Article

Ex-Incarceree/Convict Status: Beneficial for Self-Employment and Entrepreneurship?

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Abstract

This article considers whether ex-incarceree/convict status favorably conditions the decision to be self-employed—a proxy for entrepreneurship. With data from the U.S. General Social Survey, we estimate the parameters of simple Probit and Bivariate Probit treatment specifications of individual self-employment outcomes as a function of ex-incarceree/convict status, and several measures of individual risk-taking propensities. Parameter estimates reveal that ex-incarceree/convict status has a positive and significant treatment effect on self-employment, particularly for Black Americans, after controlling for various measures of individual risk propensities. Our results suggest that the expansion of entrepreneurship training programs and the elimination of any barriers that restrict access to start-up capital for ex-incarcerees/convicts would reduce crime and recidivism, ameliorate mass incarceration, and complement pro-growth economic policies that induce more self-employment and entrepreneurship.

JEL Classification: J01, J24, L26, Z13

Keywords

entrepreneurship, risk propensities, ex-convicts, ex-incarcerees, treatment effects

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Introduction

Between 1972 and 2012, the U.S. prison population increased 500%, and among industrialized countries for which prison data are available, the United States has the highest incarceration rate per 100,000 people (The Sentencing Project, 2014). Incarceration rates in the United States are also racially disparate with non-Whites constituting approximately 60% of the prison population. Relative to White males, Black males are approximately 6 times more likely to be incarcerated, and Hispanic males are approximately 2.5 times more likely to be incarcerated. Recidivism rates are also high as more than four in 10 ex-convicts nationwide return to state prison within 3 years of their release (Pew Center on the States, 2011). This suggests that successful reentry into a licit productive civilian life is difficult for many previously incarcerated and/or convicted citizens.

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Given evidence that the set of behavioral traits associated with success in illicit and licit activities intersect as success in both illicit crime and licit entrepreneurship requires for example, a heightened desire for wealth, a willingness to cooperate, competence, and a propensity for risk-taking (McCarthy & Hagan, 2001), this article considers whether ex-incarceree/convict status favorably conditions the decision to be self-employed—a proxy for entrepreneurship.[1] The extent to which ex-incarceree/convict status increases self-employment likelihoods can potentially render self-employment and entrepreneurship as a pathway out of crime (Edmondson, 2009; Smith, 2009) and a constraint on recidivism, reducing the level and the private and social costs of mass incarceration which has racially disparate effects (Alexander, 2010; Foster & Hagan, 2009).

With data from the U.S. General Social Survey (GSS), we estimate the parameters of simple Probit and Bivariate Probit treatment specifications of individual self-employment outcomes as a function of ex-incarceree/convict status, and several measures of individual risk-taking propensities. We find that ex-incarceree/convict status has a positive and significant treatment effect on self-employment after controlling for various measures of individual risk propensities. This suggests that self-employment and entrepreneurship are indeed viable pathways out of crime and recidivism, and the elimination of any barriers that restrict access to start-up capital for ex-incarcerees/convicts would reduce crime and recidivism, ameliorate mass incarceration, and complement pro-growth economic policies that encourage self-employment and entrepreneurship.

Our inquiry makes at least three contributions. First, our inquiry will further inform the nexus between individual criminal histories and/or exposure to the criminal justice system and self-employed entrepreneurship (Fairlie, 2002; Fairlie & Holleran, 2012; Levine & Rubinstein, 2017; Myers, 1992; Rieple, 1998; Spriggs & Myers, 1997). Second, as we posit and test a theory in which risk propensities matter for self-employed entrepreneurship, we add to the literature on the role of risk propensities on selection into self-employment and entrepreneurship (Hartog, Jonker, & Van Praag, 2002; Farago, Kiss, & Boros, 2008; Hvide & Panos, 2014). Finally, our inquiry will inform the extent to which programs designed to enhance the entrepreneurial capacities of ex-incarcerees/convicts (Cooney, 2012; Fletcher, 2005; Smith, 2009) are likely to be effective, and constitute policies that can foster economic growth through encouraging entrepreneurship (van Stel, Carree, & Thurik, 2005).

The remainder of this article is organized as follows. In the first section, we provide a theoretical framework that conditions the decision to be a self-employed entrepreneur on individual risk aversion. Our model views ex-incarcerees/convicts as being relatively more willing to engage gambles and lotteries relative to individuals who have never been incarcerated/convicted for a crime, which renders them relatively less risk averse. We discuss the data and methodology in the second section. In the third section, we report parameter estimates from simple Probit and Bivariate Probit treatment specifications of the individual self-employment decision as a function of former incarceree/convict status. The last section concludes.

Self-Employment, Ex-Incarceree/Convict Status, and Risk Aversion

To inform our empirical analysis, we appeal to a theoretical model of self-employment and entrepreneurship similar to Kihlstrom and Laffont (1979), where the choice to start a firm is a function of an individual's degree of risk aversion. As ex-incarcerees/convicts presumably made choices—the commission of a crime—that increased the relative risk of losing of their valuable freedom (Abrams & Rohlfs, 2011), and/or life (May, Hemenway, Oen, & Pitts, 2000), it suggests that they are less risk averse and more willing to engage gambles and lotteries relative to individuals who have never been incarcerated/convicted for a crime. Viewing the decision to be a self-employed entrepreneur as a gamble or lottery with stochastic payoffs, the optimal choice of an individual to be self-employed can be sensitive to the degree of individual risk aversion (Cramer et al., 2002) as

evidenced by Fairlie and Holleran (2012) and Hvide and Panos (2014) for individuals in general, and for illicit drug dealers in particular (Fairlie, 2002) suggests that criminals are relatively less risk averse, and perhaps relatively well-suited for entrepreneurship (Levine & Rubinstein, 2017).

Suppose there is a population of N expected utility-maximizing individuals with utility function $u(Y, \alpha)$ for $\alpha \in [0, 1]$ where the marginal utility of income Y is positive ($u_Y > 0$) and nonincreasing ($u_{YY} \leq 0$), and the Arrow-Pratt (Arrow, 1964; Pratt, 1964) measure of absolute risk aversion is $r(Y, \alpha) = -u_{YY} / u_Y$, where $r(Y, \alpha)$ is nondecreasing in α. Each individual can either be an employee at an existing firm and earn a competitive market wage w or become a self-employed entrepreneur using a costless technology with production function $q = f(L, \varepsilon)$, where $q \geq 0$ is output that has a market price of 1, $L \geq 0$ is labor input, and ε is a random nondegenerate parameter for factors other than L that determine output. For a self-employed entrepreneur $Y = f(L, \varepsilon) - wL = \pi(w, \alpha)$, and for an employed individual, $Y = w$.

