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Structural Shifts in Select Determinants of Crime with a Focus on Rural and Urban Differences

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Abstract: *In this study we offer a unique test of structural shifts in the influence of poverty and income inequality on crime rates. Using U.S. county level data drawn from the 1990 and 2000 centennial censuses and the FBI Uniform Crime Reports we uncover structural differences in the determinants of crime across rural and urban counties as well as differences across violent and property crimes. We find that over time there have been significant structural shifts in the influence of traditional socioeconomic predictors of crime. In addition, we find that income inequality outperforms poverty measures in terms of predicting changes in crime rates.*

Keywords: structural shifts, crime rates, poverty, inequality

INTRODUCTION

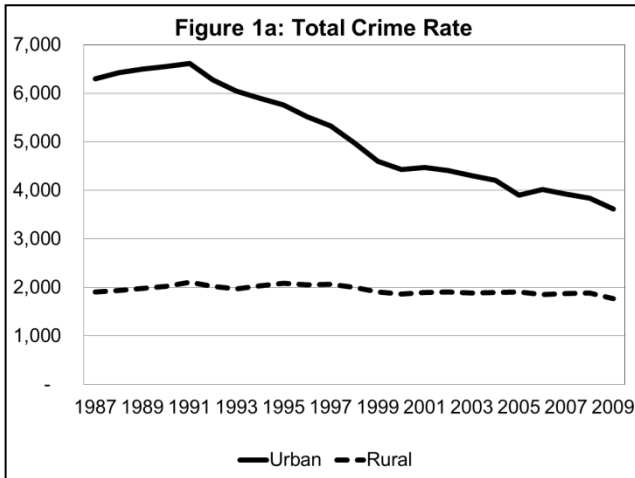
The criminology literature is vast and richly interdisciplinary. Theories aimed at helping understand patterns of crime range from social disorganization, anomie or strain to rational choice theories plus a wide collection of Marxist based theories falling within the area of criminal justice. While these theoretical perspectives provide criminologists and policy makers with a broad picture of what might drive crime patterns, much of the ecological empirical literature is often inconclusive at best and contradictory at worse (Chiricos 1987; Land, McCall and Cohen 1990; Patterson 1991; Barnett and Mencken 2002; Bausman and Goe 2004; Phillips 2006; Deller and Deller 2010). As outlined by Mazerolle, Wickes and

McBroom (2010) the movement from macro, ecological or community perspectives such as the Chicago School of social disorganization theory to micro or individual perspectives represented in anomie and rational choice theories has been driven largely by inconsistent and contradictory empirical results.

The problem of inconsistent and contradictory empirical results is compounded in the handful of studies that focus on rural crime patterns (Petee and Kowalski 1993; Rephann 1999; Jobs 1999; Osgood and Chambers 2000; Lee and Ousey 2001; Reisig and Cancino 2004; Wells and Weisheit 2004; Li 2009; Deller and Deller 2010; and Lee and Thomas 2010). The statistical patterns that tend to appear in urban focused studies tend to not hold when examining rural crime. For example, in a study comparing the role of poverty concentration on rural and

urban crime, Lee, Maume and Ousey (2003) find that urban higher poverty concentrations are associated with higher violent crime rates, as predicted by theory. But rural poverty concentration plays no role in helping explain violent crime.

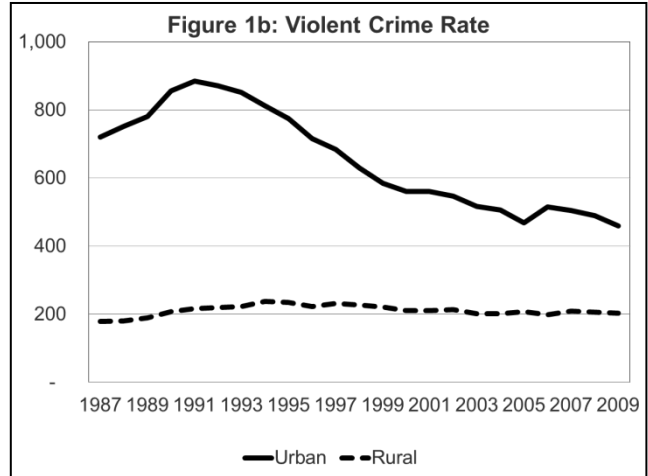
A simple contrast in trends for urban and rural areas across the U.S. makes clear that rural has not benefited from the same decline in crime experienced in urban (Figures 1a, 1b and 1c).¹ Using the FBI Uniform Crime Reports (UCR), the change in the total crime rate (violent and property crime) for urban counties from 1987 to 2009 there was an overall decline of 42.5 percent. This includes a 36.9 percent decline for violent crime (willful homicide, forcible rape, robbery and aggravated assault) and 43.3 percent for property crime (motor vehicle theft, robbery and larceny). Over the same time period total crime for rural counties did not experience similar declines and generally remained constant. Total rural crime decline by 6.7 percent and property crime declined by 8.8 percent but violent crime increased by 13.7 percent (see Donnermeyer 2007 for more detailed discussion of these general trends along with Blumstein and Beck 2000 and Quimet 2002).



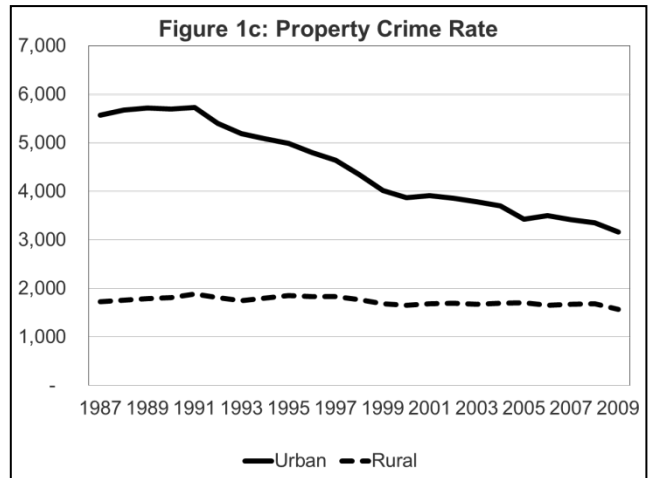
Source: FBI UCR various years. Total Crime per 100,000 population as Defined in the FBI Uniform Crime Reporting System

This is troublesome because a comprehensive theory of crime should result in consistent predictions and observations across urban and rural. If our theories can help us understand the decline in urban crime, why does this same understanding not play out in rural crime rates? Alternatively, the discrepancy between urban and rural studies may simply lend additional evidence that the empirical ecological criminology literature provides inconsistent and at times contradictory conclusions. Given the richness of the empirical literature one would expect to find a number of “empirical truths” but alas, such “truths” are few and far between.

There have been numerous reasons offered for why the ecological empirical literature might be considered inconsistent, including but not limited to aggregation bias in the definition of crime (e.g., aggregating violent and property crime rates), to inconsistency in variable measurement (e.g., multiple ways to measure income), to multicollinearity (e.g., simply too many variables considered at once), to limitations of the crime data itself.



Source: FBI UCR various years. Violent Crime per 100,000 population as Defined in the FBI Uniform Crime Reporting System



Source: FBI UCR various years. Property Crime per 100,000 population as Defined in the FBI Uniform Crime Reporting System

One explanation offered by Phillips (2006) points to discrepancies between cross-sectional and longitudinal studies. She observes that “cross-sectional studies reach different conclusions regarding several key relationships than those of longitudinal approaches” (p.949) and that when one looks within each methodological approach inconsistent empirical results are much less common. She

concludes that cross-sectional studies capture permanent effects while longitudinal studies capture temporary relationships and thus require alternative interpretations.

We hypothesize that over time there are structural shifts in how socioeconomic characteristics are related to crime. In other words, factors that were strong drivers of crime 20 or 30 years ago are not as relevant today. Could it be that 30 years ago crime was largely a function of poverty and today the underlying causes are more complex? Could changes in public policies, both within and outside the criminal justice system, alter the underlying drivers of crime? Could peoples' attitudes toward criminal activity change over time? We suggest that if there are structural shifts in the relationship between socioeconomic characteristics and crime insights into those shifts cannot be predicted through theoretical developments but can only be gained through empirical experimentation.

The intent of the research offered here is threefold. First, we offer a formal model of structural change with the idea that the relationship between key socioeconomic variables and crime has changed over time (for this study the change between 1990 and 2000). Second, we look to differences in these relationships between urban and rural areas. If there exists significant differences between the urban and rural model this suggest that studies which combine urban and rural areas may be introducing structural bias into the models. By focusing attention on rural we hope to address a weakness in the literature identified by Lee and Ousey (2001), Lee, Maume and Ousey (2003) and Donnermeyer, Jobes and Barclay (2006); specifically rural crime has largely been ignored by criminologists. Lee and Thomas (2010) note that although there has been growing interest in rural crime, the available empirical rural criminology literature is still too narrow to draw any reasonable conclusions. Third, we want to focus our discussion on the role of income, specifically poverty and income distribution. When one looks to common themes through the three core theories of criminology income, poverty and income distribution rise to the top. Throughout the 1990s poverty rates and levels of income distribution have been moving in opposite directions; poverty rates have been declining and income inequality has been increasing. As we will see in our brief review of the theories, declining poverty should drive crime rates lower while increasing inequality should push crime rates up; in the end the net impact becomes an empirical question.

Because our focus on income inequality is at the county level, we are limited to using data from the decennial census years 1990 and 2000. While more current crime data, specifically the FBI Uniform Crime Reports, along with a range of socioeconomic data including poverty, income and unemployment estimates are available, the quality of the income distribution data outside the decennial censuses is suspect. So for this

study, we use U.S. county level data from the 1990 and 2000 censuses along with data from the FBI Uniform Crime Reports.

