Crime theory

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Outline

1. Rational approach to the analysis of criminal behavior
2. Ehrlich model
3. Interperiod choice and behavior of a criminal
4. Optimizing the crime rate
5. Bureaucracy models

Rational approach to the analysis of criminal behavior

Mandeville's paradox

- In 1705 he published the first edition of his poems " The Tale of the Bees, or the Defects of Individuals for the Benefit of Society", which very quickly gained scandalous popularity in the eyes of contemporaries.
- The main idea of his work: criminal activities of individuals serves the welfare of society as a whole.

Development and formation of economic crime theory

- **Bernard Mandeville**

"The Tale of the Bees, or the Defects of Individuals for the Benefit of Society" (1705)

- **Adam Smith**

“The moral paradox”–”In pursuing his own interests, he (man) often serves the interests of the people more than when he consciously seeks to do so” (1776).

- **Cesare Beccaria, Jeremiah Bentham**

"Profit from crime is the force that motivates a person to commit an offense. The severity of punishment is the force that keeps him from it. If the first force exceeds the second, the crime will be committed, if the opposite - the crime will not be committed" (1843)

- **Harry Becker**

“Crime and punishment: economic approach” (1968)

The basic idea of economic crime theory

- Criminals are not psychopathological types, but rational agents, and their reaction to their capabilities and limitations can be predicted.
- The choice of criminal profession should be understood as a normal investment decision in conditions of risk and uncertainty.
- People decide whether to engage in criminal activity by comparing the expected benefits (material benefits, psychological satisfaction from the act of violence) and costs (fines, imprisonment).

Expected utility function

$$EU = (1-p)U(W) + pU(W-F) = U(W-pF)$$

where

- *EU* – expected utility of crimes,
- *p* – the probability of catching and punishing the offender,
- *U* – utility from a certain income,
- *W* – proceeds of crime (including intangibles),
- *F* – weight punishment (in cash equivalent)

Example

- One student decided to steal a teacher's laptop so that he could not work and torture students. The probability of punishment p = 0.3, the utility of the crime U (Y) = 2000, the utility of the crime with punishment U (YF) = -5000. Determine the appropriateness of the crime.

- EU = (1-0.3) * 2000 + 0.3 * (- 5000) = = 1400-1500 = -100
- It is irrational to commit this crime.

Number of crimes

- For j^{th} individual quantity of crimes (offenses)

$$O_j = O_j(p, F, U_j)$$

- With:

$$\theta_p = \frac{\partial O_j}{\partial p} < 0,$$

$$\theta_F = \frac{\partial O_j}{\partial F} < 0$$

Losses of society – 1

- Direct losses from offenses:

$$D = D\,(O).$$

- Judicial losses and losses of law enforcement agencies arising from the detection and detention of criminals:

$$C = C\,(p,\ O).$$

- Social costs from the punishment of criminals:

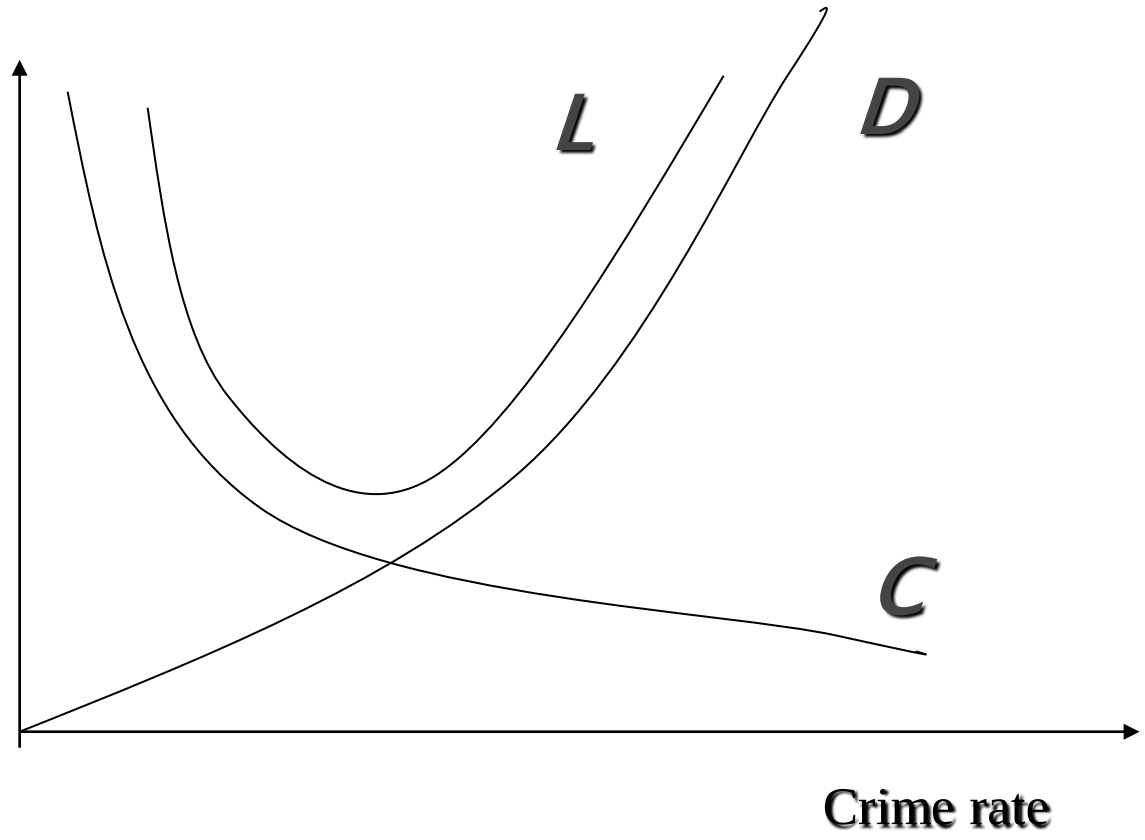
$$SC = b * p * f * O.$$

Losses of society – 2

- If a criminal sentenced to a fine, the loss of the convict is equal to the gain of other members of society, and $b = 0$, because there are no net losses of society as a whole.
- If the same criminal is sentenced to imprisonment, the cost of building a prison, maintaining a staff of guards and so on not will be compensated, so, $b = 1$.
- Total losses from crime:

$$L = D(O) + C(p, O) + bpfO$$

Losses of society – 3



Minimization of public spending

$$E_f = \frac{bpf}{D' + C' + bpf}; \qquad E_p = \frac{bpf}{D' + C' + \frac{\frac{\partial C}{\partial p}}{\frac{\partial O}{\partial p}} bpf}$$

- E_p– elasticity of offenses regarding the probability of punishment;
- E_f – the elasticity of offenses against the severity of punishment;

A necessary condition for minimizing social losses from offenses will be $E_p > E_f$.

Attitudes of individuals to risk

- At risk – a greater deterrent to the likelihood of exposure p than the severity of the punishment F.
- Neutral to risk – will be a deterrent as increasing the severity of punishment F, so proportional to him increase in the probability of punishment itself p.
- Not prone to risk – a great deterrent effect has an increase in the severity of punishment F.

According to Becker, the majority of criminals are individuals at risk, the reduction of crime in society will be more conducive to an increase in the probability of punishment by 1% than an increase in the same 1% of its severity.

Choice of severity of punishment

$$E_f = \frac{bpf}{D' + C' + bpf}$$

where

- D' – marginal damage from the offense (marginal damage)
- C' – marginal costs of termination of the offense.

$$f = \frac{D' + C'}{\left(\frac{1}{E_f} - 1\right) bp}$$

Choice of form of punishment

- Prison (*j*)
- Fine (*m*)

$$L(m) = D\left(\bar{O}_m\right) + C\left(\bar{O}_m, p\right) + b_m p_m \bar{O}_m$$

$$L(j) = D\left(\bar{O}_j\right) + C\left(\bar{O}_j, p\right) + b_j p_j \bar{O}_j$$

- If $L(m) < L(j)$, then select fine, otherwise – imprisonment.

Differentiated policy punishment

Characteristics of violators	Types of violators	
	persons with low human capital	persons with high human capital
A liquid resource for them	money	time
types of offenses committed by them	associated with the cost of time	associated with spending money
recommended punishments for them	payment of fines	imprisonment

Ehrlich model

Combination of legal and illegal activities

- An individual can spend his or her time engaging in two types of income-generating activities: legal and illegal.
- Income from illegal activities is a stochastic value: unfavorable (punishable) and favorable (if illegal activity will not be stopped).
- Income from legal activities is not accidental.
- Expected profits from both activities are monotonically increasing functions of the time an individual spends on each.
- The offender subjectively assesses the likelihood that he will be detained and punished.
- Any punishment can have a monetary value.