Given optimum profit as a self-employed entrepreneur (π^*), when employing $L(w, \alpha)$ workers, and the certainty equivalent wage $w(\alpha)$—the wage that makes individual α indifferent between employment and self-employment—the decision to become a self-employed entrepreneur is optimal for an individual when $k^* = Eu[\pi^*(w(\alpha), \alpha) - u[w(\alpha), \alpha] > 0$, where E is an expectation operator and k is assumed to be continuous monotonic function of w, and $\pi^*(w, \alpha) = g[L(w, \alpha), \varepsilon] - wL(w, \alpha)$. Assume that individuals can be partitioned into groups $\alpha^* \in [0,1]$ and $\alpha^{**} \in [0,1]$, where $\alpha^{**} < \alpha^* \; \forall \; \alpha^* \geq 0$, $\alpha^{**} \geq 0$. In a population of individuals, the decision to be a self-employed entrepreneur is a function of k^*, which is unobserved and latent. If individuals in the population indexed by α^{**} are ex-incarcerees/convicts, as ε is random, the probability of the decision to be a self-employed entrepreneur can be specified as a linear additive function of ex-incarceree/convict status. This establishes the following:

> **Proposition (Ex-Incarcerees/Convicts, Risk Aversion, and Entrepreneurship)**. In a population of risk-averse individuals with a choice of being employed or self-employed as an entrepreneur, if ex-incarcerees/convicts are relatively less risk averse, being an ex-incarceree/convict increases the likelihood of being a self-employed entrepreneur.

A proof of this proposition follows from the implications of $w(\alpha^*)$ being the certainty equivalent of $[\pi^*(w(\alpha^*), \alpha^*)]$ and letting $w(\alpha^*, \alpha^{**})$ be the certainty equivalent of $[\pi^*(w(\alpha^*), \alpha^{**}]$ for individual α^{**}. Given the monotonicity of k, from Theorem 1 of Pratt (1964, p. 128), if $\alpha^{**} < \alpha^*$ then $Eu(\pi^*(w(\alpha^*), \alpha^{**}] > u[w(\alpha^*), \alpha^{**}]$, and if ex-incarcerees/convicts are less risk averse than the marginal entrepreneur—an individual who is indifferent between employment and self-employment at the certainty equivalent wage $w(\alpha^*)$—they are more likely to choose self-employment. If for an individual ex-incarceree $ki = 1$ given $ki^* > 0$, then $P[ki = 1] = P[ki > 0] = P[Ii\beta + \varepsilon i] = P[-\varepsilon i < Ii] = \Phi(Ii\beta)$, where P is a probability operator, Ii is a binary indicator equal to unity if an individual is an ex-incarceree/convict, β is a population parameter measuring the effect of being an ex-incarceree/convict on the probability of being a self-employed entrepreneur, and Φ is a continuous distribution function. Thus, being an ex-incarceree/convict increases the likelihood of being a self-employed entrepreneur as $\partial P(k = 1 \mid Ii) / \partial Ii = \partial E(ki = 1 \mid Ii) / \partial Ii = \varphi(Ii\beta)\beta > 0$, where $\varphi(\cdot)$ is the probability density function for ki. This informs our empirical econometric strategy below to determine if ex-incarceree/convict status favorably conditions the likelihood of self-employment.

Data and Methodology

The source of our data is the GSS. GSS data are a nationally representative sample of adults living in the United States.[2] Conducted by the National Opinion Research Center (NORC) at the University of Chicago, the GSS was initiated in 1972. The first seven surveys were annual and

initially had samples of approximately 1,500 adults. Starting in 1980, the GSS is biennial and the 1994 expanded the survey to 3,000 adults. The 2008 GSS also includes for the first time since its inception, panel data, as 1,536 individual respondents from the 2006 GSS were re-interviewed in 2008. GSS data are generated by in-person interviews and are based on questions relating to various demographic and attitudinal variables. The biennial GSS contains a standard core of demographic, behavioral, and attitudinal questions, and it can vary across survey years with topics of special interest. For example, in a given survey year, special topics could include civil liberties, crime and violence, intergroup tolerance, morality, national spending priorities, psychological well-being, social mobility, and stress and traumatic events. The 1972-2016 cumulative GSS consists of 5,867 variable measured across more than 60,000 respondents.

While GSS respondents were queried about whether or not they were self-employed in each biennial survey between 1972 and 2016, queries about ever having spent time in jail and/or being convicted of a crime were only made in the 2012 biennial survey. As such, we utilize data from the 2012 GSS to inform our empirical inquiry into the consequences of being an ex-incarceree/convict on self-employment. It is also fortuitous that the 2012 GSS includes respondent answers to questions relating to, or proxying for behavioral risk propensities. Given that our inquiry, informed by our theoretical framework, considers whether ex-incarcerees/convicts are relatively less averse, as evidenced by having engaged in risky criminal activities, the 2012 GSS enables some measurement of individual risk propensities that mitigates and or eliminates the effects of unobservable individual risk propensities when making inferences about the effects of ex-incarceree/convict status on the likelihood of being a self-employed entrepreneur.

As our theoretical framework posits a linear additive relationship between the likelihood of being a self-employed entrepreneur and ex-incarceree/convict status, we extend the Bivariate Probit framework of Price (2012), and estimate the parameters of a Bivariate Probit specification of the form:

$$Y^* = \mathbf{X}^*\beta + D\alpha + \varepsilon_1, \qquad Y = II\left(Y^* > 0\right) \tag{1}$$

$$D^* = \mathbf{X}^*\beta + \mathbf{Z}^*\gamma + \varepsilon_2, \qquad D = II\left(D^* > 0\right) \tag{2}$$

Y^* and D^* are latent variables for self-employment and the treatment of being an ex-incarceree/convict, respectively, that are mapped via an indicator function $II(\cdot)$ into observed binary variables Y and D. The specification for Y^* recognizes that other individual characteristics—included in $\mathbf{X}^*$—besides being an ex-incarceree/convict may be important, given our theory posits that unobservable random factors matter for the individual self-employment decision. The specification for D^* recognizes the possible endogeneity of being an ex-incarceree/convict and includes instruments $\mathbf{Z}^*$. It is assumed that $\text{Cov}(\varepsilon_1, \varepsilon_2) = \rho$, and $(\varepsilon_1, \varepsilon_2) \sim N(0,1)$.