Beyond these brief introductory comments the study is composed of four parts. Next we outline the three core theories of criminology with a focus on the role of poverty and income inequality. In the following section of the study we offer our model of structural change as well as our empirical specification of the model. Finally, we discuss our empirical results and close the study with a discussion of the implications of our work.

THEORETICAL AND EMPIRICAL BACKGROUND

Criminology is both blessed and cursed with a vast range of theoretical perspectives (Berger, Free and Searles 2005). By having an array of different theoretical approaches or views of crime, researchers have a rich literature upon which to draw. The problem, however, is that many of these theories are contradictory and are difficult to rigorously test. As observed by Vold, Bernard and Snipes (2002), there is disagreement within the criminology literature as whether theorist should work on triangulating competing theories looking for common ground or whether a falsification process should be followed where competing theories are pitted against each other, and the theories with the greater predictive powers are allowed to stand.

A further complicating factor is the different approaches to thinking about theoretical and empirical research within the parent disciplines of criminology including sociology, economics, political science, anthropology and psychological. On the one hand, movement toward interdisciplinary approaches provides a systems or holistic way of thinking about the problem, but on the other hand it can pit theoretical and methodological approaches against each other. While the movement to interdisciplinary work is slowly seeing a blending of approaches, each of the parent disciplines have "certain perspectives" for approaching the questions at hand. This raises the question: is triangulation of approaches creating more light or smoke in our understanding of the drivers of crime, particularly rural crime?

From our perspective there are three core or umbrella theoretical approaches in explaining crime: the Chicago School of social disorganization which takes a macro, ecological or community perspective and two micro or individual focused theories, anomie or strain, and rational choice. Although each approach tackles crime from a different direction there are significant and important overlaps. Social disorganization or social cohesion theory, widely known as the Chicago School of Criminology due to the pioneering work of Park and Burgess (1925) and Shaw and McCay (1931, 1942, 1969) and their studies of

crime in Chicago, emphasizes social, economic and political forces at the macro, ecological or community level. Attention is focused on social capital broadly defined and notions of density of acquaintance across the community, village or neighborhood and is concerned with the socioeconomic deterioration of places and the social ties that link neighbors (Thorbecke and Charumilind 2002; Lederman, Loayza and Menendez 2002; Bouffard and Muftic 2006).² Spano and Nagy (2005) suggest that social disorganization theory can be restated simply as structural factors influence social networks which in turn influence social control. Social control in turn drives crime. As noted by Wells and Weisheit (2004), Donnermeyer (2007) and Li (2009), social disorganization theory has dominated the sociology literature that has examined rural crime. Indeed, Bellair and Browning (2010:497) conclude that “[s]ocial disorganization theory is one of the oldest and among the most well-respected sociological approaches to community crime.” Still, many such as Reisig and Cancino (2004), argue that social capital is too broad of a concept with respect to crime and should be more narrowly focused.

Sampson (2002, 2006) has argued that the notion of the village, neighborhood or community underpinning social disorganization theory is outmoded and to fully understand crime one must look at the behavior at the micro or individual level. Lee and Thomas (2010) and their study of U.S. rural crime follow the lead of Tolbert and his colleagues (1998, 2002, 2005) and talk in terms of “civic community”. Here the idea of social networks (i.e., the community, village or neighborhood), a key element to social disorganization theory, is not sufficient to understand crime. Rather one must think in terms of the willingness of the individual to become engaged in the community in a civic manner. The idea is that there is a fundamental difference between being “networked into the community” and willingness to engage. Mazerolle, Wickes and McBroom (2010) build on the work of Sampson (2002, 2006) and talk of “collective efficacy” and the willingness of individuals to become engaged. Social networks are insufficient to deter crime and there must be a willingness to become engaged which acts as a deterrent to criminal activities. Bellair and Browning (2010) use the terminology of “informal control” and argue that the concept of social networks is not sufficient. By moving beyond the broad-based idea of social disorganization theory and the role of social networks (or community, village or neighborhood) to think in terms of “civic community,” “collective efficacy” and “informal control” helps focus on the willingness of the individual to become directly involved in helping deter crime. This can range from the willingness to participate in neighborhood watch programs and calling the police, but also willingness to work with the police to help solve and prosecute crime.

In certain inner-city neighborhoods, the trend toward “don’t snitch” is a movement away from community

engagement. While social networks or social capital may be strong people are unwilling to be engaged when it comes to working with police to help solve crime. In rural areas, density of acquaintance, can be high and everyone knows everyone else, but residents may be unwilling to engage law enforcement if a crime is committed. Rural residents are more likely to keep community problems to themselves by viewing crime as a personal matter and not seek the help of law enforcement agencies (Laub 1981). As noted by Weisheit and Donnermeyer (2000), rural law enforcement personnel often voice frustration because of the conservative nature of many rural residents. Many people in rural areas simply prefer to handle their own problems without seeking help from “outside”. In a sense, social networks, density of acquaintance or social capital can be high but engagement with respect to crime may be low.

Anomie or strain theory focuses on conflicts between goals and means to achieve those goals (Fay 1993). Unlike social disorganization theory that looks at macro or community (i.e., village or neighborhood) level, anomie theory tends to focus on individuals and behavior of those individuals within the community. While “civic community,” “collective efficacy” and “informal control” focus on the willingness of the individual to become directly involved in helping deter crime, anomie theory focuses on the thinking of the potential criminal. In what Baumer and Gustafson (2007) refer to as Merton’s (1938, 1968) classic anomie theory there exists conflicts between the economic desires of the individual and the ability to achieve those desires. Unequal distribution of economic resources, wealth and/or income creates an “envy affect” (Kelly 2000) where those at the lower socioeconomic spectrum are jealous of those that have higher socioeconomic status. There is a level of frustration where the poor either do not have the skills or the means to achieve higher levels of income and/or wealth. Unsuccessful individuals become alienated from the community, social norms from the individual’s perspective come into question, and the strain results in criminal activity.

An additional element of anomie theory is the explicit allowance of acceptable alternative means to achieving an end, referred to as innovation by Merton (1968). A traditional example used within the literature is the powerful draw of illegal drug activity in the presence of few economic opportunities. While drugs are generally associated with urban crime, the rise of methamphetamine in many rural communities is creating a rural parallel (Weisheit 2008). For low income persons, generally youth and young adults faced with the choice of achieving limited economic success through low paying service jobs, the potentially highly profitable illegal drug trade become very attractive. Classical anomie theory suggests that within stressed economic situations (e.g., unemployment, low employment opportunities, poverty, high levels of

income inequality) any means possible to achieve one's goals becomes acceptable behavior.

Baumer and Gustafson (2007) assert that there has been a resurgence of interest in anomie theory as it relates to crime due to the introduction of "institutional" or "contemporary" anomie theory as developed by Messner and Rosenfeld (1994/2001/2007, 1997, 2006). While Merton focused on economic conditions (i.e., economic conflict, economic inequality, economic envy effects) contemporary anomie theory introduces the role of non-economic institutions such as education, political entities and family. Social structure, as thought about through these institutions, matters. In the end, crime is a product of the balancing of these different institutional elements. If economic outcomes dominate, and a philosophy of "the ends justify the means" is acceptable, then crime is acceptable and it will occur. As in social disorganization theory, community engagement through a range of different institutions leads us to ask why crime occurs in one community but not another.

Rational choice theory, which can be traced back to Beccaria's writings in 1764, was introduced into the economic literature by Fleisher (1963, 1966a, 1966b) and Ehrlich (1973), but it is broadly attributed to the Nobel winning economist Gary Becker (1968, 1993). This view of thinking about crime hypothesizes that crime is the product of rational decision making by individuals who are attempting to maximize economic well-being by comparing the benefits of crime versus the costs of apprehension and fines and/or imprisonment. If the potential "loot" is sufficiently large, then the choice to commit a crime is rational. Economists maintain that the power of the rational choice theory is that it is rooted in deductive theory of individual behavior that allows for direct and more exact empirical testing. Formal derivations of the rational choice theory are available in Chiu and Madden (1998) and Chisholm and Choe (2004). On face value classical anomie as advanced by Merton and rational choice theory appear to be two sides to the same theory. What separates the two is the notion of conflict and envy effects. In classical anomie theory and more explicitly institutional anomie theory, socially acceptable behavior plays an important role; economic frustration overrides what the individual may view as socially unacceptable behavior. Despite the moral threshold of the potential criminal being included in the cost-benefit calculations of the potential criminal, in traditional rational choice theory norms and acceptable behavior are delegated to the backburner.

More recent derivations of the rational choice theory; however, have formally introduced the concept of social capital in the spirit of anomie and social disorganization theory (Fajnzylber, Lederman and Loayza 2002; Lederman, Loayza and Menéndez 2002; Messner, Baumer and Rosenfeld 2004; Matsueda, Kreager and Huizinga 2006; Deller and Deller 2010). Here social

capital directly enters into the likelihood of being captured. Ignoring the complexities of institutional anomie theory, communities with higher levels of social capital are more likely to have neighbor watch-type programs or are willing to work with law enforcement agencies when investigating a crime. Potential criminals will explicitly consider levels of social capital and avoid communities with high levels. In essence, enhanced levels of social capital increase the risk of being caught; hence reduce the incentive to commit crime. Unfortunately, as far as we are aware, the important notions of "civic community," "collective efficacy" and "informal control" briefly outline above have not been formally introduced into the rational choice framework. As currently structured, higher levels of social capital are interchangeable with civic engagement. Although outside the scope of this applied study, social capital augmented rational choice theories need to be refined to think in terms of engagement.

An anomie-type interpretation could also be inferred from these social capital augmented rational choice theories. If social capital is high within a community, one could argue that there are higher levels of positive peer pressure; thus raising the moral threshold of the potential criminal; the ends do not necessarily justify the means. Within the rational choice framework going against one's moral values would be interpreted as a cost of committing the crime. Alternatively, higher levels of individual frustration through not achieving individual goals may cause one to question their moral position in committing crime. If the social capital of the community is low or deteriorating, coupled with frustration and/or envy, an individual person's moral threshold may be lowered thus lowering the personal cost of committing a crime.

