

# **Acquisitive Crime Trends: Unpacking the Unemployment-Crime Relationship in a Rural Context**

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### Abstract

Tests of criminological theory are conducted almost exclusively about urban spaces. In urban areas, rates of property and acquisitive crime are often tied to economic structural health through institutional anomie and market society theories. Examinations of the connection between economic structures and acquisitive crime in rural spaces are lacking in the literature. This study uses United States' NCVS data from 1993-2005 examine trends in acquisitive crime over time from a macro level economic theoretical perspective in rural United States counties. Implications for additional rural theory tests will be addressed.

**Keywords:** rural; acquisitive crime; macro; institutional anomie; market society

The sociological and criminological tradition of relating societal forces to everyday offending rates permeates the theoretical literature. Macro level theories including Messner and Rosenfeld's Institutional Anomie (1994), Currie's Market Society (1997), Merton's Social Structure and Anomie (1938), and Cohen and Felson's Routine Activity Theory (1979) are just a few of the theories that posit the influences of macro level structural forces on crime rates. The unemployment rate is the most common measurement of the economy and is a relationship well supported in this literature (Andreson, 2015; Cantor & Land, 1985; Rocque et al., 2019; Rosenfeld, 2009). Existing research focuses on areas with the largest economies, urban spaces (Frederick & Jozefowicz, 2018).

These macro level theory tests focus almost exclusively in urban spaces or in locations where urban spaces dominate and carry the significance of the model (Frederick & Jozefowicz, 2018). In these spaces, economic structural health is closely tied to crime rate outcomes. However, rural spaces function differently than their suburban and urban counterparts as their structure differs (Frederick & Jozefowicz, 2018; Osgood & Chambers, 2000). Specifically, examinations of the crime drop by location type indicate that rural locations tend to have more stable crime rates over time when compared to urban locations (Bachman, 1992; Schwartz & Gertseva, 2010). This difference justifies examining a rural sample separately for a more detailed analysis. Furthermore, rural economies are much different than urban economies as they tend to be less diversified and more dependent on blue collar type jobs (Frederick & Jozefowicz, 2018; Lee, 2008; Osgood & Chambers, 2000). In instances of economic depression, rural spaces tend to suffer more economically and take longer to rebound than urban economies (Lee, 2008). To explore these differences, an independent analysis of rural economies and rural crime is needed.

Acquisitive crime is a variant grouping of property crime (burglary, theft, and vehicle theft) with the inclusion of robbery. While robbery is a personal crime, it carries a monetary or acquisitive motive and can thus be grouped with burglary and theft due to the similar criminal motivation (Rosenfeld, 2009). Considering the economic incentive of acquisitive crimes, it is a natural outcome measure for studies of the relationship between economic health and crime. While the economic – crime relationship is established, different causal mechanisms including the underground market of stolen goods may help unpack the economic health and crime relationship (Martin et al., 2013; Rosenfeld, 2009). For example, during economic downturns, there is an increased demand for underground goods, a need met through an increase in acquisitive crime rates (Martin et al., 2013; Rosenfeld, 2009; Rosenfeld, 2014).

The existing literature examining the relationship between the economy and crime is mixed. While a variety of economic measures are used, the unemployment rate is one of the most common. Since the existing research focuses almost exclusively on urban locations, we examine the impact of unemployment on acquisitive crime rates in an aggregate rural sample while controlling for population and attitudinal trends. Firstly, we contribute an examination of an aggregate rural context. Existing literature does not differentiate by location type but social structures and institutions such as employment function differently in rural contexts

(see Lee, 2008; Osgood & Chambers, 2000). Expanding theoretical tests by location type determines applicability and robustness in new contexts. Secondly, we examine acquisitive crime (burglary, theft, vehicle theft, and robbery) while other research examines either property or violent crime rates. Theoretically, from a criminal motivation perspective, robbery shares similarities with property crimes. Considering acquisitive crime as a variant grouping may provide new insights into crimes motivated by acquisition. Rural unemployment and acquisitive crime rates are unpacked both visually and in a multivariate time series analysis.

## Background

### Economy and Crime

Extant research has established a strong relationship between the unemployment rate and crime. Continuing, prior research has predominantly measured the health of the economy through the use of the unemployment rate (Cantor & Land, 1985; Frederick & Jozefowicz, 2018; Greenberg, 2001), consumer sentiment (Rosenfeld & Fornango, 2007; Rosenfeld & Levin, 2016), inflation (Rosenfeld, 2014; Rosenfeld, Vogel, & McCuddy, 2019), the business cycle (Paternoster & Bushway, 2001), and GDP (Martin et al., 2013; Rosenfeld & Messner, 2009). Each of these measurements capture a different aspect of the relationship between the economy and crime and highlights a different mechanism. This study measures the economy using the rural unemployment rate as a starting point in an aggregated rural context.

