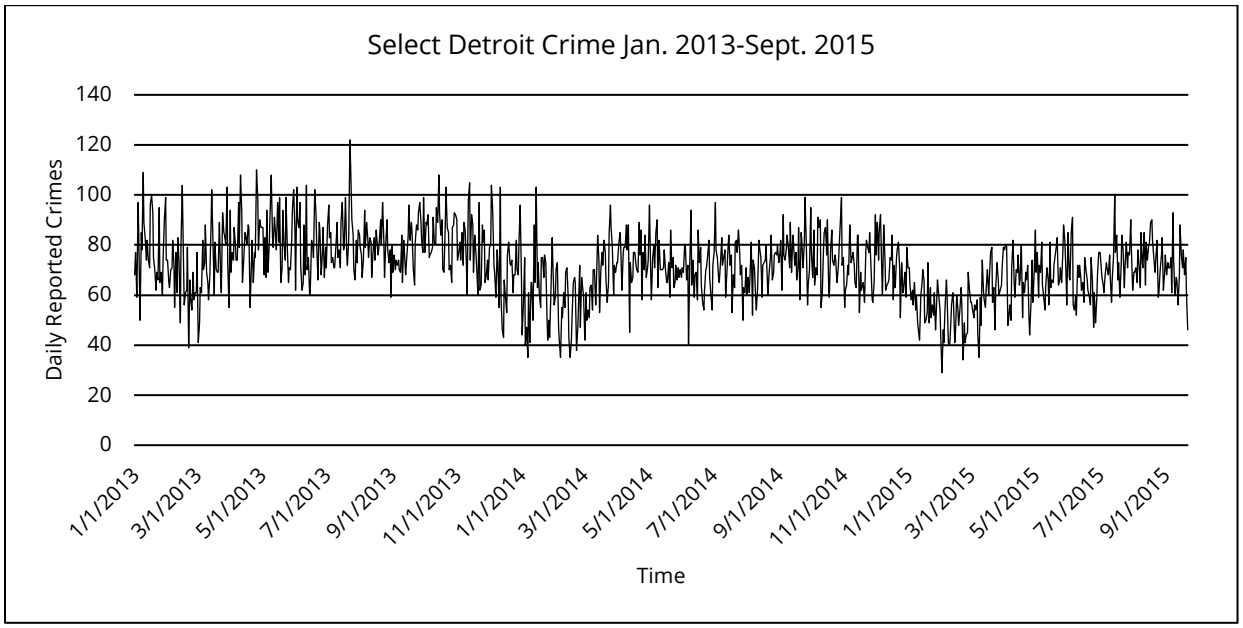
Crime data, based on criminal incidents reported to the Detroit Police Department, also were accessed through the *City of Detroit Open Data Portal*, for cases occurring between January 1, 2013 and September 22, 2015. The timeframe encompasses 1 year before the demolition program commenced and approximately 21 months while it was in operation. Utilizing state offense codes, the following crimes associated with vacant properties were selected: arson, drug-related offenses, burglary, and property-damage crimes. All other criminal offenses were excluded from the study. The daily totals for these crimes were compiled (i.e., all daily arsons, burglaries, etc. reported to the police) and recorded in a daily count fashion. Spanning 995 observations, Detroit had 71,387 reported crimes. Figure 3 documents select daily reported crimes in Detroit from the beginning of 2013 to September 22, 2015.

Figure 2. Spatial examination of demolitions in Detroit, MI. January 2014-September 2015



Source: City of Detroit, 2018

Figure 3. Daily reported cases of arson, burglary, drug-related offenses, and property damage in Detroit, MI. January 2013-September 2015

