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CLAREMONT McKENNA COLLEGE

THE EARNING GAP OF CRIMINALITY:
EFFECTS OF STIGMA, LENGTH AND FORM OF INCARCERATION

SUBMITTED TO

PROFESSOR MANFRED KEIL

AND

DEAN GREGORY HESS

BY

MATTHEW LAREDO

FOR

SENIOR THESIS

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Abstract

This paper shows that criminality causes a significant decrease in the earning potential of individuals. In addition, there is evidence to support that criminality has the same negative effect on earnings regardless of type of sentencing, whether probation or incarceration. Previous studies indicate that ex-convicts do not benefit from in-prison based programs. The purpose of this paper is to identify the short-term earning differentials between offenders and their law-abiding counter parts and offer insight as to how this can affect recidivism. Research shows that recidivists suffer the largest wage differentials, which significantly lowers their employment utility. This reduction of labor market outcomes may conversely promote the utility an individual receives from a life of crime.

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I. Introduction

It is no secret that the United States struggles with the persistent issue of criminal behavior. Although delinquency is a problem that every nation faces, the Unite States is the leader in prison population per capita. In recent decades, the United States has exhibited an explosion in incarceration rates. Between 1925 and 1972, the prison population grew by 105 percent; between 1972 and now, the prison population increased by 705 percent.[1] One cause for this drastic increase is the technological advances in law enforcement techniques and detection experienced over the past few decades. However, while criminal detention increases in efficiency, there is a lag in development of effective rehabilitation programs for criminals. Incarceration is meant to be only one step in the difficult process of returning offenders to the general population as functioning members of society. The goal of rehabilitation is as great a goal, if not greater than the goal of incarceration. It seems clear that the United States judicial system is effective in incarcerating criminals, but is it effective at rehabilitating inmates as well? By what means can one measure the effectiveness of rehabilitation in such a system?

Harold W. Clarke, Director of Virginia Corrections Department states, "the economy is causing us to take a closer look at how we're spending taxpayer dollars…we can't afford to keep building prisons as a short-term solution to public safety."[2] Clarke raises an important point - prisons are often a short-term solution. During the late 18th and early

[1] Pew Center on the States, *Prison Count 2010: State population Declines for the First Time in 38 Years* (Washington, DC: The Pew Charitable Trusts, April 2010).
[2] Pew Center on the States, *Reducing Recidivism: Corrections directors in five states share lessons learned* (Washington, DC: The Pew Charitable Trusts, December 2011). p. 2

19th centuries, the British Industrial Revolution brought the first consistent and dramatic rise in crime rates in the world. In response to this issue, the British government set up "convict colonies" in their colonies, including Australia.[3] The solution was simple; relocating thieves, murderers and other offenders from the British Islands to far-away locations on uncharted continents. Fast-forward to today, where the same policy continues to be employed, only with a change in venue. Instead of isolating offenders on a different continent, four 8-inch reinforced concrete walls lined with barbed-wire and patrolled by prison guards are used to separate those who have been convicted from general society.

Many correction directors share Clarke's beliefs; the goal of a prison should be not only to incarcerate but also to rehabilitate offenders. Director of Oklahoma Corrections, Justin Jones, reaffirms, "…if you reduce recidivism you are accomplishing all of these goals…you reduce victimization."[4] Recidivism occurs when an offender relapses into crime. Recidivism, for the purpose of this study will be defined as the act of serving multiple sentences, either on probation or in a correctional facility. A study conducted by the PEW Center on the States reports that 4 in 10 prisoners return within three years of release, and that 1 in 31 adult Americans are either incarcerated, on probation, or on parole.[5] The annual cost of penal operations throughout the US is $52 billion, a staggering amount.

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[3] "'Beyond the Seas': The Transportation of Criminals to Australia," Constitutional Rights Foundation, http://www.crf-usa.org/bill-of-rights-in-action/bria-11-2-a-beyond-the-seas-the-transportation-of-criminals-to-australia (accessed April 22, 2012).

[4] Pew Center on the States, *Reducing Recidivism: Corrections directors in five states share lessons learned*. p. 2

[5] Pew Center on the States, *Prison Count 2010: State population Declines for the First Time in 38 Years*

In a similar study, the PEW Center reports a reduction in recidivism rates in the ten states with the highest potential cost savings could reduce prison costs by over $470 million in a single year.[6] In the current economy, corrections budgets are being tightened, yet more is being demanded of correction centers. It is of interest to understand the characteristics that may contribute to criminality, the sentencing process, and the factors which affect the ability of criminals to assimilate into society after incarceration ends. It can be said that the world runs on money; thus, the first step in preventing criminal relapse and re-assimilating offenders after their release is to secure income. For the purpose of this paper, individual income is viewed as a primary factor to reduce criminal behavior and recidivism.

For context, it may help to delve into the story of three individuals studied in this report,[7] subjects 3734, 4954, 1973. We shall name each "Nick", "Sam", and "Zach", respectively. "Nick", "Sam", and "Zach" are all white males, born in the year 1982. After graduating from high school, they proceeded to join the labor force. In 2001, "Nick", "Sam", and "Zach" reported annual earnings of $5,000, $7,500, and $6,000, respectively. As of 2001, each possessed the same level of education, and similar initial labor market prospects. These individuals each committed a criminal offense, and each was consequently sentenced to a correctional facility in their young adulthood. Young adulthood is a time when labor-force attachment is most important to future outcomes, as work experience increases potential future earnings.

