RELATIONSHIPS BETWEEN YOUTH CRIME AND EMPLOYMENT: A THEORETICAL AND EMPIRICAL APPROACH

Maureen A. Pirog-Good

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Robin C. Sickles
Supervisor of Dissertation

Graduate Group Chairman

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INTRODUCTION

There is a commonly held belief that causal relationships exist between unemployment and youth crime. For example, in an address to the Joint Economic Committee, Senator Hubert Humphrey stated that if "youths don't have a chance to earn money on the job, they get money on the streets;[1] moreover, the New York Times recently ran a front page series entitled "Cost of Black Joblessness Measured in Fear, Crime and Urban Decay."[2] In addition, these beliefs are evidenced by the fact that many community based crime prevention and nationally sponsored employment programs are structured on the assumption that the introduction of an employment opportunity will beneficially affect a youth's delinquent behaviors. However, past surveys of the relevant literature have reported inconclusive evidence for any relationships between youth employment and juvenile delinquency.[3] A clearer understanding of employment and crime relationships is therefore desirable. Such a study could facilitate the structure of new employment and rehabilitation programs, as well as help to identify target groups of youths who would benefit the most by such programs.

The basis for the empirically unjustified concensus that there exist causal relationships between youth employment and crime is drawn from several theoretical literatures, as well as casual observation. Bascially, the two most frequently cited methods of upward mobility are

investing in additional formal or vocational education or upgrading one's job. However, it is felt that the traditional education system does not provide all youths with a route toward achieving their success goals.[4] It has become increasingly apparent that a high school diploma is not a guarantee of success or even employment because a high school degree either implies that a youth successfully completed a course of study or was pushed through the system. Because potential employers cannot easily differentiate between these youths, they frequently look at other screening devices, such as a higher educational degree, prior work experience or demographic characteristics.[5] Theoretically, the perception of blocked opportunities may result in juvenile delinquency due to the youth's pent up frustration reaching a critical level,[6] the youth concluding that crime is the best rational alternative,[7] and/or the youth disassociating himself from the conventional order.[8] The negative effects of blocked educational and work opportunities are presumed to be greater for older youths, males, minorities, and youths from low socio-economic backgrounds.

In additon, youths with past criminal records or with bad reputations in their nieghborhoods may have difficulties finding employment, an alternative route to success goals for youths. The lack of prior employment, erratic school schedules and weak credentials could exacerbate the employment problem, particularly in geographical locations where there is an excess supply of labor.

Thus, the perceived barriers to upward mobility can result in delinquency which in turn can fortify the actual barriers to upward mobility through legitimate means. An examination of several of the received theories suggests that the possible employment and youth crime

relationships can result in a vicious circle where unemployment results in delinquency and delinquency results in further unemployment.

This dissertation examines the theoretical and empirical basis for various employment and crime relationships, as well as the simultaniety, hierarchical structure or independence of employment and crime. In both the theoretical and empirical sections of the dissertation, various types of criminal events and employment experiences are differentiated from one another, thus enriching the scope of this study. Additionally, attention is focused on the intemporal aspects of these relationships.

Chapter II of this dissertation reviews the theoretical and empirical literatures that pertain to the relationships between youth crime and employment. Surprisingly, the theories on this subject are very general and minimal empirical work utilizing micro level data has been published. Also, no empirical study to date has examined the timing aspects of these relationships.

Chapter III extends the current theories of youth crime and employment. Emphasis is placed on the timing aspects of these relationships. In addition, the nature of the employment experiences and the delinquent acts are discussed both individually and in relation to each other.

The first part of Chapter IV describes the data base available for the empirical section of this dissertation, while the second part of Chapter IV outlines the approach to the data analysis.

Chapter V describes the results of the empirical analysis and discusses the policy-relevant findings.

In Chapter VI, the major findings of the dissertation are

reviewed, and their policy implications are discussed further. In addition, several directions for future research in this area are suggested.

NOTES AND FOOTNOTES

[1]U.S., Congress, Senate, Senator Hubert Humphrey speaking on unemployment and crime before the Joint Economic Committee, 94th Cong., 2nd sess., September 1976, Congressional Record 122:

[2]"Cost of Black Joblessness Measured in Fear, Crime and Urban Decay," New York Times, 12 March 1979, sec. 1, p. 1.

[3]Richard A. Tropp, "Suggested Policy Initiatives for Employment and Crime Problems," in Crime and Employment Issues, (Prepared for the Office of Research and Development, Employment and Training Administration, U.S. Department of Labor, 1978).

[4]See Richard Cloward and Lloyd Ohlin, Delinquency and Opportunity (Glenco, Ill.: The Free Press, 1960); and Gary Becker, Human Capital (New York: National Bureau of Economic Research, 1975).

[5]See Kenneth J. Arrow, "Higher Education as a Filter," in Efficiency in Universities: the La Paz Papers, ed. Keith Lumsden (New York: American Elsevier Publishing Co., Inc., 1974); Michael Spence, "Job Market Signalling," Quarterly Journal of Economics 87 (April 1973); and Gary Becker, The Economics of Discrimination (Chicago: University of Chicago Press, 1957).

[6]See Cloward and Ohlin, Delinquency and Opportunity.

[7]See Gary Becker, "Crime and Punishment: An Economic Approach," Journal of Political Economy 76 (March/April 1968); Issac Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," Journal of Political Economy 81 (May/June 1973); Larry D. Singell, "An Examination of the Empirical Relationship Between Unemployment and Juvenile Delinquency,"The American Journal of Economics and Sociology 26 (October 1967); and Michael Block and J.M. Heinke, "A Labor Theoretic Analysis of Criminal Choice," American Economic Review 65 (June 1975).

[8]See Travis Hirschi, Causes of Delinquency (Berkeley: University of California Press, 1969; reprint ed., Berkeley: University of California Press, 1974); Albert J. Reiss, Jr., "Delinquency as the Failure of Personal and Social Controls," American Sociological Review 16 (April 1951); David Matza, Delinquency and Drift (New York: John Wiley and Sons, Inc., 1964); and Ivan F. Nye, Family Relationships and Delinquent Behavior (New York: Wiley and Sons, Inc., 1958).

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U.S. Congress Senate. Senator Hubert Humphrey speaking on unemployment and crime before the Joint Economic Committee. 94th Congress, 2nd Session, September 1976. Congressional Record, vol. 122.

CHAPTER II

REVIEW OF CRIMINOLOGY AND LABOR MARKET THEORIES SUGGESTING YOUTH CRIME AND EMPLOYMENT RELATIONSHIPS

Introduction

Numerous determinants of youth crime have been cited in the various etiologies of delinquency. Some of these theories either suggest or are compatible with the thesis that labor market experiences, including employment, affect a youth's delinquent propensities. Likewise, theories of the labor market suggest various reasons for entering or leaving the labor force and being hired or rejected when seeking employment. The proposition that an individual's past and present criminal behavior may affect his labor force status is suggested by, or consistent with, a number of the labor market theories. However, the criminology and labor market theories which suggest that relationships between youth crime and labor market experiences exist are very general with respect to the form these relationships may assume. In fact, the theories are compatible with a wide range of hypotheses concerning the existence and form of causal paths, both within and between time periods. Moreover, the paradigms related to this subject offer a plenitude of variables, aside from current or past delinquency, that may affect a youth's labor market experiences, as well as a plethora of variables, aside from labor market experiences, that may affect a youth's delinquent behavior.

To reiterate, the situation prevails where an extremely large number of youth crime and employment related hypotheses are compatible with a substantial number of behavioral paradigms. For example, numerous hypotheses about the relevant lag structure for endogenous variables could be listed. However, none of the labor market or delinquency paradigms postulate functional forms for youth crime and employment relationships within or between time periods. At best, the theories suggest the expected signs of general employment and crime relationships under varying conditions.

Therefore, the following chapter will review the literature's support for non-systematic, hierarchical and simultaneous employment and crime relationships. To repeat in very gross terms, labor market experiences may affect delinquency and delinquency may affect a youth's labor market experiences. If both of the causal paths are valid, then the relationship is simultaneous. If one of the causal paths is valid while the other is not, then the relationship is hierarchical. If neither causal path is valid, then there are no systematic relationships of interest between the variables.

Note that reference to specific functional forms of relationships will be deferred until Chapter IV. Also, the theories reviewed in this chapter may allude, in a general manner, to the intertemporal aspects of employment and crime relationships. However, the timing aspects of these relationships will not be discussed in depth until Chapter III. Additionally, the importance of the heterogeneous characteristics of labor market and criminal events will not be developed fully until Chapter III. As with the intertemporal aspects of the employment and crime relationships, the heterogeneity of various types of

events are not typically dealt with in a specific fashion by the current theories of delinquency and the labor market.

Finally, this chapter will conclude with a review of the empirical studies including both youth employment and crime variables. The findings are not incorporated with the review of the theoretical literature because the empirical studies, to date, are largely atheoretical. Moreover, most of these studies attempt to infer individual level relationships from rudimentary analysis of aggregate level data and are consequently subject to the criticisms of Hannon[1] and Robinson.[2]

No Systematic Relationships Between Youth Crime and Employment

While many theories are consistent with the hypothesis that employment and crime relationships exist, most do not discuss the nature of these relationships or emphasize their importance. This may not be a general omission, rather a suggestion that any youth crime and employment relationships that exist are indirect or weak relative to other causal factors.

There are, in fact, several good reasons to explain why a youth's past or current delinquency might not affect his labor market experiences. For example, the information that a youth is a troublemaker or has a juvenile record may not be widely known in his neighborhood and, in any event, would probably not be known by employers outside the youth's neighborhood. Moreover, current Equal Employment Opportunity laws prohibit employers from asking, in job applications, about past arrests. In order to be in compliance with the law, employers can only request information on past convictions. In addition, even if the conviction information is requested, there is little incentive for youths to reply

honestly, as their police records are not a matter of public record. Thus, even if an employer decided to double check a youth's police record, he would typically be prohibited from doing so. Moreover, it is unlikely that employers would even attempt to check police records, given the high turnover, seasonal, secondary labor force characteristics of youth employment opportunities.

Even if these facts do not reduce the effect of past and current delinquency on labor market experiences to the level of insignificance, other factors may. For example, employment is not usually expected of young children who may nonetheless be delinquents. Consequently, it is difficult to justify the hypothesis that a youth's delinquency will adversely affect his labor market experiences if the youth is too young to participate in the labor market or if the role of the "working man" has not been assimilated. (Note, however, that this is not an attempt to argue that delinquent acts committed as a very young adult will not have negative effects on employment over a longer time horizon. That relationship was discussed in the preceeding paragraph.)

In addition to the empirically based arguments, a somewhat less convincing theoretical argument can be made, based on the marginal productivity theory of wages, against a strong relationship between a youth's delinquency and its affects on his labor market experiences.[3] According to this theory, wages in equilibrium are identically equal to the value of an individual's marginal product. Thus, a prior delinquency record would affect a youth's employment possibilities and wages only to the extent that delinquent individuals might be more or less productive than nondelinquents. However, this line of theoretical

reasoning is very weak, given the widespread criticisms of this theory. First, the labor market is rarely in equilibrium as defined by this theory.[4] Secondly, the theory assumes that labor is homogeneous with the exception of marginal productivities. Thirdly, it is assumed that information in the labor market is perfect and costless. Finally, the theory is criticized on the basis of empirical evidence. That is, if marginal productivity and ability are positively correlated, it would stand to reason that wages are distributed in the same fashion as ability. However, ability is normally distributed in the population, whereas income is log-normally distributed.[5]

One can equally argue that experiences in the labor market are not major causal factors in determining a youth's delinquent behavior. Again, an argument based on the relevance of employment for very young adults would support this thesis for that component of the juvenile population. Also, several theories of delinquency do not support strong systematic relationships between employment and crime. Theories in this category include the "culture conflict," "transmission," "subcultural," and "differential association" theories; they are grouped together by Hirschi under the general description of "theories of cultural deviance."[6] Because these theories are similar in their content,[7] they are discussed jointly in this chapter.[8] The basic tenet of the theories of cultural deviance is that "criminal behavior is learned by the same processes and involves the same mechanisms as conforming behavior."[9] Men are basically moral creatures. However, some individuals are born into societies which conform to the standards and norms of the smaller and less powerful deviant subcultures. Consequently, "overt criminal behavior has as its necessary and sufficient

conditions a set of criminal motivations, attitudes and techniques, the learning of which takes place when there is exposure to criminal norms."[10]

To reiterate, in slightly different terms, youths learn non-conforming behavior because these behaviors constitute either a relatively large part or the entirety of the behaviors to which the youths are exposed. Thus, to the extent that an employment experience is coupled with a norm-abiding role model, perhaps a supervisor, and to the extent that this supervisor does (or can) impress the youth with the importance of not participating in delinquent acts, employment may reduce delinquent behaviors. Although not explicitly suggested by any of the previously mentioned theories, this is consistent with these theories. The link between employment and crime, given the assumptions of the theory of cultural deviance, is indirect and consequently weaker than the relationships which can be inferred from other etiologies of crime.

This does not mean, however, that the authors of these theories do not believe that there are relationships between youth crime and employment. Hirschi reviews the thoughts of three prominent authors who are classified as "subcultural" theorists. His insights address the issue discussed in this paper directly and consequently warrant quotation.

> So obvious and persuasive is the idea that involvement in conventional activities is a major deterrent to delinquency that it was accepted even by Sutherland: 'In the general area of juvenile delinquency it is probable that the most significant difference between juveniles who engage in delinquency and those who do not is that the latter are provided abundant opportunities of a conventional type for satisfying their recreational interests, while the former lack those opportunities or facilities.'[11]

> The view that 'idle hands are the devil's workshop' has received more sophisticated treatment in recent sociological writings . . . . David Matza and Gresham M. Sykes suggest . . . that the leisure of the adolescent produces a set of values, which, in turn, leads to delinquency.[12]

Thus, while the theories of subcultural deviance are consistent only with an indirect and weak relationship between deviancy and employment, the authors themselves state that the availability of conventional activities (such as employment) may determine the extent to which a youth performs delinquent acts.

Hierarchical Relationships Between Youth Crime and Employment

Relationships between sets of variables are described as hierarchical if "the equations can be structured so that higher order endogeneous variables do not appear as explanatory variables in lower order equations."[13] For the purposes of this dissertation, hierarchical relationships between youth crime and employment would exist if either (a) an employment variable or set of employment variables affected a youth's delinquency behavior, but delinquent behavior had no effect on the employment variable(s), or; (b) delinquent behavior or proxies for delinquent behavior, such as police contacts, affected a youth's employment variable(s), but the employment variable(s) did not affect his delinquent behavior or proxies for delinquent behavior.[14] Consequently, in this section, the theoretical support for both arguments, employment experiences affecting delinquency and delinquency affecting employment experiences, are reviewed. However, the relationships are hierarchical if and only if one, not both directions of causality are valid.

The Effect of Employment Experiences on Juvenile Delinquency

This subsection reviews the competing paradigms of crime which suggest, or are consistent with, the hypothesis that employment experiences systematically affect a youth's delinquent behavior. The major theories of criminology that fall into this classification are the strain,[15] integrated strain/subcultural deviance,[16] control,[17] and economic[18] theories of crime. Each of these theories is reviewed, with emphasis being placed on the treatment potential of employment on delinquency given the various underlying assumptions of the competing paradigms.

Strain Theory

Durkheim[19] is the first modern criminological theorist to use the term "anomie" to denote the state of normlessness which occurs when traditional societal rules and norms are no longer effective control mechanisms over an individual's behavior.[20] The work of Durkheim was extended by Merton,[21] and it is this work which comprises the classical core of strain theory. Classical strain theory explains societal deviance rather than behavior at the level of the individual. The extension of Merton's analysis to the level of the individual was accomplished by Cloward and Ohlin[22] and further extended by Elliot and Voss.[23] (These extensions are discussed later in this section.)

Strain theory, as developed by Merton, states that there is a set of ideals or cultural goals which society purports are accessible to all of the widely diverse segments of the population. Additionally, individuals, regardless of their backgrounds, generally accept these goals as legitimate. Merton also contends that "every social group invariably couples its cultural objectives with regulations, rooted in

the mores or institutions of allowable procedures for moving towards these objectives." Merton concludes that "it is only when a system of cultural values extolls, virtually above all else, certain common success-goals for the population at large while the societal structure rigorously restricts or completely closes access to approved modes of reaching these goals for a considerable part of the population, that deviant behavior ensues on a large scale." Further, "when poverty and associated disadvantages in competing for the culture values approved for all members of the society are linked with a cultural emphasis on pecuniary success as a dominant goal, high rates of criminal behavior are the normal outcome."[24]

Although classical strain theory explains societal deviance, Merton also describes five types of individual adaptations to the society in which the legitimate means of attaining widely held success values are limited for large segments of the population. Merton's typology of modes of individual adaptations depends on whether individuals accept or reject cultural goals and whether the individuals accept or reject the societally approved institutional means of achieving those goals. These five adaptations, termed conformity, ritualism, retreatism, innovation, and rebellion, are described below.

"Conformity" occurs when an individual accepts both society's success-goals and the institutionally approved means of achieving those goals. According to Merton, conformity is the most common mode of adaptation.

"Ritualism" defines the situation where an individual abandons or scales down his success-goals to the point where his goals are achievable through institutionalized means. While ritualism is not a culturally

approved adaptation, it is not a delinquent adaptation.

"Retreatism" describes the situation where "both the cultural goals and the institutional practices have been thoroughly assimilated by the individual and imbued with affect and high value, but accessible institutional avenues are not productive of success. There results a twofold conflict: the interiorized moral obligation for adopting institutional means conflicts with pressure to resort to illicit means (which may attain the goal) and the individual is shut off from means which are both legitimate and effective."[25] Merton believes that this is the least frequent of the possible adaptations and that individuals that typify this adaptation are psychotics, chronic drunkards, drug addicts, and tramps. It has been noted that the use of the concepts of "discontent" and "frustration" in explaining delinquency, allows the strain theorist to transfer "some of the emotion producing the act to the act itself."[26] In the case of the retreatist adaptation, this frustration may help to explain such an irrational act as suicide, an extreme manifestation of retreatism.

"Innovation" occurs when an individual internalizes society's success-goals but cannot attain these goals through the prescribed legitimate channels. The individuals in this category, therefore, reject the institutionalized means of achieving the success-goals. Actions which typify the "innovative" mode of adaptation are lying, cheating, and stealing.[27] Most street, as well as white collar, crime can be considered manifestations of an "innovative" adaptation. Furthermore, most etiologies of crime focus primarily on explanations of the acts which Merton would consider mainfestations of an "innovative" mode of adaptation.

The last model of adaptation described by Merton is

"rebellion." It is unlike the preceeding modes of adaptation in that rebellion refers to "efforts to change the existing cultural and social structure rather than to accommodate efforts within the structure."[28] Because of experiences producing frustration, individuals may reject the accepted norms and means and attempt to replace them with new norms and means. As opposed to the "retreatist" mode of adaptation, "rebellious" individuals respond in an aggressive manner to (rather than retreat from) the perceived injustices in the social system.

There are a number of criticisms of classical strain theory. Hirschi rejects strain theory because "it suggests that delinquency is a relatively permanent attribute of the person and/or a regularly occurring event: it suggests that delinquency is largely restricted to a single social class; and it suggests that persons accepting legitimate goals are, as a result of this acceptance more likely to commit delinquent acts."[29] Hirschi's objection concerning the permanency of delinquency has been dealt with in Cloward and Ohlin's extension. The class boundedness assumption built into strain theory has been eliminated by the work of Elliot and Voss. Finally, the criticism that high, rather than low, aspirations are conducive to juvenile delinquency has not been adequately dealt with by strain theorists.

Classical strain theory describes the situation where a large segment of society cannot attain conventional goals by legitimate methods. The resulting frustration results in normlessness and a high rate of deviance from conventional norms. Although a typology of individual adaptations to the goals-means dichotomy is forwarded, the theory is not one of individual behavior. To the extent that classical strain theory

is an etiology of societal rather than individual deviance, its ability to expound on or to clarify the youth crime-employment relationships, at the level of the individual, is limited.

Classical strain theory, however, has been reformulated to state that the frustration that results from an individual's perception of limited or blocked opportunities leads to normlessness and deviant behavior.[30] Even if the level of analysis is shifted to the individual in this way, strain theory (with no further extensions or modifications) has only very general statements to make concerning the efficacy of employment in the reduction of delinquent behavior. An individual who chooses an "innovative" mode of adaptation (accepts society's goals but rejects the legitimacy of conventional means to attain these goals) resorts to crime because he perceives that legitimate opportunities to attain success are blocked or limited. Employment may be an indicator of a youth's ability to succeed via legitimate channels.

The fact that a youth has had several employment experiences resulting in a reliable work-history is widely believed to enhance that perons's future employment opportunities.[31] Thus, to the extent that providing a youth (who would have chosen the "innovative" mode of adaptation) with an employment experience reduces the frustration resulting from a goals-means dichotomy, employment can be expected to be effective in the reduction, prevention or elimination of delinquent acts. To the extent that the employment provides a "better" or more "meaningful" experience, a youth's future, as well as current, opportunities should be enhanced. If this is perceived by the youth, then "better," more meaningful jobs are more likely to result in reduced delinquency. If, on the other hand, a job is perceived as make-work or dead-end, it may

only reinforce the youth's belief that his current, as well as future, ability to succeed by legitimate methods is very limited. The reinforcement of this belief could exacerbate the youth's frustration and result in increased delinquent behavior. Also, if a youth believes that he or she is either unjustly accused of wrong-doing on a job or fired, a previously successful employment experience could intensify frustrations and result in delinquent behavior. Finally, employment is more likely to be an effective policy instrument in the reduction of youth crime if the opportunities are focused on the low class, economically deprived segments of society who are likely to experience frustration due to a goals-means dichotomy.

The second mode of adaptation resulting in flagrant disregard of social rules and laws is "rebellion." However, Merton states that many of the individuals who constitute the leadership of such a movement come from the privileged, rather than the poverty-stricken classes of society. Offering employment opportunities to individuals who already are employed or highly placed in society is unlikely to result in "non-rebellious" attitudes and behavior on their part. However, the masses of discontented individuals usually associated with rebellions should probably be considered as individuals choosing an "innovative" mode of adaptation, as their participation in a rebellion may simply be a result of their frustrations from inequities in the form of blocked opportunities. In any event, this dissertation addresses the problem of juvenile delinquency which is much more appropriately characterized by the "innovative" mode of adaptation.

Thus, if the transition to the individual unit of analysis is made, strain theory would infer that the provision of employment

opportunities to youths known to have adopted, or who are likely to adopt, the "innovative" lifestyle will probably result in reduction, elmination or prevention of delinquent acts. The beneficial treatment potential of employment is, however, mitigated to the extent that the employment experiences are perceived by the youths as "make-work" and "meaningless," which could intensify their frustrations and result in increased delinquent behavior. The quality of the employment experience and the manner of termination may be important factors in the efficacy of employment in the reduction of youth crime.

Integrated Strain/Subcultural Deviance Extensions

Cloward and Ohlin's work attempts to explain delinquent behavior at the level of the individual, in contrast to strain theory as outlined by Merton. Cloward and Ohlin integrate aspects of both strain theory and social learning theory. They state that a youth will resort to delinquent behavior as a result of the intense frustration he experiences as he is thwarted in his attempt to attain culturally approved goals via legitimate methods (strain theory). They add, however, that the frustrated and alienated youths will seek out "alternative groups and settings in which particular patterns of delinquent behavior are acquired and reinforced (social learning theory.)"[32] This theory of deviance indirectly addresses one of the criticisms of strain theory, specifically, the criticism that strain theory implies that deviancy is a relatively permanent attribute of the deprived and frustrated individual. While the opportunities for an individual to attain societal success goals may be relatively fixed over his lifetime, the groups and settings which reinforce delinquent behavior may not be stable, or the group's membership may be limited to

individuals falling within an age group which is implicitly understood by the members of the group.

Cloward and Ohlin go beyond these general statements. They add that the nature of a youth's delinquent response will vary according to the availability of the various illegitimate means and the youth's interpretation of whether his failure to succeed by legitimate means is attributed to the "inadequacy of existing institutional arrangements or to personal deficiencies." The posit that when this failure is attributed to the "inadequacy of existing institutional arrangements," gangs or collective adaptations emerge; conversely, when failure is attributed to "personal deficiencies," solitary adaptations result.[33]

Cloward and Ohlin also describe three types of collective nonconforming adaptations--criminal, conflict and retreatist subcultures. "The criminal subculture is likely to arise in a neighborhood milieu characterized by close bonds between different age-levels of offenders, and between criminal and conventional elements."[34] The later work by Spergel[35] divides criminal subculture into two components denoted the racket and the theft subcultures. On the other hand, the conflict or violent subculture is likely to emerge when there are severe limitations on both legitimate and criminal opportunities. If the youth's search for status recognition cannot be socially controlled by either conventional means or within an age-graded criminal subculture, then the outlet of the youth's frustrations is likely to be of a violent nature. The retreatist or drug adaptation is explained by Cloward and Ohlin as being a result of a youth's detachment from the social order resulting from failure to succeed in both the conventional order and in the criminal or conflict subcultures.

All delinquent adaptations in Cloward and Ohlin's theory result, at least initially, from the youth's frustration with his inability to succeed through legitimate means. In other words, the authors propose an ordered sequential decision-making process where the decision to participate in nonconventional behavior is conditional on the youth's conclusion that his success-goals cannot be attained through legitimate means. Consequently, the general inferences of classical strain theory would also apply to Cloward and Ohlin's extension. However, these authors also suggest that social learning, particularly in the age-graded criminal subculture, and signs of allegiance to the conflict and retreatist adaptations, are important for maintaining membership in the group. Therefore, the following hypothesis can be inferred from the extension of Cloward and Ohlin: the greater a youth's commitment to the members of a nonconforming subculture, the less likely it is that conventional employment opportunities will reduce or eliminate future delinquent behaviors.

A second attempt to integrate the strain and social learning theories has been forwarded by Elliot and Voss.[36] Their research addresses, in part, the class boundedness implication inherent in classical strain theory. Elliot and Voss state that individuals in all classes may have aspirations greater than those which they can attain through culturally prescribed methods. The middle or upper class individual, like the lower class youth, may experience intense frustration which leads him to seek out nonconforming methods of attaining his goals. The work of Elliot and Voss extends that of Cloward and Ohlin in three specific ways: "(1) The focus on limited opportunities was extended to a wider range of conventional goals,

(2) The goals-means disjunction was modified to be logically independent of social class, (3) The role of social learning in the development of delinquent behavior was further emphasized."[37]

Elliot and Voss' work has implications for the hypothesis forwarded by classical strain theory that employment is more likely to be an effective public policy instrument in the reduction of youth crime if the opportunities are focused on the low class, economically depressed segments of society who are likely to experience frustration due to a goals-means dichotomy. The analysis by Elliot and Voss infers that to the extent that middle and upper class youths are likely to experience frustrations due to a lack of legitimate employment opportunities, employment may be an effective policy instrument. However, frustration due to a lack of employment opportunities is probably less likely to exist in middle and upper class youths, as such opportunities are generally more available to these youths.

Control Theory

Hirschi[38] is the primary proponent of control theory discussed herein. However, other social control-oriented research has been conducted by Nye, Reiss, Matza, and Briar and Piliavin.[39] Control theorists assume that "delinquent behavior is a direct result of weak [or broken] ties to the conventional normative order."[40] Within this context, Hirschi describes the components of an individual's bond or tie to society. He asserts that this bond is comprised of four related components which he calls attachment, commitment, involvement, and belief.

Attachment is described as the extent to which one individual is sensitive to the wishes and expectations of others. If an individual

is sensitive to these wishes and expectations of others, he is not bound by conventional norms.

The rational component in conformity, commitment, is simply defined as the fear of the consequences of nonconforming behavior. The more an individual has invested in the conventional order, the greater his possible losses if caught in a delinquent act, and consequently, the less likely the individual is to engage in criminal behavior. The concept of commitment used by Hirschi is very similar to the economic theory of crime as forwarded by Becker.[41]

The third component of an individual's bond to society, as described by Hirschi, is involvement. The straightforward interpretation of this term is the extent to which an individual engages in activities approved of by the conventional order. The greater a person's involvement in conventional activities, the less likely he is to resort to crime. "A person may be simply too busy doing conventional things to find time to engage in deviant behavior."[42]

Belief, the fourth component of an individual's bond to society, is defined as "the extent to which people believe they should obey the rules of society. Furthermore, the less a person believes he should obey the rules, the more likely he is to violate them."[43]

The weaker these components of an individual's bond are to society, control theory asserts, the more likely it is that the individual will resort to deviant behavior. The question addressed by control theory is therefore, "Why doesn't everyone engage in criminal acts?," rather than, "Why do some individuals engage in nonconforming behavior?"

Employment opportunities could, according to Hirschi's theory, operate in a number of ways to reduce delinquent behavior. Simply keeping a youth busy in a conventional activity, "involvement," would give the youth less time to participate in crime and would strengthen his bond to the normative order. Furthermore, co-workers or a respected work supervisor may instill in the youth the "belief" that the youth should defer from deviant behavior. Moreover, if the youth becomes "attached" to his job and/or co-workers or supervisor, the rational costs of being caught in crime, embodied in Hirschi's concept of "commitment" increase, thus reducing the youth's delinquent propensities.

The Economic Model of Crime

A number of theorists suggest that the most important economic factor in determining the rate of delinquency is the number and type of licit and illicit job opportunities available to adult and youth residents. The theoretical importance of opportunity structures in a community has been discussed by Becker, Ehrlich, and Sjoquist.[44] They believe that every individual occupies a position in both the legitimate and illegitimate opportunity structures. The hypothesis propounded is that, after weighing the relative benefits and costs of licit and illicit opportunities, the rational actor will choose the activity with the highest expected return. Variables typically included in the estimates of expected returns are the probability of apprehension by the police and conviction by the courts, opportunity costs, risk preference, and a discount rate. Some persons become criminals, therefore, not because their basic motivation differs from that of other persons, but because their benefits and costs differ.[45] Based upon this type of reasoning, the juvenile crime rates in neighborhoods should be

negatively correlated with factors that measure the extent of legitimate opportunity for youth.

The economic model of crime has been widely criticized for the image of the criminal it projects -- a highly calculating, rational, decision-maker. It differs from strain theory largely in that the model forwarded is one of a simultaneous, rather than a sequential, decision-making process. This eliminates the concepts of intense frustrations which result from a goals-means dichotomy, but replaces it with the equally ambiguous notion of the maximization of a "utility function" under uncertainty. The concept of utility maximization is both an asset to the economic theorists, in that it enables them to propound a very general theory applicable to all situations, and a liability, in that it renders the theory untestable. Any behavior, criminal or otherwise, can be explained a posteriori simply by introducing the appropriate variables as arguments into the utility function and then assigning them the proper weights.

In an extension of Ehrlich's model of crime, this author introduced employment as a specific argument of the utility function.[46] A number of variables, which may be reasonably expected to affect a youth's utility function, were also introduced. Finally, Kuhn-Tucker equations were solved for the conditions under which an increase in the "probability" of employment will result in reduced delinquency. The analysis suggested that delinquent behavior is more likely to decrease, given an increase in the probability of employment, if the youth's parents punish delinquent behavior and/or if the youth is risk adverse. The result, concerning parents' attitudes towards delinquency, is reinforced by the sociological theorists, Reckless,

Dimity, and Kay,[47] who suggest that if parents and peers reward youths for "destructive, antisocial behavior, they will develop self concepts more conducive to delinquency."[48] An analysis of peers in the economic model would lead to the same conclusion -- that rewards for delinquent behavior are directly correlated with delinquent propensities. Similar conclusions concerning risk adversity were derived by the earlier work of Ehrlich.

The economic optimization model can also be expanded into a multi-period model. The multi-period dynamic approach may be a useful extension, particularly as the investment aspect of formal education and street crime discussed by Becker cannot be captured in a one period model.[49] In sociological terms, one individual's "commitment" to either the conventional or delinquent subculture can be captured in the multi-period model.[50] Finally, a multi-period model can account for the situation where a youth's perception of his future, more permanent employment opportunities, may be as important as a job obtained in the current time period. It is generally understood by both adults and youth that a teenager will be more limited in his job opportunities than an adult. Thus, the frustration of unemployment in this period may not be as important as the expectation of facing a future as a member of the fringe of the labor force, a future of low paying jobs frequently interspersed with unemployment. This result of the multi-period economic model can also be inferred from strain theory which only generally discusses the sources of frustrations that can exacerbate delinquent tendencies.