What is important here is how the three theories overlap. Common to all three are social capital and community norms along with limited economic opportunities or poverty and high and/or raising levels of inequality. The latter two are of particular interest to this study, specifically economic marginalization (poverty), unemployment, economic inequality and economic instability. Income, or more specifically the characteristics of income, is perhaps one of the most commonly used explanatory variables in thinking about and empirically modeling crime. Unfortunately, theory does not provide us with any insight into which measure of income is most appropriate. As noted by Chisholm and Choe (2004) income measures have ranged from median and average family income to median and average household income to per capita income to wages. Some studies have found that higher levels of average income tend to be associated with lower levels of crime (e.g., Reilly and Witt 1996; Gould, Weinberg and Mustard 2002; Deller and Deller 2010). There are other studies, however, that find higher income is associated with higher crime (e.g., Rephann 1999; Fajnzylber, Lederman and Loayza 2002; Mazerolle, Wickes and McBroom 2010).

Economic marginalization, often measured through poverty data, plays a role in each theoretical approach. In social disorganization theory, poverty is associated with populations where social cohesion and density of acquaintance is weak and the social norms, or levels of social capital, required to deter crime are weak. One could also argue that communities with higher poverty rates are likely to have lower levels of “civic community,” “collective efficacy” and “informal control”. In classical anomie theory, people in poverty are subject to envy effects and may pursue criminal activities as a mean to achieve desired outcomes. In institutional anomie theory, the counter balancing political, educational and family institutions are likely to be weak. In rational choice theory people in poverty may see a greater benefit from crime than lost opportunities if captured. Patterson (1991) notes that although the empirical literature has been somewhat inconsistent, the ideas advanced by the theories concerning economic marginalization tend to be supported. Patterson (1991) further notes that the primary difference between studies that find inconclusive and consistent results hinges on the definition of crime under consideration. It is generally accepted now in the empirical criminology literature that the factors that affect violent crimes such as rape are different than those that affect property crime such as burglaries.

Income distribution has been a major focus of studies on crime (e.g., Kennedy, et al. 1998; Carcach 2001; Thorbecke and Charumilind 2002; Pratt and Godsey 2003) and is widely included as a control variable (e.g., Lederman, Loayza and Menendez 2002; Fajnzylber, Lederman and Loayza 2002; Baumer and Gustafson 2007; Li 2009; Deller and Deller 2010). Consistent with the rational choice framework of crime, Ehrlich (1973) uses income inequality as a proxy for opportunity costs. Individuals at the low end of the income distribution may be more prone to commit crime because the potential pay-off is greater in terms of forgone wages if arrested and imprisoned. Ehrlich (1973), along with Fleisher (1966a), Fajnzylber, Lederman and Loayza (2002) and Kelly (2000), finds that higher levels of income inequality are statistically linked to higher levels of crime. At the heart of classical anomie theory is the inequality of economic resources (or income inequality) which creates envy effects and conflict which can lead to crime. Social disorganization theory maintains that higher levels of inequality will lower overall social capital or create situations where social conflicts can occur within the community and provides an additional theoretical link between higher levels of inequality and crime (Kawachi and Kennedy 1997; Deller and Deller 2010). Unfortunately, the empirical results are not always consistent with the theoretical expectations.

Unemployment, or more precise sustained periods of unemployment, follows the same pattern as poverty across all three theoretical approaches. In a review of sixty

empirical studies of crime Chiricos (1987) found that unemployment rates are a strong predictor of property crimes but have a poor relationship to violent crimes. This follows from both rational choice theory as well as classical strain theory. Some works, such as Carcach (2000), Deller and Deller (2010), Gould, Weinberg and Mustard (2002) and Reilly and Witt (1996), confirm these general results but others such as Timbrell (1990), Field (1990), Pyle and Deadman (1994) and Bausman and Goe (2004) have not confirmed this relationship.

While the bulk of the empirical literature tends to support the central hypotheses that flow from the overlapping areas of the three core theories of crime, there are sufficient inconsistencies and contradictions to cast a shadow over the ecological empirical literature. Several ideas have been advanced to help think about the limitations including inconsistencies in variable definitions across studies, measurement errors with the crime data itself,³ inappropriate units of analysis (e.g., county versus municipality versus neighborhood), differences in disciplinary approaches to empirical work, limitations to statistical methodologies, inability of the data to adequately capture the underlying concepts of the central theories, and serious problems of endogeneity.⁴ Perhaps Putnam’s (2000: 137) observation that the arrows of causation when thinking about social capital are “as tangled as well-tossed spaghetti” lies at the heart of the most fundamental problem of the empirical literature. Indeed, in a number of regional economic growth studies, crime rates are used as a proxy for social capital (see Deller and Deller 2010 for a detailed discussion); raising the question: which direction does causation flow? One could also reasonably suggest that the sheer volume of empirical studies will inevitably result in some inconclusive and inconsistent results.⁵ Perhaps more directly, the difficulty in identifying “empirical truths” has been a source of frustration. When minor changes in variable definitions or methodological approaches can alter results and policy insights, a cloud is cast over the whole of the literature.

In this work we offer two alternative issues that may help us understand the inconclusive findings and inconsistencies found in the macro or ecological empirical criminology literature. The dramatic shift in crime rate trends (e.g., Figures 1a, 1b and 1c) suggests that there has been a fundamental, or structural, shift in how key socioeconomic variables are related to crime. It is not unreasonable to expect that during periods of increasing crime rates the relationship of income, poverty, income inequality and unemployment to crime is different than during periods of declining crime rates. In the spirit of Phillips (2006), we suggest that the underlying statistical relationship between key socioeconomic variables and crime rates are sensitive to trends in crime levels. By rigorously comparing and contrasting statistical

relationship at the beginning and end of a sufficiently long time period we can uncover evidence of structural shifts.

There are three possible forms that these structural shifts can take. The first is a shift in significance levels where the variable of interest is statistically insignificant in one period and significant in another. In other words, in one period the variable appears to influence crime rates, but in another period it has no influence. The second case is that the parameter associated with the variable of interest becomes more or less intense in its effect. For example, during a wider economic expansion, unemployment may play a more modest role in understanding crime than during periods of economic recession. In the third case parameters of interest can actually change sign over the study period which is perhaps the most troublesome possibility. It is possible that a variable having a negative influence at the beginning of the period has a positive influence at the end of the period. Any of these three potential results would suggest that empirical observations relating socioeconomic variables to crime are sensitive to the time period examined; results that may have held in an earlier period may not hold today or sometime in the future. These structural shifts can be particularly frustrating from a policy perspective. If policies aimed at reducing poverty placed downward pressure on crime in the 1960s and 1970s, but today have little influence, one could ask: were those policies misdirected or has the situation simply changed?

More relevant to the study reported here, Bausman and Geo (2004) argue that one of the reasons for the inconsistent empirical findings in the ecological criminology literature is the predominance on statistic cross-sectional models. They argue that a more dynamic dimension needs to be introduced, such as that adopted by Gould, Weinberg and Mustard (2002) and fully examined in Phillips (2006). If crime rates tended to be stagnant and not drifting upward or downward, static cross-sectional studies may make sense but given the well-known decline in crime rates (Figure 1), it is clear that there is a dynamic process at play. Indeed, when one thinks about social disorganization theory, it is the changing dynamics of the community that drives crime.

We also build on the work of Rephann (1999) among others by drawing attention to the differences between urban and rural crime. From the simple descriptive analysis two facts are clear: rural crime tends to be significantly below urban crime rates and rural areas on average did not experience the significant decline in crime rates found in urban areas. We concur with Wells and Weisheit's (2004: 1.) claim that "[d]espite a growing interest in rural crime it remains an under-studied issue" along with Donnermeyer (2007: 2) that "[r]ural crime has long been a neglected topic in criminology" from both a theoretical and empirical perspective. If there are structural changes in the drivers of urban crime that can be used to help explain the remarkable decline in urban crime

rates, it is clear from the prima facie evidence in Figure 1 that those changes cannot help us understand rural crime patterns.

Unfortunately, there is strong evidence that crime is widely underreported in rural areas and several hypotheses have been advanced to explain this phenomenon (Weisheit and Donnermeyer 2000). In many rural areas, the presence of law enforcement is limited to a restricted resourced county sheriff who is responsible for large geographic areas. In this case, rural residents may view the reporting of a crime to have minimal use. There is also evidence that rural areas are more governed by a form of informal social control. In a study of rural crime, Smith (1980) found that shoplifting and rural theft were rarely reported to the police and in most cases handled informally. Smith reported on the frustration of rural law enforcement officers with the lack of turning to their offices for help when a crime has been committed. Because everyone "knows everyone else" in rural areas, or density of acquaintanceship is high, people are more inclined to deal with crime through informal mechanisms. As noted earlier, rural residents are more likely to keep community problems to themselves by viewing crime as a personal matter and not seek the help of law enforcement agencies which has been a large source of frustration for rural law enforcement personnel (Weisheit and Donnermeyer 2000).

In summary, by triangulating the three core theories of crime, we focus on how levels of economic well-being influence crime rates with particular attention to measures of poverty and economic inequality. Given then dramatic "U-turn" in crime rates we suggest that there are structural shifts in how our base variables of interest affect crime over time. The failure to capture these structural shifts has hindered the available empirical literature. Finally we draw attention to the urban-rural dichotomy.

A MODEL OF STRUCTURAL CHANGE

There are several approaches that can be used to test for structural changes and the one that we offer has been used to test for structural shifts in how local governments treat intergovernmental aid (Deller and Walzer 1995; Deller and Maher 2006). As far as we are aware, this formulation of modeling structural shifts has not been previously used in the criminology literature.