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[6] Pew Center on the States, *State of Recidivism: The Revolving Door of America's Prisons* (Washington, DC: The Pew Charitable Trusts, April 2011).

[7] Data in this report was gathered from a study conducted by the Bureau of Labor Statistics: The NLSY97. Information regarding the NLSY97 can be found in Chapter III Section A.

The incarceration consequences and subsequent criminal and economic behavior of these three subjects varied drastically. "Nick" was sentenced to a correctional facility in January of 2005, where he remained for fourteen months. Upon release, 'Nick" rejoined the labor-force and currently experiences superior labor market outcomes compared to "Zach" and "Sam".[8] In 2009, "Nick" reported both employment and annual earnings of $50,000. "Sam's" tenure as an inmate was brief, lasting one month, and since release he has experienced unsteady employment. In 2009, "Sam" reported multiple job changes and yearly earnings of $1,320. "Zach" was first incarcerated in 2002, and since then has seen short but frequent stays in correctional facilities. "Zach" has been incarcerated five separate times for a total of twenty-four months. "Zach" was unable to rejoin the labor-force, reporting no earnings for 2009. Despite initially sharing similar characteristics, the incarceration and labor market outcomes of these three individuals are drastically different.

The ability of an ex-offender to gain employment upon release from incarceration is undeniably a large factor for an individual at risk of criminal relapse. A person unable to rejoin the labor-force is essentially shunted into a life of unlawful acts. The purpose of this paper to analyze the effect that criminality has on an individual's income potential. This report begins with an analysis of the effect a criminal history has on an individual's future earnings, and then extends the analysis to types of sentencing received by individuals and the length of each sentence type. The two sentence types studied here are probation and detention in a correctional facility.

[8] Labor Market Outcomes refers to, but is not limited to, employment and income. This paper focuses mainly on the latter, individual income.

The remainder of this paper is organized as follows: Chapter II presents a literature review on the topic of incarceration, including educational levels as they relate to criminality; prison-based program effects; employer outlook on ex-offenders; and effects of incarceration length. Chapter III describes the data and variables used in this analysis. Further, it presents results of the regression-based analysis conducted. Chapter IV includes a discussion of the results found in the previous chapter. Chapter V concludes the paper with a summary of findings and future recommendations.

II. Literature Review

The effect of incarceration on individual labor market outcomes has increasingly become a topic of academic interest over the past few decades. A literature review of the impact of the violation of social rules and the subsequent impact of punishment could extend beyond decades. Since the dawn of society, man has struggled with the implications of rules and obedience, of crime and punishment. Our oldest recorded "history" is in fact such a tale of crime and punishment: the "sentencing" implications for Adam and Eve. Society has long struggled to understand what motivates an individual to commit a crime, and what punishments deter them from such acts. Such questions are difficult to examine, since after an individual is convicted their labor market outcomes are significantly different than if they had not been convicted. In today's world of rising penal costs, tighter budgets, and evolving morality and religion, this debate can be expected to intensify, as we seek to quantify the economics of the commission, judgment, and rehabilitation of crime.

The following section discusses how to characterize the average inmate; the role of education in criminal behavior both pre and post-offense; the willingness of employers to hire ex-convicts; and the effect incarceration length has on individual labor market outcomes. To be clear, this section uses individual labor market outcomes by examining employment rate, individual wages, and earnings.

Any discussion of the topic must begin with examining incarceration that results from acts of disobedience. Why do people break the law? In his theory of the rational behavior of criminals, Becker (1968) argues that, ideally, the net-costs of certain

convictions and incarcerations would deter criminals from criminal acts. Becker asserts that if a criminal act offers greater utility to an individual than other allocations of their time, they will commit the criminal act. This theory applies mainly to premeditated criminal acts, as spontaneous crimes do not allow the individual sufficient time to engage in a complex cost-benefit analysis. In premeditated acts, individuals either have a willful disregard for the consequences of their actions, or possess an inflated illusion of control, believing they will escape detection. For example, when playing roulette, individuals often have an inflated illusion of control, believing that they can control the roulette wheel.

It is difficult to imagine that a significant number of criminals rationally contemplate the long-term consequences of their criminal behavior. Furthermore, it is assumed that the less formally educated the person, the less understanding they have about the long-term consequences of criminal offenses and the greater their illusion of control. In 2010, Raphael characterizes prison inmates to have substantially lower levels of education and little formal work experience.[1] Additionally, they tend to come from poverty, suffer from more physical and mental health problems, and have more substance abuse problems than the average US citizen.[2] The traits that Raphael characterizes as typifying inmates are inconsistent with the characteristics employers seek in their ideal applicants. Therefore, the typical inmate may already be disadvantaged in the labor market even before conviction for any offense.

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[1] A table of Raphael's tabulations of all prison inmates released in 2003 can be found at the end of this section.

[2] Raphael, Steven. "Improving Employment Prospects For Former Prison Inmates: Challenges and Policy." *NBER Working Paper Series* (April 2010): under "Working Paper 15874." http://www.nber.org/papers/w15874 (accessed February 22, 2012).

Of all the factors which can sometimes be generalized of criminal backgrounds, lack of education may be the most common. Using three different national databases, Lochner and Moretti (2003) find that an increase in schooling decreases individual criminal activity. The impact of education on crime implies a benefit to schooling that goes beyond the individual, and thus can be seen as a social return that is larger than the individual private return. Their study projects that "a one percent increase in high school completion rate of all men [ages] 20-60 would save the United States as much as $1.4 billion per year."[3] Furthermore, they find that a ten percent increase in graduation rates would reduce arrest rates by five to ten percent based on wage increases alone, as graduation increases wage, which is negatively correlated to criminal activity. Clearly, education can be an important factor in determining individual criminal outcomes.