**Unemployment and other measures in a national context.** Studies comparing the Bureau of Labor Statistics (United States) unemployment measures with crime are not consistent. Some studies have found positive results (Buonanno et al., 2014; Cantor & Land, 1985; Raphael & Winter-Ebmer, 2001), while others found negative results (Cantor & Land, 1985), and in some studies the results are insignificant (Chamlin & Cochran, 2000; Greenberg, 2001; Rosenfeld, 2014). These mixed results are in part related to different operationalizations of economic health, proposed mechanisms, and modeling strategies.

Cantor and Land's (1985) seminal work theorizes that the unemployment and crime relationship functions through two opposing mechanisms. Firstly, increasing unemployment would have an immediate decreasing effect on acquisitive crime through a reduction in opportunity (Cantor & Land, 1985). As more individuals were unemployed, they are at home and able to act as capable guardians to their belongings. This makes their property a less attractive target and decreases acquisitive crime through reducing opportunity within a routine activities' framework (also see Cohen et al., 1980). However, increased long-term unemployment could also increase the motivation to commit acquisitive crimes (Cantor & Land, 1985). After an extended period of unemployment, individuals become more desperate as financial resources are depleted. This leads to both an increase in motivation to commit acquisitive crime and the willingness to participate in underground markets buying stolen property (Cantor & Land, 1985; Martin et al., 2013; Rosenfeld, 2009). Long-term unemployment functions as an index for offenders (Cohen et al., 1980).

Most critiques of this work center around measurement and operationalization differences. For example, Greenberg (2001) argued that the length of unemployment matters more than the unemployment rate. Specifically, short-term unemployment would not result in the same increase in motivation that long-term unemployment would produce. Therefore, using the aggregate unemployment rate does not capture the differences in short-term and long-term unemployment and their differences in motivation. To address this concern, Greenberg (2001) measured both short-term and long-term unemployment effects. Long-term unemployment was more criminogenic than short-term unemployment (Greenberg, 2001). Despite Greenberg's (2001) critique of Cantor and Land's (1985) theoretical model and measurement of unemployment, other research has replicated the models and found support for the dual impact (opportunity and motivational mechanisms) of unemployment on crime (Andresen, 2015; Frederick & Jozefowicz, 2018; Philips & Land, 2012).

**Shadow economy.** The macro crime literature has moved to studying the impact of economic measures beyond unemployment rates to explain crime. Rocque and colleagues (2019) examined the impact of the shadow economy as a buffer between increasing unemployment and crime rates. The shadow economy is conceptualized as the legitimate cash economy on which individuals exchange cash for services outside of the traditional economy/ employment. This could include landscaping, mechanic work, hair-cuts, childcare, etc. and is thought to provide a buffer effect between unemployment and the motivation to commit acquisitive crime or participate in the underground market (Rocque et al., 2019). The shadow economy was a stronger and significant predictor of property crime (larceny, burglary, and motor vehicle theft) than the unemployment rate (Rocque et al., 2019). Including the shadow economy in the model also increased explained variation.

**Inflation.** Inflation is another variable used to measure the state of the economy and its impact on crime. Specifically, Rosenfeld, (2014) uses inflation to understand how crime continued to drop during the Great Recession of 2008-2009 despite increasing unemployment rates. Stagnated inflation and the low price of goods did explain the continued crime drop (Rosenfeld, 2014; Rosenfeld & Levin, 2016). Inflation's impact on acquisitive crime is dependent on context. Namely, it particularly increases acquisitive crime more in cities that are relatively less wealthy with lower median incomes (Rosenfeld et al., 2019).

**Consumer sentiment.** Consumer sentiment is another alternative economic measure. It better captures both the current consumer feelings regarding the economy and their projections for next year (Rosenfeld & Fornango, 2007; Rosenfeld & Levin, 2016). The University of Michigan collects the Index of Consumer Sentiment each year to capture consumer evaluation of the current economic state and their projections for the coming year (Rosenfeld & Fornango, 2007). Consumer sentiment is a significant predictor of robbery and property crime rates. As consumer sentiment increases, rates of robbery and property crime decrease (Rosenfeld & Fornango, 2007; Rosenfeld & Levin, 2016).

