Rebranding Ex-convicts

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Abstract

We develop a theoretical model explaining how the problem of poor labor market outcomes for ex-convicts might be alleviated by a government intervention. While employers wish to avoid associating with those who will end up returning to crime, they cannot be certain from the available information which convicts will reoffend and which will not. We illustrate that, notwithstanding this informational asymmetry, a government can nevertheless design a costly, yet net socially beneficial program through which some ex-convicts can credibly convey their good intentions to employers. Such a "rebranding" program can help more ex-convicts find legitimate work, with fewer electing to return to crime than would otherwise have been the case.

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1 Introduction

Surveys of employers show that the stigma of a criminal record is substantial for ex-convicts seeking employment (e.g., Holzer et al., 2006; Pager, 2007). Recent studies of ex-convict populations report that roughly half remain jobless up to a year after their release (e.g., Visher et al., 2011). Convicts thereby become discouraged in their search for work or avoid formal employment opportunities preemptively (Travis, 2005). According to a study by the Bureau of Justice Statistics in the United States, the rate of recidivism is significant: within three years of release, about two-thirds of released prisoners are rearrested (Durose et al., 2014) and four out of ten are reincarcerated (Pew Center on the States, 2011).[1]

We develop a theoretical model explaining how this problem of poor labor market outcomes for ex-convicts might be alleviated to some degree. This model draws on the basic idea of an equilibrium with self-confirming beliefs in the presence of asymmetric information (e.g., Arrow, 1973; Coate and Loury, 1993; Fang, 2001). We focus on what we take to be an essential feature of the labor market for ex-convicts, namely the idea that employers wish to avoid associating with those who will end up returning to crime, but they cannot be certain from the available information which convicts will reoffend and which will not. However, the convicts themselves are presumed to know their own intentions. Hence, our theoretical model focuses on this asymmetric information as well as on the attendant issues of *adverse selection* in this market.

Our main objective by introducing this model is to illustrate that, notwithstanding this informational asymmetry, a government (or a civic society) can nevertheless design a costly, yet net socially beneficial program through which some ex-convicts can credibly convey their

[1] Refer to National Research Council (2014) for a comprehensive study of incarceration in the United States and Loury (2008) for the social problems originating from the poor labor market outcomes for ex-convicts.

good intentions to employers. Such a program can help more ex-convicts find legitimate work, with fewer electing to return to crime than would otherwise have been the case.

Our approach to the adverse selection issue differs significantly from Spence's (1973) signaling theory. In his well-known model, the assumption that an individual's productivity is negatively correlated with his or her program participation (e.g., education) cost plays a critical role in deriving the labor market equilibria that solve the problem of adverse selection. In our signaling model, however, the program participation cost need not be correlated with one's value of a criminal activity. We show that for any fixed participation cost within a limited range, there exists an equilibrium that relieves employers' adverse selection problem. Importantly, this model has a potential to apply much more broadly than to the labor market for convicted felons. One example is discussed at the end of this paper.

The reminder of this paper is structured as follows. Section 2 introduces the basic framework of the model. Section 3 describes the labor market condition for ex-convicts and the possible labor maker collapse. Section 4 proposes a costly but socially valuable "rebranding" program for the ex-convicts. Section 5 follows with a discussion of the welfare properties of the program. Section 6 presents the concluding remarks.

2 Basic Framework

The key factor to this set-up is the notion that, in a rational and self-interested manner, ex-convicts make choices about their future participation in criminal activities. Specifically, we imagine that newly released convicts choose to return to crime if and only if the perceived benefits from doing so exceed the costs. To keep things simple, we assume that the benefits from a criminal activity for any individual ex-convict are exogenous. However, in our model

the costs of returning to crime are endogenous; in other words, they are not specified a priori but rather determined by the workings of the model itself. Specifically, these costs will be reckoned in terms of the reduced remuneration from legitimate work implied by an ex-convict's choice to participate in crime, as explained concretely below.