We begin by specifying a relationship between the crime rate (C), a set of core variables (I) and second set of policy variable (S) that we alter over different specifications of the model, over two time periods (t and t-1):

$$C_{t-1} = \beta_{t-1}I_{t-1} + \alpha_{t-1}S_{t-1} + \delta X + e_{t-1} \quad (1)$$

$$C_t = \beta_t I_t + \alpha_t S_t + \delta X + e_t. \quad (2)$$

Here X is a set of control variables whose relationship is hypothesized to have remained constant over time and e_t is a well-behaved error term. Combining the two equations to obtain change over time yields:

$$C_t - C_{t-1} = \beta_t I_t + \alpha_t S_t + \delta X - \beta_{t-1} I_{t-1} - \alpha_{t-1} S_{t-1} - \delta X + e_t - e_{t-1} \quad (3)$$

Rearrange terms and we have

$$(C_t - C_{t-1}) = (\beta_t I_t - \beta_{t-1} I_{t-1}) + (\alpha_t S_t - \alpha_{t-1} S_{t-1}) + (e_t + e_{t-1}) \quad (4)$$

Note that the set of control variables (X) drops out of the analysis. Given our framework there is no change in the influence of these control variables over time hence they are removed from the analysis. Now add and subtract $\beta_t I_{t-1}$ and $\alpha_t S_{t-1}$ which yields:

$$(C_t - C_{t-1}) = (\beta_t I_t - \beta_{t-1} I_{t-1}) + (\beta_t I_{t-1} - \beta_{t-1} I_{t-1}) + (\alpha_t S_t - \alpha_{t-1} S_{t-1}) + (\alpha_t S_{t-1} - \alpha_{t-1} S_{t-1}) + (e_t + e_{t-1}). \quad (5)$$

Rearrange terms and simplify:

$$(C_t - C_{t-1}) = (\beta_t - \beta_{t-1}) I_{t-1} + \beta_t (I_t - I_{t-1}) + (\alpha_t - \alpha_{t-1}) S_{t-1} + \alpha_t (S_t - S_{t-1}) + (e_t + e_{t-1}). \quad (6)$$

Define $\Delta C \equiv (C_t - C_{t-1})$, $\Delta \beta \equiv (\beta_t - \beta_{t-1})$, $\Delta I \equiv (I_t - I_{t-1})$, $\Delta \alpha \equiv (\alpha_t - \alpha_{t-1})$, $\Delta S \equiv (S_t - S_{t-1})$ and $\varepsilon \equiv (e_t + e_{t-1})$ and the equation to be estimated can be stated as:

$$\Delta C = \Delta \beta I_{t-1} + \beta_t \Delta I + \Delta \alpha S_{t-1} + \alpha_t \Delta S + \varepsilon. \quad (7)$$

Our empirical model then focuses on the crime rate for two time periods, core variables for two time periods and finally our socioeconomic measures for two time periods.

We offer four specifications of equation (7) with three base variables appearing in each specification including (1) population, (2) median household income and the (3) unemployment rate. The socioeconomic measures that define our four different specification include the (1) overall poverty rate, (2) youth poverty rate, (3) Gini coefficient of income distribution and (4) ratio of number of low income households (income less than \$15,000) to the number of high income households (income more than \$100,000) (see Appendix A for simple descriptive statistics on each of the variables used in this analysis). By slightly modifying the specification of the model we can also gain insights into concerns of other researchers that the ecological empirical studies of crime have fallen prey to multicollinearity (Land, McCall and Cohen's (1990); Wells and Weisheit's (2004); Lee and Ousey (2001); Lee, Maume and Ousey (2003); Lee and Bartlowski (2004);

Lee and Thomas (2010)). If the results on the three base variables are sensitive to small specification changes then some credence is given to the claim of multicollinearity.

We estimate three versions of each model specification using the whole collection of counties in the U.S., or a pooled model (n=2,808), the subset of urban (metropolitan, n=973) counties and finally the subset of rural (nonmetropolitan, n=1,834) counties.⁶ Finally, we look at change in the total, violent and property crime rates. We estimate a total of 36 separate models. The beginning of the period is 1990 and the end of the period is 2000. As we noted above, we model the 1990 to 2000 time period because the quality of the income inequality data for U.S. counties outside of the decennial census years is questionable. We also maintain that the 1990 to 2000 time period is sufficiently long to capture structural shifts. In other words, if there are structural shifts in how population, income, unemployment, poverty and income distribution affect crime we should capture them over this time period.

EMPIRICAL RESULTS

The structural change models tend to perform well overall with the equation F statistic significant at or above the 95 percent level of confidence in all of the estimated models (Tables 1 to 4). The percent of the variance in the change in crime rates explained; however, tends to be low with R^2 ranging from 0.063 to 0.1359. Thus, the models consistently explain less than 14 percent of the variation in changes in crime rates. We do find, however, that the R^2 s and F statistics are consistently higher for the models using the subset of urban counties when compared to the models using only the rural data. This simple comparison does lend some evidence that the data seems to fit the urban model better than the rural models. Clearly we have purposely kept the specification of the models simple and have not included numerous variables that have been used in other studies such as ethnic composition of the community, economic structure, or various measures of social capital. Including a wider range of additional control variables beyond population, income and unemployment could increase the explanatory power of the models. But by focusing on a simpler specification, we can focus the research question and minimize problems such as multicollinearity and endogeneity.

To rigorously test for differences between the pooled, urban and rural models, we compute a Chow Test for each of the 12 model specifications. The computed χ^2 statistics range from about 175 for total crime and 104 for property crime to slightly more than 65 for violent crime. There is very little variation in the Chow Test χ^2 statistic over the poverty and income distribution specifications. These results tell us that there are statistically significant differences between rural and urban counties in the U.S. Thus, in our subsequent discussion of individual

Structural Determinants of Crime

Table 1: Structural Change Model With Respect to the Gini Coefficient

	Pooled			Metro			Nonmetro		
	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime
Median Household Income 1989 ($\Delta\beta$)	0.1386 (4.93)	0.1465 (4.79)	0.1177 (4.62)	0.1821 (3.69)	0.2331 (3.96)	0.1523 (3.46)	0.0417 (2.50)	0.1051 (2.51)	0.1000 (2.62)
Change in Median Household Income (β)	0.0382 (2.36)	0.0573 (3.25)	0.03112 (2.12)	0.06897 (2.59)	0.11379 (3.58)	0.05775 (2.44)	0.00703 (0.29)	0.00642 (0.27)	0.00811 (0.37)
Unemployment Rate 1989 ($\Delta\beta$)	-71.8511 (5.40)	-76.8971 (5.31)	-63.9635 (5.30)	-141.3027 (4.73)	-149.2456 (4.18)	-127.4347 (4.79)	14.4605 (2.99)	-43.1791 (2.98)	-38.0660 (2.87)
Change In Unemployment Rate (β)	5.1570 (0.29)	10.9296 (0.56)	7.77645 (0.48)	-52.93695 (1.28)	-43.87913 (0.89)	-41.70725 (1.13)	19.28594 (1.31)	26.20386 (1.35)	26.26803 (1.49)
Population 1990 ($\Delta\beta$)	-0.0004 (2.97)	0.0016 (10.14)	-0.0002 (2.17)	-0.0004 (3.02)	0.0017 (8.67)	-0.0003 (2.45)	0.00261 (3.01)	0.00259 (2.97)	0.0028 (3.52)
Change In Population (β)	-0.0046 (5.05)	-0.0082 (8.29)	-0.0045 (5.36)	-0.0030 (2.91)	-0.0064 (5.13)	-0.0030 (3.24)	0.0044 (7.65)	-0.0333 (7.60)	-0.0316 (7.91)
Gini Coefficient 1989 ($\Delta\beta$)	-22196.00 (6.32)	-25727.00 (6.73)	-19151.00 (6.02)	-30510.00 (4.52)	-41300.00 (5.12)	-26329.00 (4.38)	-16113.00 (3.29)	-16136.00 (3.28)	-15327.00 (3.41)
Change in Gini Coefficient (β)	-4526.5210 (1.78)	-4903.0588 (1.77)	-3604.3340 (1.57)	-12061.0000 (2.40)	-12980.0000 (2.16)	-10350.0000 (2.31)	887.2175 (0.27)	953.5227 (0.29)	595.4312 (0.20)
Intercept	2497.6049 (5.93)	3001.8058 (6.55)	2150.9830 (5.63)	4449.5469 (4.53)	5633.8062 (4.80)	3986.0917 (4.55)	1417.8200 (2.86)	1404.5912 (2.82)	1308.6011 (2.88)
R squared	0.1030	0.0892	0.0984	0.1359	0.1189	0.135	0.0714	0.0709	0.0723
F statistic	40.19	34.27	38.19	18.98	16.28	18.82	17.54	17.43	17.78
sample size	2808	2808	2808	973	973	973	1834	1834	1834

Absolute value of the t statistic in parentheses.

