

# **An Empirical Analysis of the impact of home foreclosure on the crime rate: evidence in Atlanta, GA<sup>2</sup>**

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## **Abstract:**

Over the past 28 years the United States has seen its share of prosperity and hard times. At times there have been significant increases in the number of subprime mortgages issued in the United States. Studies have shown that the number of foreclosures is highly correlated to the number of subprime loans issued. Another main issue that seems to occur with the abundance of loans and the spike in foreclosures is that crime rates tend to also increase during these times. The two major crimes that will be taken into account are violent crime and property crimes. I use foreclosure, income, and crime data from various databases from 1980 to 2008 the purpose of this paper is to determine the relationship between United States foreclosure rates and crime rates. Results from simple regression models suggest that the increase in foreclosures is significantly related to crime level increases across the United States. I conclude with the discussion of implementing social and educational programs to help the less fortunate that are on the verge of losing their homes.

*JEL classification:* E21; E51; G21; G33

*Keywords:* Foreclosure, Property Crime; Violent Crime; Unemployment Rate; Atlanta

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## **I. Introduction**

The outlook of the United State economy has been gloomy at times over the last couple of decades, during prosperous time we witness business that is booming and it is evident that there are legal opportunities to make money. On the contrary, during periods of declining growth we have seen that the number of foreclosures has increased during this time. The abundance of subprime loans during the years from 2002 to 2004 lead to a record number of no-documentation loan originations, these loans are the main reason why the subprime lending market crashed. Studies have shown that the higher the degree of foreclosure tends to more negative aspects of a community (Immergluck and Smith 2006).

This analysis reports specifically on foreclosure activity in Atlanta, Georgia, between January 2006 and August 2008. A foreclosure in itself has many other impacts on the community and there are usually many other impacts of this event. For instance, usually many homeowners have be forced to foreclose their home if they have recently lost a job and are not able to cover their mortgage payments, another main reason for foreclosures is because of divorces. Divorces are a key factor in determining foreclosure because this typically leads to only one partner having the responsibility of paying a mortgage, household incomes usually decrease substantially and the probability of foreclosure is greater. In other few instances, foreclosure occurs because influential factors of the economy, such as because of interest rates. The subprime mortgage debacle brought with it a huge number of Hybrid-Adjustable rate mortgages that begin at low rates but then hit reset dates where the interest rate jump to a capitalization rate (typically 6.00%) plus an index rate such as the 3 month LIBOR (London Inter-Bank Offering Rate). When this adjustment occurs it causes the mortgage payment to increase drastically which is a main reason why default rates usually increase as well.

The outcome of foreclosure has been known to negatively affect the community in other ways as well. For instance, if there is a foreclosure in a neighborhood the homes in a close proximity to the foreclosed home will have their value drop by 1.5%. Another negative aspect is that when these homes are foreclosed they typically become abandoned and this usually leads to other problems that society sometimes faces. Over that past couple of years (2007-2009) there has been a severe increase in the number of defaulting mortgage holders and as I stated before this only worsens the problem for the economy. The purpose of this case study is to answer questions on the relationship between the foreclosure rates and crime rates in a community, in this case more specifically the Fulton County in Georgia.

## **II. Trends**

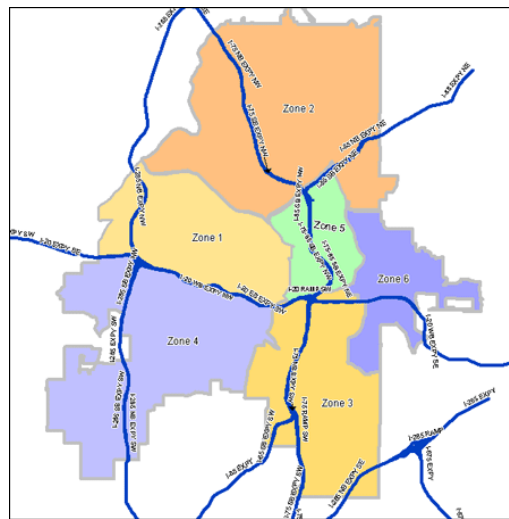
Atlanta is located in central Georgia, it has seen its population growth become one of the highest in the United States in the last couple of years. One reason that I will go into more detail later in this report is that there has been ample job creations in various sectors such as: finance, service industry, and small businesses. Atlanta's location is prime because of its mild temperature and metropolitan area. It is home to Hartsfield-Jackson International Airport, which is known as "the nation's busiest airport in terms of flight operations." The Atlanta police department does a great job of keeping the community safe and an even greater job of keeping the crime records organized for detailed statistics. Uniform Crime Reports is a database that the city of Atlanta has online which tracks the number of crimes, and detailed information of where, when, and what occurred at a crime scene. This is a great asset of the police department because they are able to see which areas criminals are more willing to commit crimes and they are also able to determine which areas they should allocate more police force to. The city of Atlanta is broken down into