We take it that employers, when faced with an ex-convict job applicant, cannot know whether this particular individual is one who places a "high" or "low" value on criminal activities. We capture this employer uncertainty in two steps. First, we posit that employers know the proportion of the overall convict population who will ultimately recidivate.[2] We denote this aggregate belief of employers about the proportion of all ex-convicts who elect to return to crime by π.

Second, we assume that when faced with a particular applicant drawn from the overall ex-convict population, employers have available to them some noisy idiosyncratic information about that individual that is relevant to assessing his or her future behavior, without being determinative of it. We model this idea by supposing that employers can see the result of a so-called "pass/fail test."[3] Our simple idea is that an ex-convict who will return to crime is more likely to "fail" than to "pass" such a test, while an ex-convict going straight is more likely to "pass."

For the sake of simplicity, we assume that the labor productivity of an ex-convict going straight is ω and that of an ex-convict returning to crime is zero. When confronted with a particular job applicant, we take it that employers make a wage offer to prospective ex-convict workers based on a test-inclusive assessment of the likelihood that this individual will return to crime. Intuitively, the more confident is an employer that a worker is going straight, the

[2]This kind of information about the overall market might be gathered, for instance, from publicly available statistical reports and research studies.

[3]You can think of this "test" as including the results of an interview, review of an individual's public records, or assessment of the parole officer's report.

higher will be the offered wage. This means that "passers" will receive more favorable terms for legitimate employment than will "failers".

Finally, we close our model by noting that since employers' wage offers to prospective ex-convict employees depend on whether an applicant "passes" or "fails" the employers' test, and since the likelihood of passing falls if an ex-convict returns to crime, the employers' wage offers thereby imply that an expected cost for ex-convicts—in terms of foregone legitimate earnings—is associated with their making that decision. This anticipated loss of expected remuneration from legitimate work determines the incentive that ex-convicts have to go straight.

The following describes the relevant notations. The value of a criminal activity for an ex-convict is denoted by c and the proportion of the ex-convict population with a crime value no greater than c is denoted by $G(c)$. We assume that ex-convicts' value of crime is uniformly distributed on the interval $[0, 2\mu]$: $G(c) = Min\{\frac{c}{2\mu}, 1\}$ for some $\mu > 0$. Thus, μ indicates the average value of a criminal activity in the ex-convict population.

The "pass/fail test" outcome for a particular ex-convict is denoted by t. The probability that a straight (criminal) ex-convict passes (fails) the employer's test is denoted by p. As mentioned above, those going straight (returning to crime) pass (fail) with the probability $p > \frac{1}{2} : \Pr\{t = pass \mid \text{straight}\} = \Pr\{t = fail \mid \text{crime}\} = p > \frac{1}{2}$. Thus, parameter p reflects the accuracy of employers' information.

3 Labor Market Analysis

In this section, we introduce the employers' wage offers to ex-cons and the corresponding ex-cons' incentives to "go straight". Then, we search for the equilibrium in the labor market for ex-cons.

3.1 Employers' Wage Offers

Given some proportion π of the overall ex-convict population that employers believe to be going straight, competition will force employers' wage offers (W) to coincide with an ex-convict's expected productivity:

$$W(\pi, t) = \omega \cdot \Pr\{\text{“}straight\text{”} \mid t, \pi\} + 0 \cdot \Pr\{\text{“}crime\text{”} \mid t, \pi\},$$

where t is the test outcome (either pass or fail). By using Bayes's rule to compute the conditional probabilities, we get the following:

$$W(\pi, pass) = \frac{\omega p \pi}{p\pi + (1-p)(1-\pi)} \quad \text{and} \quad W(\pi, fail) = \frac{\omega(1-p)\pi}{(1-p)\pi + p(1-\pi)}.$$