Table 2: Structural Change Model With Respect to the Ratio of Low to High Income Households

	Pooled			Metro			Nonmetro		
	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime
Median Household Income 1989 ($\Delta\beta$)	-0.0284 (4.32)	-0.0483 (6.74)	-0.0260 (4.37)	-0.0219 (2.07)	-0.0492 (3.88)	-0.0237 (2.52)	-0.0329 (3.33)	-0.0325 (3.27)	-0.0289 (3.19)
Change in Median Household Income (β)	0.0067 (0.66)	0.0224 (2.02)	0.0057 (0.62)	0.0087 (0.56)	0.0444 (2.38)	0.0060 (0.43)	-0.0001 (0.01)	-0.0004 (0.03)	0.0012 (0.10)
Unemployment Rate 1989 ($\Delta\beta$)	-71.8426 (5.34)	-76.3210 (5.20)	-64.6320 (5.30)	-141.6696 (4.72)	-150.2125 (4.18)	-127.7954 (4.78)	-43.8218 (2.99)	-43.7646 (2.98)	-39.2822 (2.92)
Change In Unemployment Rate (β)	2.7860 (0.16)	8.2261 (0.42)	4.9444 (0.30)	-54.6908 (1.31)	-47.6416 (0.96)	-43.2492 (1.17)	19.6594 (1.02)	20.6508 (1.06)	20.4893 (1.16)
Population 1990 ($\Delta\beta$)	-0.0005 (3.31)	0.0016 (9.72)	-0.0003 (2.50)	-0.0005 (3.25)	0.0016 (8.32)	-0.0004 (2.68)	0.0025 (2.85)	0.0025 (2.82)	0.0027 (3.37)
Change In Population (β)	-0.0050 (5.44)	-0.0087 (8.69)	-0.0048 (5.73)	-0.0036 (3.50)	-0.0072 (5.80)	-0.0035 (3.82)	-0.0337 (7.70)	-0.0336 (7.65)	-0.0319 (7.94)
Ratio of Low-to-High Income ($\Delta\beta$)	6.8037 (2.60)	7.3087 (2.56)	6.0120 (2.53)	19.4126 (2.76)	23.0578 (2.73)	16.9616 (2.70)	1.1148 (0.39)	1.0902 (0.38)	2.2629 (0.87)
Change in Ratio of Low-to-High Income (β)	6.0012 (2.29)	6.4462 (2.25)	6.6994 (2.83)	18.2454 (2.54)	21.4664 (2.50)	15.9653 (2.50)	0.5437 (0.19)	0.5171 (0.18)	1.7528 (0.68)
Intercept	213.8037 (1.02)	412.8897 (1.81)	172.4612 (0.91)	99.1022 (0.25)	118.4853 (0.24)	232.7089 (0.65)	418.4531 (1.39)	409.2528 (1.36)	282.8160 (1.03)
R squared	0.0940	0.0778	0.0905	0.1278	0.1051	0.1274	0.0641	0.0636	0.0647
F statistic	36.29	29.55	34.84	17.67	14.17	17.62	15.63	15.51	15.79
sample size	2808	2808	2808	973	973	973	1834	1834	1834

Absolute value of the t statistic in parentheses.

Table 3: Structural Change Model With Respect to the Poverty Rate

	Pooled			Metro			Nonmetro		
	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime
Median Household Income 1989 ($\Delta\beta$)	-0.0494 (6.18)	-0.0777 (8.93)	-0.0439 (6.06)	-0.0615 (4.47)	-0.1086 (6.60)	-0.0560 (4.56)	-0.0551 (4.23)	-0.0548 (4.18)	-0.0479 (4.00)
Change in Median Household Income (β)	0.0017 (0.14)	0.0174 (1.27)	0.0024 (0.21)	0.0132 (0.66)	0.0490 (2.06)	0.0117 (0.66)	-0.0155 (0.86)	-0.0160 (0.89)	-0.0107 (0.65)
Unemployment Rate 1989 ($\Delta\beta$)	-53.0103 (3.68)	-50.0695 (3.19)	-49.2335 (3.77)	-119.1048 (3.61)	-111.1332 (2.82)	-112.0063 (3.81)	-30.6223 (1.98)	-30.5029 (1.96)	-28.3190 (1.99)
Change In Unemployment Rate (β)	13.5695 (0.74)	22.8133 (1.14)	13.6614 (0.82)	-53.5764 (1.21)	-39.3878 (0.75)	-45.5907 (1.16)	27.3485 (1.39)	28.3973 (1.44)	26.9177 (1.50)
Population 1990 ($\Delta\beta$)	-0.0005 (3.22)	0.0016 (9.84)	-0.0003 (2.43)	-0.0005 (3.00)	0.0017 (8.60)	-0.0004 (2.47)	0.0024 (2.71)	0.0023 2.68	0.0026 (3.24)
Change In Population (β)	-0.0049 (5.28)	-0.0085 (8.44)	-0.0047 (5.61)	-0.0038 (3.65)	-0.0073 (5.93)	-0.0037 (3.97)	-0.0330 (7.50)	-0.0329 (7.46)	-0.0314 (7.80)
Poverty Rate 1989 ($\Delta\beta$)	-15.6317 (1.59)	-23.7709 (2.22)	-10.9260 (1.23)	-27.2406 (1.16)	-52.4283 (1.87)	-17.2091 (0.82)	-22.0983 (1.84)	-22.3541 (1.85)	-15.9770 (1.45)
Change in Poverty Rate (β)	-5.3483 (0.31)	-2.7286 (0.15)	-1.9502 (0.13)	23.9653 (0.61)	26.1885 (0.56)	26.6881 (0.76)	-17.9420 (0.94)	-18.3801 (0.96)	-12.4666 (0.71)
Intercept	1069.3674 (3.49)	1580.9274 (4.74)	875.4933 (3.15)	1661.8242 (2.73)	2543.6930 (3.50)	1449.2305 (2.68)	1403.8538 (2.86)	1400.9558 (2.84)	1096.6408 (2.43)
R squared	0.0907	0.0766	0.0868	0.1232	0.105	0.1222	0.0642	0.0637	0.0639
F statistic	34.93	29.04	33.25	16.94	14.15	16.79	15.65	15.53	15.59
sample size	2808	2808	2808	973	973	973	1834	1834	1834

Absolute value of the t statistic in parentheses.

Table 4: Structural Change Model With Respect to the Youth Poverty Rate

	Pooled			Metro			Nonmetro		
	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime	Change in Total Crime	Change in Violent Crime	Change in Property Crime
Median Household Income 1989 ($\Delta\beta$)	-0.0513 (6.79)	-0.0807 (9.83)	-0.0447 (6.53)	-0.0663 (5.23)	-0.1185 (7.86)	-0.0583 (5.15)	-0.0519 (4.15)	-0.0516 (4.11)	-0.0450 (3.92)
Change in Median Household Income (β)	0.0068 (0.57)	0.0227 (1.73)	0.0053 (0.49)	0.0163 (0.86)	0.0550 (2.45)	0.0130 (0.77)	-0.0054 (0.31)	-0.0059 (0.34)	-0.0035 (0.22)
Unemployment Rate 1989 ($\Delta\beta$)	-51.2162 (3.55)	-45.8326 (2.92)	-48.1279 (3.68)	-103.9275 (3.17)	-85.1804 (2.18)	-100.4414 (3.43)	-33.2191 (2.15)	-33.1191 (2.14)	-30.5200 (2.15)
Change In Unemployment Rate (β)	13.5487 (0.74)	24.3213 (1.22)	13.7429 (0.82)	-44.8355 (1.03)	-25.0366 (0.48)	-38.1887 (0.98)	25.0397 (1.28)	26.0754 (1.32)	25.0981 (1.39)
Population 1990 ($\Delta\beta$)	-0.0004 (3.03)	0.0016 10.10	-0.0003 (2.29)	-0.0004 (2.56)	0.0018 (9.19)	-0.0003 (2.11)	0.0024 (2.76)	0.0024 (2.72)	0.0026 (3.28)
Change In Population (β)	-0.0050 (5.34)	-0.0086 (8.51)	-0.0047 (5.65)	-0.0039 (3.80)	-0.0076 (6.16)	-0.0038 (4.09)	-0.0333 (7.57)	-0.0332 (7.52)	-0.0317 (7.86)
Child Poverty Rate 1989 ($\Delta\beta$)	-9.4691 (1.36)	-16.6474 (2.20)	-6.7304 (1.07)	-24.1083 (1.54)	-46.0386 (2.47)	-15.8355 (1.13)	-9.1963 (1.07)	-9.3692 (1.08)	-6.4136 (0.81)
Change in Child Poverty Rate (β)	7.0131 (0.66)	11.0449 (0.95)	5.1722 (0.53)	33.4781 (1.33)	48.1167 (1.61)	28.8099 (1.29)	-0.8995 (0.08)	-1.2047 (0.10)	-0.6664 (0.06)
Intercept	1017.0508 (3.25)	1560.3134 (4.59)	832.7697 (2.94)	1744.3876 (2.96)	2744.6387 (3.92)	1482.5072 (2.82)	1107.0317 (2.22)	1104.3779 (2.21)	863.3853 (1.89)
R squared	0.0919	0.0796	0.0874	0.1306	0.1208	0.1270	0.0634	0.0630	0.0634
F statistic	35.42	30.27	33.52	18.12	16.58	17.55	15.46	15.34	15.45
sample size	2808	2808	2808	973	973	973	1834	1834	1834

Absolute value of the t statistic in parentheses.

parameters, the observed differences between rural and urban are meaningful. Our results support the observation by Lee, Maume and Ousey (2003), Wells and Weisheit (2004) and Lee and Bartkowski (2004) that on face value care must be taken when mingling rural and urban together from either an empirical or policy perspective. In general, the empirical models and the underlying theoretical justifications appear to fit urban better than rural crime trends.

To determine if we have a problem with multicollinearity we compute condition indices as suggested by Belsley, Kuh, and Welsch (1980). Because multicollinearity in a regression equation is a mechanical problem with the inversion of the design matrix, the condition index looks at the square roots of the ratio of the largest eigenvalue to each individual eigenvalue. The indices range from 112.13 for the models including the Gini coefficient to 31.06 for the models including youth poverty rates.⁷ These results coupled with a cursory review of the stability of the coefficients on the base variables suggest that the results for the Gini coefficient model are suspect. Specifically across the four specifications, the results for the base variables are consistent for the two poverty measures and the ratio of low-to-high income households. We report all of our results for completeness but given this latter result on the Gini coefficient model coupled with the Chow tests on urban-rural differences we can focus our discussion.