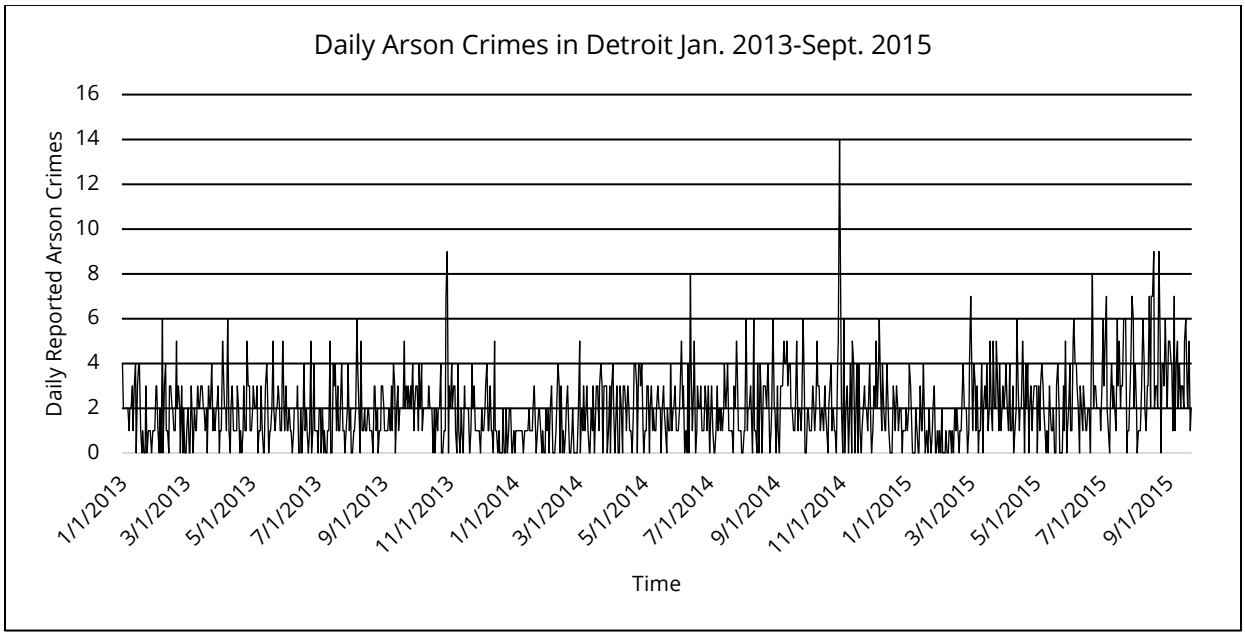


Source: City of Detroit, 2018b

Arson

According to Yin and Silverman (2015), there are more than 12,000 yearly fires reported in abandoned structures in American cities, a majority of which are arson cases. Detroit is no exception. From January 1, 2013 to September 22, 2015, the city reported 1,968 arson crimes (City of Detroit, 2018b). With limited firefighting resources, Detroit lacks the means to combat fires and investigate suspected arson crimes (Binelli, 2012; Haimerl, 2016; LeDuff, 2014).[8] In 2012, the city adopted a "Let it Burn Policy," enabling structures to burn as long as they did not pose a threat to neighboring structures. Since 2012, the arson problem has not subsided. Figure 4 documents the daily longitudinal trend of reported arson cases within the city from January 1, 2013 to September 22, 2015. As seen in Figure 4, arson is most problematic during Halloween, referred to locally as "Devil's Night" (Philp, 2017).

Figure 4. Daily reported arson crimes in Detroit, MI. January 2013-September 2015