**Business cycle.** The business cycle is the least common way of measuring the economy but operationalizes the short-term stable trends in the economy rather than capturing the unstable spikes and drops. Paternoster and Bushway (2001) argue that the business cycle can capture the lagged measure of unemployment (motivational effect) better than just lagging unemployment rates by a year. A full business cycle is about four years long and will better capture both fluctuation and stability in economic health in its context (Paternoster & Bushway, 2001). They did not find significant effects of the business cycle and motor vehicle theft by adults but note it is possible for opportunity theory to also be applying (unmeasured) in the opposite direction and masking the true effect (Paternoster & Bushway, 2001).

### **Acquisitive Crime**

In discussing the relationship between the economy and crime, an emphasis on acquisitive crime (property crime and robbery) is natural. These crimes share a monetary motive and may be viewed as consumer deviance (Martin et al., 2013). Acquisitive crime is also closely related to the underground market (Rosenfeld, 2009). As the underground market grows, acquisitive crime fills the need for cheap property (Rosenfeld, 2009). Underground market cycles follow the legal economy in an inverse relationship. While the traditional economy does well, the underground market shrinks. When the traditional economy struggles, consumers look for ways to “trade down” and acquire goods at lower prices (Martin et al., 2013; Rosenfeld, 2009). Middle class and working-class consumers may begin to shop at bargain or discount stores and good will. Poor consumers who were already patronizing these establishments during more fortunate economic times may trade down to participate in the underground markets of stolen goods (Martin et al., 2013; Rosenfeld, 2009).

### **Rural Economy and Crime**

With one notable exception (Frederick & Jozefowicz, 2018), the economy and crime literature conspicuously ignores rural contexts. Literature examining rural “economies” typically stems from the social disorganization context with unemployment being measured alongside poverty, heterogeneity, and social mobility. In this framework, violent crime outcomes are more often examined than property crime outcomes. Some studies (Deller & Deller, 2012; Kaylen & Pridemore, 2013) specifically examine property crime in a rural context. These studies are also at a different level of aggregation (state or county level) rather than national or cross national. This is directly related to the measures needed to test social disorganization theory.

Frederick and Jozefowicz (2018) examined the unemployment-crime relationship in Pennsylvania counties. They found that unemployment significantly impacted crime in the urban and pooled models but not in rural ones (Frederick & Jozefowicz, 2018). A significant Chow test (i.e., comparing for possible differences in regression coefficients for split data sets) indicated structural differences between rural and urban counties in Pennsylvania (Frederick & Jozefowicz, 2018). Additional tests are needed at different levels of rural

aggregation to determine the true nature of the unemployment-crime relationship in rural contexts. Frederick & Jozefowicz (2018) also used a measure of crime rates that included both personal and property offences (murder, non-negligent manslaughter, forcible rape, robbery, assault, burglary, larceny-theft, motor vehicle theft, and arson) which may impact the significance of the relationship.

Deller and Deller (2012) found that communities with higher rates of social capital had lower rates of burglary. Instability or increasing rates of poverty increased rates of burglary more than high rates of poverty by itself (Deller & Deller, 2012). In a full test of the social disorganization model, Kaylen and Pridemore (2013) found that socioeconomic status significantly impacted local friendship networks, problematic teen groups, property crime rates, and total crime rates. The adjusted  $r^2$  in the problematic teen group and property crime rate models were extremely low and these findings should be interpreted with caution (Kaylen & Pridemore, 2013). The current study builds upon this current research with a test of rural unemployment on rural acquisitive crime rates.

**Rural unemployment.** Rural unemployment patterns are characterized differently than urban employment. Rural employment is comparatively less diverse in more likely to involve agriculture or employment in a corporate style factory (Lee, 2008). This means that particularly non-diverse rural economies will be more subject to devastating increases in unemployment if corporations merge or agricultural pursuits perform poorly (Lee, 2008). Without the buffer of many available types of jobs especially for low skilled workers, rural economies are less resilient than diversified or larger economies or urban spaces.

### Current Study

The existing literature has mixed findings for unemployment rates and crime in a macro level context (Cantor & Land, 1985; Greenberg, 2001; Rocque et al., 2019). To better specify the health of economic structures, research has moved to operationalize the economy in different ways including shadow economies, inflation, and consumer sentiment (Rocque et al., 2019; Rosenfeld, 2014; Rosenfeld & Fornango, 2007). Unfortunately, these measures are not as widely available in the data. The impact of economic structures on crime in aggregated rural contexts has not been examined. Since social and economic structures function very differently in rural contexts, the current study examines the relationship between unemployment rates and acquisitive crime rates in a rural sample between 1993 and 2005. We hypothesize that as rural unemployment decreases, rural acquisitive crime rates will also decrease.

