How does the income disparity for males and females affect different crime rates?

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It is not hard for one to realize that crime rate and income level are highly different across the two genders. It is even more obvious when consulting official datasets (Department of Labor, 2019). In general, females have lower income and lower crime rate whereas males have higher income and higher crime rate. Does that mean people with higher income are more likely to commit crime? Or is the distinction in gender itself causing such phenomeum? Or is there a neglected confounding variable between crime rate and income? We propose that the hidden confounding variable can be education level, and we discuss its intersection with income and crime rate, for males and females respectively. We find that income level influences the crime rate of males and females directly but differently. There is no general trend between income level and crime rate. Their relationship is decided by the specific type of crime.

Introduction

As income disparity and wage gap increases in the United States, this paper explores the relationship and effect that it will have on the crime rate. More specifically, this paper aims to answer the question of whether income poverty has an equal effect on both males and females

and what specific crimes are they more likely to commit as a result of this poverty. While there is evidence from previous studies that "with a degree of consistency which is unusual in social sciences, lower-class people, and people living in lower-class areas, have higher official crime rates than other groups", the exploration of specific crime offenses is not thoroughly examined. (Braithewaite) While papers suggest that places with pronounced income inequality are more likely to have high rates of violent crime (Hicks) there is no differential for crimes that have to do with the possession of literal monetary goods. Furthermore, a big factor which is explored in this paper that is not in other studies is the factor that educational attainment plays alongside income disparity when it comes to committing criminal offenses. While the national average for education increases for both males and females, this paper focuses on making a conjunct association with income and education and how that can affect crime rate.

Related Works The Relationship between Videogame Use, Deviant Behavior, and Academic Achievement among a Nationally Representative Sample of High School Seniors in the United States (Concepcion et al 2016) is a study with similar topic and similar research objectives. We tried to study the relationships between three entities: education, crime rate and income. This paper also studies the relationships between three entities: videogame use, deviant behavior and academic achievement. The paper finds that videogame use is rather irrelevant with deviant behavior or academic performance. However, though it mentioned the influence of gender on the relationship between videogame use and academic achievement, this paper did not address it when adding deviant behavior to its regression. Our research goes one step further, splitting gender and crime type in each regression. It comes to our realization that causal relations can exist for sub-groups even if there is none for the whole.

Dataset

The data obtained for salaries and income was from the U.S Department of Labor. This data was based on median annual earnings of full-time, year-round workers, 15 years and older beginning in 1980 and people 14 years and older as of the following year for previous years. Before 1989, earnings were for civilian workers only. While for this experiment we primarily only used data for all males and all females from the years 1980 to 2019. There was excluded data available ranging from 1960 as well as data that included different ethnicities regarding their median annual earnings. The dataset choses uses median annual earnings instead of average earnings to accommodate for any outliers that might exist in the population pool.

Data that was used to find overall crime rate and the specific crime rates and count for offenses was provided by the Office of Juvenile Justice and Delinquency Prevention. In this data set, we were able to differentiate the data by male and female as well as different offenses. The data was displayed in terms of count, rate, and percentage.

The last data source that we used was for education data and collected by the U.S Census data which is very extensive in terms of covering the overall population. This data shows the educational attainment of both males and females who have completed a 4 year degree. Factors such as gender, degree achieved, and the level of postsecondary education can have an impact on employment and earnings later in life.

Result

Foremost, we noticed that the variable "gender" plays a very important role in deciding both income and crime rate (Figure. 1) and causes various different patterns of datapoint distributions. This led to analyzing the relationship between income and crime rate on males and females separately.

Since our hypothesis consisted of the fact that the rise of income should result in the decrease of crimes pertaining to wealth, while for other crimes there should not be a strong correlation between income and crime rate; we settled on picking five crimes that strongly pertain to wealth: stolen property, theft and embezzlement. For crimes that do not significantly pertain to wealth we picked the categories of weapon, simple assault, and carrying/possessing weapons (for full regression tables see Appendix).

Weapons. Regression results show that for females the correlation between weapons crime rate and income is spurious (Figure. 3), while for males income is still significant with $p.value < 0.01$. The linear relationship between the weapon crime rate and income for males is negative (Figure. 2), which means that with a male's median income increasing by 100 USD, the weapons crime cases per 100,000 people decreases by 2.

$$crime.rate.weapon = -0.02 \times income + 996.08 \ (R^2 = 0.31)$$

Simple Assault. For simple assault cases, income is significant for both male and female with $p.value < 0.01$. However, the correlation between crime rate and income for males is negative, while for females it is positive (Figure. 4).

Larceny-Theft. The regression result of theft cases is quite similar to weapons'. The relationship between theft crime and income is spurious although it seems that the regression

$$crime.rate.theft = \alpha + \beta_1 \times income$$

shows some significance. But for male there still exists some negative relationship (Figure. 5).

Stolen property (buying, receiving, possessing). For stolen property cases of female, the formula

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$$crime.rate.theft = \alpha + \beta_1 \times income$$

shows no significance on β_1, so there is not a convincing relationship between income and rate of theft cases. But for male the relationship is negative with $p.value < 0.01$ (Figure. 6).

Embezzlement. The male embezzlement cases show no relationship with income on regression

$$crime.rate.theft = \alpha + \beta_1 \times income$$

but female embezzlement still shows significant relationship with income.

By summarizing all the regression tables for five different types of crimes above and for both males and females, the original hypothesis that "the rising income decreases crime rate pertaining to wealth, but has little effect on other crimes" is incorrect, since no pattern is found to support this claim (Figure. 10). Nevertheless, the results still point out that crime types are significant in discussing how income affects crime rates as they vary from crime to crime.

Materials and Methods

In the relationship between crime rate and income, "education rate" should be considered as an important confounding variable. We check the correlation between income and education rate (Figure. 8), although it shows a highly correlated increasing trend only for females, the p.values for female and male cases are both significant (less than 0.01 and less than 0.05). Therefore we draw a potential causal plot for the relationship between income, crime rate, and education rate (Figure. 9). To prove that the relationship between income and crime rate is not spurious, three steps of tests are needed.

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1. First we test the relationship between income and crime rate. If β_1 is significant, we could move to the next step

$$income \rightarrow crime.rate$$
$$crime.rate = \alpha + \beta_1 \times (income) + \epsilon$$

2. Then we move on to test relationship between education rate and crime. If both β_2 and β_3 are significant, we move to the last step.

$$edu.rate \rightarrow crime.rate$$
$$crime.rate = \alpha + \beta_2 \times (edu.rate) + \epsilon$$
$$edu.rate \rightarrow income$$
$$income = \alpha + \beta_3 \times (edu.rate) + \epsilon$$

3. For the last step we combine the formula above and check the value of β_4. If β_4 is not significant, that means the relationship between income and crime.rate is actually spurious.

$$edu.rate \rightarrow crime.rate + edu.rate$$
$$crime.rate = \alpha + \beta_4 \times (income) + \beta_5 \times (edu.rate) + \epsilon$$

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