Source: City of Detroit, 2018b

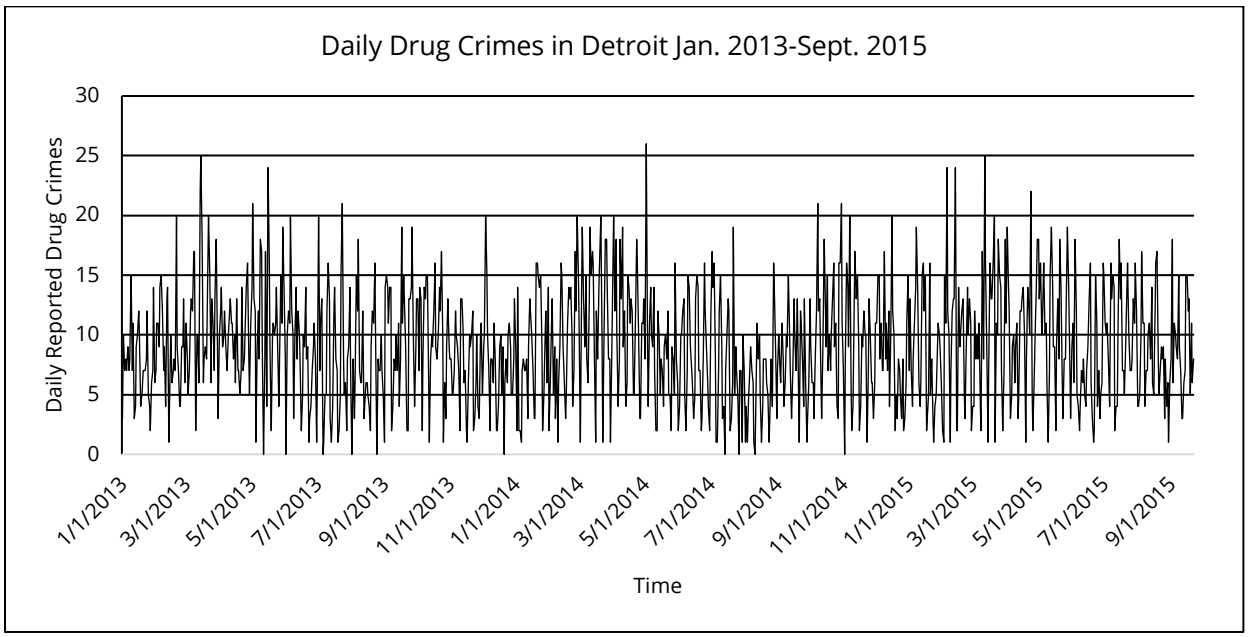
Drug Crimes

Prior research has found that vacant structures are a suitable location for drug manufacturing, usage, and distribution (Philp, 2017; Yin & Silverman, 2015). Several

[8] Less than 2% of all arson crimes are prosecuted (Binelli, 2012).

quantitative studies indicated that police are three times more likely to respond to a drug-related offense in neighborhoods with vacant structures, compared with those lacking vacant structures (Wheeler et al., 2018; Yin & Silverman, 2015). Raleigh and Galster (2014) echoed those findings. Detroit neighborhoods containing abandoned properties had 11.8% more drug offenses (Raleigh & Galster, 2014). As seen in Figure 5, documenting the daily longitudinal trend of these offenses from January 1, 2013 to September 22, 2015, drug crimes are problematic. During this time, 9,050 drug-related offenses were reported in the city (City of Detroit, 2018b).