Then, we may conclude that (i) $W(\pi, pass) > W(\pi, fail)$, for all $\pi \in (0,1)$; (ii) $W(0, pass) = W(0, fail) = 0$; (iii) $W(1, pass) = W(1, fail) = \omega$. That is, passers are offered wages at least as great as failers and, if an employer starts out believing that no (all) ex-convicts are going straight, then the offered wage is 0 (ω) to passers and failers alike. Moreover, with the aid of a bit of calculus, we see that (iv) $W(\pi, pass)$ is an increasing, concave function of π, while (v) $W(\pi, fail)$ is an increasing, convex function of π.[4] We make good use of these properties of the wage offer functions in the analysis that follows.

[4]That is, the wage offered to failers rises with employer beliefs about the overall proportion of ex-convicts electing to go straight at an increasing rate, while the wage offered to passers also rises with an employer's belief, although at a decreasing rate.

3.2 Ex-convicts' Incentive to Go Straight

Given the accuracy of employers' "test" information p, the expected legitimate earnings of an ex-convict going straight (V_1) is

$$V_1(\pi) \equiv pW(\pi, pass) + (1-p)W(\pi, fail),$$

while the expected legitimate earnings of an ex-convict returning to crime (V_0) is

$$V_0(\pi) \equiv (1-p)W(\pi, pass) + pW(\pi, fail).$$

Therefore, $V_1(0) = V_0(0) = 0$ and $V_1(1) = V_0(1) = \omega$. Hence, the wage offer incentive for an ex-convict going straight, denoted by $R(\pi)$, is

$$R(\pi) \equiv V_1(\pi) - V_0(\pi) = (2p-1) \cdot [W(\pi, pass) - W(\pi, fail)].$$

From the foregoing discussion we are assured that $R(\pi)$ is a concave function of π and that $R(0) = 0 = R(1)$. Moreover, some simple calculations reveal that

$$R(\pi) = \frac{\omega(2p-1)^2\pi(1-\pi)}{p(1-p) + (2p-1)^2\pi(1-\pi)} = \omega[1 + \frac{p(1-p)}{(2p-1)^2\pi(1-\pi)}]^{-1},$$

that

$$\frac{dR}{d\pi} \mid_{\pi=0} = \frac{\omega(2p-1)^2}{p(1-p)},$$

and that

$$R(\frac{1}{2}) = \omega(2p-1)^2 \geqq R(\pi), \text{ for all } \pi \in [0,1].$$

This last expression states that the maximum wage offer incentive for an ex-convict to go straight in this model is $\omega(2p-1)^2$, which occurs when employers believe that precisely half of the relevant population have, in fact, gone straight.

3.3 Equilibrium in the Labor Market for Ex-convicts

If an ex-convict does return to crime, he or she can still participate in the labor market, although his or her expected remuneration from doing so is reduced by the amount $R(\pi)$ relative to what it would have been had he or she gone straight. On the contrary, by returning to crime, this ex-convict receives his or her personal value for criminal participation, c. Hence, his or her decision calculus is as follows:

$$\text{"returning to crime" is the rational choice if } \; c \; > \; R(\pi),$$

$$\text{while "going straight" is the rational choice if } \; c \; < \; R(\pi).$$

We conclude that the proportion of the overall ex-convict population who will, in fact, choose to go straight equals $G(R(\pi))$. Hence, in the context of this model, an "equilibrium employer belief" is any number $\pi^* \in [0,1]$ that solves the equation $\pi^* = G(R(\pi^*))$.

Figure 1 illustrates this logic of self-confirming employers' beliefs. By substituting the functional forms that we have assumed for $G(c)$ and derived for $R(\pi)$ and simplifying, we arrive at this equation defining an equilibrium belief, π^*:

$$\pi^* \cdot [\frac{\omega(2p-1)^2}{2\mu}](1-\pi^*) = \pi^* \cdot [\pi^* p + (1-\pi^*)(1-p)][\pi^*(1-p) + (1-\pi^*)p].$$

Note that $\pi^* = 0$ always solves the above equation, reflecting the fact that employers' be-

lieving that no ex-convicts will go straight is always a self-fulfilling prophecy in this model.[5] Furthermore, when $\pi^* = 0$ is the *only* value of π (in the unit interval) that solves this equation, the labor market for ex-convicts always collapses because of the problem of adverse selection.

