Costly Rehabilitation and Deterrence

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Motivation

Does rehabilitation deter recidivism?

The history of the research in criminology:

- "Nothing works" (Martinson 1974)
  - Focus on justice, not crime prevention;
- Principles of effective correctional treatment (Andrews and Bonta 1996)
- Meta-studies: mixed evidence (various, 2000-s)
  - Integrity issues
  - Types: CBT, non-cognitive, vocational, reentry, bootcamps, etc.
  - Targeting issues
- Cost-benefit analysis: taxpayers/victims

Research questions:

1. Under what conditions will a young convict choose to participate in a voluntary rehab programme?
2. When is mandatory rehab participation socially more desirable than voluntary?

Rehabilitation

Conceptual framework

Robinson 2008: rehabilitation as a right of the offender (welfarist rationale) was politically unattractive; new focus on victims' right for protection. A new approach:

- Utilitarian rehabilitation
  - A good that benefits the broader society
  - Focus on reduction in reconvictions
    - ★ "*Reducing re-offending by ex-prisoners*" (2002 report by the Social Exclusion Unit)
- Managerial rehabilitation
  - A means of risk management
  - Focus in reducing risk and danger to public
- Expressive rehabilitation
  - Rehabilitative intervention is allied with punitiveness
  - Focus on hybrid sanctions: enforcement; discipline
    - ★ 'offender manager'; Intensive Supervision and Surveillance/Intensive Control and Change programmes

Theoretical model

Rational choice

This framework is translated into an economic model:

- A potential offender compares net gains from a criminal activity and a legal occupation
- A young convict can participate in a rehabilitation programme
- Trade-off: participation is costly (utility loss: 'expressive effect') but leads to higher future legal earnings
  - Corrective intervention: combination of treatment and external controls (Palmer, 1992)
- Higher legal earnings make re-offence less attractive

We model a decision to re-offend as a rational economic choice.

- Participation in a rehab programme can be mandatory or voluntary
  - Mandatory participation can be blanket or targeted
  - This allows a comparison of different policies

Model assumptions

Dynamic framework

We focus on an individual choice of a convicted *young* offender.

- Three periods: young, adult, old;
  - Beta-delta time preferences;
- A young offender may or may not participate in a rehab programme:
  - If participates incurs an additional utility loss (expressive effect) $v\left(r^{+}\right)$;
    - ★ $r \in [0, R]$ is the 'intensity' of the rehab programme.
- An offender is released when adult;
- Two (mutually exclusive) sources of income when adult:
  - Legal occupation: net earnings w_i; utility $u\left(w_i\right)$;
  - Criminal activity: gain θ_i^a, cost c_i; utility $u\left(\theta_i^{a+}; -c_i^{+}\right)$;
- An adult recidivist is caught with probability q:
  - No rehab opportunity: utility loss $v\left(0\right)$ from incapacitation;
  - Loses criminal gains and pays fine $f\left(\theta_i^{a+}\right)$: utility $u\left(0; -c_i^{+} - f^{+}\left(\theta_i^a\right)\right)$;
  - Released when old and retires: utility $\widetilde{u}_i^o$;
- Otherwise, retires with utility $u_i^o > \widetilde{u}_i^o$.

Model assumptions

Effect of rehabilitation

Let w_i^a denote maximal potential earnings in legal occupation for individual i when adult.

- A released ex-convict earns $w_i = \widetilde{w}_i^a(\cdot)$:
  - Incapacitation partly destroys human capital;
  - Not all jobs are available to ex-convicts;
  - Rehab improves earning opportunities:

$$\widetilde{w}_i^a(0) < \widetilde{w}_i^a(r^+) < w_i^a$$

Recidivism condition:

$$\begin{aligned} & (1-q)\left(u\left(\theta_i^a;-c_i\right)+\beta\delta u_i^o\right)+q\left(u\left(0;-c_i-f\left(\theta_i^a\right)\right)-v(0)+\beta\delta u_i^{o1}\right) \\ \geq \quad & u\left(\widetilde{w}_i^a(r);0\right)+\beta\delta u_i^o. \end{aligned}$$

Rewrite this as

$$\begin{aligned} & (1-q)\,u\left(\theta_i^a;-c_i\right)+qu\left(0;-c_i-f\left(\theta_i^a\right)\right) \\ \geq \quad & u\left(\widetilde{w}_i^a(r);0\right)+q\left[v(0)+\beta\delta\left(u_i^o-\widetilde{u}_i^o\right)\right]. \end{aligned}$$