Figure 5. Daily reported drug crimes in Detroit, MI. January 2013-September 2015



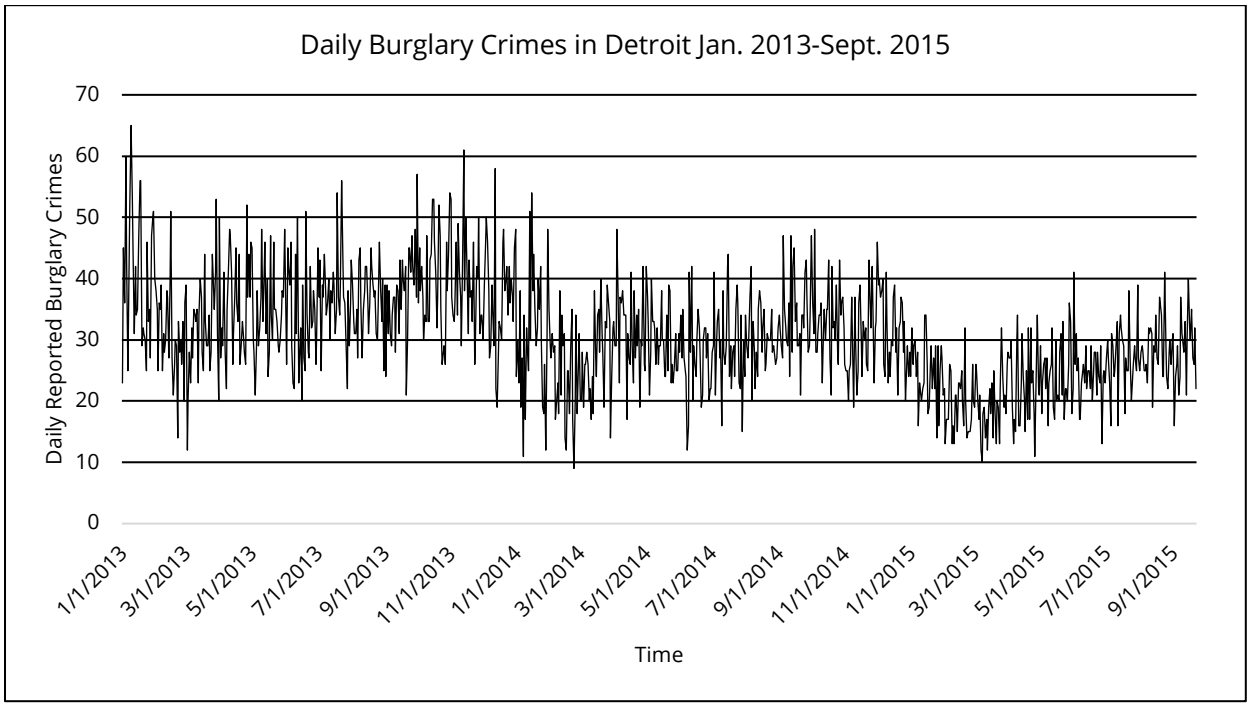
Source: City of Detroit, 2018b

Burglary

Vacant structures are prone to burglary. Criminals seek out vacant structures for tools, appliances, scrap metals (i.e. copper, cast iron, aluminum, etc.) and other valuables that could be sold for profit (LeDuff, 2014; Philp, 2017; Raleigh & Galster, 2014). Neighborhoods with vacant properties receive nearly twice as many theft-related calls compared with those neighborhoods lacking vacant structures (Wheeler et al., 2018; Yin & Silverman, 2015). Raleigh and Galster (2014) reported a similar finding. Their research found a positive relationship between vacant housing units and burglary crimes within Detroit. Research also suggests that criminals inhabit vacant buildings and utilize these structures as an operational

point to target neighboring buildings (occupied or unoccupied) (Raleigh & Galster, 2014). Given the low risk of apprehension, vacant structures are perceived as an ideal location to plan and coordinate future burglaries. During the assessed period (January 1, 2013 – September 22, 2015), 30,660 burglaries were recorded in Detroit (City of Detroit, 2018b). Figure 6 documents the daily longitudinal trend of these burglary offenses.

