Note: This analysis is based on Karin Edmark's paper "Unemployment and Crime: Is There a Connection?". Any citation without an endnote refers to this paper.[1]

Background

The reasons for crimes have always been elusive to measure. Its causes can be difficult to measure scientifically because it is seen as negative to society, we cannot force people to commit more crimes, and there are many factors that contribute to a crime being committed. Karin Edmark seeks to answer the question of whether unemployment affects property crime. To tackle the previous measurement problems, she uses Swedish data between 1988 and 1999. Sweden experienced economic instability especially in relation to unemployment due to an economic recession and an increasing budget deficit from large expenditures on unemployment benefits. In this time frame unemployment varied from 1.6% to 10.5%. This high economic volatility in Sweden over a relatively short period of time allows for good measurement of the effect of employment on crime. The study also gives researchers better insight into the degree of effect that unemployment plays on property crime.

Edmark bases her study on the theoretical framework of Becker who believes that the individual has a choice between crime and work.[2] This model states that there is supply and demand for legal work and illegal work. If there is a reduction is legal work, or an increase in unemployment, this increases the return for illegal work. The model is represented below:

$$E(W_b) - c_n > E(W)$$

The individual will choose crime if the return on crime (W_b) minus the psychological cost of the crime (c_n) is greater than the expected gain from legal work (W). This means that as unemployment rises the model predicts crime will rise as well due to a decrease in the average return on legal work. With this model in mind Edmark's research question in the study poses the question "Does an increase in the unemployment rate increase the property crime rate?"

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[1] Edmark, Karin. "Unemployment and Crime: Is There a Connection?" *The Scandinavian Journal of Economics* 107, no. 2 (2005): 353-73. http://www.jstor.org/stable/3441110.

[2] Becker, G. S. (1968), Crime and Punishment: An Economic Approach, Journal of Political Economy 78, 526-536.

Intuitively we would believe that unemployment does influence crime rate. This study is more interested in the impact unemployment has on different types of property crime.

Data Sources and Method

This study is based on panel data from Swedish counties for each year from 1988-1999. The unemployment data was taken from the National Labor Market Board and the crime data was taken from the National Convention for Crime Prevention. The crime data was normalized to crimes per 100,000 people. Both data sources are national Swedish institutions that are seen as having accurate data. This study used an Ordinary Least Squares Regression. Edmark used linear regression as the main method to support her findings, but she also analyzed the data with a quadratic regression which confirmed the linear regression's analysis.

Edmark uses county-level data for this study for multiple reasons that strengthen her econometric analysis. First, crime rates for the early 90s were only available at the county level and allowed her to measure how unemployment affects crime over the whole period of Swedish economic stability. Secondly, this data minimizes the bias from mobility of criminals. Many times, a crime is committed by an individual in an area they do not live in. This can happen commonly in cities where potential gain from crime is much higher than surrounding areas. Thirdly, clear-up rates in Sweden are measured at the county level. These rates give the researcher a good idea of the resources that police are devoting to crime.

Model

The model below can be interpreted as an increase of one percent in unemployment will increase property crime by β1 percent. The coefficient of interest is β_1 that represents the effect of unemployment on property crime rate.

$$lnB_{it} = \alpha_i + \beta_1 lnu_{it} + \beta_2 lnW_{it} + \beta_3 lnp_{it} + \gamma' ln\pi_{it} + \tau_t + \varepsilon_{it}$$

B = aggregate crime rate

U = Unemployment rate

W = Honest Income including unemployment benefits

P = Fear of getting caught (clear-up rate)

π = Socio-Economic Variables

τ = Time fixed effects

α = region fixed effects

Return from Crime and Cost of punishment are not included in this model

Findings

This study concluded that a 1% increase in unemployment leads to a statistically significant increase in burglary (.147%), bike theft (.072%), car theft (.159%), and fraud (.217%). In addition, the regression model also found a 1% increase in unemployment reduced clear-up rates for car theft, bike theft, pilfering motor vehicle, and robbery at a statistically significant level and a reduction in 1% population density results in an increase of property crime by 1.4%. This model explains a large percent of the variability of the response data with R-squared values ranging from .73 for fraud to .94 for robbery, for example 94% of the variability in the data for robbery is explained by this data. This means that this model is very accurate in describing the effect of these variables on property crime rate based on the data.