Although education can be an indicator of personal and professional traits, Bjerk (2010) finds that not all high school dropouts exhibit the same criminal and labor market traits. Using a sub-sample of individuals who either dropped out before, or continued no further than 12th grade, Bjerk notes, "while most high school dropouts do substantially worse in their early twenties in terms of labor market and criminal outcomes, a sizeable subset of dropouts...do not appear to do worse than high school completers with similar observable backgrounds."[4] He argues that the discontinuation of one's education does not inherently lead an individual to crime or poor labor market performance. Those who "continue to use their time in a productive manner and develop and maintain their soft

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[3] Lochner, Lance, and Enrico Moretti. "The Effect of Education On Crime: Evidence from Prison Inmates, Arrests, and Self-Reports." *NBER Working Paper Series* (October 2003): page nr. http://www.nber.org/papers/w8605 (accessed February 22, 2012). p. 27

[4] Bjerk, David. "Re-Examining the Impact of Dropping Out On Criminal and Labor Outcomes in Early Adulthood." *Economics of Education Review* 31 (2012): 110-12. http://www.elsevier.com/locate/econedurev (accessed February 22, 2012). p. 119

skills"[5] suffer no long-term consequences. Although education decreases the likelihood of illegal activities, there are numerous high school dropouts who function highly as contributing members of today's economic society, not turning to criminal activity despite low levels of education.

One approach to reduce the crime rate, and ease the transition from prison to general society, could be to increase the mandatory education age of youth and/or improve the methods to keep youth in schools. By investing more in youth education, individual potential earnings should increase, consequently increasing the opportunity cost of crime and the cost of time spent in prison. During incarceration, a criminal essentially loses all income they would be earning in society. Thus, by raising the education of an individual, the utility he/she would expect to receive from criminal offenses (whether economic gains or personal thrill) might be evaluated in a more sophisticated and nuanced manner, and he/she may opt to avoid crime as an unnecessary risk versus other outcomes. This concept is essentially Becker's (1968) theory of rational behavior of criminals.

Let us now move beyond the initial assessment of the characteristics that may predispose one to make the decision to commit a crime, and consider the impact of incarceration. One must consider how the negative effects of labor market absences impact rehabilitation and subsequent employment prospects. To increase the potential for post-jail employment, some facilities have prison-based vocational and/or General Education Degree (GED) programs. To better understand the effects of such programs, Tyler and Kling (2006) examine post-release economic effects of participation in prison

[5] Ibid. p. 121

based GED programs in Florida. Contrary to what one may think, they found no true, long-term labor market outcome increases for white or minority offenders that participated in these programs. They notice small, short-term increases in labor market outcomes for minority participants, to be exact a twenty percent increase in earnings, however, these increases diminish significantly after their second year post-release. To explain this occurrence, Tyler and Kling attribute that "participation in education programming may be driven more by a desire to impress prison and parole officials and improve one's situation in prison than by a desire to impact one's post-release labor market outcomes".[6] Although they extend this explanation about their findings, they did explore the subject within their research. Therefore, although prison-based education and vocational programs exist, overall they appear relatively ineffective in improving the economic status of released inmates. In fact, in his study, Raphael notes that despite their low level of education, only 31 percent of inmates took advantage of education programs while incarcerated.[7]

Not only are the effects of these GED programs not fully translated into the labor market but, La Vigene et al (2004) finds that state prisoners' opportunities to participate in such programs were being reduced across the nation throughout the 1990's. The number of soon-to-be-released prisoners who reported participating in vocational programs dropped from 31 percent in 1991 to 27 percent in 1997. This carries two implications: first, it suggests those inmates who served longer sentences had more opportunities to take advantage of these services; second, convicts have less overall

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[6] Tyler, John H., and Jeffrey R. Kling. "Prison-Based Education and Re-Entry Into the Mainstream Labor Market." *Barriers to Reentry? The Labor Market for Released Prisoners in Post-Industrial America.* (June 2006): page nr. http://www.nber.org (accessed February 22, 2012). p. 27

[7] Raphael 2010

opportunity to be involved in these programs and, thus, the decrease in participation is due to limited space, not lack of individual desire to participate.

Thus far, we have cited that the typical inmate enters prison likely as a more unmarketable employee, having less formal education and potentially greater likelihood of illness or substance abuse problems. Further, this population is often unable to see long-term benefits from the education and training opportunities they sometimes receive while in prison, or are unable to participate, as the types of programs which allow inmates to seek education or training for the incarcerated have been reduced over time. This combination of factors gives great cause to question how convicts can then re-assimilate into society, especially with respect to the critical first step of establishing a legal source of income.

To understand how criminals face employer discrimination, we next focus our attention on employers' outlooks on persons with criminal backgrounds. When discussing labor market outcomes of ex-criminals, it is important to understand the demand-side's view of the labor market: employers. We can assume that, when hiring, employers seek the "best" candidate. Managers are tasked to sift through a myriad of applicants to find those with the requisite skills, as well as those who exhibit certain inherent traits, such as honesty, drive and reliability. A criminal history may lead an employer to believe that the candidate lacks any or all of those traits. However, it was found that ex-convicts were still able to gain employment, but at lower wages than their non-convicted counterparts:

> [In] a mid 1970's review of the employment problems of former inmates, Phil Cook (1975) reviews several studies that generally find little evidence that former inmates have great difficulty finding employment, although the jobs they found

> tend to be low-paying with little room for advancement. A dual labor market interpretation of these earlier studies would be that a criminal conviction and prison history do not impact the ability to find work, but may shut some former inmates out of the market for good jobs.[8]

This review is consistent with the theory that criminals experience resistance to reentering the labor force post-release, and therefore must lower their reservation wage to improve their opportunities and likelihood of employment. A job that matches an offender's qualifications would most likely go to a non-offender, assuming each has similar qualifications, leaving the offender to seek job opportunities for which he/she is over-qualified.