Figure 6. Daily reported burglaries in Detroit, MI. January 2013-September 2015

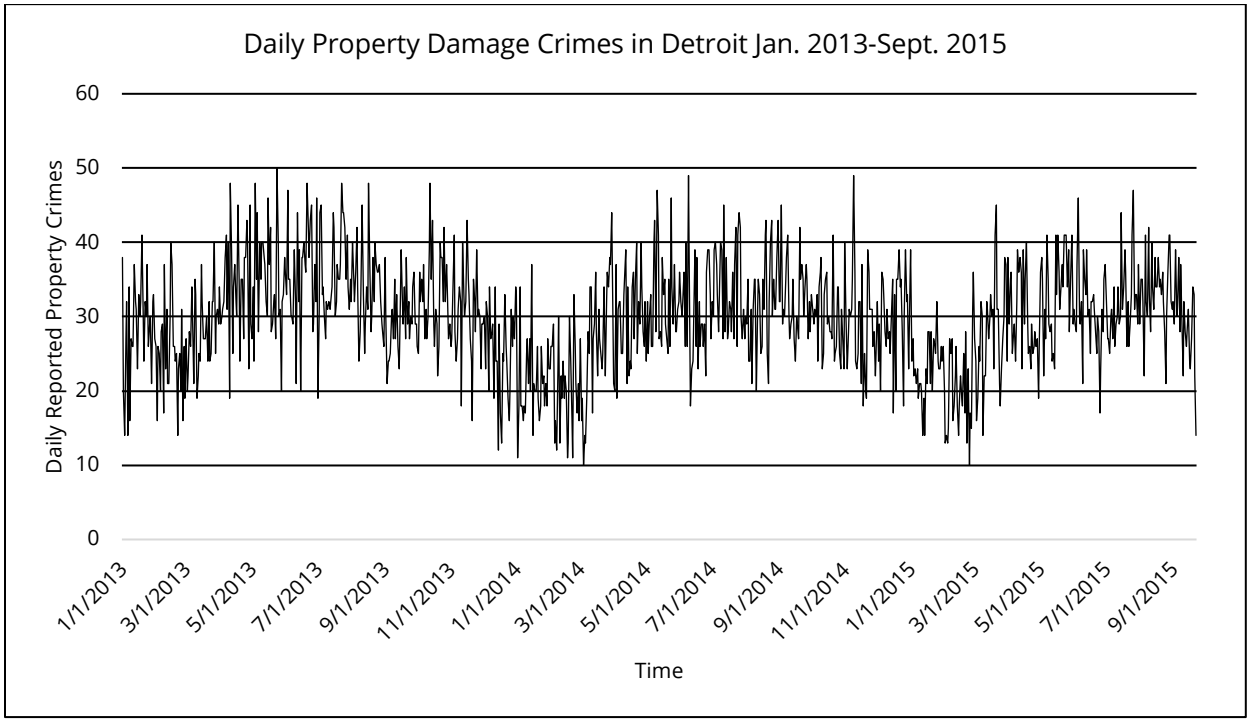


Source: City of Detroit, 2018b

Property Damage

Vacant structures also are prone to vandalism (i.e., property damage). Wilson and Kelling's (1982) Broken Windows Theory captures this concept. Between January 1, 2013 – September 22, 2015, Detroit reported 29,709 property damage crimes (City of Detroit, 2018b). Figure 7 illustrates the daily longitudinal pattern of these property-damage crimes.

Figure 7. Daily reported property damages in Detroit, MI. January 2013-September 2015



Source: City of Detroit, 2018b

Methodology

A retrospective longitudinal design was selected for this study. This design requires two crime measurements (de Vaus, 2001). One measurement will include daily criminal offenses (arson, drug-related offenses, burglary, and property damages) 1 year before the demolition program commenced (January 1, 2013 – December 31, 2013), and the other will encompass daily criminal offenses for the first 21 months it was in effect (January 1, 2014- September 22, 2015). The four criminal offenses, previously compiled as a collective unit of analysis (i.e., total daily arson, drug-related offenses, burglary, and property-damage crimes), yielded 995 observations (365 for 2013 and 630 for 2014 and 2015). Prior research established these crimes are associated with neighborhoods containing vacant structures (Fuentes & Hernandez, 2014; Katz et al., 2013; Raleigh & Galster, 2014; Wheeler et al., 2008; Yin & Silverman, 2015).

Groups were created to represent each period. The first group represents daily criminal offenses occurring January 1, 2013 – December 31, 2013, while the second group focuses on those occurring from January 1, 2014 – September 22, 2015. To

assess quantitatively the mean daily crime differences between these two groups, a t-test initially was selected.

While the t-test is an appropriate tool to assess the differences between two groups (i.e., differences in crime), it will not provide conclusive evidence of whether the demolition of vacant buildings actually caused a decrease in reported crime. Multivariate regression analysis is an appropriate tool to evaluate the effect that demolitions and other control variables had on crime.

Control Variables

For multivariate regression purposes, the researchers controlled for daily property sales as such transactions could affect crime. Yin and Silverman (2015) found that the density of vacant homes and the prevalence of neighborhood fires negatively affects housing sale prices. While Yin and Silverman (2015) concluded there was no relationship between the effects of demolitions on housing sale prices, neighborhoods with vacant structures are more susceptible to crime and lower property values.

Attempts were made to collect and examine a variety of additional control variables specifically associated with crime and urban areas: population size; population density; unemployment rates; household income; per-capita income; percent of residents who are non-homeowners; graduation rates; ethnicity characteristics and; the number of police officers. Unfortunately, with the exception of unemployment rates, the available data were reported as annual figures. Because of these data limitations, only monthly unemployment rates could be utilized as a second control variable for multivariate regression purposes, making the current research exploratory in nature.

Results

The results of an initial t-test, appearing in Table 1, revealed a significant difference in the mean number of daily criminal acts before demolitions and with demolitions occurring ($t = 12.66$; $p < .001$). The daily reported crimes for selected criminal offenses from January 1, 2014 – September 22, 2015 ($M = 67.91$; $SD = 12.30$) were lower compared with those in 2013 ($M = 78.37$; $SD = 12.99$). With the implementation of the demolition program, Detroit reported 10.46 fewer daily criminal acts.

T-tests also were conducted for individual criminal offenses (arson, drug-related offenses, burglary, and property damage crimes). Of the four crimes, arson

experienced a relatively small but significant increase, while burglary and property damage crimes experienced significant decreases with the demolition program in effect (differences of 0.35, 8.76, and 2.18 daily acts, respectively). Tables 2, 3, 4, and 5 provide the t-test results.