To conclude, the economic model of crime is very general, and the introduction of reasonable "sociological" variables as arguments

of a utility function result in hypotheses and inferences concerning the employment-crime relationship similar to those derived by the sociological theories. Unfortunately, little effort to integrate the economic and sociological perspectives in the aforementioned manner exists in the current literature. However, such an effort would probably not produce any significant new insights into the employment-crime relationship, but rather would serve to synthesize into one framework many of the hypotheses derived form the competing sociological theories. In so doing, however, much of the richness of the sociological literature would be lost.

Summary

None of the preceeding theories of crime causation are generally accepted by criminologists. This is evidenced by the criticisms existing in the current literature, as well as the ongoing attempts to extend and reconcile these theories. As none of the theories individually explains all deviant behavior,[51] synthesis or integration of these theories is desirable.[52]

Note, however, that while the theories reviewed do not agree on the motivation or reasons for delinquent behavior, many of the theories are consistent with the hypothesis that a good employment experience may reduce delinquency either because of the reduced frustration from an inability to succeed, an increase in the expected value of legitimate activities relative to illicit activities, or because the youth has a closer bond to the conventional order. Regardless of the underlying assumptions of these theories, we can surmise that positive employment experiences are likely to reduce delinquent behaviors in some very general fashion.

There are numerous questions of importance concerning youth crime-employment relationships which remain unanswered by these theories. For example, how important are past employment experiences in determining current delinquent behavior? What comprises a "good" or a "negative" employment experience? To what extent do "negative employment experiences" adversely affect a youth's delinquent behavior? How does a series of positive and negative employment experiences affect a youth's delinquent behavior? How many employment variables determine juvenile delinquency, and what are their relative importance? To what extent do the characteristics of youths and their environments interact with the relevant employment variables? Many of these questions are addressed in Chapter III and Chapter V, the empirical section of this dissertation.

The Effect of Juvenile Delinquency on Employment Experiences

The theories reviewed in the preceeding section suggest that employment experiences may affect a youth's delinquent tendencies. Analogously, there are several theories which suggest that a youth's delinquent behavior (proxied by police contacts) may affect his employment experiences, job search, job rejections, new hirings and terminations. As with the criminology theories, the labor market theories are very general with respect to the form that these relationships may take and the importance of past criminal behavior on current employment experiences.

Signaling Theory

The job market signaling theory of wage determination has evolved primarily from the work of Spence, Arrow, and Stiglitz.[53] This theory diverges from the orthodox economic theory in three ways:

(1) Individuals are assumed to be heterogeneous;

(2) Wages paid are not necessarily assumed to be equal to the value of an individual's marginal product, and;

(3) Information in the labor market is assumed to be neither perfect nor costless for employers or job seekers to obtain.

Basically, signaling theory formalizes the notion that employers pay wages to individuals based upon the employer's conditional expectations of the applicant's productivity given 'indices' and 'signals.' Indices are defined as unalterable characteristics such as age, race, sex, height, and number of past police contacts, while alterable attributes, such as educational level and amount of work experience, are termed signals.

Specifically, this theory states that an individual's marginal productivity cannot be directly observed but that the accurate determination of a job applicant's marginal productivity, through intensive interviewing and testing, would be prohibitively expensive. Moreover, the costs of signaling are borne by job applicants, not employers; thus, there is little incentive for employers to increase their applicant screening costs if 'signals' are effective determinants of productivity. Screening theorists contend that employers have probabilistic expectations of productivity distributions for whites, blacks, men, women, high school graduates, dropouts, convicts and so on. These expectations are based upon the employers' beliefs or previous experiences in sampling laborers from the work force. Theorists hypothesize that employers pay wages based on their inherent beliefs about the productivity of different groups of individuals, thus explaining observed wage differentials between equally educated but demographically

different groups of individuals.

Signaling theory, in a dynamic sense, can be easily explained by the following figure.

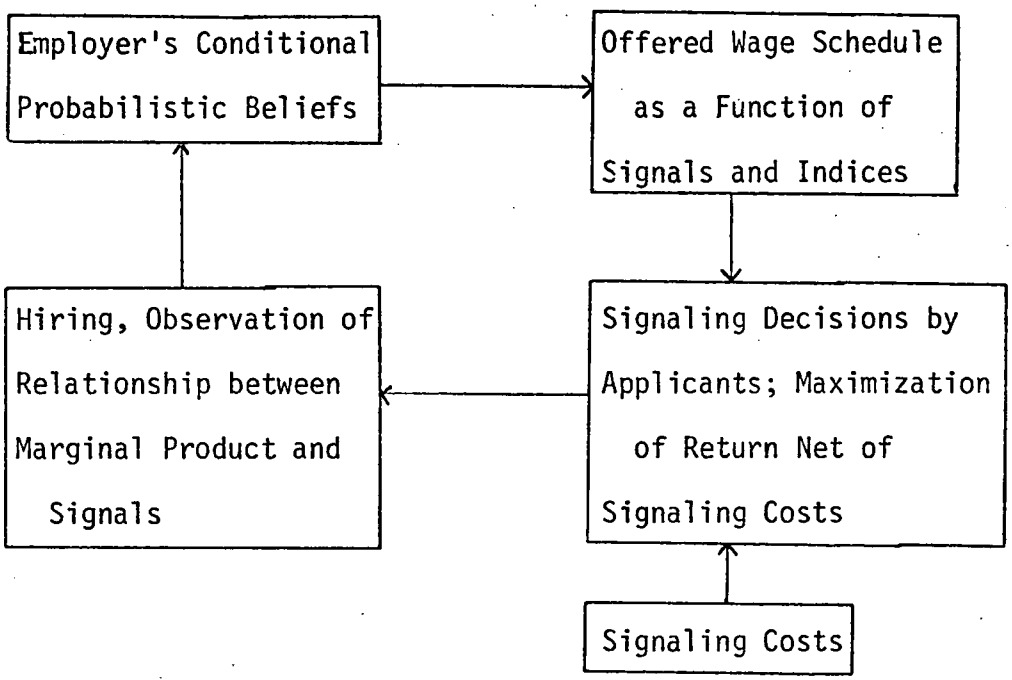


Figure 2-1: Informational Feedback in the Job Market

> As new market information comes in to the employer through hiring and subsequent observation of productive capabilities as they relate to signals, the employer's conditional probabilistic beliefs are adjusted, and a new round starts. The system is stationary if the employer starts out with conditional probabilistic beliefs that after one round are not disconfirmed by the incoming data they generated.[54]

Signaling theory would suggest that the potential employer's knowledge that a job applicant was an ex-convict, had been previously arrested, or was suspected of being a delinquent, would reduce the employer's expectations of the applicant's productivity. This would reduce the expected wages of the applicant by lowering the probability of his being hired, as well as lowering the wages offered

when actually hired.

The relationship between employment and crime is, however, tenuous given that (1) employers can only legally request information on convictions, not arrests, and; (2) the arrest records of juveniles are confidential. Thus, the honesty of a job applicant in providing information which may harm his chances of employment, cannot be easily or costlessly verified. This would make the alleged delinquent behavior, police contacts and court records relatively poor labor market screening devices.

The Taste for Discrimination Model

This model was developed by Becker and is based on the assumption that employers have a taste for discrimination.[55] The underlying assumption of the model is that employers are willing to pay more in order to hire individuals who will meet their preferences. This model is typically used to explain wage differentials between blacks and whites and males and females. The model could also be extended to explain differential wage and unemployment rates between delinquents and nondelinquents.

The relationship between youth crime and employment, as forwarded in the taste for discrimination model, is again tenuous. The criticisms of the screening theory are equally valid when evaluating the strength of the youth crime-employment relationship as suggested in the discrimination model. Basically, employers cannot discriminate between job applicants on characteristics (delinquency proneness, number of police contacts) that cannot be either easily ascertained at a low cost or determined at all.

Alternative Theses

The two preceeding sections suggest a relationship between youth crime and employment that would require employers to either "statistically" or blatantly discriminate between youths on the basis of current and past delinquent behavior, police records, or court records. However, we noted that this type of information is costly and difficult, if not impossible, to obtain. Consequently, one might suspect that the effect of delinquent behavior on employment experiences may take a considerably different form from those described by Spence, Arrow, Stiglitz, and Becker.

That is, legitimate employment and delinquency may be considered substitutes or complements for each other in the production function sense. If crime is a substitute for employment, then juvenile delinquents would be less likely to apply for jobs than nondelinquents.[56] This hypothesis is consistent with the economic, strain, integrated strain/subcultural deviance, and control theories of crime reviewed in prior sections of this chapter. Additionally, delinquent youths who apply for work may perform poorly in job interviews relative to nondelinquents. The cocky or obtrusive attitudes that are frequently associated with delinquents may result in a high job rejection rate where a job search was initiated. Thus, employers would not be blatantly or statistically discriminating against youths because of their delinquent behavior, police or court records, but rather because of attitudes or other characteristics associated with delinquents. Nevertheless, it is very unlikely that youths' past delinquent behaviors, police or court records would be generally available information which an employer could use in his selection among job applicants.

On the other hand, in some cases, crime and employment may be complements rather than substitutes. For example, in a recent Vera Institute study, researchers found that there were four types of instances in which work was concurrent with crime.[57] That is, some individuals used work as a "cover" for illegal activities. Other individuals interviewed for this study stated that the money earned at work provided the capital for criminal activity. Alternately, some individuals stated that the income earned from crime provided the capital needed for legitimate employment. Finally, other individuals felt that work provided additional criminal opportunities, such as theft or drug pushing. If crime and employment are complements, as described in the preceeding cases, then one would expect delinquents to seek out employment at least as vigorously as nondelinquents. However, given the assumption of complementarity, little can be said about the delinquents' job rejection or termination rates relative to the rates of nondelinquents. However, one might suspect a higher job rejection rate due to delinquents' attitudes in job search and a higher "negative" job termination rate due to thefts and other concurrent illegal activities.[58]

Summary

While the screening and taste for discrimination models can be extended to infer that employers will discriminate between youthful job applicants on the basis of their criminal behaviors and records, the extension is tenuous at best. The reason why these theories cannot make strong inferences about the effect of delinquent behavior on employment experiences is because information on delinquency is not typically available to employers. However, delinquents may be less likely to apply for work if employment and crime are substitutes.

Additionally, delinquents may have higher job rejection and negative job termination rates compared to nondelinquents, as a result of differences in attitudes and behavior in the job search process and on the job.

Simultaneous Relationships Between Youth Crime and Employment

The relationships between youth crime and employment are simultaneous if employment experiences affect delinquency and delinquent behaviors affect employment experiences. The theories reviewed in part C of this chapter, suggest one-way directions of causality. However, a synthesis of one of the criminology theories and one of the labor market theories would result in simultaneity in a youth crime-employment experiences model. Nevertheless, none of the theories reviewed directly suggests simultaneity, although they would be consistent with a simultaneous model. Two theories are reviewed in this section, one of which very directly suggests that youth crime-employment relationships are simultaneous. As with all of the theories reviewed thus far, these theories are very general with respect to the form these relationships take, both within and between time periods.

Theory of the Dual Labor Market

The dual labor market theory states that the economy is comprised of a core labor market and a periphery. The core of the economy, the primary labor market, is characterized by high paying, stable jobs. The periphery is comprised of at least four components -- the secondary labor market, the welfare sector, the training sector, and the "hustle." The secondary labor market, unlike the primary labor market, is characterized by low paying, menial and unstable jobs. The welfare sector consists of the gamut of government assistance programs for the poor, such as Aid to Families with Dependent Children.

The array of government manpower training programs, such as the Comprehensive Employment and Training Act (C.E.T.A.) program, constitute the training sector. Finally, the "hustle" is defined as the illegal and quasi-legal activities in which individuals engage.

Proponents of theories of labor market segmentation, such as Harrison and Bluestone, state that movement from the periphery to the core labor market is very limited.[59] Low quality education and overt and statistical racial and class discrimination are sufficient to restrict the upward movement of large numbers of individuals.

Within the periphery, individuals move or drift between the secondary labor market, the welfare sector, the training sector, and the hustle. Thus, this part of the dual labor market theory is very similar to Matza's theory that individuals drift in and out of delinquency.[60] The sequencing or timing of events is not particularly important in a theory that emphasizes virtually random drift.

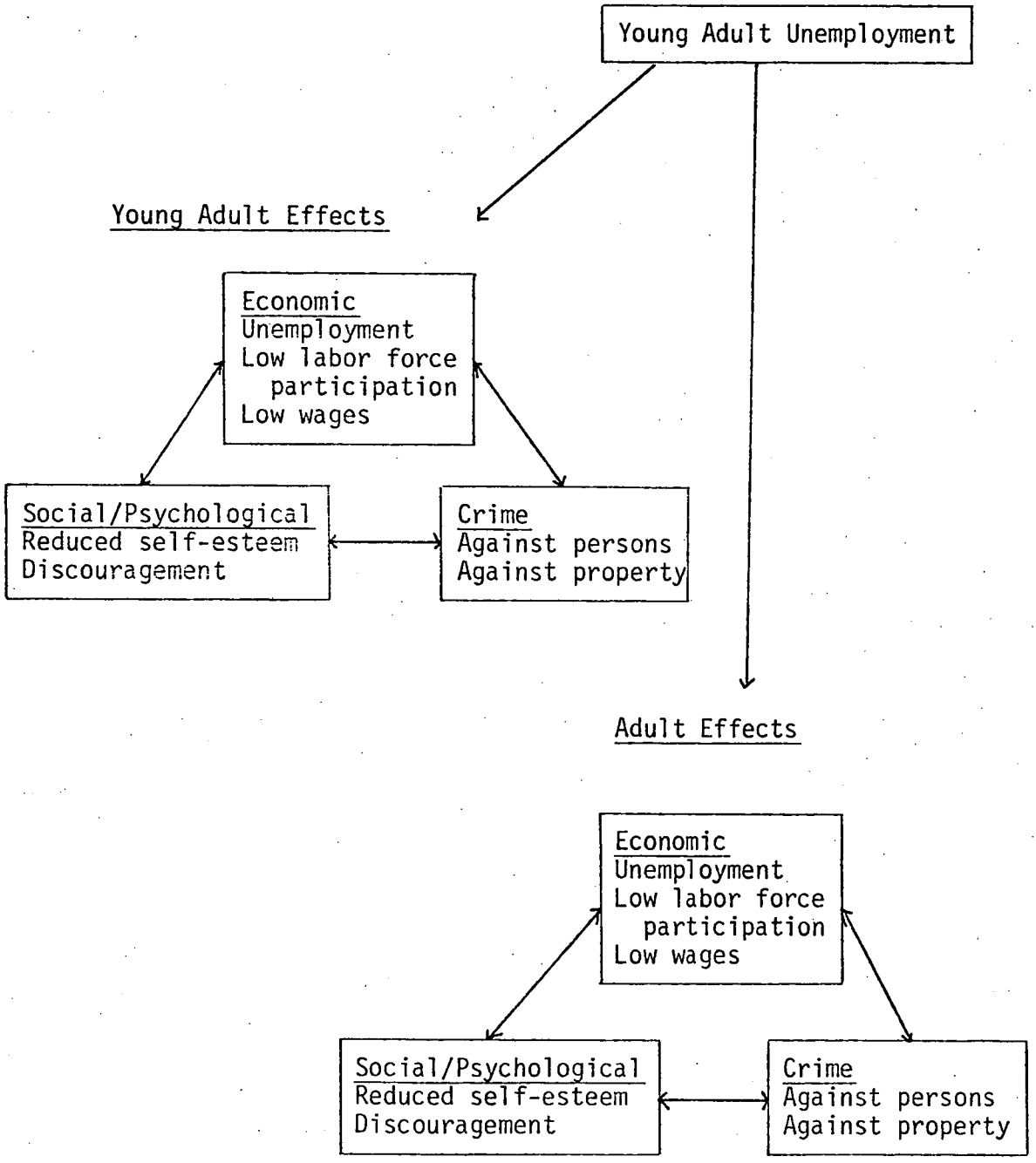
Note that crime, secondary labor market employment, and the welfare and training sectors are viewed as alternatives to each other in this theory. Thus, given that an individual is confined to the periphery, the fact that he is not employed implies an increased likelihood of criminal behavior. Conversely, the fact that an individual is not engaging in a hustle implies that there is a greater probability of being employed, being in training, or receiving welfare. Consequently, the criminal is not viewed as striking out at society, but rather as an individual choosing among three althernatives to employment. In this sense, the dual labor market theory is also closely related to the integrated strain/subcultural deviance and the economic theories of crime.[61]

Thus, this theory implies that a simultaneous crime and employment relationship exists for one component of the population. However, this is not a strong causal theory for the motivation of criminal behavior based on the miximization of expected benefits or on the frustration caused by an inability to succeed.

The Scarring Theory

The scarring theory of the labor market is a relatively new theory. The fact that the materials written on the subject are in working paper formats indicates that the theory is still in an early developmental stage. Scarring theory, as formulated by Jusenius and Ellwood, states that there are three types of negative consequences or scarring effects of young adult employment.[62] They are economic, social/psychological, and criminal effects. That is, unemployment as a young adult may result in reduced labor market participation. lower wages, further unemployment, discouragement, lower self-esteem, and a higher frequency of crimes against persons and property, as a youth and as an adult. In other words, the theory suggests that there are interactions between the economic, social/psychological, and crime variables, both within and between time periods. The theory is depicted in figure 2-2.

Figure 2-2: Possible "Scarring Effects" of Young Adult Unemployment[63]



There are interactions between three major groups of variables. Social/psychological variables are explicitly incorporated into this theory. One criticism, perhaps minor, of this theory is that one could equally as well justify placing a crime or social/psychological variable into the prominent position currently held by the young adult unemployment variable. One could postulate that crime or negative social/psychological variables as young adults result in negative consequences in one's economic, crime, and social/psychological variables as youths and adults. This problem is virtually impossible to adequately address at a theoretical level, as it is tantamount to asking how the vicious cycle of unemployment, crime, and negative self-esteem begins.

Nevertheless, the scarring literature presents a more comprehensive view of relationships between employment and crime than any of the criminology or labor market theories taken individually. This theory also includes an explicit, although rough, attempt to incorporate timing aspects.

The Empirical Evidence

Empirical analysis has been conducted to measure the effect of economic indicators of community poverty and prosperity on delinquency. The results of the correlation and regressions analyses conflict; the signs of the coefficients are neither uniformly positive, negative, significant, or insignificant. However, most of the analyses, both cross-sectional and longitudinal, have employed aggregated census and uniform crime report data on geographical areas larger than a community or neighborhood. Consequently, important differences between sub-economies in both the crime and economic variables, may be cancelling each other out, and the results, or the aggregate analysis, are not

necessarily reflecting the true relationship between variables. This is an important caveat to be rembered when reviewing the empirical analyses, particularly when the two studies using micro-level data do not directly measure the effect of employment on crime recidivism, but rather measure the impact of participation in a federally funded manpower program, on delinquency.

CHART NUMBER 2-1: THE AGGREGATION LEVEL OF DATA IN STUDIES THAT RELATE ECONOMIC CONDITIONS TO YOUTH CRIME*

AGGREGATION LEVEL OF DATA	STUDY REFERENCES	NUMBER OF STUDIES
U.S.	Philips, Votey & Maxwell, 1972 Glaser & Rice, 1959 Fleisher, 1963	3
State	Ehrlich, 1976	1
County	Bogen, 1944	1
City	Glaser & Rice, 1959 Fleisher, 1963 Fleisher, 1966	3
Census Tract Community**	Singell, 1967 Fleisher, 1967 Weicher, 1970	3
Suburb	Fleisher, 1966	1
Individual	Walthier & Magnusson, 1967 Robin, 1969	2

*This chart is based upon the typse of delinquency or crime dat that was used in the analysis.
**Census tract communities are groups of census tracts that are somehwat homogeneous in terms of socioeconomic characteristics.

The literature review that follows discriminates first between the studies based on individual and aggregate level data. Within these categories, the studies are described in order of their increasingly

complex hypotheses and methodologies.

Studies Using Individual Level Data

There is a paucity of studies relating economic factors to delinquent behavior using micro-level data as their bases. After an extensive search of the literature, only two such studies could be located. Both of these studies measure the impact on youth crime of participation in the Neighborhood Youth Corps (NYC), a federally funded manpower program. Consequently, neither of the studies directly measured the impact of employment on juvenile delinquency. However, the studies are included in this review because the NYC program provided both jobs to program participants, and counseling. The counseling concerned the participant's "problems, the role and value of education, and the need to complete high school."[64]

The Walthier and Magnusson study was based on the experience of one hundred and fifteen experimental youths chosen randomly from NYC participants in Cincinnati, Ohio.[65] One hundred and fifteen members of a comparison group were chosen from applicants who were deemed eligible for the NYC program, but who, for some reason, did not participate in the program. The members of the experimental and comparison groups were closely matched on age, sex, race, school grade, and date of application for NYC participation. Based on a pre and post examination of the police records of the two groups, the study concluded that NYC participation was "associated with a decline in the number and gravity of police contacts, particularly among female enrollees."[66] However, the results of the study are suspicious because of the possibility of a strong selection bias due to the non-random selection of the comparison group members and because of the extremely small

numbers of contacts with the police after application to the NYC program (fifteen contacts for the experimentals and twenty-four contacts for the controls). Furthermore, because of the statistical methodology employed, the Walthier and Magnusson study has been cited as being "open to serious criticism on the basis of logic and meaningfulness alone."[67]

A second study measuring the effect of NYC participation in reducing youth crime was published by Robin. Two treatment groups, eighty-two participants on the year-round NYC program and fifty participants enrolled in enrolled in the summer-only program, were compared to fifty-four youths who applied to the NYC program and were eligible but were not selected to participate so that they could be used as members of a control group. Despite the random selection process, the members of the comparison group were significantly more delinquent prior to application to NYC than were the members of the treatment groups. (This fact may strongly affect the results of the analysis.) Based upon a pre and post analysis of the police records of the black members male members of these all black groups, the author concluded, contrary to Walthier and Magnusson, that there was no empirical support to the hypothesis that participation in the NYC program would reduce youth crime.[68]

While both of these studies relate a quasi-economic variable, NYC participation to youth crime, the hypothesis that employment (not unemployment) is casually related to delinquency, was not tested. In neither study does the author consider whether youths in the comparison groups obtained employment on their own or were receiving counseling through another social service agency. Consequently, the youths in the

experimental group are being compared to youths of similar backgrounds who may or may not have been employed and who may or may not have received counseling elsewhere. Although this is not a devastating criticism of these studies as they attempt to measure the impact of NYC participation on youth crime (the alternative is to let youths shift for themselves), it is a serious criticism if the intent or interest was to measure the impact of employment or unemployment. Furthermore, both of the studies compared police records for the groups of experimental and comparison group members over different time periods. The effect of participation in NYC on the individual was not calculated and, consequently, these studies are subject to the same criticisms as studies based on aggregate data.

Studies Using Aggregated Data

The Two Variable Studies

The relationship between economic variables and youth crime has been explored by a number of authors who use simple correlation or regression analysis without controlling for other factors which might affect the rate of delinquency.[69] Three separate analyses of this type (two included in the same article) have been published. Singell correlates general unemployment data with the total number of youth contacts with the Detroit police department. He uses two different data bases and finds that unemployment is positively correlated with youth crime.[70] This result supports the hypothesis that, ceteris paribus, youth shift into criminal activity as the number of legitimate opportunities decrease. However, a similar analysis by Glaser and Rice found that the delinquency rate is inversely correlated with age-specific unemployment rates for the U.S. This is one of the few studies

that attempts to relate age-specific unemployment, rather than general unemployment, to youth crime.[71] Consequently, it is interesting to note that the result that youth crime increases as youth unemployment decreases does not support either the economic or the sociological school of thought. Sociologists, in the simplest case, postulate that youth crime increases as adults, particularly parents, enter the labor force. The results of all three analyses are statistically significant.

CHART NUMBER 2-2: DATA AND RESULTS OF STUDIES RELATING ECONOMIC VARIABLES TO YOUTH CRIME WITHOUT CONTROL VARIABLES

AUTHOR, REFERENCE	ECONOMIC DATA	DELINQUENCY DATA	OTHER CONTROL VARIABLES	YEARS OF ANALYSIS	DIRECTION OF CORRELATION	STATISTICAL SIGNIFICANCE	COMMENTS
Singell, 1967	a) General unemployment data by census tracks that were grouped into sub-communities in Detroit.	a) Total contacts with the youth Bureau of the Detroit Police Department.	None	1960	ECONOMIC VARIABLES: POSITIVE As unemployment increases, youth crime increases.	1. R^2 = .738 t = 11.51 2. R^2 = .77 t = 12.55	Two OLS Regressions were run. The second equation regressed the log of unemployment on the log of delinquency.
	b) General monthly unemployment data for Detroit.	b) Total monthly contacts with the Youth Bureau of the Detroit Police Department.	None	1950-61	ECONOMIC VARIABLES: POSITIVE As unemployment increases, youth crime increases.	ECONOMIC VARIABLES: Significant at the .25 level.	Two OLS Regressions were run. The second equation regressed the log of unemployment on the log of delinquency. R^2 was significant at the .05 level.
Glaser and Rice, 1959	a) Total and age-specific male civilian unemployment rates for the U.S. (Handbook of Labor Statistics and Annual Reports of the Labor Force)	a) Total number of fingerprint arrests by age groups for crimes against persons and property expressed as a percent of the total arrests reported for all ages. (FBI Uniform Crime Report Data)	Age	1932-50	ECONOMIC VARIABLES: NEGATIVE As unemployment increases, crime decreases.	ECONOMIC VARIABLES: Correlation coefficient significant at the .01 level.	Correlation Analysis

The Three Variable Studies

A second level of analysis which is slightly more complex includes a demographic control variable in addition to the crime and economic indices. There are five analyses that fall into this category. Two of these studies control for sex, three control for race, and one

controls for socio-economic class. The first study using sex as a control variable found that crime for both boys and girls increases as an index of business activity increases. However, a statistical measure of significance was not calculated.[72] The second study using sex as a control variable also found that youth crime increases as the unemployment rate decreases for boys and girls aged ten through seventeen in Boston. However, the results of this analysis on Chicago and Cincinnati are inconclusive, as the coefficients are statistically insignificant.[73]

Analyses using race (white, black) as a control variable has been conducted by Phillips, Maxwell and Votey using three different population partitions. In their first analysis, the arrest rates for black and white youths who were either employed, unemployed, or not in the labor force were compared in a time series analysis. They found that the crime rates for both black and white youths decrease as the labor force participation rates increase, but that the change in the crime rate with respect to the unemployment rate is positive for non-whites but negative for whites. The regression equations were significant at the .05 level or better, but severe multicollinearity problems were present. Consequently, the analysis was re-estimated using two different population partitions. The results of these analyses support the notion that individuals who are in the labor force are less prone toward delinquency. Fewer multicollinearity problems were encountered using these partitions.[74]

Only one researcher, Singell, used socio-economic class as a control variable. He found that after controlling for class (the median family income was used as a proxy), youth crime increased as unemployment rates increased. However, R^2 and the regression

CHART NUMBER 2-3: DATA AND RESULTS OF STUDIES RELATING ECONOMIC VARIABLES TO YOUTH CRIME WITH ONE DEMOGRAPHIC VARIABLE

AUTHOR, REFERENCE	ECONOMIC DATA	DELINQUENCY DATA	OTHER CONTROL VARIABLES	YEARS OF ANALYSIS	DIRECTION OF CORRELATION	STATISTICAL SIGNIFICANCE	COMMENTS
Bogen, 1944	A composite measure of bank debits, building permits, industrial employment, industrial power, telephones in use, new car registrations and department store sales in L.A. County.	Juvenile court petitions in L.A. County for boys and girls.	The number of school age youth in L.A. County. Sex	1923-41	ECONOMIC VARIABLES: POSITIVE As business activity increases, crime increases.	ECONOMIC VARIABLES: Not calculated	Graphical analysis
Glaser and Rice, 1959	B Percent of U.S. male labor force unemployed in Chicago, Cincinnati and Boston. (Handbook of Labor Statistics, Annual Reports of the Labor Force and Lebergott's "Annual Estimates of Unemployment in the U.S., 1900-54.")	B Sex and age specific arrest rates in Chicago, Cincinnati, and Boston. (City Municipal Reports)	Age, Sex	1930-56	ECONOMIC VARIABLES: MIXED NEGATIVE for youths aged 10-17 in Boston. As unemployment increases, crime decreases. POSITIVE for youths aged 10-17 in Cincinnati and Chicago. As unemployment decreases, crime decreases.	ECONOMIC VARIABLES: Correlation coefficient significant at the .05 level for the Boston data. Correlation coefficients not significant for the Chicago and Cincinnati data.	Correlation Analysis
Phillips, Votey, Maxwell, 1972	A Labor force participation rate (Probably U.S. Bureau of Labor Statistics) Unemployment rate (Probably U.S. Bureau of Labor Statistics) Population Partitions: Employed, Unemployed, Not in the Labor Force, Others.	A Arrest rate per person for burglary, auto theft, robbery and larceny for youths aged 18-19 years (FBI Statistics)	Age, race	1952-67	ECONOMIC VARIABLES: NEGATIVE The crime rates of both white and black youth decrease as the labor force participation rate increases MIXED The change in the crime rate with respect to the unemployment rate is positive for non-whites and negative for whites.	ECONOMIC VARIABLES: R^2 is significant at the .01 level. However the significance levels for the statistics of the regression coefficients are difficult to determine because the notation employed is unclear.	Regression Analysis
	B Same as above except that the population partitions are: Not Working, Others	Same as above	Age, race	1952-67	ECONOMIC VARIABLES: NEGATIVE The crime rates decreases of both white and black youth decrease as the labor force participation rate increases. MIXED The crime rate decreases as the unemployment rate decreases except in the case of larceny.	ECONOMIC VARIABLES: The coefficients for not working whites are insignificant when estimated jointly with non-whites. However, when the sample is stratified by white and non-white all of the coefficients are significant at the .05 level or better.	Regression Analysis - To reduce the multicolinearity in Secion A different population partitions are used.
	C Same as above except the population partitions are: Labor Force, Not in the Labor Force, Others	Same as above	Age, race	1952-	ECONOMIC VARIABLES: NEGATIVE Individuals in the labor force have lower crime rates.	Same as above (part B)	The regression analysis using the labor force-not in the labor force--other partition has greater explanatory power than the regression using the not working-other partition
Singell, 1967	B General unemployment data by census tracks that were grouped into sub-communities in Detroit.	B Total contacts with the youth Bureau of the Detroit Police Department.	Socio-economic class of census tracts (grouped into sub-communities) measured by the median family income of the tracts.	1960	ECONOMIC VARIABLES: POSITIVE As unemployment increases, youth crime increases. CONTROL VARIABLES: Mean family income in a community.	ECONOMIC VARIABLES: Insignificant at the .05 level within homogeneous income groups. CONTROL VARIABLES: No correlation coefficients were directly computed.	Correlational Analysis

coefficients were insignificant at the .05 level within homogeneous income groups.[75]

In summarizing, the evidence of only those studies in which the results were known to be statistically significant might lead one to hesitantly adopt the posture that individuals rationally choose between legal and illegal alternatives given the opportunity structure. All three analyses by Phillips, Maxwell and Votey, support this viewpoint. However, an analysis of Boston data published by Glaser and Rice supports the opposing perspective. It would, therefore, be uncautious to adopt either theory based on the empirical studies that control for a single economic or demographic characteristic.

In-Depth Studies

The in-depth studies relating economic indices and crime incorporate larger numbers of control variables into the anlayses. For example, in 1963 Fleisher reworked the 1959 analysis of Glaser and Rice using the same data but including a trend variable, a variable to account for a change in data collection method and other variables to account for the effect of war and the absence of fathers on delinquency over the period covered.[76] Previously, Glaser and Rice found an inverse relationship between unemployment and youth crime. The results of the U.S. and Boston analyses were significant. However, when Fleisher included the additional variables, he found a significant and positive correlation between unemployment and arrest rates for crimes against property for youths aged fifteen and under. See Chart 2-4 for the specifics of the two analyses.

