Prison-based Adult Basic Education (ABE) and

Post-release Labor Market Outcomes

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Abstract

We use administrative data from Florida to determine the extent to which participation in prison-based Adult Basic Education (ABE) improves post-release earnings and/or employment. Utilizing a comparison group of inmates who had similar TABE scores on prison entry and a rich set of conditioning covariates, we find no systematic evidence that ABE participation is associated with higher post-release earnings. We do find, however, that ABE participation is associated with an increased probability of post-release employment. We also find that the ABE-employment relationship is the largest for ABE participants who had substantial amount of uninterrupted ABE instruction.

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Introduction

Over the last three decades the convergence of several social and economic forces has worked to alter the size, face, and nature of the U.S. penal system. In terms of the size of the penal system, changes in criminal justice policies associated with the wars on drugs and crime mean that more convictions now lead to a prison sentence than in the past, and the sentences tend to be of longer duration than in the past. The most obvious result of these policy shifts is a rising penal population. There are currently more than 1.5 million prisoners incarcerated in U.S. state or federal prisons (Sabol et al., 2007). Of particular relevance for the topic of this paper is that the majority of inmates who are incarcerated lack basic educational and employment skills. It is reported that about 68 percent of U.S. State prison inmates do not hold a high school diploma (Harlow, 2003). In Florida, a state that houses the third largest number of prisoners behind California and Texas, nearly 80 percent of the prison inmates are reported to test below the ninth grade literacy level (OPPAGA, 2000). Since almost all prison inmates will eventually be released, prison-based programs that can help ex-offenders with low levels of education more successfully reintegrate into society by increasing their cognitive skills can be a critical element of the penal experience. Perhaps in recognition of this most prisons offer education opportunities to their inmates. In 2000, 91 percent of state prisons and all federal prisons reported offering educational opportunities to their inmates (Harlow, 2003).

One important education offering found in most prisons is the provision of Adult Basic Education (ABE) courses. By definition, ABE programs provide education to individuals who are reading below the ninth grade level. Once participants can read at the 9th grade level they can move on to Adult Secondary Education (ASE) classes, which are almost universally classes geared toward preparation for the General Educational Development (GED) exams. Thus, in theory, many prisons offer a sequence of courses that could advance one from very low reading and math levels to skills commensurate with GED acquisition or even postsecondary education.[1] For the large portion of offenders who enter prison with very low skills, this process starts with ABE coursework and some states require ABE participation for inmates who test below a certain threshold level of proficiency. In Florida, for instance, inmates are mandated 150 hours of literacy education if they test below the ninth grade level.[2] At least in the late 1990s there were attempts to expand education offerings to incarcerated individuals as the percentage of state prisons offering basic education classes increased from76 to 80 percent between

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[1] A significant portion of inmates identified with educational program needs are reported to not participate or complete educational programs due to movement or transfer across facilities in accordance to their custody level or because of their short prison stay (OPPAGA, 2000).

[2] The statute exempts certain inmates, such as those serving a life sentence or housed at a work camp. Section 944.801, F.S. (OPPAGA, 2000)

1995 and 2000, while the provision of ASE courses went from 80 to 84 percent (Harlow, 2003).

Despite the importance and prevalence of prison-based ABE programs, the literature examining the impact of these programs on post-release outcomes is relatively limited. Of the studies that do exist, most examine the impact of ABE participation on recidivism. Primarily due to data limitations there are few studies that examine impact on post-release labor market outcomes. A 2006 review by Aos, Miller, and Drake (2006) lists five studies that dealt with "Basic Adult Education Programs in Prison." Their examination of these studies reports an average reduction in recidivism of about five percent for ABE program participants. It is hard, however, to assess the rigor of these studies. Only one of the studies in the Aos et al. report has undergone peer review and four of the five are unpublished reports or working papers. One of these unpublished reports, Harer (1995), represents a rigorous attempt at examining program impact, but it appears that the "treatment" variable in this study is not ABE participation, but rather participation in any correctional education program. Thus, even though the Harer study is well done, it is not clear what we learn about ABE impact from this work.

In general, there may well be reason for concern about our knowledge base when it comes to the effectiveness of prison-based programming, including ABE. Our limited examination of the correctional evaluation literature suggests an overabundance of studies that fail to do an adequate job of making the treatment and comparison groups truly comparable. A statement by Wilson, Gallagher, and MacKenzie in their meta-analysis of the effectiveness of corrections education, vocational, and work programs reflects our own concern about research in this area. They write of the 33 studies they examined: "[t]he control variables were generally restricted to gender, race, and age…[and only one study] controlled for important sources of selection bias between participants and nonparticipants, such as prior criminal history, in the analysis of recidivism" (Wilson, Gallagher, and MacKenzie 2000, pg. 355). Again, our cursory examination of the literature suggests that the lack of appropriate data has been the primary limitation to carrying out correctional-program impact research that could be considered to be "rigorous." One cannot control for confounding factors using data that lack the necessary control variables.

The prevalence and potential importance of prison-based ABE, combined with the dearth of convincing research in this area provide the motivation for this paper. In what follows we use rich administrative data from several state agencies in Florida to examine the relationship between participation in prison ABE programs and post-release labor market outcomes. The wide array of variables in the Florida data allow for a rich set of covariates that we use in constructing a suitable comparison group against which to judge the outcomes of ABE participants. Meanwhile, the panel nature of our data allows us to control for unobserved, time-invariant fixed effects. Importantly, the data also allow us to study aspects of ABE participation that are likely important in understanding how ABE participation might or might not be related to post-release outcomes. In particular, we are able to observe the extent to which ABE education in Florida prisons is characterized by continuous, uninterrupted participation or by stops and starts in program participation over time. We are also able to observe interruptions to ABE participation that may be related to movements across prison facilities during ABE participation.

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The most elementary yet most empirically significant contribution of this paper is our ability to analyze longitudinal data on a large population-based sample. Specifically, we use panel data on 9,609 male inmates who entered the Florida state prison system over an 8 year period xxx. The data we use contain information on an inmate's earnings prior to and after incarceration, a detailed history of his prior criminal justice history, rich information on prison-based program participation including number of hours, program start and stop dates, and the facility where the programming took place, detailed demographic information including race, age, highest level of education, prior employment history, and a measure of cognitive skills at the time of prison entry.

In theory, one would expect that participating in ABE programs might increase the earnings or employment rates of inmates after release from prison by increasing their human capital. On the other hand, there may be several reasons why ABE may not be so effective. For example, inmates may not be taking enough ABE hours as are necessary to truly alter their skills in the long run. A not mutually exclusive reason is that inmates may not have the opportunity to get high quality education due to frequent disruptions in course-taking. That is, ABE education "as delivered" in our nation's prisons may fall far short of ABE "as designed" or imagined in the ideal. At least in a limited sense, we will be able to examine these issues.

Constructing a Comparison Group in the Florida Data

The average effect of ABE programs could be easily estimated if it were possible to simultaneously observe an inmate's post-release outcomes had he participated in prison-based ABE instruction and had he not participated. The average effect of "treatment on the treated" could then be estimated by taking the average of all of the individual differences in the post-release outcomes between the two scenarios. However, an evaluation problem arises due to the fact that we do not observe the counterfactual outcome: the post-release outcomes of inmates had they not participated in the ABE program. We are forced to rely on statistical tools to create a comparable counterfactual.