Gompertz Regression was used to determine the relationship between unemployment and acquisitive crime in rural spaces over time as appropriate to model the growth curve of acquisitive crime with a low case count (Harvey & Kattuman, 2020). We employ simple time series models allowing for the measure of lagged and lead effects on the dependent variable. In this case each year's aggregated data on the measured construct represents one case and given the limited number of years in the time frame, a limited number of independent and

control variables were included. Simonton (1977) terms these “cross sectional time-series experiments” (p. 489) and notes that they have a small number of cases (typically between 4 and 12) but a large number of observations for each case (at least 20). The analytic technique is different from other types of time series analyses which require many data points (Simonton, 1977).

### **Methods**

This study uses United States' National Crime Victimization Survey (NCVS) data from 1993 to 2005. This period is one of relative economic prosperity (decreasing unemployment) and dropping crime rates. The NCVS underwent methodological changes in 2006 making comparison to previous years unadvisable. Each year the NCVS includes roughly 240,000 interviews from a nationally representative sample of approximately 95,000 households. Individuals are asked about personal and property victimizations they experienced including details such as crime event characteristics, offender characteristics, reporting behavior, etc.

These data are combined with United States Bureau of Labor Statistics (BLS) county level unemployment data and General Social Survey (GSS) demographic data from 1993 to 2005. The BLS data are used to calculate an aggregate rural unemployment rate. The GSS data provide demographic data for aggregate rural spaces and contribute religious attachment and political affiliation information for rural residents. The GSS is collected by the independent research organization NORC at the University of Chicago and is funded by the National Science Foundation. It is a nationally representative survey that monitors trends in attitudes and opinions of Americans.

### **Sample**

Ultimately, the data we employ for this analysis is a weighted aggregation of NCVS and GSS items generated by the individual respondents that reported living in rural locations. The NCVS uses the Office of Budget and Management (MSA status) definition for determining rural location. Rural locations include residences in non-metropolitan counties with urban population of fewer than 50,000 individuals). The final sample includes 27,519 individuals, all living in rural residences across 1993-2005. In the presented analysis, the year (N=13) is the unit of analysis.

### **Measures**

Acquisitive crime is a composite of theft, auto (vehicle) theft, robbery, and burglary as a continuous measure. Theft and robbery are personal level victimizations in the NCVS data set while auto theft and burglary are household level victimizations. To correct for this difference in unit of analysis, incident weights are used to amplify the personal level victimizations and make them comparable to the household level victimizations. The composite acquisitive crime number was divided by World Bank rural United States



population numbers for each year to create acquisitive crime rates from 1993-2005 with year as the unit of analysis. It should be noted that the World Bank definition of rural is more inclusive than other definitions. Specifically, the World Bank calculates rural population by subtracting the urban population from the total population. Rural population using the World's Bank definition includes all non-urban populations (both suburban and rural). Consequently, the acquisitive crime rates are underestimated in our models. Currently, this is the best available data for the overall rural population.

The rural unemployment rate is created using Bureau of Labor Statistics data. This data uses a slightly different rural definition. Counties are assigned a value (1-9) on the rural-urban continuum code: 1 is coded as the most urban and 9 is coded as the most rural. The sample of counties is limited to only those with a stable rural designation over the time period 1993 to 2003 (the year of the most recent assignment of rural-urban continuum codes) and has a population that is either completely rural or has an urban population of fewer than 2,500 residents (rural urban continuum code=9). The final sample is 529 of the most rural counties. We calculated the mean unemployment rate for each year among the 529 rural counties included in the sample for use as a single aggregated rural unemployment rate for each year. The unemployment rate for each county is calculated as the number of unemployed individuals divided by the county labor force (unemployed individuals plus employed individuals). Thus, the unemployment rates do not consider those that are not searching for work, those that are underemployed, or those that are not participating in the labor force (attending school). Unemployment numbers count only those that are 16 years old or above that have been actively seeking work in the past month and are currently available to work.