Cook's study, from the 1970s, may be dated as criminal background information has become more readily accessible since. With the advent of Internet based technology, it is becoming easier and easier for employers to gain access to state and federal criminal histories. More recently, Finlay (2008) analyzed effects of employer access to criminal history data on the labor market outcomes of both offenders and non-offenders. He finds employment effects of incarceration to be more negative in states that provide criminal history records over the internet as compared to states that did not, strengthening the effects incarceration has on labor market outcomes.

Beyond the evaluation of personal characteristics and traits, hiring ex-convicts carries a higher potentially risk of liability for employers. Potential lawsuits may arise against individual hiring partners, recruitment firms, and the companies themselves for negligent hiring or negligent retention of employees. Increased litigation risk is a further negative factor for employers in choosing convicts who may carry perceived negative attributes. In addition, many professions legally prohibit employers from hiring

[8] Raphael 2010 p. 14

convicted felons, particularly those that have been convicted of crimes involving moral turpitude. Professions associated with law enforcement, or ones that require a security clearance disallow employment of convicted felons. Raphael (2010) documents results similar to Finlay's and conjectures that a more effective re-entry policy for convicts into the labor force may result in substantial social benefit, as convicts who achieve employment show a five percent decline in parole failure rates, thus reducing the overall recidivism rate.

We therefore see that the negative impact of incarceration on employment outcomes continues to increase due to changes in hiring behavior. In addition, though, Raphael (2007) asserts that since 1980, incarceration rates have increased as a result of changes in sentencing policy, not changes in criminal behavior. Convicted criminals are being sentenced to federal and state facilities for offenses that previously would have been reconcilable by fine, probation, or as a misdemeanor offense. In an early study, Waldfogel (1994) explains that increases in incarceration length appear to permanently alter men's career prospects and could lead to recidivism. However, more recent studies conducted by Jung (2011) and Kling (2006) find evidence to the contrary. Their studies associate longer incarceration spells with higher post-release labor market outcomes, both in real earnings and employment rates. Kling theorizes that "the mechanisms of lost experience and human capital depreciation exist, but are being offset by prison programs and removal of the individual from the criminal community -- making legitimate work more attractive."[9]

[9] Kling, Jeffrey R. "Incarceration Length, Employment, and Earnings." *American Economic Review* (2006): page nr. http://www.aeaweb.org/articles (accessed February 22, 2012). p. 18

While the data many not be entirely conclusive, the outcome of criminals, post-release, is of much concern to the general population. The goal of incarceration is to both punish and rehabilitate individuals who violate society's laws, restoring them to the general population as fully functioning members of society. Of concern then, is that when individuals are convicted, they are punished both by their incarceration and often again upon release by their inability to rejoin the labor force. Such a system is imperfect. It creates two separate societies: a law abiding, employable society, and a criminal, recidivist society. It is thus the goal of this analysis to examine criminal history of individuals and their subsequent labor market outcomes to explain the amount criminality diminishes earning potentials of individuals.

As mentioned earlier, the table on the following page is an excerpt from Steven Raphael's 2010 paper, Improving Employment Prospects for Former Prison Inmates. The table illustrates the average characteristics of State prisoners released in 2003.[10] One particularly noteworthy statistic is that the first quartile of these released prisoners were roughly age 25 and below. This percentile is within the age group of subjects chosen for this study.

[10] Raphael 2010. p. 56

Table 2
Characteristics of State Prisoners Released in 2003

	All Inmates	White	Black	Hispanic
Demographics				
Male	0.897	0.876	0.907	0.934
White	0.464	1.000	0.000	0.888
Black	0.519	0.000	1.000	0.097
Hispanic	0.202	0.069	0.007	1.000
Educational Attainment				
8th grade or less	0.114	0.124	0.085	0.261
9th grade	0.114	0.111	0.112	0.146
10th grade	0.151	0.130	0.175	0.126
11th grade	0.157	0.116	0.203	0.106
12th/GED	0.386	0.432	0.351	0.328
Some college	0.060	0.065	0.061	0.024
College grad	0.009	0.011	0.010	0.005
Special Ed.	0.007	0.010	0.005	0.004
Age percentiles				
25th	24.7	25.3	24.3	24.3
50th	32.0	33.0	31.7	30.1
75th	39.9	40.5	39.9	37.8
Time Served Percentiles[a] (months)				
25th	11.3	10.6	10.9	14.9
50th	20.8	19.6	21.3	24.0
75th	39.9	36.1	42.0	43.5
Conditionally released	0.739	0.732	0.702	0.856
Prior felony incarceration	0.327	0.292	0.410	0.203
Offense				
Murder/homicide	0.025	0.022	0.026	0.029
Rape/sex assault	0.043	0.058	0.028	0.046
Robbery	0.073	0.046	0.097	0.074
Assault	0.081	0.075	0.078	0.105
Other violent	0.022	0.027	0.017	0.027
Burglary	0.116	0.142	0.097	0.105
Larceny	0.128	0.150	0.120	0.079
Motor vehicle theft	0.024	0.025	0.016	0.041
Other property	0.037	0.046	0.030	0.030
Drugs	0.321	0.249	0.391	0.343
Other	0.128	0.159	0.100	0.121

Tabulated from the 2003 NCRP data base.
a. Refers to time served for release offense.