Fortunately, given the data that we have, it is possible to construct a comparison group who did not participate in any ABE course work, but who were nevertheless performing at a similar level of cognitive functioning upon prison entry relative to inmates who took ABE classes and who are similar on other observable dimensions to those we observe in prison-based ABE coursework. Our measure of cognitive functioning is scores on the Tests of Adult Basic Education (TABE) which are used to assess the levels of literacy and numeracy of each inmate as he enters a Florida state prison.

In Florida every criminal justice offender whose conviction and judgment leads to a prison sentence begins their journey through the state penal system at one of several designated "reception centers." At these intake points in the system each entering offender's mental, physical, and cognitive functioning levels are assessed. Cognitive functioning in the reception center is assessed via administration of the TABE Survey test battery, with scores reported as grade equivalents ranging from 0 to 12.9.

Importantly, there are no selection issues with the TABE scores we use since every new prisoner is required to take the exams. Also, it is unlikely that TABE test scores in this setting are endogenous to post-release outcomes, and since inmates are tested immediately at the point of prison entry, the test scores we use are not confounded with the participation of any prison-based program.

An inmate is considered to be participating in the ABE program in our analysis if he is observed to be taking any ABE classes during his prison spell. The data show considerable variation in years of education and proficiency level among those who appear in ABE classes.[3] In our analysis we restrict the sample of ABE participants to include only individuals who do not hold a high school diploma. We omit any high school graduates who score below the 9th grade proficiency level (i.e., those with scores of 8.9 or below) since these individuals may differ on unobservable dimensions relative to dropouts with low literacy levels. In what follows we define as our "ABE group," all school dropouts with TABE scores of 8.9 or lower who evidence some ABE coursework during their prison spell. Within the ABE group, there will be inmates who also participate in other academic programs such as the GED during their prison stay.[4] We discuss the potential effects of participation in other academic programs in later sections.

The comparison group that we use in our analyses is composed of high school dropout male inmates who score below the ninth grade proficiency level on the TABE but do not take any academic courses during their prison stay. The "impact" of participating in ABE programs is defined as the difference between the post-release earnings and employment rates of the "ABE group" relative to this comparison group. An advantage of using a comparison group composed of inmates also performing below the ninth grade proficiency level is that it will prevent us from underestimating the relationship between prison-based adult basic education and post-release labor market outcomes. This also translates into reduced selection on unobservable characteristics.

Data

We use a unique data set that was constructed through the cooperation of three state agencies in Florida. The Florida Department of Corrections (FDOC), the Florida Department of Law Enforcement, and the Florida Education and Training Placement Information Program worked together to collect and merge data from their respective agencies for our use. Before release to us the data was purged of all information that would allow for the identification of individuals. The result is a data set containing individual-level demographic, criminal justice history, and incarceration information, along with state Unemployment Insurance (UI) wage records.[5] Using these data we examine the relationship of participating in ABE classes relative to two post-release outcome variables – quarterly earnings as measured by UI wage records and quarterly employment rates as measured by non-zero UI quarterly wage records.

Our analytic data file consists of a sample of males who (1) entered prison after October 1, 1994 and (2) had forecasted release dates that were early enough to allow for

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[3] The majority of inmates taking ABE classes do not hold a high school diploma – about 91 percent. Including both high school graduates and dropouts, ABE participants have on average 9.5 years of education. Likewise, very few inmates who score above the ninth grade proficiency level on TABE take ABE classes– less than 2 percent. The average TABE score is about 7.3.
[4] About 13.5 percent of the ABE participants participated in a GED class and about 10 percent of them acquired a GED certificate during their prison spell.
[5] Using inmate Social Security Numbers (SSNs), DOC data were matched to earnings data from the Florida Unemployment Insurance (UI) System by programmers at the federal Social Security Administration. About 19 percent of the sample lacks a valid SSN. We use the same data set as used in the Tyler and Kling paper (2006).

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at least 12 quarters of post-release employment data.[6] The first selection decision is driven by the fact that inmates who entered prison prior to October 1994 tended to serve much less time in prison than subsequent offenders because of a different sentencing regime in the pre-1994 period.[7] Although there was another change in Florida sentencing policy in 1995 mandating that all inmates, regardless of the type of crime they committed, serve a minimum of 85 percent of their sentences, this does not appear to cause any selection in the current sample because all inmates in our sample admitted after October 1, 1994 appear to have been serving more than 85 percent of their sentences even before the actual passage of this law. The second selection decision is based on our desire to observe at least 12 quarters of post-release labor market outcomes. Given the UI wage records at our disposal, this means that none of our sample members entered prison after February, 1999.[8] In our analyses we use the forecasted release date of each inmate instead of the actual release date as the actual release date may be endogenous to the receipt of prison-based programming including ABE.[9]

If we were to ignore TABE proficiency levels and instead selected a sample based solely on (1) being a school dropout, (2) entering prison after October 1, 1994, and (3) having a forecasted release date on or before February 1999, a total of 13,925 individuals in the master data would be eligible for inclusion. Among these individuals 13,925 male dropouts who span all TABE proficiency levels, there are 3,790 males who tested below the ninth grade proficiency level on the TABE and took ABE classes (i.e. ABE group) during their prison spell. In the data we find that there are 5,822 males who also tested below the ninth grade proficiency level on the TABE but did not take any ABE or GED classes (i.e. comparison group) during their prison spell. Since some individuals in our data enter and exit prison more than once during the sampling period (i.e., they have more than one prison "spell"), the total number of prison admission spells is slightly larger than the number of inmates. In Table 1, we present descriptive statistics on inmates in the ABE and comparison groups, as well as for all inmates who are high school dropouts.

<Table 1 here>

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[6] We also dropped inmates 1) who were missing important demographic information (such as race, ethnicity, education level, or admission test (TABE) score); 2) who never left or entered a state prison facility during the sample period; or 3) who were not initially assigned to a correctional institute. These people comprised about 7 percent of the sample.

[7] Individuals admitted to a Florida prison prior to December, 1994 were eligible for "control release". Control release is an administrative function that was used to manage the state prison population within lawful capacity. In the era of control release many inmates were not in prison long enough to participate in academic programs and were likely different in important ways from prisoners who were admitted after December, 1994. We use people who were admitted on or after October 1, 1994 because in our data no offenders admitted during October and November of 1994 were given a control release.

[8] Information on UI earnings is available from the third quarter of 1993 to the first quarter of 2002.

[9] Using forecasted release date instead of actual release date is based on the idea from Tyler and Kling (2006). They were concerned that prisoners may affect their actual release date through "good behavior" and thus created forecasted release dates based on the sentence length and time served in jail prior to prison admission.

According to columns (1) and (2) of Table 1, we find that inmates in the ABE group are slightly more disadvantaged in terms of demographic characteristics than inmates in the comparison group. ABE participants are more likely to be minority, to have longer prison spells, and to be committed for violent crimes. They are also younger at the time of prison admission and had lower earnings and employment rates prior to prison entry. Interestingly, inmates in the ABE group were more likely to participate in prison programs such as vocational training and work release. However, they were also substantially more likely to participate in substance abuse programs which indicate that they were also more likely to be substance abusers prior to prison entry.

(xxx clarify who is in col 3)When we compare inmates in the ABE group to all high school dropout inmates who do not necessarily perform below the ninth grade proficiency level – compare columns (1) and (3), it is apparent that inmates who take ABE classes are one of the most disadvantaged populations who enter the prison system. They are more likely to be minority, to have longer prison spells, and to be unemployed during the year prior to their prison entry.