Table 1. T-test Assessing Select Reported Crime Before and While the Demolition Program was in Effect

	Select Detroit Crime January 1,2013-December 31, 2013 (n = 365)		Select Detroit Crime January 1, 2014- September 22, 2015 (n = 660)		
	M	SD	M	SD	T
Reported Crime	78.37	12.99	67.91	12.30	12.66***

*** p < 0.001

Table 2. T-test Assessing Daily Arson Crimes Before and While the Demolition Program was in Effect

	Select Detroit Crime January 1,2013-December 31, 2013 (n = 365)		Select Detroit Crime January 1, 2014- September 22, 2015 (n = 660)		
	M	SD	M	SD	T
Arson Crimes	1.76	1.402	2.11	1.757	-3.542**

** p < 0.01

Table 3. T-test Assessing Daily Drug-Related Crimes Before and While the Demolition Program was in Effect

	Select Detroit Crime January 1,2013-December 31, 2013 (n = 365)		Select Detroit Crime January 1, 2014- September 22, 2015 (n = 660)		
	M	SD	M	SD	T
Drug-Related Crimes	9.02	4.646	9.14	4.967	-0.39

Table 4. T-test Assessing Burglary Crimes Before and While the Demolition Program was in Effect

	Select Detroit Crime January 1,2013-December 31, 2013 (n = 365)		Select Detroit Crime January 1, 2014- September 22, 2015 (n = 660)		
	M	SD	M	SD	T
Burglary Crimes	36.36	8.48	27.60	7.41	16.44***

*** = p < 0.001

Table 5. T-test Assessing Property-Damage Crimes Before and While the Demolition Program was in Effect

	Select Detroit Crime January 1,2013-December 31, 2013 (n = 365)		Select Detroit Crime January 1, 2014- September 22, 2015 (n = 660)		
	M	SD	M	SD	T
Property-Damage Crimes	31.24	7.12	29.06	7.24	4.59***

*** = p < 0.001

A linear regression model then was estimated to assess the effect of demolitions with regard to reported crime. Controlling for the monthly unemployment rate and daily property sales, this regression analysis indicated that the demolition of vacant buildings had a significant negative effect on daily reported crimes. Specifically, the demolition program corresponded with 9.981 fewer daily crimes in Detroit (see Table 6). The model also identified that each daily property sale was associated 0.005 more crimes. The other control variable, monthly unemployment rate had an insignificant effect on reported crimes in this model.[9]

[9] In a subset analysis, it discovered that increased property sales positively correlated with demolitions. One explanation is that vacant structures, in some instances, are being sold to demolition companies (City of Detroit, 2018c).

Table 6. A Linear Regression Model Assessing the Impact of the Demolition of Vacant Buildings on Crime within Detroit

Variable	Coefficient
Constant	75.501***
Demolitions	-9.981***
Monthly Unemployment Rate	0.250
Daily Property Sales	0.005*

Note: The model was statistically significant ($p < .001$) and the coefficient of determination (R^2) was 0.381.
* = $p < 0.05$; *** $p < 0.001$.

Additional regression models were utilized to examine the relationship between demolitions and individual crimes. Controlling for the monthly unemployment rate and daily property sales, demolishing abandoned structures was not related to reported arsons or drug-related crimes (see Tables 7 and 8). However, the unemployment rate was negatively and significantly related to arson, meaning higher unemployment correlated with a lower number of reported arsons. It was also discovered that increases in property sales had a significant positive effect on drug-related crimes.

Table 7. A Linear Regression Model Assessing the Impact of the Demolition of Vacant Buildings on Arson Crimes within Detroit

Variable	Coefficient
Constant	4.011***
Demolitions	-0.240
Monthly Unemployment Rate	-0.229***
Daily Property Sales	0.000

Note: The model was statistically significant ($p < .001$) and the coefficient of determination (R^2) was 0.179.
*** $p < 0.001$.

Table 8. A Linear Regression Model Assessing the Impact of the Demolition of Vacant Buildings on Drug-Related Crimes within Detroit

Variable	Coefficient
Constant	11.281***
Demolitions	-0.674
Monthly Unemployment Rate	-0.258
Daily Property Sales	0.003***

Note: The model was not statistically significant and the coefficient of determination (R^2) was 0.161
*** p < 0.001.

As shown in Table 9, the demolition program was associated significantly with fewer burglaries. This finding aligns with prior research (Spader et al., 2016). In Detroit, while controlling for the unemployment rate and property sales, the demolition program resulted in 6.047 fewer daily burglaries. The model also revealed two additional findings. First, a percentage point increase in the monthly unemployment rate corresponded with 1.108 more burglaries, suggesting higher unemployment rates correlates with more burglaries. Second, each property sale was also associated with 0.004 more reported burglaries.

