

An Empirical Analysis of the Impact Specific Crimes Have on Property Values in Massachusetts

Jack Scott

Abstract:

This research paper examines the impact of specific crime types on property values in urban areas. Using a dataset of property sales and crime data from several cities in Massachusetts, a regression analysis is applied to estimate the effect of different crime types on property values.

Our findings suggest that certain types of crime, such as violent crimes and drug-related offenses, have a significant negative impact on property values, while other types of crime, such as property crimes and white-collar crimes, have a relatively small effect on property values. We also find that the effect of crime on property values varies across different neighborhoods and is influenced by factors such as socioeconomic status of the neighborhood. These results have important implications for policymakers and urban planners seeking to improve public safety and promote economic development in urban areas.

JEL Classification(s): R30, R31, R51, R58, R11, R21

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Department of Economics, Bryant University, 1150 Douglas Pike, Smithfield, RI 02917. Email:

jscott11@bryant.edu

1.0 Introduction

The real estate market is a critical component of the economic health and financial stability of any nation. Property values are influenced by a multitude of factors such as the health of the real estate market itself, a property's location, the socioeconomic makeup of the surrounding area, interest rates, and the size and condition of the property. It is also well documented that crime has a significant impact on the value of real estate. The objective of this study is to enhance the understanding and to fill the gaps in previous literature of the impact specific crimes have on home values. Previous studies have shown that there is a significant correlation between the crime rate of an area and the property values in that specific area. The objective of this paper is to determine if specific crimes have a greater impact on property values than others.

From a policy perspective, this analysis is important for several reasons. Crime is a major concern for policy makers. Reducing crime is imperative for economic growth and stability. Understanding what crimes have the greatest impact on property values allows policymakers to formulate strategies to reduce specific crimes and promote community, economic, and social prosperity. As Massachusetts has been in a prolonged battle with opiate overdoses, this provides a unique opportunity to examine the impact that drug crimes have on residential property values. Furthermore, by understanding the impact specific crimes have on property values, local and federal resources can be allocated more efficiently to both combat crime and encourage economic development.

This paper was guided by several research objectives that are unique when compared to previous publications. Much of the literature on this topic is outdated. Local socioeconomic conditions evolve with time; therefore, literature on this subject becomes outdated and irrelevant quickly. Furthermore, as technology advances, so do criminals and the crimes they commit. There are many crimes that were not conceivable when previous literature on the subject was published. By using current cross section data published by the FBI, this study brings the most current and up to date data, solving the obsolescence of previous literature. There is a significant amount of literature published on one specific type of crime, for example sexually related crimes or drug related offenses, and their impact on property values. However, there is no current research that accounts for a variety of crimes. Finally, given the uncertainty facing the US real

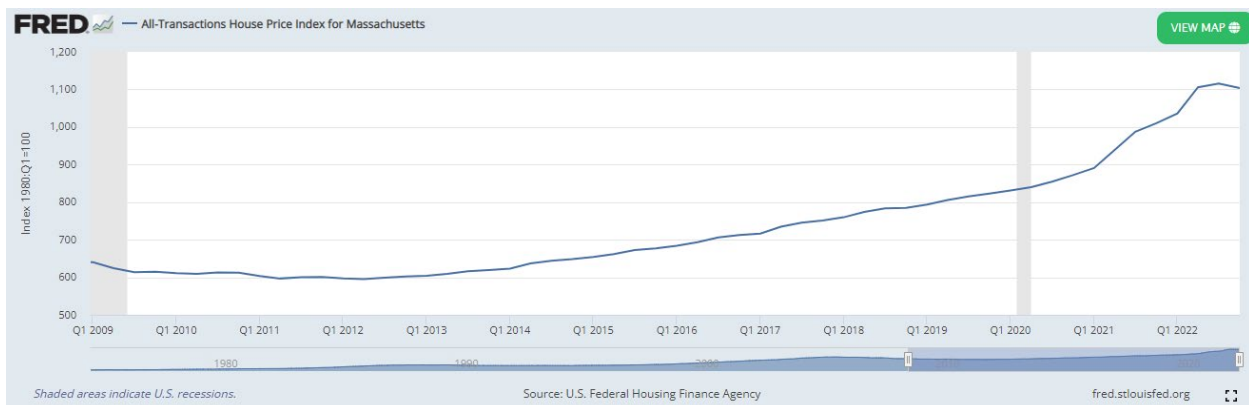
estate market caused by macroeconomic trends, this paper provides timely insight to a current event.