To get a better sense of the earnings and employment rates of inmates around the timing of their release, we provide the temporal pattern of pre- and post-release outcomes for both the ABE and comparison groups by white/minority group status in Figures 1 and 2. The negative values of the x-axis represent quarters prior to prison entry, while the positive values represent quarters after the forecasted release date. Figure 1 plots mean quarterly earnings, while Figure 2 plots mean quarterly employment rates.

<Figures 1 and 2 here>

The most obvious lessons from Figure 1 are that all offenders have higher earnings in the post-release period than in the pre-prison quarters and that white offenders have higher mean earnings than minority offenders both before and after the prison spell. Figure 1 also indicates that there is no obvious divergence in the earnings of either the white or minority ABE group and the respective comparison groups in the quarters after the prison spell; that is, there is no obvious "ABE effect" on raw post-release earnings. However, it is important to note that in the pre-prison quarters, both the white and minority comparison groups have higher pre-prison-spell mean earnings than offenders who will eventually participate in prison-ABE programming. This is likely due to the fact that the comparison group members tend to be older than the ABE group members, and age and experience are often important predictors of earnings and wages. On the other hand, the higher pre-prison earnings of the comparison groups might be the result of unobservable differences favoring comparison group members. This possibility suggests that exploiting the panel structure of the data via fixed effects estimates might be important.[10]

Turning to the employment results in Figure 2, we again see generally more positive labor market outcomes for everyone in the post-prison quarters as compared to the pre-prison outcomes. Unlike quarterly earnings in Figure 1, in this figure the only pre-prison comparison group advantage in employment is among minority group offenders,

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[10] The pre-prison trends seen in Figure 1 look the same if the pre-prison time is extended to 12 quarters prior to prison entry.

there are no pre-prison employment differences between the white ABE and comparison groups. Another difference between Figures 1 and 2 is that at least for whites, Figure 2 offers some evidence that participation in prison-based ABE coursework may be associated with higher post-release employment levels. However, the fact that estimates in Figures 1 and 2 represent raw earnings and employment rates without controlling for any observable differences between inmates suggests caution in making any conclusions about the effectiveness of ABE participation based on these figures. In what follows, we address these concerns as best as we can given the available data.

Statistical Method

For the sake of comparison, our basic analysis presents estimates from four different models relating ABE course-taking to post-release labor market outcomes. We first examine simple mean differences in post-release outcomes between the ABE and comparison groups. We next examine the mean difference in post-release outcomes between the ABE and comparison groups after controlling for age and education level. Thirdly, we examine the mean difference in post-release outcomes between the ABE and comparison groups after controlling for all observed characteristics. Finally, we estimate differences in the pre- to post-prison change in labor market outcomes between the ABE and comparison groups allowing for individual, time-invariant fixed effects.

We use the following variable definitions in our models:

- Y_{it} = earnings or employment indicator for individual i in quarter t.

- Age_{it} = a set of two variables containing age and age-squared when Y is measured.

- ABE_i = a (0,1) indicator for whether individual i took any ABE classes while incarcerated.[11]

- $County_i$ = a set of dummies indicating the county of most serious offense.

- $YRQTR_t$ = a set of dummies for the year and quarter in which Y is measured.

- X_i = a set of covariates measured upon prison entry that includes:
    - Education (a set of dummies for years of completed schooling)
    - Predicted sentence length in months
    - Marital status
    - State or region of birth
    - Whether or not employed prior to incarceration
    - Occupation of employment prior to incarceration
    - Whether or not an English speaker
    - Years in Florida prior to prison spell
    - Cumulative years in prison prior to the target spell
    - Number of disciplinary reports during prior prison spells

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[11] An inmate is considered to be in the "ABE group" if he is a high school dropout, scored below 9 in the TABE at prison entry, and took any ABE classes while incarcerated. An inmate is considered to be in the "Comparison group" if he is a high school dropout, scored below 9 in the TABE at prison entry, and did not take any ABE classes or GED classes while incarcerated.

- o Participation in non-academic prison-based programs – substance abuse, vocational, work release, and prison industry
- o Type of offense for the observed prison spell
- o A measure of cognitive skills – i.e. TABE test scores[12]

Our first set of estimates are based on equation (1) which estimates the simple mean differences in post-release outcomes between the ABE and comparison groups.

(1) $Y_{it} = \beta_{10} + ABE_i\delta_1 + \varepsilon_{1it}$

Next, we estimate the difference in mean post-release outcomes between the ABE and comparison groups controlling for age and education level in equation (2). We present estimates based on this model because this specification matches the model often found in the literature on prison-based interventions (Tyler and Kling, 2006).

(2) $Y_{it} = \beta_{20} + ABE_i\delta_2 + Age_{it}\beta_{21} + Educ_i\beta_{22} + YRQTR_t\lambda_{21} + \varepsilon_{2it}$

In equation (3) we estimate the difference in mean post-release outcomes between the ABE and comparison groups controlling for the rich set of covariates available in our data. The variable *County* is included to account for differences in labor markets across counties in Florida. The underlying assumption is that inmates are mostly likely to return back to their original county of admission after release from prison. The variable *YRQTR* controls for differences in the economy across time periods as well as the change in prison or state policies that may affect earnings or employment.

(3) $Y_{it} = \beta_{30} + ABE_i\delta_3 + Age_{it}\beta_{31} + Educ_i\beta_{32} + X_i\beta_{33} + YRQTR_t\lambda_{31} + County_i\lambda_{32} + \varepsilon_{3it}$

Lastly, we estimate a fixed effects model in equation (4) using the earnings and employment data during the four quarters prior to prison admission and 12 quarters after the forecasted release date.

(4)
$$Y_{it} = AFT_{it}\beta_{40} + ABE_{it}\delta_4 + Age_{it}\beta_{41} + \left(AFT_{it} * SubAbuse_i\right)\pi_{41} +$$
$$\left(AFT_{it} * County_i\right)\pi_{42} + YRQTR_t\lambda_{41} + \alpha_i + \varepsilon_{4it}$$

In equation (4), a time-invariant fixed effect for each individual is captured in α_i. The variable *AFT* indicates whether quarter t is after individual i's forecasted release date. It captures the main effect of being in the labor market in post-release periods relative to the period before prison entry. ABE_{it} equals 0 for everyone during the four pre-prison quarters, switching to 1 during the twelve post-prison quarters for members of the ABE group. The interaction of *AFT* with the covariates *SubAbuse* and *County* allows for these covariates to have different effects on Y during the pre and post-prison periods (Tyler and Kling, 2006). Standard errors in all four equations account for the dependence

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[12] We create a vector of 39 TABE score by version indicators for our sample of inmates who score below proficiency level 9. We control for TABE score with this vector of indicators.

of the errors within people across time. In equation (4), δ_4 is effectively a "difference-in-differences" estimator as it estimates the average change in Y from the pre- to the post-prison quarters for ABE group members relative to the pre-post change in Y for the comparison group members.

In each of the four above equations, the differences in outcomes between the ABE group and the comparison group members are estimated by the δ's. In order to account for the possibility of differential ABE effects by race, we estimate each model separately for white and non-whites (minorities). We also fit the equations separately for the first, second, and third post-release years to allow for differential ABE effects relative to the timing of prison release.

