THE IMPACT OF POST-RELEASE EMPLOYMENT ON RECIDIVISM IN NORTH CAROLINA

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ABSTRACT

This study uses longitudinal data on a cohort of individuals exiting prison in North Carolina to examine the relationship between post-release employment and subsequent criminal justice contact. Individuals who found employment shortly after exiting prison in 2016 were significantly less likely to return to prison within the next two years than those who were not employed, controlling for observed covariates. The impact of employment on recidivism varied widely by earnings level: workers in the top quartile of wage earnings were only around half as likely to be reincarcerated, while the lowest-paid individuals returned to prison as often as their counterparts who found no employment at all. These findings add to a growing body of evidence establishing that high-quality employment is an important determinant of recidivism outcomes.

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I. Introduction

The United States incarcerates a larger share of its population than any other nation on Earth (Walmsley, 2018), and recidivism is common: most individuals released from state prisons in the United States are re-arrested within two years (Durose & Antenangeli, 2021). Numerous federal and state agencies fund and operate prisoner reentry programs to combat the factors leading to recidivism. Programs that prepare exiting prisoners for employment are an important component of the nationwide reentry system; in the last fiscal year alone, the US Department of Labor budgeted over $100 million for its reentry employment program (US Department of Labor, 2021). Such interventions are motivated by the belief that employment can keep individuals from returning to prison, a belief with limited empirical support in the existing literature (see Steffey [2015] and Chalfin & McCrary [2017] for reviews). Reentry policymaking can be better served by research that credibly demonstrates the causal effect of post-release employment on subsequent criminal justice contact. This study follows a cohort of individuals exiting prison in North Carolina in 2016 and uses a propensity score weighting approach to determine whether post-release employment leads to improved recidivism outcomes. The findings from this study show that obtaining employment after leaving prison—in particular, high-quality employment—can substantially reduce an individuals' likelihood of returning to prison within the next two years.

Several criminological theories undergird the contention that finding employment—especially high-quality employment—leads to abstaining from crime. Economic theory depicts criminal offenders as rational agents whose behavior responds to changes in the relative "price" of deviance (Becker, 1968), with higher-paying employment presenting a greater incentive for desisting than lower-paying employment (Fagan & Freeman, 1999). Routine activity theory

observes that changes in activity patterns affect criminal opportunity (Cohen & Felson, 1979; Jacob & Lefgren, 2003); employment occupies "idle hands" and removes potential offenders from criminogenic environments, and full-time work presents individuals with fewer opportunities for criminality than part-time work. Other theories posit that employment reinforces informal social bonds that constrain deviant behavior (Sampson & Laub, 1993), or that employment reduces the motivation for offending by offering a legitimate path to achieving social mobility (Merton, 1938) and overcoming adversity (Agnew, 1992). However, persistent behavioral characteristics like capacity for self-control (Gottfredson & Hirschi, 1990) could also affect both individuals' employability and their propensity to reoffend. The relationship between post-release employment and recidivism may be driven by difficult-to-change individual characteristics that influence selection into employment rather than by employment itself.

Individual-level data are needed to account for characteristics that may confound the impact of post-release employment on recidivism. Unfortunately, there have been relatively few longitudinal studies on post-release employment, and findings from these studies have been mixed regarding the impact of employment on subsequent criminal justice contact. For example, Makarios et al. (2010) find that employment of any kind led to a lower likelihood of recidivism among individuals released from Ohio prisons, while Visher et al. (2004) report that post-release employment had no significant impact on recidivism in their study of former prisoners in Maryland. While the existing literature offers little empirical evidence to support a relationship between recidivism and employment *per se*, there is more consistent evidence that *high-quality* employment can lead to improved recidivism outcomes (Visher et al., 2008; Uggen, 1999; LaBriola, 2020).

This study contributes to the empirical literature on prisoner reentry, using a similar dataset and research design as LaBriola's study of former prisoners in Michigan (2020) to estimate the impact of post-release employment on recidivism in North Carolina. Individuals in the study cohort who found employment soon after leaving prison were 20.0% less likely than their non-employed counterparts to return to prison within the next two years, after controlling for an array of covariates including demographic characteristics and pre-prison employment and criminal histories. Notably, recidivism outcomes varied by level of employment quality: the highest-paid workers in the sample were only around half as likely to be reincarcerated, while the lowest-paid returned to prison as often as those who found no employment at all. Follow-up analyses demonstrate these findings are robust to different data sources and model specifications and hold across time periods covering several economic cycles. However, while these findings suggest a causal relationship, the potential for unaddressed selection bias due to data limitations cannot be ruled out.