Critiques

It was hard to find critiques for this study because it minimized bias and supported many of its assumptions with references to other papers. What follows are my critiques and how Karin Edmark addressed these problems in her paper.

Reverse Causality

There could be some potential of reverse causality with crime rather than unemployment causing crime. This could occur if businesses decide not to move to an area because of a high crime rate. It could also happen if an area has a high rate of ex-convicts who cannot get work, leading to a higher rate of unemployment in that area. Below is the model used in the study and the reverse causality model:

Unemployment causes Crime

$$\ln B_{it} = \alpha_i + \beta_1 \ln u_{it} + \beta_2 \ln W_{it} + \beta_3 \ln p_{it} + \gamma' \ln \pi_{it} + \tau_t + \varepsilon_{it}$$

Crime causes Unemployment

$$\ln u_{it} = c_i + b_1 \ln B_{it} + b_2 \ln W_{it} + b_3 \ln p_{it} + \gamma' \ln \pi_{it} + \tau_t + \varepsilon_{it}$$

If this reverse causality was true it would result in upward bias because β_1 and b_1 are both positive, resulting in a positive correlation. This would lead to an overestimation of the effect of unemployment on crime because we would be measuring the effect of unemployment on crime and crime on unemployment at the same time.

Edmark references Raphael and Winter-Ebmer's paper to support her assertion that there is no reverse causality between crime and unemployment. In the paper, the authors use an instrumental variable for unemployment based on oil price shocks and national defense contracts.[3] To make sure the instrumental variable is valid it must pass three tests:

[3] Raphael, S. and Winter-Ebmer, R. (2001), Identifying the Effect of Unemployment on Crime, Journal of Law and Economics 44, 259-283.

1. Oil price shocks and defense contracts are strongly related to unemployment

2. Oil price shocks and defense contracts are exogenous of unemployment; oil price shocks and defense contracts do not cause unemployment. Both factors are uncorrelated with an omitted variable.

3. Oil price shocks and defense contracts only affect crime through unemployment.

If we analyze these three statements, we find that the instrumental is valid.

1. Oil prices and defense contracts are strongly related to unemployment. Oil prices are a fixed cost for many businesses, as these prices go up, they pay higher prices and let go of employees to make up for this. Defense contracts bring federal money into a community spurring direct employment due to that contract and more jobs from a higher working population.

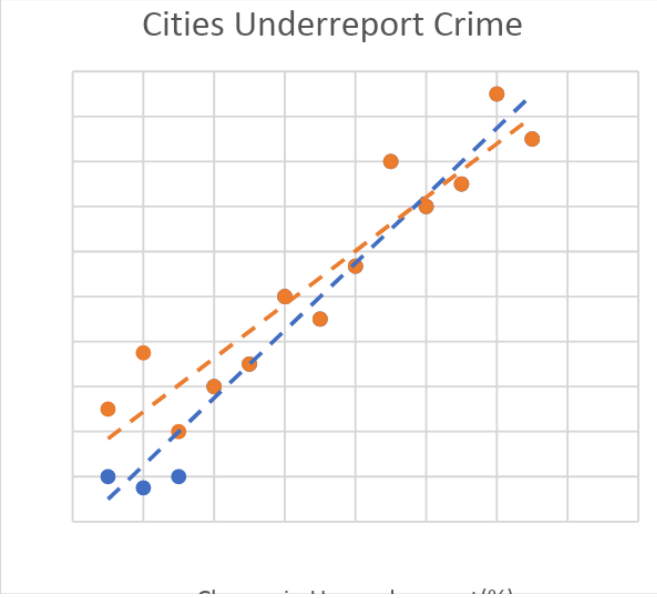
2. Oil prices are set in the world market which means it is unaffected by local unemployment rates. Defense contracts are generally considered by other factors such as the quality of contractor and not by local unemployment rates. The authors admit that there is some potential for omitted variable bias if the variable is correlated with unemployment such as drug consumption. They use control variables to minimize this problem, but they admit it is a shortcoming for this instrumental variable.

3. There is no direct link between changes in oil prices or changes in defense contracts and local crime rate in an area.