Results

The GSS questions upon which each of the covariates in our specifications of the individual self-employment decision is based, along with their coding are reported Table 1. As in Price (2012), we include covariates that measure individual characteristics available in the GSS, that have been found to be important for the self-employment decision.[3] Our covariates also include constructed covariates that capture individual behavioral risk propensities as they relate to the number of sexual partners, frequency of heterosexual sex, casual pick-up sex, extramarital sex, intravenous drug use, and knowledge about probability.[4]

Table 2 reports a statistical summary of all covariates constructed. For each relevant covariate, we also report *t* tests for the equivalence of means across the sample groupings. A simple analysis

Table 1. Description of 2012 GSS Covariates.

Covariate	Definition	GSS question	GSS coding
SELFE	Binary variable equal to 1 if respondent is self-employed	Are you self-employed or do you work for someone else?	Yes = 1 No = 2
CVICT	Binary variable equal to 1 if respondent ever convicted of a crime	Not counting minor traffic offenses, have you ever been convicted of a crime?	Yes = 1 No = 2
INCAR	Binary variable equal to 1 if respondent ever spent any time in prison or jail	Have you ever spent any time in prison or jail?	Yes = 1 No = 2
AGE	Age of respondent	Respondent's age in years	Numeric value for age
BLK	Binary variable equal to 1 if the respondent is a Black American	What race do you consider yourself?	White = 1 Black = 2 Other = 3
DRUGS	Binary variable equal to 1 if respondent ever injected any any drugs	Have you ever, even once, taken any drugs injected with a needle?[a]	Yes = 1 No = 2
GSEX1	Number of gay male male sex partners in past 12 months	*Derived*[b]	Numeric value
GSEX2	Number of gay male male sex partners since the age of 18	*Derived*[c]	Numeric value
IPROB1	Binary variable equal to 1 if respondent is not knowledgeable about probability	A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child chance with an inherited illness. Does this this mean that if their first child has the illness, the next three will not have the illness?	Yes = 1
IPROB2	Binary variable equal to 1 if respondent is not knowledgeable about probability	A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child chance with an inherited illness. Does this mean that each of their children have the same risk of suffering from the illness?	No = 2
MALE	Binary variable equal to 1 if respondent is a Male	Respondent's sex	Male = 1 Female = 2

(continued)

Table 1. (continued)

Covariate	Definition	GSS question	GSS coding
MSELFE	Binary variable equal to 1 if respondent's mother was self-employed while respondent was growing up	What kind of work did your mother normally do while you were growing up?	Self-employed = 1
NSEXP	Number of sexual partners respondent had in past year	How many sex partners have you had in the last 12 months?	Numeric value
PSELFE	Binary variable equal to 1 if respondent's father was self-employed while respondent was growing up	What kind of work did your father normally do while you were growing up?	Self-employed = 1
PUSEX	Binary variable equal to 1 if respondent had casual sex last year	If you had other partners, please indicate all categories that apply to them	Casual date or pickup = C
SPAR18	Number of sexual partners since the age of 18	*Derived*[d]	Numeric value
UN10	Binary variable equal to 1 if respondent has been unemployed in the last 10	At any time during the last ten years, have you been unemployed and looking for work for as long as a month?	Yes = 1
XMSEX	Binary variable equal to 1 if respondent ever had extramarital sex	Have you ever had sex with someone other than your husband or wife while you were married?	Yes = 1
YRSCH	Years of Schooling completed by respondent	What is the highest grade in elementary school or high school that you finished and got credit for?	Numeric value

Source: The General Social Survey Cumulative 1972-2016 Data, National Opinion Research Center, University of Chicago.

[a]This includes drugs such as heroin, cocaine, amphetamines, and steroids, and is exclusive of anything the respondent took under a doctor's orders.

[b]The numeric value is derived from three GSS questions: (a) Whether sex partners in the past 12 months have been exclusively male, (b) the number of sex partners the respondent had in the past year, and (c) whether the respondent is male.

[c]The numeric value is derived from three GSS questions: (a) Whether sex partners in the past 12 months have been exclusively male, (b) the number of sex partners the respondent had since the age of 18, and (c) whether the respondent is male.

[d]The numeric value is derived from the GSS questions asking sex partners the respondent had since the age of 18 for both males and females.

of the mean self-employment rate suggests that being an ex-convict and ex-incarceree lowers the likelihood of being self-employed entrepreneur. Nonetheless, in the case of being an ex-incarceree the difference is not statistically significant. However, an analysis of various across group risk-propensities suggests that being an ex-convict or ex-incarceree increases tolerance for risk, as measured and proxied by these covariates. For example, relative to the population in general, ex-convicts and ex-incarcerees are more likely to have injected drugs and engaged in extramarital sex, and the *t* tests for group differences are, at least at the .10 level, statistically significant. To the extent that these covariates are proxies for risk propensities and condition individual Arrow-Pratt measures of absolute risk aversion, the simple mean self-employment rates across the sample groupings reported in Table 2 may not be informative of how ex-offender status matters for the decision to be a self-employed entrepreneur.

As our theory omits and abstracts away from the potential role of human, financial and cultural/social capital that may be important for the self-employment decision (Kim, Aldrich, & Keister, 2006), we include covariates to proxy for these as their omission may be a source of bias in parameter estimates. We proxy human capital with years of schooling (YRSCH). For both social/cultural and financial capital, we use whether or not an individual's mother (MSELFE) or father (PSELFE), was self-employed, as Dunn and Holtz-Eakin (2000) find evidence of an intergenerational causal nexus between an individual's transition into self-employment, and their parent's self-employment status, wealth and human capital. Given the intergenerational correlation between parent's selfemployment status and offspring wealth, the inclusion of MSELFE and PSELFE may also account for the affects of accumulated financial capital and income as a determinant of individual self-employment (Blanchflower & Oswald, 1998).

Given the differences in the number of observations due to missing observations, empirical estimates of the effects of being an ex-incarceree/convict on self-employment could be subject to bias if the pattern of missing observations is not completely random. Table 3 reports the results of testing whether or not in the GSS, the core covariates—self-employment, having spent time in jail, and ever being convicted of a crime—are missing completely at random (MCAR). The test of Li (2013) based on that of Little (1988) cannot reject the null hypothesis that the three main covariates of interest are MCAR. This suggests that given these covariates can be viewed as MCAR, estimating specifications based on Equations 1 and 2 above across differential sample sizes will not result in any bias due to missing observations or variability in the number of observations across specifications.