The next section describes the data and methods used to estimate the impact of post-release employment on recidivism. Section III reports the study findings, and Section IV concludes with a discussion of these findings, their limitations, and their implications for prisoner reentry programs.

II. Data and Methods

a. Data

Data for this study are from the Common Follow-up System (CFS), a longitudinal repository of administrative microdata covering all participants in state and federally funded workforce and education programs in North Carolina. The CFS is maintained by a collaborative effort between the Government Data Analytics Center of the North Carolina Department of

Information Technology and the Labor and Economic Analysis Division of the North Carolina Department of Commerce. Participating agencies are required by state law to contribute data to the CFS for program evaluation purposes.[1] The North Carolina Department of Public Safety (DPS) regularly submits data to the CFS covering all persons under their supervision, including those in prison and on community supervision, regardless of whether they participated in a workforce or educational program. These data include information about individuals' demographic characteristics, criminal histories, and subsequent recidivism.

Individual-level records from DPS are linked by Social Security number (SSN) to quarterly wage-earning records from North Carolina's unemployment insurance (UI) program administrator, the Division of Employment Security (DES) of the North Carolina Department of Commerce, to calculate pre- and post-release employment and wage earnings. Employers report wage information to DES to assess their UI tax liability and verify claimants' UI benefit eligibility. Although UI wage records represent an accurate and comprehensive accounting of formal employment in the state, they are limited to jobs covered by North Carolina's state UI program and thus may omit earnings from informal employment, self-employment, federal government employment, out-of-state employment, and other non-covered work. The study sample excludes individuals who cannot be linked to wage-earning records because they lack a valid SSN.[2]

[1] More information about North Carolina's Common Follow-up System can be found here: https://tools.nccareers.org/CFS/

[2] Social Security numbers are validated using the Social Security Administration's validation criteria: https://secure.ssa.gov/apps10/poms.nsf/lnx/0110201035

This study follows a cohort of 10,861 individuals convicted of felonies who were released from state prison into community supervision in 2016. To permit the inclusion of up to four years of pre-prison wages and employment as controls, individuals entering prison before October of 1996 are excluded from the study sample.[3] Those with any wage earnings in the first quarter following release are recorded as "employed". Earnings quartiles are calculated based on the real earnings distribution of employed individuals in the first quarter after release:[4]

- Lowest-paid (1st quartile): less than $1,020 per quarter
- Lower-paid (2nd quartile): at least $1,020 but less than $2,707 per quarter
- Higher-paid (3rd quartile): at least $2,707 but less than $5,058 per quarter
- Highest-paid (4th quartile): $5,058 or more per quarter

This study uses observed wage earnings as a direct, individual-level measure of employment quality. Previous studies with otherwise similar research designs have instead relied on indirect, sector-level proxies to identify whether individuals are engaged in low- or high-quality employment (Uggen, 1999; LaBriola, 2020). Sector-level proxies may be too broad to meaningfully capture variation in employment quality, especially for former prisoners, who tend to find work in only a handful of sectors.[5] Industry sector explains only 15% of individual-level

[3] The CFS includes wage earning records back to the fourth quarter of 1992.

[4] Earnings are adjusted to year 2020 dollars using the Consumer Price Index for All Urban Consumers.

[5] Eighty percent of employed former prisoners in the study sample primarily worked in the following industry sectors, defined at the broad 2-digit North American Industry Classification System (NAICS) level: Administrative and Support and Waste Management and Remediation Services; Accommodation and Food Services; Manufacturing; and Construction. These four sectors accounted for the vast majority of employment at each earnings quartile, representing 84%, 83%, 81%, and 71% of the lowest-, lower-, higher-, and highest-paid groups, respectively. See Berger-Gross (2019) for more information about the labor market for former prisoners in North Carolina.

variation in wage earnings among employed workers in the study sample, reflecting substantial within-sector heterogeneity in hourly wage rates and hours worked.