A similar reversal of analytical results occurred when Weicher reworked part of a study published by Fleisher in 1966. These studies

CHART NUMBER 2-4: A COMPARISON OF TWO DIFFERENT STUDIES IN WHICH ONE AUTHOR ADDS THREE ADDITIONAL VARIABLES

AUTHOR, REFERENCE	ECONOMIC DATA	DELINQUENCY DATA	OTHER CONTROL VARIABLES	YEARS OF ANALYSIS	DIRECTION OF CORRELATION	STATISTICAL SIGNIFICANCE	COMMENTS
Glaser and Rice, 1959	A Total and age-specific male civilian unemployment rates for the U.S. (Handbook of Labor Statistics and Annual Reports of the Labor Force)	A Total number of fingerprint arrests by age groups for crimes against persons and property expressed as a percent of the total arrests reported for all ages. (FBI Uniform Crime Report Data)	Age	1932-50	ECONOMIC VARIABLES: NEGATIVE As unemployment increases, crime decreases for youth up to age 17.	ECONOMIC VARIABLES: Correlation coefficient significant at the .01 level.	Correlation Analysis
	B Percent of U.S. male labor force unemployed in Chicago, Cincinnati and Boston. (Handbook of Labor Statistics, Annual Reports of the Labor Force and Lebergott's "Annual Estimates of Unemployment in the U.S., 1900-54.")	B Sex and age specific arrest rates in Chicago, Cincinnati, and Boston. (City Municipal Reports)	Age, Sex	1930-56	ECONOMIC VARIABLES: MIXED NEGATIVE for youths aged 10-17 in Boston. As unemployment increases, crime decreases. POSITIVE for youths aged 10-17 in Cincinnati and Chicago. As unemployment decreases, crime decreases.	ECONOMIC VARIABLES: Correlation coefficient significant at the .05 level for the Boston data. Correlation coefficients not significant for the Chicago and Cincinnati data.	Correlation Analysis
Fleisher, 1963	A Same as Glaser and Rice, A.	A The arrest rate for property crimes expressed as the number of arrests divided by the age-specific population of the appropriate areas. (FBI Uniform Crime Report Data)	The number of personnel in the US armed services. This variable is to account for the effect of war. (Source not reported) A trend variable and its common logarithm. The ratio of property crime arrests for all ages to the rate of property offenses known to the police. This variable was used to reflect the change in data collection that occurred between 1951 and 1952. (Probably FBI Uniform Crime Reports) Age.	1932-61	ECONOMIC VARIABLES: MIXED POSITIVE for youths aged 16 and over. As unemployment increases, crime increases. NEGATIVE for youths aged 15 and under. As unemployment increases, crime decreases.	ECONOMIC VARIABLES: The ratios appear substantial except for youths aged 16. The results are probably significant but neither the degrees of freedom nor the significance levels are directly reported.	OLS Regression Analysis - Fleisher reworked the data used by Glaser and Rice but included a trend variable, a variable to account for the effect of war and a variable to account for the change in the method of data collection of the crime statistics. However, it would seem to me (although not reported) that fingerprint arrests by age groups (Y) would apriori be highly correlated with the ratio of property crime arrests for all ages to the rate of property offenses known to the police (X_6). The causal logic is circular.
	B Same as Glaser and Rice, B.	B Same as Glaser and Rice, B.	Total number of personnel in the U.S. armed services. This variable is to account for the effect of war. (Source not reported) A trend variable and its common logarithm. Age, sex.	1936-56 for most of the analysis 1930-56 for the analysis of the Boston data.	ECONOMIC VARIABLES: POSITIVE As unemployment increases, youth crime increases regardless of age.	ECONOMIC VARIABLES: Same as above.	Same as above except that the variable X_6 was not included in this analysis.

estimated the relative importance of economic and sociological variables. Weicher used the same crime and economic indices as Fleisher but changed several of the variables that were supposed to control for the "tastes" for delinquency of the population. Based on a priori reasoning, Weicher included a better variable for the number of youth in a community who were not living with both parents. This is the most significant of the six taste variables. By simply replacing one measure with another, two of the economic variables, one measuring the effect of income dispersion, the other the effect of opportunity, became insignificant. Other similar variable replacements were made by Weicher, all of which significantly changed the analysis. (For the specifics, please see Appendix A.) The only conclusion that can be drawn from this type of data manipulation is that the model on which these empirical tests have been based in not well specified.[77]

The final empirical study to be reviewed is one conducted by Ehrlich in 1973. It is an estimation of an economic model in which the probability of being caught, the average cost of criminality if caught, and the expected payoff to crime and legitimate activities are modeled. Ehrlich also controls for age and race. See chart number 2-5 for specifics. The model used is intuitively appealing, but the empirical results are largely insignificant. Even a straightforward analysis of a well formulated economic model does not yield the desired results. This suggests that youth crime is the result of a set of indiosyncratic factors for each youth and that these factors cannot be captured with economic or crime constructs for a state or census tract.[78]

The results of the complex analyses relating youth crime to economic conditions are confusing. Results of analysis that appear

CHART NUMBER 2-5: AN EMPIRICAL ANALYSIS OF THE ECONOMIC MODEL

AUTHOR, REFERENCE	ECONOMIC DATA	DELINQUENCY DATA	OTHER CONTROL VARIABLES	YEARS OF ANALYSIS	DIRECTION OF CORRELATION	STATISTICAL SIGNIFICANCE
Ehrlich, 1976	The median income of families by state. (No source reported) Percentage of families with incomes below one-half of median income. As a measure of the cost of criminality the average time served by offenders in state prisons was used. The civilian unemployment rate of civilian males aged 14-24. The labor force participation rate for civilian urban males aged 14-24.	The number of offenses known per capita in 1940, 1950, and 1960 by state, current and one-year lagged rates (FBI Statistics)	The probability of apprehension and imprisonment is estimated by the ratio of the number of commitments to state prisons in a given state to the number of offenses known to have occurred in the same year. (FBI Statistics) Percentage of non-whites. (Probably census data) The percentage of all males in the age group 14-24. (Probably census data	1940 1950 1960	ECONOMIC VARIABLES: MIXED As unemployment of youths aged 14-21 increases, the number of offenses may increase or decrease. The effect of the labor force participation rate of 14-21 year olds is inconclusive in explaining crimes against property but is negatively correlated with crimes against persons. The coefficients of the remaining variables are not reported for the age specific equations.	ECONOMIC VARIABLES: Insignificant at the .05 level. Significant at the .05 level only in the case of crimes against persons.

reasonable are reversed when minor modifications to the variable construct are made. This suggests that there is multicollinearity among the explanatory variables and that these models, from the simplest to the most complex, have not been well specified. Theory building and data base building in this field must be advanced before empirical analysis will yield stable and reasonable results.

Summary

The theories of the labor market and criminology are diverse. Depending on the theoretical perspective selected, one can argue that there are hierarchical, simultaneous or non-systematic relationships between youth crime and employment. Likewise, the results of the empirical studies related to youth crime and employment are confusing and conflicting. There is a clear need for a more specific theoretical analysis, as well as a systematic micro-level empirical analysis of the relationships between youth crime and employment.

NOTES AND FOOTNOTES

[1]Michael Hannon, Aggregation and Disaggregation in Sociology (Lexington: Lexington Books, 1971).

[2]W.S. Robinson, "Ecological Correlation and the Behavior of Individuals," American Sociological Review 15 (June 1950).

[3]Martin Bronfenbrenner, Income Distribution Theory (New York: Aldini-Atherton, 1971).

[4]John Hicks, "The Marginal Productivity Theory of Wages," in Perspectives on Wage Determination, ed. Campbell McDonnel (New York: McGraw-Hill Book Co., 1970).

[5]Gian Singh Sabota, "Theories of Personal Income Distribution: A Survay," Journal of Economic Literature (March 1978):3.

[6]See Travis Hirschi, Causes of Delinquency (Berkeley: University of California Press, 1969; reprint ed., Berkeley: University of California Press, 1974), p. 1; Note: that theories of subcultural deviance have been widely criticized. However, the belief that the most damaging criticism concerns the analytic inability to verify or reject the theory is brought out in Edwin Sutherland, the proponent of the theory of differential association, and Donald Cressey, Criminology, 8th ed. (Phialdelphia: J.B. Lippincott Co., 1970), pp. 78-87. Critics have stated that the ratio: of learned behavior patterns used to explain criminality cannot be determined with accuracy in specific cases; for an example see Sutherland and Cressey, Criminology, p.85. However, Sutherland and Cressey have responded by stating in Criminology, p. 13, that a theory accounting for the distribution of crime, delinquency or any other phenomenon can be valid even if a presumably coordinate theory specifying the process by which deviancy occurs in individual cases is incorrect, let alone untestable. While this is hardly an adequate response to the testability criticism, the verification of this theory is not the subject at hand, but rather the implications of subcultural deviance theories on the youth-crime employment relationship.

[7]In a recent publication, Marguerite Warren and Michael Hindelang, "Current Explanations of Offender Behavior," in Psychology of Crime and Criminal Justice, ed. Hans Toch (New York: Holt Rinehard, 1979), pp. 169-170, these theories were discussed under the general description of "subcultural deviance theories."

[8]The work of Edwin H. Sutherland, Principles of Criminology, 3rd ed. (Philadelphia: J.B. Lippincott, 1939), notably his theory of

differential association, and the work of Thorstein Sellin, "Culture, Conflict, and Crime," Social Science Research Bulletin 41 (1938), notably his theory of culture conflict, have been extended by Donald Cressey's reformulation of Sutherland's work, Delinquency, Crime and Differential Association (The Hague: Martinus Nijboff, 1964); Daniel Glaser's differential identification, "Criminality Theories and Behavioral Images," American Journal of Sociology 61 (March 1956); Gresham Sykes and David Matza's techniques of neutralizations, "Techniques of Neutralization: A Theory of Delinquency," American Sociological Review 22 (December 1957), and "Juvenile Delinquency and Subterranean Values," American Sociological Review 26 (October 1961); Richard Cloward and Lloyd Ohlin's treatment of adaptations of frustrations, Delinquency and Opportunity (Glenco, Illinois: The Free Press, 1960); and A.K. Cohen and J.F. Short's work on subcultural forms of delinquency, Research in Delinquent Subcultures," Journal of Social Issues 14 (Summer 1958).

[9]Robert Burgess and Ronald Akers, "A Differential Association--Reinforcement Theory of Criminal Behavior," in Delinquency, Crime and Social Processes, eds. Donald Cressey and David Ward (New York: Harper and Row, 1969).

[10]Melvin DeFleur and Richard Quinney, "A Reformulation of Sutherland's Differential Association Theory and a Strategy for Empirical Verification," Journal of Research in Crime and Delinquency 3 (January 1966): 7.

[11]Hirschi, Causes of Delinquency, p. 37.

[12]Ibid., pp. 22-23.

[13]Eric Hanushek and John Jackson, Statistical Methods for Social Scientists (New York: Academic Press, 1977), p.225.

[14]This definition of a hierarchical model is valid if the endogenous variables are constrained to one time period. That is, while employment at time (t) may not affect delinquency at time (t), and delinquency at time (t) may affect employment at time (t), employment at time (t-1) or (t-2) may affect delinquency at time (t). In other words, if a lagged endogenous variable is an explanatory variable in a lower order equation the model is not strictly hierarchical.

[15]See Emile Durkheim, Suicide: A Study in Sociology (Glenco, Illinois: The Free Press, 1951); Idem, The Rule of Sociological Method (Chicago: University of Chicago Press, 1938); and Robert K. Merton, Social Theory and Social Structure (New York: Free Press, 1949; reprint ed., New York: Free Press, 1968).

[16]Note that the theories of subcultural deviance were described in the preceeding section. References to integrated strain/subcultural deviance theories include Cloward and Ohlin, Delinquency and Opportunity; and Delbert Elliot and Harwin Voss, Delinquency and Dropout (Lexington: Lexington Books, 1974).

[17]Hirschi, Causes of Delinquency.

[18]See Gary Becker, "Crime and Punishment: An Economic Approach," Journal of Political Economy 76 (March/April 1968); Issac Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," Journal of Political Economy 81 (May/June 1973); David Lawrence Sjoquist, "Property Crime and Economic Behavior: Some Empirical Evidence," American Economic Review 63 (June 1973).

[19]See Durkheim, Suicide: A Study in Sociology and The Rule of Sociological Method.

[20]In Donald R. Cressey and David A. Ward, Delinquency, Crime and Social Process (New York: Harper and Row, 1969), it is asserted that Durkheim resurrects the term "anomie" from the literature of the late sixteenth century.

[21]Merton, Social Theory and Social Structure.

[22]Cloward and Ohlin, Delinquency and Opportunity.

[23]Elliot and Voss, Delinquency and Dropout.

[24]Merton, Social Theory and Social Structure, p. 256, 270, 271.

[25]Ibid, p. 277.

[26]Hirschi, Causes of Delinquency, p. 6.

[27]Again Hirschi would argue that violent crimes such as vandalism and assault can be explained by the transfer of frustration to a deviant act. However, crimes such as vandalism and assault should probably be considered as "innovative" or "rebellious" adaptation rather than a "retreatist" adaptation.

[28]Merton, Social Theory and Social Structure, p. 264.

[29]Hirschi, Causes of Delinquency, p. 12.

[30]Cloward and Ohlin, Delinquency and Opportunity, are credited with the reformulation.

[31]See Michael Spence, "Job Market Signalling," Quarterly Journal of Economics 87 (April 1973); and Joseph E. Stiglitz, "The Theory of Screening, Education, and the Distribution of Income," Cowles Foundation Discussion Paper No. 354, March 1973. "Scarring" literature purports that a youth's poor or nonexistent employment experiences may permanently "scar" or impede his future ability to succeed-- for an example see Carol Jusenius, "Scarring Effects," unpublished paper, National Committee for Employment Policy, 1979; and David Ellwood, "Teenage Unemployment: Permanent Scars or Temporary Blemishes," unpublished paper, Harvard University and National Bureau of Economic Research, 1979.

[32]Delbert Elliot, Suzanne Ageton, and Rachelle Carter, "An Integrated Theoretical Perspective on Delinquent Behavior," Journal of Research in Crime and Delinquency 16 (January 1979):5.

[33]Cloward and Ohlin, Delinquency and Opportunity, p. 125.

[34]Ibid, p. 171.

[35]Irving Spergel, Racketville, Slumtown, Haulburg: An Exploratory Study of Delinquent Subcultures (Chicago: University of Chicago Press, 1964).

[36]Elliot and Voss, Delinquency and Dropout.

[37]Cloward and Ohlin, Delinquency and Opportunity, p. 6.

[38]Hirschi, Causes of Delinquency.

[39]See Ivan Nye, Family Relationships and Delinquent Behavior (New York: Wiley, 1958); Albert J. Reiss, Jr., "Delinquency as the Failure of Personal and Social Controls," American Sociological Review 16 (April 1951); David Matza, Delinquency and Drift (New York: John Wiley and Sons, 1964); and Scott Briar and Irving Piliavin, "Delinquency, Situational Inducements, and Commitment to Conformity," Social Problems 13 (1965).

[40]Elliot, Ageton, and Carter, "An Integrated Theoretical Behavior," p. 11.

[41]Becker, "Crime and Punishment: An Economic Approach."

[42]Hirschi, Causes of Delinquency, p. 22.

[43]Ibid, pp 25-26.

[44]See Becker, "Crime and Punishment: An Economic Approach;" Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation;" and Sjoquist, "Property Crime and Economic Behavior: Some Empirical Evidence."

[45]Becker, "Crime and Punishment: An Economic Approach," p. 176.

[46]Maureen Pirog-good "The Relationship Between Youth Crime and Unemployment: A Theoretical Paper," Law Enforcement Assistance Agency report, March 1979.

[47]Walter Reckless, Simon Dinitz, and Barbara Kay, "The Self Component in Potential Delinquency," American Sociological Review 22 (1957).

[48]Marvin Wolfgang and Franco Ferracuti, The Subculture of

Violence (New York: Tavistock Publications, 1967), p. 52.

[49]Becker, "Crime and Punishment; An Economic Approach."

[50]The word "commitment" is used here in the same sense as Hirschi, Causes of Delinquency.

[51]The economic model of crime is very general and can be made to explain any individual's behavior by introducing appropriate variables and weights into a utility function. No one set of these variables and weights could explain all deviant behavior.

[52]The need for such a synthesis is discussed by Wolfgang and Ferracuti, The Subculture of Violence; and Warren and Hindelang, "Current Explanations of Offender Behavior."

[53]See Spence, "Job Market Signalling;" Kenneth Arrow, "Higher Education as a Filter," in Efficiency in Universities: The La Paz Papers, ed. Keith Lumsden (New York: American Elsevier Publishing Co., 1974); and Stiglitz, "The Theory of Screening, Education, and the Distribution of Income."

[54]See Spence, "Job Market Signalling," p. 359.

[55]Gary Becker The Economics of Discrimination (Chicago: University of Chicago Press, 1957)

[56]See Ibid,; Cloward and Ohlin, Delinquency and Opportunity; and Hirschi, Causes of Delinquency.

[57]Michelle Sviridoff and James Thompson, "Linkages Between Employment and Crime: A Qualitative Study of Rakero Releases," unpublished paper, Vera Institute of Justice, 10 September 1979.

[58]A negative job termination is defined as occurring when a youth is fired or quits due to poor job performance or suspicion of illegal activities at work or both.

[59]See Bennett Harrison, Education, Training and the Urban Ghetto (Baltimore: The Johns Hopkins University Press, 1972); and

[60]Matza, Delinquency and Drift.

[61]See Cloward and Ohlin, Delinquency and Opportunity; and Becker, "Crime and Punishment: An Economic Approach."

[62]See Jusenius,"Scarring Effects;" and Ellwood, "Teenage Unemployment: Permanent Scars or Temporary Blemishes."

[63]Jusenius, "Scarring Effects," p. 9.

[64]Gerald D. Robin, "An Assessment of the In-Public School Neighborhood Youth Corps Projects in Cincinnati and Detroit, with Special Reference to Summer-only and Year-round Enrollees," final report

of the National Analysts, Inc., Philadelphia, 1969.

[65]Regis Walthier and Margaret Magnusson, "A Retrogressive Study of the Effectiveness of Out-of-School Neighborhood Youth Corps Programs in Four Urban Sites," unpublished report of the Manpower Administration, U.S. Department of Labor, 1967.

[66]Ibid., p. 123.

[67]Robin, "An Assessment of the In-Public Neighborhood Youth Corps Project," p. 328.

[68]Ibid.

[69]I do not consider age as a control variable, as it is used to define the potentially delinquent population.

[70]Larry Singell, "An Examination of the Empirical Relationship Between Unemployment and Juvenile Delinquency," The American Journal of Economics and Sociology 26 (1967).

[71]Daniel Glaser and Kent Rice, "Crime, Age, and Unemployment," American Sociological Review 24 (October 1959).

[72]D. Bogen, "Juvenile Delinquency and Economic Trends" American Sociological Review 9 (April 1944).

[73]Glaser and Rice, "Crime, Age, and Unemployment."

[74]Lloyd Phillips, Harold Votey, and Donald Maxwell, "Crime, Youth and the Labor Market," Journal of Political Economy 80 (June 1972).

[75]Singell, "An Examination of the Empirical Relationship."

[76]Belton Fleisher, "The Effects of Unemployment of Delinquent Behavior," Journal of Political Economy 71 (December 1963).

[77]See Idem, "The Effect of Income on Delinquency," American Economic Review 56 (March 1966); and John Weicher, "The Effect of Income on Delinquency: Comment, "American Economic Review 61 (1970).

[78]Ehrlich, "Participation in Illegitimate Activities."

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CHAPTER III

A NEW PERSPECTIVE ON YOUTH CRIME AND EMPLOYMENT RELATIONSHIPS

Introduction

The literature reviewed in Chapter II includes theories of the labor market and juvenile delinquency that do not deal in-depth with youth crime employment relationships. These theories suggest general employment-crime relationships while empiricists have forwarded ad hoc statements about indices of behavior that have been used to motivate analyses with aggregate data. In this chapter, a more complete framework for analyzing these causal relationships is developed. Attention is focused on the need to consider the historical aspects of youth crime and labor market experiences. This is because it is unlikely that a youth's employment and crime decisions at time (t) would be made without regard to his or her prior experiences. Consequently, it is useful to distinguish between current and past labor market experiences as well as current and past delinquency experiences. The relationships between these four groups of variables becomes particularly complex when different types of labor market and criminal experiences are identified. Therefore, to facilitate a reasonable starting point for an analysis, all crimes are treated as homogeneous events and all employment experiences are treated as homogeneous events. This simplification is relaxed in the latter part of this chapter.

It is for conceptual, as well as analytical, reasons that the historical aspects of the youth crime and employment relationships are explicitly modeled. At a theoretical level, the etiologies of delinquency and the labor market either explicitly or implicitly consider a youth's past experiences to be determinants of his current behavior. For example,the integrated strain/subcultural deviance theory of criminal behavior suggests that an individual resorts to crime when the frustration from his inablility to succeed in the legitimate world becomes sufficiently intense. This frustration is likely to build up over time. There is also the scarring theory of the labor market which suggests that young adult unemployment results in a future of either more unemployment or low wages when employed.

The role of past employment and criminal experiences in determining current behavior is also an important policy question to address. Employment or delinquency prevention policies can change the potentially delinquent futures of today's youngsters. However, some young adults already have extensive delinquency records and/or negative employment records. It is important to know, for example, what effects a change in a youth's current employment status will have on his current criminal behavior, given that negative experiences have already been encountered.

It is also important, from an analytical perspective, to model the effect of a youth's past on his current behavior. That is, summary measures of individual level data over time can obscure causal relationships between employment and crime in the same way that the use of aggregate data (data on states, counties, cities, neighborhoods, etc.) cannot reliably estimate individual level behavior.[1] For example,

in an earlier empirical paper, [2] correlation coefficients between employment and crime variables were smaller than had been anticipated. However, it was felt that this resulted from the aggregation of individual level data into average monthly numbers of police contacts and the percent of time employed over an entire observation period (up to three years). These aggregate measures did not reflect the sequencing of employment and criminal activities. That is, while there was a significant negative relationship between the percent of time employed and the average monthly frequency of police contacts, it was not possible (from the time-aggregate analysis) to determine whether or not the fewer police contacts sustained by the individuals with more extensive employment records actually occurred while the youths were employed or unemployed.

The relationships between employment, unemployment, other labor market events, criminal acts and the absence of criminal acts are discussed in-depth in this chapter. While the effect of other variables such as age, race, living conditions, peer influences and so forth are acknowledged to be potentially important determinants of a youth's labor market status or delinquency, these variables are not examined until the second section of Chapter IV. Attention initially focuses on the relationships between current and past labor market and delinquency experiences, as charted in Figure 3-1.

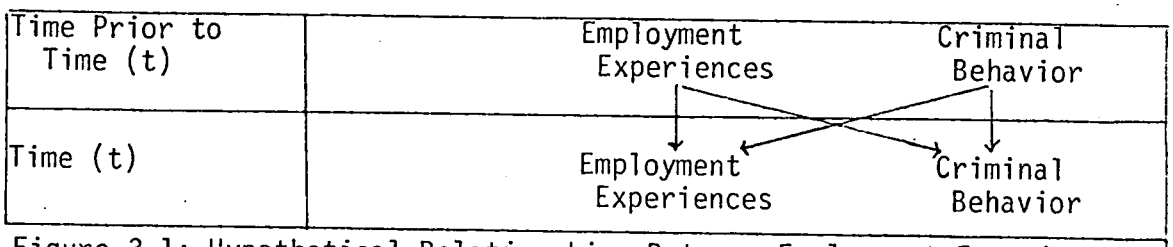


Figure 3-1: Hypothetical Relationships Between Employment Experiences and Crime Over Time

Discussion of the relationships in Figure 3-1 is initiated by defining the concepts of juvenile delinquency, labor market experiences, and the length of a time period.

Functional Definitions

Juvenile Delinquency

For this research, the concept of juvenile delinquency is defined by the frequency of delinquent acts, acts which violate the norms of society and are punishable by law, such as burglary, robbery, assault, larceny, vandalism, arson, and so on. Not included in the concept of delinquency are those "offenses" for which a youth, but not an adult, could be apprehended; these include truancy, running away from home, and incorrigibility. In the empirical section of this dissertation, a police contact is used as a proxy for a delinquent act. It is acknowledged that not all delinquent acts will be recorded because only a fraction of illegal activities are known to the police. Therefore, the concept of delinquency is typified by a series of point events, delinquent acts, which will be proxied by police contacts. The nature of the police contact, whether the police contact was initiated for a crime against property, individuals or for some other type of offense, will be the subject of discussion after dropping the assumption that delinquent acts are homogeneous.

Labor Market Experiences

The concept of labor market experiences used in this dissertation is considerably more complex than that of juvenile delinquency because labor market experiences are not classified into the three commonly used states of employed, unemployed (not employed but looking for work), and out of the labor force (not employed and not

looking for work). Rather, labor market experiences are typified by only two states, employment and unemployment. However, labor market experiences also include one type of point event, a job rejection, where a youth either refuses or is refused a job. This less traditional classification is adopted because of the nature of the data available for this research. In particular, the information that a youth applied for a job but was not hired on a certain day is known. However, it is unclear whether this implies that he was unemployed and looking for a single day, a week or a longer period of time. This ambiguity is eliminated by simply noting both periods of employment and unemployment and the job rejections that occurred while employed or unemployed.

In the empirical section of this dissertation, a period of employment is defined by the time that elapsed between the start and end dates of a job, regardless of whether the job was full or part-time. That is, one must assume that individuals act as if they were employed every day of the week even though their jobs may only be part-time. Nevertheless, it is reasonable to assume that the important aspects of the employment experience are the well defined ties to the conventional order, a source of income independent from a youth's family, and a sense of dignity or self-esteem fostered by the employment experience. The assumption being made is that these aspects of employment are equally as valid for part-time employment as for full-time employment.

The Length of Time Periods

In the introduction to this chapter, the importance of disaggregating data over time is discussed. Short time periods are advocated because summary measures of numerous events over long time periods can obscure causal relationships. Theoretically, these re-

lationships are more readily identified when short time periods are utilized in empirical analyses. However, following this argument to its logical conclusion results in time periods of one day (or less), which are unsatisfactory because such short time periods result in an empirically intractable number of observations, approximately twenty-five thousand person/days. Consequently, there is a tradeoff between theoretical desirability and empirical tractability. A compromise was struck in selecting a time period of thirty days. This does not appear to be a serious theoretical compromise, as the selection of a thirty day time period, however arbitrary, resulted in very few person/thirty day observations in which multiple events (two jobs, three police contacts) occurred.

Intratemporal Relationships Between Labor Market and Delinquency Experiences

The employment crime relationships depicted in Figure 3-1 suggest the existence of reciprocal relationships between employment and crime variables, e.g., labor market experiences at time (t) affect delinquency at time (t), and delinquency at time (t) affects labor market experiences at time (t). Consequently, specific intratemporal hypotheses dealing with each direction of causality are developed and analyzed.

The Effects of Labor Market Experiences on Delinquency Within a Time Period

There are several effects that labor market experiences may have on a youth's delinquent behavior. The most obvious effect, the one suggested by many of the delinquency theories reviewed in Chapter II, is that "all else constant," there should be fewer crimes committed

while employed than while unemployed because youths should have greater commitments to, and beliefs in, the normative order, decreased frustration from a goals-means dichotomy and a lower expected return from crime while employed.[3]

Further, examination of the effects of a youth's labor market experiences on his delinquency suggests that there are interaction effects between a youth's labor market status and the occurrence of job rejections at time (t) in determining delinquency at time (t). In other words, one can hypothesize that job rejections will have negligible effects on a youth's delinquent behavior if the youth is employed at time (t), because one could expect the stabilizing effect of an employment experience to neutralize the negative effect of a job rejection. Therefore, job rejections while employed should result in less frustration and a smaller reduction in expectations from employment than a job rejection that occurs while unemployed.

On the other hand, a job rejection at time (t) should, all else constant, increase an unemployed youth's frustration from a goals-means dichotomy, lessen his commitment to the normative order, and reduce his expected returns from legitimate activities. Thus, unemployed youths who are rejected from jobs are more likely to commit criminal acts than both youths who are employed and youths who are unemployed and not looking for work. That is not to say that every unemployed youth who receives a job rejection at time (t) will commit a delinquent act. We would expect no change in a youth's criminal behavior unless a threshold level of frustration is attained or the net expected return from crime is positive. However, in the aggregate, job rejections during time(t) do imply a higher frequency of crimes among the unem-

ployed than among either the employed or individuals who are unemployed and not looking for work. Moreover, the higher the frequency of job rejections in a given period, the more likely it is that an unemployed youth will resort to crime in that period.

To reiterate, individuals who are both unemployed and rejected from jobs at time (t) are more likely to commit crimes than youths who are employed, regardless of their job search activities, or youths who are unemployed and not looking for work. However, the latter comparison with youths who are unemployed and not looking for work is tenuous, as the youths who are out of the labor force are probably drawn from two different populations--hard core delinquents who have given up on legitimate success routes and youths who are less delinquent prone and simply not looking for work at time (t).

The likely division of youths who are out of the labor force into hard core delinquents and those less delinquent prone explains the contradictory hypothesis which follows, a hypothesis which was formulated from the control and integrated strain/subcultural deviance theories of delinquency. One can hypothesize that an unemployed youth who is searching for (and is rejected from) a job at time (t) is less likely to commit a delinquent act than a youth who is unemployed and not looking for work. This relationship between job search (or the intensity of job search) and delinquency among unemployed youths, is anticipated for two reasons: (1) an unemployed job searcher simply has less time to engage in crime than an unemployed youth who is not seeking work; and (2) the integrated strain/subcultural deviance theory of delinquency states that employment-crime decisions are made sequentially.[4] Youths look to succeed via legitimate channels (school, employ-

ment) prior to resorting to crime as an alternative success route. It is clear that a youth who is seeking work has not broken all of his ties to the conventional order.

In order to synthesize the hypotheses discussed in the three preceeding paragraphs, an alternative hypothesis can be formulated--a youth who is unemployed and looking for work (rejected from jobs, by definition) is (1) more likely to be delinquent than youths who are employed (regardless of their job search activities); (2) more likely to be delinquent than youths who are unemployed, not looking for work and who have not rejected legitimate success routes; and (3) less likely to be delinquent than youths who are unemployed, not looking for work and who have rejected legitimate success routes. (Again, these relationships are likely to be stronger when the intensity of job search among unemployed youths is higher.) Unfortunately, there is no way to distinguish a priori between youths who have and who have not given up on legitimate success routes. Consequently, the results of comparisons between youths who are unemployed and looking for work and youths who are unemployed and not looking for work will be ambiguous and difficult to interpret.

The Effects of Delinquency on Labor Market Experiences Within a Time Period

Arguments can also be made for and against the effect of criminal behavior on a youth's employment status during a given period. A labor market screening theorist might postulate that a criminal offense committed by a youth would be treated as a negative signal by an employer. This would either reduce the probability of being hired if the youth was looking for a job, or increase the probability of

being terminated if already employed. The delinquent act would, therefore, reduce the (potential) employer's expectations of the youth's productivity.

Alternatively, a delinquent act at time (t) is likely to imply that a youth will not be seeking work at time (t) either because he has given up on legitimate paths to success or simply because he has less time to search for a job. This would result in both fewer job applications made by this youth at time (t) and a lower probability of a job rejection (since delinquents spend less time looking for work). If, however, a youth applied for a job at time (t) or he was already employed, a criminal act may determine whether an employer will hire or keep the youth on the payroll.

Nevertheless, the effect of a criminal record on an employer's hiring and termination policies is tenuous for three reasons. First a youth's record of arrests and convictions is not public record and can only be obtained by selected government employers for positions in which youths (less than age eighteen) are not likely to be hired. Thus, disclosure of criminal acts is dependent on the honesty of the youth or must be conveyed by word-of-mouth, which may be inaccurate or incomplete. Secondly, an employer may legally request information about a youth's prior convictions but not about prior arrests that did not result in convictions. However, as these records are not available to the general public, youths may not respond honestly to questions concerning prior convictions. Finally, many delinquent prone youths, particularly in my sample, are poor inner city youths who are frequently employed by government programs targeted to the disadvantaged. These programs do not typically discriminate against delinquents and, fre-

quently, delinquent youths comprise a target group for an employment project.

Yet, while official police or court records may not be useful screening devices, youths who commit delinquent acts in a given time period may display negative attitudes and behaviors (associated with delinquents) in a job interview or while working. These attitudes and behaviors are easily observable at a low cost to employers and may consequently be used as screening devices. Thus, while a youth may not be rejected or terminated from a job because he was arrested, he may be rejected or terminated because of negative attitudes and behaviors that occurred in the job interview or while working.