Tables 4 to 11 report simple Probit and Bivariate Probit treatment parameter estimates of the self-employment decision across nine specifications of risk propensities, for the treatment of both having ever spent any time in jail, and ever being convicted of a crime.[5] All parameter estimates are based on heteroskedasticity robust standard errors, which can mitigate/eliminate any biases associated with correlations in the type self-employed jobs secured as a function of having ever been an ex-incarceree/convict, or not. The explanatory adequacy of all parameter estimates are assessed with a Wald chi-square distributed test for the null hypothesis that the exogenous explanatory variables have parameters that are jointly insignificant. For all specifications, pseudo-$R2$ (McFadden, 1974) is reported as a goodness-of-fit measure. For the Bivariate Probit treatment estimates, the adequacy of the restriction that the treatment is correlated with the outcome is assessed with a chi-square test for the null hypothesis that the joint error terms are not correlated.[6] The specific treatment effects reported are the average treatment effect (ATE) and the average treatment effect on the treated (ATT). In particular, for the Bivariate Probit specification, the ATE and ATT are estimated as the average marginal effect of each treatment—having been jailed and convicted—on self-employment for the entire sample and for those actually treated.[7]

The simple Probit parameter estimates reported in Tables 4 to 7 reveal that almost across all nine risk propensity measures, having ever been jailed and ever being convicted of a crime do not have a statistically significant effect on the probability of being self-employed. Moreover, the signs of the treatment are positive in the case of ever being jailed, and negative and significant in the case of ever being convicted, when risk propensity is measured by the number of sexual

Table 2. Covariate Summary.

	Sample	Ex-convicts	Ex-incarcerees
SELFE			
M	0.102	0.065	0.099
SD	0.303	0.247	0.299
Number of observations	1,894	201	252
CVICT			
M	0.120	1	0.552
SD	0.325	0	0.498
Number of observations	1,748	259	210
INCAR			
M	0.148	0.681	1
SD	0.355	0.467	0
Number of observations	1,748	210	259
AGE			
M	48.19	41.20	43.12
SD	17.69	14.41	14.88
Number of observations	1,969	210	259
BLK			
M	0.152	0.176	0.205
SD	0.359	0.382	0.404
Number of observations	1,974	210	259
DRUGS			
M	0.025	0.121	0.130
SD	0.155	0.326	0.337
Number of observations	1,703	199	238
GSEX1			
M	0.029	0.065	0.049
SD	0.356	0.578	0.522
Number of observations	1,723	199	241
GSEX2			
M	1.05	4.01	3.28
SD	12.93	31.05	28.40
Number of observations	1,587	190	226
IPROB1			
M	0.099	0.083	0.114
SD	0.299	0.278	0.319
Number of observations	909	123	108
IPROB2			
M	0.233	0.236	0.274
SD	0.423	0.427	0.448
Number of observations	913	124	110
MALE			
M	0.448	0.676	0.691
SD	0.497	0.469	0.463
Number of observations	1,974	210	259
MSELFE			
M	0.116	0.062	0.079
SD	0.321	0.242	0.269
Number of observations	1,369	161	191

(continued)

Table 2. (continued)

	Sample	Ex-convicts	Ex-incarcerees
NSEXP			
M	1.12	1.47	1.18
SD	1.28	1.46	1.64
Number of observations	1,723	199	241
PSELFE			
M	0.255	0.199	0.192
SD	0.436	0.401	0.395
Number of observations	1,618	161	203
PUSEX			
M	0.389	0.444	0.437
SD	0.488	0.502	0.501
Number of observations	270	54	64
SPAR18			
M	11.64	36.29	32.73
SD	48.71	130.62	120.89
Number of observations	1,498	177	208
UN10			
M	0.358	0.568	0.559
SD	0.479	0.497	0.498
Number of observations	1,337	148	184
XMSEX			
M	0.125	0.177	0.167
SD	0.331	0.382	0.374
Number of observations	1,702	198	239
YRSCH			
M	13.53	12.91	12.64
SD	3.13	2.45	2.59
Number of observations	1,972	210	259

Source. The General Social Survey Cumulative 1972-2016 Data, National Opinion Research Center, University of Chicago.
Note. Test for equality of means across the sample groupings allows for unequal variances.

partners an individual had in the past year. To the extent that ever spending time in jail and ever being convicted of a crime are exogenous, the results in Tables 4 to 7 suggest that ex-incarceree/convict status have no effect on the likelihood of being a self-employed entrepreneur. Even in the case where risk aversion is captured by factors like the number of sexual partners in the past year, being an ex-incarceree/convict has a negative, albeit statistically insignificant effect on being a self-employed entrepreneur.

For the Bivariate Probit treatment parameter estimates in Tables 8 to 11, we could not conceptualize a sensible exclusion restriction from data in the GSS. As such, we estimate the treatment effects without an exclusion restriction and identify the treatment effects by treating Equations 1 and 2 as a recursive Probit model.[8] This allows identifying the treatment effect with no exclusion restrictions, which Wilde (2000) shows is permissible if each equation contains at least one varying exogenous regressor—an approach which has been utilized to explain the likelihood of entrepreneurial exit by Hessels, Isabel, Thurik, and van der Zwan (2011).[9] Allowing for the endogeneity of ever being jailed and convicted, the Bivariate Probit treatment parameter estimates in Tables 8 to 11 reveal that in six of the specifications, there is evidence for endogeneity suggested by the rejection of $\rho = 0$ in those instances—the correlation between the errors of the outcome and treatment.

Table 3. Missing Completely At Random Test.

	SELFE	INCAR	CVICT
$\bar{y}_i$	.1023	.1481	.1198
Σ_{oj}			
SELFE	.0919	.0004	−.0040
INCAR	.0041	.1261	.0639
CVICT	−.0040	.0639	.1057
Number of observations	1,961		
$\chi^2_7 = 8.96$			
p value	.255		

Note. The test for MCAR is that of Li (2013) based on the test proposed by Little (1988). For the covariates of interest y_i, it is assumed that $\mathbf{y} \sim N(\boldsymbol{\mu}, \Sigma)$. Let $\bar{\mathbf{y}}_{oj}$ ($p_j \times 1$) be the observed sample average for the *j*th missing value data pattern for $j \in J$, and let $\boldsymbol{\mu}_{oj}$ and Σ_{oj} be the $p_j \times 1$ dimensional mean vector and the $pj \times pj$ covariance matrix of the observed components of the *j*th missing value pattern, respectively. Finally, let $\mathbf{r}_i = (r_i 1 \ldots, r_{ip})T$ be the p-dimensional binary indicator vector of whether each observation in $\mathbf{y}_i$ is observed, (e.g., $r_{ik} = 1$ if y_{ik} is observed, and zero otherwise), and let $\mathbf{I}_j \subseteq [1, 2, \ldots, n]$ be the index set of pattern *j* in the sample where $n_j = |\mathbf{I}_j|$ and $\sum_{j-1}^{J} n_j = n$. Little's $\chi 2$ test statistic with $\sum_{j=1}^{J} p_j - p$ degrees of freedom is:

$$d_o^2 = \sum_{j=1}^{J} n_j \left(\bar{o}_j - \mu_{oj}\right) \sum_{oj} t-1 \left(\bar{y}_{oj} - \mu_{oj}\right).$$

Given that if the data are MCAR, *d*2 is a test statistic for the null hypothesis:
H_0: $\mathbf{y}_{o,i} \mid \mathbf{r}_i \sim N(\boldsymbol{\mu}_{oj}, \Sigma_{oj})$.
If H_0 is rejected, the *yi* cannot be viewed as MCAR. In Table 3, the $\bar{\mathbf{y}}_i$ are the sample mean values of the covariates, and Σ_{oj} is the estimated variance-covariance matrix.