The rest of this paper is organized in the following order. The second section is a literature review of previously published and related research. Section three is a review of the empirical models and various regressions. In section four, the data used in these models as well as the methodology used are discussed. Section five discusses the results of the empirical models, which is followed by a conclusion in section six.

2.0 Literature Review & Industry Trends

Figure one (1) shows that the transaction costs of residential real estate in Massachusetts has seen steady increases since the financial crisis of 2008. Given the growth of home prices in Massachusetts, it is imperative to understand the past performance of residential real estate values before conducting analysis.

Figure 1: Home Price Index for Massachusetts (2009 – 2022)

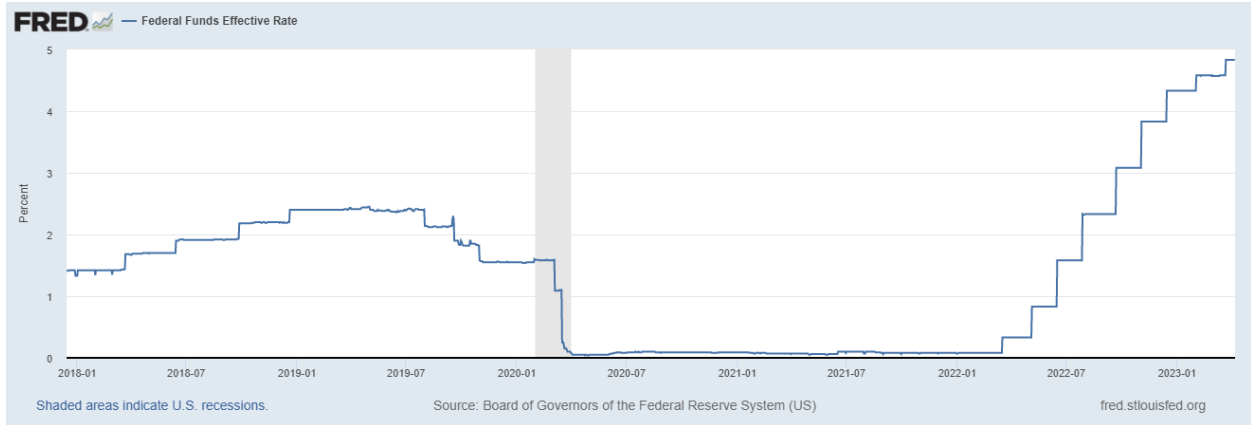


Source: FRED

According to the National Association of Realtors (NAR), the real estate industry in Massachusetts accounts for \$105.8 billion or 16.6% of the state's gross product in 2021. This is a significant portion of Massachusetts' economy, and further supports the importance of researching the intricacies that affect real estate prices.

There are also many macroeconomic factors that contribute to real estate prices. As shown in figure two (2), the Federal Reserve has raised the federal funds rate sharply after near zero levels since during the Covid-19 pandemic.

Figure 2: The Federal Funds Rate (2018 – 2023)



Source: FRED

The increased federal funds rate has led to increases in the price of debt. This is visualized in figure three (3), which shows the average 30-year fixed mortgage rate in the United States. Because it represents the cost of borrowing money, the 30-year fixed mortgage rate is seen as a useful indicator for the real estate industry. When mortgage rates are low, borrowing money to buy a home becomes cheaper, which can stimulate demand for real estate and increase home prices. When mortgage rates are high, it can make purchasing a property more expensive and reduce demand, resulting in lower home prices.

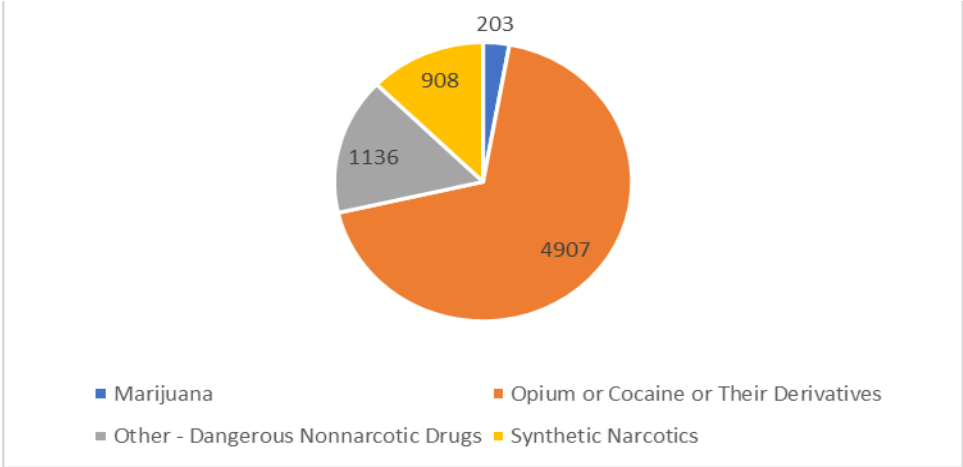
Figure 3: 30 Year Fixed Mortgage Rates in the US (2018-2023)



