Deterrence, Income Support and Optimal Crime Policy

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Outline

1. Introduction
2. Labor Supply and Need
3. Alternative Activities
4. Policy Implications
5. Concluding Discussion
6. Bibliography
7. Extra Slides

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4. Policy Implications
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6. Bibliography
7. Extra Slides

Reducing Illegitimate and Criminal Activity is an Important Public Policy Question

- In the US crime is estimated to cost about $2.6 trillion in 2017, or 3.2% GDP.
  - Exceeded the $590 billion spent on the military, or the $450 billion spent on social welfare programs in 2017.
  - Health care costs are about $3.8 trillion.
- There have been numerous attempts to get "tough on crime" that have not worked.
  - Focus on deterrence and incapacitation following Becker (1968) model.
  - Recent calls for research on less punitive solutions Bell (2021).
- Mass criminalization of US adults
  - US has $> 20\%$ of the world's prisoners
  - 8% of US adults have a felony conviction
  - > 70 million have criminal records
- Yet, US recidivism rates remain high
  - 2/3 people rearrested within 3 years

Classic Contributions

- Becker (1968):
  - Crime as economic phenomena
  - Crime persists because perfect enforcement/deterrence is too costly.
- Ehrlich (1973) extends Becker:
  - Incorporates preference over uncertainty and substitution between legitimate and illegitimate activities,
  - $\Rightarrow$ deterrence always reduces crime.
  - But, inequality can increase crime because illegitimate activities are more attractive.

Literature on Sanctions - Questions Addressed by Polinsky and Shavell (2000)

- How much of society's resources should be devoted to apprehending violators?
- If a violator is caught, should the rule of liability be strict or fault-based?
- Should the form of the sanction be a fine, an imprisonment term, or a combination of the two?
- At what level should sanctions be set?

Legal and Sociological Approaches

- Posner (1985):
  - Provides a law and economics approach to criminal law.
  - Criminal law plays a role in deterring judgment proof individuals - usually low income individuals.
  - Like Becker and Ehrlich, the focus is upon deterrence of illegitimate activity, and why tort law is an inadequate substitute for criminal law
- In sociology there is are many thoughtful studies of the complex factors that lead to crime. Notable contributions include:
  - Merton (1938)'s classic study highlights the role of the environment to regulate deviate behavior.
  - Agnew (1992) and Agnew et al. (2009) extends these ideas to what is known as "general strain theory" where individuals feel compelled to behavior in ways that may be reactive in the short run.

A Law and Economics Approach

- These legal and sociological approaches illustrate the complexity and the large variation in observed behaviors - this makes it very challenging to produce reproducible and testable empirical hypotheses.
- This paper extends the work of Becker (1968), Ehrlich (1973) Polinsky and Shavell (2000) to:
  - Highlight the interaction between the budget constraint and a precise definition of economic need or desperation.
  - Our notion of need provides a simple *behavioral* account of decision making:
  - The approach makes predictions on the relationship between observable personal characteristics and criminal activity consistent with a many empirical studies.
  - Integrate deterrence theory with optimal transfer policy for low income individuals.

The Jean Valjean Effect

- The main idea is what we call the "Jean Valjean" effect:
  - general conditions under which the supply of criminal activity is produced by a backward bending labor supply curve:
  - In Victor Hugo's *Les Misérables*, the hero, Jean Valjean, is imprisoned for 19 years for stealing bread to feed his starving sister and her children. It is unlikely that any level of deterrence would have altered Jean Valjean's choices.
  - The New Deal attacked "the Roots of Crime" by ensuring desperate Americans could make ends meet (Fishback et al. (2010)).
  - Drug addiction leads to street crime through "one-off 'acts of desperation" (Allen (2005)).

Empirical Implications

- Deterrence may or may not be effective depending upon:
  - Need or wealth of individuals,
  - The degree of substitution between between illegitimate and legitimate activities (particularly whether or not they are substitutes or complements).
- Whether or not an activity should be a crime depends upon the social costs and complementarities:
  - It may be optimal to allow some illegitimate activities to be legal/allowed (jaywalking in New York City)
  - Other legitimate activities, such as alcohol consumption in some jurisdictions, may be made a deterred as a crime.
- Optimal crime policy entails a combination of deterrence and transfers to the needy to address inequality (Soares (2004)).

Outline

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4. Policy Implications
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6. Bibliography
7. Extra Slides

The Elasticity Question - An Agency Approach

- Can we have a simple model with low or negative labor supply elasticities?
  - yes!
- Start with a version of King et al. (1988) (KPR) preferences where consumption is $c = wl + t$:

$$max_{l \geq 0} u(wl + t) - V(l),$$

  $V'(l), V''(l) > 0$ for $l > 0$.
- Let $l(w)$ be the resulting labor supply. It is wage inelastic if $\frac{dl}{dw} = 0$.