Additional demographic variables including proportion 18-24 years old and percent homeowners are included in the model. Each of these measures is a proportion of the rural sample of the GSS. Rural residents include those living in incorporated areas with fewer than 2,500 residents, unincorporated areas with between 1,000 and 2,500 residents, and in open country that is part of other types of civil divisions such as townships. This operationalization of rural residence meets common definitions in the literature (see Donnermeyer, 2015 and Weisheit & Donnermeyer 2000). Religious attachment is a dichotomous variable representing the percent of rural residents that indicated they have religious affiliations that are "strong affiliation," or "somewhat strong affiliation" categories in the original GSS question. On average, more than half of the respondents indicated they had a strong or very strong religious affiliation each year. Class is the respondents' self-identification of their social class (lower, working, middle, or upper class), dichotomized to represent the proportion of rural respondents that have self-identified as lower or working class. Just over half of respondents (mean 60%) identified as belonging to the lower and working classes each year. Political party affiliation is a scale from strong democrat (0) to strong republican (6). Aggregated rural respondents indicated a balance between party affiliation with a slight majority indicating a more conservative position indicated by a mean of 3.00 and an observable range from 2.70 to 3.18 from 1993 to 2005. Table 1 lists the frequency for each key variable by year.

**Table 1***Sample Descriptive Statistics*

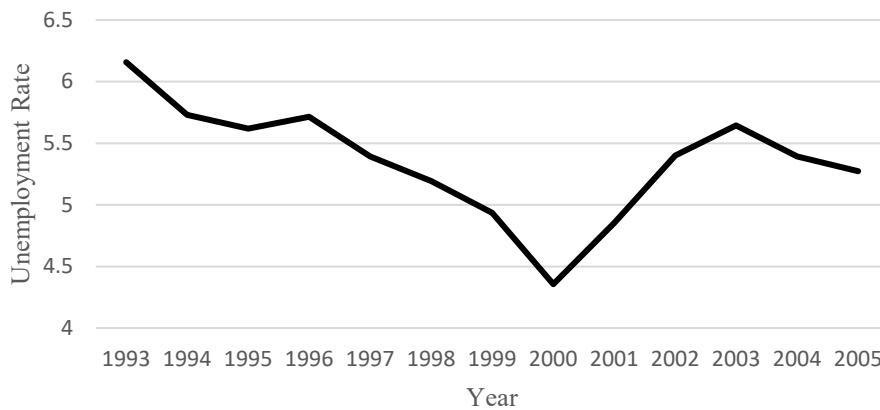
<b>Year</b>	<b>Acquisitive Crime Rate</b>	<b>Unemploy ment Rate</b>	<b>Proportion 18-24</b>	<b>% Home</b>	<b>Political Affiliation</b>	<b>Religious Attachment</b>	<b>Class</b>
1993	108.5335	6.157	0.145442	0.51	2.70	0.86	0.67
1994	101.6404	5.730	0.168355	0.50	3.19	0.89	0.55
1995	87.4974	5.617	0.158611	0.51	3.10	0.87	0.60
1996	94.951	5.714	0.154753	0.51	3.01	0.86	0.64
1997	76.94643	5.392	0.169316	0.51	3.00	0.86	0.65
1998	71.75822	5.191	0.166833	0.50	2.99	0.87	0.66
1999	62.44769	4.936	0.164742	0.51	3.00	0.85	0.63
2000	58.36246	4.356	0.149649	0.52	3.01	0.83	0.60
2001	54.71883	4.851	0.143676	0.39	3.04	0.88	0.62
2002	63.30938	5.399	0.166121	0.25	3.07	0.92	0.64
2003	66.65693	5.645	0.167244	0.25	3.03	0.90	0.63
2004	60.82465	5.392	0.155507	0.24	2.98	0.88	0.61
2005	62.48883	5.273	0.159485	0.30	2.98	0.85	0.50

**Results**

While the rural population remained relatively steady from 1993 to 2005 ranging from a high of 61.1 million in 1993 to a low of 59.1 million in 2000, rural unemployment fluctuated. Specifically, rural unemployment rates overall have decreased steadily from 1993 to 2005 although they suffered from increases from 2000 to 2003. Overall, Figure 1 demonstrates that rural unemployment is trending down in this time period. When rural unemployment rates are overlaid with rural acquisitive crime rates, the lines reflect similar patterns. Acquisitive crime rates decrease as unemployment rates decrease from 1993 to 2000. In 2000, the unemployment rate begins to increase and in 2001 the acquisitive crime rate also begins to increase. Both unemployment and acquisitive crime rates peak and begin to decrease in 2003. Figure 2 demonstrates this relationship visually.