six different zones. The two figures below show exactly how the zones are broken down and where exactly they are located.

Fig 1.1 – Zone Breakdown for Atlanta Police Department

Patrol Zone	Area served
Zone 1	Western Atlanta
Zone 2	Northern Atlanta
Zone 3	Southern Atlanta
Zone 4	South-West Atlanta
Zone 5	Downtown
Zone 6	Eastern Atlanta

Fig 1.2 – Atlanta Police Department Zone Visual



Mortgage default rates have been increasing over the last couple of years and this has had a great deal of affect on the number of foreclosure that has taken the United States by storm. Currency we can see that the number of foreclosure has dampened the US housing markets and has caused the prices to decrease from all-time highs. The average home price in October 2004 was \$264,540 where in today’s markets a single-family home comes at an expense of \$180,100 in December 2008. The subprime mortgage mess has also affected many US investment banks

and investment firms that have long positions in subprime-backed securities. These mortgage-backed securities, which are basically bonds with the lowest rating, had the subprime loans as their underlying collateral. As these mortgage loans started being delinquent the value of these securities started to decrease drastically to the point where many banks started losing money. The reason why we have seen the economy so deeply affected by these defaults is because many of these loans were packaged into collateralized debt obligations (CDO). These CDOs were sold to bank and they consisted of pools of many subprime mortgages, When the mortgage payer would make a payment it would go directly to the holder of the Mortgage-backed security and that would be their investment cash flow. As I have stated the problem with this is since the mortgage holders were defaulting many of the investment banks were coming up short on cash. These losses were even more magnified because of the fact that many of these investment banks were highly leveraged, some were even levered up to 50 times the amount they had in assets. So little losses on these CDOs would mean a great deal and the amount of money lost was tremendous.

The fact that the number of Foreclosures in the Atlanta area keeps increasing and is estimated to peak sometime in 2010 leads researchers to believe that home prime are going to continue to come down. This is bad in a way because many of the loyal home owner that have been paying their mortgages down for most of their life have seen their 401Ks have been decreasing as well as the amount of equity that they have built in their house has been lost. The only positive aspect of this type of real estate bust is that when the price hit rock bottom there will be an abundance of home properties on the market. This leads many investors to believe that this may very well be the “time to buy”. But the problem that has also affected the opportunity to buy in our current economic crisis is that the United State economy is also going through a

“credit crunch”, this means that the availability for investor to borrow money has become a lot harder because of the fact that many people have been defaulting on their mortgages. This crisis is one of the main reasons why the economy has had trouble rebounding. The typically US consumer has felt a great deal of pressure on his/her wallet which has directly affected the level of consumer spending. With this said many consumer try to turn to banks to borrow more money in order to try to get by, and as I have stated before many of these banks are stricter than they were before because they themselves are low on cash. To conclude on this thought, all I can say is that the US economy is in big trouble.