Proposition

Labor supply is wage inelastic on an open set of wages not containing the zero wage for a person with a transfer t iff the preference for consumption has the form:

$$u(c) = log(c - t). \tag{1}$$

Proof of Proposition 1

Defining Need and Desperation

- Though this is a straight forward result, we now have an elegant model of desperation:

Definition

A person has a consumption need c_i^0 if:

$$\lim_{c_i \to c_i^0} u(c_i) = -\infty.$$

- Using the KPR preferences, we now define individual i's preferences:

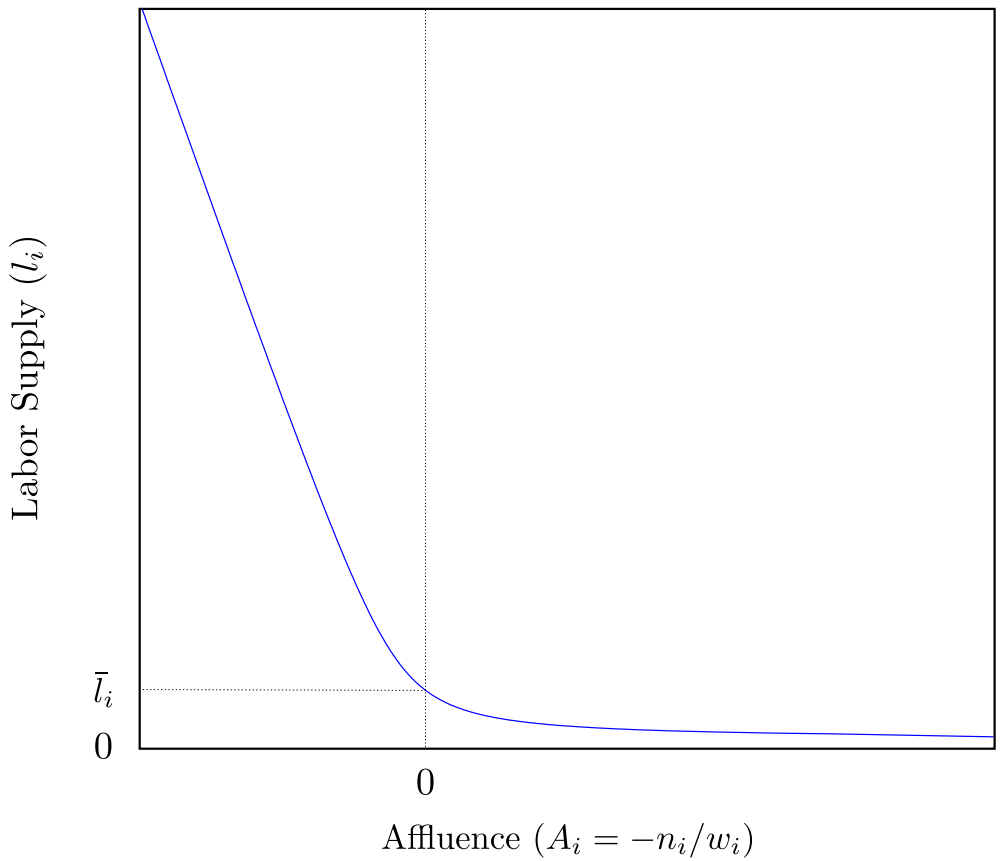
$$U_i(c) = log\left(c - c_i^0\right) - V(l_i).$$

- Thus, this person needs (believes they need) consumption $c > c_i^0$.
- As c approaches c_i^0, utility is falling and they are increasingly desperate.