Recidivism is defined in this study as returning to prison during the eight quarters (two years) following the first quarter after release. Impacts are estimated by comparing the recidivism outcomes of employed former prisoners with their non-employed counterparts. Individuals who returned to prison during the quarter of release or the first quarter after release, before they had an opportunity to work for a full quarter, are dropped from the sample. Parole violations that result in incarceration in a Confinement in Response to Violation center are counted as prison entries for the purpose of this study.[6] This study's measure of "recidivism" is limited to incarceration in DPS-operated state facilities; the CFS does not include data on arrests, local jails, out-of-state prisons, or federal prisons.

b. Empirical Models

To estimate the impact of post-release employment on recidivism, this study first uses a series of "naïve" logistic regression models to compare the outcomes of employed and non-employed individuals:

$$[1] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Employed_i + \varepsilon_i$$

Where $Employed_i$ indicates whether individual *i* was employed in the first quarter after release and $Recidivism_i$ indicates whether they returned to prison within the two subsequent years. A negative coefficient on β_1 means that employed workers in our sample were less likely to return

[6] Confinement in Response to Violation (CRV) centers incarcerate individuals for 90-day periods in response to violations of parole or post-release supervision. More information about CRV centers can be found here: https://www.ncdps.gov/adult-corrections/community-corrections/confinement-in-response-to-violation-crv

to prison than their non-employed counterparts. For ease of interpretation, impact estimates are reported as risk ratios.[7]

Separate outcome models are estimated at each earnings level, i.e.:

$$[2] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Lowest\ paid_i + \varepsilon_i$$

$$[3] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Lower\ paid_i + \varepsilon_i$$

$$[4] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Higher\ paid_i + \varepsilon_i$$

$$[5] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Highest\ paid_i + \varepsilon_i$$

Where $Lowest\ paid_i$, $Lower\ paid_i$, $Higher\ paid_i$, and $Highest\ paid_i$ indicate whether individual *i* was employed in each respective earnings level in the first quarter after release. Impacts are estimated by comparing recidivism outcomes for workers at each earnings level against those of non-employed individuals in the study sample, excluding workers at other earnings levels. For example, equation [5] compares the recidivism outcomes of the highest-paid workers against non-employed individuals in the sample. A negative coefficient on β_1 in equation [5] means that the highest-paid workers in the sample were less likely to return to prison than their non-employed counterparts.

If selection into employment were random then these univariate models would be sufficient to yield the causal impact of employment on recidivism. However, this study uses

[7] The reported risk ratios are approximated from the estimated odds ratios using the method described by Zhang and Yu (1998).

observational data generated in a non-experimental setting; individuals in the study sample may differ systematically in their propensity to find employment after exiting prison. The estimated impact of employment will be biased if the likelihood of recidivism is determined by factors that also predict selection into employment. Accordingly, results from these univariate models are reported only for illustrative purposes.

The preferred approach for this study identifies the impact of employment on recidivism under the assumption of conditional independence, i.e., that recidivism is independent of factors determining selection into employment conditional on observed covariates. Following LaBriola (2020), the influence of measured confounders is controlled for using inverse probability weighting with regression adjustment ("IPWreg"), a "doubly-robust" approach that identifies the causal effect if either the selection model or the outcome model is correctly specified (Bang & Robins, 2005).

In the first stage, propensity scores are generated by estimating a series of logistic regression models predicting the likelihood of selection into employment:

$$[6] \quad \log\left(\frac{Prob(Employment_i)}{1 - Prob(Employment_i)}\right) = \alpha + \beta_1 X_i + \varepsilon_i$$

Where *X* is a vector of covariates predicting employment. As noted by LaBriola (2020), identifying the causal effect of employment *quality* requires appropriate controls for selection into *each category* of employment. Accordingly, separate selection models are estimated for employment at each earnings level.

Weights for each individual (w_i) are then calculated using the propensity scores generated by the selection models as follows:

$$[7] \quad w_i = \frac{1}{Prob(Employment_i)} \quad if \ \ Employment_i = 1$$

$$w_i = \frac{1}{1 - Prob(Employment_i)} \quad if \ \ Employment_i = 0$$

Separate selection weights are calculated for employment at each earnings level.

Finally, a series of weighted logistic regression models is used to estimate the impact of employment on recidivism, incorporating the selection weights described above:

$$[9] \quad \log\left(\frac{Prob(Recidivism_i)}{1 - Prob(Recidivism_i)}\right) = \alpha + \beta_1 Employed_i + \beta_2 X_i + \varepsilon_i$$

Where *X* is a vector of covariates predicting recidivism and the coefficient on β_1 represents this study's preferred estimate of the impact of post-release employment on recidivism. Separate outcome models are estimated for employment at each earnings level.