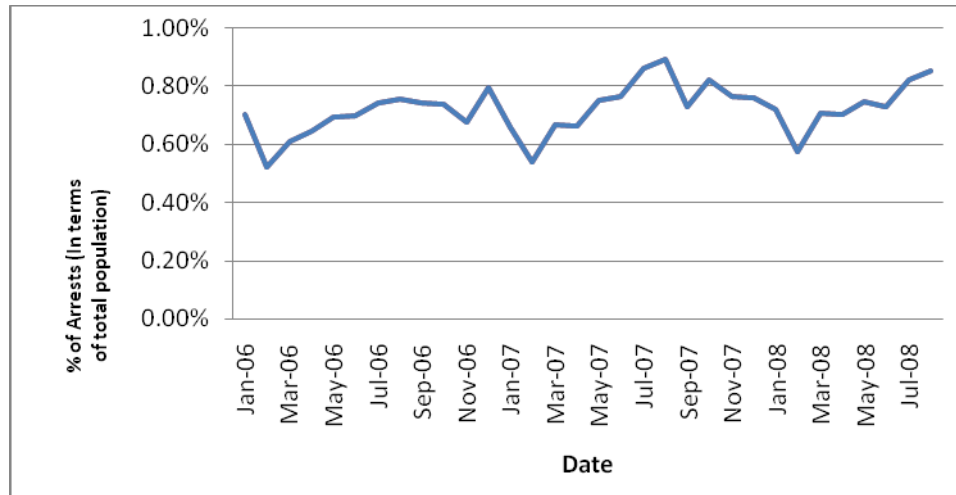
The Unemployment rate is usually used as a key determinant in estimating crime rates because as history has shown as the unemployment rate increases people have less income coming into their pockets and they also have more time on their hands. Because of this fact some of these distressed workers take into consideration committing actions that may be unlawful, especially if that is the only means of getting their hands on some cash. Although the unemployment rate is not highly correlated with the violent crime rates, it is definitely more closely related to property crimes (Rafael & Winter-Ember, 2001). This study shows evidence that the drop property crime rates during the 1990s in the United State was attributed to the lower unemployment rates. The effect of the change in the wage from month to month has mostly affected business' profits, crimes such as burglary, larceny and auto theft are typically the property crimes that tend to spike the most during periods of increases unemployment.

During the 1990s Atlanta had tremendous growth economically, it is home to more that 24 Fortune 1000 companies (Ex. Home Depot, UPS, Bellsouth, and Delta Airlines). During the period of 1990-2000 more than 1.1 million new residents moved to the Atlanta area, which has attracted new businesses to open in this area. Many feel that the reason why Atlanta has been

able to do well during recessions is because they have a strong labor force and many companies that are financially strong, and so Atlanta typically suffers less from slowdowns in the US and is able to get back on track quicker than most states. Figures from the Bureau of Labor Statistics in 2000, estimate that during the time period 1998-2025 metropolitan Atlanta is expected to create 1.8 million high-paying tech jobs in light of the growth in the business sector. The Atlanta economy's biggest sectors are services, manufacturing, and trade.

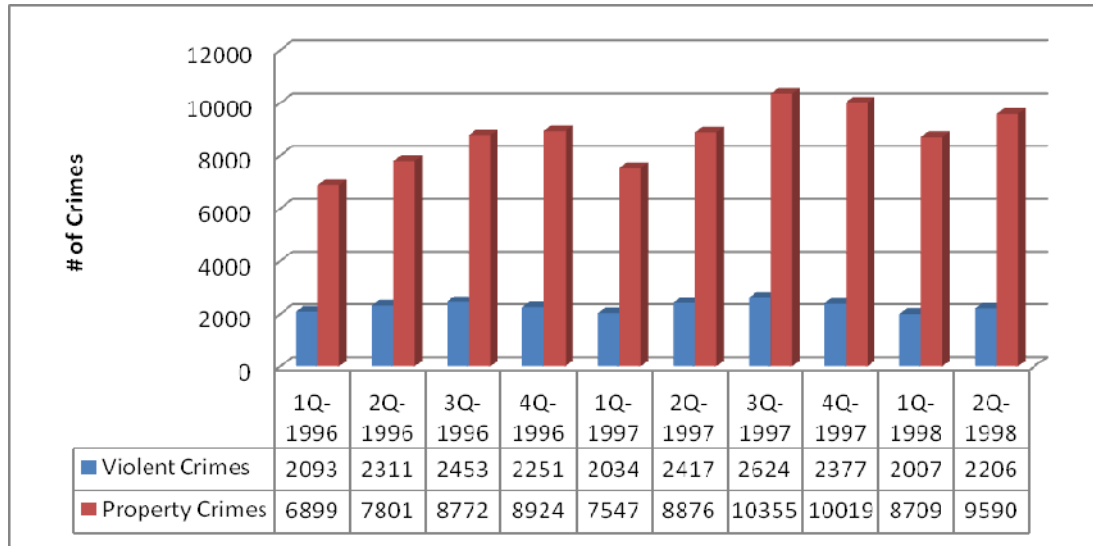
Average household income for a family in Atlanta in 2008 was \$55,939 according to the census bureau. We have also talked about how the population growth is increasing at alarming rates and how job creations in Atlanta have been plentiful. A important topic that many community officials have looked into is that the crime rates in the respective areas where there are higher levels of income will not be as affected as the zip codes that are the least wealthy will not be as effected when it comes to foreclosures and unemployment spikes. Crime is most elastic with to wages in sectors that use low-skilled labor these results were determined by looking at sector specific wages (Doyle, Et Al, 1999). They also found that income inequality has no significant effect on crime rates. I disagree with this point because of that fact that because my studies have shown that in the lower income areas of Atlanta the crime rates are highly positively correlated to foreclosure, unemployment and income levels. Consider the scenario, if the crime rate in Atlanta were to increase by 20% where would this most likely be attributed to? In my studies the results show that the percentage increase of crimes would be higher in the low-income communities rather than in the wealthier ones.