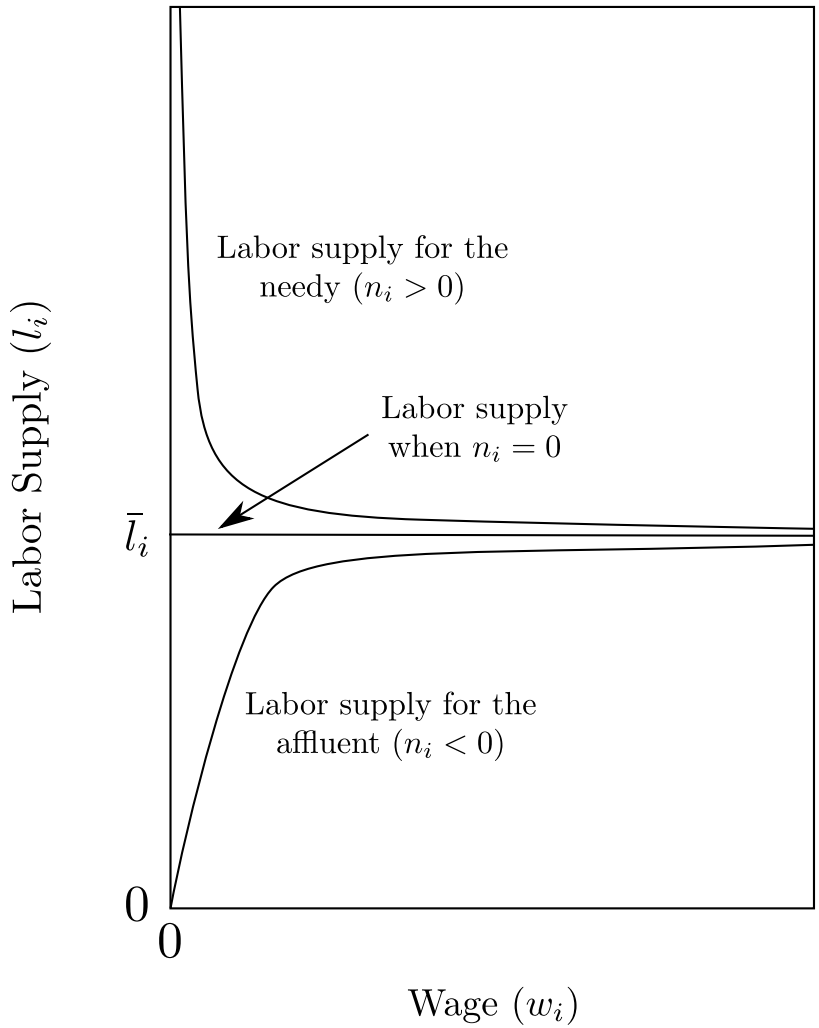
Deterrence and Labor Supply

- The question of deterrence can be viewed as an labor supply question where crime is the amount of illegitimate labor supply and the wage is net of deterrence.
- Let w be gross return from from crime and let $\tau_i \in [0, w]$ be deterrence, then net income is $w_i = w - \tau_i$
- Deterrence is wedge between target consumption and current consumption. Can be seen as:
  - A fine, damaged employment prospects / credit, or time spent detained (lost income)
  - Re-possessed gains from criminal activity (e.g., returned stolen goods)
  - Lost time spent unable to consume (e.g., drug dependency)

Labor Supply/Crime as a Function of Affluence ($A_i = \frac{t_i - c_i^0}{w_i}$)



The Effect of Increased Deterrence on Labor Supply/Crime



Summary of Effects

- Thus, we have a transfer t_i that increases affluence, and always decreases labor supply (or crime if the activity is criminal):

$$\partial l_i / \partial t_i = \frac{\partial l_i / \partial A_i}{w_i} < 0,$$

- For an affluent individual ($A_i > 0$), increased deterrence, reduces the wage and decreases labor supply/crime:

$$\partial l_i / \partial \tau_i = \frac{\partial l_i / \partial A_i}{w_i} A_i < 0.$$

- For needy individual ($A_i < 0$), increasing deterrence, *increases* labor supply/crime:

$$\partial l_i / \partial \tau_i = \frac{\partial l_i / \partial A_i}{w_i} A_i > 0.$$

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4. Policy Implications
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6. Bibliography
7. Extra Slides

Alternative Activities

- Ehrlich (1973) highlights impact of deterrence on choice between *legitimate* and *illegitimate/criminal* activities.
  - Because legitimate and illegitimate activities are **substitutes**
- We use a CES (constant elasticity of substitution) production function connecting the effect of transfers, via the Jean Valjean effect, to substitution **and complementarities** between activities.
  - In addition to 'need', the degree of substitution between activities is an important determinant of optimal crime policy.

Skip Technical Details

Setup

- Let $W_i = W + s_i$ (s_i is a wage subsidy) be the wage for the legitimate activity and let $w_i = w - \tau_i$ be the wage from the illegitimate activity.
- Preferences are given by:

$$u_i\left(\vec{w}_i, \vec{l}_i, \vec{pol}_i\right) = \log\left(W_i \times L_i + w_i \times l_i + w_i A_i\right) - V_i\left(\left(L_i^{\theta} + l_i^{\theta}\right)^{1/\theta}\right), \tag{2}$$

  where $\vec{w}_i = \{W_i, w_i\} = \{W_i, w - \tau_i\}$ $\vec{l}_i = \{L_i, l_i\}$, and the policy is given by $\vec{pol}_i = \{\tau_i, s_i, t_i\}$.
- Set:

$$f_\theta\left(\vec{l}\right) = \left(L^{\theta} + l^{\theta}\right)^{1/\theta}.$$

Two Extreme Cases

- Perfect substitutes ($\theta \to 1$): then $f_1\left(\vec{l}\right) = L + l$: the model is linear and the individual allocates all effort to the activity with the highest wage.
- Perfect Complements ($\theta \to \infty$), then we get Leontief preferences, $f_{\theta=\infty}\left(\vec{l}\right) = max\{L, l\}$.