In those instances where there is evidence for treatment endogeneity (e.g., $\rho \neq 0$), both the treatment of ever being jailed and convicted are positive and significant, suggesting that being an ex-incarceree/convict increases the likelihood of being a self-employed entrepreneur.[10] The estimated ATEs suggest that for the population of individuals as a whole, being an ex-incarceree/convict increases the likelihood of being a self-employed entrepreneur between approximately 30% and 40%. For the population of actual ex-incarcerees/convicts, the estimated ATTs suggest that having such status increases the likelihood of being a self-employed entrepreneur between approximately 58% and 64%.

The Bivariate Probit results in Tables 8 to 11 also suggest that ex-incarcerees/convicts are relatively less risk averse—a characteristic that is theoretically important for becoming a self-employed entrepreneur. Relative to the simple Probit parameter estimates in Tables 4 to 7, where the treatment of being an ex-incarceree/convict is never significant, the Bivariate Probit treatment estimates endogenize ex-incarceree/convict status on risk propensities, whereby the treatment of ex-incarceree/convict status becomes significant. In this context, the parameter estimates reported in Tables 8 to 11 are consistent with current and former criminals and incarcerees being relatively well suited for entrepreneurship (Levine & Rubinstein, 2017).

Given that Black Americans are disproportionately jailed/incarcerated (Alexander, 2010; Foster & Hagan, 2009), the ATTs reported in Tables 8 to 11 may be biased, as they do not account for the differential rate at which Black Americans enter into ex-incarceree/convict status relative to non-Black Americans. Table 12 reports the ATT for Black Americans, Black females, and Black males for the specifications in Tables 8 to 11 in which treatment exogeneity can be rejected ($\rho = 0$). Relative to the ATT for the entire sample, the estimated ATT is higher on average for Black Americans. With respect to gender, for the six specifications in Table 12, it is relatively high for Black females and males in three instances, respectively. The estimated ATT's in Table 12 suggest that relative to the population of ex-incarcerees/convicts as a whole, Black ex-incarcerees/convicts are more likely to be self-employed entrepreneurs.

Table 4. Simple Probit Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(1)	(2)	(3)	(4)	(5)
Regressand: Individual is self-employed (binary) regressors					
Constant	−2.43 (.001)[a]	−2.48 (.001)[a]	−2.39 (.001)[a]	−2.49 (.001)[a]	−2.53 (.001)[a]
AGE	0.019 (.005)[a]	0.019 (.001)[a]	0.018 (.001)[a]	0.018 (.001)[a]	0.019 (.001)[a]
BLK	−0.449 (.242)	−0.465 (.054)[c]	−0.465 (.059)[c]	−0.279 (.301)	−0.439 (.076)[c]
MALE	0.131 (.145)	0.138 (.341)	0.112 (.446)	0.047 (.772)	0.064 (.691)
MSELFE	0.222 (.217)	0.195 (.367)	0.247 (.260)	0.360 (.135)	0.309 (.192)
PSELFE	0.126 (.186)	0.168 (.356)	0.094 (.611)	−0.034 (.883)	0.017 (.939)
UN10	−0.154 (.210)	−0.095 (.554)	−0.139 (.401)	−0.146 (.430)	−0.154 (.401)
YRSCH	0.009 (.025)	0.011 (.644)	0.008 (.747)	.018 (.535)	0.022 (.442)
Exogenous treatment:					
Individual was jailed (binary)					
INCAR	0.151 (.210)	0.168 (.412)	0.228 (.280)	0.357 (.239)	0.359 (.127)
Risk propensities					
DRUGS	−0.183 (.534)				
GSEX1		−0.159 (.587)			
GSEX2			0.0002 (.712)		
IPROB1				−0.338 (.334)	
IPROB2					−0.043 (.828)
H_0: $\beta i = 0$ (χ^2_{k-1})	28.62a	29.85a	28.17	20.56a	17.68a
Pseudo-*R*2	.065	.065	.064	.058	.039
Number of observations	609	613	579	456	460

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Conclusion

This article considered whether ex-incarceree/convict status favorably conditions the individual decision to be self-employed—a proxy for entrepreneurship. With data from the GSS, we estimated the parameters of Bivariate Probit treatment specifications of the individual self-employment decision as a function of former incarceree/convict status conditioned and several measures of individual risk-taking propensities. Our estimated treatment effects suggest that being an ex-incarceree/convict increases the likelihood of being a self-employed entrepreneur. We also find that for Black American ex-incarcerees/convicts, relative to the population of ex-incarcerees/convicts as a whole, the average treatment effect of being an ex-incarceree/convict is higher.

Our findings have several policy implications. First, our results suggest that entrepreneurship programs targeted at current and former incarcerees/convicts are likely to be effective in fostering new entrepreneurs and their expansion could result in an increase in the number of self-employed entrepreneurs. Second, our results suggest that the case-specific findings of Cooney (2012) may be general for the population of ex-incarcerees/convicts. In particular, our parameter estimates suggest that prison entrepreneurship programs may be effective treatments that affect criminal justice reform. Given that self-employment and entrepreneurship as individual labor force attachments are plausible substitutes for crime, the elimination of any barriers that restrict access to start-up capital or self-employment opportunities for ex-incarcerees/convicts would reduce crime and recidivism (Fetsch, 2016; Keena & Simmons, 2015), which would reduce mass incarceration and complement pro-growth economic policies that encourage self-employment and entrepreneurship.