4 Rebranding Program for Ex-convicts

In this section, we show how a costly "rebranding" program can be socially valuable when agents self-select. Now, suppose $G(c)$ and $R(\pi)$ are such that $G(R(\pi)) < \pi$, $0 < \pi \leqq 1$, as depicted in Figure 2. Then, $\pi^* = 0$ is the *only* equilibrium employer belief. Clearly, given the concavity of $R(\pi)$ and linearity of $G(c)$ in our model, this condition is obtained if and only if $\frac{d}{d\pi}[G(R(\pi))] \mid_{\pi=0} \leqq 1$, which amounts to $\frac{\omega(2p-1)^2}{2\mu \cdot p(1-p)} \leqq 1$, equivalent to $p \leqq (\frac{1}{2})[1 + (\frac{\mu}{\mu+2\omega})^{\frac{1}{2}}]$. Thus, we adopt the following assumption that ensures the labor market collapse:

Assumption 1. *Employers' information about criminal intentions is not so accurate that* $p \leqq (\frac{1}{2})[1 + (\frac{\mu}{\mu+2\omega})^{\frac{1}{2}}]$.

Supposing this to be the case, we wish now to envision a rebranding program for ex-convicts, run by the government and proceeding along the following lines: there is to be a certifiable and costly activity (hereafter "the program") **with no productive content** (i.e., an ex-convicts' participation neither raises productivity ω nor lowers the value of criminal activity c) such that, before entering the labor market, ex-convicts choose whether to join this program or not. Let K denote the cost to an ex-convict for participating in this program. By deciding how onerous to make it, the program's designers can, in effect, choose the value of K. (With no loss of generality, we restrict attention to programs for which $0 < K < \omega$.) The behavioral protocol we envision is as follows:

[5] As $\pi \downarrow 0$, wage offers approach 0 for passers and failers alike, meaning that the return from going straight, $R(\pi) \downarrow 0$, and hence $G(R(\pi)) \downarrow 0$ as well.

1. Convicts decide whether to participate in the program. Program participation may be verifiable by employers (e.g., a certificate is issued that cannot be forged).

2. In addition, convicts also choose whether to return to crime. They then enter the labor market.

3. Employers believe that a certain proportion of program participants and non-participants will go straight.

4. Employers make wage offers to individual ex-convicts, conditional on program (non-) participation and on the observed test outcome.

5. The equilibrium occurs when employers' beliefs about participants and non-participants are confirmed by ex-convicts' behaviors.

Now, let π' denote employers' prior beliefs about the proportion of certified program participants going straight. (We assume, plausibly, that employers continue to anticipate that all non-participants will return to crime.) Hence, $R(\pi') = V_1(\pi') - V_0(\pi')$ now represents the value of going straight for program participants only, where $V_1(\pi')$ is the expected wage of an ex-convict program participant going straight and $V_0(\pi')$ is the expected wage of an ex-convict who joins the program and returns to crime. Then, we achieve the following result:

Proposition 1. *For every $K \in (0, \omega)$, there is an (essentially unique) equilibrium with positive program participation, such that a positive proportion $\widetilde{\pi}' \in (0, 1)$ of program participants elect to go straight, where*

$$K = V_0(\widetilde{\pi}'), \quad 0 < K < \omega.$$

Moreover, program participants who go straight are strictly better off than they would have been in the absence of the program, while non-participants are no worse off, implying that the

introduction of such a program induces a (weak) Pareto improvement over the status quo ante.

Proof. Refer to the appendix.