Fig 1.4 – Total Percentage of Population Getting arrested in Atlanta (Month-to-Month)



Violent crimes are defined as an incident where the offender uses or threatens to use violent force upon the victim. Criminal homicide, forcible rape, robbery, and aggravated assault are all considered violent crimes. These type of offense spike and hit a peak during 1992, the number of violent crimes has steadily decreased since then however it became an issue again in 2004 when rates turned and started rising. When it comes down to national rates Atlanta falls under the worst part of the country when it comes down to violent crimes – the South, made up 42% of the United States total violent crimes registered. It is also been researched that younger people are more likely to commit more violent crimes than older people. (1) Individuals in their thirties, forties and fifties made up 41 percent of the people arrested for violent crime, where as 33 percent of all violent crimes in the United States were in their twenties. People of the age of sixty comprised only 1 percent of violent crimes. Lastly these studies have also shown that 62% of all violent crimes happen to be aggravated assaults.

Fig 1.4 – Property Crime vs. Violent Crimes in Atlanta (Jan 2006 – Mid 2008)



Property crimes are considered to be unlawful activities that involve taking money or property, but it does not necessarily involve force or threat of force against a victim. Property crimes include burglary, larceny, theft, motor vehicle theft, arson, shoplifting, and vandalism. The affect of unemployment and foreclosures tend to escalate the rates in property crimes, this is the case be many people find themselves at home with less money in their pockets and more time on their hands. Some of these individuals take these problems into their own hands even though this might encounter coming across other people’s property. The individuals that have been hit hardest by the downturns in the economy are typically the ones that tend to search to find a source of income. I believe that one of the reasons why property crime rates increase during times of higher foreclosure rates, higher unemployment rates, and typically recessions because many business owners try to lower their costs and spend less money in security systems and hiring security officers. This could be one of the reasons why property crime rates increase

### III. Empirical Models

The two equations that I will be working with are to determine the level of crime rates in Atlanta. The two dependent variables are Property Crime Rates and Violent Crime rates.

Equation 1.1: Model: **Property Crimes** =  $\beta_0 + \beta_1 * \text{Unemployment Rate} + \beta_2 * \text{Income} + \beta_3 * \text{ANoFpZ} + \beta_4 * \text{PoPgA} + \beta_5 * \text{Violent Crimes}$

Equation 1.2: Model: **Violent Crimes** =  $\beta_0 + \beta_1 * \text{Unemployment Rate} + \beta_2 * \text{Income} + \beta_3 * \text{ANoFpZ} + \beta_4 * \text{PoPgA} + \beta_5 * \text{Property Crimes}$

**Fig 1.5 – Summary of the variable signs for Property Crime Model**

Variable	Expected
Income	-; studies have shown that more robberies occur in areas of lower income, if income increase there tends to be higher security and therefore fewer crimes occur.
Unemployment Rate	+; The higher the unemployment rates goes means that there will many people trying to find alternate way of making money.
# of Foreclosures	+; as more homes get foreclosed one means that there are typically less employed individuals in the community.
% of Population getting arrested	+; the more people getting arrest means that crimes rates will be increased.
Violent Crimes	-; study have shown that as the number of violent crimes increase usually make the area less desirable, and the police force usually become strengthened and the overall occurrence of crimes, property crimes more specifically will decrease.