Note: This table was created by and is the property of Steven Raphael. The original can be found in his 2010 paper[11], Improving Employment Prospects for Former Prison Inmates. See References for more information. The intention of the redistribution of this table is to help frame the reader in the average characteristics of individuals exiting prison.

[11] Raphael 2010. p. 56

III. Data: Methodology and Econometric Theory

A) Data Collection

Data for this analysis was gathered from the National Longitudinal Survey of Youth 1997 (NLSY97). The NLSY97 is a national survey of approximately 9,000 randomly selected American youth. Individuals were considered eligible if they were between the ages of 12 and 16 as of December 31st, 1996. Those selected were interviewed annually for 13 consecutive years, from 1997 through 2009. The NLSY97 is conducted by the Bureau of Labor Statistics (BLS), with the purpose of gathering data regarding education, crime and labor market experiences among others variables.

As discussed earlier, many factors influence an individual's labor market outcomes, from family background, to education, to criminal history. The purpose of this analysis is to determine the effects of incarceration, length and type of incarceration, and recidivism, on an individual's earnings. To assess possible relationships, this sample is limited to males who completed the survey in 2009. Furthermore, individuals reporting no income ($0) in 2009, without valid AFQT scores[1] or insufficient criminal histories[2] were removed from this sample. Although the effect of incarceration on female labor market outcomes is of importance, they are excluded from this sample for several reasons. First, women tend to have less attachment to the labor force than men; through pregnancy and childbirth, females may take leaves of absence from the labor force for periods which vary from a few weeks to indefinitely. In addition to their labor market

[1] The AFQT score generated by the NLS staff is a computer-adaptive form of the Armed Services Vocational Aptitude Battery examination. Scores are normalized to account for the age of participants.
[2] Insufficient criminal histories would refer to individuals reporting beginning a criminal sentence, whether in a criminal facility or probation, without reporting an end date while reporting positive income in 2009.

differences, women have a distinctly different criminal behavior pattern than males, both in frequency, demeanor, and conviction rates for similar crimes. Given their unpredictable attachment to the labor force and these differences in criminal behavior and conviction bias, women were not included in this analysis.

B) Initial Analysis: Controlling for Individuals

As mentioned, there are many contributing factors when it comes to estimating and projecting an individual's earning potential. Table 1 illustrates that among NLSY97 participants, there is an earning difference between convicts and non-convicts, however it is now important to be able to control for differing characteristics that may have existed

Table 1:
Mean outcome differences between convicts and non-convicts.

Outcome	Convict	Non-convict	Difference	Observations
Individual Earnings (2009)	$25,717.53	$34,462.75	-$8,745.22	2576

Note: Sample consists of males with valid AFQT scores, positive income and complete criminal histories.
*** Significant at 1%

Table 2:
Mean background characteristics for convicts and non-convicts.

Characteristic	Convict	Non-Convict
Black	0.20 (0.40)	0.21(0.41)
Hispanic	0.22 (0.41)	0.19 (0.40)
Household Income (1996)	$40,341.28 (36,168.68)	$52,446.28 (43,603.97)
One Parent Household (1997)	0.35 (0.48)	0.26 (0.44)
Lived in North Central U.S. (1997)	0.31 (0.46)	0.24 (0.43)
Lived in Southern U.S. (1997)	0.34 (0.47)	0.35 (0.48)
Lived in Western U.S. (1997)	0.23 (0.42)	0.22 (0.41)
Urban	0.73 (0.44)	0.74 (0.44)
AFQT	36.87 (26..33)	48.79 (29.76)
Potential Experience Squared	117.55 (53.13)	75.53 (48.85)
Education	11.62 (2.35)	13.43 (2.60)
Recidivism	0.25 (0.433)	-

Note: Sample consists of males with valid AFQT scores, positive income and complete criminal histories.
Standard deviation in parentheses.

pre-incarceration. In analyzing Table 2, it is apparent that there are significant differences between the mean characteristics of an offender and those of a non-offender. The arguments in Table 2 will be used in this analysis as controls that contribute to an individual's future earnings.

Table 3 shows that as characteristic controls are added, negative effects of incarceration and recidivism are hedged. Table 3 illustrates the results of a regression analysis of the OLS form[3],

$$Y_i = \alpha + \beta_C \times Convict_i + \beta_R \times Recidivism_i + \boldsymbol{\beta_X} \times \boldsymbol{X_i} + \varepsilon_i \qquad (1)$$

where in this case, Y_i is log(earnings), and $Convict_i$ and $Recidivism_i$ are indicator variables for determining if the individual is a criminal and/or recidivist respectively. The term $\boldsymbol{X_i}$ represents a vector of variables used to characterize individuals, and ε_i is the individual error term. For the purposes of this analysis, we assume the collective error

Table 3:
Regression results: Log earnings outcomes.