When interpreting our results, there are several patterns that we are looking for beyond the urban/rural differences such as our interest in comparing and contrasting the results on poverty and income distribution. At the same time, given the volume of results, it is not practical to discuss all of the individual estimated parameters. Let us focus first on the general results of the on the set of control variables including median household income, unemployment rate and population then turn attention to poverty and income distribution patterns.

The base parameters (β) for median household income tend to be statistically insignificant except for violent crimes in urban area where it is significant and positive. The positive effect on violent crime in urban areas is not consistent with theory but as noted by Patterson (1991) the macro or ecological empirical literature tends to be more consistent with respect to property crime. The structural change parameters ($\Delta\beta$) associated with median household income are all negative and statistically significant across both types of crime as well as urban and rural. This provides strong evidence that there has been a structural shift in how income levels are related to crime. At the peak of the crime rate (about 1990) income did not appear to influence crime but by the end of the decade the relationship changed. It appears that in 2000 higher levels of income, all else held constant, are associated with lower or declining crime rates. This result is consistent with the predictions of all three core theories of crime and suggests

that wealthier counties, as measured by median household income, experience lower levels of crime.

For unemployment the base parameter tends to be statistically insignificant. This result is consistent with the findings of Reilly and Witt (1996) as well as Bausman and Goe (2004) who suggest that unemployment alone is not a major determinant of crime. But one must keep in mind that the base parameter is reflective of the relationship at the beginning of our study period. The structural change parameters ($\Delta\beta$) are all negative and statistically significant for both urban and rural. This is the opposite of what we would expect to find given the overlapping of our three core theories; our results suggest that higher levels of unemployment are associated with lower crime rates. Given the results of Bausman and Goe (2004) one could argue that our measure of unemployment is not capturing persistent unemployment and is thus insufficient to capture the true underlying relationship. Specifically, unemployment duration or length of time unemployed better fits the underlying theories. Unfortunately, such data are not readily available at the county level. Regardless of this limitation our results suggest that there have been structural shifts in the relationship between unemployment and crime.

Our results suggest that there is a strong negative base relationship between population and crime which is what we would expect given our simple descriptive analysis outlined in Figures (1a, 1b and 1c). But we draw this conclusion only in hindsight; prior to the remarkable decline in crime rates over the 1990s the "conventional wisdom" is that larger places should see higher levels of crime. The structural change parameter tends to be positive with the exception of property crime in urban areas. This suggests that the positive effects associated with the base parameter are weakening over time, but the weakening is not sufficient to overpower the negative base affect (i.e., $\Delta\beta > 0 \ll |\beta < 0|$). In other words, the negative relationship between population size and crime rates is negative in both time periods but the magnitude of the negative relationship is weakening.

We use four measures of inequality and poverty including the Gini coefficient (Table 1), the ratio of low to high income households (Table 2), and both the overall and child poverty rates (Tables 3 and 4 respectively). With respect to the Gini coefficient of income inequality we find that the base parameter is negative for urban counties but statistically insignificant for rural (Table 1). The shift parameter is negative for urban counties and when matched with the statistically weak negative base parameter suggests that higher levels of inequality are associated with lower levels of crime. But for rural areas, the base coefficient is insignificant but the shift parameter is negative and significant suggesting that this inverse relationship between inequality and crime is developing in rural counties. The pattern that higher levels of income inequality as measured by the Gini coefficient is associated

with lower crime rates is unexpected given the three core crime theories. But, given our observations on multicollinearity with the results associated with the Gini coefficient, these empirical results that are contradictory to the theories are suspect and must be discounted.

Our alternative measure of income inequality, the ratio of the number of low-income to high-income households provides results more consistent the predictions of the theories. Specifically, as the ratio increases, or there is a higher proportion of low income relative to high income households, there tends to be higher levels of both violent and property crime in urban areas. Both the base parameter and shift parameters in the urban models are positive and statistically significant. But for rural areas, the parameters are all positive but statistically insignificant. Thus, for urban counties but not for rural an increasing ratio of low to high-income households result in high crime rates and the affect is becoming stronger over the 1990s. This again provides evidence that rural and urban crime is fundamentally different and our theories are insufficient to offer any reasonable explanation as to why.

The results for the overall poverty rate (Table 3) suggest that the base parameter is statistically indistinguishable from zero for both violent and property crime across urban and rural areas. This suggests that overall poverty rates did not have an impact on crime in 1990. The shift parameter property crime is also statistically insignificant for both rural and urban, but is weakly negative for violent crime, again for both urban and rural. Here we can conclude that overall poverty rates tend not to influence property crime rates but could perhaps have a negative association with violent crime. We also see a very similar pattern for child poverty rates where the base coefficient is statistically equivalent to zero for both types of crime and area (Table 4). For rural areas, the shift parameters are insignificant and for urban the parameter is insignificant for property crime. But for violent crime in urban areas the shift parameter is negative and statistically significant indicating that higher levels of child poverty are associated with lower levels of violent crime.

Much like our unemployment measure, the definitions of poverty that determine the values of the variables has been challenged as being somewhat arbitrary and outdated (Sen 1976, 1979; Callan and Nolan 1991; Zheng 1997, 2000; Brady 2003; DeFina 2007). Critiques of the Census derived measures range from thresholds being too low and not reflecting a minimal standard of living, to how the definition of income used to determine poverty is computed, to the headcount nature of the measure. But herein lies a fundamental problem with modeling crime: the theories do not lend any insights into which measure of income, unemployment, poverty or income distribution is the “correct” measure. If empirical criminologists experiment with alternative definitions until the data supports the theories is this not a form of “cooking the

results”? But this experimentation can lend valuable insights into alternative ways of thinking about the traditional drivers of crime. For example, Bausman and Goe’s (2004) experimentation with different ways of thinking about unemployment expanded our understanding of moving beyond a simple snapshot of the unemployment rate at any given time to thinking in terms of unemployment duration.

Our results complement the work of Lee and his colleagues along with Donnermeyer in finding that there are significantly unique differences between urban and rural crime. While one could argue that the trends outline in Figures 1a, 1b and 1c is *prima facie* evidence that there are fundamental differences between urban and rural crime, the empirical modeling reported here points to specific differences. The data suggest that what may hold true for urban does not necessarily hold for rural areas. Hence, policy insights that may be gained from urban studies cannot be blindly transferred to rural.

Our results also complement the observations of Phillips (2006) in that there are significant dynamic characteristics to the drivers of crime. Our structural shift model identifies several instances where the relationship between core variables is not stable over time. In some instances effects weakened in intensity and in others the effects strengthened. Unfortunately, the theories cannot lend any insight into why these dynamic characteristics may or may not exist. Still, our results suggest that simple cross sectional studies that examine a single time period may yield inadequate results.

CONCLUSIONS

This study on crime has focused on three distinct issues: differences across rural and urban; the impact of socioeconomic well-being on crime rates; and the identification of structural shift in the relationship between traditional explanatory variables used in the ecological empirical criminology literature. Using county level data for the years 1990 and 2000 and a formal model of structural change, we can draw three general conclusions. First, there is strong evidence that there have been structural shifts in how ecological socioeconomic variables are related to crime. Second, there are fundamental differences between rural and urban areas. Third, the relationship between socioeconomic well-being and crime is not as clear as predicted by the three theories of criminology.

While our understanding of the drivers of crime has matured over time (e.g., classical versus institutional anomie theory or social capital in terms of civic engagement) the inability of the literature to come to a set of “empirical truths” has proven frustrating. This latter observation is particularly true for rural crime where the limited available evidence strongly suggests that any “empirical truths” that might be drawn from the urban

literature cannot be directly applied to rural. While the available rural focused criminology literature is slowly growing, it is still too modest to draw any conclusions. We are not ready to conclude that we need new theories of crime that are unique for rural areas, but it is clear additional work on rural crime is needed. What is it about rural that makes it fundamentally different than urban when it comes to crime? Or is it as simple as the quality of the ecological data is not up to the task?

The methods adopted here have proven to be promising but the results are suggestive and clearly additional empirical work is required. For example, we pick two periods in time that coincide with the availability of Census data, specifically quality income distribution data. A systematic examination of different timeframes would lend additional insights into how these structural changes are occurring. For example, all three core theories of crime used in this study suggest that changes over time are important. Our results suggest that time dynamics matter but we can only guess at what those dynamics are or are not. One approach might be to explore distributive lag structures with dynamic changes stepped back in time.

In addition, the FBI Unified Crime Reports have well known deficiencies and the examination of other measures of crime would also prove useful. Unfortunately, these data are considered the best that we have for rural studies outside of focused case-studies. In addition, these crime data are widely used to base policy discussions and decisions. Because we are modeling changes in crime over time the relatively stagnant rural crime rates might be problematic. From the simple aggregate urban-rural crime trends (Figure 1a, 1b, 1c) the noticeable decline in urban crime tells us that there is likely significant variation in the dependent variables of our models. But the stagnant rural crime pattern suggests that there may be little variation in the dependent variables for the rural models. The lack of variation may be causing problems with the statistical analysis.

We have also strategically limited the number of control variables that are examined and omitted variable bias could be a problem. The approach of Lee and his colleagues of combining several variables into “distress” indices may prove fruitful. Rather than including all the theoretically relevant variables at the same time and risking multicollinearity along with potentially distracting inconsistent results, the researchers could use constructed indices to control for these factors and then isolate key variables of interest. Despite these limitations, this study has offered an alternative way of thinking about the ecological empirical criminology literature.

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Endnotes

¹ Because we use county level data the technical correct terms are metropolitan and nonmetropolitan as opposed to urban and rural. The Bureau of the Census defines counties as metro and nonmetro and places (municipalities) as urban and rural. We will use the terms interchangeably

² Following the work of Coleman (1988), Flora and Flora (1993), Putnam (1993, 1995, 2000), and Turner (1999), Shaffer, Deller, and Marcouiller (2004:203-4) offer the following definition of social capital:

Social capital refers to features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit. Networks of civic engagement foster norms of general reciprocity and encourage the emergence of social trust. Social capital consists of the social networks in a community, the level of trust between community members, and local norms. These networks, norms and trusts help local people work together for their mutual benefit.