Relationships Between Employment Variables Within a Time Period

There are three substantively different intraperiod labor market relationships. First, a youth is less likely to apply for a job during time (t) if already employed. Secondly, if a youth applies for a job during time (t), and given that s/he is employed, the youth will be less likely to be rejected from the job than an unemployed job applicant. This is because employers typically consider unemployment to be a negative characteristic or signal. Finally, the probability of being employed at time (t) is higher for youths who are unemployed but not applying for jobs, as compared to youths who are unemployed but not seeking work.

Intertemporal Relationships Between Employment and Crime

Intertemporal effects among a youth's employment status, job rejections and delinquent acts, introduce a host of theoretical

complexities which have not received explicit attention in the literature. Current theories of delinquency or labor market participation do, however, suggest in general terms the importance of intertemporal effects. This section outlines some of the more probable forms that these intertemporal effects may take. The discussion is divided into four subsections, as depicted by the causal arrows in Figure 3-1. These subsections are: the effect of past employment experiences on current employment experiences, the effect of past delinquency on current delinquency, the effect of past employment on current delinquency, and the effect of past delinquency on current employment experiences. The latter two subsections listed are of greater substantive interest in this research. However, the first two sets of relationships are important for accurate modeling of the entire employment-crime causal system. As a preface to the subsequent discussion, recall that the definition of a time period is thirty consecutive days.

Past and Current Labor Market Experiences

In this section, the theories that relate past employment experiences to a youth's current labor force status are briefly summarized with respect to their historical implications. Next, three alternative specifications of the employment relationships over time are forwarded, based on theories which only loosely discuss the nature of the historical relationships. Consequently, they do not exhaust all of the possible formulations but rather represent a sample of the models that are logically consistent with the theories.

Briefly, the signaling theory of wage determination states that employers pay wages to individuals based upon their conditional expectations of the job applicant's productivity, given their changeable and

fixed characteristics.[4] That is, employers have dynamic beliefs about the productivity of different groups of individuals that are a function of the employer's perception of the productivity of the individuals he has already employed. The logic of the signaling theory implies a queing model when excess labor supply conditions prevail. In other words, the employer would rank the applicants by their expected marginal productivities and then select the applicant with the most desirable combination of characteristics. It is generally believed that employers consider a previous work history to be a desirable attribute of an individual, particularly if the work history indicates that the job applicant possesses specific skills or is a stable worker.

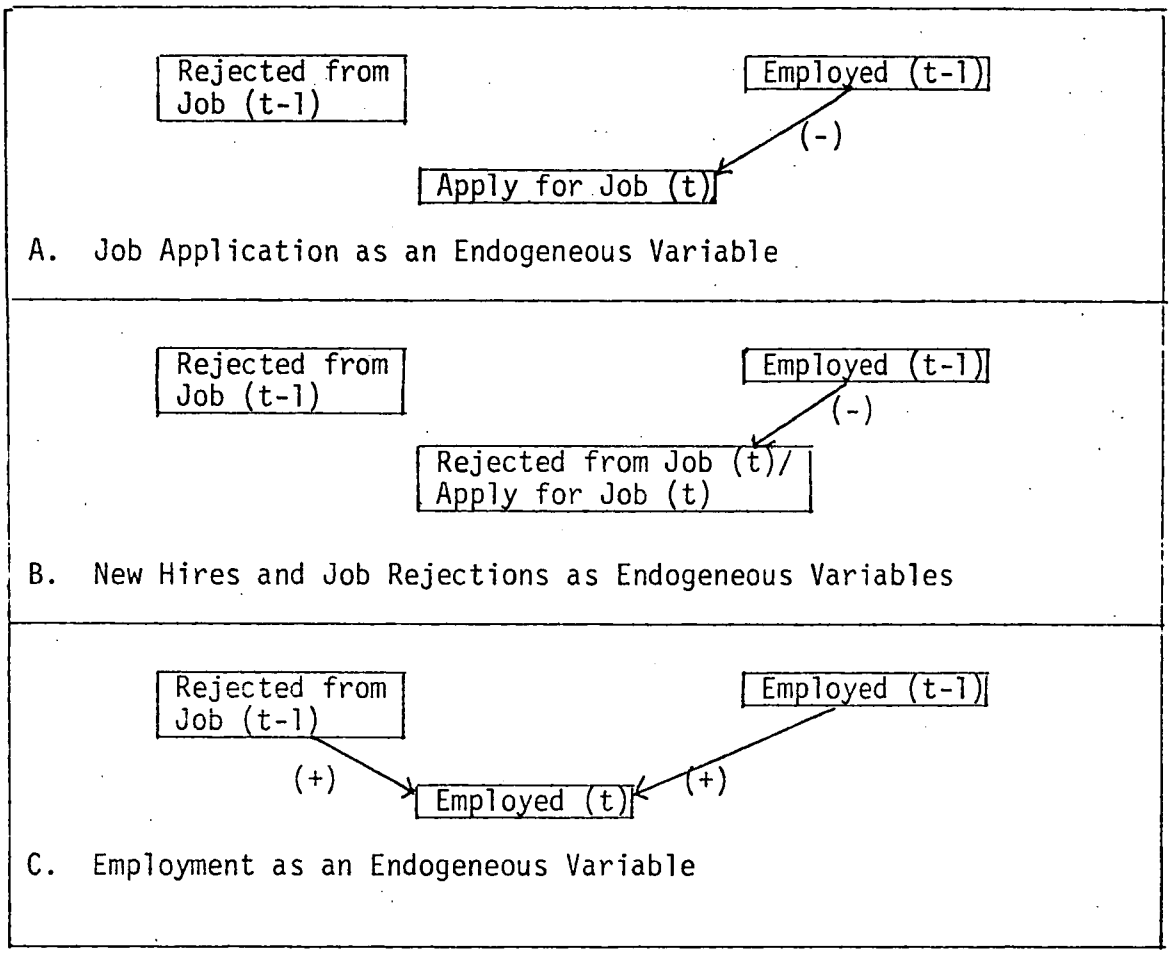
Additionally, the scarring theory of the labor market states that youth unemployment affects a youth's future economic, social, psychological and criminal behaviors, even into adulthood. Unemployment as a young adult, generates both further unemployment and lower paying jobs when employed.[5] However, no specific forms of the historical relationships are suggested.

From an empirical perspective, several descriptions of the history of employment states, job terminations, new hirings, and job rejections are consistent with the signaling and scarring theories of the labor market. This is because these theories neither logically derive nor suggest specific forms of intertemporal relationships, nor embody a complete treatment of all of the types of labor market experiences explicitly considered herein. With respect to intertemporal relationships, three alternative sets of such relationships are suggested in this text. Although they are not exhaustive of all possible relationships, these alternatives represent some of the more reasonable

and empirically testable hypotheses. More extensive formulations of the effects of past labor market experiences on a youth's current employment experiences are not warranted, as this modeling does not constitute the core of this research.

First, a simple model of historical employment relationships assumes that a youth's labor market experiences at time (t) are stochastic functions of the youth's labor market experiences at time (t-1). For example, a youth who was employed at time (t-1) would, regardless of his job search status, more likely be employed at time (t) than youths who were unemployed at time (t-1). Figure 3-2 (a-c) details the expected directions of relationships between labor market states and events over two time periods. Note that job applications, new hires(or job rejections) and employment status are each treated as dependent variables because the endogeny of the point events, job application and new hires, in the network of employment relationships, is an empirical issue.[6] Also note that job applications and terminations are not explicitly considered to be dependent variables since these point events are captured in the historical analysis by the variables, such as length of time employed and length of time unemployed. A short duration of employment or unemployment indicates a recent new hiring or job termination. On the other hand, job rejections are not captured by the duration variables incorporated into the historical analysis and, consequently, they are explicitly considered in this section. Moreover, control variables such as the level of unemployment, seasonality, and the demographics of the youths must be incorporated into the final "employment relationships over time" model.

Figures 3-2 (a-c): Relationships Between Labor Market Experiences and Job Statuses Over Time

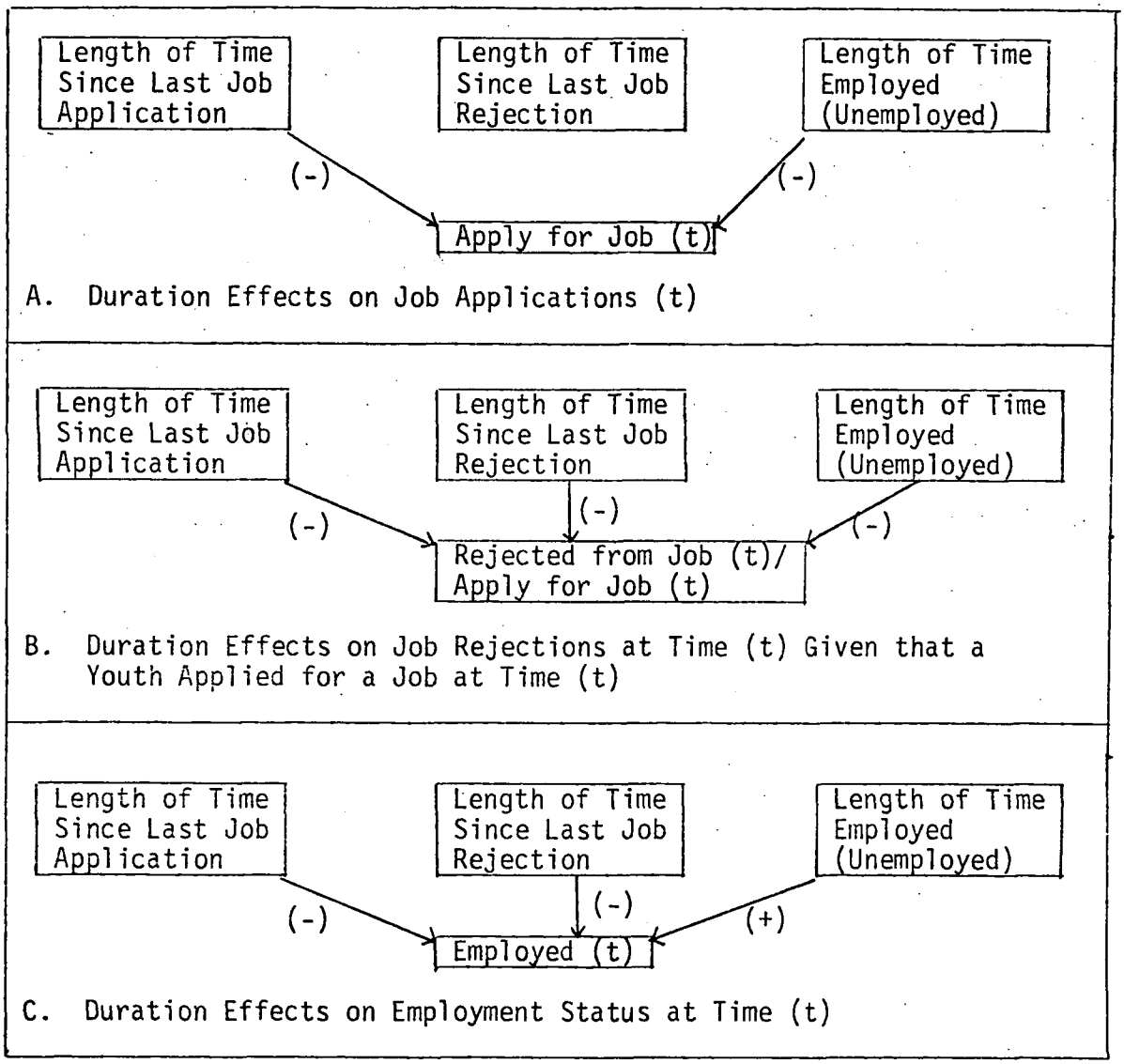


Additionally, these relationships over two time periods can be extended by redefining the point event variables, such as job applications (yes/no) and job rejections (yes/no) as continuous variables with lower limits of zero. That is, the strength of the relationships in Figure 3-2 (a-c) should increase as the number of job applications and rejections at time (t-1) increases. The variable employed at time (t-1) could be redefined as the number of jobs held during time (t-1).

A slightly more complex model than the one described above would incorporate duration variables as well as the labor market status and activities of the youth in the preceeding period. These duration variables are the length of time in a job state up to the end of time (t-1), the length of time since the youth's last job application, and the length of time since the youth's last job rejection. Note that the variable, length of time since last job termination, is not included in this list, as this concept is fully captured by looking at the interaction term between current employment status and the variable, length of time in current job state. Graphs of the additional relationships implied by the duration variables are presented in Figure 3-3(a-c).

The suggested relationships in Figure 3-3 (a-c) are not explicitly derived from labor market theories, although the postulated directions of causality seem reasonable. Yet, the duration variables may also interact with a youth's employment status at the end of time (t-1). For example, if a youth is employed at the end of time (t-1), the length of time since his last job rejections will not contribute strongly to the probability of employment at time (t). However, if a youth is unemployed at the end of time (t-1), the longer the length of

Figures 3-3 (a-c): The Effects of Duration Variables on Labor Market Activities at time (t)



time since his last job application, the less likely it is that the youth would be employed at time (t). Additionally, the length of time since a youth's last job application will probably not affect the likelihood of his applying for a job or being hired for a job during time (t) if the youth is already employed. However, if a youth is unemployed, the probability of applying for a job or of being rejected will likely decrease as the length of time since the last job application increases. One can postulate similar interaction effects with the variables length of time in current job state and length of time since a youth's last job rejection.

A third alternative model assumes that the probability of labor market experiences at time (t) is a stochastic function of the types and sequences of labor market experiences up to time (t) within a longer period of time. More weight is given to the employment experiences that occurred closer in time to the end of period (t-1). For example, employment at the beginning of time (t-1) would contribute more heavily to the probability of employment at time (t) than would employment during times of (t-2) or (t-3). This model suggests that the probability of employment at time (t) depends on the types and sequences of labor market experiences. Zero, proportional, and negative exponential weighting schemes appear to be reasonable alternatives to test in the exploratory data analysis.

In other words, the three models proposed suggest that a youth's labor market experiences at time (t) are functions of (1) employment experiences at time (t-1), (2) duration variables alone and interactions between a youth's employment status at time (t-1) and the duration variables, and (3) the type and sequence of labor market experiences

up to the end of (t-1) where labor market events are weighted with respect to time.

Past and Current Criminal Experiences

As with the models of labor force participation over time, the theories of delinquency do not logically derive functional specifications of the historical relationships. In fact, the criminology theories do not support a strong relationship between deviant behavior and delinquency over time. Moreover, empirical analyses suggest that roughly one half of all delinquents are one time offenders.[7] Thus, the theories of delinquency will be summarized briefly with respect to their inferences concerning the probability of deviant acts over time. More empirically oriented models are discussed at the end of this section.

The economic model of delinquency[8] postulates that a youth examines his expectations of returns from alternative activities and then chooses the mix of activities that will maximize his returns given his risk preference. Moreover, the model states that current decision making regarding job search, employment and/or crime is a function of previous decision making in those areas to the extent that prior successes or failures will affect the youth's expectations of returns in the current time period. Consequently, a series of crimes for which the youth was not apprehended may increase his expectations from delinquency and result in further delinquency. Similarly, a youth who is apprehended for a crime might reduce his expectations from illicit activities and thus be less likely to return to crime. However, the economic model would not reject either the case where a youth did not revise his conditional expectations from crime after several arrests or where the expected value of crime was positive, given a high probability of arrest.

On the other hand, the integrated strain/subcultural deviance theory suggests that a youth's inability to succeed via legitimate channels results in frustration which, if sufficiently intense, causes delinquency. Thus, a youth has given up on legitimate activities once he engages in crime and is, therefore, likely to continue to commit delinquent acts, particularly if his criminal behavior is being reinforced by a delinquent subculture.

The control theory of delinquency[10] states that deviant behavior is a direct result of weak or broken ties with the normative order. It is a theory which explains delinquency in terms of the absence of effective controls. Briar and Piliavin[11] suggest that situational motivations occurring in the absence of controls result in delinquent acts. Alternatively, Matza[12] suggests that a "feeling of desperation" resulting from a "mood of fatalism," "the experience of seeing oneself as effect" rather than cause, results in a youth's delinquency. Consequently, clear inferences concerning the relationship of past to current delinquent behavior cannot be made on the basis of this theory. Delinquency depends on the absence of controls, not past delinquency. However, to the extent that delinquent youths at time (t) are youths without ties to the normative order at times (t+i), (i>1), then delinquency over time should be a repetitive and stochastic process.

Finally, the subcultural deviance theories[13] postulate that criminal behaviors are learned in much the same way as other behavior. However, some individuals are born into deviant subcultures. Thus, delinquency results from having been indoctrinated into a criminal subculture. Therefore, as in control theory, delinquency at time (t) does not depend on prior delinquency but rather depends on the subculture

to which the youth is affiliated at time (t). To the extent that delinquent youths at time (t) are youths associated with delinquent subcultures at time (t+i), (i>1), delinquency over time should be a repetitive and stochastic process.

The criminology theories reviewed suggest that past delinquency may or may not result in future delinquency and that the knowledge of past delinquency alone is insufficient to predict current behavior. However, the theories reviewed imply that if a youth or his environment does not change significantly over time and if the youth was delinquent in some previous time period, then the youth has a higher probability of delinquency in subsequent time periods as compared to a similar youth who was not delinquent in a previous time period. Nevertheless, the theoretical relationship between past and current delinquency is tenuous at best. Depending upon the theories to which one subscribes, other factors important to the explanation of current behavior would include number of arrests and convictions over time (not just delinquent acts), police policies, risk preference, adaptiveness of expectations, the existence of a supporting criminal subculture, situational motivations to crime, the youth's perception of his environment and a host of economic, social, and demographic variables.

The notion that, all else constant, prior delinquency implies a higher probability of future delinquency is substantiated by the Philadelphia cohort study by Wolfgang, Figlio, and Sellin.[14] In a sample of 9,945 youths, 1,613 were one time delinquents, whereas 1,862 were recidivists. That is, the probability of committing at least one offense was thirty-five percent. However, the probability of committing two or more offenses, given that one offense had been committed, was

fifty-four percent. Nevertheless, forty-six percent of the youths arrested were non-repeat offenders.

The most straightforward characterization of delinquency over time has been formulated as a recidivism or failure rate model. These models typically estimate the distribution of failures over time after release from a program. That is, the models estimate a failure rate, the proportion of individuals who will eventually fail at each time period.

The split population (repeat and one time offenders), negative exponential probability of delinquency model[15] accounts for the fact that a certain percentage of the population may not recidivate. It also estimates the proportion of youths who will recidivate at each time period, given a vector of independent variables which must be specified. This hazard or failure rate regression model is an extension of the work of Cox,[16] which is derived from models used in the "engineering application of probability and statistical theory to equipment reliability problems and in biomedical survival surveys."[17]

Another interesting specification of a hazard rate regression model is given by Barton and Turnbull.[18] These authors have formulated a failure rate model that incorporates time varying covariates such as employment or income. This extension of the basic failure rate model is valuable if one believes that the duration, sequencing or changes in the magnitudes of variables over time affects current behavior. Additionally, this methodology has been generalized by Maltz and McCleary.[19]

Thus, the historical and empirical models of delinquency suggest that prior police contacts should be incorporated in some way in an empirical model of delinquency over time. While many such specifica-

tions are possible, three reasonable formulations are suggested. First, based on the results of the Wolfgang, Figlio, and Sellin study,[20] the total number of police contacts up to the end of time(t-1) would aid in predicting the probability of a police contact at time (t). Specifically, the higher the number of police contacts up to the end of time (t-1), the more likely it is that a police contact would occur during time (t). Alternatively, one could weigh prior police contacts so that police contacts which occurred further away in time are given less weight than contacts that occurred closer in time to period (t). That is, events which occurred further back in one's past are less likely to influence one's current behavior. A third possibility is to account for the historical aspects of police contacts by using the length of time since the last police contact as a predictor of current delinquency.

Note that these three variable specifications have different implications for the historical delinquency relationships. For example, the distribution of crimes over time may be important in determining current behavior relative to the total number of prior offenses. Alternatively, the fact that the youth had at least one police contact at some known point in the past may be as good or better a predictor of current delinquency than variables which summarize and index entire lifelong histories of police contacts.

The Effects of Past Labor Market Experiences on Delinquency

For youths, prior labor market experiences can include jobs worked and job search which has taken place over a period of several years. Moreover, a youth's employment status over this period of time

as well as point events must be analyzed independently, jointly and in sequences in order to do justice to the wide scope of possible employment crime relationships. However, this complexity can be reduced by the fact that successful job search (new hires) and job terminations are both captured by the variable length of time in current job state. That is, new hires and job terminations are definitionally incorporated into an historical analysis of job status and job rejections if this duration varible is included in the analysis. Additionallly, the complexity of the historical effects of labor market experiences on crime is furhter reduced by focusing on several reasonable forms for the intertemporal relationships which are consistent with the criminology theories.

The Effect of Employment States on Crime Over Time

In this section, two forms for employment history-delinquency relationships are suggested. First, recall that the hypothesis that delinquency at time (t) is a funciton of a youth's employment status during time period (t). It would be reasonalbe to further suggest that delinquency at time (t) is also a function of the length of time in a youth's current job state. This variable is broken into the length of time employed and the length of time unemployed. Integrated strain/subcultural deviance, control, and the economic paribus, the longer the period of employment, the less likely the youth is to resort to crime. Conversely, the longer the period of unemployment, the more likely the youth is to resort to crime.

However, the above formulation can be criticized because youths tend to enter and quit the labor market frequently. There are

typically many short periods of employment interspersed with longer periods of labor market inactivity. Consequently, the hypothesis that crime at time (t) is a function of one's current employment state and the length of time in that state may not adequately capture the nature of youth labor market histories. An alternative approach would be to hypothesize that employment in all previous time periods contribute to crime patterns. The periods of employment could be noted and summed to form several indicies. For example, the periods of employment furnter back in time from period (t) could be given less weight than periods of employment closer to time (t). Different weighting schemes could be evaluated.

Zero weights imply that the total number of months (percent of time) employed in one's past is improtant. Linear weights would imply that employment in one's past becomes proportionately less important in determining one's current delinquent behavior. Negative exponential weights would imply that employment further away in one's past contributes an exponentially smaller amount to the determination of current delinquent behavior. All three weighting schemes are compatible with the theories of delinquency.

The Effect of Job Rejection on Crime Over Time

In an earlier section of this chapter, the effects of job rejections within a time period were discussed. The section concluded that the effects of job rejections within a time period were ambiguous because a youth who looks for a job is still committed to the normative order. However, job rejections also decrease the probability of success via legitimate success routes. Moreover, it is unclear whether individuals who are not seeking work are committed criminals or simply too

young or not desiring to work. Consequently, as the intraperiod effects of job rejections on crimes are ambiguous, so are the interperiod effects. As the theories of the labor market or delinquency do not speculate about job search or job rejections per se, the issue is largely exploratory and empirical.

Two reasonable variables, aside from job rejections during period (t), are formulated herein. They are the length of time since a youth's last job rejection and a weighted index of job rejections over a youth's employment history. Again, zero, proportional, and negative exponential weighting schemes are proposed. To reiterate, the effects of these variables may be difficult to interpret given the implications and effects of a job rejection and the lack of information about individuals without job rejections.

Interactions Between Employment States and Job Rejections

The major thrust of this section is that if job rejections produce frustration conducive to crime, then the amount of frustration produced from a job rejection is likely to be less if a youth is employed. That is, it is possible that the increase in the likelihood of crime is less from a job rejection that occurred while employed, as compared with a rejection that occurred while unemployed. Consequently, weighted distributions of job rejections while employed and unemployed could be included as explanatory variables in the crime at time (t) equation. Again, zero, proportional, and negative exponential weighting schemes could be tested, each scheme having different implications for the historical relationships.

at time (t). With a proportional weighting scheme, one would expect that police contacts that occurred further back in time will have proportionately less to contribute to the likelihood of searching for a job at time (t). Negative exponential weights imply that contacts occurring further back in time will have an exponentially smaller effect on the probability of being hired.

The Effect of Prior Police Contacts on New Hires on Job Rejections Given a Job Application

Screening theory states that employers judge job applicants on the basis of characteristics which are easily discernible. Characteristics perceived as negative lower the probability of being hired or increase the probability of a job rejection. Although a prior police contact is not easily discernible, information about the youth's prior police record within his neighborhood or negative attitudes associated with delinquents are likely to be correlated with police contacts and consequently reduce the probability of being hired. That is, it is anticipated that the effects of prior police contacts variables will operate on job rejections/new hires in the same way as they are likely to work on job search. The greater the length of time since the last police contact, the more likely it is that the youth will be hired if he applies for a job. Additionally, weighted distributions of prior police contacts may affect one's success in job search. Note that the zero, proportional, and negative exponential weighting schemes have different implications about new hires and job rejections which parallel the effects of these distributions on job search.

The Effects of Past Delinquency on Current Labor Market Experiences

In this section, labor market experiences are comprised of four dependent variables; job applications, new hires and job rejections given job search, length of time employed or unemployed, and current employment status. It is hypothesized that the frequency of police contacts during the last period, the length of time since the last police contact, or a weighted distribution of police contacts may affect these four labor market variables. Below is a discussion of the four labor variables as they related to prior police contacts.

The Effect of Prior Police Contacts on Job Search

Although not explicitly stated by any labor market or criminology theory, it is likely that youths with prior police records are less likely to look for work, as they may already be committed to crime or part of a subculture which frowns on work. In any event, it is expected that the higher the frequency of crimes last period, the lower the probability that a youth will look for work in the current time period. Also, the greater the length of time since the youth's last police contact, the more likely it is that he has rejected illicit success routes and will seek legitimate employment. Finally, the distribution of a youth's prior police contacts over time may affect a youth's job search behavior. Zero, proportional, and exponential weighting schemes can be evaluated separately.

The weighted distributions of prior police contacts have different implications about job search. With a zero weighting scheme, one would expect the total number of prior police contacts to be inversely related to the likelihood that a youth would search for a job

The Effect of Prior Police Contacts on the Length of Time Employed.

It is anticipated that youths with prior police records of increasing severity will have less stable job histories. It is expected that delinquent youths will have jobs of shorter duration than youths with less severe or nonexistent police records. Delinquent youths who are hired are more likely to display negative attitudes or be less job-ready than nondelinquents who conform more easily to the normative order. Consequently, the higher the frequency of offenses prior to starting a job, the less likely it is that the job obtained will be of a long duration. The longer the length of time since the last police contact prior to starting a job, the more likely it is that the job will be of a long duration. Finally, the weighted distribution of offenses prior to starting a job will affect the tenure of a job. A distribution with zero weights would suggest that the job duration will be shorter given a larger total number of offenses prior to starting the job. Proportional weights imply that offenses further back in one's past will decrease the expected period of job tenure by a proportionally smaller amount. Negative exponential weights imply that police contacts occurred further back in time, will contribute an exponentially smaller amount to the probability of the length of the period that the youth will be employed.

The Effect of Prior Police Contacts on Current Job Status

The effects of prior police contacts on a youth's employment status parallel the effects of prior police contacts on job search and new hires/job rejections given job search. The greater the length of time since the youth's last police contact, the more likely it is that the youth will be employed at time (t). Alternatively, the weighted

distribution of prior police contacts may affect a youth's employment status at time (t). Again, it is suggested that zero, proportional, and negative exponential weighting schemes be tested in order to determine the nature of the historical effects of crime on employment.

Summary List of the Inter- and Intratemporal Relationships Discussed Thusfar.

Below are the five dependent variables discussed in the preceeding sections. Beneath each dependent variable is a list of explanatory variables and a (+) or (-) sign is indicated. Note that current and historical employment and crime variables are the only explanatory variables included in these tables.

Table 3-1: Factors Affecting Crime (t).

Dependent Variable: Crime (t)

	Explanatory Variables:
(+)	$\sum_t w_t$ Police contacts (t).
(-)	Length of time since last police contact.
(-)	Employed at time (t).
	Length of time in current job state Ø Current employment status.
(-)	*Length of time in current job state if employed at time (t).
(+)	*Length of time in current job state if unemployed at time (t).
(-)	$\sum_t w_t$ Employed at time (t).
	Number of job rejects at time (t).
	Number of job rejects at (t) Ø Current employment status.
( )	*Number of job rejects if employed at time (t).
( )	*Number of job rejects if unemployed at time (t).
( )	$\sum_t w_t$ Job rejects during time (t).
	$\sum_t w_t$ Job rejects during time (t) Ø Employment status during time(t).
( )	*$\sum_t w_t$ Job rejects while employed (t).
( )	*$\sum_t w_t$ Job rejects while unemployed (t).

Table 3-2: Factors Affecting Job Applications (t).

Dependent Variable: Job Applications (t)

Explanatory Variables:

(-)	Employed at time (t).
	Length of time in current job state ⊗ Current employment status.
(-)	*Length of time in current job state if employed at (t).
(+)	*Length of time in current job state if unemployed at (t).
(-)	Length of time since last job application.
	Length of time since ⊗ Current employment status. last job application
( )	*Length of time since las job application if currently employed.
(-)	*Length of time since last job application if currently unemployed.
(-)	Number of police contacts at time (t).
(+)	Length of time since last police contact.
(-)	$\Sigma_t w_t$ Police contacts (t).

Table 3-3: Factors Affecting Job Rejections Given that a Youth Applies for a Job at Time t.

Dependent Variable: Job Rejctions (t)/Job Application(t)

Explanatory Variables:

(-)	Employed at time (t)
	Length of time in current job state ⊗ Current employment status.
(-)	*Length of time in current job state if employed.
(+)	*Length of time in current job state if unemployed.
	Length of time since last job application ⊗ Current employment status.
( )	*Length of time since last job application if currently employed.
(-)	*Length of time since last job application if currently unmployed.
	Length of time since last job rejection ⊗ Current employment status.
( )	*Length of time since last job rejection if currently employed.
( )	*Length of time since last job rejection if currently unemployed.
( )	$\Sigma_t w_t$ job rejections (t).
(+)	Number of police contacts at time (t).
(-)	Length of time since last police contact.
(+)	$\Sigma_t w_t$ Police contacts (t).

Table 3-4: Factors Affecting Employment Status(t)

Dependent Variable: Employment (t)

Explanatory Variables:

(+) Employed during (t-1).
Length of time in current job state ⊗ Current employment status.
(+) *Length of time in job state if currently employed.
(-) *Length of time in job state if currently unemployed.
Length of time since last job application ⊗ Job status during time (t-1).
(+) *Length of time since last job application if employed last period.
(-) *Length of time since last job application if unemployed last period.
Length of time since last job rejection ⊗ Job status during time (t-1).
( ) *Length of time since last job rejection if employed last period.
( ) *Length of time since last job rejection if unemployed last period.
(-) Length of time since last job application.
( ) Length of time since last job rejection.
(+) Apply for a job at time (t).
(+) $\Sigma_t^t w$ Job applications (t).
(+) $\Sigma_t^t w$ Employment status (t).
(-) Police contact (t).
(+) Length of time since last police contact.
(-) $\Sigma_t^t w$ Police contacts (t).

Table 3-5: Factors Affecting Length of Job Tenure if Employed

Dependent Variable: Length of tenure of job if employed.

Explanatory Variables:

(+) Length of time since last police contact.
(-) $\Sigma_t^t w$ Police contacts (t).

The Effects of Dropping the Homogeneity Assumptions

Up until now, all employment experiences have been treated as if they were homogeneous, and various types of police contacts have not been differentiated from one another. The assumptions of homogeneity were made in order to keep the analysis of possible employment-crime relationships tractable. Acknowledging that there are different types of employment experiences and police contacts has two effects. First, meaningful and workable definitions distinguishing between different types of jobs and police contacts must be established. Secondly, one must determine if there are any theoretical reasons to believe that these distinctions will substantially change the direction or magnitude of the relationships discussed in the preceeding sections.

With respect to the former problem, definitions distinguishing different types of employment experiences and crimes have been derived. With respect to jobs, the definitions do not characterize all or many of the important attributes of jobs, such as the wages paid, hours worked, or the type of services performed. Given the limitations of the data available, jobs are classified as either successful or unsuccessful. A successful job is defined as a job which (1) lasted at least three weeks unless an earlier termination was specified a priori, and (2) terminated with no negative strings attached. That is, the youth must not have been fired, accused of crimes, or arrested on the job, and the youth must not have quit under questionable circumstances.