5 Socially Optimal Rebranding

We close by considering the welfare properties of the equilibria in our model with and without the proposed rebranding program. Under Assumption 1, the market for ex-convict labor collapses in the absence of a program, with all of them returning to crime.[6] Net social welfare (per ex-convict) therefore equals μ. Now, suppose a rebranding program is introduced along the lines proposed above, with a real resource cost to participants of $K \in [0, \omega]$. Since employers pay wages equal to the expected productivity of workers, their net surplus from hiring program participants is necessarily zero. In addition, since ex-convicts with crime values $c > R(\widetilde{\pi}')$ are indifferent about participation ($\because K = V_0(\widetilde{\pi}')$), their net welfare, whether they join the program or not, equals c which is the same as in the absence of any program.

Therefore, the introduction of a rebranding program changes the equilibrium payoff for only one group of agents in our model, namely those with $c < R(\widetilde{\pi}')$, who elect both to participate in the program and to go straight. For these ex-convicts, the equilibrium payoff in the presence of the program is $V_1(\widetilde{\pi}') - K = V_1(\widetilde{\pi}') - V_0(\widetilde{\pi}') = R(\widetilde{\pi}')$, while their payoff in the absence of any program is just c. Therefore, rebranding produces a net gain in welfare for these agents relative to the no-program situation of $R(\widetilde{\pi}') - c > 0$. We conclude that the overall net surplus for society associated with the introduction of the rebranding program,

[6] While we adopted Assumption 1 to guarantee that the market collapses completely in the absence of any program, our result that a societal welfare improvement is possible here does not depend on market failure because of adverse selection being so complete. Even if employers' information is sufficiently accurate to allow for some legitimate employment among the ex-convicts in the equilibrium, it is still possible that an intervention along the lines described here could generate a substantial welfare gain. We leave the exploration of this case as an exercise for the readers.

relative to the status quo ante, is

$$\text{NSS} = \int_0^{R(\widetilde{\pi}')} [R(\widetilde{\pi}') - c] dG(c) = \int_0^{R(\widetilde{\pi}')} G(c) dc.$$

Now, the "optimal" program (characterized by participation cost K^{**}) maximizes net surplus for society. Obviously, then, since the function $G(c)$ is strictly positive for $c > 0$, the optimal program is the one that, in the equilibrium, induces some proportion π^{**} of its participants to go straight such that

$$R(\pi^{**}) \geqq R(\pi'), \text{ for all } \pi' \in [0, 1],$$

with the corresponding costliness to participants of this optimal program being determined by the equation:

$$K^{**} = V_0(\pi^{**}).$$

As noted previously, the return from going straight $R(\widetilde{\pi}')$ is maximized when employers believe that precisely half of the relevant ex-convict population have, in fact, elected to go straight, which is to say,

$$\pi^{**} = \frac{1}{2}.$$

We conclude that the socially optimal rebranding program is calibrated such as to cost each participant the amount:

$$\begin{aligned} K^{**} &= V_0(\frac{1}{2}) = (1-p)W(\frac{1}{2}, pass) + pW(\frac{1}{2}, fail) \\ &= 2\omega p(1-p). \end{aligned}$$

Moreover, the proportion of the ex-convict population $N(\pi^{**})$, who in the equilibrium partic-

ipate in this socially optimal rebranding program, is given by

$$N(\pi^{**}) = \frac{G(R(\pi^{**}))}{\pi^{**}} = 2G(R(\frac{1}{2})) = (\frac{\omega}{\mu})(2p-1)^2.$$

Thus, the more the optimal program for rebranding ex-convicts is onerous, the higher is the value of legitimate work and the less accurate is employers' information about workers' criminal intentions. Further, as the size of the optimal program (in terms of the proportion of ex-convicts who participate in it) rises, the higher is the value of legitimate work, the smaller is the mean value of criminal participation, and the more accurate is the information available to employers.