Such a broad definition of social capital is attractive from a conceptual perspective, but it creates serious problems for research interested in developing specific empirical metrics.

³ See Lott and Whitley (2003) for a detailed discussion of problems with the county level FBI UCR data which is used in this study as well as most ecological studies of U.S. crime patterns

⁴ An approach advanced by Lee and his colleagues (Lee and Ousey 2001; Lee, Maume and Ousey 2003; Lee and Bartlowski 2004; Lee and Thomas 2010) suggests that to avoid problems of collinearity one can control for a range of variables in the form of indices. For example, by combining variables such as poverty, income and unemployment (among others) into a single index researchers can the focus on variables of interest such as different metrics of social capital.

⁵ One could make the case that if the early empirical results were consistent there would be little academic interest in continuing to explore this line of research.

⁶ Missing data within the FBI UCR removes a handful of counties from the analysis.

⁷ The condition indices approach is not a statistical test hence there are no probabilistically determined critical values Monte Carlo simulation suggest that values below 30 indicate no collinearity problems, but values above 100 suggest that collinearity is a problem (Judge, et al. 1982). At values between 30 and 100 the test is indeterminate.

References

- Barnet, Cynthia and F. Carson Mencken. 2002. "Social Disorganization Theory and the Contextual Nature of Crime in Nonmetropolitan Counties." *Rural Sociology* 67:372-393.
- Baumer, Eric P. and Regan Gustafson. 2007. "Social Organization and Instrumental Crime: Assessing the Empirical Validity of Classic and Contemporary Anomie Theories." *Criminology* 45(3):617-663.
- Bausman, Kent W. Richard Goe. 2004. "An Examination of the Link Between Employment Volatility and the Spatial Distribution of Property Crime Rates." *The American Journal of Economics and Sociology* 63(3):665-695.
- Beccaria, Cesare. 1764/1963. *On Crime and Punishment*. Indianapolis, IN: Bobbs-Merrill.
- Becker, Gary.S. 1968. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76:169-217.
- Becker, Gary. S. (1993). "Nobel Lecture: The Economic Way of Looking at Behavior." *Journal of Political Economy*. 101:385-409.
- Belliar, Paul E. and C.R. Browning. 2010. "Contemporary Disorganization Research: An Assessment and Further Test of the Systemic Model of Neighborhood Crime." *Journal of Research in Crime and Delinquency* 47(4):496-521.
- Belsley, David A., Edwin Kuh and Roy E. Welsch. 1980. *Regression Diagnostics: Identifying Influential Observations and Sources of Collinearity*. John Wiley and Sons: New York.
- Berger, Ron J., Marvin D. Free Jr. and Pattie Searles. 2005. *Crime, Justice and Society: An Introduction to Criminology*. Boulder, CO: Lynne Rienner Publishing. 2nd Edition.
- Blumstein, Alfred and Allen J. Beck. 2000. *The Crime Drop in America*. New York: Cambridge University Press.
- Bouffard, Leana Allen and Lisa R. Muftic. 2006. "The 'Rural Mystique': Social Disorganization and Violence Beyond Urban Communities." *Western Criminology Review* 7(3):56-66.
- Brady, David. 2003. "Rethinking the Sociological Measurement of Poverty." *Social Forces* 81(3):715-751.
- Callan, Tim and Brian Nolan. 1991."Concepts of Poverty and the Poverty Line." *Journal of Economic Surveys* 5(3):243-261.
- Carcach, Carlos. 2000. "Regional Development and Crime." *Trends and Issues in Crime and Criminal Justice*. No. 160. Australian Institute of Criminology. Canberra, Australia.
- Carcach, Carlos. 2001. "Economic Transformation and Regional Crime." *Trends and Issues in Crime and Criminal Justice*. No. 209. Australian Institute of Criminology. Canberra, Australia.
- Chiricos, Theodore G. 1987. "Rates of Crime and Unemployment: An Analysis of Aggregate Research Evidence." *Social Problems* 34(2):187-212.
- Chisholm, John and Chongwoo Choe. 2004. "Income Variables and the Measures of Gains from Crime." *Oxford Economic Papers* 57(1):112-119.
- Chiu, W. Henry and Paul Madden. (1998). "Burglary and Income Inequality." *Journal of Public Economics* 69(1):123-141.
- Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94 Supplement: S95-S120.
- DeFina, Robert H. (2007). "A Comparison of Poverty Trends and Policy Impacts for Working Families using Different Poverty Indexes." *Journal of Economic and Social Measurement* 32(2-3):129-147.
- Deller, Steven C. and Melissa Deller. 2010. "Rural Crime and Social Capital." *Growth and Change* 41(2):221-275.
- Deller, Steven C. and Craig Maher. 2006. "A Model of Asymmetries in the Flypaper Effect." *Publius: The Journal of Federalism* 36(2):213-229.

- Deller, Steven C. and Norman Walzer. 1995. "Structural Shifts in the Treatment of Intergovernmental Aid: The Case of Rural Roads." *Journal of Agricultural and Applied Economics* 27(2):522-535.
- Donnermeyer, Joseph F. 2007. "Rural Crime: Roots and Restoration." *International Journal of Rural Crime* 1:2-20.
- Donnermeyer, Joseph F., Jobes, Patrick, and Elaine Barclay. 2006. 'Rural Crime, Poverty, and Community'. In W.S. DeKeseredy, and B. Perry. Lanham (eds) *Advancing Critical Criminology*; Lexington Books.
- Ehrlich, Isaac. 1973. "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy* 81:521-565.
- Ehrlich, Isaac. 1975. "On the Relation Between Education and Crime." In F. T. Juster, editor, *Education, Income, and Human Behavior* McGraw-Hill Book Co., New York.
- Fajnzylber, Pablo, Daniel Lederman and Norman Loayza. 2002. "What Causes Violent Crime?" *European Economic Review* 46(7):1323-1357.
- Fay, Marianne. 1993. *Illegal Activities and Income Distribution: A Model of Envy*. New York: Department of Economics, Columbia University.
- Field, Simon. (1990). *Trends in Crime and their Interpretation: A Study of Recorded Crime in Post-War England and Wales*. Home Office Research Study 119.
- Fleisher, Belton M. 1963. "The Effect of Unemployment on Juvenile Delinquency." *Journal of Political Economy* 71:543-555.
- Fleisher, Belton M. (1966a). "The Effect of Income on Delinquency." *American Economic Review*. 56:118-137.
- Fleisher, Belton M. (1966b). *The Economics of Delinquency*. Qaudrangle: Chicago.
- Flora, Cornelia B. and Jan L. Flora. 1993. "Entrepreneurial Social Infrastructure: A Necessary Ingredient." *Annals, American Association of Political and Social Sciences*. 529(Sept.):48-58.
- Gould, Eric D., Bruce A. Weinberg and David B. Mustard. 2002. "Crime Rates and Local Labor Market Opportunities in the United States: 1979-1997." *Review of Economics and Statistics* 84(1):45-61.
- Jobes, Patrick C. 1999. "Residential Stability and Crime in Small Agricultural and Recreational Towns." *Sociology Perspectives* 42:499-524.
- Judge, George G., R. Carter Hill, William E. Griffiths, Helmut Lütkepohl, and Tsoung-Chao Lee 1982. *Introduction to the Theory and Practice of Econometrics*. New York: John Wiley & Sons.
- Kawachi, Ichiro and Bruce P. Kennedy. 1997. "Socioeconomic Determinants of Health: Health and Social Cohesion: Why Care About Income Inequality." *British Medical Journal* 5:314.
- Kelly, Morgan. 2000. "Inequality and Crime." *Review of Economics and Statistics* 82(4):530-539.
- Kennedy, Bruce P., Ichiro Kawachi, Deborah Prothrow-Stith, K. Lochner and V. Gupta. 1998. "Social Capital, Income Inequality, and Firearm Violent Crime." *Social Science and Medicine* 47(1):7-17.
- Land, Kenneth C., Patricia L. McCall and Lawrence E. Cohen. 1990. "Structural Covariates of Homicide Rates: Are There Any Invariances Across Time and Social Space?" *American Journal of Sociology* 95:922-963.
- Laub, John H. 1981. "Ecological Considerations in Victim Reporting to the Police." *Journal of Criminal Justice* 9:419-430.
- Lederman, Daniel, Norman Loayza and Ana María Menéndez. 2002. "Violent Crime: Does Social Capital Matter?" *Economic Development and Cultural Change* 50(3):509-539
- Lee, Matthew R. and John P. Bartkowski. 2004. "Love They Neighbor? Moral Communities, Civic Engagement, and Juvenile Homicide in Rural Areas." *Social Forces* 82(3):1001-1035.
- Lee, Matthew R., Michael O. Maume and Graham C. Ousey. 2003. "Social Isolation and Lethal Violence Across the Metro/Nonmetro Divide: The Effects of Socioeconomic Disadvantage and Poverty Concentration on Homicide." *Rural Sociology* 68(1):107-131.
- Lee, Matthew R. and Graham C. Ousey. 2001. "Size Matters: Examining the Link between Small Manufacturing, Socioeconomic Deprivation, and

