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Can College Correctional Education Improve Prisoners' Wellbeing?



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I hereby recognize and pledge to fulfill my responsibilities as defined in the Honor Code and to maintain the integrity of both myself and the College as a whole.

Mark Egan

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Abstract

Recidivism or a released prisoner returning to prison is a major problem in the United States. When an ex-offender is incarcerated, he or she cannot participate in the labor market. However, if he or she has a Bachelor's degree, that person is more likely to have adequate working skills and not go back to prison. According to the Diamond-Mortensen-Pissarides Model, when more people have advanced college degrees, the economy is more productive because there are more potential employment matches. One way to give prisoners this opportunity is to provide undergraduate correctional education programs.

This study examines the undergraduate correctional education programs in the state of Indiana. The three-year recidivism rates of 41 Indiana counties between 2012 and 2014 were collected. Regression analyses of these recidivism rates showed that Indiana counties tend to reduce recidivism by having more undergraduate correctional education programs. However, African American prisoners appear to be more significantly affected by demographic and economic factors than Caucasian prisoners. Therefore, these programs have a very insignificant effect on African American recidivism. Despite this problem, this study shows that undergraduate correctional education programs tend to lower recidivism rates and presumably increase human capital and participation in the labor market.

Chapter 1: Literature Review

Released prisoners are some of the most marginalized people in modern day America. In a five-year follow up study, four researchers examined the lives of 6,561 released prisoners in Indiana. Between 2005 and 2009, nearly 40% of released violent, non-violent, sex, and drug offenders were never employed (Ho, Knutson, Lockwood & Nally, 2014, p. 22). To make matters worse, around 50% of each type of offender went back to prison during this time period (Ho, Knutson, Lockwood & Nally, 2014, p. 22). There are even more alarming national statistics about prisoners and released offenders.

There are about four million prisoners in the United States (Owens, 2009, p. 316). That number increased by 55% between 1995 and 2010 (Hall, 2015, p. 5). Many researchers agree that the dramatic increase was due to a high national recidivism rate. Annually, about 735,000 prisoners return to normal society (Bales, Mears, & Wang, 2014, p. 822). A 1994 Department of Justice study found that 68% of these people were rearrested within five years (Wheeldon, 2011, p. 25). Between 1983 and 1994, the re-incarceration rate within three years increased from 41.4% to 51.8% (Weiman, 2007, p. 598). These American citizens also lack of sufficient educational attainment and employment. The median education attainment level for prisoners is the 11th grade (Owens, 2009, p. 317). More specifically, 40% of state inmates, 27% of federal inmates, 47% of local jail inmates, and 31% of probationers have not completed high school level education (Gould, Harkins, & Stevens, 2015, p. 103). This is drastically different from 14.7% of the United States' 2009 general population aged 25 years and over not having a high school level education (Ryan & Siebens, 2012, p. 6). While the country's general unemployment rate was 9.9% during the 2008-2009 Recession, released prisoners had a 65.6% unemployment rate (Ho, Knutson, Lockwood, & Nally, 2014, p. 19). With a large population having a lack of labor market participation, an important question needs to be asked: can more undergraduate

correctional education programs reduce the recidivism rate of American prisoners? If "yes" is the answer, more advanced correctional education programs would improve the wellbeing of both imprisoned and law abiding American citizens.

ii. Released Prisoners Today

There are some striking details about recidivism in America. One study concluded that released prisoners tend to make more risky decisions than incarcerated individuals (Gummerum, Hanoch, & Rolison, 2013, p. 2021). This was most likely due to "a reduced sensitivity to the magnitude of potential losses" (Gummerum, Hanoch, & Rolison, 2013, p. 2021). In other words, ex-offenders are less likely to comprehend the negative consequences of risky or criminal behavior. It is very likely that an ex-prisoner will commit a crime again. This was especially true for drug offenders (Belenko, Hiller, Mennis, Stahler, Welsh, & Zajac, 2013, p. 691).

Demographic factors have huge effects on recidivism. Lori L. Hall found that ex-offenders in different demographic groups had different rearrest, reconviction, and reincarceration rates. A 1997 Bureau of Justice Statistics study found that ex-offenders 41 years old or older had a three-year re-incarceration rate of around 35% compared to nearly 50% of 21 to 30 years old ex-offenders (Hall, 2015, p. 8). The same study showed that Caucasian former prisoners had around 42% three-year re-incarceration rate, which was about eight percentage points less than African American ex-offenders (Hall, 2015, p. 9). The study also stated that female ex-offenders had around 37% three-year re-incarceration rate, compared to around 45% of men (Hall, 2015, p. 10). In other words, older, Caucasian women had the lowest recidivism rates. Younger, African American men had the highest recidivism rates.

The Indiana study showed that the recidivism rate was mostly correlated with lack of education, unemployment, and younger age (Ho, Knutson, Lockwood, & Nally, 2014, p. 30). Three researchers noticed that African American male recidivism rates were significantly

correlated to returning areas' unemployment rates (Bales, Mears, & Wang, 2014, p. 840). Also, an offender is much more likely to recidivate if he or she is imprisoned rather than being put on probation. One study explained that prisoners are 2.3 times more likely to be charged with a new offense than probationers (Hollerman & Spohn, 2002, p. 342). These findings suggest that in order to help the most vulnerable prisoners, college-correctional programs should be designed for young, imprisoned African American men returning to impoverished areas.

Whether or not the released prisoner was a drug-involved offender also affected recidivism. Starting in the 1980s, American policymakers established stricter drug offense punishments. These politicians believed that increasing the penalty would reduce criminal activity (Hollerman & Spohn, 2002, p. 331). In reality, changing criminal penalties had very little effect on crime (Hollerman & Spohn, 2002, p. 331). The policies only increased the prison population. The percentage of drug offending state prisoners increased from 6% in 1980 to 25% in 1996 (Hollerman & Spohn, 2002, p. 329). In federal prisons, that population increased from 25% in 1980 to 60% in 1996 (Hollerman & Spohn, 2002, p. 329).

The strict drug enforcement laws made it easier for drug-offenders to recidivate. Within three years of being released, about 95% of drug-offenders return to drug use and 67% are rearrested (Belenko, Hiller, Mennis, Stahler, Welsh, & Zajac, 2013, p. 691). The time for a drug-involved offender to go back to jail is shorter than any other type of offender (Belenko, Hiller, Mennis, Stahler, Welsh, & Zajac, 2013, p. 691). These results suggest that college correctional education alone may not be enough to reduce recidivism among drug offenders. They may also need help with substance abuse recovery.

In addition to substance abuse, ex-offenders often return with unresolved mental health problems (Belenko, Hiller, Mennis, Stahler, Welsh, & Zajac, 2013, p. 691). Researchers found 24% of American prisoners have mental illness, which is four times higher than the general

population (Bewley & Morgan, 2011, p. 351). Even with this high rate of mental illness, correctional psychotherapy programs lack sufficient government funding (Bewley & Morgan, 2011, p. 361). Improper treatment of mental illness causes these people to lose time on searching for employment. Under these circumstances, released prisoners usually go into the black market to fix these issues (Belenko, Hiller, Mennis, Stahler, Welsh, & Zajac, 2013, p. 691). Mental illness support should be part of undergraduate correctional education.

Even if ex-offenders can avoid more prison time, they still have trouble getting employed. Most employers are very hesitant to hire released prisoners due to issues of perceived liabilities and consumers' discomfort (Ho, Knutson, Lockwood, & Nally, 2014, p. 18). As a result, 30-year old African American men with prison records work 15.1% fewer weeks per year and earn 12.4% lower wages than their free African American peers (Weiman, 2007, p. 590).

Former prisoners are less likely to be employed if they are released in areas with high unemployment rates (Bales, Mears, & Wang, 2014, p. 825). The Real Intertemporal Model with Investment can explain this situation. According to this economic model, a low demand for labor leads to a low supply of labor and wages (Williamson, 2014, p. 397-399). Therefore, prisoners should be released in more prosperous areas or receive more education opportunities.