Results

In Table 2 we report quarterly earnings results based on the above four equations. In the first row and first column of Table 2 the estimate indicates that when estimated over the pooled sample, inmates in the ABE group have slightly lower average quarterly earnings than inmates in the comparison group during the first and third year out of prison. When we estimate equation (1) separately for whites and minority group members there is less evidence of negative ABE estimates for whites than for minority group members, and only the third year estimate for the latter group is significant. Once we control for age and education differences between the two groups, the negative estimates associated with ABE participation essentially disappear. When we control for all observed characteristics as is described in equation 3, some of the negative patterns reappear, but are not statistically significant. When we control for time-invariant individual differences in the fixed effects model of equation 4, we find that the estimates do not vary much from equations 2 and 3 and are still not statistically significant. That is, the estimates from equation (4) tell us that the *changes* in earnings between the pre- and post-prison periods are not statistically different for the ABE group members relative to the *changes* in earnings over this period for the comparison group.

<Table 2 here>

We report estimates of the relationship between ABE participation and post-release quarterly employment rates in Table 3. In the first row of Table 3, we find that white inmates who take ABE classes have higher post-release quarterly employment rates than white inmates in the comparison group by 3.5 to 4.4 percentage points in the second and third post-release years. There are no estimated differences for minority inmates based on this simple specification. When we control for age, education level, and year quarter dummies, the positive estimate for whites disappear. These estimates do not change when we control for a full set of observed characteristics in equation 3. However, the equation (4) fixed effects estimates show statistically significant positive estimates of ABE participation for both whites and minorities. Between the pre-release year and the third post-release year, the employment levels of white ABE participants have increased by 5.3 percentage points more than the pre- to post-release employment levels of the comparison group. Meanwhile, the pre to post employment level change for minority ABE participants is 2.4 percentage points greater than the change for the minority comparison group. Using the pooled baseline pre-prison employment rates by

white/minority status, this translates into about a 20 percent relative increase in quarterly employment rates for whites and about a 16 percent increase for minorities.[13] One interpretation of the fact that the estimated ABE-earnings relationship increases as we control for unobserved individual fixed characteristics is that participation in ABE programs is associated with a negative selection process. That is, inmates participating in ABE programs appear to be more likely to have an unobserved propensity to perform poorly in the labor market than others who do not participate in ABE. Failure to control for such differences would lead to an underestimation of the true ABE-employment relationship.

<Table 3 here>

Taken together, the above results suggest that taking ABE classes has no relationship to post-release quarterly earnings but does have a positive relationship with post-release quarterly employment rates. Furthermore, we find that the positive relationship gets stronger with time and is slightly larger for white participants. These findings suggest that ABE participation may lead to greater employment levels, but that this increased employment is coupled either with lower wages or relatively fewer hours worked compared to the comparison group. To better understand our results to this point, we explore in the next section the sensitivity of the estimate in the fixed effect model, δ_4, for various subgroups.

Sensitivity Analysis

Using information available in the Florida administrative data, we construct various subgroups of ABE participants in order to explore whether the overall results thus far mask different ABE "effects" for different subgroups. The underlying premise of the following sensitivity analyses is that any relationship between ABE classes and post-release outcomes may vary by the intensity of course-taking as well as by other facets of institutional life that may affect post-release outcomes.

In Table 4, we present information on the intensity of ABE participation, the course-taking patterns of ABE participants, and on facility movement for inmates in the ABE group, along with information on the number of inmates in the ABE group who are in prison for what we call "income generating" crimes. These numbers are useful because they provide us with important insight into the realities of ABE program participation while in prison. In column (1), we observe that there is substantial variation in the number of ABE course hours across inmates. The median inmate in the ABE group takes about 313 hours of classes. The average is about 416 hours with a standard deviation of 363 hours. Figure 3 gives the entire distribution of ABE hours, and shows that while most ABE participants garner between 250 and 750 hours, there is a long right hand tail to the distribution. Given this large variation in the actual number of ABE hours each inmate receives and given that limited ABE exposure is likely to alter labor market outcomes, we examine the relationships between ABE participation and labor market outcomes separately for inmates with different levels of ABE class hours. We examine the ABE-

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[13] The pre-prison quarterly employment rates of white ABE participants is about 27 percent while it is about 19 percent for minorities.

labor market relationships separately for inmates who took less than 150 hours, at least 150 hours, and at least the median number of ABE hours (313 hours). We use 150 hours as our first benchmark because 150 hours is the mandated level of literacy education in Florida state prison for inmates who test below the ninth grade level on the TABE.

<Table 4 here>
<Figure 3 here>

Columns (2) and (3) of Table 4 turn from hours of ABE participation to number of separate ABE "spells" (column 2) and the number of different facilities in which we see ABE coursework taking place during an inmate's prison spell (column 3). These estimates provide some insight into what ABE program participation in prisons actually entails, and they speak at least partially to the quality of ABE programming that an inmate receives since it is not difficult to assume that education is most effective when it is regular and provided without frequent interruptions to the program of instruction.

Column (2) shows that on average we see ABE participants in three different ABE "spells" during any single prison spell. In our data we are able to see the date when an individual enters an ABE program, the number of hours per day in which the inmate is receiving ABE programming, and the date at which the inmate was "unenrolled" in the program. Leaving a program in our data is associated with a code indicating the reason for program termination. At this point we are not confident that these "termination codes" can be used to accurately depict the reason for terminating a program "spell," but we are looking into the possibility that there is valuable information here. For now, we simply note the facts of (1) start date, (2) hours per day, and (3) stop date, to code up program spells, total hours per program spell, and total hours per *prison spell*. Termination from ABE coursework could result from one of several reasons including changes to an inmate's security level, medical condition, or psychological grade, because of disciplinary actions, because an inmate voluntarily interrupts program participation, or because an inmate completed a program cycle. For any cause except program "completion," it is likely that an interruption to ABE programming, similar to "summer loss" in K-12 education, results in a decrease in the effectiveness of the programs ability to positively impact the literacy and numeracy levels of participants. That is, one would expect greater learning gains from 100 hours of uninterrupted ABE instruction than from four temporally separated ABE spells of twenty five hours each. It may also be important that ABE course work takes place in one or a limited number of facilities rather than taking place across multiple facilities, each with different instructors, different classmates, and different physical settings for the classroom. Reports on prison-based programming, including education programs, find that one of the most common reasons an inmate exits a prison-based program before completion is because of inmate movement across facilities (OPPAGA, 2000). In column (3) we show that on average inmates in the ABE group stay in about 1.4 facilities during the time he is taking ABE classes, and that one in every four inmates is in at least two different facilities during their ABE coursework.[14]

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[14] It is important to note here that these figures are likely underestimates of the total number of different facilities in our sample. The reason is that our facilities indicator is a part of the ABE program file and thus

In column (4) of Table 4, we turn our attention to a different subset of the ABE group, ABE inmates who are committed to prison for what Berk (2007) calls "income generating" crimes.[15] These crimes include robbery, burglary, property theft, fraud, and drug trafficking. The reason we classify inmates based on this criterion is because we suspect that there may be unobserved differences between inmates who commit income generating crimes and non-income generating crimes in terms of the desire or need for financial reward after release from prison. Simply put, the returns to increasing reading, writing, and math skills that should be rewarded in the labor market may well be higher for offenders who committed a crime in order to generate income, than for offenders who committed crimes of passion, anger, or other reasons not related to generating income. As a result, we estimate the ABE-earnings and employment relationships separately for inmates whose crimes were motivated by potential financial gain and for inmates whose crimes were largely consumption oriented.

In Tables 5 and 6, we present the results from sensitivity analyses based on equation 4. Again, we report the estimates separately for whites and minorities and by post-release year. Results from Tables 5 and 6 should be compared to the estimates reported in the fourth row of Tables 2 and 3, respectively.