Aggregation

- The solution to maximizing utility (2) implies:

$$\left(\frac{l_i^*}{L_i^*}\right) = \left(\frac{w_i}{W_i}\right)^{1/(\theta-1)}.$$

- We can define aggregate activity:

$$\hat{l}_i = f_\theta\left(\vec{l}\right) = \left(L_i^\theta + l_i^\theta\right)^{1/\theta}, \tag{3}$$

$$\hat{w}_i = f_\sigma\left(\vec{w}\right) = \left(W_i^\sigma + w_i^\sigma\right)^{1/\sigma}, \tag{4}$$

where $\sigma = \frac{\theta}{\theta-1}$.

Solution

- Aggregation allows us to transform a two activity problem back into the one activity problem at the beginning:

$$\max_{\vec{l}_i \geq \vec{0}} \log\left(W_i \times L_i + w_i \times l_i + \hat{w}_i A_i\right)$$

subject to:

$$f_\theta\left(\vec{l}_i\right) \leq \hat{l}_i.$$

The solution to this is:

$$L_i = \frac{W_i^{\sigma-1}}{\left(W_i^\sigma + w_i^\sigma\right)} \hat{w}_i \hat{l}_i \equiv \gamma\left(\frac{W_i}{w_i}\right) \hat{l}_i, \tag{5}$$

$$l_i = \frac{w_i^{\sigma-1}}{\left(W_i^\sigma + w_i^\sigma\right)} \hat{w} \hat{l}_i \equiv \gamma\left(\frac{w_i}{W_i}\right) \hat{l}_i, \tag{6}$$

where $\gamma(r) = \left(r^{-\sigma} + 1\right)^{\frac{1-\sigma}{\sigma}}$ is increasing in r. Observe that $\frac{\partial \hat{w}_i}{\partial W_i} = \gamma\left(\frac{W_i}{w_i}\right)$.

Hence we have:

- Relationship between activities and aggregates:

$$W_i \times L_i + w_i \times l_i = \hat{w}_i \hat{l}_i,$$
$$f_\theta\left(\vec{l}_i\right) = \hat{l}_i.$$

- The optimal activity level, $\hat{l}_i^*$, is the solution to:

$$\hat{l}^*\left(\hat{w}_i\right) = \arg\max_{\hat{l}_i \geq 0} \log\left(\hat{w}_i \times \hat{l}_i + \hat{w}_i \hat{A}_i\right) - V_i\left(\hat{l}_i\right).$$

This is formally identical to the one activity problem solved in the previous section. As before, we can define affluence as $\hat{A}_i = \frac{-n_i}{\hat{w}_i} = \frac{-c_i^0 + t_i}{\hat{w}_i}$, and thus we have:

$$\hat{l}^*\left(\hat{w}_i\right) = l\left(\hat{A}_i\right) = l\left(\frac{-n_i}{\hat{w}_i}\right). \tag{7}$$

Summary on Substitution Effects

- When the legitimate and illegitimate activities are strong substitutes, then increased deterrence always reduces illegitimate/criminal activity.
    - An increase in transfers reduces both legitimate (a negative) and illegitimate activity (a positive).
- When the legitimate and illegitimate activities are strong complements, then increased deterrence increases both both illegitimate/criminal activity and legitimate activity for needy individuals.
    - An increase in transfers reduces both legitimate (a negative) and illegitimate activity (a positive) for both needy and affluent individuals.

Empirical Example: Drug Trafficking and Shipping are Complements

- Importation of illegal drugs is easier with more trade flowing into a country.
  - Value of imports is a *complement* to illegal drug imports $\Rightarrow$ Legal imports $\uparrow \rightarrow$ illegal imports $\uparrow \rightarrow$ drug prices $\downarrow$