The most important observation is that most ex-offenders lack the necessary academic and professional skills to meet the changing job demands (Ho, Knutson, Lockwood, & Nally, 2014, p. 29). Since these people cannot participate in the legal market, they are more likely to get involve in the illegal economic environment (Hall, 2015, p. 11). If more undergraduate correctional programs were available, released prisoners would have more essential professional skills.

iii. Correctional Education's Effects

All forms of correctional education have helped released prisoners, even if they did not provide undergraduate education. In the past 30 years, all forms of correctional education have significantly reduced recidivism rates (Wheeldon, 2011, p. 26). More specifically, postsecondary correctional education reduced the average recidivism rate by 46% (Meyer, 2011, p. 63). Even if a prisoner only took a few college classes, he or she is less likely recidivate back to prison (Rose & Rose, 2014, p. 37).

The Diamond-Mortensen-Pissarides Model can explain this fact. When there is a lower recidivism rate, the labor force increases. The labor force includes both the employed population and people actively looking for legal work (Williamson, 2014, p. 58-59). According to the Diamond-Mortensen-Pissarides Model, the expected payoff to search for work increases when the labor force increases (Williamson, 2014, p. 194). The expected payoff to search for work is the entire benefit of looking for work even if the person does not find employment (Williamson, 2014, p. 194).

*Expected Payoff to Searching for Work = Probability of Finding a Job * Market Wage +*
*Probability of Being Unemployment * Unemployment Insurance Benefit*

In other words, the benefit of searching for a job outweighs the cost of being arrested or incarcerated.

By reducing recidivism, correctional education also reduces government spending. The nationwide cost of prosecution, prison services, and the loss to productivity is estimated to be about $1 trillion (Gummerum, Hanoch, & Rolison, 2013, p. 2013). State and federal governments spend a lot of money on re-arresting, re-convicting, or re-incarcerating former prisoners. In 1997, the state of Ohio spent $35 million on recidivating prisoners at $47 per inmate (Hall, 2015, p. 6). According to Lori L. Hall (2015), every $962 spent on correctional

education will save the criminal justice system $5,306 per inmate (p. 6). As a result, more money goes into other government programs.

However, current correctional education programs do not always help released prisoners find employment. The Indiana study found that correctional education programs had a statistically insignificant effect on employment (Ho, Knutson, Lockwood, & Nally, 2014, p. 18). Ex-offenders' employment was largely dependent on economic conditions (Ho, Knutson, Lockwood, & Nally, 2014, p. 18). As mentioned before with the Real Intertemporal Model with Investment, the supply of labor is highly correlated with the demand of labor (Williamson, 2014, p. 397-399). Released prisoners are more likely to be employed if they are living in an area with a high demand for labor.

Since most prisoners lack the necessary professional and academic skills, the Indiana study concluded that there should be more advanced correctional education programs. Enhancing correctional education would further decrease ex-offenders' recidivism and unemployment rates (Ho, Knutson, Lockwood, & Nally, 2014, p. 30). Even if these prisoners do not obtain a bachelor's degree, they are significantly more likely to pursue more advanced education programs (Rose & Rose, 2014, p. 35). Afterwards, they have better chances of obtaining employment. According to the business cycle, increasing the employed population increases the nation's GDP (Williamson, 2014, p. 84). If there were more correctional programs that provide bachelor's degrees, the nation would be more productive.

iv. Correctional Education Today

In order to properly enhance correctional education, the current state of this type of education needs to be understood. Correctional education funding has been reduced due to shrinking state budgets and weak economic conditions (Wheeldon, 2011, p. 25). The only current federal funding program for prison education is the 1998 Youthful Offender Program.

This provides funds to postsecondary education and vocational training programs for inmates under the age of 25 (Wheeldon, 2011, p. 25). These inmates also have to be qualified for release or parole within five years (Wheeldon, 2011, p. 25). Depending on the state government, correctional education programs can get strong state-level support (Meyer, 2011, p. 62). Other than that, these educational programs get very little federal financial support.

To make the situation worse, many politicians are against correctional education funding. In 1972, the Pell Grant provided federal student aid to postsecondary education including correctional college education (Wheeldon, 2011, p. 24). In 1994, the Violent Crime Control Act ended the Pell Grant eligibility for state and federal prisoners (Wheeldon, 2011, p. 25). Many politicians believe in the "principle of least eligibility." This is the belief that it is unfair to provide inmates with programs not granted freely to the public (Hall, 2015, p. 6).

Due to limited funding, very few prisoners receive any type of correctional education. In 2005, only 5% of inmates enrolled in correctional education programs (Hall, 2015, p. 12). About 66.67% of these participants were in vocational programs (Meyer, 2011, p. 63 & 64). Most of the other participants were in associate degree programs (Meyer, 2011, p. 63 & 64). If these statistics are correct, less than 1.667% of inmates were in bachelor's degree programs. In order to provide prisoners with more undergraduate programs, more politicians need to understand the programs' benefits.

If a prisoner can get into a college correctional program, his or her performance depends on a number of factors. If the offender received a high school diploma or equivalent, he or she is much more likely to have a high academic achievement (Meyer, 2011, p. 85). Good instructional and peer support also improves a prisoner's performance (Meyer, 2011, p. 85). In order to make sure that their students are successful, undergraduate correctional programs may only want to accept well-behaved prisoners with high school diplomas or equivalent. The

programs also need to hire professors who can handle the prison environment and know how to give proper support.

v. Literature Conclusions

Many important points are made by these pieces of literature. The most vulnerable released prisoners are young, substance abusing, mentally ill African American men who lack a full high school education. Most of these men are returning to impoverished areas. However, prisoners with a high school diploma or equivalent are most likely to be successful in undergraduate correctional programs. The programs might only want to accept vulnerable African American men who have at least a GED.

More advanced correctional education programs can improve the wellbeing of released prisoners. They can also decrease government spending. Very few prisoners are participating in undergraduate correctional programs. In order to have more advanced prison education programs, their benefits need to be explained to the federal government.

vi. Contributions of the Project

The examined pieces of literature focused on recidivism and all types of correctional education. This project specifically examines the recidivism rates of Indiana's regular and undergraduate correctional programs. The paper focuses on Grace College, Oakland City University, and Purdue University North Central's Prison Education Programs.

For the project, the recidivism rates of Indiana's counties were collected. The rates are separated by gender, prison type, and the availability of a correctional education program. If the literatures' conclusions are correct, the project will show that prisoners with undergraduate degrees have lower recidivism rates than those who do not. Therefore, they are more likely to participate in the legal market.

Chapter 2: Theoretical Section

i. Utility Theory

In order to understand college correctional education's benefits, economic statistics and economic theories need to be examined. When a person's education attainment level increases, his or her income normally increases as well. The Bureau of Labor Statistics found that the 2014 median weekly earnings for individuals with some college experience was about 56% higher than those who had no formal education credentials (*Median Weekly Earnings*, 2015). The median weekly earnings were 126% higher for individuals with bachelor's degrees (*Employment 2012*, 2015).

According to the utility theory, when an individual's disposable income increases, his or her budget line shifts to the right (Williamson, 2014, p. 110). When the budget line increases, the individual reaches a higher indifference curve, which improves his or her wellbeing. At that point, the individual can afford more quantities of available goods (Williamson, 2014, p. 111). Therefore, his or her level of consumption increases. It can be concluded from these observations and the utility theory that increasing released prisoners' education attainment levels would improve their wellbeing.

Figure 2.1 Consumer Budget Line

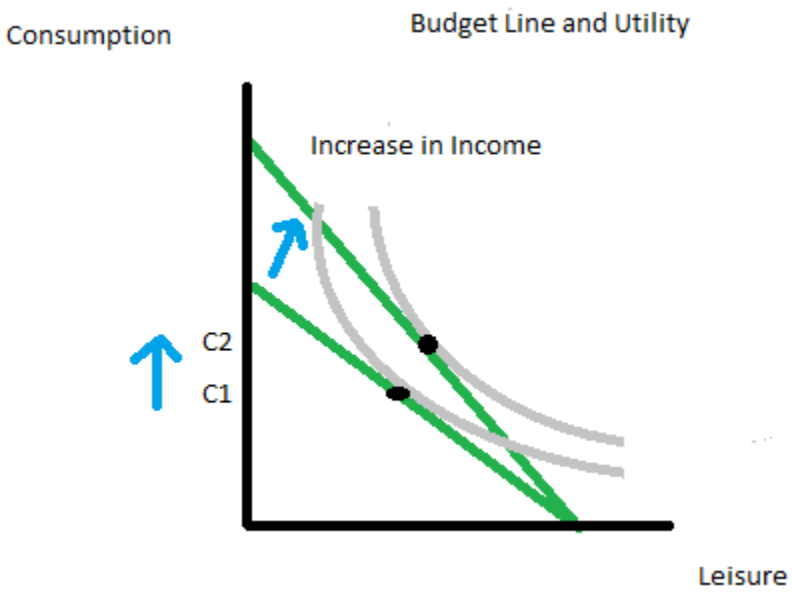


Figure 2.1: When the budget shifts to the right, a consumer is on a higher indifference curve and can consume more normal goods.