Table 9. A Linear Regression Model Assessing the Impact of the Demolition of Vacant Buildings on Burglary Crimes within Detroit

Variable	Coefficient
Constant	25.144***
Demolitions	-6.047***
Monthly Unemployment Rate	1.108***
Daily Property Sales	0.004***

Note: The model was statistically significant (p < .001) and the coefficient of determination (R^2) was 0.504.
***= p < 0.001.

Finally, it also was discovered that the demolition of vacant buildings resulted in significantly fewer property damage crimes, while controlling for the monthly unemployment rate and daily property sales (see Table 10). The demolition program was associated with 3.022 fewer daily property-damage crimes. It was also discovered that increases in property sales was associated with 0.003 fewer reported property-related crimes. The unemployment rate was insignificant in this model.

Table 10. A Linear Regression Model Assessing the Impact of the Demolition of Vacant Buildings on Property-Damage Crimes within Detroit

Variable	Coefficient
Constant	35.066***
Demolitions	-3.022***
Monthly Unemployment Rate	-0.386
Daily Property Sales	-0.003**

Note: The model was statistically significant ($p < .001$) and the coefficient of determination (R^2) was 0.175. **= $p < 0.01$; ***= $p < 0.001$.

Discussion

Overall, while controlling for monthly unemployment rates and daily property sales, implementing demolitions in Detroit had a significant negative effect on daily burglaries and property-damage crimes. This implies that fewer abandoned structures result in fewer targets to burglarize and items to steal (e.g., copper wiring, copper pipes, cast iron stoves, aluminum, etc.). The elimination of vacant buildings also provides fewer operational dens for burglars to plan and coordinate such crimes. A similar argument is inferred with reported property-damage crimes. With the demolition of abandoned buildings, there are fewer structures to vandalize.

Assessing the control variables, prior empirical studies identified a positive relationship between unemployment and burglaries (Andresen, 2015; Britt, 1997), which was supported in this study as well. However, the unemployment rate did not have a significant relationship with two other crimes, and for arson, the result was in an unexpected direction. Overall, the findings suggest unemployed individuals may burglarize abandoned residential and commercial buildings for monetary reasons.

Property sales, meanwhile, was negatively associated with property-damage crimes. This correlation was anticipated as demolitions eliminate structures that could be vandalized. Increases in property sales, however, had the opposite effect on reported drug-related crimes and burglaries. First, increased property sales corresponded with elevated drug crimes, inferring more property sales yield additional opportunities for drug manufacturing, distribution, and/or usage. Second, an increase in property sales was also shown to be correlated with higher incidents of burglaries. This could be the result of contractors or newly established homeowners leaving tools or appliances unattended during the home renovation

and/or demolition process (Philp, 2017). Property sales had no effect on reported cases of arson.

While it was shown the demolition of vacant structures is one promising strategy to reduce crime, it is possible that other factors could be responsible for the crime decline as well. Changes in population and population density, for instance, are possible explanations. Fewer people living in Detroit could result in less crime. Socioeconomic factors such as poverty, graduation rates, and per-capita income also could be affecting crime. Because these variables only were reported annually in the available data, they could not be utilized in this study for regression purposes.

In 2014, Detroit introduced a $520 million plan to eradicate blight over a ten-year period (Haimerl, 2016). As a result, the city has reported an increase in the number of blight citations, pressuring homeowners to address deteriorating property conditions. These blight-fighting initiatives may reduce the number of vacant structures and increase the occupancy rate. An increase in the number of occupied buildings and maintained properties also could explain why crime reduced in Detroit.

Gentrification (i.e., the revitalization of existing housing) is another possible factor influencing the decrease in reported crime. Gentrification initiatives in Detroit have encouraged residents to invest and stay in the city. The Coss Corridor in Detroit has witnessed some success with its gentrification initiatives, including improvements in community safety (Martelle, 2014). The current Detroit Mayor, Michael Duggan, promoted such initiatives by creating the *Neighbors Wanted Program* (NWP) (Haimerl, 2016). NWP auctions off two homes a day to the highest bidder. The auction winners are allowed up to 9 months, depending on the age of the structure, to restore the home to working order. If unsuccessful, the property is repossessed by the city (Haimerl, 2016). A high volume of property sales has the potential to mend declining neighborhoods by improving housing conditions, increasing surrounding property values, and lowering crime (Yin & Silverman, 2015). According to Dewar (2015), the managed sale of properties is a recommended long-term strategy for redeveloping Detroit and generating tax-dependable revenue. [10]