Table 5. Simple Probit Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(6)	(7)	(8)	(9)
Regressand: Individual is self-employed (binary) regressors				
Constant	−2.57 (.001)[a]	−3.20 (.056)[c]	−2.43 (.001)[a]	−2.38 (.001)[a]
AGE	0.020 (.001)[a]	0.057 (.002)[a]	0.018 (.001)[a]	0.017 (.001)[a]
BLK	−0.476 (.051)[b]	−5.18 (.001)[a]	−0.466 (.089)[c]	−0.487 (.042)[b]
MALE	0.121 (.400)	0.183 (.683)	0.019 (.899)	0.152 (.302)
MSELFE	0.183 (.400)	0.971 (.099)[c]	0.323 (.140)	0.234 (.285)
PSELFE	0.174 (.341)	−4.89 (.001)[a]	0.003 (.987)	0.129 (.478)
UN10	−0.093 (.565)	0.835 (.068)[c]	−0.117 (.498)	−0.145 (.380)
YRSCH	0.009 (.687)	−0.097 (.324)	0.014 (.589)	0.006 (.805)
Exogenous treatment:				
Individual was jailed (binary)				
INCAR	0.125 (.536)	0.132 (.771)	0.163 (.504)	0.145 (.480)
Risk propensities:				
NSEXP	0.062 (.162)			
PUSEX		0.165 (.746)		
SPAR18			−0.001 (.552)	
XMSEX				0.346 (.077)b
H_0: $\beta i = 0$ (χ^2_{k-l})	29.93[a]	280.96[a]	24.25[a]	31.57[a]
Pseudo-*R*2	.068	.326	.060	.073
Number of observations	613	102	548	608

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 6. Simple Probit Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(1)	(2)	(3)	(4)	(5)
Regressand: Individual is self-employed (binary) regressors					
Constant	−2.28 (.001)[a]	−2.29 (.001)[a]	−2.17 (.001)[a]	−2.22 (.001)[a]	−2.28 (.001)[a]
AGE	0.018 (.001)[a]	0.018 (.001)[a]	0.018 (.001)[a]	0.017 (.001)[a]	0.016 (.001)[a]
BLK	−0.401 (.101)[b]	−0.418 (.090)[b]	−0.413 (.100)[b]	−0.193 (.477)	−0.199 (.440)
MALE	0.169 (.246)	0.183 (.207)	0.169 (.249)	0.119 (.471)	0.129 (.435)
MSELFE	0.212 (.331)	0.181 (.402)	0.223 (.312)	0.358 (.136)	0.300 (.203)
PSELFE	0.126 (.498)	0.163 (.372)	0.089 (.629)	−0.055 (.811)	−0.002 (.992)
UN10	−0.122 (.458)	−0.056 (.730)	−0.094 (.567)	−0.106 (.559)	−0.105 (.560)
YRSCH	0.003 (.897)	0.003 (.901)	−0.001 (.959)	0.005 (.852)	0.010 (.560)
Exogenous treatment:					
Individual was convicted (binary)					
CVICT	−0.394 (.181)	−0.415 (.120)	−0.424 (.119)	−0.283 (.325)	−0.281 (.329)
Risk propensities					
DRUGS	0.061 (.915)				
GSEX1		−0.139 (.570)			
GSEX2			0.001 (.789)		
IPROB1				−0.355 (.308)	
IPROB2					0.002 (.993)
H_0: $\beta i = 0$ (χ^2_{k-l})	31.61[a]	31.51[a]	30.23[a]	20.93[a]	18.02[a]
Pseudo-*R*2	.069	.069	.067	.055	.047
Number of observations	609	613	579	456	460

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 7. Simple Probit Parameter Estimates: Ex-Incarceree/Convict Status And Self-Employment.

Specification	(6)	(7)	(8)	(9)
Regressand: Individual is self-employed (binary)				
Regressors				
Constant	−2.43 (.001)[a]	−2.60 (.116)	−2.22 (.001)[a]	−2.18 (.001)[a]
AGE	0.019 (.001)[a]	0.057 (.002)[a]	0.017 (.001)[a]	0.016 (.001)[a]
BLK	−0.439 (.076)[c]	−5.10 (.001)[a]	−0.463 (.097)[c]	−0.448 (.065)[c]
MALE	0.160 (.266)	0.271 (.581)	0.049 (.753)	0.194 (.189)
MSELFE	0.171 (.434)	1.03 (.107)	0.310 (.158)	0.222 (.312)
PSELFE	0.173 (.345)	−5.06 (.001)[a]	0.003 (.989)	0.129 (.482)
UN10	−0.059 (.718)	0.883 (.070)[a]	−0.079 (.646)	−0.111 (.505)
YRSCH	0.002 (.921)	−0.139 (.187)	0.005 (.838)	−0.002 (.922)
Exogenous treatment:				
Individual was convicted (binary)				
CVICT	−0.467 (.070)[c]	−0.555 (.295)	−0.492 (.139)	−0.448 (.105)
Risk propensities				
NSEXP	0.075 (.106)			
PUSEX		0.077 (.884)		
SPAR18			0.001 (.784)	
XMSEX				0.382 (.055)[c]
H_0: $\beta i = 0$ (χ^2_{k-1})	35.53[a]	329.95[a]	27.0[a]	35.40[a]
Pseudo-R^2	.075	.335	.066	.079
Number of observations	613	102	548	608

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 8. Bivariate Probit Treatment Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(1)	(2)	(3)	(4)	(5)
Regressand: Individual is self-employed (binary)					
Regressors					
Constant	−2.83 (.001)[a]	−2.85 (.001)[a]	−2.73 (.001)[a]	−3.30 (.001)[a]	−3.08 (.001)[a]
AGE	0.019 (.001)[a]	0.019 (.001)[a]	0.019 (.001)[a]	0.017 (.001)[a]	0.015 (.002)[a]
BLK	−0.502 (.017)[b]	−0.504 (.023)[b]	−0.490 (.031)[a]	−0.548 (.017)[a]	−0.511 (.054)[c]
MALE	0.041 (.785)	0.042 (.778)	0.025 (.873)	−0.107 (.568)	−0.069 (.702)
MSELFE	0.290 (.195)	0.232 (.276)	0.294 (.180)	0.378 (.059)[b]	0.326 (.107)
PSELFE	0.097 (.589)	0.154 (.383)	0.078 (.668)	0.157 (.336)	0.142 (.465)
UN10	−0.222 (.164)	−0.169 (.301)	−0.206 (.227)	−0.239 (.110)	−0.257 (.080)[c]
YRSCH	0.036 (.221)	0.034 (.222)	0.029 (.327)	0.075 (.001)[a]	0.067 (.013)[b]
Endogenous treatment:					
Individual was jailed (binary)					
INCAR	1.83 (.070)[b]	1.39 (.197)	1.34 (.247)	2.70 (.001)[a]	2.65 (.001)[a]
Risk propensities					
DRUGS	−1.06 (.096)[c]				
GSEX1		−0.118 (.634)			
GSEX2			0.002 (.651)		
IPROB1				−0.273 (.269)	
IPROB2					−.079 (.658)
ATE	0.318 (.063)[b]	0.244 (.238)	0.237 (.291)	0.427 (.001)[a]	0.422 (.001)[a]
ATT	0.646 (.001)[a]	0.514 (.260)	0.490 (.325)	0.576 (.001)[a]	0.581 (.001)[a]
H_0: $\beta i = 0$ (χ^2_{k-1})	136.02[a]	653.39[a]	100.96[a]	533.37[a]	536.79[a]
H_0: $\rho = 0$ (χ^2_1)	1.39	.899	.703	7.10[a]	.242

(continued)

Table 8. (continued)

Specification	(1)	(2)	(3)	(4)	(5)
Pseudo-*R*2	.541	.562	.538	.366	.368
Number of observations	609	613	579	456	460

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses. ATE = average treatment effect; ATT = average treatment effect on the treated.
a Significant at the .01 level.
b Significant at the .05 level.
c Significant at the .10 level.