Source: FRED

The impact that crime has on real estate prices is well documented. However, cross sectional data that is current has not been applied to previous studies. Figure four (4) shows drug related arrest data. According to the FBI, a majority of drug related arrests in Massachusetts are related to opioids. Previous research shows that there is a correlation between increased opioid activity and a decrease in home values (Custodio et al., 2021).

Figure 4: 2021 Drug arrests by category in Massachusetts



Source: Federal Bureau of Investigation – Crime Data Explorer

There is also research that supports sexually related crimes have a statistically significant impact on real estate prices. Megan's Law is a federal statute in the United States that mandates states to set up a system for publicly disclosing information about registered sex offenders to safeguard communities and prevent sexual crimes. Megan Kanka, a seven-year-old girl who was abducted, raped, and killed by a known child molester who lived across the street from her family, inspired the law. Megan's Law requires convicted sex offenders to register with their local law enforcement authorities and allows the public to learn their identify, whereabouts, and criminal history. The law is intended to arm individuals with the information and resources they need to defend themselves and their families against sexual predators. The passing of this law was proven to have a significant impact on home values (Linden et al., 2007). It has been demonstrated that the values of homes within 0.1 miles of an offender see a 4% decrease in value. However, this effect dissipates rapidly with distance of homes from the offender as homes greater than 0.1 miles away see no negative impact (Tita et al., 2006; Buck et al., 1993).

While the relationship between crime and real estate prices is well documented, many studies on the matter are antiquated and their data would not be applicable in the 21st century. However, the methodology applied by the authors to conduct their research is valuable. It is apparent that crime rates unanimously have a negative effect on the real estate industry. Additionally, there is strong evidence that crime of all types has a significant negative impact on market rent. The level of impact that violent crime has on housing prices is dependent on the socioeconomic makeup of the area (Rizzo, 1979; Naroff et al., 1980; Burnell, 1988).

4.0 Data and Empirical Methodology

4.1 Data

This study uses cross section data from 2022. All crime data was gathered from the Federal Bureau of Investigation (FBI)'s Crime Data Explorer. This data is updated annually and is publicly available to all. The dataset consists of 66 unique statistics for every city, town, and academic institution in Massachusetts. These statistics were then grouped to provide the most accurate and complete analysis. These groupings consist of assault offenses, loss of life (homicide, justifiable homicide, and manslaughter), sex crimes, burglary / breaking and entering, fraud, and weapons violations.

All home price data was collected from the NAR. Compiling monthly market reports for every town in Massachusetts for 2022, an average home price for each town was computed as well as the population for every town in Massachusetts. Given that there is a high likelihood that areas with greater populations will experience a larger amount of crime, the total amount of crimes committed was divided by the town's population to compute each town's crime rate. Additionally, median household income and per capita income were collected for each town using the most up to date census information for Massachusetts.

Finally, The FBI provided three additional groupings for crime data. These groups are: crimes against persons, crimes against property, and crimes against society. By utilizing both broad and specific groupings, the likelihood of accuracy is increased.

4.2 Empirical Model

Pulling inspiration from Ihlandfeldt and Mayock (2009), this model relied on a cross section of crime and housing data as well as controlling for population discrepancies.

$$\begin{aligned} \text{Home Price} = & \beta_0 + \beta_1 \text{ Crime Rate} + \beta_2 \text{ Assault Offences} + \beta_3 \text{ Loss of Life} \\ & + \beta_4 \text{ Sex Crimes} + \beta_5 \text{ Burglary or Breaking and entering} + \beta_6 \text{ Fraud} \\ & + \beta_7 \text{ Drug Offences} + \beta_8 \text{ Weapons violations} + \epsilon \end{aligned}$$

Independent variables are directly from the FBI's report or a computation from data sourced from the NAR and the census.