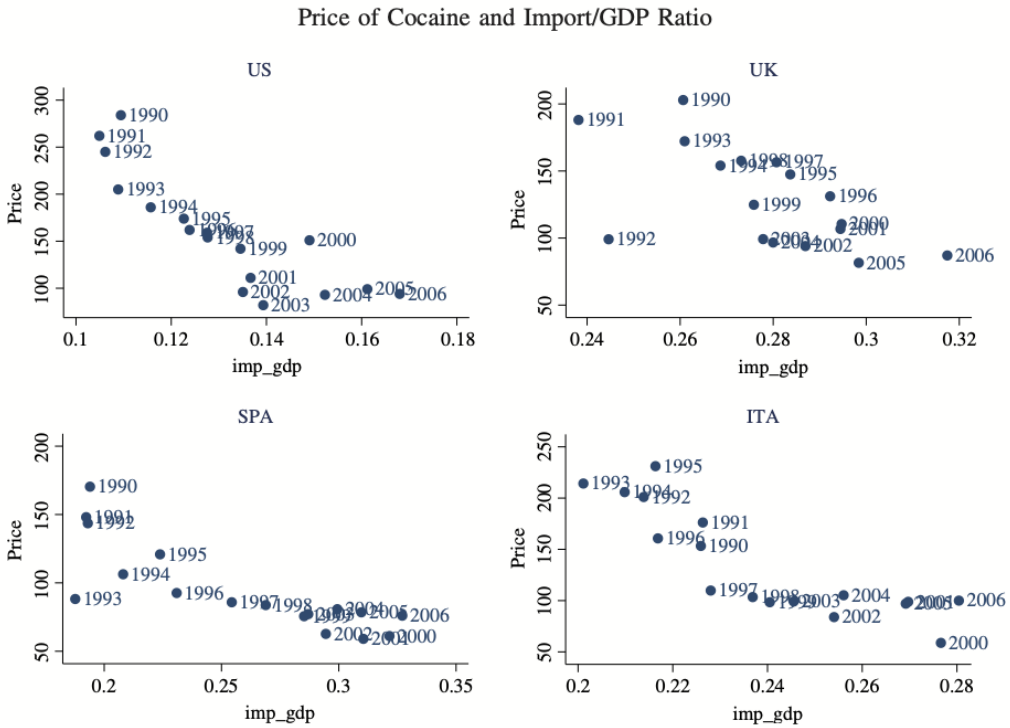


Figure: Price of Cocaine and Import/GDP Ratio

Source: Russo (2014)

Empirical Example: Ignoring Complementarities is Costly

- The Netherlands has a policy of tolerance known as "gedoogbeleid":
  - Soft drugs (cannabis) are **not legal** but **sale/consumption is effectively decriminalized.**
  - Can be sold in 'coffee shops', but as all production is illegal, all suppliers must be criminal enterprises.
  - Creates complementarity between **consumption** (legitimate) and **production** (illegitimate).
- Result: the Netherlands became a hub for European drug cartels / trade:
  - Drug cartels invest in underground production and illegal smuggling networks that are highly complementary with cocaine trafficking and the international drug trade.
  - Drug gangs became powerful and assassinated lawyers and threaten politicians.

Skip Technical Details Social Costs

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7. Extra Slides

Policy Choices

- One benefit of this framework is that it allows for an exploration of the optimal trade-off between three instruments:
  - Deterrence (τ_i)
    - Lower $w_i = w - \tau_i$
  - Work subsidies to legitimate labor (s_i)
    - Higher $W_i = W + s_i$) at cost $\rho \times s_i$
  - Transfers to individuals (t_i)
    - Higher t_i, and hence higher aggregate affluence $\hat{A}_i = \frac{-c_i^0 + t_i}{\hat{w}_i}$ at cost $\rho \times t_i$.
- We can measure these policies in terms of dollar social costs.
  - The marginal cost of the illegitimate activity is $w^c > w$, and hence the total cost is $w^c l_i$.
  - If $w^c < w$, then the activity is a reward to the individual.
  - If $w^c > w$ then may be optimal to reduce activity l_i.

Social Costs

- Deterrence and cost of illegitimate labor ($c', c'' \geq 0, \lim_{x \to 1} c(x) = \infty$):

$$sc_i^{\tau} = c(\tau_i / w) + w^c l_i$$

- Wage subsidy costs:

$$sc_i^{s} = \rho s_i L_i$$

- Transfer costs:

$$sc_i^{t} = \rho t_i - \hat{w}_i \hat{l}_i$$

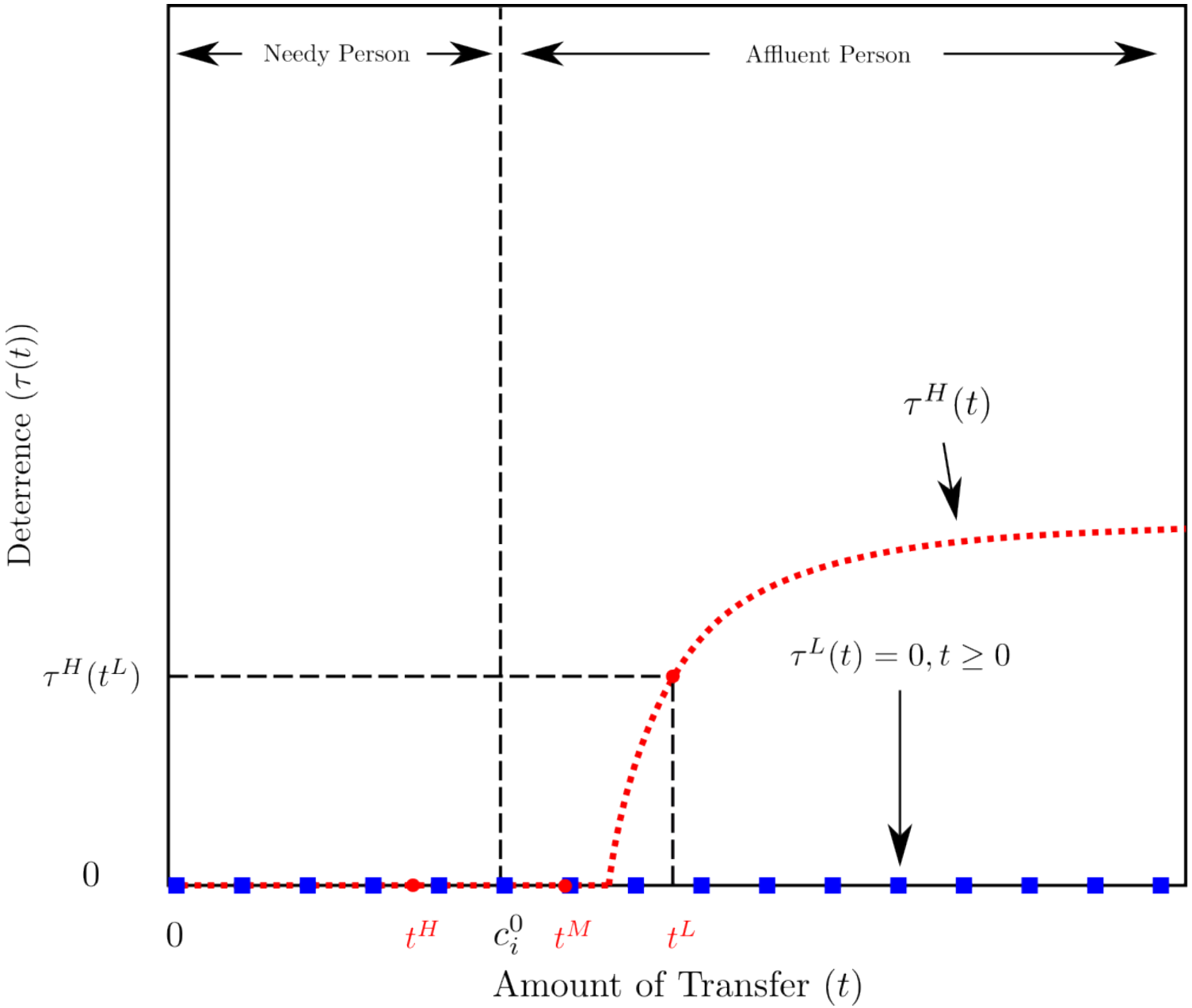
- Optimal social policy entails choosing $\{\tau_i, s_i, t_i\}$ to minimize total costs.
- Then we consider the two extreme cases.

Optimal Social Policy Depends Upon Need and Activity Technology

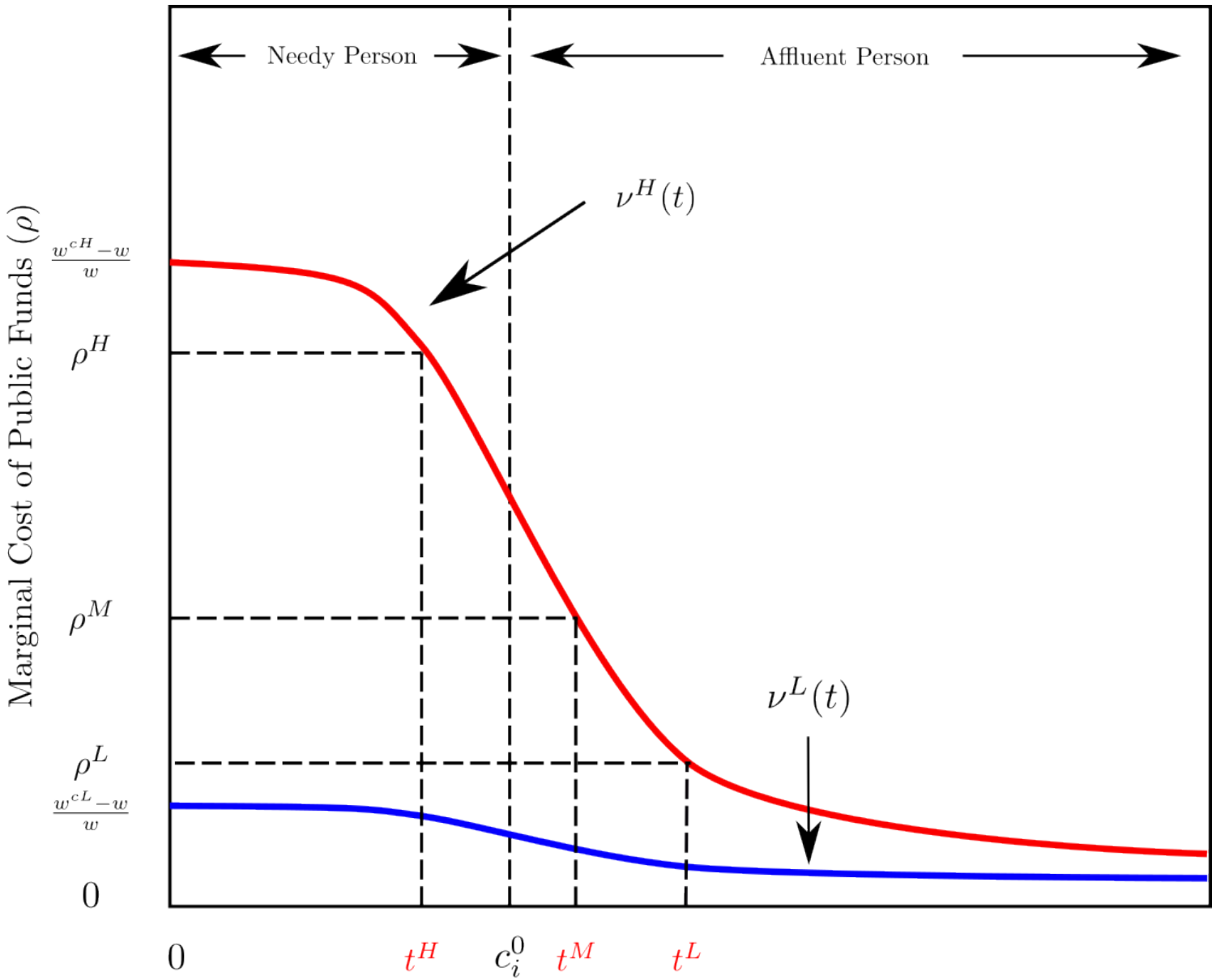
	Needy Person	Affluent Person
No legitimate activities	Income Transfer	Deterrence
Perfect Substitutes	Deterrence or Subsidy	Deterrence
Perfect Complements	Income Transfer	Deterrence