<Tables 5 and 6 here>

Let us first examine the relationship of ABE course participation to pre-post quarterly earnings gains in Table 5. We find that taking more than a certain threshold of ABE hours is not associated with differential pre-post quarterly earnings. Although we only report the results for taking at least 313 ABE hours (the median), we obtain substantially smaller estimates when we reduce the threshold to at least 150 hours or less than 150 hours. Next, when we estimate the "effect" of taking at least 313 hours of ABE courses in one ABE spell or in one facility, we find that the estimate increases substantially in magnitude especially for whites. However, these estimates are still not statistically significant at the 5 percent level, though the estimate associated with being in one ABE spell for at least 313 hours is significant at the 10 percent level in the third post-release year. This lack of statistical significance on the relatively large point estimates is likely driven by the fact that there are only 253 ABE group members who have over 313 hours in one ABE spell, and only 1,049 ABE group members with over 313 hours in one facility; that is, failure to make positive inferences about substantial hours of ABE coursework in one spell or one facility is likely a sample size problem. In the last panels

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we are only picking up the facilities in which the ABE coursework is taking place. If someone in our ABE group were to spend time in a different facility where they did not participate in ABE coursework, we would not record that additional facility move. We are able to observe all facilities in which an inmate spends any time during a prison spell using what is know as the "Move" file. We are in the process of coding up these data so that we will have good information on all facilities inhabited by all inmates, ABE members and comparison group members, during a prison spell.

[15] Berk (2007) examines separate program effects according to whether or not an inmate is serving time for an "income generating" or "non-income generating" crime. Her work examines the effects of work release participation on outcomes. She finds that while work release participation raises the post-release earnings of all ex-offenders, it only lowers recidivism rates for those who committed "income generating" crimes.

of Table 5 we find no ABE-earnings relationship associated with whether or not the crime was income or non-income generating.

Although the results in Table 5 can be interpreted as lacking strong evidence of a systematic ABE-earnings relationship, we find very different results for pre-post employment rate gains in Table 6. The estimates associated with taking at least 313 hours of ABE courses is estimated to be positive and statistically significant for both whites and minorities during all post-release years.[16] The estimates range from employment gains that are 5 to 8 percentage points larger for whites and from 3 to 5 percentage points greater for minority group members. Given that the average quarterly employment rate during the pre-prison years is 27 percent for whites and 19 percent for minorities, the reported estimates are quite significant in magnitude. We also find that the receiving at least 313 hours of ABE without interruption is associated with large positive employment gains, at least for white offenders. For minority offenders the most positive estimates appear in the third post-release year. The taking at least 313 hours of ABE courses in one facility is associated with employment gains of between 7 to 12 percentage points for whites and 4 to 5 percentage points for minorities.

Compared to estimates reported in Table 3, we see that the estimates for both whites and minorities during all post-release years more than doubled in magnitude and became statistically significant at the 5 or 1 percent level. It is also worth noting that the estimated relationship is larger for whites than for minorities where the increase in employment rates translates into at about a 44 percent increase for whites and about a 26 percent increase for minorities. Finally, we find that inmates who commit income generating crimes experience a 3 to 6 percentage point increase in employment rates after taking ABE classes. However, the more interesting part of the story is that this large positive estimate is largely being driven by minority inmates whose estimates range between 6 and 8 percentage points. When we look at inmates committing non-income generating crimes, we find that only white inmates show positive estimates. The positive estimated ABE-employment relationship is present during the second and third post-release years ranging from 6 to 8 percentage points.

We also estimated models that examined the relationship between *hours* of ABE participation and pre-post changes in earnings and employment. In the models we estimated, ABE hours were entered as a quartic. We did not find a pattern of positive, statistically significant estimates in these "hours" models.

Finally, we estimated a model that limits the ABE group to inmates who do not participate in other academic programs such as the GED. We estimate this model to make sure that the above results were not driven by potential positive effects of GED participation. This reduced the sample of ABE group inmates by about 14 percent. Using the restricted sample did not change the estimate from those reported in the fourth row of Tables 2 and 3. That is, when we drop inmates who take GED classes from our ABE group, we still find no estimated ABE-earnings relationship, while we do find statistically

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[16] We tried estimating the effect of taking at least 150 ABE hours or less than 150 ABE hours on employment rates as well. We find that the effect of taking at least 150 ABE hours to be smaller but positive and less statistically significant. The effect of taking less than 150 ABE hours was not different from zero.

significant positive ABE-employment estimates similar in magnitude to those reported in Table 3 for both whites and minorities.

The findings from the above sensitivity analyses allow us to better understand the ways in which ABE programming may or may not impact post-release labor market outcomes. We find that participating in ABE is only associated with higher employment levels if inmates obtain education above a certain level – in our case, at or above 313 hours (the median). We also find that the positive estimates increase when inmates receive their education with little or no interruption. The point estimates for inmates who receive ABE in one facility or in one course for at least 313 hours were substantially larger than for the other groups and for the pooled groups. Finally, we find that the ABE-employment relationship varies by type of crime and race. Specifically, minority inmates who commit financially motivated crimes have large positive ABE-related increases in employment rates (about 42 percent), while this ABE-employment relationship is not present for white inmates who commit the equivalent crime.

We reemphasize here that any positive ABE-labor market outcome is limited to the probability of employment. We find very little evidence of a systematic relationship between participation in ABE courses and quarterly earnings. Nevertheless, the increased post-release employment rates we find suggest that ABE participants have more access to the mainstream labor market which may be a crucial factor in reintegration into society. Recent results from a randomized evaluation of the Center for Employment Opportunities (CEO) program in New York City are intriguing in this respect. The year one results show that the CEO program did not increase the earnings of randomly assigned program participants, but CEO assignment did result in a substantial and positive effect on recidivism (Tyler and Berk 2007). Since the CEO program provides stable employment during the first post-release year, it may be that in terms of impacting recidivism, employing ex-offenders, especially in the first post-release year, may be critical even if the employment does not lead to higher overall earnings. If this were indeed the case it suggests that there might be economic benefits associated with programs that increase employment rates even if these programs do not result in earnings gains.[17]

We explored whether ABE-related employment gains are related to changes in recidivism probability by estimating linear probability recidivism models. The results are positive, but not as positive as one would hope, given (1) the positive employment estimates we find for ABE participation and (2) the interpretation of the CEO results. According to our estimations, we find that inmates who get at least 313 hours of ABE classes with no interruption during their prison stay do have lower chances of returning to a Florida state prison.[18] Specifically, white inmates who take at least 313 hours of ABE in one ABE spell or in one facility are less likely to recidivate by about .23 percentage points, while minority inmates who take at least 313 hours of ABE in one course are less likely to recidivate by about 1.3 percentage points during the three year post-release period, with both results being statistically significant.[19] Given the baseline 3-year

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[17] This point becomes clearer as one considers the high cost of incarcerating an individual in prison. The cost of simply housing an inmate for one year is estimated to be approximately $19,000 in Florida while the cost of providing educational programs per inmate is approximately $1,418 (OPPAGA, 2000).

[18] Our definition of recidivism is a return to prison within three years of release for a new prison spell.

[19] We find some small marginally significant effects of ABE on recidivism for white inmates who take at least 313 hours of ABE classes but not for minority inmates.

recidivism rate in Table 1 for the ABE group, these figures represent from one-half of a percent (for whites) to a 2.9 percent decrease in the probability of returning to prison within three years of release. Based on these findings, we conclude that inmates who receive high quality ABE during their prison stay will experience both an increase in their post-release employment rates as well as a decrease in their recidivism rates, though the recidivism reduction is relatively small.