Variable	Coefficient of variable by specification		
	Birth year dummies only	+ Controls for race, family characteristics, and environment	+ Test scores and academic achievement
	(1)	(2)	(3)
Convict Dummy	-0.154 (0.026)***	-0.128 (0.027)***	-0.082 (0.027)***
Recidivism Dummy	-0.078 (0.049)	-0.078 (0.051)	-0.055 (0.05)

Note: Sample for all specifications consists of males with valid AFQT scores, positive income and complete criminal histories.
Regressors in specification (2) include race dummies, household income in 1996, a dummy variable for living in a one parent household in 1997, a dummy for living in an urban area in 1997, and dummies for region of the U.S. resided in 1997. Regressors in specification (3) include all variables in (2) along with AFQT scores, highest level of education, and potential experience squared. Standard errors are in parentheses.
***Significant at 1%.

[3] OLS, meaning Ordinary Least Squares, represents a simple linear model that uses point-estimates for unknown parameters to describe a linear relationship between multiple regressors. OLS is evaluated by minimizing the sum of standard errors, SSE.

terms to be normally distributed, so we may disregard them and focus mainly on differences in β coefficients.

Table 3 shows both the convict dummy, and recidivism dummy, coefficients as individual characteristics are added to the $\boldsymbol{X_i}$ vector. In Specification (1), only dummy variables for birth year are included in the $\boldsymbol{X_i}$ vector. Specification (2) includes all variables in Specification (1) as well as controls for race, family characteristics, and environment. New variables that appear in the $\boldsymbol{X_i}$ vector include: dummies denoting the if respondent is Hispanic or black; a dummy denoting if they lived in an urban household in 1997; a dummy denoting if they lived in a single parent household in 1997; dummies indicating the United States region[4] of the household residence in 1997; and household income in 1996. Specification (3) includes all variables in (1) and (2) as well as variables on test scores and academic achievement. New variables that appear in $\boldsymbol{X_i}$ vector are: AFQT score, education, and potential experience squared. For additional details on variables, see Data Appendix.

As previously stated, the output in Table 3 corresponds to the dummy coefficients of their respective variables. Assuming individuals with a criminal history are more likely to experience additional barriers to re-entry into the labor force, and comprise a larger portion of the sample removed for reporting no income in 2009, it can be inferred that the effects of incarceration are underestimated in this regression. That being said, Table 3 – Specification (1) shows that individuals with a criminal background earn 15.4% less than their law-abiding counterparts; and individuals who are recidivists earn 7.8% less than that, or 23.2% less than their law-abiding counterparts. As characteristics are

[4] The NLSY97 divides the U.S. into four regions: North-East, North-Central, South and West.

added to the analysis, the effects on income decrease by approximately half for the criminal indicator, however the recidivism indicator is reduced by roughly one-third.

It is apparent that an individual that is charged with a criminal offense faces severe labor market challenges. While we cannot conclude it with certainty, we can hypothesize that the probability of an ex-convict finding work is lower than that of non-offender. However, we can conclude for certain that once employment is secured, earnings are drastically reduced for ex-convicts versus law-abiding counterparts.

C) Criminal Analysis: Effects of Sentence Type and Length

It has now been demonstrated that there is a significant difference in the earnings of offenders and non-offenders. The question still remains, though: how do different forms of punishment affect an individual's ability to recover after sentencing? The NLSY97 segments criminal sentencing into three distinctly different pathways: correctional facilities, probation, and community service. For the purposes of this analysis, we focus solely on the first two (incarceration in correctional facilities and probation). Community service is not analyzed due to a small sample size, with less than 100 participants receiving a sentence of community service. The regression analysis utilized to examine sentence type is similar to the one previously mentioned, however the convict dummy variable is supplemented by two continuous variables: correctional facility and probation. Both variables represent length of sentence and use months as the unit of time, with the smallest sentence length equal to one month if $Convict_i$ takes value 1. For more information on the construction of these variables, see Data Appendix.

Table 4 shows the results of the regression mentioned above. The regression takes the OLS form,

$$Y_i = \alpha + \beta_C \times Convict_i + \beta_{CF} \times CF_i + \beta_{Pb} \times Probation_i \ldots + \beta_R \times Recidivism_i + \boldsymbol{\beta_X} \times \boldsymbol{X_i} + \varepsilon_i \quad (2)$$

where *CF* represents the length of sentence in a correctional facility for individual *i*, and *Probation* represents the length of sentence on probation for individual *i*. Note that for a non-offender, both of these variables take the value zero. Controls in specifications (4) – (6) are identical to Specifications (1) – (3) in the previous analysis. Values from Table 4 reveal that initial correctional facility sentences are over twice as detrimental to an individual's future earnings as initial probation sentences. Specification (4) indicates that a one month stay in a correctional facility will reduce future earnings by 0.3%, whereas a one month probation sentence will actually increase future earnings by 0.1%. Surprisingly, as more control characteristics are included, as illustrated in Specification

Table 4:
Regression results: Log earnings outcomes.

	Coefficient of variable by specification			
Variable	Birth year dummies only	+ Controls for race, family characteristics, and environment	+ Test scores and academic achievement	Convicts only
	(4)	(5)	(6)	(7)
Convict Dummy	-0.147 (0.030)***	-0.121 (0.031)***	-0.076 (0.031)**	-
Correctional Facility	-0.003 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.001 (0.002)
Probation	0.001 (0.002)	-0.000 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Recidivism Dummy	-0.064 (0.051)*	-0.070 (0.052)*	-0.053 (0.052)*	-0.059 (0.056)

Note: Sample for all specifications consists of males with valid AFQT scores, positive income and complete criminal histories.
Regressors in specification (2) include race dummies, household income in 1996, a dummy variable for living in a one parent household in 1997, a dummy for living in an urban area in 1997, and dummies for region of the U.S. resided in 1997. Regressors in specification (3) include all variables in (2) along with AFQT scores, highest level of education, and potential experience squared. Standard errors are in parentheses.
*Significant at 10%.
**Significant at 5%.
***Significant at 1%.