Increasing the education attainment levels of prisoners would also improve the supply of normal goods. In general, when an individual has more education experience, he or she is more likely to be employed. While the 2014 unemployment rate of individuals without a high school diploma or equivalent was 9.0%, people with those credentials had an unemployment rate of 6.0% (*Earnings and Unemployment*, 2015). Individuals with a bachelor's degree had an unemployment rate of 3.5% (*Earnings and Unemployment*, 2015). This means that America's labor supply increases when more people attain higher education levels. When the labor supply increases, output supply also increases. For this reason, the supply of normal goods increases (Williamson, 2014, p. 120). The final result of more college correctional education would be more normal goods produced at around same price.

ii. The Diamond-Mortensen-Pissarides Model of Search and Unemployment

Another important economic concept that needs to be considered is the Diamond-Mortensen-Pissarides Model of Search and Unemployment. A part of this model was explained on page 6 of this composition. This theory states that there are two types of consumers: those who search for market work and those who work outside of the market (Williamson, 2014, 190). When the expected payoff from searching for market work increases, the number of people searching for labor market work also increases (Williamson, 2014, 191). At the same time, firms are posting vacancy or job openings for individuals looking for work.

Figure 2.2 Supply Side of the Labor Market

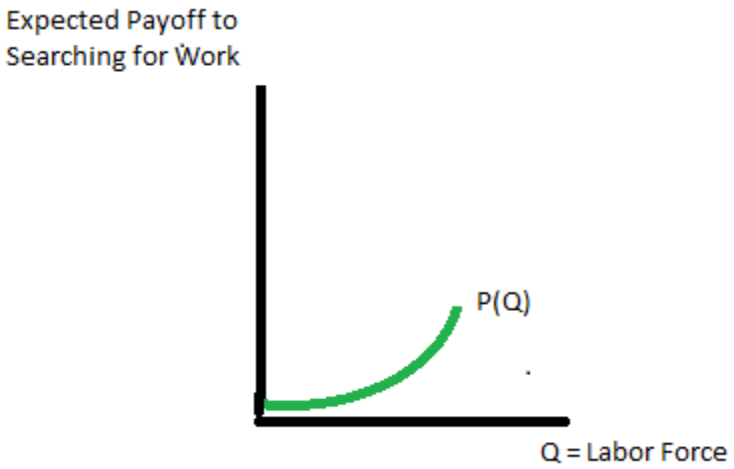


Figure 2.2: As the expected payoff to searching for work increases, the labor force, which includes people searching for work, also increases.

In order to have an efficient economy, a firm's vacancy has to match the type of job a worker is looking for (Williamson, 2014, 191). In other words, a worker has to able to perform the job that is open. This matching process can be shown through the matching function.

$$M = em(Q, A).$$

In this equation, *Q* represents the number of workers searching for work and *A* represents the number of job vacancies (Williamson, 2014, 192). *m* is the matches, between the consumers and

firms and *e* is the matching efficiency. *e* increases when consumers and firms use less time and work to create a match (Williamson, 2014, 193). The number of successful matches is represented by *M*.

The effects of undergraduate correctional education fit very well into this model. When a prisoner increases his or education attainment level, he or she has more working skills. Therefore, the released prisoner is more likely to search for work in the legal market, which increases *Q*. Having a bachelor's degree is generally an indication that a person is proficient in a specific skill. A college-educated consumer would spend less time and energy proving his or her capabilities to a firm. As a result, *e* increases. According to the Diamond-Mortensen-Pissarides Model, having more released prisoners with bachelor's degrees will increase the number of successful job matches.

iii. Endogenous Growth in Human Capital

Increasing a person's level of education is one of the best ways to increase human capital. Human capital is the accumulated stock of skills and education that a worker has at a certain point of time (Williamson, 2014, 277). When workers have more human capital, they can produce more and the economy grows at a faster rate (Williamson, 2014, 277). Therefore, the more education prisoners receive, the more likely they will contribute to the economy after they are released.

As Paul Romer described, knowledge is nonrivalry (Williamson, 2014, 277). A person receiving knowledge does not reduce the ability for someone else to receive the same knowledge. For this reason, there are no diminishing marginal returns in human capital investment (Williamson, 2014, 277). In other words, the economic effects of each amount of human capital investment do not decrease when the investment increases. When there is more

human capital investment, there is a more constant increase in economic activity. Increasing people's levels of education is probably the best way to increase human capital investment.

In the endogenous growth model, a representative consumer has $H^{(S)}$ units of human capital and u units of working time in a time period (Williamson, 2014, p. 277). The units of labor a consumer applies are represented by $uH^{(S)}$. At the same time, a consumer receives a current real wage. Assuming that the consumer does not spend time on leisure and cannot save, the consumer budget constraint is represented by the equation below (Williamson, 2014, p. 278).

$$C = wuH^{(S)}$$

A consumer can also spend time to accumulate human capital instead of consumption. If this person can use a substantial amount of time in increasing human capital ($(1-u)H^{(S)}$), he or she can have a huge growth in his or her future human capital (Williamson, 2014, p. 280). The future human capital can also increase if the education sector or human capital accumulation technology (b) is efficient.

$$H^{(S)}' = b(1-u)H^{(S)}$$

Figure 2.3 Human Capital Accumulation in the Endogenous Growth Model

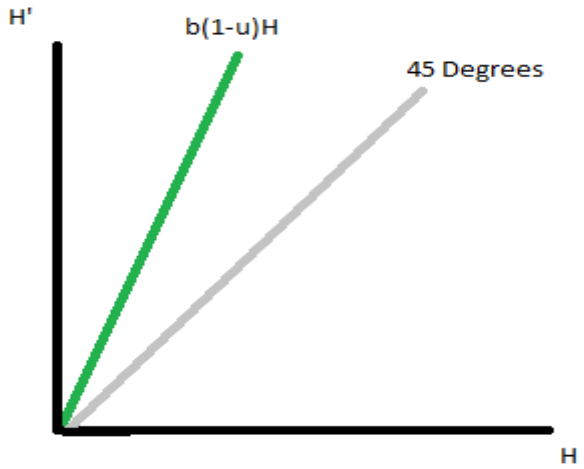


Figure 2.3: As current human capital increases, future human capital increases.

If a prisoner can spend time in higher-level education, he or she will increase his or her future human capital. That, in turn, will shift his or her budget line to the right.

If the government or private organizations try to improve education efficiency (*b*), there would be both financial and labor costs. More specifically, labor would be diverted from goods production to educational activities (Williamson, 2014, p. 283). It would initially reduce consumption since there are fewer goods available. However, the growth rate of consumption would increase. This is because an increase in education efficiency increases the future units of human capital (H') (Williamson, 2014, p. 283). Since more units of human capital would shift a consumer's budget line, that person can afford to consume more goods. Therefore, consumption would increase in the long run. The benefits of ex-offenders having more future consumption outweigh the initial costs of correctional undergraduate programs.