Conclusion

Is participation in prison-based Adult Basic Education (ABE) associated with better post-release labor market outcomes? The answer critically depends on what outcome measure we choose to examine as well as on the definition of ABE participation. As we explain above, inmates taking ABE classes experienced higher employment rates especially when they participate in the program for a substantial amount of hours without interruption. The positive relationship was not present when we examined inmates' post-release quarterly earnings. Although this may imply that the receipt of ABE is not associated with longer working hours or a higher paying job, it still suggests that it increases the opportunity of an inmate to find a job in the mainstream labor market after release from prison.

Another important finding of this paper is that it is important to account for unobserved heterogeneity across individuals in evaluating a program that serves such a disadvantaged population. The estimated ABE-labor market relationship was markedly different between equations 3 and 4 indicating that the unobserved fixed characteristics of ABE participants were negatively correlated with employment outcomes. If we had not accounted for such differences we would have underestimated the positive association between ABE participation and post-release employment rates. We press on this point given the lack of studies in the field of prison-based program evaluation that take this into consideration.

Another reason that ABE participation may not have the intended impact is that program participants may be in ABE classes for reasons other than human capital development. As reported in Tyler and Kling (2006), in interviews of offenders just prior to release Steurer, Smith, and Tracy (2001) found that relative to non-participants, prison-education program participants had lower levels of motivation in regard to several labor market activities including the "motivation to get a job, a better job, or higher pay" or the "motivation to improve job performance" and higher motivation levels to "look good to prison or parole officials to get out" and to "get a better situation in prison." Thus, participation in education programming may sometimes be driven more by a desire to impress prison and parole officials than by a desire to impact one's post-release labor market outcomes.

We end the paper with a note on the limitations of interpreting the results. The paper provides evidence of a strong positive correlation between prison-based ABE participation and post-release employment rates. However, the estimates above do not represent the causal impact of ABE participation on post-release outcomes given that there may still be other time-varying unobserved factors that we were not able to account for in the above models. We are also not able to examine any relationships between ABE participation and long term post-release outcomes given the availability of our UI earnings data. It may be the case that these positive employment associations dissipate

over time or that ABE-earnings relationships appear later than the time frame we can observe. Finally, these results may not be generalizable to female inmates, to male inmates who stay in prison for a longer time period than we are able to observe, or to other states.

References

Aos, Steve, Marna Miller, and Elizabeth Drake (2006). *Evidence-Based Adult Corrections Programs: What Works and What Does Not*. Olympia: Washington State Institute for Public Polilcy.

Berk, Jillian. (2007) "Does Work Release Work?" Unpublished manuscript. Brown University.

Harlow, C. W. (2003). Education and Correctional Populations. U.S. Department of Justice: Washington D.C. NCJ 195670.

dbook of Labor Economics. Amsterdam: North-Holland.

Office of Program Policy Analysis and Government Accountability (OPPAGA) of the Florida State Legislature. (2000). Review of the Department of Corrections. Report 00-23.

Sabol, W. J., T. D. Minton, and P. M. Harrison. (2007). Prison and Jail Inmates at Midyear 2006. Bureau of Justice Statistics Bulletin. U.S. Department of Justice: Washington D.C. NCJ 217675.

Streurer, S., L. Smith, and A.Tracy. (2001). Three State Recidivism Study. Report for the Office of Correctional Education, United States Department of Education.

Tyler, J.H. and Jillian Berk. (2007) "Correctional Programs in the Age of Mass Incarceration: What Do We Know About 'What Works'" Paper prepared for the Federal Reserve Bank of Chicago conference on *Strategies for Improving Economic Mobility of Workers.*

Tyler, J. H. and Kling, J. R. (2006). "Prison-Based Education and Re-entry into the Mainstream Labor Market." In Bushway, S., M. Stoll, and D. Weiman (*Eds.*), *Barriers to Reentry? The Labor Market for Released Prisoners in Post-Industrial America*. New York: Russell Sage Foundation Press.

Wilson, David B., Catherine A. Gallagher, and Doris L. MacKenzie. 2000. "A Meta-Analysis of Corrections-Based Education, Vocation, and Work Programs for Adult Offenders." *Journal of Research in Crime and Delinquency* 37, no. 4, 347-368.

Table 1. Descriptive Statistics of ABE Group, Comparison group, and All High School Dropout inmates (including the ABE and Comparison groups).

	(1) ABE group	(2) Comparison group	(3) All high school dropouts
Demographics			
% white	28.6%	32.6%	40.9%
% black	64.7%	63.0%	53.9%
% Hispanic	6.4%	4.2%	5.0%
% other race	0.2%	0.2%	0.3%
Avg yrs of Educ	9.3	9.5	9.5
	(1.35)	(1.37)	(1.32)
Avg Age at Admission	24.3	31.5	27.9
	(8.39)	(8.65)	(8.91)
Avg Age at Release	26.0	32.6	29.3
	(8.39)	(8.68)	(8.83)
% Single	40.7%	48.7%	45.1%
% Married	8.2%	12.5%	10.5%
% Separated, Divorced, Widowed	9.0%	16.4%	13.6%
% Unknown marital status	42.1%	22.5%	30.8%
Primary Offense Type			
% Violent crime	40.3%	30.6%	34.5%
% Property crime	34.2%	32.5%	35.8%
% Drug crime	22.2%	32.8%	25.6%
% Other crime	3.3%	4.2%	4.1%
Prison Characteristics			
% with prior prison spells	30.7%	55.6%	42.4%
# of prior disciplinary reports if inmate has prior spells	3.8 (8.74)	3.2 (7.77)	3.2 (7.53)
Avg length of prison stay in months for current spell	18.1 (9.28)	13.0 (7.95)	15.1 (8.80)
% who recidivate w/in 1 yr	25.6%	22.6%	22.4%
% who recidivate w/in 2 yr	38.7%	33.6%	33.5%
% who recidivate w/in 3 yr	45.0%	39.8%	39.6%
Prison Programs % with hours in GED	13.5%	0%	16.8%
program % with hours in substance	41.1%	23.9%	33.2%
abuse program % with hours in vocational	19.6%	3.5%	12.2%
program % participated in work	15.3%	13.8%	16.1%
release program % with hours working in	2.7%	2.8%	2.7%

prison industry

Employment	1174.8	1688.9	1663.7
Earnings 1 Yr prior to	(2733.1)	(3440.6)	(3359.9)
Prison Admission	46.4%	51.4%	52.9%
% Employed 1 Yr prior to			
Prison Admission	2817.5	3081.6	3306.7
Earnings 1 Yr post Prison	(4958.2)	(5244.6)	(5336.5)
Release	59.2%	58.0%	61.5%
% Employed 1 Yr post			
Prison Release			
Total N of Prison spells	3,845	5,955	14,213
Total N of Inmates	3,790	5,822	13,925

Note: The estimates are calculated for each observed prison spell that an inmate had during the sampling period.