(6), a correctional facility sentence contributes no additional earning reductions whereas probation does. Specification (7) removes non-offenders from the sample population, thus narrowing the analysis to compare criminal-to-criminal. The results show there is no difference in earning outcomes of individuals whether the sentence was served in a correctional facility or on probation.

It is important to note, however, that although there is no difference between sentence types, as the variables here are continuous, this analysis shows an increase in sentence length does have a negatively multiplicative effect on the labor market outcomes of convicts.

D) Limitations

In any analysis the topic of sampling bias must be addressed. Recall, individuals were removed from the sample if they did not have valid AFQT scores, positive income in 2009, or complete criminal history. Although reporting income at $0 in 2009 is a valid response, they are unable to be interpreted in this analysis due to the fact that earning distributions are analogous to a logarithmic function. Reporting no income in 2009 is a topic that will be addressed in the following chapter. Table 5 displays the relative percentages, by reason, of individuals removed from the sample. Individuals who are removed do not appear to be a random subsample of the survey. Table 5 reveals that valid responses are missing from a higher proportion of whites than of blacks and Hispanics. The worry of disproportionate invalidates is circumvented by the addition of extra control variables, as it is expected that the chosen control variables will help capture

the noise created from this occurrence. Sampling error is expected as the NLSY97 relies upon

Table 5:
Percentage of individuals removed from sample by reason

Invalid Segment	Total	By Race		
		Black	Hispanic	White
Did not complete round 13 (2009)	17.7%	24.1%	19.4%	56.5%
Did not have valid income	1.3%	40.0%	25.0%	35.0%
Reported income of $0	10.8%	47.3%	19.8%	32.9%
Unreported AFQT	15.5%	28.4%	29.8%	41.7%
Incomplete criminal history	1.7%	41.0%	33.3%	25.6%
Total	**47%**	**31.8%**	**23.6%**	**44.4%**

Note: Total percentages are based on the number of male participants in the NLSY97. Furthermore, total percentages represent disjoint sub-samples. For example, an individual that did not complete round 13, regardless of their AFQT, they would not be included in that invalid percentage. Thus, each total percentage is mutually exclusive. Race breakdowns are a partition of their respective total percentage.

self-reporting. Despite the attempts to have each participant answer every question, since there is no BLS proctor to facilitate each round of surveying, incomplete submissions can be expected.

One concern for the extension of this analysis lies in the correlation between earnings and education. Since it has been well documented that education raises the earning potential of individuals, it is important to check how the model explains education changes in terms of earning differentials. Since education appears both as an independent variable and in the variable *potential experience squared*, which uses the parabolic form, there is not a straight-forward one-to-one correlation of education to earnings.

The econometric model used in the previous sub-headings uses a fixed-effects model. Therefore, in order to examine the effects of a single variable, the model must be maximized ceteris paribus.[5] With that being said, the equation:

$$\frac{dy}{d\theta} = \beta_{education} - 2 * \beta_{PEsquared}(\gamma - \theta - 6) \quad (3)$$

is the expected return of education on an individual's earning potential. In this equation theta (□) represents the variable education and gamma (γ) represents age. The beta coefficients (β) are multiplicative constants for their respective variables, *Experience* and *Potential Experience Squared*. For the purpose of this differential, the betas are point-estimates and can thus be seen as constants; their values were estimated in the regressions in the previous sections. Maximizing (3) gives:

$$\frac{\beta_{education}}{2*\beta_{PEsquared}} = Potential\ Experience \quad (4)$$

showing that the optimal education return is function of both age and education, which has been previously defined as *Potential Experience*.

Using the results from Specification (3), the maximum return to education occurs with 6.6 years of potential work experience. From Specification (6) we find that the maximum return to education occurs at 6.25. Since education and age are integer values only, the results from Equation (4) imply that, in both analyses, the optimal return on education is to leave school in the calendar year of 2002. This implies that each individual inherently receives the unequal returns to education; in fact, there is a one-to-one tradeoff of age and education. Those born in 1980 benefit the most from a bachelor's degree (education=16), those born in 1984 maximize their educational utility from a high

[5] Ceteris paribus, a Latin phrase, translates to holding all other things constant

school diploma (education=12), and the rest fall sequentially in between. The implications of this will be discussed in the following chapter.

IV. Discussion

The results briefly discussed in Chapter III suggest that criminality does significantly alter the earning potential of an individual. Specification (3) reveals that criminality shifts the earning distribution of an individual. Convicts' earnings are reduced by 8.2% and recidivists receive additional negative impacts in the labor market by a further 5.5% decrease in salary. When punishment type is broken down further, Specification (6) illustrates that those serving time in a correctional facility experience superior earnings post-release. Previously incarcerated individuals receive a salary boost of 0.1% per month incarcerated compared to their probationary counter-part. Specification (6) also indicates recidivism as a significant reducer of potential earnings, resulting in a 5.3% loss of potential income. In Specification (7), when examining only the convicted sample, there is no difference between earnings based on sentence type.