Table 9. Bivariate Probit Treatment Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(6)	(7)	(8)	(9)
Regressand: Individual is self-employed (binary) regressors				
Constant	−2.88 (.001)[a]	−1.53 (.469)	−2.68 (.001)[a]	−2.82 (.001)[a]
AGE	0.019 (.001)[a]	0.057 (.003)[a]	0.019 (.001)[a]	0.017 (.001)[a]
BLK	−0.518 (.017)[b]	−6.21 (.001)[a]	−0.489 (.066)[c]	−0.524 (.012)[b]
MALE	0.011 (.942)	0.179 (.650)	−0.019 (.902)	0.046 (.748)
MSELFE	0.241 (.254)	0.795 (.262)	0.349 (.111)	0.292 (.172)
PSELFE	0.153 (.382)	−5.69 (.001)[a]	−0.002 (.991)	0.111 (.527)
UN10	−0.169 (.278)	0.792 (.088)[a]	−0.169 (.356)	−0.209 (.172)
YRSCH	0.037 (.126)	−0.172 (.041)[b]	0.028 (.358)	0.036 (.169)
Endogenous treatment:				
Individual was jailed (binary)				
INCAR	1.68 (.012)[b]	−1.13 (.169)	0.965 (.468)	1.78 (.009)[a]
Risk propensities				
NSEXP	0.020 (.583)			
PUSEX		0.092 (.809)		
SPAR18			−0.001 (.450)	
XMSEX				0.238 (.214)
ATE	0.298 (.013)[b]	−0.128 (.393)	0.155 (.514)	0.308 (.007)[a]
ATT	0.618 (.001)[a]	−0.055 (.069)[c]	0.312 (.614)	0.644 (.001)[a]
H_0: $\beta i = 0$ (χ^2_{k-1})	128.49[a]	564.92[a]	92.79[a]	157.64[a]
H_0: $\rho = 0$ (χ^2_{k-1})	2.71[c]	.713	.353	2.91[c]
Pseudo-R^2	.561	.656	.477	.554
Number of observations	613	102	548	608

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses. ATE = average treatment effect; ATT = average treatment effect on the treated.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 10. Bivariate Probit Treatment Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(1)	(2)	(3)	(4)	(5)
Regressand: Individual is self-employed (binary)					
Regressors:					
Constant	−2.13 (.008)[a]	−1.08 (.388)	−1.41 (.410)	−2.77 (.001)[a]	−2.83 (.001)[a]
AGE	0.017 (.004)[a]	0.009 (.362)	0.013 (.329)	0.017 (.001)[a]	0.016 (.001)[a]
BLK	−0.383 (.178)	−0.262 (.300)	−0.344 (.294)	−0.209 (.344)	−0.141 (.476)
MALE	0.189 (.273)	0.277 (.024)[b]	0.249 (.185)	0.032 (.839)	0.030 (.862)

(continued)

Table 10. (continued)

Specification	(1)	(2)	(3)	(4)	(5)
MSELFE	0.188 (.442)	0.025 (.924)	0.087 (.809)	0.333 (.115)	0.318 (.155)
PSELFE	0.131 (.484)	0.135 (.403)	0.086 (.613)	−0.019 (.927)	0.011 (.958)
UN10	−0.085 (.714)	0.162 (.474)	0.039 (.896)	−0.187 (.236)	−0.189 (.206)
YRSCH	−0.002 (.934)	−0.033 (.378)	−0.025 (.610)	0.043 (.085)[b]	0.049 (.050)[c]
Endogenous treatment:					
Individual was convicted (binary)					
CVICT	−.816 (.600)	−1.73 (.001)[a]	−1.51 (.190)	2.40 (.001)[a]	2.46 (.001)[a]
Risk propensities					
DRUGS	0.273 (.785)				
GSEX1		−0.186 (.445)			
GSEX2			−0.001 (.925)		
IPROB1				−0.288 (.408)	
IPROB2					−0.143 (.350)
ATE	−0.128 (.640)	−0.389 (05.0)[b]	−0.304 (.445)	0.401 (.001)[a]	0.411 (.001)[a]
ATT	−0.039 (.076)[c]	−0.024 (.012)[b]	−0.027 (.207)	0.603 (.001)[a]	0.588 (.001)[a]
H_0: $\beta i = 0$ (χ^2_{k-1})	83.51[a]	154.51[a]	101.16[a]	143.21[a]	119.53[a]
H_0: $\rho = 0$ (χ^2_{k-1})	.064	.577	.219	89.57[a]	8.49[a]
Pseudo-R^2	.526	.544	.529	.383	.394
Number of observations	609	613	579	456	460

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses. ATE = average treatment effect; ATT = average treatment effect on the treated.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 11. Bivariate Probit Treatment Parameter Estimates: Ex-Incarceree/Convict Status and Self-Employment.