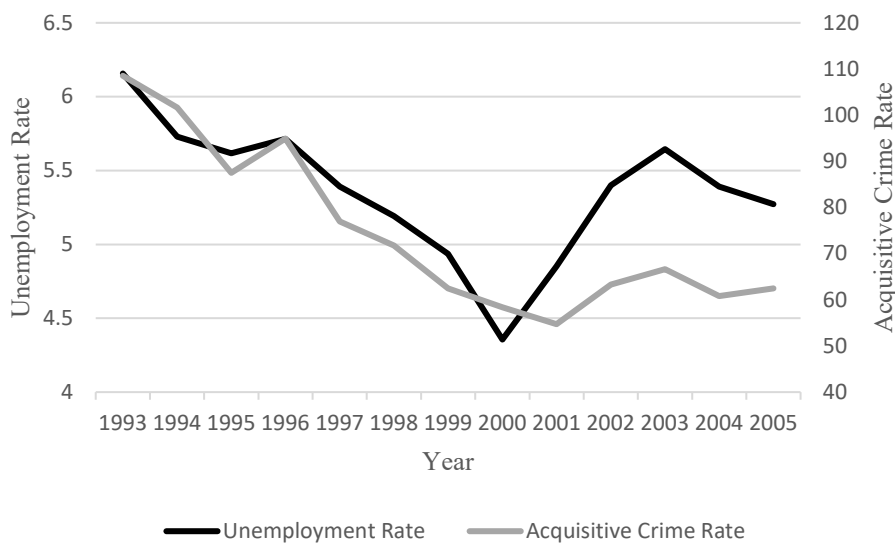
**Figure 1**

*Rural Unemployment Rate 1993-2005*



**Figure 2**

*Rural Unemployment and Acquisitive Crime Rates 1993-2005*



In the regression model, the rural unemployment rate is a strong and significant predictor of rural acquisitive crime rates after controlling for the time effects and other covariates at the  $p < 0.001$  level. The lagged proportion of 18 to 24 year-olds, percent of rural home ownership, and political affiliation are also significant. The model has an adjusted  $R^2$  of 0.84 demonstrating the predictive power of macro level modeling. Tests removing autocorrelation of the residuals (see Simonton, 1977) ensure that the model is not violating the assumption of independence of errors and that model coefficients can be interpreted. Table 2 shows the full cross sectional time series Gompertz regression model.

**Table 2***Gompertz Regression of Rural Unemployment and Acquisitive Crime (N=13)*

	<b>Coefficient</b>	<b>Standard error</b>
Unemployment	35.43***	5.13
Proportion 18-24	856.56*	277.48
Percent own home	89.49**	20.48
Political affiliation	-141.72*	44.14
Religious attachment	-102.80	74.69
Class	-239.14	110.46
<b>Model statistics</b>		
F	10.86	
Adjusted R <sup>2</sup>	.84	

\*p&lt;0.05 \*\*p&lt;0.01 \*\*\*p&lt;0.001

### Discussion

This study fills the gap in the literature through extending tests of the economy crime relationship to a rural context and demonstrates the overwhelming importance of unemployment to acquisitive crime rates in rural America. The findings are as expected in H<sub>1</sub>, rural unemployment rates substantially and significantly predict rural acquisitive crime rates. As rural unemployment rates increase, rural acquisitive crime increases net of population and attitudinal controls. Interestingly, the lagged percentage of rural home ownership is positively related to acquisitive crime. It is possible that as rural homeownership increases on the aggregate it is correlated with increases in aggregate rural resident possession of valuable goods inside these homes. This increases the attractive targets for acquisitive crime in aggregate rural spaces and is related to increases in acquisitive crime rates. Further research and additional data are needed to disentangle this relationship.

While the literature is littered with findings that are not supportive of relationship between unemployment and crime, the overwhelming recommendation is to use a different measure of the economy or capture unemployment differently (Chamlin & Cochran, 2001). As these models do not conceptually differentiate between urban, suburban, and rural spaces, it is not possible to extrapolate the true significance of the rural economy and rural crime relationship. We unpack the relationship between rural unemployment rates and rural acquisitive crime rates both visually and through a multivariate analysis. Additionally, we found that the variant grouping of acquisitive crime was well explained by unemployment (adjusted r<sup>2</sup> of 0.89). This has implications for future research.

## Limitations

Despite its contributions, this project is not without limitations. We assume that the NCVS measure of location of residence is capturing where the victimizations occurred or at least that all error is randomly distributed. There is also some discrepancy in how rural locations are defined and measured across data sources. We used the most rural locations in each dataset in an attempt to standardize the rural sample as much as possible. This research begins to unpack the relationship between rural unemployment and acquisitive crime, additional control variables and specific measures of economic health are needed to further investigate the relationship.