Table 2. Estimates of the ABE-quarterly earnings relationship, pooled and by white/minority group status across post-release years, – estimated δ's from equations 1,2,3, and 4

	Years After Release	All (1)	Whites (2)	Minorities (3)
Eq. 1 No Controls	1st year	-60.89** (26.55)	-62.35 (55.99)	-41.83 (29.00)
	2nd year	-32.85 (29.22)	28.31 (59.23)	-44.86 (33.00)
	3rd year	-58.06* (30.81)	44.24 (61.20)	-91.65*** (35.31)
Eq. 2 Control for Age EDUC YRQTR	1st year	13.66 (30.17)	-17.29 (62.98)	41.91 (33.03)
	2nd year	2.46 (33.20)	56.22 (66.27)	32.73 (37.79)
	3rd year	-5.54 (35.10)	44.12 (68.03)	-16.72 (40.76)
Eq. 3 Control for Age YRQTR X	1st year	-24.86 (31.92)	-60.08 (68.57)	1.84 (34.86)
	2nd year	-3.02 (35.25)	-20.37 (73.65)	6.11 (39.61)
	3rd year	-42.28 (37.55)	-14.97 (75.29)	-57.95 (43.61)
Eq. 4 Control for Age X YRQTR α_i	1st year	-39.18 (30.36)	-61.74 (64.17)	-23.49 (33.25)
	2nd year	.42 (34.35)	26.27 (70.44)	-9.42 (38.87)
	3rd year	-28.08 (37.39)	50.73 (75.00)	-60.08 (42.96)
N of inmates		9,609	3,019	6,590

Note: Eq. 1 controls for no observed characteristics. Eq. 2 controls for age, education, and year-quarter. Eq. 3 controls all observed characteristics. Eq. 4 controls for all observed characteristics and unobserved individual fixed characteristics. Standard errors are in parentheses clustered within individual over time. * = p<0.10; ** = p<0.05; *** = p<0.01;

Table 3. Estimates of the ABE-employment relationship, pooled and by white/minority group status across post-release years – estimated δ's from equations 1,2,3, and 4

	Years After Release	All (1)	Whites (2)	Minorities (3)
Eq. 1 No Controls	1st year	.0005 (.007)	.023 (.014)	-.0057 (.009)
	2nd year	.013 (.007)	.035** (.014)	.0050 (.009)
	3rd year	.0078 (.007)	.044*** (.014)	-.0068 (.009)
Eq. 2 Control for Age EDUC YRQTR	1st year	.0000 (.009)	-.0079 (.016)	.0088 (.011)
	2nd year	.0101 (.009)	.0091 (.016)	.0151 (.011)
	3rd year	.0108 (.009)	.0234 (.016)	.0078 (.011)
Eq. 3 Control for Age YRQTR X	1st year	-.0084 (.009)	-.0219 (.017)	.0001 (.011)
	2nd year	-.0003 (.009)	-.0118 (.017)	.0076 (.011)
	3rd year	.0075 (.009)	.0141 (.017)	.0048 (.011)
Eq. 4 Control for Age YRQTR X α_i	1st year	.0148 (.010)	.0109 (.019)	.0142 (.011)
	2nd year	.0310*** (.010)	.0361* (.019)	.0253** (.011)
	3rd year	.0357*** (.010)	.0526*** (.020)	.0238* (.012)
N of inmates		9,609	3,019	6,590

Note: Eq. 1 controls for no observed characteristics. Eq. 2 controls for age, education, and year-quarter. Eq. 3 controls all observed characteristics. Eq. 4 controls for all observed characteristics and unobserved individual fixed characteristics. Standard errors are in parentheses clustered within individual over time.
* = p<0.10; ** = p<0.05; *** = p<0.01;

Table 4. ABE participation intensity/patterns and type of crime for ABE participants

	(1) Total Number of Hours in ABE	(2) Total Number of ABE Spells	(3) Total Number of Facilities while taking ABE courses	(4) Offense Type Income Generating Crime
Mean	415.7	3.0	1.4	-
(Std Dev)	(362.7)	(2.4)	(0.67)	
5%	32.1	1	1	
25%	171.4	1	1	
50%	312.9	2	1	
75%	563.6	4	2	
95%	1127.1	8	3	
N of prison spell with positive value	**3,845**	**3,476[a]**	**3,476[a]**	**1,844**

Note:

[a] We were not able to match information on class enrollment and facility for 369 inmates in the ABE group.

Table 5. Sensitivity analysis of the ABE-quarterly earnings relationship, pooled and by white/minority group status across post-release years – estimated δ_4 from equation 4

	Years After Release	All (1)	Whites (2)	Minorities (3)
ABE Group:	1st	-48.91	-68.56	-28.63
$\geq$ 313 ABE hrs	year	(38.48)	(86.50)	(41.77)
Comparison Group:	2nd	33.54	45.34	40.54
No ABE hrs	year	(44.03)	(97.42)	(48.56)
	3rd	19.39	138.05	-15.04
	year	(47.73)	(105.23)	(52.91)
N of inmates		7,719	2,392	5,327
ABE Group:	1st	20.04	87.95	24.18
1 ABE course &	year	(88.27)	(236.44)	(89.03)
$\geq$ 313 ABE hrs	2nd	72.64	221.01	35.92
Comparison Group:	year	(103.56)	(284.80)	(103.18)
No ABE hrs	3rd	175.79	576.32*	57.59
	year	(116.04)	(306.72)	(118.25)
N of inmates		6,075	1,983	4,092
ABE Group:	1st	23.81	13.75	41.70
1 Facility &	year	(47.93)	(107.19)	(52.27)
$\geq$ 313 ABE hrs	2nd	70.45	115.47	64.93
Comparison Group:	year	(54.10)	(120.07)	(59.66)
No ABE hrs	3rd	59.84	183.81	19.15
	year	(57.83)	(124.94)	(64.62)
N of inmates		6,871	2,194	4,677
ABE Group:	1st	-25.35	-119.83	57.27
Income generating	year	(44.00)	(80.25)	(50.90)
Crime & have ABE hrs	2nd	8.43	-67.36	64.27
Comparison Group:	year	(50.85)	(84.73)	(63.71)
Income generating	3rd	-6.52	-27.41	9.36
Crime & no ABE hrs	year	(56.22)	(91.26)	(72.30)
N of inmates		4,116	1,577	2,539
ABE Group:	1st	-48.08	14.46	-67.00
Non-Inc generating	year	(42.06)	(103.69)	(43.56)
Crime & have ABE hrs	2nd	7.06	148.96	-41.00

Comparison Group:	year	(46.60)	(116.08)	(48.79)
Non-Inc generating	3rd	-27.18	152.26	-78.12
Crime & no ABE hrs	year	(50.79)	(122.05)	(54.27)
N of inmates		5,548	1,448	4,100

Note: Standard errors are in parentheses clustered within individual over time. * = p<0.10; ** = p<0.05; *** = p<0.01;

Table 6. Sensitivity analysis of the ABE-employment relationship, pooled and by white/minority group status across post-release years – estimated δ_4 from equation 4

	Years After Release	All (1)	Whites (2)	Minorities (3)
ABE Group:	1st	.033***	.046*	.027*
$\geq$ 313 ABE hrs	year	(.013)	(.026)	(.014)
Comparison Group:	2nd	.057***	.061**	.052***
No ABE hrs	year	(.013)	(.027)	(.014)
	3rd	.060***	.084***	.045***
	year	(.013)	(.027)	(.015)
N of inmates		7,719	2,392	5,327
ABE Group:	1st	.038	.093	.019
1 ABE course &	year	(.030)	(.061)	(.034)
$\geq$ 313 ABE hrs	2nd	.043	.124**	.015
Comparison Group:	year	(.030)	(.063)	(.033)
No ABE hrs	3rd	.090***	.193***	.052
	year	(.031)	(.071)	(.034)
N of inmates		6,075	1,983	4,092
ABE Group:	1st	.054***	.073**	.046***
1 Facility &	year	(.015)	(.031)	(.018)
$\geq$ 313 ABE hrs	2nd	.061***	.100***	.045**
Comparison Group:	year	(.016)	(.032)	(.018)
No ABE hrs	3rd	.068***	.119***	.044**
	year	(.016)	(.034)	(.018)
N of inmates		6,871	2,194	4,677
ABE Group:	1st	.031**	-.009	.057***
Income generating	year	(.015)	(.026)	(.019)
Crime & have ABE hrs	2nd	.052***	.017	.069***
Comparison Group:	year	(.016)	(.026)	(.020)
Income generating	3rd	.064***	.036	.075***
Crime & no ABE hrs	year	(.016)	(.027)	(.021)
N of inmates		4,116	1,577	2,539
ABE Group:	1st	.003	.037	-.009
Non-Inc generating	year	(.013)	(.028)	(.014)
Crime & have ABE hrs	2nd	.019	.063**	.002