Figure 2.4 Effect of Increasing *b* on the Consumption Path

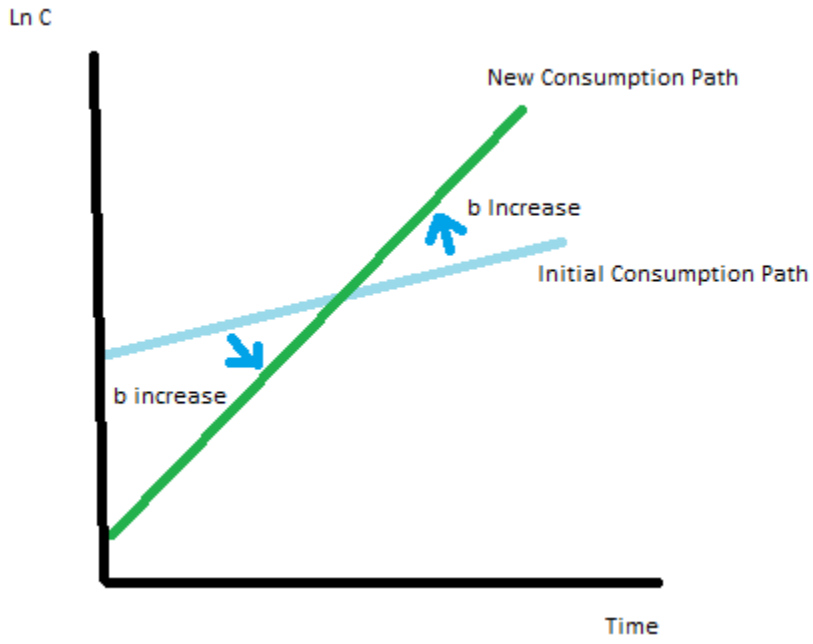


Figure 2.4: By increasing the efficiency of education, consumption growth will initially decrease. The consumption growth will eventually increase from the initial growth.

iv. Theoretical Section's Conclusion

By using these theories and observations, it is hypothesized that increasing the education levels of four million Americans would improve the nation's economy and the wellbeing of released inmates. More specifically, this would shift ex-offenders' budget lines to the right and increase their consumption levels.

Chapter 3: Empirical Analysis

i. Empirical Analysis Setup

To fully understand the economic effects of undergraduate correctional education, many economic factors need to be studied. Initially, graduated prisoners' recidivism rates, incomes, races, genders, offense types, and degree types were sought after. Adams State, Bard, Cornell, and Goucher's prison education programs were contacted. However, all of these organizations explained that they could not provide this information due to the Family Educational Rights and Privacy Act. This act states that in general, "schools must have written permission from the parent or eligible student in order to release any information from a student's education record" (*FERPA*, n. d.). Only specified officials, state or local authorities, or organizations conducting studies for or on behalf of colleges can person this type of project. Therefore, the empirical study has to examine an entire prison population, instead of focusing on the correctional educated prisoners.

It was decided to do a case study on a single state. More specifically, the study would examine the correctional education programs' effects on counties' recidivism rates. The study's question is, "If a county provided an undergraduate correctional education program, would its recidivism rate be reduced considering other factors?" The study also assumes that non-recidivating ex-offenders participated in the labor market. Depending on the state, counties' recidivism rates, median annual income, and unemployment rates are available to the public. The first action was to determine which states had a substantial number of correctional education programs.

In order to find the number of prison education programs a state had, the "Prison Studies Project" website was used. This organization provides a directory on America's prison education programs. Unfortunately, the directory is a work in progress (*Directory*, 2011). For

this reason, not all of the provided information is updated. However, the website does provide the number of education programs in each state.

Noticeably, Indiana and New York had five or more prison education programs. New York had eight programs, with five providing various bachelor's degrees (*New York*, 2011). New York provided a good opportunity compare outcomes between the prison populations with and without undergraduate education opportunities. However, New York only provided the recidivism rates in 17 counties (*2010 Inmate Releases*, 2014, p. 25). All of the other information was in the broad category of "Other New York State." Because of this, New York could not be used for this study.

Even though Indiana had only three undergraduate correctional programs, the state provided the recidivism rates of all of its counties. More specifically, Indiana's Department of Corrections had counties' three-year recidivism rates of 2009, 2010, and 2011 released prisoners (*Planning and Research Division*, 2015). The department also provided the recidivism rates of each demographic, offense, and release type of released prisoners. Indiana was an appropriate state to study college correctional education's effects on recidivism.

ii. Possible Problems

One problem with studying the programs' effects on Indiana's recidivism rates is fact that they serve a very small number of prisoners. In the 2010 school year, Grace College and Oakland City University had about 950 incarcerated students (*Directory*, 2012). Purdue North Central claimed to have 280 prison students, but it did not specify which school year it was referring to (*Purdue North Central*, 2011). If the organization was referring to the 2010 school year, 1,230 prisoners out of 28,281 Indiana prisoners had the potential to receive a Bachelor's degree (*2010 DOC Annual Report*, 2011, p. 3). In other words, the correctional education programs only affected about 4.35% of the 2010 Indiana prison population. Even if the

programs have a drastic, positive effect on its incarcerated students, it would be small on the entire Indiana incarcerated population.

Another problem is the small number of prison graduates with Bachelor's degrees. Since its founding in 1995, 280 Oakland City incarcerated graduates received Bachelor's degrees out of 1765 graduates (*Oakland City University*, 2011). In 2011, Purdue North Central graduated 85 prison students with only 18 obtaining Bachelor's degrees (*Purdue North Central*, 2011). It appears that these programs tend to give Bachelor's degrees to 15% to 21% of its graduates. For this reason, the programs' Bachelor's degrees affect less than 1% Indiana prisoners.

The third problem involves how Indiana's Department of Corrections defines recidivism. Unlike Lori L. Hall's study, Indiana did not separate returning prisoners by rearrest, reconviction, and reincarceration rates. Without knowing how long the returning individuals will stay in prison, it can be fully determined if they left the labor market or not. However, it can be assumed that any additional prison time would reduce an individual's possibility of staying in the labor market. In addition, a person could have been re-arrested because he or she participated in the illegal market.

The final problem is the fact that all three correctional education programs worked only in state correctional facilities. The state facilities are in 15 out of the 93 Indiana counties (*Adult Facilities*, n.d.). In order to reduce selection bias, more than 15 counties need to be observed. Since county and state jails affect prisoners differently, studying other counties may not show the accurate effects of college correctional education.

Despite these problems, there is enough data to run an empirical analysis. Any effect from undergraduate correctional education can show benefits, disadvantages, or the insignificance of these programs. If the organizations can increase or decrease recidivism

against more significant factors like poverty rates and county population, they clearly have made a positive effect on the prison population.

iii. Variables and Observations

The observations in this study are the three-year recidivism rates of selected Indiana counties. Indiana's Department of Corrections provides the three-year recidivism rates of 2009, 2010, and 2011 released prisoners. The provided county recidivism rates are "based on County of commitment" (*2012 Recidivism Report*, 2013). It can be assumed that the word "commitment" is referring to the county where the individuals were imprisoned. Each observed county has three observations of recidivism rates.

As mentioned in the section before, the 15 counties with state correctional facilities would not be enough observations to reduce selection bias. In general, a larger sample size reduces the possibility of getting results by chance (Newsom, n.d.). For this reason, 26 more counties were used for this analysis. In order to have the maximum representation of Indiana, these additional counties were chosen based upon population size. In total, the analysis had 123 potential observations in each regression.

In addition to the recidivism rates of counties' entire prison populations, there are recidivism rates of different types of prisoners. African American, Caucasian, and male recidivism rates were used in this study. There are different offense types, which include controlled substance, person, property, sex, weapon, and other. Due to the time limit, only controlled substance offense recidivism was examined. With the chosen information, there are 11 different regression analyses.

As mentioned in Section 2.iii of this paper, economic and demographic factors have huge effects on recidivism rates. This is why it is very important to put these types of factors as variables that would change the recidivism rate equation. These variables include county

population rank, median household income rank between 2009 and 2013, average unemployment rate for two years after release, and average poverty rate for two years after release.

The number and types of prisons can also affect a county's recidivism rate. Therefore, there are variables for this type of information. These variables include number of prisons, county prisons, and state prisons. There are also three dummy variables showing whether or not a county has minimum, medium, or maximum-security state prisons.

The two most important variables are the "Programs" and the "Number of Programs" variables. The "Programs" variable is a dummy variable that indicates if a county does or does not provide an undergraduate correctional education program. As the name explains, the "Number of Programs" variable shows the number of college prison education programs a county has. Because these variables directly indicate the effect of undergraduate correctional education, a regression analysis would not use both of these variables at the same time.