#### IV. Data

The data for this paper was obtained from various sources, the majority of the data came from the Uniform Crime Reports Database of the Atlanta Police Department. The Bureau of Labor Statistics (BLS) and the government website for the census were also key contributors.

Foreclosure data and demographics data of Atlanta were provided by Professor Peter Nigro from Bryant University, in, RI.

The explanation of the data is below:

<b>Variable</b>	<b>Description</b>	<b>Data Source</b>
<b>Property Crime</b>	<b>Property crimes include burglary, larceny, theft, motor vehicle theft, arson, shoplifting, and vandalism.</b>	<b>Atlanta Police Department – Uniform Crime Reports Database</b>
<b>Violent Crime</b>	<b>Violent crimes consist of criminal homicide, forcible rape, robbery, and aggravated assault.</b>	<b>Atlanta Police Department – Uniform Crime Reports Database</b>
<b>Unemployment Rate</b>	<b>The unemployment rate is percentage of the population that is currently unemployed.</b>	<b>Bureau of Labor Statistics (BLS)</b>
<b>Average HH Income</b>	<b>The average gross amount of money that a working household bring home every year.</b>	<b>Bryant University Professor of Finance: Peter Nigro</b>
<b># of Foreclosures</b>	<b>The number of properties that get taken over by a bank because the homeowner can no longer afford it.</b>	<b>Bryant University Professor of Finance: Peter Nigro</b>
<b>% of Population Getting Arrested</b>	<b>The number of arrests made monthly divided by the total population.</b>	<b>Atlanta Police Department – Uniform Crime Reports Database and the demographics report</b>

a. Regression Results

Explanatory Variables	Dependent Variable	
	Property Crime in Atlanta (1996-1998)	Violent Crime in Atlanta (1996-1998)
	<i>Model 1</i>	<i>Model 2</i>
Unemployment Rate	0.074726 (0.1143)*	-0.009265 (0.9324)
Average HH Income	-0.64374 (0.0970)**	-2.067541 (0.0148)**
# of Foreclosures	0.058055 (0.0021)**	0.039188 (0.3962)
% of Population (Arrested)	1.4074 (0.0000)**	2.804591 (0.000)**
Violent Crime	-0.332181 (0.000)**	
Property Crime		-1.687113 (0.000)**
<b>Method</b>	OLS	OLS
<b>Sample Size</b>	32	32
<b>R-Squared</b>	0.980525	0.871236

\* Significant at 15% confidence level

\*\*Significant at 10% confidence level

From the regression results, where the dependent variable is property crime, we are able to see that almost all of the variables had the expected signs, only the unemployment and the average household income variables were different from what was expected. Both average household income and violent crimes had negative signs. The coefficient for income was -0.64374 which leads us to believe that as the income levels increase in a city the number of property crimes should decrease because there is higher security and the potential of getting caught is greater. Many high net worth individuals can afford to buy security that protects them from property damage or theft, this is something that may not be available to protect the people who have less income and cannot afford extra security. On the other hand we can also see that

violent crime is greater than amount of property would decrease. Consider the scenario, if there was a city where a tremendous amount of violent crime are the odds are that people are going to move away and that the police will strengthen their police force there. So the marginal opportunity of committing a property crime will be highly increased which could deter potential thieves. The unemployment rate, foreclosure rates, and the percentage of the population getting arrested all had positive signs. The correlation between foreclosure rates is simple to understand, if the number of foreclosure in a community is increasing this will mean that some people could have quite possibly been living in an area that they could not afford which in a sense could make them vulnerable to committing a property crime. For instance, a person may want what others' have and if the only means of attaining it may be by committing an offense, this is likely to stop some people and for others it really does not. Unemployment is similar to the foreclosure's expected affect on the property crime rate. As workers have become laid off and lose their jobs they will most likely still have some of the fundamental expenses (home, car, and food) but will have a significantly lower income. In the meantime many of these people look for other ways to make money and to make ends meet. I believe that this is the key factor on why the crime rate is highly related to the unemployment rate. The above regression also shows that all the factors chosen were important in the equation - they all play a significant part in the increase or decrease of the property crime rate. Almost all of the factors fall into the 10% or 15% range which means that there is a 85% or 90% chance that they play a role in the amount of property crime in Atlanta. Since all the variables are important, this makes the accuracy of the regression more viable.