Alternatively, the amount of data available concerning each police contact is quite substantial. Nevertheless, using every possible arrest code leads to a theoretically and empirically unmanageable number of nominal classifications. Therefore, the information

concerning the events leading to each police contact have been analyzed to determine if the offense involves bodily injury and/or property theft. Offenses such as vandalism, which involve neither bodily injury nor property theft were classified as other offenses. Note that some offenses were classified as bodily injury, property theft, and other. An example of the multiple classification of one police contact is an incident where a youth breaks into a home, terrorizes the occupants and steals part of the contents of the house.

Theoretical or empirical analyses of employment-crime relationships over time at the level of the individual are virtually nonexistent. Therefore, an analysis which goes beyond this to distinguish between different types of jobs and police contacts is pathbreaking research. While little can be said with the support of existing theories or prior empirical work, several new employment-crime relationships are likely to emerge by differentiating between types of jobs and police contacts.

For example, it is likely that a history of successful jobs will beneficially effect a youth's current labor market activities and his potentially delinquent behavior. However, unsuccessful jobs may result in more active job search while employed, more frequent job rejections if applying for new jobs (given poor references) and possibly an adverse effect on a youth's delinquent behavior. Unfortunately, while clearcut distinctions between different types of crimes are possible given the nature of the data available for this dissertation, it is not at all clear that these distinctions will contribute to new, meaningful employment-crime relationships. For example, attitudes associated with delinquents (regardless of the types of crimes committed)

are likely to result in fewer job applications and new hires, less employment and shorter durations of jobs. That is, it is doubtful that distinguishing between different types of offenses when offenses are used to explain the employment variables will contribute new insights into labor market activities. However, historical employment and offense records may contribute differentially to the likelihood of committing different types of offenses. There is however very little information available to indicate what these differential effects may be.

Summary

Five likely dependent labor market and crime variables have been culled from a plethora of candidates. They are job applications, job rejections given active job search, employment status, the length of job tenure, and criminal activity. The effects of historical employment and crime variables have been analyzed and are summarized in Tables 3-1 through 3-5. Moreover, different types of police contacts and jobs have been distinguished from each other. However, any analysis distinguishing between different types of jobs or police contacts will be tentative given the dearth of prior empirical and theoretical research in this area.

NOTES AND FOOTNOTES

[1]See Michael Hannon, Aggregation and Disaggregation in Sociology (Lexington: Lexington Books, 1971); and W.S. Robinson, "Ecological Correlation and the Behavior of Individuals," American Sociological Review 15 (June 1950).

[2]Maureen Pirog-Good, "The Relationship Between Youth Employment and Juvenile Delinquency; Some Preliminary Findings," Paper presented to the American Society of Criminology, October 26, 1979.

[3]The last statement concerning employment-crime relationships, as derived from the economic model of crime, is valid under the assumption that a specific form of joint production between employment and crime cannot occur. That is, employment could not result in an increase in criminal behavior. Note that the sociological models of juvenile delinquency do not appear to provide strong support for a joint production function of this type. However, the economic model of crime would allow for this type of production function.

[4]See Joseph E. Stiglitz, "The Theory of Screening, Education, and the Distribution of Income," Cowles Foundation Discussion Paper No. 354 (March 1973); Michael Spence, "Job Market Signaling," Quarterly Journal of Economics 87 (April 1973); and Kenneth J. Arrow, "Education as a Filter," In Efficiency in Universities: the La Paz Papers, edited by Keith Lumsden (New York: American Elsevier Publishing Co., Inc., 1974).

[5]See Carol Jusenius, "Scarring Effects," unpublished paper, National Commission for Employment Policy, 1979; and David Ellwood, "Teenage Unemployment: Permanent Scars or Temporary Blemishes," unpublished paper, Harvard University and National Bureau of Economic Research, 1979.

[6]A job termination during time (t) is not treated as a dependent variable. This is because it is more meaningful to treat the duration of a job as a dependent variable. Individuals with positive or negative employment histories will all eventually terminate their jobs. Consequently, job terminations are probably not systematic or meaningful functions of prior employment and crime histories or current states in the context of this research. On the other hand, delinquents are more likely to have a series of short unsuccessful jobs if they are employed at all. The exploration of the effects of employment and crime variables on the duration of job tenure is more pertinent to this research. This subject is discussed in a later section of this chapter.

[7]See Marvin Wolfgang, Robert Figlio, and Thorsten Sellin, Delinquency in a Birth Cohort (Chicago: University of Chicago Press, 1972).

[8]See Gary Becker, "Crime and Punishment: An Economic Approach," Journal of Political Economy 76 (March/April 1968); and Issac Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," Journal of Political Economy 81 (May/June 1973).

[9]Richard Cloward and Lloyd Ohlin, Delinquency and Opportunity (Glenco, Ill.: The Free Press, 1960).

[10]Travis Hirschi, Causes of Delinquency (Berkeley: University of California Press, 1969).

[11]Scott Briar and Irving Piliavin, "Delinquency, Situational Inducements, and Commitment to Conformity," Social Problems 13 (1965)

[12]David Matza, Delinquency and Drift (New York: John Wiley and Sons, Inc., 1969)

[13]For a discussion of these theories see Hirschi, Causes of Delinquency.

[14]Wolfgang, Figlio, and Sellin, Delinquency in a Birth Cohort, p. 66.

[15]See Michael Maltz and Richard McCleary, "The Mathematics of Behavioral Change," Evaluation Quarterly 1 (August 1977); Michael Maltz and Richard McCleary, "Recidivism and Likelihood Functions: A Reply to Stollmack," Evaluation Quarterly 3 (February 1979); and Michael R. Lloyd and George W. Joe, "Recidivism Comparisons Across Groups: Methods of Estimation and Tests of Significance for Recidivism Rates and Asymptotes," Evaluation Quarterly 3 (February 1979).

[16]D.R. Cox, "Regression Models and Life Tables," Journal of the Royal Statistical Society, Series B 34 (1972).

[17]Russell Barton and Bruce W. Turnbull, "Evaluation of Recidivism Data: Use of Failure Rate Regression Models," Evaluation Quarterly 3 (November 1979), pp. 631-632.

[18]Ibid, pp. 629-641.

[19]Maltz and McCleary, "The Mathematics of Behavioral Change."

[20]Wolfgang, Figlio and Sellin, Delinquency in a Birth Cohort.

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CHAPTER IV

THE DATA AND THE METHODOLOGICAL APPROACH

Introduction

The first section of this chapter describes the data used for this dissertation; its substantive content, how and when it was collected, its amenability for data analysis and its biases. Four distinct data sets combine to form the core of the information for the empirical component of this study. They are socio-demographic characteristics, arrest records, and the employment histories of three hundred and two youths, as well as economic indicators of the local labor market.

The second section of this chapter outlines the methodological approach to the data analysis. Given the hypotheses generated in Chapter III, as well as the strengths and limitations of the data, an empirical research agenda is forwarded. This agenda necessarily represents a compromise between theoretical desirability and empirical tractability.

The Data

The major data collection effort for this dissertation was undertaken between June 1977 and November 1978. The bulk of the data describes the characteristics, employment, and criminal activities of three hundred and two delinquent and pre-delinquent youths who participated in a community based delinquency prevention program located in Philadelphia.

This program is one of the myriad of social service agencies funded by the federal, state, or local governments. As with many of these service oriented agencies, such as family counseling agencies, legal aid, and manpower programs, each client is assigned a personal caseworker. The main job of this caseworker is to sustain a relationship with the client through maintaining frequent contacts. That is, the caseworker is supposed to be on top of the dynamics of his cases, aware of the presenting problems and underlying causes, and aware of the forces impacting on the client.

Additionally, this program hires a number of "specialists" to whom caseworkers would refer clients with special needs. The specialists provide services which require indepth knowledge of areas such as the law, medicine, psychology, the labor market, the school or court systems. Referrals to specialists are usually made by a caseworker based on his perceptions of the client's needs. In smaller, less formal agencies, the client may also directly request the services of a specialist. This is true in the case of a job specialist in the delinquency prevention program, which is the source of the data for this analysis. However, the organization in question is very informal and, at times, there was a lack of clarity concerning the responsibilities of the job specialist and the caseworkers with respect to finding job openings and making referrrals. This, combined with the fact that all working adults have some knowledge of the labor market, led to the outcome that a large number of youths also received job referrals directly from their caseworkers.

Two issues arise simply from the fact that the data for this study are drawn entirely from youths enrolled in a crime prevention pro-

gram. First, a general criticism of the data is that there is no official comparison or control group drawn from outside this program. Consequently, all comparisons are made between person/months where the youths in the program were either engaged in job search or not engaged in job search, were employed or unemployed, were arrested or not arrested. Fortunately, a large number of person/months fall into each half of the dichotomous variables listed above to allow statistically valid comparisons to be made. However, the results of this analysis will have to be qualified to account for the possibility that enrollment in the crime prevention program is confounded with factors not included in the analysis which systematically affect labor market or delinquent behaviors.

Nevertheless, it is doubtful that this is a serious problem for two reasons. First, prior analysis with two comparison groups has shown that participation in this program produced no systematic effect on the enrollees' delinquent behaviors as measured by police contacts.[1] Secondly, many of the youths who did not receive job referrals from the center, sought out and obtained employment on their own initiative. That is, youths' labor market activities were only partially affected by the fact of their enrollment in the program. The program operators could not control the hiring or firing actions of employers or the fact that some youths sought out work independent of the center.

With respect to the data, a second point may also be raised that the referral of a youth to a job by the staff of the delinquency prevention program may be correlated with some other treatment provided at the center which is the "true" causal agent of a youth's delinquency. In order to establish the fact that this is an unlikely event, it should be noted that the major treatment provided through this program is the as-

signment of a counselor to each youth. Every youth enrolled in this program was the recipient of this treatment. Other services were provided to clients on a selective basis, according to the needs of the clients. For example, all of the youths who were charged with crimes just prior to intake into this program or during participation in the program were recipients of the program's legal aid services. The youths needing to transfer schools received the assistance of a school liaison officer. Thus, the receipt of services beyond the assignment of counselor is likely to be correlated with a youth's delinquent behavior prior to and during enrollment in this program, e.g., the more delinquent youths are likely to need legal services or school transfers. However, prior analysis of the data on the three hundred and two youths comprising the population from which this sample is drawn, found that, aside from age, the youths who received job referrals through this program did not differ significantly from the youths who did not receive job referrals.[2] It is, therefore, unlikely that the receipt of a job referral through this program is highly correlated with another treatment selectively provided to those youths obtaining job referrals and that this other unknown treatment is operating through the employment variable.

With respect to the data collection process and data availability, the youths in this study entered this program between January 3, 1975 and January 24, 1978. Although the date of intake varies among the youths, this date is considered the beginning of the first person/month (30 day) observation for each youth. Note that there are 3,532 complete person/month observations whereas data was only collected on 302 youths. This indicates that, on average, there are approximately eleven person/month observations in the sample for each youth on whom information was

collected.

The socio-demographic data were collected on each of the youths on their dates of intake. Police contact data were collected in November 1978 and is cumulative to birth. Employment data are known only for those months during which the youths were enrolled in the program. The labor market indices were collected so as to range between the earliest date of intake and the latest termination date. Schematically, the availability of the data is described in Chart 4-1. Problems of biases or data censoring are discussed when each data set is described.[3]

CHART 4-1: DATA COLLECTION SCHEME

Birth	Date of Intake[1]		Date of Termination
	Length of Observation Period		
	o Socio-Demographic Data Collected		
	Youths' Labor Market Activity and Local Labor Market Index Data Available		
	Police Contact Data Available[2]		

1. The dates of intake and termination varied for each youth.

2. The police contact data was collected as of November 1978 and is cumulative to birth. Person/month observations on youths enrolled in the program after November 1978, when no police contact is available, are dropped from this study.

The Socio-Demographic Data Set

Information characterizing the youths in this study and their families was collected when each youth was admitted into the crime prevention program. This one shot approach to data collection adequately characterizes variables such as race, sex, or birthdate, which do not

change. However, a parent's marital status, a youth's living arrangements, as well as many additional variables, may change over time. Unfortunately, the values of these variables are only known for that point in time when the youths entered the program.

The "typical" youth in this study is a white male who was enrolled in school and fourteen years of age at the time he entered the program. The head of this youth's household is most likely his mother (52.3%), a direct result of the high divorce/separation rate of parents in this population (45%). While many of the youth's mothers do not work (61.0%), most of those that do work hold low paying clerical, sales worker, or laborer positions. When they are present at all (and if they are employed), the male household heads tend to fall into somewhat higher paying categories, including craftsmen and operatives. A high percentage of the youths' families receive welfare payments (45%) and, based on sample data of sixty-seven families, the average yearly income is estimated to be $6,309. More detailed information on the characteristics of the youths in this sample and their families can be found in Tables 4-1 to 4-3. Note that the frequency distributions for the three hundred and two youths are provided in the left hand columns of the tables, whereas the frequency distributions for the 3,532 person/month observations are found in the right hand columns. Both sets of figures are provided whenever possible, in order to show how the transformation of the person data into person/month data biases the original sample.

TABLE 4-1: CHARACTERISTICS OF THE YOUTHS

Variables	Number (Percent) Person Observations	Person/Month Observations
Race:		
White	196 (64.9)	2,032 (57.5)
Non-White	106 (35.1)	1,500 (42.5)
Sex:		
Male	233 (77.2)	2,942 (83.3)
Female	69 (22.8)	590 (16.7)
Age:[1]		
Nine	3 (1.0)	11 (.3)
Ten	9 (3.0)	65 (1.9)
Eleven	11 (3.6)	135 (3.8)
Twelve	31 (10.3)	205 (5.8)
Thirteen	27 (12.3)	267 (7.5)
Fourteen	44 (14.6)	509 (14.4)
Fifteen	56 (18.5)	668 (19.0)
Sixteen	55 (18.2)	766 (21.6)
Seventeen	42 (13.9)	667 (18.9)
Eighteen	7 (2.3)	207 (5.9)
Nineteen	1 (.3)	32 (.8)
Missing	6 (2.0)	0 (0)
School:[2]		
High School	96 (31.8)	
Jr. High School	113 (37.4)	
Elementary	38 (12.6)	
Dropout	39 (12.9)	Not Calculated
Graduated	2 (.7)	
Other	3 (1.0)	
Missing	11 (3.5)	

1. The frequency distribution for age is at the date of intake when the person is the unit of observation. For the person/month observations, age is calculated for each 30 day observation. The age data used in the regressions is calculated in terms of tenths of years. That is, the age 18.2 would equal eighteen years and two tenths of a year (not two months).

2. The school status information was not calculated for the person/month data as it was felt that it would be grossly inaccurate given that the school status data was only available for the date of intake. A search of several of the youths' school records revealed that the youths' school statuses were not at all stable between or even within years.

TABLE 4-2: A DESCRIPTION OF THE YOUTHS' FAMILY LIVES

Variables	Number (Percent) Person Observations	Person/Month Observations
Parents' Marital Status:[1]		
Married & Living Together	92 (30.5)	1579 (44.7)
Other	193 (63.9)	1953 (55.3)
Missing	17 (5.6)	0 (0)
Youths' Living Arrangement:[2]		
With no parents	20 (6.6)	287 (8.1)
With one parent	169 (60.0)	2108 (59.7)
With both parents	99 (32.8)	1137 (32.2)
Missing	14 (4.6)	0 (0)
Welfare Recipient:[3]		
Yes	136 (45.0)	1819 (51.5)
No	112 (37.1)	1713 (48.5)
Missing	54 (17.9)	0 (0)
Yearly Family Income Group:[4]		
Below $5,001	25 (8.3)	
$ 5,001- 7,500	21 (7.0)	
$ 7,501-10,500	14 (4.6)	Not
$10,501-14,200	5 (1.7)	Calculated
$14,201-20,000	2 (.2)	
Not Available	225 (77.5)	

1. If the parent's marital status data is missing for the data when the person is the unit of observation, the youths' parents' marital status was assigned to the "other" category for the person/month data. It was felt that if there was any ambiguity with respect to this question during the intake interview with the youth, that it was very unlikely that his or her parents were married and living together.

2. If the information on the youths' living arrangements was missing, then the value of zero was assigned. That is, if the living arrangement of the youth is unknown, then all person/month observations for that youth are assigned the value of zero, not living with any parents.

3. If the information concerning public assistance is missing, the person/month observations for that youth indicate that his family did not receive public assistance. It was felt that due to funding reasons it was and always is in the best interest of the crime prevention program to determine if the youth's family received public assistance. Therefore, if the information was missing, it was unlikely that the family did in fact receive such assistance.

4. Yearly family income data was not calculated for the person/month data. A reasonable assignment of the large number of missing observation to income categories could not be made.

TABLE 4-3: OCCUPATIONS AND LABOR FORCE STATUS OF THE YOUTHS' PARENTS

Variables	Number (Percent) Person Observations Mother		Person Observations Father		Person/Month Observations Mother		Person/Month Observations Father	
Occupation:[1]								
Manager/Administrator	3	(1.0)	9	(3.0)				
Professional/Technical Worker	6	(2.0	7	(2.3)				
Craft/Foreman	1	(.3)	35	(11.6)				
Sales Worker	7	(2.3)	4	(1.3)				
Operative	13	(4.3)	22	(7.3)				
Non-Farm Labor	1	(.3)	10	(3.3)				
Clerical	16	(5.3)	0	(0)				
Service Worker	30	(9.9)	22	(7.3)				
Private Home/ Service Worker	5	(1.7)	1	(.3)	Not Calculated			
Unemployed-Seeking a Job	162	(53.6)	24	(7.9)				
Unemployed-Not Seeking a Job (includes housewives)	162	(53.6)	24	(7.9)				
Deceased/Disabled/ Unknown	17	(5.6)	101	(33.4)				
Missing	36	(11.9)	64	(21.2)				
Labor Force Status:[2]								
Employed	82	(27.1)	110	(36.4)	1024	(29.0)	1205	(34.1)
Not Employed	184	(61.0)	128	(42.4)	2508	(71.0)	2327	(65.9)
Missing	36	(11.9)	64	(21.2)	0	(0)	0	(0)

1. The detailed occupational data was not calculated for the person/month observations due to the problems of assigning missing cases and also because the use of the dummy variables for the occupational categories in the regression analysis would necessitate estimating a large number of additional parameters. Estimating the additional parameters in the context of a simultaneous FIML probit of multinomial logit program with over 3,500 observations presents severe computational problems which are not dealt with due to the weak theoretical importance of these variables.

2. If the labor force status data for the youths' parents was missing, the person/month data was assigned to the mean category, not employed.

The Police Contact Data

The police contact data were obtained from the Philadelphia Police Department during November of 1978. They are cumulative to birth. Consequently, two situations may prevail. First, the police data may have been collected after the youth terminated the program. By far, the majority of youths fall into this category. Alternatively, the police data may have been collected while the youths were still enrolled in the crime prevention program. This situation prevails for a small number of individuals in this study.[4] In these cases, the employment-crime data sets describing these individuals after 15 October 1978, the police data collection date, are incomplete. Consequently, person/month observations ocurring after this date, are eliminated from the empirical analyses.

The fact that observations are systematically excluded from the empirical analyses would result in a bias if the individuals enrolled in the later years of the program were significantly different from the youths enrolled in the earlier phases of the program. Additionally, biases could result if the content of the program changed over time. Fortunately, these biases, if they exist at all, are likely to be small because very few person/month observations had to be eliminated from the study due to a lack of police data.[5]

A more general criticism of the police contact data is that police contacts are poor proxies for delinquent behavior. First, youths come in contact with the police for only a fraction of their delinquent behavior. Moreover, it is argued that the officially recorded offenses are biased towards blacks and youths from poor neighborhoods who are more

likely to come in contact with the police, regardless of their current delinquent behavior. Consequently, self-reported delinquency scales are frequently suggested as preferable measures. However, in a recent analysis of existing research using self-reported and official delinquency measures, Hindelang, Hirschi and Weis concluded that:

> ...studies of the administration of juvenile justice have failed to locate sufficient bias against powerless groups in official processing to account for their higher rates of criminality. Once the seriousness of the instant offense and prior police record of the offender are taken into account apparent class bias plays only a relatively minor role in the generation of official data (Wolfgang et al., 1972; Cohen, 1975; Terry, 1967; Hohenstein, 1969). Our earlier analyses suggested that no class bias should have been expected, since direct comparisons reveal little or no self-report/official discrepancy....[6]

In this study, arrest records are used as measures of the youths' delinquent behavior. Furthermore, only police contacts for indexed offenses are used as proxies for delinquent behavior. An indexed offense is an offense which is regarded as criminal, regardless of whether it is committed by a youth or an adult. It excludes such "offenses" as truancy, running away from home, and incorrigible behavior.

Out of three hundred and two youths in the sample, one hundred and fifty-one had indexed offenses. Of these one hundred and fifty-one youths, ninety-nine youths (66%) had multiple contacts with the police. The average number of contacts with the police among these one hundred and fifty-one youths was 4.24. This figure was much lower, however, within the total sample averaging 2.12 police contacts per person. The distribution of the number of contacts with the police for indexed or non-status offenses is found in Table 4-4.

TABLE 4-4: FREQUENCY OF CONTACTS WITH THE PHILADELPHIA POLICE FOR NON-STATUS OFFENSES

Total Number of Contacts	Total Number of Youths	Percent	Cumulative Percent
One	52	34.43	34.43
Two	26	17.22	51.65
Three	10	6.62	58.27
Four	14	9.27	67.54
Five	13	8.61	76.15
Six	3	1.99	78.14
Seven	6	3.97	82.11
Eight	8	5.30	87.41
Nine	2	1.32	88.73
Ten	5	3.31	92.04
Eleven	2	1.32	93.36
Twelve	3	1.99	95.35
Thirteen	1	.66	96.01
Fourteen	1	.66	96.67
Fifteen	1	.66	97.33
Sixteen	1	.66	97.99
Nineteen	1	.66	98.65
Twenty-five	1	.66	99.31
Thirty-four	1	.66	99.97*
TOTAL	151		100.00

* The fact that this figure does not equal 100, is due to the roundoff error.

The types of crimes for which the youths came into contact with the police were classified according to two systems. The first system classified an offense as property theft, property damage, bodily injury, drug/alcohol or other. The numbers of police contacts which fell into each of these categories are found in Table 4-5.

TABLE 4-5: NUMBER OF CONTACTS WITH THE PHILADELPHIA POLICE BY TYPE OF OFFENSE

Type of Offense	Total Number of Offenses	Percent
Property Theft	295	46.0
Property Damage	47	7.3
Bodily Injury	95	14.8
Drug/Alcohol	33	5.2
Other	171	26.7
TOTAL	641	100.0

As you can see in this table, more than half of the offenses for which the youths came into contact with the police were for property theft. The types of goods which were stolen are classified in Table 4-6.

TABLE 4-6: FREQUENCY OF TYPES OF GOODS STOLEN
(PERCENTAGES = TYPE OF GOOD STOLEN/TOTAL NUMBER OF POLICE CONTACTS FOR PROPERTY THEFTS)

Type of Good Stolen	Frequency of Thefts	Percentages
Currency and Bonds	56	18.98
T.V., Radio, Stereo	23	7.8
Office Equipment	10	3.39
Jewelry, Precious Metals	14	4.75
Large Household Items	2	.68
Consumer Items	25	8.47
Automobile	35	11.86
Clothing	18	6.10
Firearms	6	2.03
Miscellaneous	91	30.84
Data Missing	15	5.08
TOTAL	295	100.00

Emphasis in these thefts was on items which could easily be transformed into cash. For example, there was a greater number of thefts of currency, bonds, and automobiles (91) than there was of large household items(2). This seems to indicate that a fairly large percent of the police contacts were for offenses that could be directly linked to an economic motive. The average value of these thefts was $288. The average value of the property recovered in the 155 cases where some of the property was recovered was $249.95. On a superficial level, empirical evidence of this nature lends support to the hypotheses of Becker and Ehrlich, who postulate that youths will resort to crime when the perceived benefits exceed the expected costs.[7]

There were also 47 arrests for property damage. The total value of the damage to the property was known in only 15 cases. In these cases, the average value of the damage was $170.67. However, there is great

variation in the value of the property damaged by these youths. See Table 4-7 below.

TABLE 4-7: VALUE OF PROPERTY DAMAGE

Value of Damage	Number of Cases	Percent of Cases
$ 5	5	10.6
10	1	2.1
20	1	2.1
25	2	4.3
155	1	2.1
200	1	2.1
300	2	4.3
700	1	2.1
800	1	2.1
Unknown	32	68.1
TOTAL	47	100.0

There were also 95 arrests for bodily injury. However, more than one person or type of injury may have been incurred for any given offense. Consequently, in this sample, 95 individuals incurred some type of bodily injury, even though the information is missing on the number and types of bodily injuries incurred in a number of police contacts. See Table 4-8 below.

TABLE 4-8: FREQUENCY OF DIFFERENT TYPES OF BODILY INJURY

Injury Type	Frequency of Persons Sustaining Injuries	Percent of Total Injuries
Minor Harm	64	62.1
Treated and Discharged	18	18.9
Hospitalized	10	10.5
Killed	1	1.1
Forcible Rapes	2	2.1
TOTAL	95	100.0

Although there were 95 individuals who incurred bodily harm, in a total of 90 or fewer incidents, there were only 50 known contacts with the police in which the youths allegedly intimidated their victim. (The data is missing for 87 police contacts.) That is, there were at least 50 incidents in which one or more victims was threatened with bodily harm or some other serious consequences for the purpose of forcing the victims to obey the requests of the offenders to give up something of value, to assist in an event that leads to someone's bodily injury and/or to property theft, damage, or destruction or to witness such an act. In 7 of these cases, the victim was threatened verbally. There was physical intimidation, the use of strong arm tactics, threats with fists, menacing gestures, physical restraint by pinioning arms, etc., in 37 cases. In six cases, a victim was intimidated by a weapon, such as a knife, gun, or blunt object.

Finally, the crimes for which the 151 youths came in contact with the police were also classified according to a detailed classification system which describes the first five (most serious) offenses with which these youths were charged. See Table 4-9.

For every police contact, up to five charges were coded. The most serious charges generally precede lesser offenses. Consequently, if a youth was charged with three offenses for one police contact: robbery, possession of stolen property and conspiracy, the most serious of these offenses, robbery, would be coded prior to possession of stolen property, which would be coded prior to conspiracy.

Note that there was a total of 1,501 charges. Also, the YSC youths were most frequently charged with conspiracy (244 charges), which is not usually the primary reason for the police contact. The

Table 4-9: Frequencies With Which the Youths Were Charged for Various Offenses

Type of Charge	Frequency on 1st Charge	%	Frequency on 2nd Charge	%	Frequency on 3rd Charge	%	Frequency on 4th Charge	%	Frequency on 5th Charge	%	Frequency on Charges 1-5	%
1. Willful killing, murder, & non-negligent manslaughter	1	.16	0		0		0		0		1	.07
2. Rape, attempted rape, & indecent assault	3	.47	0		1	.37	1	.69	0		5	.33
3. Robbery: highway & miscellaneous (no gun)	22	3.40	0		0		0		0		22	1.5
4. Robbery: highway & commercial house (w/gun)	4	.62	0		0		0		0		4	.27
5. Robbery: purse-snatching, from under $5 to over $50	12	1.9	0		0		0		0		12	.80
6. Robbery: purse-snatching, attempt	4	.62	0		0		0		0		4	.27
7. Robbery: miscellaneous, attempt	5	.78	0		0		0		0		5	.33
8. Aggravated assault w/intent to kill	1	.16	2	.54	0		0		0		3	.20
9. Aggravated assault & battery on police officer and/or others; assault & battery on police officer and/or others; resisting arrest	58	9.00	43	11.70	17	6.30	12	8.30	5	6.5	135	9.0
10. Burglary: any premise, day or night	114	17.80	2	.54	2	.74	0		0		118	7.9
11. Burglary: attempt, day or night	16	2.50	0		0		0		0		16	1.1
12. Larceny: purse-snatching, shoplifting, auto accessories, & all others, $50 and over	42	6.60	57	15.40	6	2.20	0		0		105	7.0
13. Burglary: vehicle & non-vehicle accessories, over $50	3	.47	0		0		0		0		3	.20
14. Larceny: all types (see #12), $5-$50	34	5.30	23	6.20	5	1.90	0		0		62	4.1
15. Burglary: vehicle, non-accessory, $5-$50	1	.16	0		0		0		0		1	.07
16. Larceny: all types under $5, include attempts	43	6.70	20	5.40	6	2.20	4	2.80	0		73	4.9
17. Burglary: vehicle accessories & non-accessories, under $5, include attempts	8	1.20	0		0		0		0		8	.53
18. Auto theft: all types, include attempts	29	4.50	2	.54	3	1.10	0		0		34	2.3
19. Forgery	0		1	.27	0		0		0		1	.07
20. Receiving, buying and/or possessing stolen property	3	.47	100	27.10	78	28.90	18	12.50	10	13.0	209	13.9
21. Carrying and/or possessing firearms and/or weapons	16	2.5	9	2.4	9	3.3	9	6.3	2	2.6	45	3.0
22. Solicitation for immoral purposes; sodomy, buggery, pandering	3	.47	1	.27	0		0		0		4	.27
23. Possession of narcotic drug	34	5.3	3	.81	1	.37	0		0		38	2.5
24. Disorderly conduct; unlawful assemblies	55	8.6	4	1.1	2	.74	1		1		61	4.1
25. Motor vehicle law violations; driving without consent of the owner	0		3	.81	17	6.3	3	2.1	3	3.9	26	1.7
26. Violations of ordinances; curfew, false reports or requests for police services	14	2.2	1	.27	1	.37	0		0		16	1.1
27. Threats: forcible entry, threatening letters and phonecalls, threats to do bodily harm	5	.78	3	.81	1	.37	1	.69	3	3.9	13	.87
28. Damage to city property; trespassing; malicious mischief and vandalism; loitering and prowling	64	10.0	39	10.6	11	4.1	32	22.2	4	5.2	150	10.0
29. False alarm of fire, failure to pay transportation fee	3	.47	0		1	.37	0		0		4	.27
30. Investigation, projection, medical examination	4	.62	0		0		0		0		4	.27
31. Arson; escaped prisoner; offenses other than above specified	30	4.7	4	1.1	4	1.5	10	6.9	8	10.4	56	3.7
32. Conspiracy	2	.31	46	12.5	101	37.4	54	37.5	41	53.2	244	16.3
33. Possession of burglar tools	0		4	1.1	3	1.1	0		1	1.3	8	.53
34. Riots; inciting to riot	0		2	.54	1	.37	0		0		3	.20
35. Illegal possession of liquor; intoxicated minor	8	1.2	0		0		0		0		8	.53
TOTALS	641	100	369	100	270	100	144	100	7.7	100	1501	100

charge of conspiracy in all but 2 cases was in addition to one or more serious offenses. The second and third most frequent charges against the YSC youths were for receiving, buying, and the possession of stolen property (209 charges) and malicious mishcief and vandalism, including trespassing and damage to city property (150 charges). Aggravated assault, including assault and battery, was the fourth most frequent charge (135 charges).

Note that the raw police contact information, like the demographic, employment, and labor market indices data, is transformed into person/month observations for the regression analyses. While some of the data categories used in the preceeding part of this section are retained, others are dropped and many new variables are defined. In particular, many police contact variables which summarize historical aspects of the youths' delinquent activities are defined. Historical summaries of varying legnths were defined in order to test alternative timing hypotheses in the preliminary data analysis. That is, the variables the occurrence or non-occurrence of a police contact in the current thirty day period, within the past thirty days, the past calendar quarter, six months, one year, two years, and since birth, are constructed. The same time periods are used for police contacts for crimes against persons, property, and other types of offenses. As one would expect, the longer the historical summary, the higher the frequency of observations in which a police contact occurred. That is, out of 3,532 observations, there are 200 person/month observations in which a police contact occurred in the current thirty day period, while there are 1,720 observations where one or more police contacts were incurred since birth.