Resulting Regression Equation

$$Recd = cons + ß1Prog\ (Or\ ß1NumOfProg) + ß2PrisNum\ (Or\ ß2ContPrisNum) + ß3MinSec + ß4MedSec + ß5MaxSec + ß6CountPopRank + ß7AvgUemply + ß8MedIncmRnk0913 + ß9AvgPovRate + \varepsilon$$

iv. Regression Analyses

a. Indiana Released Prisoner Population

i. With "Program" Variable

The first regression analysis is designed to show undergraduate correctional education's effects on counties' released offender populations.

Table 3.1 Regression of County Recidivism Rate with Program Variable

Recd	Coef.	P-Value |t|	Number of Obs.	123
Prog	-0.01394	0.661	Prob > F	0.0017
ContPrisNum	0.072868	0.003	R-Squared	0.203
MinSec	-0.009347	0.622	Adj R-Squared	0.1395
MedSec	0.067694	0.003		
MaxSec	-0.007519	0.8		
CountPopRank	-0.000471	0.288		
AvgUemply	-0.351919	0.361		
MedIncmRnk0913	0.0003218	0.468		
AvgPovRate	0.015595	0.955		
Cons	0.2730879	0.0		

County Recidivism Rate = .2730879 - 0.01394Prog + 0.072868ContPrisNum - 0.009347MinSec + 0.067694MedSec - 0.007519MaxSec - 0.000471CountPopRank - 0.351919AvgUemply + 0.0003218MedIncmRan0913 + 0.015595AvgPovRate + ε

As predicted, this regression shows that having an undergraduate correctional education program reduces a county's recidivism rate. However, the "Program" variable's p-value is far above 10%. This indicates that the coefficient is not statically significant. Noticeably, if a county has a medium-security state prison, the recidivism rate is significantly higher. This may be because there are more counties with medium-security prisons than ones with maximum or minimum-security prisons. Since state prisons tend to hold more serious offenders, they might

have higher recidivism rates than county prisons. Both of these factors may cause the "Medium Security" variable to have more statically significant, positive coefficient.

a. Check for Heteroskedasticity

While doing any regression analysis, it is very important to test for heteroskedasticity. The Breusch-Pagan / Cook-Weisberg Test is used to test for heteroskedasticity. This method tests the null hypothesis that all of the errors are equal versus the hypothesis that the errors increase or decrease as the dependent variable increases (Williams, 2015, p. 4). The process uses chi-squared formula. If the chi-square p-value is less than 0.05 the, null hypothesis of homoskedasticity is rejected.

Table 3.2 Breusch-Pagan / Cook-Weisberg Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: Prog ContPrisNum MinSec MedSec MaxSec CountPopRank AvgUemply
                    MedIncmRnk0913 AvgPovRate

         chi2(9)      =    11.30
         Prob > chi2  =   0.2559
```

Since the p-value of chi-square is above 0.05, it can be safely assumed that heteroskedasticity is not a significant factor in this regression. The differences between the observed results and expected results are likely due to chance. The standard errors are not biased.

b. Check for Multicollinearity

Multicollinearity also needs to check in a regression. This occurs when two or more variables are highly correlated (Greenlaw, 2009, 222). Stata would not know how to allocate the similar effects of two collinear variables on the recidivism rates. The coefficients would be inefficient with high variances (Greenlaw, 2009, 223).

In order to see if there is multicollinearity in the initial regression, the variance inflation factor for each variable is calculated. The variance inflation factor is a measure of how much the

variances of regression coefficients are inflated compared to uncorrelated variables (Stine, 1995, p. 53). The higher the variable inflation factor is, the more it is affected by multicollinearity. VIF numbers that are 5 or more are generally considered to be high.

Table 3.3 Variance Inflation Factors

Variable	VIF	1/VIF
Prog	5.27	0.189605
MedIncm~0913	5.11	0.195590
AvgPovRate	4.51	0.221541
MaxSec	2.35	0.424813
MedSec	2.35	0.425815
CountPopRank	2.01	0.496660
ContPrisNum	1.73	0.578228
AvgUemply	1.46	0.685893
MinSec	1.37	0.729971
Mean VIF	2.91	

In this regression, the "Programs" and "Medium Income Rank ('09-'13)" variables are most affected by multicollinearity. If the "Medium Income Rank ('09-'13)" variable is removed from this regression, stata might determine variables' coefficients better.

c. Without Marion County

The number county prisons drastically increases recidivism. Only Marion County has more than one county prison. If Marion County is dropped in this regression, it may decrease the p-value of the "Programs" variable. In order to do this, the "County Prisoner Number" variable has to be changed to the "Prison Number" variable. This variable includes the number of both county and state prisons.

Table 3.4 Regression of County Recidivism Rate with "Program" Variable & Without Marion County

Recd	Coef.	P-Value |t|	Number of Obs.	120
Prog	-0.0275158	0.417	Prob > F	0.0418
PrisNum	-0.599687	0.218	R-Squared	0.1428
MinSec	-0.0529977	0.327	Adj R-Squared	0.0726
MedSec	0.1453515	0.031		
MaxSec	0.560979	0.347		
CountPopRank	-0.0005277	0.240		
AvgUemply	-0.4760318	0.236		
MedIncmRnk0913	0.0004797	0.303		
AvgPovRate	0.1015004	0.728		
Cons	0.4295492	0.0		

County Recidivism Rate = 0.4295492 - 0.0275158Prog - 0.599687PrisNum - 0.0529977MinSec + 0.1453515MedSec + 0.560979MaxSec - 0.0005277CountPopRank - 0.4760318AvgUemply + 0.0004797MedIncmRnk0913 + 0.1015004AvgPovRate + ε

Dropping Marion County has the expected effect. The "Program" variable's p-value decreases to 0.417. Also, it still has a negative effect on counties' recidivism rates. However, it is not close to the 10% p-value. Factors like the number of prisons, the types of prisons, county population, unemployment rates, and median household income have more significant effects on recidivism.

Table 3.5 Breusch-Pagan / Cook-Weisberg Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: Prog PrisNum MinSec MedSec MaxSec CountPopRank AvgUemply
                    MedIncmRnk0913 AvgPovRate

         chi2(9)      =    10.59
         Prob > chi2  =   0.3051
```

The regression without Marion County also has more homoskedasticity. The chi-squared p-value increases. The differences in residuals are very likely due to chance. The standard errors are less biased.

Table 3.6 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	27.28	0.036663
MedSec	20.90	0.047836
MinSec	9.35	0.106947
MaxSec	7.21	0.138650
MedIncm~0913	5.41	0.184678
Prog	5.37	0.186055
AvgPovRate	4.80	0.208206
CountPopRank	1.95	0.511745
AvgUemply	1.56	0.640606
Mean VIF	9.32	

There is much more multicollinearity in this regression. The VIF values for the "Prison Number" and "Medium Security" variables are very high. The multicollinearity could explain why the "Prison Number" variable has a negative effect on county recidivism rates. The two variables should probably be removed.

ii. With "Number of Programs" Variable

The previous regression shows the effects of a county having an undergraduate correctional program. However, it does not give the effects of a county having more than one program. Changing the "Program" variable to the "Number of Programs" variable may provide a more reliable regression.

Table 3.7 Regression of County Recidivism Rate with "Number of Programs" Variable & the Breusch-Pagan / Cook-Weisberg Test

Recd	Coef.	P-Value |t|	Number of Obs.	123
NumOfProg	-0.015999	0.422	Prob > F	0.0015
ContPrisNum	0.071296	0.003	R-Squared	0.2062
MinSec	-0.00889	0.629	Adj R-Squared	0.1430
MedSec	0.072255	0.001	Chi2(9)	11.81
MaxSec	-0.03234	0.908	Prob > Chi2	0.2242
CountPopRank	-0.0004848	0.205		
AvgUemply	-0.333314	0.384		
MedIncmRnk0913	0.0003265	0.454		
AvgPovRate	0.016708	0.951		
Cons	0.272717	0.0		

County Recidivism Rate = .272717 - 0.015999NumOfProg + 0.071296ContPrisNum - 0.00889MinSec + 0.072255MedSec - 0.03234MaxSec - 0.0004848CountPopRank - 0.333314AvgUemply + 0.0003265MedIncmRnk0913 + 0.016708AvgPovRate + ε

Table 3.8 Variance Inflation Factors

Variable	VIF	1/VIF
MedIncm~0913	4.96	0.201557
AvgPovRate	4.51	0.221722
NumOfProg	3.56	0.281019
MedSec	2.24	0.446827
MaxSec	2.11	0.473117
ContPrisNum	1.65	0.606103
CountPopRank	1.50	0.668163
AvgUemply	1.45	0.691392
MinSec	1.30	0.771720
Mean VIF	2.59	

The "Number of Programs" variable gives a more accurate regression. The "Number of Programs" variable has a lower p-value. The adjusted residual squared slightly increased and the Fstat slightly decreased. Heteroskedasticity is not a significant problem since the chi-squared p-value is far above 5%. Also, multicollinearity does not appear to affect this regression because all of the VIF values are below 5.