- For affluent individuals some deterrence is in general optimal, as predicted by the Becker-Ehrlich model.
- The new point is that for needy individuals optimal policy is *complex* and context specific.
- The provision of transfers provides "something to lose", thus making deterrence more effective.

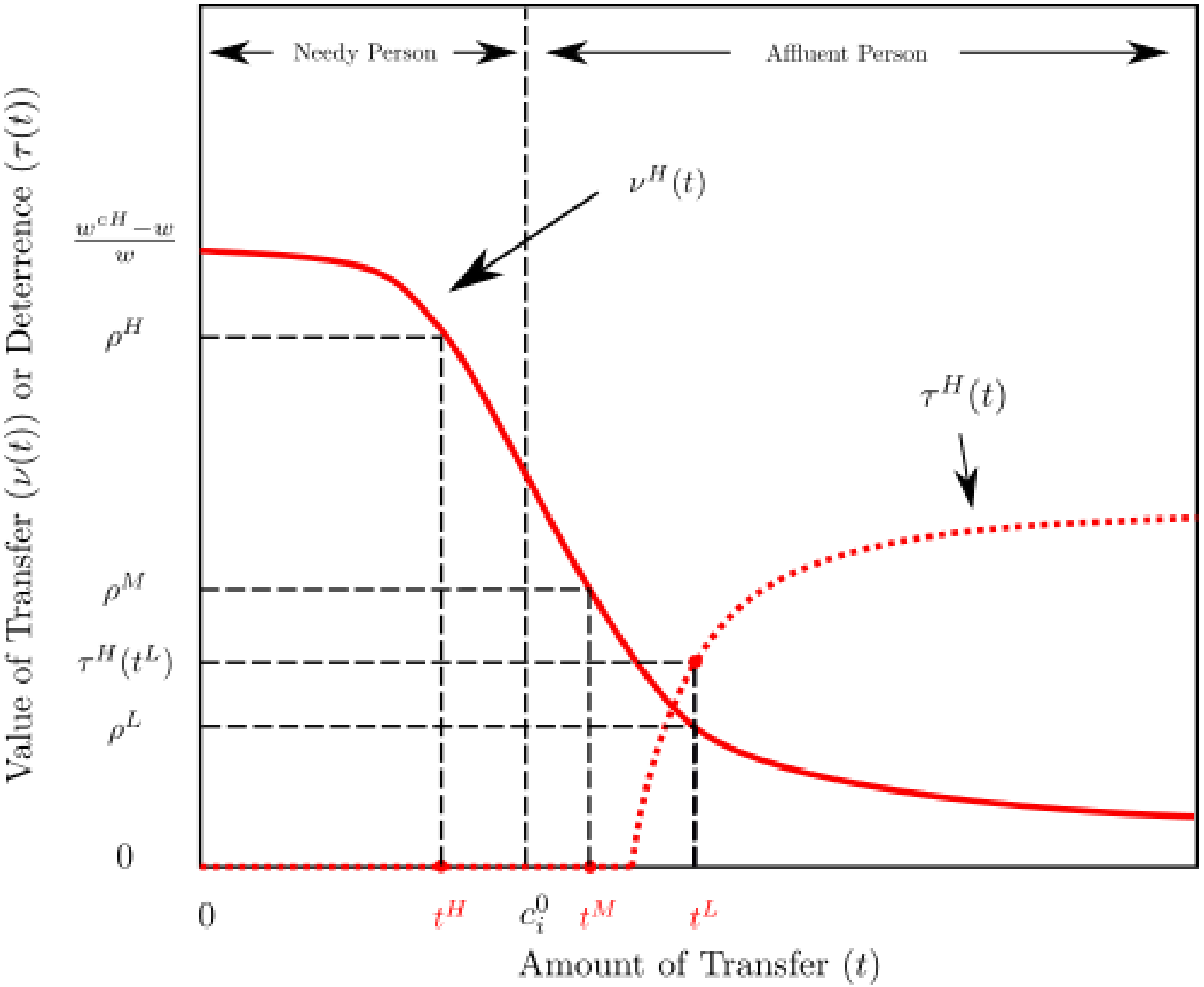
Optimal Deterrence as a Function of Transfer (t)



