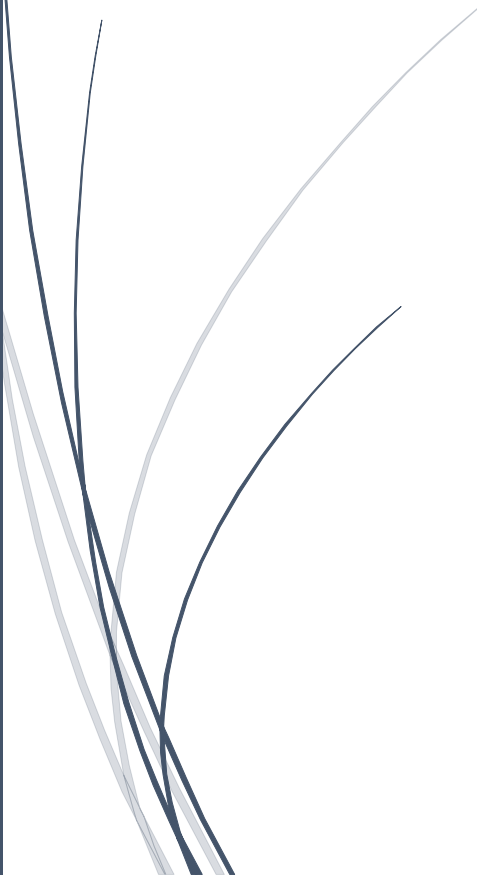


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# Risk Preferences and Crime



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## **I. Introduction**

Crime has always been seen as risky, but only recently has the choice to engage in that risk been examined as an economic choice (Becker 1968). There is a myriad of answers to the question of why people engage in crime from socio-economic background to racial prejudice to simply wanting to acquire more personal wealth, but one aspect that is rarely examined is how people approach the risk itself. Not the punishment, or the chance of getting caught (although those factor in), but the willingness of the individual to engage in any sort of risk. Different individual risk preferences could have a significant impact on criminal activity, and this paper intends to uncover how criminal choice varies with the riskiness of the individual. This will not be the first paper to broach that topic, but it will bring something new to the table, namely analysis of a real-world dataset that deals directly with risk aversion as opposed to theoretical or experimental investigations. Section II presents the literature on criminal risk. Section II elaborates on the objectives of the paper. Section IV details the econometric methods done on the while Section V analyzes the results. The conclusion and areas for future research can be found in Section VI.

## **II. Literature Review**

### **A. Crime**

Economic methods have been expanding into the criminal justice system since the 1960s as economists began thinking of the decision to commit a crime as just another variation on rational choice. The most famous example of this relatively recent trend is Becker's *Crime and Punishment: An Economic Approach* (1968), which began to model

a potential criminal's thought process as one which examines the potential benefits of committing the crime, the chance of getting caught, and the punishment if getting caught were to occur. Further economic literature in the criminal justice system has been along the same track, making models for criminal activity that deviate from Becker's initial design and into the economic implications and causes of criminal activity (Ehrlich 1996, Brown and Reynolds, Block et al. 1975). However, little direct research is done on those who commit crimes themselves. While Becker's initial piece and later modeling attempts reference the risk preferences of those who were willing to commit crime, none offer direct data on the subject despite these papers being built on assumptions about risk preferences. Becker's model, for example, only explains the data on changes in criminal behavior if criminals are risk preferring, and does so without addressing data on risk preferences directly, as shown below.

Becker's economic model of crime is a model of straightforward expected utility maximization, and is recreated below.

$$EU = pU(Y - f) + (1 - p)UY$$

$p$  is the probability of being caught;

$U$  is the utility function;

$Y$  is the utility from committing the act, both in terms of material and psychic gains;

$f$  is the intensity of the punishment.

We can then write the first order conditions of  $p$  and  $f$  below

$$\frac{\partial EU}{\partial p} = U(Y - f) - U(Y) < 0$$

$$\frac{\partial EU}{\partial f} = -pU(Y - f) < 0$$

Becker then compares the average change in utility from modifying the intensity of punishments to the marginal change in utility, deriving the function below.

$$\frac{U(Y) - U(Y - f)}{f} = U(Y - f)$$

Thus, the average change in utility would be greater than the marginal change if  $U'' > 0$ , which is the definition of a preference for risk (Becker 1975, Ehrlich 1967).

As Becker references in his piece, empirical evidence has made it clear that changes in  $p$  are more impactful than changes in  $f$  on the prevalence of criminal activity, validating his conclusions if and only if criminals prefer risk (Smigel 1965, Ehrlich 1967). In other words, assuming the empirical evidence on criminal reactions to changes in  $p$  and  $f$  is true, Becker's model is accurate if it is true that criminals are risk preferers.