Comparison Group:	year	(.014)	(.030)	(.015)
Non-Inc generating	3rd	.019	.079***	-.003
Crime & no ABE hrs	year	(.014)	(.030)	(.016)
N of inmates		5,548	1,448	4,100

Note: Standard errors are in parentheses clustered within individual over time. * = $p<0.10$; ** = $p<0.05$;
*** = $p<0.01$;

Figure 1. Average quarterly earnings by ABE and white/minority group status
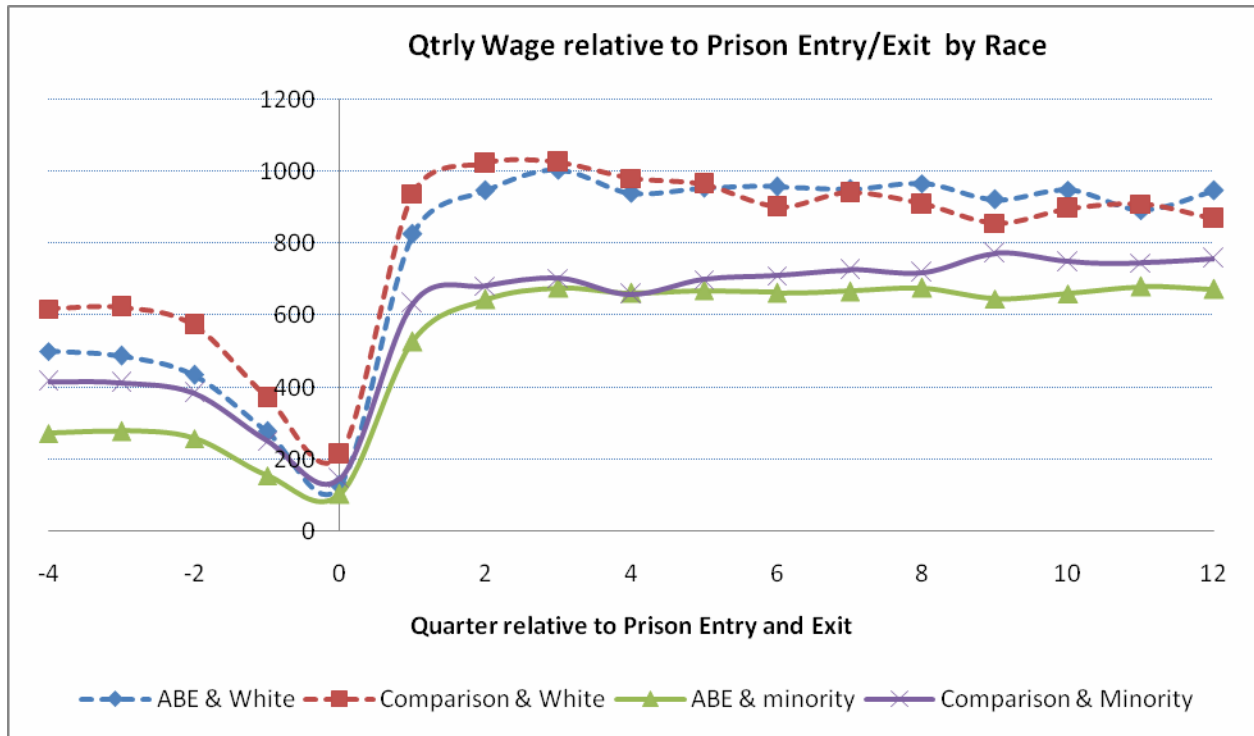

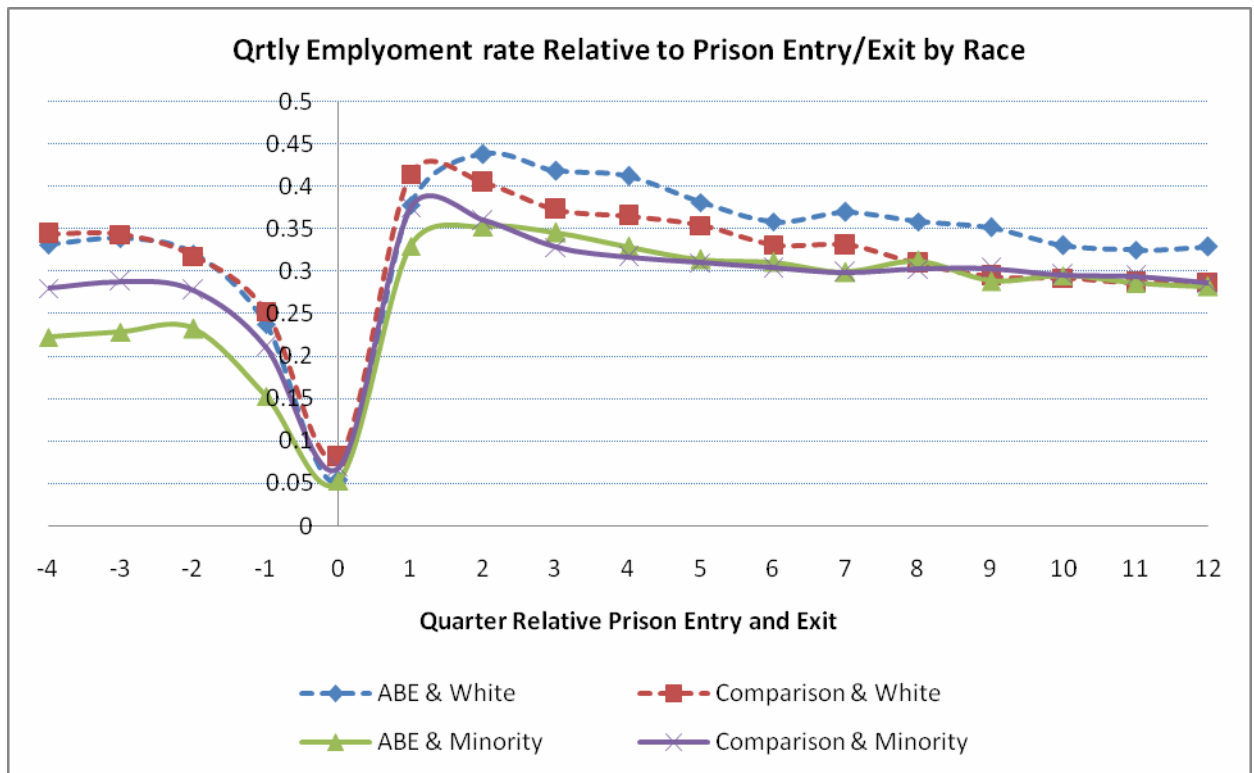**Figure 2. Average quarterly employment rate by ABE and white/minority group status**

Figure 3. Distribution of ABE hours conditional on having positive hours

Kernel density estimate

kernel = epanechnikov, bandwidth = 24.66