Propensity score-based weighting designs can perform poorly in the presence of extremely large weights or a lack of overlap in propensity scores between groups. Accordingly, the weights used in this study are normalized using the method described by Robins et al. (2000) and, for each outcome model estimated, observations with weights falling outside the region of common support are dropped.

c. Covariates

Both the selection and outcome models in this study's IPWreg approach include a common set of observed covariates that are likely to affect both post-release employment and recidivism. Demographic characteristics in these models include gender, race/ethnicity,

citizenship status, and age at release.[8] Indicator variables for individuals' prison site capture facility-level differences in the criminogenic environment while incarcerated, and variables indicating county of residence control for geographic differences in job availability and criminal opportunity after release.[9] Controls for educational attainment at release and pre-prison work history, including employment and wage earnings, serve as proxies for individuals' human capital, attachment to the workforce, and behavioral readiness for employment.[10] Potentially confounding behavioral characteristics like self-control are also accounted for by covariates that indicate individuals' criminal histories, including the type of crime they committed, their duration of imprisonment, and their prior criminal record level.[11] Controlling for pre-prison work and criminal histories is particularly important in isolating the causal impact of employment on recidivism if confounding behavioral factors are stable over time, as in Gottfredson and Hirschi's self-control theory (1990). Finally, differences in reporting frequency introduce another potential source of bias: prison exits are recorded at a daily frequency in the CFS, while wage earnings are recorded by calendar quarter. An individual released from prison

[8] Gender categories in the CFS data are male and female. Race/ethnicity categories in the CFS data are White, Black, Asian, Indian, Hispanic (regardless of race), and other/unknown. Citizenship categories are born in the United States, naturalized, alien, dual citizenship, and unknown. Age categories are specified in five-year increments: younger than 20, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, and 55 or older.

[9] Indicator variables are included for each of North Carolina's 57 state prisons and each of the state's 100 counties as well as an indicator for unknown county of residence.

[10] Educational attainment is specified using three categories: less than high school; high school (or equivalent); and at least some college. Employment is specified as indicator variables for each of the four years preceding displacement. Real wage earnings and the square of real earnings in each of the four years preceding displacement are also included as controls.

[11] The most serious offense committed is specified using indicator variables for each of the 34 crime categories tracked by DPS. A binary variable is also included for incarceration resulting from probation revocation. Duration of imprisonment is measured using four categories: (i) less than half a year; (ii) between half a year and one year; (iii) between one year and two years; and (iv) two or more years. Prior criminal record level is specified using indicator variables for each of the six levels defined by the State of North Carolina for felony sentencing. More information about how these record levels are defined can be found in North Carolina General Statutes § 15A-1340.14: https://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter_15a/GS_15A-1340.14.pdf

earlier in a given quarter will be more likely to find employment by the next quarter—and return to prison in subsequent quarters—than those released later in the quarter. Accordingly, a continuous measure representing the number of days between exiting prison and the end of the quarter is included as a covariate.

While this study's research design is consistent with other studies in controlling for demographic, economic, and behavioral factors likely to affect both employment and recidivism, certain potentially influential factors are omitted due to data limitations. In LaBriola (2020), individuals' marital status, intensity of community supervision, and conduct while incarcerated—all strong determinants of recidivism—are also found to be significant predictors of selection into high-quality employment. The robustness tests reported in section IIIb exploit a separate dataset to estimate the reduction in bias that might be expected from incorporating omitted information about prison conduct.

d. Descriptive Statistics and Covariate Balance

For illustration, Table 1 compares the composition of individuals employed after exiting prison against their non-employed counterparts along a handful of key observed characteristics. Of the 10,861 individuals in the full study sample, 4,035 found employment in the first quarter following release. Only 28% of those who were employed after release returned to prison within the subsequent two years, compared to 38% of the non-employed group. This observed difference in recidivism rates does not necessarily indicate a causal relationship; the two groups differ along observable dimensions that are likely to affect both selection into employment and subsequent recidivism. In particular, the employed group has more people of prime working age (25-44), more Black people, and more individuals with a high school education or above. Those

in the employed group also had much higher rates of employment and lower criminal record levels prior to entering prison than their non-employed counterparts.