Given that the instrumental variable passed each test or minimized its error we can say that it is valid. When Raphael and Winter-Ebmer ran the regression, they found a strong causal relationship showing unemployment affects crime. This supports Edmark's assertion that there is no reverse causality with crime causing unemployment. In addition, using county-level data minimizes this reverse causality problem. Even if a firm doesn't want to move to an area with high crime, they can probably find another area with low crime in the same county. Also, it is improbable that there would be a high enough rate of ex-convicts in a county to affect the unemployment rate.

Non-Classical Measurement Error

A non-classical measurement error could occur if counties are motivated to underreport crimes. This could occur if different counties are competing for a firm to move to their area. Depending on whether the county is rural or urban affects the sign of bias. It would be downward bias if rural areas are reporting less crime (Figure 2). This is because the regression found that a reduction in 1% population density results in an increase of property crime by 1.4%, leading to rural areas being on the right-hand side of the chart. This would lead to an underestimation for the effect of unemployment on crime. However, if cities are underreporting crime this would lead to an upward bias because they will experience less of a change in crime that rural areas (Figure 1). This leads to an underestimation for the effect of unemployment on crime.



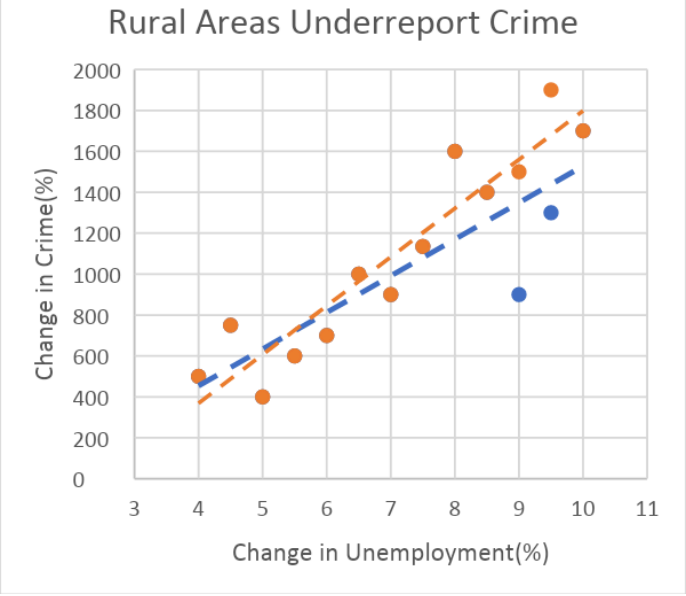


Figure 1

Figure 2

To address this potential problem, Edmark references a National Council for Crime Prevention study which concluded reported crime rate mirrors change in actual crime rate. This was done by comparing reported crime statistics to victim surveys.[4] Even though the crime statistics aren't exact if the relative change in crime rate is similar across counties it will be controlled through fixed effects in the model. In this case county-level data also minimizes any bias. Policy makers for crime reporting are influential at the municipal level, but since we are aggregating these decisions at the county-level it should minimize any unsystematic variation in underreporting of crime. Lastly, property crimes are reported at a high rate because there is little repercussions from reporting this type of crime and to claim insurance. This means that there will be very little difference between reported property crimes and actual property crimes. This minimizes the variance between actual and reported crime.

Conclusion

Overall, I believe this paper does a good job at minimizing its biases and relying on previous papers to support its assumption. Its conclusion is grounded in the regression's findings.

- Edmark carefully chose the data, focusing on property crime, to minimize reverse causality, omitted variable bias, and variability in reporting.
- I raised the issue of reverse causality. To refute this, the author backed up her assumptions with Raphael and Winter-Ebmer's instrumental variable which showed unemployment causes crime. Even if there is an omitted variable, it is unlikely the bias would significantly alter the results.
- Edmark minimized the non-classical measurement error of underreporting crime with the National Council for Crime Prevention's study and using county-level data. There could still be some underreporting that affects the results, but I believe that would have minimal effects on the regression findings.
- She controlled for time and county fixed effects.

[4] National Council for Crime Prevention (2001), Brottsutvecklingen i Sverige: 1998-2000 (Trend Analysis of Crime in Sweden, 1998-2000), Stockholm.

- The author used linear and quadratic time trends to check for any variation in the results.
- The high R-squared result for property crimes indicates little noise in data.