Optimal Crime Reducing Transfers as a Function of the Marginal Cost of Public Funds (ρ)



Optimal Transfer and Deterrence for High Cost Crime



Case of Perfect Substitutes

- With perfect substitutes it is optimal to specialize in either the legitimate or illegitimate activity.
- Suppose that $w > W$, then one can go to the zero crime outcome with *either* a deterrence or subsidy:

$$l_i = 0 \ \textit{if} \ \ s_i = \tau_i = w - W$$

Hence

- The choice of instrument depends upon w^c and the marginal costs of deterrence ($c'()$) or subsidy (ρ).
- When the cost of crime is very high or W/w is close to 1, then these solutions may be optimal.
- When the cost of crime is low and the return of the legitimate activity is low, then some form of transfer to lower crime my be preferred.
- Providing legal alternatives can also reduce illegitimate substitutes.
  - Cunningham and Shah (2017) find that decriminalizing sex work reduced rape and STDs,
  - Ciacci and Sviatschi (2021) find that legal adult entertainment reduced sex crime in New York City.

Case of Perfect Complements

- If person is affluent, then from the one dimensional analysis some deterrence or tax may be efficient.
- If person is needy, then *only* a transfer is potentially optimal.
- Finally, the complements case can explain why some potentially legitimate activities may be made illegal if there is a belief that the complementary illegitimate activities have a sufficiently high social cost.
    - E.g., soft drug use, paid sex between consenting adults, alcohol sales

Evidence on Transfers and Desperation

- Transfers have large effects on crime among the poor
  - Deshpande and Meuller-Smith (2021): Removal from welfare causes a large increase in crime among recipients, particularly income-generating crimes.
  - Tuttle (2019): Removal from SNAP has been shown to increase financially motivated crimes and recidivism
  - But, work requirements for SNAP decreases participation among participants while having very positive small effects on labor market participation (Gray et al. (2021)).
  - Watson et al. (2020): universal cash transfers to relatively wealthy have little negative effect on property crime.
- Coca eradication has little to no effect on cultivation (Reyes (2014)Mejia et al. (2017))
- Wage subsidies (minimum wage or EITC) reduce recidivism largely by reducing income generating crimes (Agan and Makowsky (2021)).

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1. Introduction
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4. Policy Implications
5. Concluding Discussion
6. Bibliography
7. Extra Slides

Concluding Discussion

- This paper presents a simple model of labor supply that extends the Becker-Ehrlich model of crime provide an explicit model of economic need that can lead to a backward bending labor supply curve making deterrence ineffective.
- Policy choices are shown to also depend upon the extent to which legitimate and illegitimate activities are complements or substitutes.
- It illustrates the challenge that policy makers face when when activities are strongly complementary because the reduction of illegitimate activities also leads to the reduction of valued legitimate activities.

Future Work

- The model emphasizes the fact that optimal policy is person-specific, highlighting the importance of targeted policies that vary with the characteristics of the individual.
- More generally, our work implies that optimal policy requires an integration of social policy with deterrence policy in order to provide a cost-effective solution to crime and illegitimate activities.
- Mechanically, incarceration reduces crime via incapacitation. However, it does so at high cost, not only due to the cost of incarceration, but also in terms reduced human capital accumulation of the incarcerated individuals.
- This is a centuries old question (since at least Beccaria (1963)) of the role of incarceration for the rule of law continues to be an import research topic.

Outline

1. Introduction
2. Labor Supply and Need
3. Alternative Activities
4. Policy Implications
5. Concluding Discussion
6. Bibliography
7. Extra Slides

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Outline

1. Introduction
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Sketch Proof of Proposition 1

- Begin with first order conditions for labor supply, $u'(wl+t)w = V'(l)$.
- Differentiate with respect to w and set $l' = 0$.
- The result are differential equations with a generically unique solutions that imply $u(c) = log(c-t)$.

◂ Proposition 1