These differences in composition are assessed using their absolute standardized difference in means, which represents the size of each difference relative to the variability in the data. Standardized differences (*SD*) for each covariate *x* are calculated as the absolute difference in means between the employed and non-employed groups divided by the pooled standard deviation, per Rosenbaum (2010):

$$[10] \quad SD_x = \frac{|\bar{x}_{employed} - \bar{x}_{non-employed}|}{\sqrt{\frac{(s^2_{employed} + s^2_{non-employed})}{2}}}$$

Where *s* is the standard deviation for each group. A standardized difference of zero indicates a perfectly balanced sample, whereas larger values indicate an imbalance. Covariate balance is assessed at the conventional 0.25 and 0.10 levels of standardized difference.

Covariate values for the non-employed group are poorly balanced with respect to the employed group: of the 241 covariates used in this study, 12 have standardized differences above the 0.25 threshold and 26 are above the 0.10 threshold. The inverse probability weighting approach described above in section IIb yields a substantially improved covariate balance between the two groups along observed dimensions, with no covariates falling above the 0.25 threshold and only one over the 0.10 threshold of standardized difference. The differences in covariate values that remain after weighting are controlled for using regression adjustment in the IPWreg models.

Table 1: Selected descriptive statistics

	Employed post-release	Not employed post-release	Standardized difference before weighting	Standardized difference after weighting
Sample size	4,035	6,826		
Recidivism rate	28%	38%		
Prime working age (25-44)	68%	61%	0.15	0.00
Black, non-Hispanic	54%	49%	0.12	0.01
High school education or above	75%	66%	0.20	0.03
Employed prior to entering prison	77%	46%	0.69	0.11
Low prior criminal record level	65%	60%	0.11	0.02
Total number of covariates above standardized difference threshold:				
0.25			12	0
0.10			26	1

Selected characteristics are shown for illustration. The IPWreg impact estimates reported in section III control for an array of demographic, economic, and behavioral factors, including age, race/ethnicity, gender, educational attainment, county of residence, citizenship status, pre-prison employment and wage earnings, prior criminal record level, type of criminal offense, duration of imprisonment, prison site, and number of days between release and beginning of quarter.

III. Results

a. Main findings

Impact estimates are reported in Table 2 and Figure 1. The naïve (univariate) impact estimate yields a risk ratio of .736 for post-release employment, indicating that individuals who found employment after exiting prison were 73.6% as likely (or 26.4% less likely) than their non-employed counterparts to return to prison within the next two years. At least some of this impact can be attributed to compositional differences between the two groups. However, even after weighting and adjusting for observed covariates, the estimated relationship between post-release employment and recidivism remains large and statistically significant.