The tranformation of the raw police contact data into person/month observations is done in order to test the historical or timing aspects of employment-crime relationships. Analytical problems may arise from this tranformation due to the low frequency of observations during the current thirty day period in which police contacts are incurred. That is, it may be difficult to obtain statistically significant coefficients of the impact of employment on crime or crime on employment, when only 200 observations, 5.6 percent of the data, have police contacts indicated. Consequently, a choice based sampling scheme which would boost the percent of offenses at time t within the sample, may ultimately be adopted. That is the final regression analysis could be estimated using only the data on high frequency offenders. A choice based sample may be particularly important when various types of offenses are distinguished from one another. In this case, the relative frequency of different types of offenses will be less than 5.6 percent of the sample.

The Labor Market Activity Data

The labor market activity data set consists of the dates on which youths sought out jobs, were newly hired, rejected from jobs, terminated, successfully employed, and unsuccessfully employed. The data only cover the period of time in which the youths were enrolled in the crime prevention program.

All available sources of data were reviewed several times to obtain a record of the youths' labor market activities that is as complete as possible. The labor market data were abstracted from in-depth records maintained by the youths' caseworkers, notes systematically recorded at the crime prevention centers' periodic staffing meetings for

each youth, and the records maintained by the job specialists. These data were augmented by the lengthy interviews with each of the (three) job specialists. Nevertheless, vigilance in recording this data does not preclude the possibility that the youths in this sample engaged in labor market activities that were not known to the staff of the crime prevention center. Moreover, the magnitude or direction of the possible biases in the data is not known.

In several cases, however, educated guesses concerning the likely direction of existing biases can be formulated. For example, not all job search is likely to have been reported by the youths. Moreover, unsuccessful job search (job rejections) and job terminations are probably less likely to be reported to caseworkers than new hires. This assumes that these youths prefer to convey good, rather than bad news to their caseworkers. To reiterate, it is likely that the labor market data are biased and incomplete, although the magnitude of the problem cannot be ascertained.

Given that the potential biases in the labor market data have been acknowledged, a few summary statistics of the existing data base are provided. In this sample, of the three hundred and two youths, one hundred and fifty-one were referred to jobs through the crime prevention center. Of these individuals, one hundred and thirty-four initially obtained employment, although only one hundred and one of the original one hundred and fifty-two obtained successful job placements.

As mentioned previously, a successful job placement is defined as a job which (1) lasted at least three weeks unless an earlier termination was specified a priori, and (2) terminated with no negative strings attached. That is, the youth must not have been fired, accused

of crimes or arrested, and the youth must not have quit the job under questionable circumstances. Over the period while they were on caseload, seventy-two youths found jobs without the help of the program and sixty-seven of these youths found a minimum of one successful job placement. In total, one hundred and fifty-five youths found one or more jobs and one hundred and forty-one of these youths had at least one successful job placement as defined above.

Again, the raw labor market activity data has been transformed into person/month data. In an effort to investigate the timing aspects of employment, new employment variables and histories have been constructed. The variables employed or not employed in the current thirty day period, within the past thirty or ninety days, have been calculated. Approximately twenty-four percent of the sample were employed during the current time period. Twenty-three percent were employed in the preceding thirty day period. Thirty percent were employed in the preceding ninety day period.

As with the crime data, a choice based sample may have to be selected for analyses distinguishing between successful and unsuccessful employment as an extremely low percent of employment was classified as unsuccessful.

The Labor Market Index Data

For the empirical analyses, person/month observations were derived from the original demographic, police, and employment data. Consequently, monthly labor market data were highly desirable. Unfortunately, the only monthly labor market data available are the seasonally adjusted and unadjusted unemployment rates for the Philadelphia Standard Metropolitan Statistical Area. Although monthly unemployment data for

youths or a smaller geographical area in Philadelphia were sought, they simply do not exist. However, youth unemployment rates are likely to be highly correlated with the overall unemployment rate, even though the youth rates tend to exceed the overall unemployment rates. Over the observation period, the unadjusted unemployment rate ranged between 6.6 and 11.4%. The unadjusted rate was used in the regression analyses as seasonal dummies were entered directly into the equations. In some of the analyses, lagged values of the unemployment rate were also used.

The Methodological Approach

The relationships between labor market experiences and juvenile delinquency discussed in Chapters II and III are quite complex. Moreover, limiations of the data, econometric theory, as well as the unavailability and high cost of appropriate computer programs combine with the theoretical complexities to make the estimation of the alternative employment and crime models summarized at the end of Chapter III intractable without a substantial simplification of the five equation models.

For example, five dependent variables, as well as the contemporaneous and lagged endogeneous variables which are hypothesized to affect the dependent variables were summarized at the end of Chapter III. In the simplest case, where employment experiences and criminal events are considered two different types of homogeneous events, six distinct equations for each of the dependent variables can be identified. Each of these equations has slightly different implications for the timing aspects of employment and crime decisions.[8] Moreover, these thirty equations can be combined in different ways so that the ultimate result is 5^6 or 6,250 alternative structural models. Furthermore, if some of the explanatory variables are redefined as continuous or limited

variables, which is reasonable, the number of structural equation models can be increased by a factor of fourteen. This problem is further magnified when distinctions between different types of employment and crime are introduced.

Consequently, in order to cope with the model specification, econometric, and programming problems, two equation models with employment and crime variables as dependent variables, will be estimated. That is, the variables job applications, job rejections, and time in current job state will be considered exogeneous to the models estimated. The employment and crime variables were selected as the dependent variables because they are of the greatest substantive interest in this research. Moreover, if the values of the job applications and job rejections variables are lagged, then one can consider them predetermined variables. However, the variable, time in current job state, will not be lagged because such a variable construction would not measure current changes in a youth's employment status which are theoretically important in determining a youth's criminal behavior. It will, nevertheless, be treated as if is an exogeneous variable.

Latent Versus Observed (Truncated) Counterparts as Explanatory Variables in a Simultaneous Probability Model

The employment and crime dependent variables outlined in Chapter III are most appropriately modeled as indicators of latent variables that cross thresholds.[9] For example, whether or not a youth incurrs a police contact during time period t (C_t) is an indicator of the latent variable (C_t^*): the net utility of crime; the frustration resulting in crime; or simply, the propensity to be delinquent. The fact that the net utility of crime was positive or that the frustration from

the inability to succeed had exceeded a threshold, would be indicated by the fact that the youth had incurred a police contact over the relevant time period. However, when a simultaneous probability model has one or more of the indicators of the latent variables on the right hand side (r.h.s.) of the equations, there are constraints on the parameters of the models which must be met in order to insure that a given set of exogeneous variables and disturbances yield a unique solution for the endogeneous variables.[10]

For example, consider the two equation system where C_t^* and E_t^* are latent variables and C_t and E_t their observed dichotomous counterparts. Schmidt and Heckman show that the following model is inconsistent in that unique exogeneous variables, X, and disturbances, e, result in non-unique values of C_t^* and E_t^*.

$$(1) \quad C_t^* = \gamma_1 E_t + \beta_1 X_t + e_1$$

$$(2) \quad E_t^* = \gamma_2 C_t + \beta_2 X_t + e_2$$

$$(3) \quad C_t = 1 \text{ if } C_t^* > 0$$
$$= 0 \text{ if } C_t^* \leq 0$$

$$(4) \quad E_t = 1 \text{ if } E_t^* > 0$$
$$0 \text{ if } E_t^* \leq 0$$

For example, let C_t^* equal the net utility of crime during time period t and E_t^* equal the probability of employment during time period t. Then C_t and E_t would equal the incidence of a police contact or a youth's employment status during time period t, respectively. According to Heckman and Schmidt, the employment-crime model used in this disser-

tation cannot be specified by equations (1) - (4) above.[11] This rules out the model in which the propensity to be delinquent during time period t is a function of the youth's employment status during time period t AND where the probability of employment during time period t is a function of whether or not the youth has a police contact during time period t .

If it is theoretically desirable to use the unstarred values of the dependent variables on the r.h.s of the equations, then the models must be restructured to be recursive. (In models with three or more equations the restriction is that all principal minors of the coefficient matrix of the unstarred dependent variables must equal zero.)[12] That is, the example above can be restructured in either of the following ways:

$$(1)' \quad C_t^* = \beta_1' X_t + e_1$$

$$(2)' \quad E_t^* = \gamma_2 C_t + \beta_2' X_t + e_2$$

or

$$(1)'' \quad C_t^* = \gamma_1 E_t + \beta_1' X_t + e_1$$

$$(2)'' \quad E_t^* = \quad + \beta_2' X_t + e_2$$

However, in Chapter III, it is hypothesized that the dependent variables are functions of one or more of the contemporaneous endogeneous variables, as well as values of the lagged endogeneous variables. Unfortunately, it is not possible to re-order equations and variables in such a way that all of the non-zero coefficients of the contemporaneous endogeneous variables lie above the diagonal in the matrix of coefficients. Consequently, a degree of recursivity must be imposed on the model if the

unstarred values of the dependent variables are to enter the r.h.s. of the equations. However, one of the primary purposes of this research is to determine whether or not there is a simultaneous employment-crime relationship. Moreover, simultaneity cannot be ascertained by looking at the coefficients of the endogeneous variables in the recursive system. If one estimates a recursive model that is in fact a simultaneous model, then all of the coefficients in the misspecified (recursive) model will be biased.[13] As a simultaneous employment-crime relationship is consistent with several economic and sociological hypotheses, it becomes essential to estimate a simultaneous, rather than a hierarchical, model. Because the use of the unstarred values of the endogeneous variables on the r.h.s. of the equations precludes this possibility, this model specification must be rejected.

An alternative to using the indicators of the latent variables on the r.h.s. of equations is to use estimates of the latent variables. Use of these values does not necessitate the same parameter restrictions as does the use of the unstarred values. That is, the following model can be estimated.

$$(1)''' \quad C_t^* = \gamma_1 E_t^* + \beta_1 X_t + e_1$$

$$(2)''' \quad E_t^* + \gamma_2 C_t^* + \beta_2 X_t + e_2$$

Equations three and four would remain the same.

In the context of this research, this model would state the propensity to be delinquent during time period t is a function of the probability of employment during time period t AND that the probability of being employed is a function of a youth's propensity to be delinquent

in that time period.

To summarize, because testing the hypothesis that there is a simultaneous relationship between employment and crime is central to this research, models using estimates of latent variables, rather than their observed dichotomous indicators, will be used. That is, the parameter restrictions required in simultaneous probability models which have the unstarred values of endogeneous variables on the r.h.s. of the equations, preclude testing an hypothesis which is central to this research.

The Specification of the Histories of the Endogeneous Variables

One important issue arises in the specification of the histories of the endogeneous variables in the employment-crime models to be estimated. In a nutshell, equations estimated with time series data frequently assume that disturbance terms are autocorrelated. However, the presence of autocorrelation in a simultaneous model with lagged endogeneous variables results in an identification problem,[14] regardless of whether the lagged values of the latent variables or their indicators appear on the r.h.s.of the equations.[15] While estimators for simultaneous equation systems with lagged endogeneous variables and first order serially correlated errors have been proposed by Amemiya and Fair,[16] estimators for equation systems of latent variables have not yet been derived. Although estimators for a single equation latent variable tobit model with lagged endogeneous variables and autocorrelated errors have been derived by Robinson[17], neither has this work been extended to simultaneous probability models with latent structures. Given that this dissertation is not an econometrics thesis and that the derivation of this

extension would be extremely complex, it will be assumed throughout that disturbance terms are not serially correlated and that the other standard assumptions about the error terms hold.[18]

Given these assumptions, the specifications of the historical endogeneous variables summarized in Chapter III must, nonetheless, be modified due to limitations in the data base. For example, the distributed lags of the employment variables cannot extend far back into a youth's past without systematically eliminating observations on which there is a small amount of time series data. Therefore, none of the historical employment variables extend back farther in time than three observation periods or ninety days. This restricts the scope of the hypotheses that can be tested. For example, with this restriction, it is not possible to determine if negative employment experiences occurring futher back in a youth's past affects his current labor force status or criminal behavior. It is, nevertheless, an advancement over current empirical research to ascertain if employment experiences in a youth's recent past affects his current employment or criminal behavior.

On the other hand, the police contact data is not censored, i.e., it is cumulative to birth. However, as the youths in the sample are different ages at each time period, the total number of person/month observations back to birth varies dramatically from observation to observation. Therefore, a distributed lag function weighting police contacts back to birth, would have to treat the "missing" observations in the distributed lag as zeros--e.g., meaning no police contacts occurred before birth. The interpretation of the coefficient of such a variable construct would, not surprisingly, be rather ambiguous. Thus,

the historical variable constructs discussed in Chapter III have been modified so that the coefficients will be more easily interpretable while maintaining, as best as possible, the spirit of the variables discussed in Chapter III.

The lagged or implicitly lagged endogeneous variables used in this empirical analysis are summarized in Table 4-10 below.

TABLE 4-10: DEFINITIONS OF THE HISTORICAL ENDOGENEOUS VARIABLES

Crime Variables:

PCNTM = Total number of police contacts in the past 30 days
PCNTQ = Total number of police contacts in the pasy 90 days
PCNTB = Total number of police contacts in the past 6 months
PCNTY = Total number of police contacts in the past year
PCNT2 = Total number of police contacts in the past 2 years
PCNTA = Total number of police contacts since birth
TSLPC = Length of time since last police contact

Employment Variables:

EMPM = Employment status in the past month
EMPQ = Employment status in the past three months

In analyses differentiating between types of police contacts and types of jobs, these same time intervals are maintained. Jobs are categorized as successful or unsuccessful, as was defined earlier in this chapter. Police contacts are categorized as crimes against persons, property, or other. These definitions are consistent with the theories espoused in Chapter III.

Note that the relative importance of the different historical crime and employment variables will be determined in the preliminary data analysis. It would be impossible to include all of the historical employment and crime variables in a single model, as the employment variables

are highly correlated with each other, as are the historical crime variables.

Also note that an implicit choice has been made in specifying the historical endogeneous variables. That is, one could specify some of the histories of the employment and crime variables in terms of their latent variable counterparts. In cases where this is possible, the unstarred values of the historical variables have been selected over their latent variable counterparts, as it is felt that they provide a theoretically more appropriate specification. For example, from the perspective of a signalling theorist, one's criminal propensities in previous periods are less likely to have an effect on a youth's current employability than the fact that the youth does or does not have an extensive police record. In order to test a simultaneous employment-crime model, the values of the current endogeneous variables entering the r.h.s. of the equations must be starred. As a similar restriction does not pertain to the values of the historical endogeneous variables, the unstarred values of these variables are used in the estimation of all equations.

The Specification of the Exogeneous Variables

The exogeneous variables included in the employment-crime model fall into two groupings. The first group of variables includes two types of labor market participation data, as well as the local unemployment indicator and seasonal dummies. The second group of exogeneous variables is composed of the youths and their families' characteristics. Each of these groups of data is described in turn.

The labor market participation data includes two types of

information on job applications and rejections. First, the total number of job applications (JAPM) and rejections (REJM) in the preceding time period, as well as the total number of job applications (JAPQ) and rejections (REJQ) in the preceding three time periods, are defined. It is hypothesized that the larger the number of job applications, the greater the probability of a youth's employment. As discussed in Chapter III, the effects of job rejections on a youth's criminal propensities is ambiguous and cannot be signed a priori.

Additionally, the variables, time since last job rejection (TSLJR) and time since last job application (TSLJA), have been constructed. It is anticipated that these variables will measure the longer term impacts of job applications and rejections on the probability of employment and crime better than will the monthly or quarterly job applications and rejections data. However, both of these variables are censored at the date of intake of the youths into the crime prevention program. That is, if a youth was in this program for one year and never applied or was rejected from a job, then the variables, time since last job application and time since last job rejection will equal fifty-two weeks. As a consequence of this censoring, these variables should be interpreted as the "minimum estimate of the length of time since a youth's last job application or job rejection." While a more systematic censoring can be imposed on this data, the variable constructs selected for the final analysis make use of all of the available information in the data base. Censoring at the date of intake also permits the testing of the labor market aspects of the employment-crime model over a longer time interval than ninety days.

The length of time in one's current job state (TICS) is an additional labor market participation variable which is treated as if it were exogeneous to the employment-crime model. This variable is hypothesized to directly affect the probability of crime and employment. In theory, this variable should measure the longer time effects of employment and unemployment on a youth's current employability or criminal propensities. As with the variables, TSLJR and TSLJA, this variable is censored at the date of intake and may more appropriately be considered "the minimum estimate of the length of time in one's current job state."

In addition to the variables described above, interaction terms (including at least one of the variables described above) are assumed to affect the probabilities of employment and crime. These interaction terms are summarized in Table 4-11.

TABLE 4-11: SPECIFICATION OF THE INTERACTION TERMS AND THE HYPOTHESIZED RELATIONSHIPS TO C*(t) AND E*(t).

REJM X EMPM	As indicated in Chapter Three, this is an exploratory variable, the sign of which cannot be specified apriori. However, one hypothesis is that youths who are both unemployed and receive job rejections in the preceeding month are more inclined towards crime than either youths who were employed or youths who were unemployed but not looking for work.
REJQ X EMPQ	The comments above apply to this variable as well with the exception that this is quarterly rather than monthly data.
TICS X EMPM	The longer one is unemployed (as of last month), the more likely he is to be inclined towards crime and the less likely it is that he will be employed in the current time period.
TSLJA X EMPM	If a youth is unemployed and has not applied for a job in a long time, then he is less likely to be employed in the current time period than a youth who was employed last period or a youth who was unemployed but actively seeking work in the recent past.
TSLJR X EMPM	As indicated in Chapter three, this is an exploratory variable, the sign of which cannot be specified apriori.

In addition to the youth specific labor market variables and interaction terms, the local Philadelphia unemployment rate (ERATE) will be included as an exogeneous variable. It is assumed that the youths will be less likely to be employed in periods of high unemployment as compared to periods of low unemployment. Seasonal dummies have also been constructed to account for systematic seasonal shifts in the labor market. The seasonal dummies are assumed to operate

directly on the probability of employment and a youth's criminal tendencies. It is assumed that the peak periods of employment and crime will occur over the summer months.

The second group of exogeneous variables describes the youths and their families. These variables include the youth's demographic characteristics such as age during time period t , race, and sex. The attributes of the youths' families that are controlled for include the clients' living arrangements, e.g., the number of adults in the household (CLA), the parents' marital status (MST), the employment status of the youth's mother (MOCC), the employment status of the youth's father (FOCC), and whether or not the family receives public assistance (PUBLIC). (Note that the information on the youths' families' characteristics are available as of the youths' intake dates. While time varying data would be preferred, it is not available.)

To conclude this section, it should be noted that it would be highly desirable to have information on the youths' school attendance records and school performances. It is probable that poor school performers are less likely to obtain jobs and more likely to be inclined towards crime. Dropouts would be more likely to obtain jobs with little potential and would be more inclined towards crime. An enthusiastic attempt was made to obtain the school records of the youths in this sample. Unfortunately, school record release forms could only be obtained on approximately one third of the youths in this sample. Moreover, only a fraction of the school records for these youths were ever obtained. Additionally, many of the records obtained were incomplete.

From the information that was obtained, it was found that these youths were frequently transferred between schools for disciplinary reasons. Also, there was a large variance in this sub-sample with respect to the I.Q. scores of the youths, their attendance records, and the extent to which disciplinary actions were brought against the youths. It would seem reasonable however, to characterize the youths on whom information was obtained as relatively poor school performers with large numbers of unexplained absences throughout the school year. Also, the disciplinary files served to reinforce the fact that while police records do not record all of a youth's delinquent acts, they are correlated with a youth's delinquent acts.

The Estimation Techniques

Even with the simplification of the theoretical exposition in Chapter three and the discussion in the earlier part of this chapter, there still remains a great deal of latitude in the specification of the final employment-crime model. Moreover, cost and computational consideration prohibit the use of the simultaneous probit model for initial exploratory analyses. Consequently, preliminary single equation models will be estimated and the results compared in order to reduce the number of parameters which must be estimated in the more rigorous FIML simultaneous probit model. OLS and logit programs will be used to estimate the single equation models although it is acknowledged that these coefficients will be biased and that the statistics must be viewed with skepticism. Nonetheless, it is anticipated that the initial analysis will provide "ballpark" estimates, which when combined with sound theoretical reasoning, will result in a final model which will be tractable to estimate.

To reiterate, some exploratory analysis is necessary in order to reduce the number of parameters to be estimated and minimize collinearity in the final model. That is, two equations are summarized in Table 4-12 below. Variables which are boxed together are likely to be highly carrelated with each other. The choices of variables within these variable groups or the elemination of some of these groups althogether is necessary to keep the number of parameters to be estimated to a reasonable level. Also, as was mentioned earlier in this chapter, the final model may be estimated for subgroups of the sample in order to boost the percent of observations in which police contacts were incurred in the current time period or boost the percent of observations in which individuals were unsuccessfully employed.

TABLE 4-12: THE BASIC MODEL

Explanatory Variables	Dependent Variables C*(t)	E*(t)
1. C*(t)		X
2. E*(t)	X	
3. PCNTM	X	X
4. PCNTQ	X	X
5. PCNTB	X	X
6. PCNTY	X	X
7. PCNT2	X	X
8. PCNTA	X	X
9. TSLPC	X	X
10. EMPM	X	X
11. EMPQ	X	X
12. TICS	X	X
13. JAPPM		X
14. JAPPQ		X
15. TSLJA		X
16. REJM	X	
17. REJQ	X	
18. TSLJR	X	
19. REJM X EMPM	X	
20. REJQ X EMPQ	X	
21. TICS X EMPM	X	X
22. TSLJA X EMPM		X
23. TSLJR X EMPM		X
24. ERATE		X
25. WINTER	X	X
26. SUMMER	X	X
27. SPRING	X	X
28. FALL		
29. AGE	X	X
30. RACE	X	X
31. SEX	X	X
32. CLA	X	
33. MST	X	
34. MOCC		X
35. FOCC		X
36. PUBLIC	X	X

* For the definition of the variables see Appendix 1 to this Chapter.

An FIML simultaneous multivariate probit model will be estimated, using the data which differentiates successful and unsuccessful employment and various crime types, if and only if the results of the analyses treating the employment and crime types as homogeneous indicates that a significant simultaneous relationship exists. If simultaneity between employment and crime must be rejected on the basis of the results of the former analysis, then single equation or hierarchical models will be estimated with the distinctions maintained between different employment and crime types. Estimation of a hierarchical model rather than a simultaneous model would be computationally much simpler and far less costly.

All of the final models will be estimated using a FIML probit program. The latent variable model described earlier is retained throughout. The properties of these estimators used are discussed by Heckman, Madalla, and Goldfeld and Quant.[19] Basically, the estimators are asymptotically efficient, consistant and have an asymptotic distribution which is normal.[20]

APPENDIX 4-1

VARIABLE NAME ABBREVIATIONS

AND MEANINGS

POLICE CONTACT VARIABLES

1. C*(t) - the propensity to be delinquent in the current time period
2. PCNYM - the number of police contacts in the preceeding month
3. PCNTQ - the number of police contacts in the preceeding 3 months
4. PCNTB - the number of police contacts in the preceeding 6 months
5. PCNTY - the number of police contacts in the preceeding year
6. PCNT2 - the number of police contacts in the preceeding 2 years
7. PCNTA - the number of police contacts since birth
8. ECON*(t) - the propensity to commit an economically motivated offense in the current time period
9. PECONM - the number of police contacts for economic offenses in the preceeding month
10. PECONQ - the number of police contacts for economic offenses in the preceeding 3 months
11. PECONB - the number of police contacts for economic offenses in the preceeding 6 months
12. PECONY - the number of police contacts for economic offenses in the preceeding year
13. PECON2 - the number of police contacts for economic offenses in the preceeding 2 years
14. PECONA - the number of police contacts for economic offenses since birth
15. PINJ*(t) - the propensity to commit an offense against a person in the current time period
16. PINJM - the number of police contacts for crimes against persons in the preceeding month
17. PINJQ - the number of police contacts for crimes against persons in the preceeding 3 months
18. PINJB - the number of police contacts for crimes against persons in the preceeding 6 months
19. PINJY - the number of police contacts for crimes against persons in the preceeding year
20. PINJ2 - the number of police contacts for crimes against persons in the preceeding 2 years
21. PINJA - the number of police contacts for crimes against persons since birth
22. POTH*(t) - the propensity to commit an "other" type of offense in the current time period
23. POTHM - the number of police contacts for "other" crimes in the preceeding month
24. POTHQ - the number of police contacts for "other" crimes in the preceeding 3 months
25. POTHB - the number of police contacts for "other" crimes in the preceeding 6 months
26. POTHY - the number of police contacts for "other" crimes in the preceeding year
27. POTH2 - the number of police contacts for "other" crimes in the preceeding 2 years
28. POTHA - the number of police contacts for "other" crimes since birth
29. TSLPC - the length of time since the youth's last police contact

LABOR MARKET ACTIVITIES VARIABLES

1. E*(t) - the propensity to be employed in the current time period
2. EMPM - whether or not the youth was employed in the preceeding month
3. EMPQ - whether or not the youth was employed in the preceeding 3 months
4. SE*(t) - the propensity to be successfully employed in the current time period
5. SEMPM - whether or not the youth was successfully employed in the preceeding month
6. SEMPQ - whether or not the youth was successfully employed in the preceeding 3 months
7. UE*(t) - the propensity to be unsuccessfully employed in the current time period
8. UEMPM - whether or not the youth was unsuccessfully employed in the preceeding month
9. UEMPQ - whether or not the youth was unsuccessfully employed in the preceeding 3 months
10. TICS - time in current job state
11. JAPPM - number of job applications in the preceeding month
12. JAPPQ - number of job applications in the preceeding 3 months
13. TSLJA - time since last job application
14. REJM - number of job rejects in the preceeding month
15. REJQ - number of job rejects in the preceeding 3 months
16. TSLJR - time since last job reject

LABOR MARKET INDEX VARIABLES

1. ERATE - the unadjusted unemployment rate during time period t
2. ERAT3 - the unadjusted unemployment rate lagged by 3 time periods

YOUTH AND FAMILY DEMOGRAPHICS

1. AGE - age of the youth during time period t
2. RACE - (1) if white, (0) if non-white
3. SEX - (1) if male, (0) if female
4. CLA - the number of parents that the youth lives with
5. MST - (1) if married and living together, (0) if otherwise
6. MOCC - (1) if the youth's mother is employed, (0) if otherwise
7. FOCC - (1) if the youth's father is employed, (0) if otherwise
8. HOCC - (1) if the adult head of the household is employed, (0) if otherwise
9. PUBLIC - (1) if the family receives welfare, (0) if otherwise

SEASONAL DUMMIES

1. WINTER - (1) if winter, (0) if otherwise
2. SUMMER - (1) if summer, (0) if otherwise
3. SPRING - (1) if spring, (0) if otherwise
4. FALL - (1) if fall, (0) if otherwise

NOTES AND FOOTNOTES

[1]Maureen Pirog-Good, "The Impact of Y.S.C. Participation on the Frequency and Seriousness of Police Contacts," Law Enforcement Assistance Agency report, October 1979.

[2]Maureen Pirog-Good, "A Description of the Y.S.C. Population and a Statistical Analysis of Screening and Crime Recidivism - Employment Hypotheses," Law Enforcement Assistance Agency report, July 1979.

[3]For a detailed analysis of the effects of censoring, see Ralph B. Ginsberg, "Timing and Duration Effects in Residence Histories and Other Longitudinal Data I: Stochastic and Statistical Models," Regional Science and Urban Economics 9 (November 1979): 311-331. See also Ralph B. Ginsberg, "Timing and Duration Effects in Residence Histories and Other Longitudinal Data II: Studies of Duration Effects in Norway, 1975-1971," Regional Science and Urban Economics 9 (November 1979): 269-392.

[4]Less than five percent of the youths in this study were enrolled in the crime prevention program after the police contact data was collected.

[5]Less than one percent of the person/month observations had to be eliminated.

[6]Michael J. Hindelang, Travis Hirschi, Joseph G. Weis, "Correlates of Delinquency: The Illusion of Discrepancy Between Self-Report and Official Measures," American Sociological Review 44 (December 1979): 1109-1110.

[7]Gary Becker, "Crime and Punishment: An Economic Approach," Journal of Political Economy 76 (March/April 1968): 169-217. Issac Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," Journal of Political Economy 81 (May/June 1973): 521-565.

[8]This number of equations can be obtained by substituting different lag structures and by introducing varying amounts of simultaneity into the equation systems.

[9]For a discussion of indicators of latent variables that cross thresholds see James J. Heckman, "Dummy Endogenous Variables in a Simultaneous Equation System," Econometrica 46 (July 1978): 931-959.

[10]Peter Schmidt, "Constraints on the Parameters in Simultaneous Tobit and Probit Models," Unpublished paper, Michigan State University, (October 1978): 16.

[11]Heckman, "Dummy Endogenous Variables in a Simultaneous Equation System," p. 931-959. Schmidt, "Constraints on the Parameters in Simultaneous Tobit and Probit Models," p. 1-18.

[12]Schmidt, "Constraints on the Parameters in Simultaneous Tobit and Probit Models," p. 10.

[13]Henri Theil, Principles of Econometrics. (New York: John Wiley and Sons, Inc., 1971): 549.

[14]Franklin M. Fisher, The Identification Problem in Econometrics. (New York: Robert E. Krieger Publishing Company, 1976): p. 168-175.

[15]Assume that the model to be estimated is given by equations (1) - (8) below and maintain the notation given in the previous section.

(1) $C_t^* = \gamma_1 E_t^* + a_1 C_{t-1} + b_1 E_{t-1} + C_1 X_t + U_{1t}$

(2) $E_t^* = \gamma_2 C_t^* + a_2 C_{t-1} + b_2 E_{t-1} + C_2 X_t + U_{2t}$

(3) $C_t = 1$ if $C_t^* > 0$

(4) $C_t = 0$ if $C_t^* \leq 0$

(5) $E_t = 1$ if $E_t^* > 0$

(6) $E_t = 0$ if $E_t^* \leq 0$

(7) $U_{1t} = d_1 U_{1t-1} + E_{1t}$

(8) $U_{2t} = d_2 U_{2t-1} + E_{1t}$

The proof that C_{t-1}^*, and C_{t-1} are correlated with U_{1t} follows. The proof for E_{t-1}^* and E_{t-1} are parallel.

(9) $C_t^* = f(U_{1t})$ by eq. (1)

(10) $C_{t-1}^* = f(U_{1t-1})$ by eq. (1) with lags.

(11) However, U_{1t-1} is correlated with U_{1t} by equation (7).

(12) $\therefore C^*_{t-1} = f(U_{1t})$

(13) However, C^*_{t-1} is functionally related to C_{t-1} by equations (3) and (4).

(14) $\therefore C_{t-1} = f(u_{1t})$

[16]Ray Fair, "The Estimation of Simultaneous Equation Models with Lagged Endogenous Variables and First Order Serially Correlated Errors," Econometrica 38 (May 1970): 507-515. Takeshi Amemiya, "Specification Analysis in the Estimation of Parameters of a Simultaneous Equation Model with Autoregressive Residuals," Econometrica XXXIV (April 1966): 283-306.

[17]P.M. Robinson, "Estimation of a Model for Electric Utility Demand in the Presence of Missing Observations," Unpublished paper. Harvard University, 1980: 1-23.

[19]Note that this logic also precludes using error components models which deal with correlated disturbances due to pooling time series and cross section data. Error components models have been discussed by Pietro Balestra and Marc Nerlove, "Pooling Cross-Section and Time Series in the Estimation of a Dynamic Model. The Demand for Natural Gas," Econometrica 34 (July 1966): 585-612; V.K. Chetty, "Pooling of Time Series and Cross Section Data," Econometrica 36 (April 1968): 279-290; Meghnad Desai, "Pooling as a Specification Error - A Note," Econometrica 42 (March 1974): 389-391; Moheb Ghali, "Pooling as a Specification Error: A Comment," Econometrica 45 (April 1977); 755-757; Charles R. Henderson Jr., "Comment on the Use of Error Component Models in Combining Cross Section with Time Series Data," Econometrica 39 (March 1971): 397-401; Edwin Kuh, "The Validity of Cross Sectionally Estimated Behavior Equations in Time Series Applications," Econometrica 27 (1959): 197-214); G.S. Maddala, "The Use of Variance Components Models in Pooling Cross Section and Time Series Data," Econometrica 39 (March 1971): 341-357; G.S. Maddala and L.D. Mount, "A Comparative Study of Alternative Estimators for Variance Components Model Use in Econometric Applications," Journal of the American Statistical Association 68 (June 1973): 324-328; Marc Nerlove, "Further Evidence on the Estimation of Dynamic Economic Relations from a Time Series of Cross Section Data," Econometrica 39 (March 1971): 359-382; Richard W. Parks, "Efficient Estimation of a System of Regression Equations when Disturbances are Both Serially and Contemporaneously Correlated," Journal of the American Statistical Association 62 (1967): 500-509.