Recidivism

Threshold type

Consider a released adult ex-convict of type c_i facing a criminal gain opportunity (crime shock) of θ_i^a.

$$\begin{aligned} & (1-q)\, u\left(\theta_i^a; -c_i\right) + q u\left(0; -c_i - f\left(\theta_i^a\right)\right) \\ \geq \quad & u\left(\widetilde{w}_i^a\left(r\right); 0\right) + q\left[v\left(0\right) + \beta\delta\left(u_i^o - \widetilde{u}_i^o\right)\right]. \end{aligned}$$

- There is a threshold crime cost, $\underline{c}_i$, such that the individuals with $c_i < \underline{c}_i$ become recidivists;
- The threshold decreases as $\widetilde{w}_i^a\left(r\right)$ (legal earnings when adult), $v\left(0\right)$ (utility loss from incapacitation), and/or $u_i^o - \widetilde{u}_i^o$ (retirement differential) increase;
- The effect of θ_i^a (crime shock) is ambiguous:
  - Higher shock brings higher gains from crime but also raises penalty.

Deterrence effect

Mandatory participation

We are interested in the effect of rehabilitation on recidivism.

- No effect on offenders with low crime cost: $c_i < \underline{c}_i^m(\cdot)$ where

$$\begin{aligned} & (1-q)\, u\left(\theta_i^a; -\underline{c}_i^m\right) + q u\left(0; -\underline{c}_i^m - f\left(\theta_i^a\right)\right) \\ = \;& u\left(\widetilde{w}_i^a(r); 0\right) + q\left[v(0) + \beta\delta\left(u_i^o - \widetilde{u}_i^o\right)\right]. \end{aligned}$$

- However, those with high crime cost will not re-offend even without rehab: $c_i > \overline{c}_i(\cdot)$ where

$$\begin{aligned} & (1-q)\, u\left(\theta_i^a; -\overline{c}_i^m\right) + q u\left(0; -\overline{c}_i^m - f\left(\theta_i^a\right)\right) \\ = \;& u\left(\widetilde{w}_i^a(0); 0\right) + q\left[v(0) + \beta\delta\left(u_i^o - \widetilde{u}_i^o\right)\right]. \end{aligned}$$

- Note that $\underline{c}_i^m < \overline{c}_i^m$ as long as $\widetilde{w}_i^a(r) > \widetilde{w}_i^a(0)$ for $r \in (0, R)$.
- Thus, a mandatory rehab programme helps prevent recidivism for $c_i \in \left[\underline{c}_i^m, \overline{c}_i^m\right]$.
- Observe that $\frac{d\underline{c}_i^m}{dr} < 0$, since $\frac{du(\widetilde{w}_i^a(r))}{dr} = u'\left(\widetilde{w}_i^a(r); 0\right)\widetilde{w}_i'^a(r) > 0$.
  - A higher rehab intensity pushes down the lower threshold and thus prevents recidivism by criminals with lower crime cost.

Deterrence effect

Voluntary participation

To evaluate the effect of voluntary participation on recidivism we need to evaluate and compare (expected) utilities from criminal and legal activities:

$$\begin{aligned} V_i^L(x) &= -v(x) + \beta\delta\left(u\left(\widetilde{w}_i^a(x);0\right) + \beta u_i^o\right) \\ V_i^C(x) &= -v(x) + \beta\delta E_\theta\left[(1-q)\left(u\left(\theta_i^a;-c_i\right) + \beta u_i^o\right)\right. \\ &\quad \left. +q\left(u\left(0;-c_i - f\left(\theta_i^a\right)\right) - v(0) + \beta\widetilde{u}_i^o\right)\right] \\ x &\in \{0,r\}. \end{aligned}$$

- Since $V_i^C(r) < V_i^C(0)$ we can ignore $V_i^C(r)$.
- Choice = "NOT participate" if either
  - $V_i^C(0) > \max\left\{V_i^L(r), V_i^L(0)\right\}$: recidivism; or
  - $V_i^L(0) > \max\left\{V_i^L(r), V_i^L(0)\right\}$: no recidivism.
- Choice = "participate" if $V_i^L(r) > \max\left\{V_i^C(0), V_i^L(0)\right\}$
  - if $V_i^C(0) < V_i^L(0) < V_i^L(r)$: no effect; would not re-offend without rehab;
  - if $V_i^L(0) < V_i^C(0) < V_i^L(r)$: rehab reduces recidivism.