Revitalization is another possible rivaling factor explaining why crime reduced. Over the last several decades, Detroit has revitalized the downtown area with new buildings, stadiums, casinos, and automobile manufacturing factories (Anderson, 2016; Martelle, 2014; Moufakkir, 2005; Philp, 2017). Recently, a $250 million hockey

[10] Auction sales, compared with managed sales, have a lower likelihood of properties being redeveloped (Dewar, 2015). Most auctioned home sales are primarily situated in neighborhoods containing a high prevalence of vacant structures (Dewar, 2015).

arena for the Red Wings was completed to stimulate economic growth. Infrastructural investments alleviate the vacancy problem, generate income for local residents, make the city self-sustaining, and reduce crime. As shown in this study, increased employment opportunities are an appropriate measure to reduce burglary crimes in Detroit.

Concerning these infrastructural investments, two individuals have made significant strides to secure Detroit's long-term stability. Dan Gilbert, the CEO of Quicken Loans, purchased 30 properties in the downtown area and created 15,000 tech-jobs (Anderson, 2016; Martelle, 2014). Locals refer to this area as Gilbertville 2.0 (Anderson, 2016). These jobs provide economic stability for the city and reduce the vacancy rate. In addition, John Hantz purchased more than 1,900 parcels of abandoned properties and converted the land into an urban tree farm (Anderson, 2016; Safransky, 2017).[11] Hantz Farms, or Hantz Woodlands, has created employment opportunities, increased local property values, and offered much needed tax revenue for the city (Anderson, 2016; Binelli, 2012; Safransky, 2017). Like Gilbert, Hantz is providing economic stability for Detroit and reducing the number of vacant properties. These revitalization efforts, which could not be evaluated in this study, also may explain why crime decreased.

In addition to demolitions and the initiatives discussed above, in November 2014, Detroit introduced a 10-year $464 million initiative to upgrade equipment and hire more emergency-related staff (Haimerl, 2016). Recently, the city adopted COMPSTAT (or computer-driven crime statistics) to aid the city in its crime-fighting efforts. Using computer technology, COMPSTAT provides timely intelligence on criminal trends within the city (McDonald, 2001; Zimring, 2012). This aids police administrators in determining where resources should be allocated to reduce illicit activities. COMPSTAT has shown promising results in reducing property crimes in cities like Fort Worth, Texas and New York City (Jang, Hoover, & Joo, 2010; Zimring, 2012). A similar projection is possible in Detroit.

Finally, research suggests a stronger law-enforcement presence in hot-spot areas (including neighborhoods containing abandoned structures) deters criminal activity (Zimring, 2012). Moreover, an increased community-based law enforcement presence could enhance community bonds, essential for a city's crime-fighting efforts (Scheider, Rowell, & Bezdikian, 2003; Zimring, 2012). Detroit, however, has not seen an increase in the number of police officers. According to the Uniform Crime Report, the number of police officers declined from 2,356 in 2013 to 2,255 in 2015 (Federal Bureau of Investigation, 2018). The lack of adequate police and

[11] The 1,900 parcels were purchased for $520,000 or $275 per parcel (Safransky, 2017).

perhaps fire officials could explain why daily arson crimes increased in the city (1.76 in 2013 to 2.11 in 2014/2015).

Conclusion

Prior research uncovered a positive relationship between vacant properties and crime. In 2014, Detroit initiated a demolition program to restore properties values, reduce foreclosures, and improve community safety. This study sought to explore whether eliminating vacant structures improves community safety in Detroit. Through a retrospective longitudinal design and t-tests, the initial quantitative findings revealed that reported crimes (arson, burglary, drug-related offenses, and property damage) reduced by an average of 10.46 daily acts with the demolition program in effect. More specifically, burglary and property damage crimes experienced significant reductions (8.76 and 2.18 daily crimes respectively). Linear regression analyses also provided support for the demolition of vacant buildings reducing crime, while controlling for the monthly unemployment rate and daily property sales. In the first model, it was discovered that the demolition program reduced reported daily crimes by 9.981 acts. Additional analyses revealed that burglaries and property damage crimes were the most significantly associated with demolitions occurring. Although exploratory, these findings correspond with previous research on the effect of demolition programs in other Rust Belt cities. They also suggest that demolition programs be evaluated further, along with other efforts to enhance and revitalize urban areas.

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