The "Number of Programs" regression is the most reliable in regards to undergraduate correctional education's effects on recidivism. It indicates that an Indiana county can reduce its recidivism rate by having more college correctional education programs. In order to observe the full effects of undergraduate correctional education, there have to be regressions on different types of released prisoners.

b. Released African American Prisoner Population

In this regression, observations with less than 20 released African Americans are dropped. This is because counties with fewer releases have less consistent recidivism rates. For example, a county with only one released African American each year can either have an African American recidivism rate of 0% or 100%. Because of this, 57 counties are dropped for this regression. Also, a dummy variable indicating a Marion County observation is added. By doing this, the effects of Marion County are recognized.

Table 3.9 Regression of County African American Recidivism Rate With "Program" Variable & the Breusch-Pagan / Cook-Weisberg Test

AfrAmRecd	Coef.	P-Value |t|	Number of Obs.	66
Prog	0.0099196	0.877	Prob > F	0.0018
PrisNum	0.028784	0.300	R-Squared	0.3366
MinSec	-0.0461199	0.316	Adj R-Squared	0.2435
MedSec	0.0167688	0.740	Chi2(8)	25.79
MaxSec	Omitted		Prob > Chi2	0.0011
CountPopRank	-0.0043856	0.005		
AvgUemply	-0.5026545	0.444		
MedIncmRnk0913	0.0015005	0.052		
AvgPovRate	-0.5526268	0.232		
Marion	Omitted			
Cons	0.4187734	0.0		

County African American Recidivism = .4187734 + 0.0099196Prog + 0.028784PrisNum - 0.0461199MinSec + 0.0167688MedSec - 0.0043856CountPopRank - 0.5026545AvgUemply + 0.015005MedIncmRnk0913 - 0.5526268AvgPovRate + ε

According to this regression, having an undergraduate program would increase African American recidivism rate. However, the "Program" variable has a very high p-value. The increase is very likely to be the result of chance. Interestingly, the county population significantly affects this recidivism rate. If the county population is smaller, the African American recidivism rate is more likely to be reduced. This might be due to the fact that there are fewer African Americans in these counties. The most important difference is that African

American ex-offenders appear to be more affected by the median household income ranking. A county with higher median household income would likely have a decrease in African American recidivism. The regression appears to agree with other studies' conclusions that African American released prisoners are highly affected by outside economic factors.

At least one variable in the regression is highly affected by heteroskedasticity. Since, the chi-squared p-value is 0.0011, the null hypothesis of homoskedasticity has to be rejected. The unequal residuals are not the result of chance. This might be due to the fact that there are fewer observations as compared to the previous regressions. When there are fewer observations, the regression is more likely to be affected by outliers (Stark, 2014). In other words, fewer relatively equal residuals are less likely to offset outliers. Doing a regression on a state with more released African American prisoners might prevent this heteroskedasticity problem.

Table 3.10 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	8.39	0.119128
AvgPovRate	5.76	0.173732
MedIncm~0913	5.56	0.179966
Prog	5.06	0.197783
MinSec	3.24	0.308687
MedSec	3.11	0.321288
AvgUemply	1.47	0.681405
CountPopRank	1.26	0.793738
Mean VIF	4.23	

The "Prison Number," "Average Poverty Rate" and "Median Income Rank ('09-13)" variable have relatively high VIF values. This may indicate that the number of prisons can easily correlate with other variables. The "Prison Number" variable may have to be removed in future studies.

Table 3.11 Regression of County African American Recidivism Rate with "Number of Programs" Variable & the Breusch-Pagan / Cook-Weisberg Test

AfrAmRecd	Coef.	P-Value |t|	Number of Obs.	66
NumOfProg	0.0001978	0.998	Prob > F	0.0038
PrisNum	0.0288118	0.331	R-Squared	0.3366
MinSec	-0.0461457	0.329	Adj R-Squared	0.2300
MedSec	0.0167068	0.763	Chi2(9)	26.71
MaxSec	0.0096304	0.936	Prob > Chi2	0.0016
CountPopRank	-0.004386	0.005		
AvgUemply	-0.5027798	0.449		
MedIncmRnk0913	0.0015012	0.065		
AvgPovRate	-0.552948	0.249		
Marion	Omitted			
Cons	0.4187825	0.0		

County African American Recidivism Rate = 0.4187825 + 0.0001978NumOfProg + 0.0288118PrisNum - 0.0461457MinSec + 0.0167068MedSec + 0.0096304MaxSec - 0.004386CountPopRank - 0.5027798AvgUemply + 0.0015012MedIncmRank0913 - 0.552948AvgPovRate + ε

The "Number of Programs" variable has a smaller increase to African American recidivism. However, the variable has an even higher p-value. As with the "Programs" regression, heteroskedasticity significantly affects at least one variable.

Table 3.12 Variance Inflation Factors

Variable	VIF	1/VIF
MaxSec	17.18	0.058222
NumOfProg	11.53	0.086693
PrisNum	9.41	0.106238
AvgPovRate	6.09	0.164217
MedIncm~0913	6.06	0.165020
MedSec	3.67	0.272587
MinSec	3.36	0.297488
AvgUemply	1.47	0.678456
CountPopRank	1.27	0.785150
Mean VIF	6.67	

Interestingly, the "Maximum Security" and "Number of Programs" variables have significantly high VIF values. This could mean that counties with a significant number of African American releases have more undergraduate programs if they have a maximum-security prison. For this reason, the "Maximum Security" variable should be removed.

According to these regressions, factors like county's population and median household income have bigger effects on Indiana's African American ex-offenders than undergraduate correctional education programs. If counties have a higher population and a lower median household income, their African American recidivism rate would increase.

Only three counties had both an undergraduate correctional education program and more than 20 African American released prisoners in any given year. This may indicate that there were not enough counties that provide African American prisoners with college correctional education.

c. Released Caucasian Prisoner Population

The undergraduate correctional education programs would probably have positive, more significant effects on Caucasian recidivism rates. This is because all of the Indiana counties have no fewer than 40 released Caucasian prisoners.

Table 3.13 Regression of County Caucasian Recidivism Rate with "Program" Variable & the Breusch-Pagan / Cook-Weisberg Test

CaucRecd	Coef.	P-Value |t|	Number of Obs.	123
Prog	-0.0470646	0.188	Prob > F	0.0056
PrisNum	-0.0818035	0.111	R-Squared	0.1933
MinSec	0.0657334	0.248	Adj R-Squared	0.1213
MedSec	0.1677011	0.018	Chi2(10)	8.89
MaxSec	0.0748471	0.233	Prob > Chi2	0.5427
CountPopRank	-0.0000782	0.868		
AvgUemply	-0.5968585	0.158		
MedIncmRnk0913	0.000307	0.530		
AvgPovRate	-0.0095607	0.975		
Marion	0.3616924	0.003		
Cons	0.4557599	0.0		

County Caucasian Recidivism Rate = 0.4557599 - 0.0470646Prog - 0.0818035PrisNum + 0.0657334MinSec + 0.1677011MedSec + 0.0748471MaxSec - 0.0000782CountPopRank - 0.5968585AvgUemply + 0.000307MedIncmRnk0913 - 0.0095607AvgPovRate + 0.3616924Marion + ε

A county having college correctional education appears to reduce the Caucasian recidivism rate. However, like the African American recidivism rate, the "Program" variable has a very high p-value. Not surprisingly, these prisoners are not as affected by economic factors as African American released prisoners. Since the Caucasian recidivism regression is partially similar to the state regression, it can be assumed that the "Number of Programs" variable would

have a smaller p-value. Additionally, heteroskedasticity does not appear to be a significant problem in any of the regression's variables.