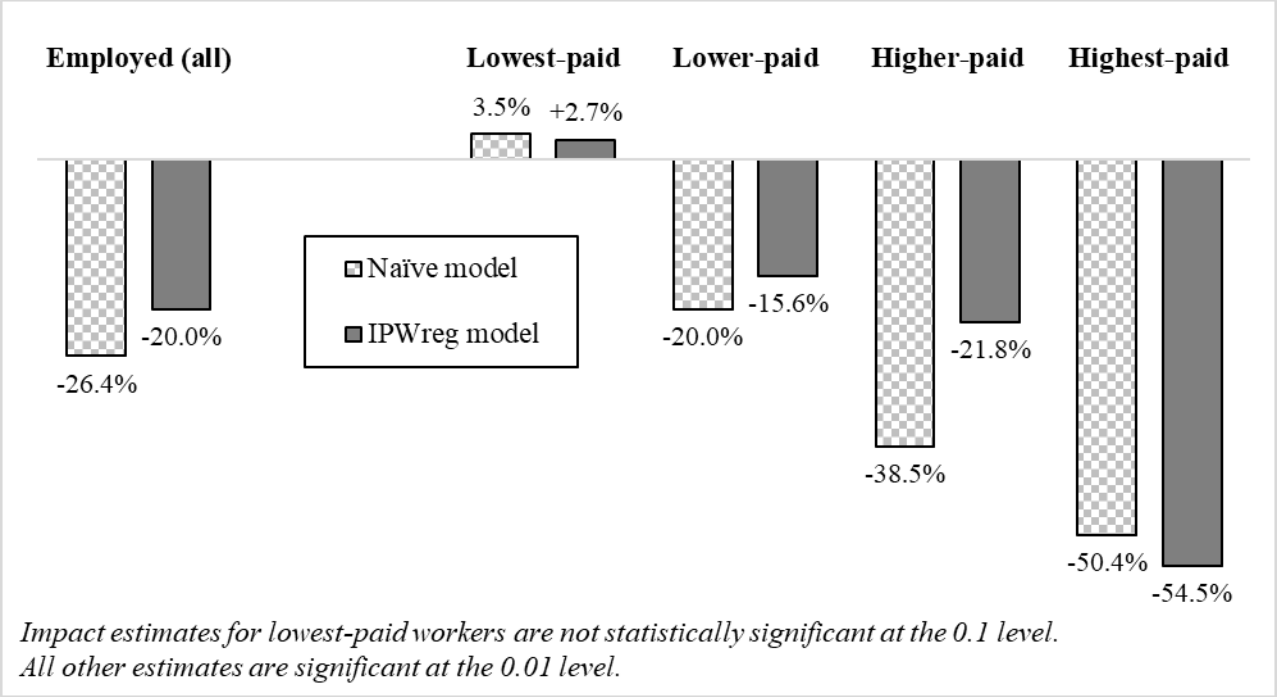
Results from the IPWreg (weighted and regression-adjusted) models show that, after controlling for measured confounders, the likelihood of recidivism among the employed group was 20.0% lower than for those who did not find work. Notably, the impact of post-release employment varied considerably by earnings quartile: the estimated risk ratios range from a statistically insignificant 1.027 for the lowest-paid workers, to 0.844 and 0.782 for lower- and higher-paid workers (respectively), to 0.455 for the highest-paid workers. In other words: the highest-paid workers in the sample were only around half as likely to return to prison as their non-employed counterparts, while the lowest-paid workers were as likely to return to prison as those who found no employment at all.

Table 2: Impact of post-release employment on recidivism

	Impact estimate	Standard error		Odds ratio	Risk ratio
Naïve models					
Employed (all)	-0.228	0.022	***	0.633	0.736
Lowest-paid	0.028	0.035		1.057	1.035
Lower-paid	-0.170	0.036	***	0.712	0.800
Higher-paid	-0.349	0.039	***	0.497	0.615
Highest-paid	-0.486	0.042	***	0.378	0.496
IPWreg models					
Employed (all)	-0.168	0.027	***	0.715	0.800
Lowest-paid	0.022	0.046		1.045	1.027
Lower-paid	-0.131	0.050	***	0.769	0.844
Higher-paid	-0.186	0.052	***	0.689	0.782
Highest-paid	-0.535	0.066	***	0.343	0.455

**** significant at the 0.01 level*
Separate models are estimated for employment at each wage level.
The comparison group for each model consists of non-employed individuals.

Figure 1: Relative likelihood of recidivism, compared to non-employed



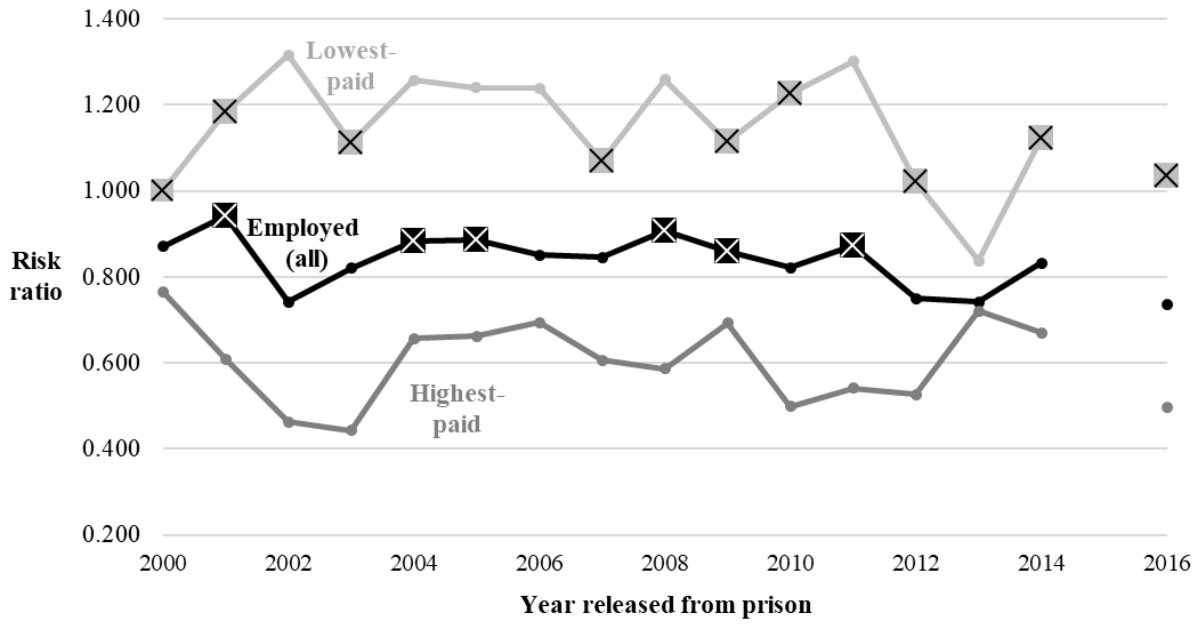
Impact estimates for lowest-paid workers are not statistically significant at the 0.1 level. All other estimates are significant at the 0.01 level.