The study went further to also so the affects of these variable and their impact on determining the level of violent crimes in Atlanta. For the most part many of the variables affect

the violent crimes in the same way that property crimes were affected. Both average household income and the unemployment rates had negative coefficients which mean that they are inversely related to the level of property crimes. At any point in time when these variable are increasing then the level of violent crime should be decreasing. For household income this is fairly easy to understand because as a family has a higher level of income they can afford to buy protection and security, therefore it should lower the level of violent crimes. On the other hand, when the unemployment rate is increasing our results show that the number of violent crimes will decrease, this can be thought as people are willing to commit small crimes because they are not considered life threatening or felonies. Foreclosure rates is positively correlated because as the rate of foreclosures increases then there is a downward pressure on home prices and these cities are known for having high crime rates because some of these foreclosed homes become abandoned. The percentage of individuals getting arrested is positively correlated because if there is more people committing crimes then the proportion of the population not committing crimes will therefore decrease. The number of property crime is negatively correlated; this is easy understood by comprehending that if the number of property crimes is increasing then what typically happens is that the police force gets stronger which will deter individuals from committing violent crimes.

## **V. Conclusion**

When people think of Atlanta many individuals think of its crime rates and think the worst-case scenario and how things are unsafe. What they forget to look at is all the positive that Atlanta has to offer, this city has great opportunities and the job growth and its metropolitan area is one of the most potent in the United States. However my analysis looks at which issues affect the crime rates and how viable they are. We see that some variable are more significant than others but

what is most important is that they give us a greater picture how these fundamental these variables are. The results are that the property crime rate is more elastic in regards to the home foreclosure rates than violent crimes. In conclusion, the regression is considered accurate and viable and should hopefully prove to help us understand why foreclosure rates and other factors affect the crime rates.

## **VI. Proposals**

There are various programs that the city of Atlanta might want to implement after seeing how foreclosures affect crime rates. I will provide them with a proposal on a plan to keep foreclosure as the last possible option, and if they do end up foreclosing there will be programs available to start life over and think positively.

Another proposal may be to implement a larger police force for during economic downturns where the number of foreclosures increases. By doing so I believe that the city of Atlanta will have an easier time on trying to cracking down on crime. My studies have shown that the rate of unemployment increases during periods of recession, so one way to combat this loss of jobs is to train and hire some of these unemployed individuals and create neighborhood patrol officers. This would be a great opportunity to increase the police force to combat with the higher crime rates that usually rise due to the number of foreclosures and unemployed people in the area.

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## Property Crimes

Fig 1.10 – Eviews Ordinary Least Squares (OLS) Regression Results

Dependent Variable: Property Crime

# of Observations: 32

Model: Property Crimes = C(1)\*Unemployment Rate + C(2)\*Income + C(3)\*ANoFpZ + C(4)\*PoPgA + C(5)\*Violent Crimes + C(6)

	Coefficient	Std. Error	t-Statistic	Prob.
UNEMPLOYMENT_RATE	0.074726	0.045734	1.633910	0.1143
INCOME	-0.643740	0.373936	-1.721526	0.0970
AVERAGE_NUM_OF_FORECLOSU	0.058055	0.016980	3.419003	0.0021
PERCENTAGE_OF_POP_ARREST	1.407400	0.067216	20.93833	0.0000
VIOLENT_CRIMES	-0.332181	0.057696	-5.757446	0.0000
C	11.11144	2.358646	4.710941	0.0001
R-squared	0.980525	Mean dependent var		3.467532
Adjusted R-squared	0.976779	S.D. dependent var		0.067165
S.E. of regression	0.010235	Akaike info criterion		-6.158687
Sum squared resid	0.002724	Schwarz criterion		-5.883862
Log likelihood	104.5390	Hannan-Quinn criter.		-6.067590
F-statistic	261.8035	Durbin-Watson stat		1.379287
Prob(F-statistic)	0.000000			

Dependent Variable: Violent Crime

# of Observations: 32

Model: Violent Crimes = C(1)\*Unemployment Rate + C(2)\*Income + C(3)\*ANoFpZ + C(4)\*PoPgA + C(5)\*Property Crimes + C(6)