Deterrence effect

Voluntary participation

The deterrence effect depends on the criminal type.

- Case 1. High cost of crime.
  Convicts with $c_i \geq \overline{c}_i^v$ participate but *ex ante* they would not re-offend in any case.

$$\begin{aligned} & E_\theta \left[(1-q)\, u\left(\theta_i^a; -\overline{c}_i^v\right) + q u\left(0; -\overline{c}_i^v - f\left(\theta_i^a\right)\right)\right] \\ = \quad & u\left(\widetilde{w}_i^a\left(0\right)\right) + \beta q \left(u_i^o - \widetilde{u}_i^o\right) + q v\left(0\right) \end{aligned}$$

- Case 2. Intermediate cost of crime.
  Convicts with $c_i \in \left[\underline{c}_i^v, \overline{c}_i^v\right]$ participate AND rehab has deterrent effect

$$\begin{aligned} & E_\theta \left[(1-q)\, u\left(\theta_i^a; -\underline{c}_i^v\right) + q u\left(0; -\underline{c}_i^v - f\left(\theta_i^a\right)\right)\right] \\ = \quad & u\left(\widetilde{w}_i^a\left(r\right)\right) - \frac{v\left(r\right) - \left(1-\beta\delta q\right) v\left(0\right)}{\beta\delta} - \beta q \left(u_i^o - \widetilde{u}_i^o\right). \end{aligned}$$

- Case 3. Low cost of crime.
  Convicts with $c_i < \underline{c}_i^v$ do not participate and become recidivists.

Effect of rehab intensity

Comparison

Both mandatory and voluntary participation can deter recidivism and can also be redundant.

Recidivism is deterred:

- For $c_i > \underline{c}_i^m$ under mandatory participation;
  - $\frac{d\underline{c}_i^m}{dr} < 0$: higher intensity increases reduction in recidivism.
- For $c_i \in \left[\underline{c}_i^v, \overline{c}_i^v\right]$ under voluntary participation;
  - $\overline{c}_i^v$ does not depend on r;
  - $\underline{c}_i^v$ may be increasing or decreasing in r
    - ★ Higher intensity may overturn reduction in recidivism if $\frac{d\underline{c}_i^v}{dr} > 0$.

We show that for $\frac{d\underline{c}_i^v}{dr} < 0$ to hold the earnings effect must be sufficiently strong:

$$\widetilde{w}_i^{a\prime}(r) > \frac{v'(r)}{\beta\delta u'\left(\widetilde{w}_i^a(r)\right)} \ \forall r \in (0,R) \Leftrightarrow$$

$$\varepsilon_w^a \equiv \frac{r\widetilde{w}_i^{a\prime}(r)}{\widetilde{w}_i^a(r)} > \frac{1}{\beta\delta}\frac{rv'(r)}{\widetilde{w}_i^a(r)u'\left(\widetilde{w}_i^a(r)\right)} \ \forall r \in (0,R).$$

Effect of rehab intensity

Comparison

As long as an individual chooses to participate, a small increase in rehab intensity up from zero always reduces recidivism:

$$\widetilde{w}_i^{a\prime}(0) > \frac{v'(0)}{\beta\delta u'\left(\widetilde{w}_i^{a}(0)\right)} \Rightarrow \left.\frac{d\underline{c}_i^{v}}{dr}\right|_{r=0} < 0.$$

We show that if for some $r^* \in (0, R)$

$$\widetilde{w}_i^{a\prime}(r^*) = \frac{v'(r^*)}{\beta\delta u'\left(\widetilde{w}_i^{a}(r^*)\right)}$$

then

$$\left.\frac{d\underline{c}_i^{v}}{dr}\right|_{r<r^*} < 0 \text{ and } \left.\frac{d\underline{c}_i^{v}}{dr}\right|_{r>r^*} > 0.$$

- The efficiency threshold, r^*, is unique (under standard assumptions on the utilities);
  - Largest reduction in recidivism.

Earnings in legal occupation depend on innate abilities, availability of jobs, etc. To analyse the efficiency threshold we make further assumptions.