Table 3.14 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	48.83	0.020480
MedSec	21.03	0.047552
MinSec	10.95	0.091362
Marion	9.55	0.104681
MaxSec	9.38	0.106603
Prog	5.90	0.169522
MedIncm~0913	5.54	0.180486
AvgPovRate	5.05	0.197916
CountPopRank	2.03	0.491568
AvgUemply	1.56	0.640753
Mean VIF	11.98	

The "Prison Number" variable has a noticeably high VIF value. The "Marion" and state security prison variables also have high VIF values. These specific variables are probably correlated because having a state prison would increase the number of prisons in a county. Also, Marion County has more prisons than any other Indiana county. The "Prison Number" and state security prison variables need to be removed.

Table 3.15 Regression of County Caucasian Recidivism Rate with "Number of Programs" Variable & the Breusch-Pagan / Cook-Weisberg Test

CaucRecd	Coef.	P-Value |t|	Number of Obs.	123
NumOfProg	-0.0385134	0.087	Prob > F	0.0036
PrisNum	-0.0900685	0.080	R-Squared	0.2019
MinSec	0.0726301	0.196	Adj R-Squared	0.1306
MedSec	0.1824376	0.010	Chi2(10)	9.87
MaxSec	0.0853209	0.165	Prob > Chi2	0.4517
CountPopRank	-0.0002421	0.558		
AvgUemply	-0.552822	0.183		

MedIncmRnk0913	0.0002939	0.537		
AvgPovRate	-0.0189763	0.950		
Marion	0.3667709	0.002		
Cons	0.4648143	0.0		

County Caucasian Recidivism Rate = 0.4648143 - 0.0385134NumOfProg - 0.0900685PrisNum + 0.0726301MinSec + 0.1824376MedSec + 0.0853209MaxSec - 0.0002421CountPopRank - 0.552822AvgUemply + 0.0002939MedIncmRnk0913 - 0.0189763AvgPovRate + 0.3667709Marion + ε

As predicted, the “Number of Programs” variable’s p-value is lower than the "Program" variable's probability score. Because the p-value is below 10%, the variable’s negative effect on Caucasian recidivism is statistically significant. This regression is significantly showing that undergraduate correctional education programs can reduce Caucasian’s recidivism rates. The regression also does not have a heteroskedasticity problem.

Table 3.16 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	49.49	0.020208
MedSec	21.15	0.047276
MinSec	10.76	0.092971
Marion	9.13	0.109515
MaxSec	9.05	0.110453
MedIncm~0913	5.32	0.188023
AvgPovRate	5.04	0.198558
NumOfProg	4.03	0.247911
CountPopRank	1.58	0.633699
AvgUemply	1.52	0.655820
Mean VIF	11.71	

The VIF table is almost exactly same as the previous VIF table. As explained before, whether or not the county has a state prison or is Marion would have the same effect as the “Prison Number” variable. The “Prison Number” variable would need to be taken out.

d. Differences between African-American and Caucasian Prisoners

In addition to more observations, there may be a number of reasons why the Caucasian recidivism rate is more significantly affected by undergraduate correctional education than the African American recidivism rate. Indiana has a larger Caucasian prison population than an African American prison population. Between 2009 and 2011, the Indiana male, adult prison population was between 55% and 56% Caucasian (*2009 DOC Annual Report*, 2009; *2010 DOC Annual Report*, 2010; *2011 DOC Annual Report*, 2011). At the same time, the female, adult prison population was between 70% and 74% Caucasian (*2009 DOC Annual Report*, 2010; *2010 DOC Annual Report*, 2011; *2011 DOC Annual Report*, 2012). According to the U.S. Census, the Indiana state population was 84.3% Caucasian and 9.1% African American in 2010 (*QuickFacts: Indiana*, 2015). Because of these facts, it can be assumed that Caucasian prisoners are more likely to receive undergraduate correctional education.

Indiana African Americans have experienced more economic hardship than Caucasians. The 2014 poverty rate for Indiana African Americans was 34%, while it was 11% for Indiana Caucasians (*Poverty Rate by Race/Ethnicity*, 2016). In 2005, Indiana's median African American household income was $29,164, while the median Caucasian household income was $13,580 higher. During the second quarter of 2015, the Indiana unemployment rate of African Americans was 7.9% and the rate for Caucasians was 4.9%. Since economic issues are more significant for African Americans prisoners, undergraduate correctional education programs have a less significant effect on their recidivism rates (Wilson, 2015).

e. Released Male Prisoner Population

The effects of undergraduate correctional education would probably be different for different genders. Between 2009 and 2011, the minimum number of male Indiana prisoners was 25,805 and the maximum number of female prisoners was 2,476 (*2011 DOC Annual Report*,

2012). Because there are more men than women in Indiana prisons, the programs would probably have a more significant effect on male recidivism rates.

Table 3.17 Regression of County Male Recidivism Rate with "Program" Variable & the Breusch-Pagan / Cook-Weisberg Test

MenRecd	Coef.	P-Value |t|	Number of Obs.	123
Prog	-0.061562	0.158	Prob > F	0.0108
PrisNum	-0.0582991	0.295	R-Squared	0.1799
MinSec	0.0487584	0.413	Adj R-Squared	0.1066
MedSec	0.1604789	0.048	Chi2(10)	12.18
MaxSec	0.070701	0.331	Prob > Chi2	0.2734
CountPopRank	-0.0001742	0.669		
AvgUemply	-0.3026983	0.488		
MedIncmRnk0913	0.0002968	0.555		
AvgPovRate	0.0235547	0.941		
Marion	0.2455568	0.046		
Cons	0.4076868	0.0		

County Male Recidivism Rate = 0.4076868 - 0.061562Prog - 0.0582991PrisNum + 0.0487584MinSec + 0.1604789MedSec + 0.070701MaxSec - 0.0001742CountPopRank - 0.3026983AvgUemply + 0.0002968MedIncmRnk0913 + 0.0235547AvgPovRate + 0.2455568Marion + ε

Table 3.18 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	42.38	0.023595
MedSec	23.32	0.042879
MinSec	9.68	0.103332
MaxSec	9.12	0.109706
Marion	9.04	0.110644
Prog	6.00	0.166581
MedIncm~0913	5.50	0.181809
AvgPovRate	5.07	0.197090
AvgUemply	1.57	0.637428
CountPopRank	1.43	0.699348
Mean VIF	11.31	

As expected, a county having an undergraduate correctional program appears to reduce its male recidivism rate. As indicated in the high chi-squared p-value, the hypothesis of homoskedasticity is not rejected. The VIF values are very similar to ones for Caucasian recidivism. The same variables would have to be removed. The "Programs" variable has a lower p-value than in the Caucasian regression. Because the Caucasian and male regressions are following in similar patterns, the "Number of Programs" variable would probably have a very low p-value.

Table 3.19 Regression of County Male Recidivism Rate with "Number of Programs" Variable & the Breusch-Pagan / Cook-Weisberg Test

MenRecd	Coef.	P-Value |t|	Number of Obs.	123
NumOfProg	-0.0340771	0.181	Prob > F	0.0116
PrisNum	-0.0521139	0.337	R-Squared	0.1784
MinSec	0.041509	0.474	Adj R-Squared	0.1050
MedSec	0.1477665	0.055	Chi2(10)	9.22
MaxSec	0.0542046	0.415	Prob > Chi2	0.5115
CountPopRank	-0.0002924	0.459		
AvgUemply	-0.2404943	0.578		

MedIncmRnk0913	0.0002093	0.669		
AvgPovRate	0.0576801	0.854		
Marion	0.232279	0.053		
Cons	0.3966801	0.0		

County Male Recidivism Rate = 0.3966801 - 0.0340771NumOfProg - 0.0521139PrisNum + 0.041509MinSec + 0.1477665MedSec + 0.0542046MaxSec - 0.0002924CountPopRank - 0.2404943AvgUemply + 0.0002093MedIncmRnk0913 + 0.0576801AvgPovRate + 0.232279Marion + ε

Table 3.20 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	40.25	0.024845
MedSec	20.99	0.047645
MinSec	9.14	0.109417
Marion	8.62	0.115989
MaxSec	7.62	0.131264
MedIncm~0913	5.21	0.191890
AvgPovRate	4.97	0.201396
NumOfProg	4.17	0.239810
AvgUemply	1.54	0.650001
CountPopRank	1.33	0.749362
Mean VIF	10.38	

Unexpectedly, the p-value for the "Number of Programs" variable increased. Counties with more undergraduate education programs may have more significant economic factors than counties with fewer programs. The chi-squared p-value and VIF values are still similar to the values in the previous regressions. Heteroskedasticity is not significant problem and the "Prison Number" variable should be removed. It appears that if a county has more undergraduate correctional education programs, it will decrease its male recidivism rate.

f. Released Controlled Substance Release Population

As mentioned in previous studies, drug offenders tend to have high recidivism rates because of strict drug laws. Since undergraduate correctional education should help prisoners to find employment outside of the illegal market, the programs are expected reduce county's controlled substance recidivism rates. As with the African American regressions, observations with fewer than 20 released prisoners were dropped.