The model does, however, suggest that sentence durations are a significant factor of future earnings. Using a linear model, individuals experience negative returns with a multiplicative relationship. Therefore, an individual whose sentence is twice as long as another inmate will experience twice the effect on earnings. In an addition to duration, multiple sentences also contribute significantly to negative outcomes. Many regressors in these analyses were not found to be significant, meaning there is a lack of statistical evidence to believe the relationship described is as such. This may have resulted from limited sample sizes of criminal populations.

There is little doubt that criminal indicators are viewed negatively by employers. As mentioned previously, this analysis only examined individuals that secured

employment. Individuals that reported no income in 2009, the unemployed segment, account for roughly 27% of the criminal subgroup and 11% of the non-offenders. This discrepancy is very noticeable. There are many factors of unemployment that are not considered in these figures, but it may suggest that it is nearly three times as hard for an offender to secure employment as a non-offender; however this claim is suggested very loosely.[1]

The frequency of individuals opting towards crime is of much concern to the safety and functioning of society. This analysis does not observe the proponents of initial criminal acts, but it instead examines earning differentials as a potential explanation of recidivism, repetitive criminality. The results demonstrate that when convicted, an individual is tagged with a price ceiling. Opportunities in the labor force that were once practical and pivotal to career advancement may no longer be available after incarceration.

The degree at which criminality reduces earnings could be explained by the limited career opportunities available to ex-convicts. Raphael (2010) finds that "nearly one quarter of the employers in the California survey indicate they are legally prohibited from staffing their most recently filled exempt job with a convicted felon."[2] This percentage is likely underestimated as many government agencies were excluded from the survey. In addition, changing careers is likely to impact a person's salary. Career changes that cross industries often result in salary reduction while one gains experience

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[1] There was no analysis done to verify the actuality of that statement. The probability of employment is a completely different analysis on its own. The purpose of this analysis was to reveal and explain the true earning gap between offender's and non-offenders conditional on them being employed.

[2] Raphael, Steven. "Improving Employment Prospects For Former Prison Inmates: Challenges and Policy." *NBER Working Paper Series* (April 2010): under "Working Paper 15874." http://www.nber.org/papers/w15874 (accessed February 22, 2012). p. 23

in the new field. Criminality may result in temporary removal from the society and thus carries the commensurate switching reduction and its negative impact on employment outcomes.

The relatively small magnitude of sentence length coefficients suggest that length plays a much smaller role in post-sentence earnings. Rather, it seems that the stigma placed on an individual with a criminal record is the most telling factor regardless of sentence length. It was expected that time on probation would be less detrimental to earnings than time in a correctional facility. It could be reasoned that the ability to work while serving a sentence, as opposed to detention implies, better labor force outcomes. This relationship is not found in this analysis. Certain specifications indicate probation to cause lower earnings, whereas others put probationary sentences equal to effects of correctional sentences. Regardless of sentence length, this study found that the signaling effect generated by a criminal record is by far the most important aspect of earning differences.

V. Summary and Conclusion

This paper re-examines the impact criminality has on potential earnings of individuals once released from their sentence. It was found that, of those who secured income in 2009, individuals with a criminal record earned significantly less than non-offenders. It was also found that incarcerated individuals experience no worse personal income effects than convicts on probation. Although sentence type did not impact earning differences, the duration of sentencing proves to be negatively correlated with earnings.

Large earning gaps, combined with employers' unwillingness to hire ex-convicts, may be a contributing factor to recidivism. In this modern age, information is attainable at the click of a button. With the advent of near instantaneous access to data and crime rates rising, it is curious how ex-convicts cope in the labor force. The ability to secure income is a pivotal step in the process of rehabilitation. Income creates responsibility and opportunity. If unemployment or poor labor market outcomes are factors that drive individuals to recidivism, then it is in the best interest of society to understand and improve the outcomes rehabilitated criminals have in the work force. Tyler and Kling (2006) find that prison-based programs are not relating to improved labor market outcomes after release; the key to reducing incentives to recidivism is to create programs that help narrow this earning gap.

Data Appendix: Construction of Key Variables

Sentence Length is a continuous variable measured in months. For those who served more than one term in a correctional facility or on probation, the sum of their sentences was used. The smallest increment allowed was one month for a convict.

In certain cases, income was given as a value within an interval. If the respondent could not recall their exact earnings they were presented a card with earning intervals, e.g. $1 - $5,000, and instructed to pick which interval best estimated their income. For cases where this was the report of income, an average of the interval was used. For the above range $1 - $5000, $2,500.50 would have been used as their earnings.

The variable *recidivism* is an indicator variable. In order for an individual to be considered a recidivist, they must serve more than one term per sentencing type. For example, an individual that served one sentence in a correctional facility and one sentence on probation is not classified as a recidivist. The individual must serve two sentences either at a correctional facility or on probation.

The variable *education* was collected using the cumulative "Highest Grade RS [The Subject] Completed" survey option. However, a small portion of the sample reported their highest grade completed as "Ungraded", for example a student that left school while attending a Montessori institution. This portion was less than 0.1 percent of the total survey, and their education level was approximated by using the "Highest degree received" survey option.

The variable *potential experience squared* was calculated using the formula

$$Potential\ Experience\ Squared = (Age - Education - 6)^2 \qquad (5)$$

where education was gathered using the previous explanation. This is a common variable when analyzing labor market outcomes of individuals. The term (*Education – 6*) refers to the time before an individual has reached the proper working age, as most children do not start school until they reach age 6. It is squared to remove the linearity this variable has with the *education* variable.

The title "dummy variable" is synonymous with indicator variable, dichotomous variable and binomial variable. It is a logical statement that takes value "1" if the statement is true, and a value of "0" if false.

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