[19]James J. Heckman, "Dummy Endogenous Variables in a Simultaneous Equation System," Econometrica 46 (July 1978): 931-959; G.S. Maddala and Lung-fei Lee, "Recursive Models with Qualitative Endogenous Variables," Annals of Economic and Social Measurement 5 (Fall 1976) 525-545.

[20]Steven M. Goldfeld and Richard E. Quant, Nonlinear Methods in Econometrics. (London: North-Holland Publishing Company, 1972): pp. 57-74; 233-234.

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CHAPTER V

FINDINGS ON THE RELATIONSHIPS BETWEEN YOUTH CRIME AND EMPLOYMENT

Introduction

The findings of the empirical component of this thesis are described and analyzed in this chapter. The first section outlines the rationale for the specification of the simultaneous probability model. Single equation methods are used to obtain initial parameter estimates. These results are used in conjunction with the theories reviewed and developed in Chapters two and three to reduce collinearity within as well as the size and cost of estimating this model.

The results of the simultaneous FIML probit model are presented in the second section of this chapter. Neither different types of employment nor different types are police contacts are differentiated from one another in this analysis. The choice based sampling technique which is used is fully described.

Section three of this chapter reviews the results of estimates in which types of employment and crimes are differentiated from one another. Single equation estimation techniques are used in this section as multiple equation estimators are computationally intractable.

Section four of this chapter summarizes the major findings of the empirical research and analyzes the policy implications.

Moreover, the qualifications and limitations of this study are reviewed so as to place the findings and policy implications within their proper context.

Finalizing the Model Specification

The basic model to be estimated in this research is best summarized by equations 5.1 through 5.4 below.

$$(5.1)\quad C_t^* = \gamma_1 E_t^* + \underset{\sim}{\beta}_1' \underset{\sim}{X}_{1t} + \underset{\sim}{e}_{1t}$$

$$(5.2)\quad E_t^* = \gamma_2 C_t^* + \underset{\sim}{\beta}_2' \underset{\sim}{X}_{2t} + \underset{\sim}{e}_{2t}$$

$$(5.3)\quad C_t = \begin{cases} 1 \text{ if } C_t^* > 0 \\ 0 \text{ if } C_t^* \leq 0 \end{cases}$$

$$(5.4)\quad E_t = \begin{cases} 1 \text{ if } E_t^* > 0 \\ 0 \text{ if } E_t^* \leq 0 \end{cases}$$

The latent variable, C_t^*, can be interpreted as the net utility of crime or as the threshold level of frustration resulting from a youth's inability to succeed. Also, E_t^*, can be interpreted as the net utility of employment or as an employability index which accounts for the youth's desire for employment as well as his employability. Depending on one's perspective, the youth will be employed if either the net utility of employment or the employability index exceeds some threshold level.

In this section, the model specification given above is finalized by identifying the components of the vectors $\underset{\sim}{X}_{1t}$ and $\underset{\sim}{X}_{2t}$. The variables which are candidates for inclusion in the final model are listed in Table 5-1 on the following page. This table differs from

Table 4-12: The Basic Model as three new measures have been defined and added to the list of independent variables. For these additions, see Table 5-2.

Table 5-1: Components of the Vectors X_{1t} and X_{2t}

Independent Variables	Dependent Variables C_t^*	Dependent Variables E_t^*
1. PCNTM	X	X
2. PCNTQ	X	X
3. PCNTB	X	X
4. PCNTY	X	X
5. PCNT2	X	X
6. PCNTA	X	X
7. TSLPC	X	X
8. EMPM	X	X
9. EMPQ	X	X
10. TICS	X	X
11. JAPPM		X
12. JAPPQ		X
13. TSLJA		X
14. REJM	X	
15. REJQ	X	
16. TSLJR	X	
17. UREJM	X	
18. UREJQ	X	
19. UTIME	X	X
20. ETIME	X	X
21. TSLMMA	X	X
22. ERATE		X
23. LERATE		X
24. WINTER	X	X
25. SUMMER	X	X
26. SPRING	X	X
27. FALL	X	X
28. AGE	X	X
29. RACE	X	X
30. SEX	X	X
31. MST	X	X
32. CLA	X	X
33. MOCC		X
34. FOCC		X
35. HOHW		X
36. PUBLIC	X	X
37. TOCL	X	X

**All of the variable abbreviations are defined in Appendix 4-1, except for the new variables defined in Tables 5-2 and 5-3.

Table 5-2: New Variables

Abbreviation	Defination
HOHW	This dummy variable equals one if the adult head of the youth's household is employed. Otherwise, it is zero.
LERATE	This variable is the unemployment rate in the Philadelphia SMSA lagged by three months.
TOCL	This variable indicates the length of time that the youth was enrolled in the crime prevention program as of time period t. It is constructed to capture any possible "length in Program" effects on the youths' employability or criminality.

Also, the interaction terms listed as variables nineteen through twenty-three in Table 4-12 have been replaced by the following interaction terms.

Table 5-3: Old and New Interaction Terms

Old Interaction Terms	New Interaction Terms
REJM X EMPM: This is the interaction between the number of job rejections that the youth had in the preceeding time period (REJM) with his employment status last period (EMPM). The direction of this interaction is now explicitly defined by the variable UREJM.	UREJM: This variable is the number of job rejections that the youth had in the preceeding time period if he was unemployed at the end of last period. If the youth was employed at the end of last period, then this variable equals zero.
REJQ X EMPQ: This is the interaction between the number of job rejections the youth had in the preceeding calendar quarter (REJQ) with his employment status over that time period (EMPQ). The direction of this interaction is now explicitly defined by the variable UREJQ.	UREJQ: This variable is the same as UREJM if the word, month, is replaced with calendar quarter.

Table 5-3 (Cont.): Old and New Interaction Terms

Old Interaction Terms	New Interaction Terms
TICS X EMPM: This is the interaction term between time in current job status (TICS) and the youth's employment status last period (EMPM). The timing aspects of this variable are poor. For example, a youth may have been employed most of last period and then EMPM=1. However, he may have been unemployed at the end of time period t-1. In this case, the interaction term TICS X EMPM would combine the length of time in the youth's in the youth's current job status (which would be less than one month) with his labor market status last period. As this is obviously misleading, two new interaction terms are defined.	UTIME: This variable reflects the length of time unemployed up to the end of last time period if the youth was unemployed at the end of the last time period. Otherwise, this variable equals zero. ETIME: This variable reflects the length of time employed if employed up to the end of the last time period if the youth was employed at the end of the last time period. Otherwise, this variable equals zero.
TSLJA X EMPM: This interaction term indicates the length of time since the youth's last job application if he was unemployed last period. TSLJR X EMPM: This interaction term indicates the length of time since the youth's last job rejection if he was unemployed last period. Again, the timing aspects of these interaction terms are poor. For example, a youth may have been employed for only a small fraction of time period t-1. Nevertheless, EMPM will equal 1 and the value of the interaction term will equal zero even if the youth was unemployed and actively seeking work for the past two or three weeks.	TSLMMA: This variable indicates the length of time since the youth's last labor market activity as of the end of time period t-1. If a youth is employed at the end of time period t-1, this variable equals zero. Otherwise, it indicates the length of time since the youth left a job, applied for a job or was rejected from a job, whichever occurred last.

As can be ascertained from Table 5-1, there may be as many as sixty-one coefficients to estimate in the vectors $\underset{\sim}{X}_{1t}$ and $\underset{\sim}{X}_{2t}$ when the model, defined by equations 5.1 through 5.4, does not differentiate between types of employment or crimes. This number is necessarily increased when different types of employment experiences or police contacts are allowed. Given that there are over 3,500 observations, this poses serious computational problems which necessitate a succinct as well as theoretically sound approach to estimating the simultaneous probability model.

As noted in Chapter four, the variables which are boxed together in Tables 4-12 and 5-1 tend to be theoretically redundant and/or highly correlated with one another. Therefore, a competitive elimination of variables within these boxes is desirable. Additionally, the elimination of some groups of variables or single variables is possible. For example, in some cases, preliminary single equation estimates indicate that variables with weak theoretical ties to the dependent variable(s) are consistantly poor preformers from an empirical perspective. Note, however, that poor preformance in the preliminary runs is not the sole criteria on which the variables are evaluated.[1] If a variable is theoretically important to testing the simultaneity or timing aspects of employment-crime relationships, then it is retained in the simultaneous probit model despite possible poor preformance in the preliminary OLS or logit runs.

Specifying the Employment Equation

Numerous employment equations were estimated incorporating different variables in the vector, $\underset{\sim}{X}_{2t}$. As a consequence of the initial OLS and logit runs, several trends in the data emerged. They are:

1. There are mixed results concerning the impact of the historical police contact variables on a youth's employment status. In the OLS equations, these variables were virtually always insignificant. In the logit equations, these variables had the largest coefficients and were typically significant. In all of the preliminary runs, these variables displayed the theoretically correct signs.

2. The historical employment variables are uniformly significant determinants of a youth's current employment status.

3. The findings on the effects of job search on a youth's current employment status are mixed. The frequency of job applications and the length of time since a youth's last job application display the hypothesized signs although they are frequently insignificant.

4. There are mixed results on the impact of the interaction terms on the probability of employment. For example, the variable, ETIME, the length of time employed if employed atthe end of the last time period, is always significantly and positively related to the probability of employment during time period t. Also, TSLMMA, the length of time since a youth's last labor market activity, is always negatively and usually significantly related to the probability of employment during time period t. On the other hand, the findings concerning the variable, UTIME, the length of time unemployed if unemployed at the end of time period t-1, are mixed with respect to sign and level of significance.

5. The lagged unemployment rate appears to be a better predictor of the probability of employment than the current unemployment rate.

6. As anticipated, there appear to be strong seasonal effects on the probability of employment. Employment probabilities are greater during the summer months.

7. The demographic variables, age, race and sex, are significant predictors of the probability of employment. Older white males are more likely to be employed than there younger, non-white female counterparts.

8. Of the homelife variables, the marital status of a youth's parents is a better predictor of employment than the number of parents with whom a youth lives. If a youth's parents are married and living together, then the youth is less likely to be employed.

9. Of the variables indicating the labor force status of the youths' parents, HOWH, whether or not the adult head of the household is employed, is the most significant. If the head of the household is employed, then the youths are more likely to be employed.

10. Whether or not the youths' families receive public assistance was initially considered a proxy for the economic need of the youths' families. While it is positively related to the probability of a youth's employment, the relationship is never significant. This may be because the variable PUBLIC is capturing other characteristics of the youths and their families not measured in this study such as motivation.

11. The findings relating the length of time on caseload to the probability of employment suggests that a weak positive relationship may exist.

Based on the theories reviewed and developed in Chapters II and III as well as the above findings, the independent variables tested can be divided into five categories. First, there are several variables which are theoretically related to the probability of employment, significant throughout the preliminary analyses and not highly correlated with other explanatory variables. All of these variables are included in the vector $\underset{\sim}{X}_{2t}$. They are age, race, sex and seasons of the year.

Other variables have a strong theoretical relationship to the probability of employment, are significant in the preliminary analyses but are theoretically redundant and/or highly correlated with other explanatory variables. The historical employment variables fall in this category. They include the youth's employment status in the preceeding month (EMPM), the youth's employment status in the

preceeding calendar quarter (EMPQ) and the length of time in the youth's current job state (TICS). Of these variables, EMPM is selected for inclusion in the simultaneous probability model. It is more strongly related to the probability of employment from a theoretical perspective and is also the most significant variable in the preliminary analyses. This conforms with a priori expectations.

There is a third group of variables which are theoretically related to the probability of employment but which have mixed empirical results and are also redundant or highly correlated with other explanatory variables. Several "boxes" of variables in Table 5-1 fall into this category. Within the first cluster of variables that meet this criteria, the number of job applications made by the youths in the preceeding month is selected over the number of job applications made in the preceeding quarter and the length of time since the youth's last job application. JAPPM is selected over JAPPQ because the preliminary analyses indicate that job applications occurring in the preceeding month are more likely to affect a youth's employment status than applications occurring two or three months in the past. TSLJA is not included in the final models because it is theoretically redundant with the other job search variables.

The second group of variables which fall within the third category described above includes the current and lagged unemployment rates. The current rather than the lagged unemployment rate is included in further analyses. This is because there is a more direct theoretical relationship between the current rather than the lagged

unemployment rate and the probability of employment. Note that the current unemployment rate is selected over the lagged rate despite the higher significance of the lagged rate in the preliminary analyses.

The third cluster of variables which falls into the third category of variables included the two homelife variables, CLA and MST. If a youth's parents are married and living together, then the dummy variable MST equals one. Consequently, MST and the number of parents with whom the youths live, CLA, measure similar aspects of the youths' home environments. MST was selected over CLA as a control variable due to its more consistent performance in the single equation estimates. The initial findings on the variable MST indicate that youths with parents who are married and living together are less likely to be employed. This may be due to a more stable home environment and/or less need or desire to generate income through employment.

The fourth box of variables which falls into the third category described above includes the interaction terms, UTIME, ETIME and TSLMMA. UTIME and ETIME measure the length of time unemployed or employed if unemployed or employed at the end of the preceeding time period. Both variables appear to be positively related to the employment status of a youth. Of these first two variables, only ETIME is included in the final specification of the employment equation. The positive coefficient of UTIME indicates that this variable is capturing the effects of the passage of time rather than a lack of employability. The variable, TSLMMA, the length of time since a youth's last labor market activity, is excluded from the final equation

because it is ambiguous as well as redundant with the variables TSLJA, TSLJR, TICS, UTIME and ETIME.

The next group of variables which falls into the third category measure whether the youth's mother, father or adult head of the household is employed. The variable, HOHW, whether or not the adult head of the household is employed, is considered theoretically preferable to the other two variables given the fact that some mothers and more than half of the fathers are not present in the home. Consequently, HOHW is included in the vector of exogeneous variables, $\underset{\sim}{X}_{2t}$.

The final and most important group of variables (for the purposes of this research) which falls into the third variable classification includes all of the historical police contact variables. This group of variables includes the number of police contacts that occurred in the preceeding month (PCNTM), calendar quarter (PCNTQ), six months (PCNTB), year (PCNTY), two years (PCNT2), and since birth (PCNTA). As all of these variables are highly correlated with one another, all but one is excluded from the final models. However, the choice among the six historical police contact variables cannot be made on the basis of the superior performance of any of the variables. However, PCNT2 is selected for theoretical reasons. This is because it is unlikely that police contacts occurring more than two years in the past will affect a youth's current attitude towards employment. Neither is it likely that these police contacts will be known by local employers and used as a screening device in the hiring process. This implies that PCNTA which is the sum of all police

contacts since birth may include "irrelevant" police contacts for the purposes of predicting a youth's current employment status. At any rate police contacts occurring more than two years in the past should probably not be given the same weight in predicting employment as police contacts occurring closer in time. However, lagged endogeneous variables would introduce numerous complexities in the simultaneous probability model with latent dependent variables. Consequently, police contacts occurring more than two years in the past are excluded from further analyses.

A similar arguement can be made that the variable PCNTM, PCNTQ, PCNTB, and PCNTY may excluded police contacts that are relevant in determining a youth's current employment status. Thus, it should be noted that while the selection of PCNT2 appears reasonable, it necessarily results in an arbitrary choice with two years as the dividing line between relevant and irrelevant police contacts.

The fourth category of variables is comprised solely of the variable PUBLIC, whether or not the youth's family receives public assistance. This variable is theoretically related to the probability of employment in that it is considered a proxy for the financial need of a youth's family. This variable is not highly correlated with any of the other independent variables. Despite its weak performance in the preliminary estimates, it is included in the final model for theoretical reasons.

The fifth and final category of variables is also comprised of one variable, TOCL, the length of time that the youth was enrolled

in the crime prevention program as of time period t. This variable is only weakly related to the probability of employment. The results of the initial regressions for this variable are also weak. Therefore, TOCL is eliminated from further analyses.

To summarize, the preliminary OLS and logit findings combined with the theoretical agruements of Chapters III and IV are successful in reducing the number of parameters to be estimated in the final employment equation from thirty-seven to sixteen. The variables included in the employment equation of the simultaneous probit model are summarized in Table 5-4 below.

Table 5-4: Specification of the Employment Equation

Dependent Variable: E_t^*

Other Endogeneous Variable: C_t^*

Independent Variables:
PCNT2
TSLPC
EMPM
JAPPM
ETIME
ERATE
SPRING
SUMMER
FALL
AGE
RACE
SEX
MST
HOHW
PUBLIC

Specifying the Crime Equation

As with the employment equation, numerous single equation OLS and logit regressions were estimated for the dependent variable, PCNTT, whether or not a police contact occurred during time period t.

Various combinations of the exogeneous variables hypothesized to affect a youth's delinquent behavior were examined in the preliminary runs. The trends in the data that emerged from these analyses are enumerated below.

1. The historical employment variables do not display the theoretically correct signs but are frequently insignificant.

2. All of the historical police contact variables display the correct signs and are uniformly significant. Youths who had police contacts in the past were more likely to commit offenses in the current time period. Also, the longer it had been since a youth's last police contact, the less likely he is to commit an offense in the current time period.

3. None of the job rejection variables are ever significant determinants of the probability of committing an offense. Also, the signs of these variables are mixed.

4. The interaction terms, UREJM amd UREJQ, are always positively but insignificantly related to PCNTT. UREJM and UREJQ are the number of job rejections that the youths incurred if they were unemployed in the preceeding month or calendar quarter.

5. The interaction terms, UTIME and ETIME, display the anticipated signs but are frequently insignificant. That is, the longer a youth has been unemployed up to the end of time period t-1, the more likely he is to committ an offense. Alternatively, the longer a youth has been employed up to the end of time period t-1, the less likely he is to commit an offense during the current time period. The interaction term, TSLMMA, is mixed in sign and never significant. TSLMMA is the length of time since the youth last participated in job search or employment.

6. There is a fairly strong indication that the frequency of police contacts depends on the seasons. More offenses occur in the summer and fall months.

7. There are mixed results on the effects of the demographic variables on the probability of committing an offense. On the average, age appears to be positively related to the probability of a police contact. Non-whites appear more likely to commit offenses than whites. Also, males tend to be more inclined towards crime than females.

8. Neither of the homelife variables, CLA nor MST, appear to be significantly related to the probability of committing an offense. The number of parents with whom the youths live, CLA, appears to be a more consistant predictor than MST, the marital status of the youths' parents.

9. Of the three variables which indicate whether or not a youth's mother, father or adult head of the household is employed, the latter variable appears to be the best predictor of the probability of incurring a police contact.

10. The variable, PUBLIC, indicates whether or not the youths' families receive public assistance. This variable appears to be a weak predictor of the probability of committing an offense.

11. The length of time that the youths are enrolled in the crime prevention program, TOCL, does not appear to be a strong predictor of the probability of committing an offense during time period t.

Based on the theories reviewed and developed in Chapters II and III as well as the above findings, the exogeneous variables tested in the preliminary regressions can be divided into five categories. The first category of variables are theoretically related to the probability of committing an offense, significant, but highly correlated or theoretically redundant with the other explanatory variables. This group of variables includes all of the historical police contact variables. Specifically, the variables PCNTM, PCNTQ, PCNTB, PCNTY, PCNT2 and PCNTA are redundant and highly correlated with one another. Thus, only one of these variables is included in the final models. The variable, PCNT2, the sum of the police contacts in the past two years, is selected for inclusion in further analyses. PCNT2 is particularly significant in the preliminary analyses. This may well be due to the same logic that was used to motivate the inclusion of PCNT2 in the employment equation. That is, PCNTA may

include police contacts that occurred too far back in a youth's past to be considered relevant in determining current criminal behavior. Alternatively, PCNTM, PCNTQ, PCNTB, and PCNTY may exclude some police contacts which are relevant in determining current delinquency proneness. Nevertheless, while this line of reasoning appears acceptable, the choice of PCNT2 is still somewhat arbitrary if based on this theoretical arguement alone.

TSLPC, the length of time since a youth's last police contact, is not highly correlated with the other historical police contact variables. It is included in further analyses because it enables more extensive testing to be performed on the timing aspects of the relationship between prior and current delinquent behavior.

The second category of variables are those which are theoretically related to the probability of employment, insignificant and highly correlated or redundant with other explanatory variables. The historical employment variables fall into this category. These variables include the youth's employment status in the preceeding time period (EMPM), calendar qaurter (EMPQ), and the length of time in the youth's current job state (TICS). Because employment in the current time period is so highly correlated with employment in the preceeding month and calendar quarter, EMPM and EMPQ are dropped from the crime equation in the simultaneous probability model. This is because it is critical to test the simultaniety hypothesis and thus include EMPT, current employment, as the indicator of the latent variable, P_t^*, in the probit model. Additionally, the variable TICS is

dropped from the crime equation for the same reason that it was dropped from the employment equation. That is, it is not clear exactly what this variable is measuring. The interaction terms, ETIME and UTIME, are more clearly defined and are considered for inclusion in thie simultaneous probit model at a later point in this section.

The second group of variables that fall into the second category of variables, as described earlier, includes the number or parents with whom the youths live (CLA) and the marital status of the youths' parents (MST). Both variables measure similar aspects of the youths' homelives. Given that that there is no strong theoretical reason to select one variable over the other, CLA is included in further analyses due to its' more consistent performance in the preliminary analyses.

There is a third group of variables which fall into the second category, described above, which includes the interaction terms UREJM and UREJQ. The interaction term between a youth's employment status at the end of the preceeding time period and the number of job rejections last month (UREJM) is included in further analyses. The number of job rejections if unemployed during the last time period is likely to be a much better indicator of "frustration from the inability to succeed" than simply the frequency of job rejections in the past month. The interaction term, UREJM, is selected over the variable, UREJQ, as monthly rather than quarterly data are likely to be more closely related to delinquency proneness in the

current time period.

The last group of variables which are theoretically related to the probability of committing an offense but are weak empirically and theoretically redundant with other explanatory variables includes the interaction terms UTIME, ETIME and TSLMMA. The variables, ETIME and UTIME, indcate the length of time that a youth has been employed or unemployed if employed or unemployed at the end of time period t-1, respectively. Both variables are included in the simultaneous probit model. As anticipated, the longer a youth is unemployed, the higher his or her delinquency proneness. Alternatively, the longer a youth has been employed, the less his or her probability of incurring a police contact during the current time period. While the preliminary estimates indicate the expected direction of the hypothesized relationships, they are not significant. However, it has already been noted that the significance tests as well as the magnitudes of the coefficients in the exploratory analyses are biased. Consequently, the inclusion or exclusion of variables from further analyses is not based solely on these criteria. TSLMMA, the length of time since the youth's last labor market activity, is not included in further computer runs due to the fact that this is not a well defined variable, it is empirically weak, and it is redundant with the variables TSLJR, TSLJA, UTIME and ETIME.

The third category of variables includes variables which are theoretically related to the probability of delinquency, are not highly correlated with other explanatory variables but are weak or

or only moderately strong from an empirical perpsective. All of these variables are included in the final models. They include age, race, sex as well as the seasons.

The fourth category of variables are weakly related to the probability of committing an offense, are weak empirically and are correlated or redundant with other explanatory variables. They include the number of job rejections the youth had in the preceeding month, calendar quarter and the length of time since the youth's last job rejection. Another variable which meets all of the above criteria excpet that it is not redundant with other variables is the length of time that the youth was enrolled in the crime prevention program as of time period t. This variable is also eliminated from further analyses.

The fifth and final category is comprised of the variable, PUBLIC. Whether or not a youth's family recieves public assistance is a proxy for the financial need of his family. It is theoretically related to the probability of committing an offense. Neither is this highly correlated with other exogeneous variables. Despite its' poor performance empirically, this variable is included in the simultaneous employment-crime model.

Summary

All of the variables hypothesized to affect the probability of employment and/or crime in the current time period are discussed above. The final specification of the employment and crime equations is summarized in Table 5-5 on the next page.

Table 5-5; Specification of the Employment and Crime Equations

Independent Variables		Dependent Variables	
		E_t^*	C_t^*
1.	PCNT2	X	X
2.	TSLPC	X	X
3.	EMPM	X	
4.	JAPPM	X	
5.	UREJM		X
6.	ETIME	X	X
7.	UTIME		X
8.	ERATE	X	
9.	SPRING	X	X
10.	SUMMER	X	X
11.	FALL	X	X
12.	AGE	X	X
13.	RACE	X	X
14.	SEX	X	X
15.	MST	X	
16.	CLA		X
17.	HOHW	X	X
18.	PUBLIC	X	X
Endogeneous Variables			
1.	C_t^*	X	
2.	E_t^*		X

Results on Youth Crime and Employment When Types of Employment and Offenses Are Not Differentiated

The Sampling Procedure

Given the number of observations and the number of parameters of the model developed in the last section, it is not reasonable to obtain full information maximum likelihood estimates (FIML) for the entire population. Some sort of sampling from the population is required.[2] The subset of observations chosen is a choice based sample. That is, the observations were sampled at different rates dependent on the outcome of the manifest variables, C_t and E_t. The sampling procedure's effect is to over sample categories where the population proportion is very samll, and consequently, under sample those categories where the population proportions are relatively large. This procedure is usually employed before the data are collected in order to minimize the cost of gathering the data base. Nonetheless, it will be useful to employ the procedure in this study.

The application of this procedure to this study has mixed advantages when compared to alternative sampling procedures. The primary advantage is that the observations in the choice based sample will be more representative of the population within each category than they would otherwise be in a randomly chosen sample. As Tables 5-6 and 5-7 point out, a random sample of the same total size as the choice based sample would have approximately six observations in the C_t=1, E_t=1 category. The full thirty-one

observations (the population) are included in the choice based sample.

Table 5-6: The Frequency of Observations of Police Contacts and Employment in the Current Time Period in the Population

	$C_t=0$	$C_t=1$
$E_t=0$	2,529	169
$E_t=1$	803	31

Table 5-7: The Sampling Proportion (SP) and Frequency (N) of Employment and Police Contacts Observations in the Choice Based Sample

	$C_t=0$	$C_t=1$
$E_t=0$	SP=.1250 N= 316	SP=1.0 N=169
$E_t=1$	SP=.3325 N= 267	SP=1.0 N= 31

The primary drawback to the choice based sampling procedure is that ordinary FIML estimators are not consistent and modified FIML estimators are consistent but not efficient. Given the sample is still fairly large, 783 observations, this loss in efficiency is probably outweighed by the use of a more representative sample in the categories where the population is very small. This is especially true when one considers the highly skewed nature of this population.

Stratified as well as random sampling was considered as an alternative to the choice based sample. This procedure would have chosen observations on the basis of the characteristics of the youths or some other independent variables. This approach allows the use

of ordinary FIML estimators which are both consistent and efficient. However, it is not possible to generalize the results of regressions based on a stratified sample beyond the types of youths included in the sample. The random or choice based approaches can be generalized to the entire population from which they are drawn.

Given that a choice based sampling procedure is used, the model in Table 5-5 is estimated using the Weighted Exogeneous Sampling Maximum Likelihood (WESML) estimator. This procedure weights each observation's contribution to the likelihood function by w_i, where;

$w_i = Q_i/H_i$,

Q_i = the population proportion in category i, and

H_i = the sample proportion in category i.

This estimator is shown to be consistent by Mansky and Lerman.[3]

Derivation of the Bivariate Probit Model

This section derives and discusses the requirements for parameter identification of the simultaneous probit model of employment and crime.

It is not possible to identify the parameters in equations 5.1 and 5.2. This occurs, as in all latent variable models, because C_t^* and E_t^* do not have any particular scale attached to them. Once suitable estimates for γ_1 and β_1 are determined, any multiple of these parameters satifies equation 5.1 just as well. Some arbitrary normalization is required. The normalization chosen is to require that $var(e_1)=var(e_2)=1$. The implication for the parameters to be estimated is that the model is normalized so that;

$$(5.1a)\quad C_t^* = \gamma_1^* E_t^* + \underset{\sim}{\beta}_1^{*\prime} \underset{\sim}{X}_{1t} + e_{1t}^*$$

$$(5.2a)\quad E_t^* = \gamma_2^* C_t^* + \underset{\sim}{\beta}_2^{*\prime} \underset{\sim}{X}_{2t} + e_{2t}^*$$

$$(5.3)\quad C_t = 1 \text{ if } C_t^* > 0$$

$$0 \text{ otherwise}$$

$$(5.4)\quad E_t = 1 \text{ if } E_t^* > 0$$

$$0 \text{ otherwise}$$

Where;

$$\gamma_i^* = \gamma_i \sigma_{ii}^{-1/2}, \quad i=1,2$$

$$\beta_i^* = \beta_i \sigma_{ii}^{-1/2}, \quad i=1,2$$

$$e_{it}^* = e_{it} \sigma_{ii}^{-1/2}, \quad i=1,2$$

$$\sigma_{ij}^* = \sigma_{ij} \sigma_{ii}^{-1/2} \sigma_{jj}^{-1/2}, \quad i=1,2; \quad j=1,2$$

Also,

$$(5.5)\quad e_t^* \sim N(0, \Sigma^*) \text{ where } \Sigma^* = \begin{bmatrix} 1 & \sigma_{12}^* \\ \sigma_{12}^* & 1 \end{bmatrix}$$

All of the parameters of this normalized model are identified provided that the usual conditions for excluding the exogeneous variables in $\underset{\sim}{X}_{1t}$ and $\underset{\sim}{X}_{2t}$ are met.[4] These conditions are satisfied in Table 5-5.

Specifically, equations (5.1a) and (5.2a) can be specified by the following reduced form together with equations (5.3) and (5.4).

$$(5.6)\quad C_t^* = (1-\gamma_1\gamma_2)^{-1} \underset{\sim}{\beta}_1' \underset{\sim}{X}_{1t} + \gamma_1 \underset{\sim}{\beta}_2' \underset{\sim}{X}_{2t} + v_{1t}$$

$$(5.7)\quad E_t^* = (1-\gamma_1\gamma_2)^{-1} \gamma_2 \underset{\sim}{\beta}_1' \underset{\sim}{X}_{1t} + \underset{\sim}{\beta}_2' \underset{\sim}{X}_{2t} + v_{2t}$$

where v_{1t} and v_{2t} are defined by;

(5.8a) $v_{1t} = (1-\gamma_1\gamma_2)^{-1}\{e_{it} + \gamma_1 e_{2t}\}$

(5.8b) $v_{2t} = (1-\gamma_1\gamma_2)^{-1}\{e_{2t} + \gamma_2 e_{1t}\}$

Together with equation (5.5), this implies that;

$$\underset{\sim}{v}_t \sim N(\underset{\sim}{0}, \Omega) \text{ where}$$

$$\Omega = \begin{bmatrix} 1 & -\gamma_1 \\ -\gamma_2 & 1 \end{bmatrix}^{-1} \Sigma^* \begin{bmatrix} 1 & -\gamma_2 \\ -\gamma_1 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} w_{11} & w_{12} \\ w_{21} & w_{22} \end{bmatrix}$$

and also,

$$\begin{bmatrix} v_{1t} w_{11}^{-1/2} \\ v_{2t} w_{22}^{-1/2} \end{bmatrix} \sim N(\underset{\sim}{0}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix})$$

where ρ is the correlation between v_{1t} and v_{2t}. Let

$$z_{1t} = -(1-\gamma_1\gamma_2)^{-1} w_{11}^{-1/2} \{\underset{\sim}{\beta}_1' \underset{\sim}{X}_{1t} + \gamma_1 \underset{\sim}{\beta}_2' \underset{\sim}{X}_{2t}\}$$

$$z_{2t} = -(1-\gamma_1\gamma_2)^{-1} w_{22}^{-1/2} \{\underset{\sim}{\beta}_2' \underset{\sim}{X}_{2t} + \gamma_2 \underset{\sim}{\beta}_1' \underset{\sim}{X}_{1t}\}$$

for observation t. Then the probability that there is both a police contact and employment during time period t is,

$$P_{11t} = \text{Prob}\{C_t^* > 0 \text{ and } E_t^* > 0\}$$

$$= \int_{-\infty}^{-z_1} \int_{-\infty}^{-z_2} \frac{1}{2\pi(1-\rho^2)} \exp\left(-\tfrac{1}{2}\frac{(x^2 + y^2 - 2\rho xy)}{(1-\rho^2)}\right) dx\, dy$$

$$= \Theta(-z_1, -z_2, \rho)$$

Similarly for the remaining categories of outcomes,

$$P_{01t} = \text{Prob}\{C_t^* \leqq 0 \text{ and } E_t^* > 0\} = (z_1, -z_2, -\rho)$$

$$P_{10t} = \text{Prob}\{C_t^* > 0 \text{ and } E_t^* \leqq 0\} = (-z_1, z_2, -\rho)$$

$$P_{00t} = \text{Prob}\{C_t^* \leqq 0 \text{ and } E_t^* \leqq 0\} = (z_1, z_2, \rho)$$

The WESML function is given by;

$$\mathcal{L} = \prod_{t\varepsilon T_{00}} P_{00}^{w_{00}} \prod_{t\varepsilon T_{10}} P_{10}^{w_{10}} \prod_{t\varepsilon T_{01}} P_{01}^{w_{01}} \prod_{t\varepsilon T_{11}} P_{11}^{w_{11}}$$

where w_{ij} are the weights associated with the choice based sample mentioned previously, and;

T_{ij} specify the relevant observations.