## Implications

Macro level theory typically does not differentiate between aggregated location types. This study fills the gap by specifically examining the unemployment and acquisitive crime relationship in an aggregated rural context. We find that unemployment is a significant positive predictor of rural acquisitive crime indicating that macro level economic theories such as Messner and Rosenfeld's Institutional Anomie (1994), Merton's (1938) Social Structure and Anomie, and Currie's (1997) Market Society theories may also be applicable in aggregated rural contexts. Additionally, we demonstrated that acquisitive crime is well explained by unemployment in our aggregate rural sample. Future theoretical tests should consider using acquisitive crime as an outcome measure in addition to property crime.

Further tests should continue to separate out rural samples when testing macro level structural predictors. The utility of different economic measures and different time periods should also be explored. To build on this study, Cantor and Land's (1985) model of long-term and short-term unemployment should be examined in an aggregated rural context. Models examining suburban and urban samples should also be examined individually to parse out the true impact of economic and structural forces in these aggregated locations. Within rural contexts, the importance of the economy and particularly unemployment needs to be further unpacked through further examination of social structure by location type. Aggregate rural locations lack some of the economic diversity and additional strong institutions (see Donnermeyer 2015 and Weisheit & Wells, 1996 for discussion) that may account for the substantial importance of unemployment.

## References

- Andresen, M. A. (2015). Unemployment, gdp, and crime: The importance of multiple measures of the economy. *Canadian Journal of Criminology and Criminal Justice*, 57(1), 35-58. <https://doi.org/10.3138/CJCCJ.2013.E37>
- Bachman, R. (1992). Crime in nonmetropolitan America: A national accounting of trends, incident rates, and idiosyncratic vulnerabilities. *Rural Sociology*, 57(4), 546-560. <https://doi.org/10.1111/j.1549-0831.1992.tb00479.x>
- Buonanno, P., Drago, F., & Galbiati, R. (2014). Response of crime to unemployment: An international comparison. *Journal of Contemporary Criminal Justice*, 30(1), 29-40. <https://doi.org/10.1177/1043986213509023>
- Cantor, D. & Land, K. C. (1985). Unemployment and crime rates in the post-world war II United States: A theoretical and empirical analysis. *American Sociological Review*, 50(3), 317-332. <https://doi.org/10.2307/2095542>
- Chamlin, M. B. & Cochran, J. K. (2000). Unemployment, economic theory, and property crime: A note on measurement. *Journal of Quantitative Criminology*, 16(4), 443-455. <https://doi.org/10.1023/A:1007599232183>
- Cohen, L. E. & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44(4), 588-608. <https://doi.org/10.2307/2094589>
- Cohen, L. E., Felson, M., & Land, K. C. (1980). Property crime rates in the United States: A macrodynamic analysis, 1947-1977; With ex ante forecasts for the mid-1980s, *American Journal of Sociology*, 86(1), 90-118. <https://doi.org/10.1086/227204>
- Currie, E. (1997). Market, crime and community: Toward a mid-range theory of post-industrial violence. *Theoretical Criminology*, 1(2), 147-172. <https://doi.org/10.1177/1362480697001002001>
- Deller, S. & Deller, M. (2012). Spatial heterogeneity, social capital, and rural larceny and burglary. *Rural Sociology*, 77(2), 225-253. <https://doi.org/10.1111/j.1549-0831.2012.00076.x>
- Donnermeyer, J. F. (2015). The social organization of the rural and crime in the United States: Conceptual considerations. *Journal of Rural Studies*, 39, 160-170. <https://doi.org/10.1016/j.jrurstud.2014.11.014>
- Frederick, S. A. & Jozefowicz, J. J. (2018). Rural-urban differences in the unemployment-crime relationship: The case of Pennsylvania. *Atlantic Economic Journal*, 46(2), 189-201. <https://doi.org/10.1007/s11293-018-9581-y>
- Greenberg, D. F. (2001). Time series analysis of crime rates. *Journal of Quantitative Criminology*, 17(4), 291-327. <https://doi.org/10.1023/A:1012507119569>
- Harvey, A. & Kattuman, P. (2020). Time series models based on growth curves with applications to forecast coronavirus. *Harvard Data Science Review*, DOI: 10.1162/99608f92.828f40de. <https://doi.org/10.1162/99608f92.828f40de>
- Kaylen, M. T. & Pridemore, W. A. (2013). Social disorganization and crime in rural communities: The first direct test of the systemic model. *British Journal of Criminology*, 53(5), 905-923. <https://doi.org/10.1093/bjc/azt031>