- Crime Rates in Nonmetropolitan Communities.” *Sociological Quarterly* 42(4):581-602.
- Lee, Matthew R. and Shaun A. Thomas. 2010. “Civic Community, Population Change, and Violent Crime in Rural Communities.” *Journal of Research in Crime and Delinquency* 47(1):118-147.
- Li, Yuh-Yuh. 2009. *Social Structure, Social Control, and Crime in Rural Communities: A Test of Social Disorganization Theory*. PhD dissertation, Ohio State University, Columbus, OH.
- Lott, John R. Jr. and John E. Whitley. 2003. “Measurement Error in the County-Level UCR Data.” *Journal of Quantitative Criminology* 19:185-198.
- Matsueda, Ross L, Derek A. Kreager and David Huizinga. 2006. “Deterring Delinquents: A Rational Choice Model of Theft and Violence.” *American Sociological Review* 71(February):95-122.
- Mazerolle, Lorraine, Rebecca Wickes and James McBroom. 2010. “Community Variations in Violence: The Role of Social Ties and Collective Efficacy in Comparative Context.” *Journal of Research in Crime and Delinquency* 47(1):3-30.
- Merton, Robert. 1938. “Social Structure and Anomie.” *American Sociological Review* 3(10):672-682.
- Merton, Robert. 1968. *Social Theory and Social Structure*. New York: Free Press.
- Messner, Steven F., Eric P. Baumer and Richard Rosenfeld. 2004. “Dimensions of Social Capital and Rates of Criminal Homicide.” *American Sociological Review* 69(6):882-903.
- Messner, Steven F. and Richard Rosenfeld. 1994/2001/2007. *Crime and the American Dream*. Belmont, CA: Wadsworth. (3rd Edition 2001, 4th Edition 2007).
- Messner, Steven F. and Richard Rosenfeld. 1997. “Political Restraint of the Market and Levels of Homicide: A Cross-national Application of Institutional Anomie Theory.” *Social Forces* 75:1393-1416.
- Messner, Steven F. and Richard Rosenfeld. 2006. “The Present and Future of Institutional Anomie Theory.” In F.T. Cullens (ed.) *Taking Stock: The Status of Criminological Theory: Advances in Criminological Theory*. Volume 15. Piscataway, NY: Transaction Books.
- Osgood, D.Wayne and Jeff M. Chambers. 2000. “Social Disorganization Outside the Metropolis: An Analysis of Rural Youth Violence.” *Criminology* 23(1):81-114.
- Ouimet, Marc. 2002. “Explaining the American and Canadian Crime Drop in the 1990s.” *Canadian Journal of Criminology* 44(1):33-50.
- Park, Robert E. and Ernest W. Burgess. 1925. *The City*. Chicago, IL: University of Chicago Press.
- Patterson, Britt E. 1991. “Poverty, Income Inequality, and Community Crime Rates.” *Criminology* 29:755-775.
- Petee, Thomas and Gregory S. Kowalski. 1993. “Modeling Rural Violent Crime Rates: A Test of Social Disorganization Theory.” *Sociological Focus* 26(1):87-89.
- Phillips, Julie A. 2006. “Explaining Discrepant Findings in Cross-Sectional and Longitudinal Analysis: An Application to U.S. Homicide Rates.” *Social Science Research* 35(4):948-974.
- Pratt, Travis C. and Timothy W. Godsey. 2003. “Social Support, Inequality, and Homicide: A Cross-National Test of an Integrated Theoretical Model.” *Criminology* 41(3):611-643.
- Putnam, Robert D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press, Princeton, New Jersey.
- Putnam, Robert D. 1995. “Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America.” *Political Science and Politics* 28:664-683.
- Putnam, Robert D. 2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon and Schuster: New York.
- Pyle, David J. and Derek Deadman. 1994. “Crime and Unemployment in Scotland.” *Scottish Journal of Political Economy* 41(3):325-335.
- Reilly, Barry and Robert Witt. 1996. “Crime, Deterrence and Unemployment in England and Wales: An Empirical Analysis.” *Bulletin of Economic Research* 48(2):137-159.
- Reisig, Michael D. and Jeffrey M. Cancino. 2004. “Incivilities in Nonmetropolitan Communities: The Effects of Structural Constraints, Social Conditions, and Crime.” *Journal of Criminal Justice* 32(1):15-29.

- Rephann, Terry. (1999). "Links Between Rural Development and Crime." *Papers in Regional Science*. 78:365-386.
- Sampson, Robert J. 2002. "Transcending Tradition: New Directions in Community Research, Chicago Style." *Criminology* 40:213-230.
- Sampson, Robert J. 2006. "Collective Efficacy Theory: Lessons Learned and Directions for Future Inquiry." In F.T. Cullen, J.P. Wright, and K. Blevins (eds.) *The Status of Criminological Theory: Advances in Criminological Theory Vol 15*. New Brunswick, N.J.: Transaction Publishers. Pp. 149-167.
- Sen, Amartya. 1976. "Poverty: An Ordinal Approach to Measurement." *Econometrica* 44:219-231.
- Sen, Amartya. 1979. "Issues in the Measurement of Poverty." *Scandinavian Journal of Economics* 81:285-307.
- Shaffer, Ron, Steven C. Deller and David W. Marcouiller. 2004. *Community Economics: Linking Theory and Practice*. Second Edition. Oxford: Blackwell Publishing.
- Shaw, Clifford R. and Henry D. McCay. 1931. "Social Factors in Juvenile Delinquency." In *Report of the Causes of Crime, Vol 2*. National Commission on Law Observance and Enforcement. Washington DC: Government Printing Office.
- Shaw, Clifford R. and Henry D. McCay. 1942. *Juvenile Delinquency and Urban Areas*. Chicago, IL: University of Chicago Press.
- Shaw, Clifford R. and Henry D. McCay. 1969. *Juvenile Delinquency and Urban Areas*. Revised. Chicago, IL: University of Chicago Press.
- Smith, Brent L. 1980. "Criminal Victimization in Rural Areas." In B.R. Price and R.A. Silverman (eds) *Criminal Justice Research: New Models and Findings*. Boulder, CO: Westview Press.
- Spano, Richard. and Steven. Nagy. 2005. "Social Guardianship and Social Isolation: An Application and Extension of Lifestyle/ Routine Activities Theory to Rural Adolescents." *Rural Sociology* 70(3): 414-437.
- Thorbecke, Erik and Chutatong Charumilind. 2002. "Economic Inequality and Its Social Impact." *World Development* 30(9):1477-1495.
- Timbrell, Michael. 1990. "Does Unemployment Lead to Crime?" *Journal of Interdisciplinary Economics* 3:223-242.
- Tolbert, Charles M. 2005. "Minding Our Own Business: Local Retail Establishments and the Future of the Future of Southern Civic Community." *Social Forces* 83:1309-13028.
- Tolbert, Charles M., Michael D. Irwin, Thomas A. Lyson and Alfred R. Nucci. 2002. "Civic Community in Small-Town America: How Civic Welfare is Influenced by Local Capitalism and Civic Engagement." *Rural Sociology* 67:90-113.
- Tolbert, Charles M., Thomas A. Lyson and Michael D. Irwin. (1998). "Local Capitalism, Civic Engagement, and Socioeconomic Well-Being." *Social Forces*. 77:401-419.
- Turner, Robyne S. 1999. "Entrepreneurial Neighborhood Initiatives: Political Capital in Community Development." *Economic Development Quarterly* 13:15-22.
- Vold, George B., Thomas J. Bernard and Jeffrey B. Snipes. 2002. *Theoretical Criminology*. Oxford: Oxford University Press. 5th Edition.
- Weisheit, Ralph A. 2008. "Making Methamphetamine." *Southern Rural Sociology* 23(2):78-107.
- Weisheit, Ralph A. and Joseph F. Donnermeyer. 2000. "Changes and Continuity in Crime in Rural America." Pp. 309-359 in *Criminal Justice 2000 Series, Volume 1, The Nature of Crime*. Washington, D.C.: U.S. Department of Justice, National Institute on Justice.
- Wells, L. Edward and Ralph A. Weisheit. 2004. "Patterns of Urban and Rural Crime: A County-Level Comparison." *Criminal Justice Review* 29(1):1-22.
- Zheng, Buhong. 1997. "Aggregate Poverty Measures." *Journal of Economic Surveys* 11(2):123-163.
- Zheng, Buhong. 2000. "Poverty Orderings." *Journal of Economic Surveys* 14(4):427-267.

Appendix

Appendix A: Descriptive Statistics						
	Non Metro		Metro		All Counties	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Median Household Income 1989	21,351.61	4,323.55	28,370.34	7,023.40	23,751.12	6,343.59
Change in Median Household Income 1989-1999	11,562.68	2,740.76	14,129.06	4,236.73	12,440.05	3,543.71
Unemployment Rate 1989	6.38	3.18	5.64	2.25	6.13	2.91
Change In Unemployment Rate 1989-1990	-1.29	2.25	-1.68	1.44	-1.42	2.02
Population 1990	22,522.85	54,794.79	180,940.99	429,410.76	76,681.56	265,750.28
Change In Population 1990-2000	4,274.62	11,122.17	31,482.27	66,802.08	13,576.16	42,102.88
Gini Coefficient 1989	0.25	0.04	0.32	0.06	0.27	0.06
Change in Gini Coefficient 1989-1999	0.10	0.02	0.10	0.02	0.10	0.02
Ratio of Low-to-High Income 1989	101.80	120.48	51.52	79.99	84.77	111.04
Change in Ratio of Low-to-High Income 1989-1999	-83.84	118.94	-43.49	77.10	-70.18	108.31
Poverty Rate 1989	18.55	8.07	13.35	6.34	16.77	7.92
Change in Poverty Rate 1989-1999	-3.91	3.69	-2.49	3.08	-3.43	3.55
Child Poverty Rate 1989	23.57	10.64	17.31	8.59	21.43	10.41
Change in Child Poverty Rate 1989-1999	-3.06	5.32	-2.22	3.96	-2.77	4.92
Change in Total Crime 1990-2000	-578.24	1,454.59	-1,098.35	1,728.42	-760.20	1,575.24
Change in Violent Crime 1990-2000	-577.58	1,468.80	-1,070.60	2,035.30	-750.06	1,704.68
Change in Property Crime 1990-2000	-558.62	1,331.83	-995.76	1,538.28	-711.61	1,422.63

Source: Census, 1990, 2000 and the FBI Uniform Crime Reports

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