Effect of rehab intensity

Efficiency threshold and abilities

Assume

$$\begin{aligned} \widetilde{w}_i^a(r) &= \widetilde{w}_i^a(0)\,\phi(r),\ \phi'(r) > 0,\ \phi''(r) \leq 0, \\ \widetilde{w}_i^a(0) &= \gamma w_i^a < \widetilde{w}_i^a(R) < w_i^a,\ \gamma \in (0,1) \end{aligned}$$

- Maximal wage w_i^a is determined by individual i's innate abilities, education or training, available job opportunities, etc.
  - Adult individual i earns w_i^a if was not convicted when young.
  - Across population, $w_i^a \in \left[w_L^a, w_H^a\right]$, with some distribution.
- We show that

$$\varepsilon_{r^*} \equiv \frac{w_i^a}{r^*}\frac{dr^*}{dw_i^a} = \frac{1-\sigma}{\widetilde{\varepsilon}_v + \widetilde{\varepsilon}_\phi + \sigma\varepsilon_\phi}.$$

where

$$\begin{aligned} \sigma &\equiv -\frac{u_2''\left(\widetilde{w}_i^a;0\right)\widetilde{w}_i^a}{u_2'\left(\widetilde{w}_i^a;0\right)} > 0, \widetilde{\varepsilon}_v \equiv \frac{r^* v''(r^*)}{v'(r^*)} > 0, \\ \varepsilon_\phi &\equiv \frac{r^*\phi'(r^*)}{\phi(r^*)} > 0, \widetilde{\varepsilon}_\phi \equiv -\frac{r^*\phi''(r^*)}{\phi'(r^*)} > 0. \end{aligned}$$

Effect of rehab intensity

Efficiency threshold and abilities

Depending on the degree of risk aversion (σ) ε_{r^*} can be positive or negative.

- It is plausible to assume low risk aversion among young offenders: $\sigma \approx 0$.

$$\varepsilon_{r^*} \approx \frac{1}{\widetilde{\varepsilon}_v + \widetilde{\varepsilon}_\phi} > 0.$$

What does this mean for the optimal choice of the rehab intensity under voluntary participation?

- Setting r at $r^*\left(w_i^a\right)$ maximises reduction in recidivism for offenders with earning ability w_i^a:
- Released adults with crime cost at or above $\underline{c}_i^v\left(r^*\left(w_i^a\right)\right)$ choose legal occupation;
- Those with crime cost $c_i > \underline{c}_i^v\left(r^*\left(w_i^a\right)\right)$ and earning ability above w_i^a also prefer legal occupation.

Effect of rehab intensity

Efficiency threshold

Optimal r^* is the lowest for those with the lowest earning ability, $\min_{\left[w_L^a, w_H^a\right]} r^*\left(w_i^a\right) = r^*\left(w_L^a\right)$:

- Thus, setting rehab intensity at $r^*\left(w_L^a\right)$ gives the maximal *ex ante* reduction in recidivism among the lowest earning ability individuals
- This also *ex ante* will reduce recidivism among those with $w_i^a \in \left(w_L^a, w_H^a\right]$ and $c_i \in \left[\underline{c}_i^v\left(r^*\left(w_i^a\right)\right), \overline{c}_i\left(w_i^a\right)\right]$ where $\overline{c}_i\left(w_i^a\right)$ solves

$$E_{\theta^a}\left[(1-q)\, u\left(\theta_i^a - \overline{c}_i\right) + qu\left(-\overline{c}_i - f\left(\theta_i^a\right)\right)\right] = u\left(\gamma w_i^a\right) + \beta\delta\left(u^{o1} - qu^{\text{c}}\right.$$

- A higher level of rehab intensity will tend to reduce further recidivism among higher abilities but have opposite effect on lower ability types.
- The net effect may well be higher rate of recidivism, especially if the distribution of abilities among young offenders is sufficiently right-skewed.

Further research

Recidivism and welfare

This part of work has focussed on the reduction in recidivism.

- Correctional programmes (MacKenzie 1997):
  - Incapacitation & Deterrence & Community Restraints (no transforming effect)
  - Rehabilitation & Structure/Discipline/Challenge (transforming effect)
  - Combined Rehabilitation and Restraint
- Welfare effect of rehabilitation: how to define?
  - Social welfare: fewer crimes; lower losses from crime (= lower criminal gains);
  - Individual welfare: higher earning ability; lower utility loss;
- Deterrence of crime more generally:
  - Reduction in the first-time offences-rehab may lower this
- Cost-benefit analysis
  - Welsh & Farrington (2000); Aos et al. (2001); Duwe (2015)
    - ★ Perspective of the public;
    - ★ Economic efficiency vs non-economic criteria; distribution/fairness.