6 Concluding Remarks

One may argue that a careful evaluation must reject this sort of program on cost/benefit grounds because of its assumed zero "treatment effect" with no productive content. Yet, it is clear that this programmatic intervention would still be socially valuable—*precisely because it induces positive selection among participants*, which partially relieves employers' "adverse selection" information bind.

This study provides the theoretical implications of controversial prison education programs. In the United States, such programs (GED, college degree, vocational training) have diminished since the 1990s. While some argue that the most effective way in which to keep people out of prison is to give them job skills that make them marketable employees, others contend that those programs punish law-abiding taxpayers who are already burdened with the increasing funding for correctional operations.

Over recent decades, scholars have accumulated empirical evidence that supports the

premise that participation in correctional education while incarcerated reduces an individual's risk of recidivating and increases the odds of obtaining employment after release (Davis et al., 2013). Their opponents, however, are concerned about the possibility of selection bias. In other words, the higher rates of employment and lower rates of recidivism among correctional education participants may simply reflect inmates' temperament and be unrelated to exposure to the program. Our theoretical results reconcile these two contrasting views. Selection bias may play a critical role in the improvement of ex-convicts' labor market opportunities. Although the education program does not itself carry significant productive content, ex-convicts who place low value on criminal activities can credibly convey their good intentions to employers.

The theoretical finding in this paper has broader applicability beyond the labor market context. For instance, this same idea might be used to account for periodic and costly "franchise rebranding campaigns" wherein a franchise retailer "reinvents" itself from time to time by imposing costly (and seemingly meaningless) requirements on its current members in order to induce weaker members—who know who they are—to voluntarily withdraw. Or, equivalently, this same outcome could be achieved by creating a "super-brand" that is costly to attain, thereby allowing stronger members to acquire a new and more profitable identity of their own. Because agents' endowments are assumed to be private information, this kind of exclusionary re-grouping can only be implemented in an incentive-compatible manner by imposing some real resource cost for continued group membership that weaker members could then elect not to pay. It is interesting to consider that owing to the problems of adverse selection, some kind of periodic "purging" of this sort might be the only way in which to keep the overall enterprise viable over time.

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[Appendix] Proof of Proposition 1

We first show that in any equilibrium, the equation in the proposition must hold. We then show how, given this equation, an equilibrium with the asserted properties can be constructed. Let there be an equilibrium in which some proportion $\widetilde{\pi}'$ of program participants are believed by employers to be going straight. If $K > V_0(\widetilde{\pi}')$, no ex-convict returning to crime would join the program, which means $\widetilde{\pi}' = 1$. However, then $R(\widetilde{\pi}') = 0$, so $\widetilde{\pi}' = 0$. This is a contradiction. Likewise, if $K < V_0(\widetilde{\pi}')$, then all ex-convicts would want to join the program regardless of their criminal intentions. Nonetheless, this would mean the program conveys no information. Hence, from our assumption that the test is not too accurate, $\widetilde{\pi}' = 0$, which implies $V_0(\widetilde{\pi}') = 0$. This is also a contradiction. Therefore, $K = V_0(\widetilde{\pi}')$ in any equilibrium.

Since $V_0(\tilde{\pi}')$ is a strictly increasing function with $V_0(0) = 0$ and $V_0(1) = \omega$, this equation defines the equilibrium program quality, $\widetilde{\pi}'$, for every choice of the program design parameter $K \in [0, \omega)$. Now, clearly, a program participant will go straight only if $c \leqq R(\widetilde{\pi}')$. Moreover, all ex-convicts with $c < R(\widetilde{\pi}')$ will find it rational to join the program and go straight, since the payoff from doing so is $V_1(\widetilde{\pi}') - K = R(\widetilde{\pi}')$, while the payoff from staying out of the program is c. Then, employers' beliefs are confirmed in this equilibrium if and only if some proportion ϕ of ex-convicts with $c \geqq R(\widetilde{\pi}')$ also join the program and yet return to crime, with the complementary proportion $1 - \phi$ of these high crime value ex-convicts not joining the program, where ϕ solves the equation:

$$\widetilde{\pi}' = \frac{G(R(\widetilde{\pi}'))}{G(R(\widetilde{\pi}')) + \phi[1 - G(R(\widetilde{\pi}'))]},$$

so

$$\phi = \frac{\frac{G(R(\widetilde{\pi}'))}{1-G(R(\widetilde{\pi}'))}}{\frac{\widetilde{\pi}'}{1-\widetilde{\pi}'}}.$$

From Assumption 1, we know that $\pi' > G(R(\pi'))$ for all $\pi' \in (0, 1]$. Therefore, ϕ, as defined above, falls between zero and one. Moreover, since the condition $K = V_0(\widetilde{\pi}')$ implies that

reoffending ex-convicts are indifferent about program participation, their specified behavior in this equilibrium (some participating in the program, some not) is entirely consistent with rationality. Hence, this is indeed an equilibrium. Finally, it is easily seen that for K fixed, any two equilibria can differ only with respect to which of the high crime value ex-convicts join the program, which is the sense in which the equilibrium being described here is "essentially" unique. Q.E.D.

Figure 1. Equilibrium in Labor Market for Ex-cons

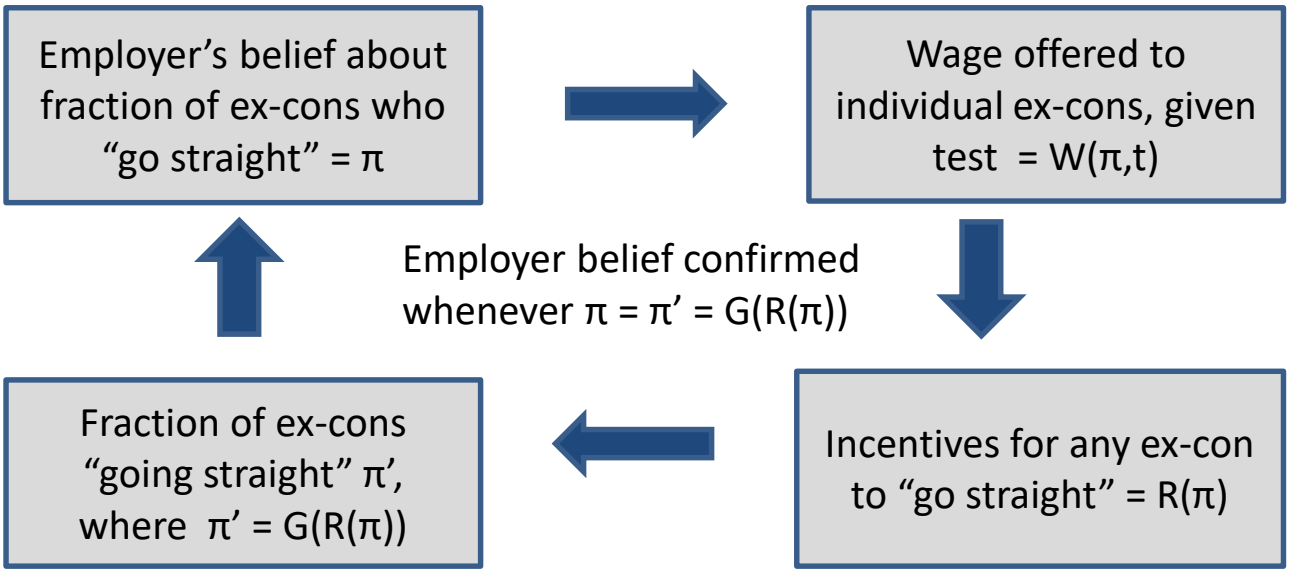

Figure 2. The Labor Market Collapse for Ex-cons