5.0 Empirical Results

The first regression results are below in table one (1). Given that socioeconomic conditions, populations, and property values are not uniform throughout each town in Massachusetts, towns were grouped by size. Table one consists of all cities and towns in Massachusetts. This was a preliminary regression that served as a proof of concept and to weigh the impact that income and population had on property values to ensure accurate information in future regressions.

Table 1: Preliminary Regression:

$$\text{Home Price} = \beta_0 + \beta_1 \text{ Population} + \beta_2 \text{ Per Capita Income} + \epsilon$$

SUMMARY OUTPUT					
<i>Regression Statistics</i>					
Multiple R		0.76391653			
R Square		0.583568465			
Adjusted R Square		0.580237013			
Standard Error		260800.1308			
Observations		253			
ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	2.38289E+13	1.19144E+13	175.1693903	2.77301E-48
Residual	250	1.70042E+13	68016708243		
Total	252	4.08331E+13			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	-261718.196	51264.32609	-5.105269414	6.54851E-07	
Population	0.782773089	0.333354127	2.348172781	0.019645646	
Per capita Income	22.8501789	1.222014667	18.6987763	2.10979E-49	

This model shows the impact that income and population have on home values in Massachusetts. An adjusted R^2 of 0.58, given the simplicity of the model, paved the way for the final models used in this paper.

These findings lead to the conclusion that areas with higher population densities are prone to higher crime rates. For the model to be accurate, these findings must be accounted for. Table two (2) considers the population of cities and towns in Massachusetts. This model includes the 25 largest cities and towns in Massachusetts.

Table 2: 25 Largest Cities in MA by population

SUMMARY OUTPUT

<i>Regression Statistics</i>					
Multiple R		0.820648004			
R Square		0.673463146			
Adjusted R Square		0.469415843			
Standard Error		460430.8339			
Observations		25			

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7	8.74461E+11	1.24923E+11	0.58927	0.749332274
Residual	2	4.23993E+11	2.11997E+11		
Total	9	1.29845E+12			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	691301.9066	355980.4043	1.941966182	0.19164
Assault Offenses	174.300439	596.037501	0.292432001	0.7975
Loss Of Life	-	71530.42995	-	0.43259
Sex Crimes	69705.94984	7522.848755	0.974493651	0.77866
Burglary / B&E	2414.699395	2003.997536	0.320982047	0.23644
Fraud Offenses	3351.219757	1549.787611	1.672267404	0.28467
Drug Offences	2243.61168	2555.574112	1.447689777	0.64153
	1387.768818		0.543036029	

Weapon				
Law	2382.638061	3284.860665	0.725339156	0.54363
Violations				

It is well documented that crime has a negative impact on property values. The objective of this research was to prove a correlation between specific crimes and their impact on property values. This model shows that specific crimes have significantly more impact on property values in the densely populated areas of Massachusetts. Crimes that result in the loss of life such as murder or manslaughter, burglaries, and drug related offences are the largest contributors to crime's negative impact on real estate values.

Moreover, this research also highlights the need for homeowners, real estate agents, and investors to consider crime rates when making decisions related to property purchases and sales. It is essential to recognize that the value of a home is not only determined by its physical characteristics but also by its location and the safety of the surrounding area. As such, it may be wise for stakeholders to invest in preventative measures and community-building initiatives that aim to reduce crime rates in high-risk neighborhoods.

Finally, it is worth noting that this study focused specifically on densely populated areas in Massachusetts, and therefore, caution should be exercised when generalizing these results to other regions or different types of communities. Nonetheless, the findings of this research contribute to the growing body of literature on the economic impact of crime and provide important insights into the relationship between crime and property values in urban settings.

5.0 Conclusion

The above model has proven that crimes such as murder, burglary, and drug-related offenses significantly lower house prices. For legislators, law enforcement personnel, and community leaders who are concerned in improving public safety and establishing stable and flourishing communities, this study's findings have important implications. The findings of this study imply that lowering crime rates in these groups may lower housing costs.

This research also highlights the need for homeowners, real estate agents, and investors to consider crime rates when making decisions related to property purchases and sales. It is essential to recognize that the value of a home is not only determined by its physical

characteristics but also by its location and the safety of the surrounding area. Therefore, it should be encouraged for those in the industry to invest in preventative measures and community-building initiatives that would not only benefit themselves, but the community as a whole.

Finally, it is important to note that this study is specifically focused on areas in Massachusetts with the largest populations. Therefore, further research would be needed to be able to generalize these results to other communities, regions, and states.

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