- Lee, M. R. (2008). Civic community in the hinterland: Toward a theory of rural social structure and violence. *Criminology*, 46(2), 447-477. <https://doi.org/10.1111/j.1745-9125.2008.00115.x>
- Martin, K. D., Cullen, J. B., & Martin, M. W. (2013). What's yours is now mine: Deviant consumption through acquisitive crime. *Journal of Public Policy & Marketing*, 32(1), 140-157. <https://doi.org/10.1509/jppm.11.104>
- Merton, R. K. (1938). Social structure and anomie. *American Sociological Review*, 3(5), 672-682. <https://doi.org/10.2307/2084686>
- Messner, S. F. & Rosenfeld, R. (1994). *Crime and the American dream*. Belmont, CA: Wadsworth.
- Osgood, D. W. & Chambers, J. M. (2000). Social disorganization outside of the metropolis: An analysis of rural youth violence. *Criminology*, 38(1), 81-116. <https://doi.org/10.1111/j.1745-9125.2000.tb00884.x>
- Paternoster, R. & Bushway, S. D. (2001). Theoretical and empirical work on the relationship between unemployment and crime. *Journal of Quantitative Criminology*, 17(4), 391-407. <https://doi.org/10.1023/A:1012593805457>
- Philips, J. & Land, K. C. (2012). The link between unemployment and crime rate fluctuations: An analysis at the county, state, and national levels. *Social Science Research*, 41(3), 681-694. <https://doi.org/10.1016/j.ssresearch.2012.01.001>
- Raphael, S. & Winter-Ebmer, R. (2001). Identifying the effect of unemployment on crime. *Journal of Law and Economics*, 44(1), 259-283. <https://doi.org/10.1086/320275>
- Rocque, M., Saunoris, J. W., & Marshall, E. C. (2019). Revisiting the relationship between the economy and crime: The role of the shadow economy. *Justice Quarterly*, 36(4), 620-666. <https://doi.org/10.1080/07418825.2018.1424230>
- Rosenfeld, R. (2009). Crime is the problem: Homicide, acquisitive crime, and economic conditions. *Journal of Quantitative Criminology*, 25(3), 287-306. <https://doi.org/10.1007/s10940-009-9067-9>
- Rosenfeld, R. (2014). Crime and inflation in cross-national perspective. *Crime and Justice*, 43(1), 341-366. <https://doi.org/10.1086/677665>
- Rosenfeld, R. & Fornango, R. (2007). The impact of economic conditions on robbery and property crime: The role of consumer sentiment. *Criminology*, 45(4), 735-769. <https://doi.org/10.1111/j.1745-9125.2007.00096.x>
- Rosenfeld, R. & Levin, A. (2016). Acquisitive crime and inflation in the United States: 1960-2012. *Journal of Quantitative Criminology*, 32(3), 427-447. <https://doi.org/10.1007/s10940-016-9279-8>
- Rosenfeld, R. & Messner, S. F. (2009). The crime drop in comparative perspective: The impact of the economy on American and European burglary rates. *The British Journal of Sociology*, 60(3), 445-471. <https://doi.org/10.1111/j.1468-4446.2009.01251.x>
- Rosenfeld, R., Vogel, M., & McCuddy, T. (2019). Crime and inflation in U.S. cities. *Journal of Quantitative Criminology*, 35(1), 195-210. <https://doi.org/10.1007/s10940-018-9377-x>
- Schwartz, J. & Gertseva, A. (2010). Stability and change in female and male violence across rural and urban counties, 1981-2006. *Rural Sociology*, 75(3), 388-425. <https://doi.org/10.1111/j.1549-0831.2010.00016.x>

- Simonton, D. K. (1977). Cross-sectional time-series experiments: Some suggested statistical analyses. *Psychological Bulletin*, 84(3), 489-502. <https://doi.org/10.1037/0033-2909.84.3.489>
- Weisheit, R. A. & Donnermeyer, J. F. (2000). Change and continuity of crime in rural America. In G. LaFree (ed.), *Criminal justice 2000 Volume I. The nature of crime: Continuity and change* (pp. 309-357). Washington, DC: National Institute of Justice.
- Weisheit, R. A. & Wells, L. (1996). Rural crime and justice: Implications for theory and research. *Crime & Delinquency*, 42(3), 379-397. <https://doi.org/10.1177/0011128796042003003>