b. Robustness

The CFS underwent major enhancements in 2015. The main findings in this study focus on a cohort released from prison in 2016, using programmatic data provided after these enhancements were completed, referred to hereafter as "CFS 2.0". These data are not strictly comparable to data from the pre-2015 period due to differences in data collection processes and covariate data availability as well as changes in institutional context. Most notably, CFS 2.0 data cover the period following the implementation of North Carolina's Justice Reinvestment Act of 2011 which redirected misdemeanants away from state prisons and expanded post-release community supervision to cover all individuals convicted of a felony. Nonetheless, the availability of historical data from 2000-2014 ("CFS 1.0") enables an assessment of whether the estimated impact of post-release employment on recidivism holds across different data sources, model specifications, and time periods covering several economic cycles.

Figure 3 illustrates how the relationship between post-release employment and recidivism has varied over time, using results from the "naïve" univariate comparisons. Despite considerable differences between the two data sources, the CFS 2.0 impact estimates for 2016 are broadly consistent with the estimates calculated from CFS 1.0 data. Individuals who found employment after exiting prison were between 5.9% and 25.3% less likely to return to prison than their non-employed counterparts during the 2000-2014 period, with most years seeing significant impact estimates. The relationship between employment in the highest-paid quartile and recidivism was statistically significant, and larger than the impact of employment overall, in all years examined here.

Figure 2: Impact of post-release employment on recidivism, 2000-2014 and 2016



The estimates reported here are from the naïve (univariate) models.
Crosses denote estimates that are insignificant at the 0.1 level.
Data sources: CFS 1.0 (2000-2014), CFS 2.0 (2016). These two datasets are not strictly comparable.

While some attributes of DPS-supervised individuals are measured across both versions of the CFS, certain variables are only available in CFS 1.0, while others exist only in CFS 2.0:

- CFS 1.0 data includes information pertaining to prison conduct, such as disciplinary segregation and confinement in high-security and intensive-control units.
- CFS 2.0 data includes Hispanic ethnicity, citizenship status, educational attainment, county of residence, type of criminal offense, and prior criminal record level.
- Variables that are shared across both versions of the CFS include age, race, gender, pre-prison employment and wage earnings, prison site, duration of imprisonment, and the number of days between exiting prison and the beginning of the next quarter.

This study's main findings may be biased due to a lack of information about prison conduct that was controlled for in prior research on post-release employment (LaBriola, 2020) and is only available in CFS 1.0. On the other hand, the main findings include controls for criminal history, as well as potentially important demographic variables, that are only included in CFS 2.0.

Table 3 shows how the weighted and regression-adjusted impact estimates vary by data source and model specification used. Results that incorporate only shared covariates are reported in column A, while results that include all available covariates are reported in column B. The difference between these two columns is interpreted as the reduction in bias achieved by incorporating the variables uniquely available in each respective CFS version. The estimated bias reduction across CFS 1.0 findings is very small, suggesting that any bias in the main findings resulting from a lack of information on prison conduct is likely to be minimal.