Specification	(6)	(7)	(8)	(9)
Regressand: Individual is self-employed (binary) regressors				
Constant	−2.78 (.001)[a]	−3.09 (.087)[b]	−2.17 (.045)[b]	−1.17 (.205)
AGE	0.019 (.001)[a]	0.047 (.011)[b]	0.017 (.015)[b]	0.009 (.231)
BLK	−0.424 (.060)[c]	−5.97 (.990)	−0.463 (.096)[c]	−0.322 (.182)
MALE	0.093 (.491)	0.199 (.692)	0.053 (.768)	0.268 (.040)[b]
MSELFE	0.312 (.082)[a]	1.02 (.173)	0.302 (.264)	0.082 (.734)
PSELFE	0.172 (.280)	−5.97 (.981)	0.003 (.988)	0.113 (.488)
UN10	−0.147 (.363)	0.708 (.136)	−0.069 (.786)	0.081 (.678)
YRSCH	0.028 (.192)	−0.071 (.529)	0.003 (.938)	−0.033 (.285)
Endogenous treatment:				
Individual was convicted (binary)				
CVICT	2.25 (.001)[a]	1.38 (.019)[b]	−0.628 (.818)	−1.68 (.001)[a]
Risk propensities				
NSEXP	0.037 (.355)			
PUSEX		0.148 (.740)		
SPAR18			0.001 (.903)	
XMSEX				0.432 (.013)[b]
ATE	0.387 (.001)[a]	0.147 (.039)[b]	−0.094 (.826)	−0.349 (.023)[b]
ATT	0.636 (.001)a	0.309 (.111)	−0.039 (.001)[a]	−0.024 (.010)[a]
H_0: $\beta i = 0$ (χ^2_{k-1})	92.27[a]	75.23[a]	60.10[a]	128.85[a]
H_0: $\rho = 0$ (χ^2_{k-1})	14.35a	2.19	.002	1.33
Pseudo-R^2	.538	.669	.467	.535
Number of observations	613	102	548	608

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses. ATE = average treatment effect; ATT = average treatment effect on the treated.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

Table 12. Average Treatment Effect on the Treated Estimates for Black Americans: Ex-Incarceree/Convict Status and Self-Employment.

Risk measure	(IPROB1)	(NSEXP)	(XMSEX)	(IPROB1)	(IPROB2)	(NSEXP)
Treatment:	Jailed	Jailed	Jailed	Convicted	Convicted	Convicted
Black Americans						
ATT	.828 (.001)[a]	.609 (.080)[c]	.652 (.055)[c]	.695 (.001)[a]	.653 (.001)[a]	.779 (.001)[a]
Black females						
ATT	.808 (.001)[a]	.608 (.084)[c]	.649 (.062)[c]	.702 (.001)[a]	.660 (.001)[a]	.792 (.001)[a]
Black males						
ATT	.856 (.001)[a]	.610 (.075)[c]	.655 (.046)[b]	.686 (.001)[a]	.644 (.001)[a]	.764 (.001)[a]
Number of observations	456	613	608	456	460	613

Note. Approximate *p* values, based on heteroskedasticity robust standard errors, are in parentheses. ATT = average treatment effect on the treated.
[a]Significant at the .01 level.
[b]Significant at the .05 level.
[c]Significant at the .10 level.

As for limitations, our analysis may obscure the effects of race on the likely efficacy of entrepreneurship training program for ex-incarcerees/convicts—particularly the consequences of being Black, as there is evidence that the postincarceration labor market experiences of Blacks is less favorable relative to Whites (LeBel, 2012; Pager, 2003; Winnick & Bodkin, 2009). We do include a binary indicator for being Black in our specification—which is negative and significant in many instances—suggesting that Black ex-incarcerees/convicts face, relative to non-Blacks, barriers in the self-employment labor market, which may reduce the effectiveness of entrepreneurial training programs for ex-incarcerees/convicts for Black participants. However, we do find that the treatment effect of being an ex-incarceree/convict on self-employment is higher for Black Americans. This suggests that relative to the population of ex-incarcerees/convicts in general, Black American ex-incarcerees/convicts could particularly benefit from the expansion of entrepreneurship training programs and policy interventions that eliminate any barriers they face in accessing start-up capital.

Our data also do not permit identification of when individuals were convicted/incarcerated or the nature of the crime for which they were convicted/incarcerated. As such, our specifications may suffer from unobservable and omitted variables—the type of crime and years since convicted/incarcerated for—that we cannot measure and omit, which can introduce bias in our parameter estimates. However, to the extent that the missingness of omitted and unmeasured variables is random, but are possibly dependent and correlated with included covariates, our reported parameter estimates are unbiased, as we could not reject the hypothesis of the covariates MCAR in Table 3.[11]

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Notes

1. In general, a self-employed individual need not constitute a entrepreneur in the Schumpeterian sense—the founder of a firm that is innovative and catalyzes economic growth by innovation (Henrekson & Sananjaji, 2014). In this context, self-employment is at best a proxy for entrepreneurship in some non-Schumpeterian sense—firms owned by individuals with different motivations relative to Schumpeterian entrepreneurs (Hurst & Pugsley, 2011), and catalyze economic growth through employment and not innovation.
2. GSS data are available at http://gss.norc.org/Get-The-Data.
3. For an overview of the determinants of self-employment and entrepreneurship, see De Wit (2012); G. Kim (2008); Simoes, Crespo, and Moreira (2016); and Van der Sluis, van Praag, and Vijverberg (2008). We include the covariate UN10 to control for "entrepreneurship," capturing the effect that unemployment in the traditional labor market may incentivize self-employment (Block & Koellinger, 2009).
4. Our risk measures follow the practice of using actual behaviors are a proxy for risk preference in the manner of Anderson and Mellor (2008), Hakes and Viscusi (2007), and Viscusi and Hersch (2001).
5. Given that MCAR could not be rejected for the main covariates of interest, we report unweighted parameter estimates. As MCAR is consistent with nonselection in the sample, and we interested in the causal effects of being an ex-incarceree/convict, refraining from the use of sampling weights minimizes biased standard errors (Freedman & Berk, 2008), and as long as some of the covariates are related to possible heteroskedasticity, unweighted parameter estimates will be unbiased (Solon, Haider, & Wooldridge, 2015). As there is an age–crime gradient (Blonigen, 2010), our inclusion of individual age as a covariate mitigate/eliminates this potentially dominant source of heteroskedasticity in individual crime.
6. All parameter estimates were enabled with StataSE 13.
7. The Ruben Causal Model of potential outcomes (Holland, 1986) rationalizes ATE and ATT. For each individual, we observe $Y_i = Y_{oi} + D_i\,(Y_i1 - Y_{oi})$, where Y_i1 is the potential self-employment status of individual *i* if he were an ex-incarceree/convict, *Yoi* is potential self-employment status if he were not an ex-incarceree/convict, and *Di* is a binary indicator for ex-incarceree/convict status. It follows that ATE $= E[Y_{1i} - Y_{oi}]$ and ATT $= E[Y_{1i} - Y_{oi} \mid D_i = 1]$, where E is an expectation operator.
8. In particular, the absence of an exclusion restriction implies $Z / \gamma = 0$ in Equation 2.
9. See, in particular, Wilde's (2000) Lemma on p. 3, which allows identification in the absence of exclusion restrictions as long as the error terms have a multivariate normal distribution.
10. For brevity, we do not report the estimated parameters for the equation determining the treatment in Tables 8 to 11 as the primary interest in the effect of treatment once accounting for its endogeneity.
11. Covariate dependent missingness is a special case of MCAR (Li, 2013).

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