That the veracity of his model depends on those who commit crimes being risk preferers has been a large point of contention for future theorists working to modify his model (Ehrlich 1996, Brown and Reynolds 1973, Block et al. 1975). Much focus has come on this part of Becker's conclusions because the general population is risk averse, as has been verified again and again and is summarized well in the literature

review cited here (Eckel and Grossman 2008). This will be one of the primary focuses of this paper, as since Becker's model relies upon those who commit crimes being less risk averse than the rest of the population, if this turns out not to be the case Becker's model does not match the available data.

It is worth noting that each paper which doubts Becker's model does so in respect to how he handles risk preferences, more often than not with the specific concern that his finding of risk preferring criminals is inaccurate (Ehrlich 1996, Brown and Reynolds 1973, Block et al. 1975). As a result, most models have been modifications of the initial Becker model that allow for criminals to be risk averse. While the different models of crime use varying methods, all have one thing in common: the results are due in part to the risk preferences of the agents who are contemplating crime, and the disagreement comes in part from what those risk preferences might be.

One common disagreement with Becker's model is on how criminals, and how people, view what they risk losing. Becker assumes a very economically rational approach to risk, arguing that people see their lost income as losing everything they could have possibly gained. For example, if robbing a store would have earned you \$100,000, then the losses from being caught are not just the unpleasantness and lost income from prison, it is also the \$100,000 not received from a successful robbery. Later theorists have disputed that this is in fact how people view risk, both in experiments separate from Becker and criminal justice that introduce the concept of prospect theory as a way of looking at risk in terms of gains and losses instead of absolute utility (Kahneman and Tversky 1971), and in further iterations on the Becker model (Brown and Reynolds, 1973). These further theorists suggest that people are not

thinking of the potential losses from criminal activity as  $Y+f$ , and are instead thinking of those losses only as  $f$ . Or, in plain English, they are considering the potential punishment as the only negative consequences, and the wealth they failed to successfully acquire does not factor in. Regardless of whether it is correct of the potential criminals to conduct their analysis in this way, if they are not considering as a loss what they do not already have, Becker's model does not properly model their decision making. This paper introduces the idea of prospect theory only to explain how Becker's model is not the only viable option for criminal activity on the market, and thus to reinforce the importance of this research. If criminals are not more risk preferring than the population, not only is Becker's model invalidated, but these other models can move more into the forefront.

## **B. Risk Preferences**

Risk preferences themselves, of course, are widely studied, but little effort has been made to link those studies to criminal activity. One reason for the dearth of research on the subject is the difficulty of studying it. Nonexperimental data on risk preferences has not always been widely available, and the origin of risk preferences is unclear. Psychologists and behavioral economists believe that risk aversion may come from an evolutionary fear of the worst outcome, a general sense of diminishing marginal returns which make the big payoffs often associated with risks provide less utility, or even as a part of basic motivation theory, implying that those with a higher self-confidence will take more risks (Lopes 1986). Whether the true cause of risk preferences is one, none, or a combination of the reason above, the uncertainty makes

one's risk preferences difficult to isolate as a variable, especially when many of the factors that may influence risk preferences must be controlled for in order to get a good approximation of how risk preferences alone correlate with criminal activity.

Fortunately, despite the uncertainty in the origin of risk preferences, the preferences themselves are frequently studied using both self-assessments and hypothetical gambles (Eckel and Grossman 2008). A general trend towards risk aversion in the population as well as varying risk preferences among genders and socio-economic statuses have been reported on, as have the relationship of risk preferences to other risky activities, such as smoking, sports, or moving for a new job. However, all direct studies of both risk preferences and criminal activity have been severely limited. Dohmen et al. (2005) looked into how risk preferences may correlate with traffic offenses, while Block et al. (1995) shows experimentally that incarcerated individuals are less risk averse than the general population in laboratory settings, although only with a sample size of 40.

### **III. Objectives**

This paper intends to be the first direct analysis of real-world data on the risk preferences of those who have committed crimes to answer two key questions. First, how do the risk preferences differ for those who have committed crimes as opposed to the general population, and, second, how does the importance of risk aversion vary between different races and genders. The first question hopes to provide answers into the importance of risk aversion, which will provide a framework for further researchers

to look into models of criminal choice armed with the knowledge that the aversion towards risk is different among those who are likely to commit crimes. This paper is also potentially beneficial for education towards crime prevention despite the fact that the data analysis will not prove causation between varying risk preferences and crime, it will represent a step in that direction. Furthermore, this paper serves as an empirical test on Becker's famous model of crime. If it turns out that those who engage in criminal activity are not any more risk preferring than the rest of the population, then Becker's model is invalidated, and only the later modifications of his model should be considered by policy makers attempting to understand the decision to commit a crime. This is especially important since Becker's paper goes on to make policy suggestions, claiming that the best way to deal with crime is to set punishments extremely high and to keep a low probability of being caught, since it is the most cost-effective way to reduce crime according to his model. This paper will examine this question in race-gender groups (black males, Asian females, etc.) because in the criminal justice system where race and gender are such important factors, it is important to see these results separated in addition to aggregated. If the impact of risk aversion on criminal behavior is lower with one race-gender group, for example, education in risk aversion would be less effective on that group in reducing crime.

