



A non-stationary panel data investigation of the unemployment–crime relationship



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ABSTRACT

Many empirical studies of the economics of crime focus solely on the determinants thereof, and do not consider the dynamic and cross-sectional properties of their data. As a response to this, the current paper offers an in-depth analysis of this issue using data covering 21 Swedish counties from 1975 to 2010. The results suggest that the crimes considered are non-stationary, and that this cannot be attributed to county-specific disparities alone, but that there are also a small number of common stochastic trends to which groups of counties tend to revert. In an attempt to explain these common stochastic trends, we look for a long-run cointegrated relationship between unemployment and crime. Overall, the results do not support cointegration, and suggest that previous findings of a significant unemployment–crime relationship might be spurious.

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1. Introduction

1.1. Some theories of unemployment and crime

Crime rates usually exhibit substantial variation across time. Indeed, the total number of offences recorded by Swedish police per 100,000 of the population has gone from 9223 in 1975 to 14,613 in 2010, an increase of more than 50%. However, there is not only the variation across time, there is also cross-sectional variation, which is just as pronounced. For example, in 2001, the number of thefts and robberies per capita reported in the capital of Stockholm was 0.09, which is almost twice the crime rate in the rural southern county of Blekinge. The most northern county of Norrbotten has a similar low crime rate of 0.05, whereas in Skåne, which is a neighboring county of Blekinge, the crime rate is almost as high as in Stockholm.

The large variation in crime rates over time and across areas has stimulated a large literature in economics, sociology, and criminology attempting to explain the determinants of crime. In economics, much of the literature has been influenced by the pioneering works of Becker (1968) and Ehrlich (1973), suggesting that the choice of the individual of whether or not to engage in crime may be viewed as a tradeoff between the expected costs and benefits of crime. While the theory does not rule out that criminals differ systematically in various aspects from those who abide laws, it predicts that individuals do respond to incentives. The works of Becker and Ehrlich have stimulated a voluminous empirical literature attempting to establish a link between crime and various measurable opportunities that can explain criminal motivation. A particularly well-researched area is the unemployment–crime relationship. The idea is that a depressed labor market, for example,

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makes crime relatively more attractive than work. Thus, we may expect a positive unemployment–crime relationship for crimes that give direct financial payoff such as burglary, theft and auto theft.

The theory advanced by [Becker \(1968\)](#) and [Ehrlich \(1973\)](#) has been generalized by [Sah \(1991\)](#), who develops the first of a new class of dynamic deterrence models. In contrast to the original theory, Sah advances a model where individuals' perceptions concerning their probability of punishment are determined endogenously in the economy. Also, by letting the perceived probability of arrest differ from the actual probability, and therefore has to be learned from experience, crime is expected to be persistent over time. An important implication of this is that the effects of policy may take time to materialize, and hence that any static approach to modeling is likely to be inadequate.¹

In another influential study, [Cantor and Land \(1985\)](#) point out that the unemployment–crime relationship is not only affected by changes in motivation of unemployed individuals, the so-called “direct effect”, but also by employed individuals' motivation to commit crime, the so-called “contextual effect”, both of which are driven by economic conditions. Since the rate of unemployment may be viewed as a measure of economic activity, the total effect of unemployment on crime is given by the sum of the direct and contextual effects. The authors also highlight a potential countervailing effect of economic activity, the criminal “opportunity effect”. Fluctuations in economic activity affect the availability of criminal targets and therefore the number of criminal opportunities. If the unemployment rate is high, for example, more individuals are at home rather than at work, leading to increased guardianship and fewer crime targets. Conversely, due to the increased income, a booming economy increases both the number and attractiveness of crime targets.

An alternative perspective on the unemployment–crime relationship is offered by sociological theories, such as strain and social control theory (see, for example, [Agnew, 1992](#)). Strain theory emphasizes that the anxiety of unemployment impacts individuals' aspirations and expectations, which in turn affect their motivation to commit crime. If such mechanisms are in action, we expect a positive unemployment–crime relationship. Social control theory suggests that individuals' commitments, relationships and beliefs encourage them to abide laws. According to this view, the process of socialization and social learning builds self-control and reduces criminal involvement by increasing the costs associated with deviant acts. The theory predicts that as individuals invest time and energy in their work, criminal behavior is avoided in order not to jeopardize these investments. Thus, as with strain theory, social control theory suggests a positive unemployment–crime relationship.

The above theories are, of course, not the only factors affecting the unemployment–crime relationship. Alcohol consumption, for example, usually varies pro-cyclically leading to a negative relationship between unemployment and crime ([Ruhm, 1995](#)). However, while the exact impact of unemployment is ambiguous, these theories and factors all predict that crime should have a strong common component, and that this component should be driven mainly by unemployment.

There are other theories, not directly related to unemployment, which also predict that local-level crime rates should tend to co-move. [LaFree \(1998\)](#), for example, argues that crime is affected by the legitimacy that individuals grant to key social institutions, who act to suppress crime. According to this view, crime rates are expected to increase in periods of diminishing trust in political institutions and decreasing family stability. While perceptions of institutional legitimacy may vary somewhat between regions within a country, it is likely that they are driven by a general pattern that operate across the nation as a whole. Similarly, routine activity theory ([Cohen and Felson, 1979](#)) emphasizes the role country-wide factors, such as female labor force participation, that influence criminal opportunities.

1.2. The empirics of unemployment and crime

The discussion above makes clear that the hypothesized unemployment–crime relationship may be either positive or negative, and over the past decades a large empirical literature has attempted to estimate this relationship. In this section we offer a brief discussion of this literature with a focus on recent panel data studies. The point is not to make a complete review, but to point to two issues that we believe have not been appropriately addressed in the literature; (i) the persistence, or trending behavior, of crime and (ii) the co-movement of local-level crime rates.

[Chiricos \(1987\)](#) provides an early overview of the large empirical literature on the unemployment–crime relationship. The results of the 63 articles considered (published in journals in economics, sociology and criminology) are mixed, at best. He therefore concludes that “this paper underscores how little we really know about this issue” (page 202). More recent reviews are provided by [Piehl \(1998\)](#), [Levitt \(2001\)](#) and [Mustard \(2010\)](#). While the first author declares that there is surprisingly little evidence that economic conditions influence crime rates, the latter two find supportive evidence of a positive unemployment–crime relationship. One reason for this, it is argued, is the increased availability and use of data at local levels, such as cities, counties, and metropolitan areas, which are more likely to document a relationship between labor markets and crime than research that uses aggregated country data. This is because national data might disguise cross-sectional variation in crime that is needed to identify the relationship. Indeed, as [Forni and Lippi \(1997\)](#) show, aggregation across heterogeneous units is likely to lead to misleading results.

The issue of aggregation is discussed to some extent by [McDowall and Loftin \(2009\)](#), who try to assess the degree to which the crime rates of US cities follow a national trend. Clearly, if the observed nationwide trend is just due to chance aggregation of factors that varies within local areas, then national conditions are unlikely to be successful in explaining

¹ [Lochner \(2004\)](#) provides empirical evidence of such belief updating and concludes that the full impact of crime reduction policies may not be realized for many years. [Imai and Krishna \(2004\)](#) and [Sickles and Williams \(2008\)](#) provide further evidence in favor of a dynamic deterrence theory based on an individual's perceived probability of arrest.

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