The log of the likelihood function is optimized with respect to the normalized parameters $\beta_1^*, \beta_2^*, \gamma_1^*, \gamma_2^*$, and σ_{12}^*. Starting values were obtained by estimating single equation probits where E_t or C_t was substituted for the relevant latent variable. The starting value of σ_{12} was obtained by maximizing the log likelihood function with respect to the parameter, σ_{12}, while holding all other parameters fixed at their previously chosen values.

The procedure used to optimize this log likelihood function is Davidon-Fletcher-Powell (DFP) with analytical derivatives. Convergence was obtained in eighteen iterations. While this fast a convergence is not problemmatic for the parameter estimates, ample information was not obtained to achieve a reasonable estimate of the Hessian.[5] Consequently, a linear approximation of the Hessian was used for hypothesis testing.

Under very general conditions, these coefficients are distributed asymptotically $N(\theta, V)$ where V is the variance-covariance matrix estimated by taking the linear approximation to the Hessian.

The Findings

Table 5-8 below presents the results of the estimation of the employment-crime model described above.

Table 5-8: Findings on the Relationships Between Youth Crime and Employment

Coefficients of the Explanatory Variables	Standard Error	Z Score
Dependent Variable: E_t^*		
1. - .770 C_t^*	.24847	-3.080
2. - .009 PCNT2	.09788	- .095
3. - .006 TSLPC	.00196	-4.294
4. 2.813 EMPM	.38631	7.282
5. .278 JAPPM	.31625	.880
6. - .004 ETIME	.01438	- .278
7. - .040 SPRING	.52249	- .077
8. .826 SUMMER	.49240	1.678
9. - .525 FALL	.47394	-1.108
10. .127 AGE	.10988	1.154
11. .206 RACE	.35270	.584
12. .425 SEX	.92284	.460
13. .050 MST	.32740	.153
14. .038 HOHW	.34583	.109
15. .082 PUBLIC	.38601	.213
16. - .098 ERATE	.15118	- .648
17. -4.775 CONSTANT	2.11000	-2.263
Dependent Variable: C_t^*		
1. - .318 E_t^*	.15488	-2.055
2. .005 PCNT2	.04766	.101
3. - .007 TSLPC	.00095	-7.823
4. - .032 UREJM	.56468	- .056
5. - .003 UTIME	.00459	- .613
6. - .011 ETIME	.01260	- .854
7. .085 SPRING	.46329	.184
8. .211 SUMMER	.46876	.449
9. .095 FALL	.41996	.227
10. - .048 AGE	.10268	- .446
11. - .087 RACE	.35628	- .243
12. .462 SEX	1.13890	.406

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Table 5-8 (Cont.): Findings on the Relationships Between Youth Crime and Employment

Dependent Variable: C_t^*		
Coefficients of the Explanatory Variables	Standard Error	Z Score
13. - .045 CLA	.27095	- .166
14. - .767 HOHW	.37219	- .206
15. - .101 PUBLIC	.37080	- .273
16. -1.337 CONSTANT	2.18800	- .611
.100 $Corr(e_1,e_2)$	.14700	.684

The above results indicate that a youth's employability as well as his criminality are simultaneously determined. Both γ_1 and γ_2 are significant at the .02 level or lower. The magnitude of the coefficients indicate that a one hundred percent increase in the net utility of crime will result in a seventy-seven percent decrease in a youth's employability index. On the other hand, a hundred percent increase in a youth's employability index (or the net utility of employment) results in a thirty-two percent decrease in the net utility of crime. These results support the economic rather than the sociological model of crime.[7] The former model postulates a simultaneous decision making process whereas the latter theory is consistent with a sequential decision making process. Additionally, these results are consistent with the signaling theory of the labor market which suggests that employers screen job applicants on the basis of their delinquent attitudes or behavior. Another hypothesis which is not inconsistent with signaling theory is that youths with high delinquent tendencies

are uninterested in seeking or continuing employment.

Aside from C_t^*, several additional variables are significant determinants of a youth's employability index during time period t. (The criteria used for significance is the .15 level or lower.) These variables are the youth's employment status in the preceeding time period, age, summer, fall and the length of time since the youth's last police contact. As anticipated, employment in the preceeding time period has a large and positive effect on employability in the current time period. Also, age is positively related to employability. An increase in the age of the youth by one month results in an increase in his or her employability index of approximately thirteen percent.

Over the summer months, a youth's net utility of employment or employability is increased by nearly eighty-three percent. This is consistent with the fact that youths are out of school and have more time for employment over these months. Additionally, the net utility of employment decreases in the fall indicating that many youths leave their jobs as they return to school.

Of the variables that are significant in the employment equation, only the length of time since a youth's last police contact (TSLPC) has an unexpected sign. The regression results indicate that the longer it has been since a youth's last police contact, the lower his or her employability index. Moreover, while the coefficient of this variable is small, TSLPC is measured in weeks. Thus, if a youth's last police contact occurred five years ago,

then his employability would decrease by two hundred and sixteen percent. However, if the last police contact occurred one year ago, employability would decrease by a mere thirty-one percent.

One possible explanation for this finding is that youths who have recently committed offenses are sometimes mandated by the courts to prove themselves "reformed". It may well be that the youths as well as the staff of the crime prevention program (in which the youths were enrolled) feel compelled to seek out and find employment for the youths soon after a police contact.

Aside from the variables discussed above, none of the remaining variables in the employment equation are significant. The fact that the historical employment or job search variables are not significant determinants of employability in the current period is not surprising given that this model controls for a youth's employment status in the preceeding time period. Moreover, the inclusion of EMPM in the model may also explain the insignificance of the homelife and demographic variables.

As can be seen from Table 5-8, there is only one variable, aside from a youth's current employability, that affects the net utility or threshold level of crime. This variable is the length of time since the youth's last police contact. The longer it has been since a youth's last police contact, the lower the net utility of crime in the current time period. To repeat, TSLPC is measured in weeks so that the small coefficient of this variable is deceptive. Thus, if a youth has not had a police contact within

the past three years, then his threshold level of crime is decreased by one hundred and nine percent. This finding is consistent with the raw data for this study which shows that youths who have not incurred police contacts in the preceeding three years will not incur any new police contacts.

None of the historical job search or employment variables are significant determinants of a youth's criminality. Only the latent variable, E_t^*, the youth's employability, is significant. Thus, the history of a youth's job search and employment is irrelevant in predicting employability if the youth's current employability is known.

Somewhat surprisingly, none of the demographic, homelife or seasonal variables are significant determinants of the youth's criminality. While prior research has shown that many of these variables are related to the frequency of delinquent acts, they are not strong predictors of a youth's net utility of crime as shown in this study.

Relationships Between Different Types of Employment and Crime

As discussed in Chapter IV, the data in this study permit one to distinguish between different types of employment and police contacts. In the following analyses, employment is classified as either successful or unsuccessful.[8] Police contacts are classified as being either economically motivated or not economically motivated. The majority of offenses that are not

economically motivated include simple assault, aggravated assualt, rape and murder. However, a small number of vandalism and drug offenses are also included in the not economically motivated category.

As mentioned previously, the employment and crime regressions which differentiate between types of police contacts and types of employment are estimated as single equation polytomous logits. This is due both to the lack of computer software required to estimate a simultaneous polytomous probit model with latent dependent variables as well as the excessive computations that would be required to estimate such a model even if the software was available. Consequently, the results of the following analyses must be regarded tentatively. Although two single equation models are estimated, it has already been shown, in the previous section, that a simultaneous model is appropriate. Therefore, the coefficients of the parameters as well as the Z scores are biased.

However, in the preliminary analyses used to specify the model estimated in the preceeding section, the logit estimates were fairly good indicators of the parameters in the simultaneous probit model. Unfortunately, the single equation logits provided poor estimates of the magnitude and significance of γ_1. On the basis of the results of the single equation logits, one would have to conclude that E_t did not affect C_t. Thus, to reiterate, the following results must be regarded tentatively.

The two polytomous logit models that are estimated are not exactly the same as the employment and crime equations in the simultaneous model even even with the exception of the two trichotomous dependent variables. Some of the variables which were never significant have been dropped. In the employment equation, the variables JAPPM, ETIME, SPRING, MST, HOHW and PUBLIC have been dropped. TSLPC has also been dropped given its' unexpected sign and difficulty to interpret in the previous section. Additionally, the variables C_t^* and PCNT2 have been replaced by PET, POT and PE2 adn PO2, respectively. PET and POT indicate whether or not an economically motivated or other type of police contact occurred in the current time period. PE2 and PO2 indicate the number of economically motivated or other types of offenses that occurred over the preceeding two years. Equations (5.9a) through (5.9c) delineate the new model specification for the probability of successful employment, E_s^*, the probability of unsuccessful employment, E_u^*, and the probability of no employment, E_n^*, during time period t.

$$(5.9a)\quad E_s^* = \beta_1 + \beta_3 EMPM + \beta_5 PET + \beta_7 POT + \beta_9 PE2 + \beta_{11} PO2$$

$$(5.9b)\quad E_u^* = \beta_2 + \beta_4 EMPM + \beta_6 PET + \beta_8 POT + \beta_{10} PE2 + \beta_{12} PO2$$

$$(5.9c)\quad E_n^* = \beta_{13} ERATE + \beta_{14} SUMMER + \beta_{15} FALL + \beta_{16} AGE + \beta_{17} RACE + \beta_{18} SEX$$

Additionally, some variable which were never significant were dropped from the crime equations. These variables include UREJM, SPRING, FALL, CLA, HOHW and PUBLIC. Also, EMPM is replaced

by SET and UET, successful and unsuccessful employment in the current time period. The crime equation is now specified as follows;

$$(5.10a)\quad P_e^* = \beta_1 + \beta_3 SET + \beta_5 UET + \beta_7 PE2 + \beta_9 PO2 + \beta_{11} TSLPC + \beta_{13} ETIME + \beta_{15} UTIME$$

$$(5.10b)\quad P_o^* = \beta_2 + \beta_4 SET + \beta_6 UET + \beta_8 PE2 + \beta_{10} PO2 + \beta_{12} TSLPC + \beta_{14} ETIME + \beta_{16} UTIME$$

$$(5.10c)\quad P_n^* = \beta_{17} SUMMER + \beta_{18} AGE + \beta_{19} RACE + \beta_{20} SEX$$

where P_e^*, P_o^* and P_n^* equal the probabilities of an economic, other type of, or not police contact during time period t.

Note, when these equations were estimated, the full population of data was used. This is because single equation estimators are not as computationally demanding as simultaneous estimators. The results for the employment and crime equations are presented in Tables 5-9 and 5-10 below.

The employment equation converged in five iterations.

Table 5-9: The Effects of Different Types of Crimes on Different Types of Employment

Dependent Variables	Coefficients of the Independent Variables		Z Score
E_s^*	- 8.6416	CONSTANT	- 9.10
	4.2276	EMPM	28.08
	- .3322	PET	- .71
	- .4104	POT	- 1.23
	- .0401	PE2	- .58
	- .1334	PO2	- 2.16
E_u^*	-10.0733	CONSTANT	-10.50
	3.4691	EMPM	16.36
	- .1211	PET	- .21
	- .1644	POT	- .41
	.0032	PE2	.04
	.1124	PO2	1.56
E_n^*	.0953	ERATE	1.17
	- 1.3300	SUMMER	- 8.82
	.9180	FALL	5.22
	- .3575	AGE	- 8.66
	- .4155	RACE	- 3.09
	- .4871	SEX	- 2.63

Table 5-10: The Effects of Different Types of Employment on the Probabilities of Different Types of Police Contacts

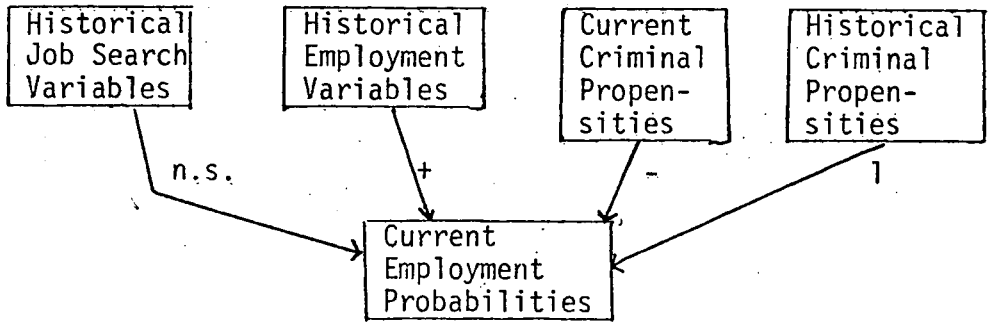
Dependent Variables	Coefficients of the Independent Variables		Z Score
P_e^*	5.2464	CONSTANT	4.00
	.1313	SET	.44
	.5439	UET	.86
	.0333	PE2	.56
	- .1397	PO2	-2.84
	.0040	TSPLC	8.43
	- .1568	ETIME	- .63
	- .0937	UTIME	-1.35
P_o^*	3.5533	CONSTANT	2.77
	.2220	SET	.64
	.0610	UET	.84
	- .0837	PE2	-1.52
	- .0899	PO2	-1.78
	.0042	TSLPC	7.60
	- .0963	ETIME	- .37
	.0269	UTIME	.39
P_n^*	- .1723	SUMMER	-1.00
	1.5671	AGE	2.11
	.0008	RACE	.12
	.0024	SEX	.79

Although the magnitudes of the coefficients and the significance levels must not be interpreted too literally, given the model misspecification, a general trend or pattern of results obtains in both the employment and crime equations. That is, particularly for the variables which are significant determinants of E_s^* and E_u^*, the magnitude of the coefficients are very similar in predicting both E_s^* and E_u^*. The same result obtains for the crime equation. This suggests that for the purposes of predicting the probability of employment, the distinction between different types of employment will add little to the predictive power of the model. Also, the distinction between economically motivated and not economically motivated police contacts contributes little additional insight over the model in the previous section. This may be due to the fact that the effects of employment experiences as well as police contacts are fairly homogeneous despite their heterogeneous characteristics. Alternatively, the data for this dissertation may not allow the proper distinctions to be made between types of employment or police contacts.

A Review of the Findings and Their Policy Implications

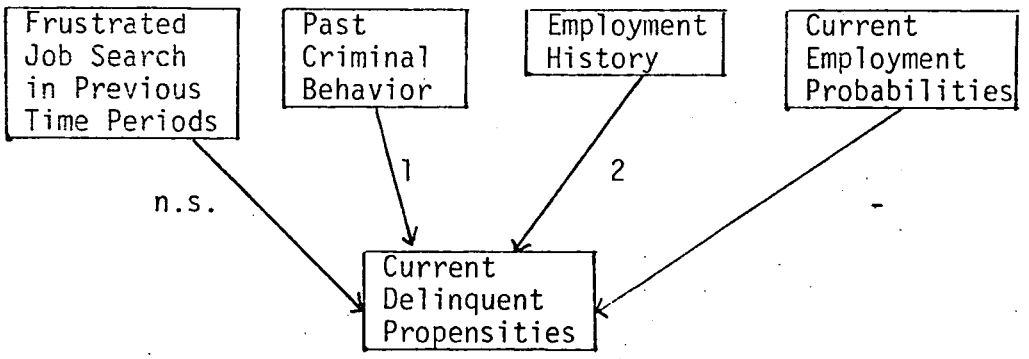
In Chapter III, numerous hypotheses were fowarded. They are summarized in the following graphs.

Graph 5-1: Hypotheses Related to the Probability of Employment



1. PCNT2 was not significant. TSLPC was significant but had an unexpected sign.

Graph 5-2: Hypotheses Related to a Youth's Delinquent Propensities



1. PCNT2 was not significant. TSLPC was negative and significant, as expected.
2. EMPM had to be eliminated from the simultaneous probit model given that it is so highly correlated with EMPT, the indicator of the latent variable, E_t^*.

Initially, each of the arrows in Graphs 5-1 and 5-2 represents a question mark. Does a youth's job search affect his current employment probabilities and if so, how? Now these arrows can be signed and the significance levels have been determined.

Most importantly, this study has ascertained that employment and

crime probabilities are simultaneously determined. Also, a youth's employment history is a good predictor of current employability. Likewise, the length of time since a youth's last police contact is a good predictor of current criminal propensities. Additionally, the empirical analyses suggest that differentiating between types of employment and types of crimes contribute very little to one's predictive ability.

The findings of this study are significant. However, it should be remembered that this study pretains to inner-city, relatively disadvantaged youths. One should not attempt to generalize these findings to the children of moderate income surburban families or the rural poor. Additionally, this study is limited in several technical ways.

1. The data used are only for youths enrolled in a crime prevention center. While it is very unlikely that employment or criminal propensities are correlated with some treatment at this center that has not been studied previously (and ruled out), this possibility cannot be eliminated entirely.

2. The defination of some of the variables may obscure some of the timing aspects of employment and crime. Thirty days is considered the length of a time period in this study. If a youth is employed three out of four weeks in the current time period, then $E_t=1$. If a police contact occurred over the one week when $E_t=0$, then the data would suggest that $E_t=1$ and $C_t=1$ whereas, in truth, at the time of the offense, $E_t=0$ and $C_t=1$. Nonetheless, the effects of these timing problems are likely to be small given that a relatively short time period was selected.

3. Complex timing hypotheses involving lagged endogeneous variables could not be tested given the simultaneous probit with latent dependent variables model specification.

Given the results and limitations of this study, the following policy prescriptions can be made. First, a youth's criminal

tendencies may be reduced by increasing the net utility of employment of the youth. An increase in the net utility of employment may be achieved by giving a youth a job. Other methods, not considered in this study, which would increase the net utility of employment include paying youths higher wages and/or improving the "quality of worklife."

Additionally, the lower a youth's net utility of crime in the current time period, the higher his or her employability index. Thus, if the policy objective is to increase the employability of youths, the decreasing the net utility of crime will be effective. A decrease in the net utility of crime may be achieved through delinquency prevention programs which decrease the likelihood of new police contacts. Also, increasing the number of police on the streets and the punishments given to convicted youths is likely to decrease the net utility of crime.

These policy implications are amplified in Chapter VI.

NOTES AND FOOTNOTES

[1]This is also due to the fact that the single equation OLS and logit estimates are biased if a simultaneous model is being postulated. Little reliability can be placed on the value of any single t statistic or the magnitude of the coefficients. Thus, only trends in the preliminary analyses are discussed.

[2]The estimation of the entire model with the full data set would exceed 6 CPU hours. The probability of a hardware error over the length of time required to estimate such a model would be substantial. Note, the length of time required to estimate the model is considerable longer than 6 hours as one hundred percent capacity is seldom available for a single user. Also, it would be prohibitively expensive to use the entire data set in this model. With a choice based sample, which is less than one quarter the size of the entire data set, it costs approximately $2,000 to estimate the model. Moreover, this model was estimated several times using different starting values for the correlation between the structural errors.

[3]Charles F. Mansky and Steven R. Lerman, "The Estimation of Choice Probabilities from Choice Based Samples," Econometrica 45 (8), November 1977, page 1978.

[4]For more information, see Henri Theil, Principles of Econometrics. New York: John Wiley and Sons, Inc., 1971.

[5]In DFP, the Hessian is obtained by analyzing information from the first partials. This approximation is updated on an iterative basis. In general, if the function is quadratic, an estimate of the Hessian would be reasonable after the number of iterations is greater or equal to the number of parameters in the model.

[6]The derivation and asympototic equivalence of the variance-covariance matrix is described in Stephen M. Goldfeld and Richard M. Quant, Nonlinear Methods in Econometrics. London; North-Holland Publishing Company, 1972, pages 68-74.

[7]For information on the economic model of crime, see Gary Becker, "Crime and Punishment; An Economic Approach," Journal of Political Economy 76 (March/April 1968); Issac Ehlich, "Participation in Illegitimate Activities; A Theoretical and Empirical Investigation," Journal of Political Economy 81 (May/June 1973); David Lawrence Sjoquist, "Property Crime and Economic Behavior; Some Empirical Evidence," American Economic Review 63 (June 1973). For the relevant sociological model of crime, in this discussion, see Richard Cloward and Lloyd Ohlin, Delinquency and Opportunity (Gelnco, Ill.: The Free Press, 1960.)

[8]A successful job placement is a job which (1) lasted at least three weeks unless an earlier termination date was specified a priori, and (2) terminated with no negative strings attached. That is, the youth must not have been fired, accused of crimes or arrested, and the youth must not have quit the job under questionable circumstances.

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CHAPTER VI

A REVIEW OF THE FINDINGS, THEIR POLICY IMPLICATIONS AND DIRECTIONS FOR ADDITIONAL RESEARCH

This thesis began with a review of the literature relating youth crime and employment. There were several major conclusions of this review. First, the theoretical literature, emanating from the sociological and economic traditions, conflict with one another with respect to the existance of employment-crime relationships for youths. Secondly, the theories which relate employment and crime differ with respect to the directness and timing aspects of the relationships. Consequently, the empirical literature was investigated to ascertain if there was strong support for any one of the economic or sociological theories.

Basically, the findings of existing empirical work were conflicting and consequently, did not lend support to any one of these theories. Moreover, it was found that there were no studies relating youth employment and crime that maintained the integrity of micro level data. Most of the empirical work related aggregate employment and crime indicies. The two studies based on micro level data did not directly relate employment and crime and additionally, aggregated the data in such a way that the benefits of having such data were lost. Finally, no studies attempted to assess the simultaniety or other timing aspects of employment and

crime decisions.

Based upon this review, the desirable attributes of a study of employment and crime were assessed. First, and most importantly, a study which contributed to this literature should maintain the integrity of data on individuals. Secondly, the timing aspects of employment and crime decisions should be explored. This statement can be broken into five distinct questions which a desirable model would address. They are:

1. Are employment and crime decisions made simultaneously?
2. Do past employment experiences affect a youth's current employment status?
3. Do past employment experiences affect a youth's current criminal behavior?
4. Does a past criminal history affect a youth's current criminal behavior?
5. Does a criminal history affect a youth's current employment status?

In addition to an analysis of these questions, any investigation relating different types of employment to different types of criminal behavior would represent a new contribution to the existing literature.

This study, based on micro level data, addresses all of the above questions. However, given the constraints of econometric modeling and the fact that the simultaniety question was considered to be of key importance, a model relating employability and the net utility of crime was adopted. This study concludes that a

youth's employability and criminal propensities are simultaneously determined. Moreover, it is essential to construct a simultaneous model as the preliminary single equation estimates suggest that a youth's current employment status does not affect the probability of incurring a police contact in the current time period. This relationship, rephrased in terms of the net utility of crime and employment, is shown to be significant ONLY in the context of a simultaneous model. Additionally, the magnitude of the latent variable, the net utility of crime, is moderately strong in comparison with the rest of the significant variables in the employment equation.

This study also concludes that a past employment history affects a youth's current employability and that job search variables are insignificant after controlling for the youth's employment status in the preceeding time periods. Additionally, a youth's employability is affected by the historical police contact variable, the length of time since the last police contact, in an unexpected way. Contrary to a priori expectations, this study finds that the more recent a police contact, the greater the youth's employability. The only reasonable explanation for this result is that youth's incurring police contacts may have to prove themselves reformed to the courts. Thus, employment may be sought more vigorously soon after a police contact.

With respect to the crime equation, it was found that a high employability index results in a lower net utility of crime.

The magnitude of this coefficient is large in comparison to the coefficient on the length of time since a youth's last police contact, the only other significant variable in the crime equation. Historical employment and job search variables were not found to be significant determinants of the current utility of crime. Thus, the sequential "frustration from the inability to succeed" model of crime is not supported by these findings. Alternatively, the simultaneous economic model of crime and employment is supported by these findings.

The final empirical section of this thesis estimated the effects of different types of employment on the probability of crime and the effects of different types of crime on employment. This section concludes that distinctions between types of employment and crimes are relatively unimportant in determining the probability of employment or crime. However, single equation estimation techniques were used in this section given the excessive computational demands of a simultaneous multinomial probit model. Thus, these results are considered tentatively. Additionally, the employment data do not permit the type of qualitative distinctions (wages, hours employed, type of work) that may be critical if differential impacts are to be ascertained from the econometric model.

With respect to policy initiatives, what do these findings suggest? Employability and the net utility of crime are unobservable and consequently, not strong candidates as policy parameters. Nonetheless, employability and the net utility of crime are related to

employment and crime in a theoretical sense and in the empirical model. Allowing some liscense with the strict econometric definations of the variables, this study can conclude that having a job has a fairly strong beneficial effect on criminal behavior. Additionally, if a youth is currently engaging in crime, he is less likely to be employed. Thus, employment and crime decisions on the part of youths are not made independently of one another.

Therefore, public programs which employ youths will result in a reduction in crime. An example of such programs include the employment programs sponsored under the Comprehensive Employment and Training Act. It is interesting to note here that the data on the youths in this study were obtained from a crime prevention program. Although this program provided counseling, legal aid and referrals to employment, the program was judged to be ineffective in reducing the frequency and seriousness of police contacts and court dispositions. How then can employment, a goal of this program, be found to be effective in reducing the probability of crime? I believe that the positive empirical findings of this study resulted from the fact that I considered both jobs obtained through this program and jobs found by the youths, their families and friends. Thus, activities outside the scope of this program were considered in this study. Consequently, I believe that community based programs which focus intensively on employment will be found to be effective in reducing crime. In fact, in an analysis of the jobs component of the program from which this data were drawn, it was found that no crime were incurred over the period of the youths' employment.[1]

Perhaps, it is also because employment comprised a relatively small fraction of the time that the youths were enrolled in this program, less than twenty percent, that the program was judged to be ineffective.

Aside from public programs which directly employ youths, what can be said about public policies which increase the probability of employment for youths such as the lower minimum wage for youths currently being considered by the Regan administration? Employment, in this study, consisted of "official" jobs subject to the current minimum wage requirements as well as "unofficial" jobs such as mowing lawns, house cleaning, baby sitting, helping to sell produce at the local vegetable market and carrying groceries to cars at the local supermarkets. Although the data did not always exist to differentiate these jobs or include a wage analysis, the thesis concludes that employment, including the lower wage jobs, has a beneficial effect on a youth's criminal tendencies. Thus, while more extensive research in this area is suggested, this study would conclude that a lower minimum wage policy would have the beneficial effect of reducing crime by youths. However, if youths displace adults in the labor market as a result of the lower minimum wage, adult crime may rise.

Although this thesis contributes substantially to the existing employment and cirme literature, several areas for future research are suggested. Additional research on the timing aspects of employment and crime decisions is suggested. This research may take several

forms. A variable length time series analysis which weights the length of each observation is one approach. This would eliminate the abundance of no crime-no employment thirty day observations in which only the age and historical summary variables are changing. An alternative approach would maintain the thirty day observations and include explicitly lagged endogeneous and exogeneous variables. However, this approach would require extensive new econometric modeling and may well be computationally intractable.

A third approach would consider an entirely new methodological such as prediction analysis.[2] In prediction analysis, one could re-define complex historical variables and test a priori predictions for the strength and scope of their predictive power. An example of such a hypothesis would be that youths who were recently laid off and seeking new employment are more likely to committ an offense than youths who were employed or unemployed and not seeking work. The advantage of prediction analysis is that it is computationally simple once the data have been appropriately constructed and the relevant hypotheses identified. It would also avoid the ambiguity of looking at variables such as the net utility of employment and crime and would look directly at the policy parameters. The disadvantage of this approach is that there are a virtually infinite number of relevant hypotheses which can be identified. Also, this approach becomes rather complex when one attempts to control for even a relatively small number of variables such as age, race, sex, family characteristics, etc. Nonetheless, this approach looks very

promising particularly since most of these control variables were found to be insignificant.

Another recommendation for future research would be to better classify types of employment. The fact that types of employment, successful or unsuccessful, did not have differential impacts on the probability of crime in this study, may well be due to the fact that the relevant distinctions between types of jobs could not be deduced from the available data. Qualitative distinctions between types of jobs could include regular employment vs. irratic employment, government sponsored jobs vs. private sector jobs, hours employed, wages paid and the type of work performed.

The final recommendation for research in this area would broaden the entire scope of this study by looking at the educational performance and attendance records of the youths. This is the one major area of youths' lives which probably has significant impacts on their criminal tendencies. It was not included in this study given the lack of such information. Nonetheless, a complete treatment of youth crime would incorporate employment, family characteristics as well as educational performance and attendance.

NOTES AND FOOTNOTES

[1]See Maureen Pirog-Good, "The Relationship Between Youth Employment and Juvenile Delinquency: Some Preliminary Findings," Paper presented to the American Society of Criminology, October 26, 1979. Also Maureen Pirog-Good, "The Impact of YSC Participation on the Frequency and Seriousness of Police Contacts," Law Enforcement Assistance Agency Report, October 1979.

[2]Laing, James, et. al., Prediction Analysis of Cross Classifications. New York: John Wiley and Sons, Inc., 1977.

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APPENDIX A

DESCRIPTIVE STATISTICS FOR THE DATA

VARIABLE ABBREVIATION		MEAN	STANDARD DEVIATION
1.	RACE	.575	.494
2.	SEX	.833	.373
3.	MST	.447	.497
4.	CLA	1.241	.588
5.	MOCC	.394	.585
6.	FOCC	1.183	.791
7.	PUBLIC	.515	.499
8.	AGE	15.529	1.925
9.	EMPT	.262	.502
10.	SEMPT	.226	.473
11.	UEMPT	.036	.195
12.	EMPM	.255	.493
13.	SEMPM	.217	.462
14.	UEMPM	.039	.199
15.	EMPQ	.359	.603
16.	SEMPQ	.281	.529
17.	UEMPQ	.078	.304
18.	REJT	.055	.275
19.	REJM	.059	.279
20.	REJQ	.191	.513
21.	PCNTT	.066	.292
22.	PINJT	.010	.117
23.	PECONT	.031	.191
24.	PVANT	.007	.085
25.	PCNTM	.065	.289
26.	PINJM	.009	.115
27.	PECONM	.030	.189
28.	PVANM	.007	.085
29.	PCNTQ	.191	.572
30.	PINJQ	.029	.198
31.	PECONQ	.087	.352
32.	PVANQ	.019	.148
33.	PCNTB	.418	.962
34.	PINJB	.066	.315
35.	PECONB	.193	.582
36.	PVANB	.044	.227
37.	PCNTγ	.832	1.648
38.	PINJγ	.133	.471
39.	PECONγ	.392	.955
40.	PVANγ	.084	.337
41.	PCNT2	1.400	2.711
42.	PINJ2	.219	.606
43.	PECON2	.635	1.442
44.	PVAN2	.138	.463
45.	PCNTA	2.048	3.878
46.	PINJA	.317	.776
50.	PECONA	.883	1.979
51.	PVANA	.251	.701
52.	JAPPT	.104	.357

VARIABLE ABBREVIATION	MEAN	STANDARD DEVIATION
53. JAPPM	.108	.362
54. JAPPQ	.333	.675
54. TOCL	51.865	33.202
55. TICS	30.140	28.461
56. TSLR	48.167	33.081
57. TSLPC	603.555	360.692
58. TSLJA	38.480	32.333
59. WINTER	.235	.424
60. SUMMER	.259	.438
61. SPRING	.251	.434
62. FALL	.254	.435
63. ERATE	8.399	.801
64. LERATE	8.424	.848

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