Table 3.21 Regression of County Controlled Substance Offense Recidivism Rate with "Program" Variable & the Breusch-Pagan / Cook-Weisberg Test

SubstOffRec	Coef.	P-Value |t|	Number of Obs.	107
Prog	-0.0934657	0.070	Prob > F	0.0317
PrisNum	-0.1603892	0.020	R-Squared	0.1794
MinSec	0.1744874	0.019	Adj R-Squared	0.0939
MedSec	0.2973896	0.003	Chi2(10)	21.25
MaxSec	0.1678259	0.048	Prob > Chi2	0.0194
CountPopRank	0.0006356	0.343		
AvgUemply	-0.46458	0.406		
MedIncmRnk0913	0.0002863	0.656		
AvgPovRate	-0.1167455	0.773		
Marion	0.5344627	0.002		
Cons	0.4666977	0.0		

County Controlled Substance Offense Recidivism Rate = 0.4666977 - 0.0934657Prog - 0.1603892PrisNum + 0.1744874MinSec + 0.2973896MedSec + 0.1678259MaxSec + 0.0006356CountPopRank - 0.46458AvgUemply + 0.0002863MedIncmRnk0913 - 0.1167455AvgPovRate + 0.5344627Marion + ε

Table 3.22 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	51.60	0.019379
MedSec	21.05	0.047499
Marion	11.24	0.088969
MinSec	10.26	0.097449
MaxSec	9.75	0.102560
Prog	5.94	0.168451
MedIncm~0913	5.30	0.188773
AvgPovRate	4.99	0.200215
CountPopRank	1.62	0.618581
AvgUemply	1.51	0.663105
Mean VIF	12.33	

The "Programs" variable has the lowest p-value out of all of the regressions. Since it is below 10%, the "Programs" variable's negative coefficient is statistically significant. What is also unusual about this regression is that County Population Ranking variable has a positive coefficient. In other words, a county with a lower population would have a higher controlled substance recidivism rate. This could be the result of lower populated counties having fewer resources for substance offenders. Because the chi-squared p-value is lower than 5%, heteroskedasticity is a significant problem in this regression. As with the African American regressions, this might be the result of fewer observations. What is not unusual about this regression is that the "Prison Number" and state prison security level variables have very high VIF values.

Table 3.23 Regression of County Controlled Substance Offense Recidivism Rate with "Number of Programs" Variable & the Breusch-Pagan / Cook-Weisberg Test

SubstOffRec	Coef.	P-Value |t|	Number of Obs.	107
NumOfProg	-0.0398302	0.189	Prob > F	0.0529
PrisNum	-0.1471221	0.033	R-Squared	0.1659
MinSec	0.1566416	0.035	Adj R-Squared	0.0790
MedSec	0.2679073	0.006	Chi2(10)	20.44
MaxSec	0.1321376	0.103	Prob > Chi2	0.0254
CountPopRank	0.0003254	0.611		
AvgUemply	-0.3916782	0.485		
MedIncmRnk0913	0.00008	0.898		
AvgPovRate	-0.0481168	0.905		
Marion	0.4779289	0.004		
Cons	0.4505911	0.0		

County Controlled Substance Offense Recidivism Rate = 0.4505911 - 0.0398302NumOfProg - 0.1471221PrisNum + 0.1566416MinSec + 0.2679073MedSec - 0.1321376MaxSec + 0.0003254CountPopRank - 0.3916782AvgUemply + 0.00008MedIncmRnk0913 - 0.0481168AvgPovRate + 0.4779289Marion + ε

Table 3.24 Variance Inflation Factors

Variable	VIF	1/VIF
PrisNum	51.34	0.019478
MedSec	20.51	0.048766
Marion	10.43	0.095877
MinSec	10.01	0.099887
MaxSec	8.78	0.113940
MedIncm~0913	4.97	0.201386
AvgPovRate	4.90	0.203916
NumOfProg	3.96	0.252599
AvgUemply	1.50	0.666313
CountPopRank	1.45	0.690144
Mean VIF	11.78	

Surprisingly, the "Number of Programs" variable has a higher p-value than the "Programs" variable. This may indicate that counties with undergraduate correctional education programs have lower recidivism rates. However, the counties with one program have lower substance recidivism than counties with two programs.

v. Empirical Analysis Conclusions

Excluding the ones of African American ex-offenders, the regressions show that Indiana counties tend to reduce their recidivism rates if they have one or more undergraduate correctional education program. The “Program” variable most significantly reduces counties’ controlled substance recidivism rates. The “Number of Programs” variable most significantly reduces counties’ Caucasian recidivism rates. In most of the other regressions, the two variables reduce county recidivism rates even if they are not statistically significant.

Chapter 4: Future Studies

A major problem with being student researcher is there is a limited access to information. Indiana did provide the recidivism rates of different types of prisoners. However, it did not indicate which prisoners had the same types of description. For example, it would have been useful to know how undergraduate correctional education affected African American prisoners with controlled substance offenses. If a professor or professional researcher can access this information, he or she may be able to study the full effects of undergraduate correctional education.

As mentioned in Chapter 3, Section i, FERPA prevented undergraduate correctional education programs from providing specific information about their students. For this reason, this study could only analyze the effects of correctional education on the county's recidivism rate. The original plan for this composition was to compare the recidivism rates of the undergraduate programs and the whole county. This would provide more details about undergraduate correctional education's effects.

The ideal study would be at an individual level. The individuals are released inmates and the dependent variable would be whether or not they were reincarcerated within a certain period of release. A key independent variable would be a dummy variable for if they completed a bachelor's degree in prison. Another important independent variable would be an indicator of the amount of education acquired in the correctional institution. Other independent variables would be control variables for other characteristics about the individual, original incarceration experience, and economic conditions of individual's released area. This type of analysis would be better at identifying the impact of correctional undergraduate on recidivism rates.

Chapter 5: Conclusions

According to the regressions of this study, counties tend to reduce their recidivism rates if they have more than one undergraduate correctional education program. The groups that appear to benefit the most from these programs are Caucasian and controlled substance offense prisoners. This is most likely due to the fact that these education programs are more often available to incarcerated Caucasian men. This may also be caused by the fact that African American prisoners tend to be more significantly affected by economic factors like county populations and median household incomes.

Undergraduate correctional education programs appear to improve prisoners' wellbeing and the economy. If a prisoner is taught at a higher-level education, he or she is increasing his or her human capital. In turn, this shifts his or her budget line to the right, which increases his or her consumption levels. When there is a lower recidivism rate, it can be assumed the number of people searching for work in the labor market has increased. As explained in Chapter 2, Section ii, an increase in the number of labor market participants improves the economy. For these reasons, it can be concluded that more undergraduate correctional programs will improve ex-offenders' wellbeing and the nation's economy.

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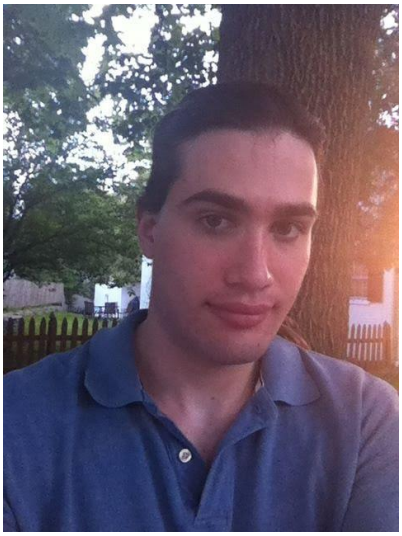
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