Table 3: Impact of post-release employment on recidivism, CFS 1.0 vs. CFS 2.0

		Shared covariates (A)		All covariates (B)		Bias reduction (B minus A)
CFS 1.0 (2000-2014)	Employed (all)	0.921	***	0.920	***	-0.002
	Lowest-paid	1.090	***	1.083	**	-0.007
	Highest-paid	0.694	***	0.694	***	0.000
CFS 2.0 (2016)	Employed (all)	0.806	***	0.800	***	-0.006
	Lowest-paid	1.039		1.027		-0.012
	Highest-paid	0.414	***	0.455	***	0.041

*** significant at the 0.05 level*
**** significant at the 0.01 level*
Impact estimates are reported as risk ratios.
The estimates reported here are from the IPWreg models.
Data from CFS 1.0 and CFS 2.0 are not strictly comparable.

IV. Discussion

This study demonstrates that finding a job after prison can be an important pathway to desistance. Post-release employment was strongly associated with a lower likelihood of recidivism among a cohort of former prisoners in North Carolina, an effect that is attenuated somewhat, but remains substantial, after controlling for individuals' demographic characteristics and pre-prison employment and criminal justice histories. Notably, the inverse probability-weighted and regression-adjusted estimates indicate that former prisoners in the top quartile of wage earnings were only around half as likely to be reincarcerated, while the lowest-paid returned to prison as often as their counterparts who found no employment at all. The importance of employment *quality* in determining recidivism outcomes is the most robust finding in this

study—holding across different datasets, model specifications, and time periods—and adds to a growing body of evidence showing that high-quality employment can help prevent recidivism.

It is important to note that both this study and LaBriola (2020) use UI wage-earning records to identify post-release employment. These data are limited in scope to wages covered by state UI law and thus may not capture the informal work commonly performed by former prisoners (Visher et al., 2008). Individuals are recorded as non-employed in this study if they earned no UI-covered wages during the quarter after release, even though they may have earned informal wages during that time. Some may have been recorded as ranking among the "lowest paid" based on their UI-covered earnings when their combined informal and formal wages would place them higher in the earnings distribution. UI wage-earning records, like other administrative tax datasets, allow a much more cost-effective and comprehensive accounting of individual-level workforce activity than survey methods. However, unlike these tax data, surveys offer the ability to measure (self-reported) untaxed employment, which may be of particular importance when studying populations like former prisoners who have high rates of informal employment. Follow-up survey research of former prisoners in North Carolina could help us better understand the role that both formal and informal employment plays in the prisoner reentry process.

This study identifies the causal impact of post-release employment on recidivism by statistically controlling for a rich set of observed covariates. Follow-up analyses confirm that the reported findings are robust to changes in measurement method and model specification. Nonetheless, the potential for unaddressed selection bias cannot be ruled out. The weighted and regression-adjusted estimates could be biased in the presence of unmeasured confounders such as individuals' marital status or intensity of community supervision (LaBriola, 2020), potentially leading to an inflated impact estimate. Randomized designs or natural experiments that exploit

plausibly exogenous variation in post-release employment may be needed to further validate these findings. In the meantime, the impacts reported here should be construed as outer-bound estimates.

The findings from this study, if interpreted causally, validate the mission of reentry programs that aim to improve the employment outcomes of exiting prisoners. Although this study does not evaluate the effectiveness of such programs, it does offer an important lesson for program designers and administrators: while employed workers are less likely to return to prison, not all post-release employment leads to improved recidivism outcomes. Individuals who earn very low wages may be no better off than those with no earnings at all. Finding "any job" may be less important than finding "the right job." Accordingly, reentry programs should aim to prepare former prisoners for the types of high-quality employment that research has consistently shown to help prevent recidivism.

Unfortunately, this study offers no clarity regarding which criminological theories best explain *why* high-quality employment leads to desistence. The level of quarterly wage earnings—the measure of employment quality used in this study—is a product of the number of hours worked per quarter multiplied by the hourly wage rate. A 40 hour per week job paying $10/hour and a 20 hour per week job paying $20/hour both generate $5,200 in earnings per quarter, but the former offers more routine activities that limit criminal opportunity, whereas the latter offers more of a marginal economic incentive for abstaining from crime. Is the impact of high quarterly earnings on recidivism a result of the incapacitating effect of routine activities, or do the economic benefits of high wages predominate? Should reentry professionals help former prisoners find more hours of work, or higher pay per hour? Researchers should collaborate with states like Minnesota whose unemployment insurance systems track both hours worked and

hourly wage rates to replicate this study in a manner that clarifies whether it is working *a lot*—versus working *for* a lot—that leads to improved recidivism outcomes.

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