#### **IV. Plan for Analysis**

This analysis relies on data from the 1997 National Longitudinal Survey of Youth (NLSY97), a US Bureau of Labor Statistics project which gave a questionnaire to a group (n = 8984) of young Americans every year from 1997 to 2013. This panel study is



one of the few data sources that offers information tying risk preferences to criminal activity, using the information outlined below.

Risk preferences, the primary independent variable of interest, are formed using a self-assessment provided in the NLSY97, in which respondents must rate their own risk preferences from a scale of 1-10, the higher the number the more willing they are to take risks. This is following results of newer research into risk preferences. While in the past risk preferences were measured using hypothetical gambles, data which is available in the NLSY97, recent studies have shown that self-assessments are far more accurate at predicting actual risky activity. Dohmen et al. (2005) found in a German study of 40,000 participants that when comparing the ability of hypothetical gambles and self-assessments of riskiness to predict actual risky behavior such as career risks, sports, or financial investments, self-assessments were far more accurate than the gambles, correlating with the risky behavior at  $R^2$  values of .609, .563, .506 respectively, values significantly higher than the correlation between the hypothetical gambles and risky activity. While the exact cause of this difference is unknown, it is likely that in aggregate people are able to estimate their own willingness to take risks more effectively than a hypothetical gamble is since the self-assessment asks for a holistic approach to thinking about riskiness rather than deciding a course of action in a single instance (Dohmen et al. 2005).

Criminal behavior, the dependent variable, is measured using data from the NLSY97. The self-reported nature of the data throws some doubts on the accuracy of the information, especially considering the discussion is on a taboo subject such as criminal activity. As such this paper focuses on correlating the risk index with multiple

measures of criminal activity (all listed in Appendix B) to minimize the chance that deception on any one question has a significant effect. The varying responses need to be measured using different econometric methods, but can be split into two groups.

Binary responses, such as “have you been incarcerated” or “have you been convicted of a crime,” are analyzed using the probit model, looking for how changes in risk preferences change the probability one is involved in criminal activity. The answers to these questions are taken from nonbinary questions “how many times have you been arrested,” for example, as turning that question into a yes or no question is straightforward. The probit model is being used since the dependent variable is a probability, namely the probability of being involved in criminal activity, and thus a standard linear regression will not suffice.

Responses on more of a spectrum, such as “how many months have you been incarcerated” or “what was your longest incarceration” are examined on a linear model examining how changes in risk preferences increase the severity of the crimes one commits, as measured by the length of incarceration. Length of incarceration is used as a proxy to determine the severity of the crime, with longer incarcerations implying more heavily punished and thus riskier criminal activity.

Each regression with risk preferences as the primary independent variable and some measure of criminal activity as the dependent variable are run separately, and all have a series of other independent variables as controls. Controls include personal gang activity, family gang activity, poverty, income, unemployment, urban/rural residence, father’s highest education, mother’s highest education, SAT scores, traumatic events which include deaths in the family, family members going to jail, and

divorce. Since the regressions are run for each race/gender group, race and gender do not need to be controlled for within the regressions themselves.

**V. Analysis**

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**VI. Conclusions**

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## **Appendix A – Risk Preferences Data**

### **Risk Self-Assessment**

*N- 7436*

*Min- 0*

*Mean- 5.610*

*Median- 5*

*Max- 10*

*Variance- 6.721*

## **Appendix B – Criminal Activity**

### **Total Arrests**

*N- 8984*

*Min- 0*

*Mean- 1.326*

*Median- 0*

*Max- 68*

*Variance- 12.57*

### **Total Incarcerations**

*N- 839*

*Min-1*

*Mean- 1.908*

*Median- 1*

*Max- 12*

*Variance- 1.83*

### **First Incarceration Length, in months**

*N- 839*

*Min- 1*

*Mean- 13.011*

*Median- 4*

*Max- 182*

*Variance- 525.06*

### **Longest Incarceration, in months**

*N*- 839

*Min*- 1

*Mean*-18.378

*Median*- 8

*Max*- 208

*Variance*- 732.60

### **Total Incarcerations Length, in months**

*N*- 839

*Min*- 1

*Mean*- 25.070

*Median*- 10

*Max*- 323

*Variance*- 1227.99

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