The function of the expected utility of the offender

The utility function of the individual:

$$U = U(Y, t_c)$$

- Y – quantity of composite goods (individual wealth);
- t_c – the time an individual spends on consumption

Expected utility for a potential offender:

$$EU = (1-p)U(Y^S, t_c) + pU(Y^U, t_c)$$

The result for a criminal

Favorable result:

$$Y^S = Y^0 + W_i(t_i) + W_l(t_l)$$

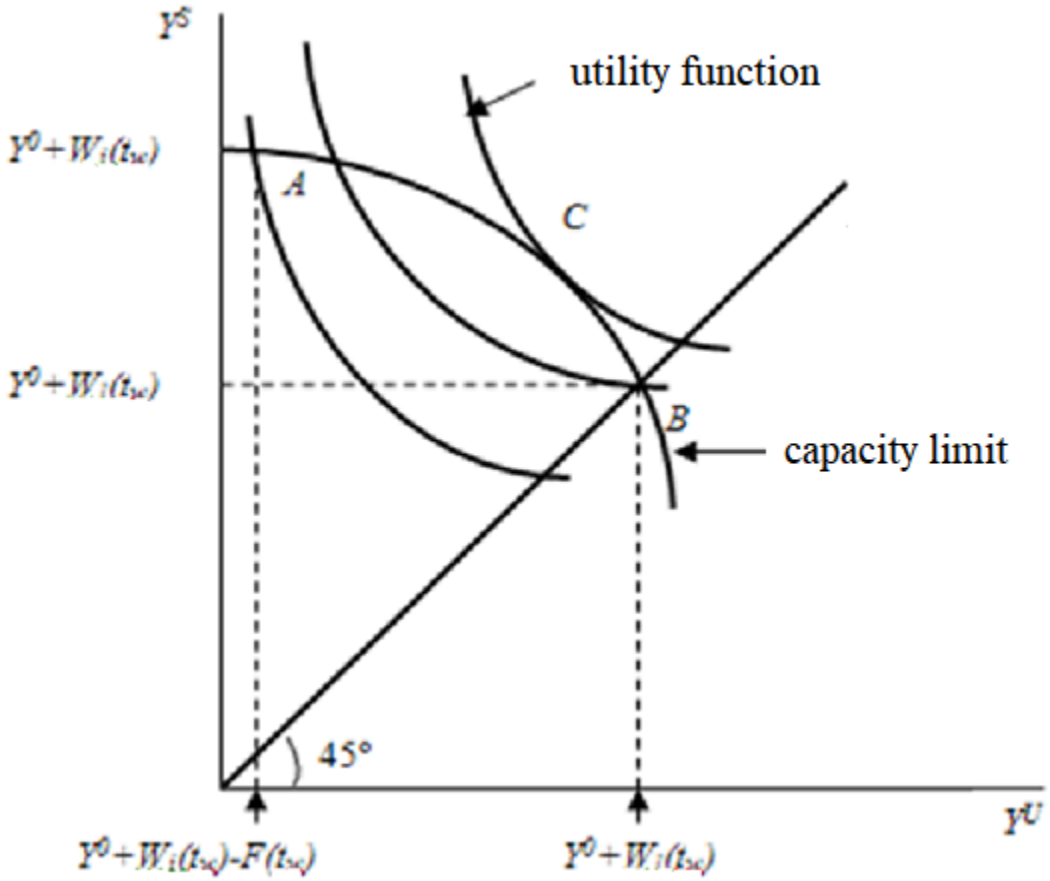
- Y^0 – the wealth of the individual at the beginning of the period duration t;
- W_i – income received by the individual from illegal activities during this period;
- W_l – individual income from legal activities;
- t_i – time spent by the individual in the period t for illegal activities;
- t_l – the time that the individual spent on activities in the legal sphere.

Adverse outcome (punishment):

$$Y^U = Y^0 + W_i(t_i) - F(t_i) + W_l(t_l)$$

- F – severity of punishment, expressed in money.

The division of individual time between criminal and legal activities



The main conclusions of Ehrlich model

- The propensity of individuals to criminal activity is inversely proportional to F and p.
- For risk-neutral individuals, both an increase in the expected probability of punishment and an increase in the severity of the punishment will have the same deterrent effect.
- For those who are not at risk, the severity of the punishment is a stronger deterrent than the likelihood of being punished.
- In at-risk individuals, the likelihood of punishment is a much stronger deterrent than increasing the severity of the punishment.

- The expected income from crime stimulates the individual to criminal activity, while the increase in expected income from legal activities, other things being equal, reduces the individual's propensity to criminal behavior.

Interperiod choice and behavior of a criminal

Davis model

- Expected earnings discount rate
- Discounted amount of fine:

$$F_d = F\int_0^{\infty} g(t)e^{-rt}dt$$

- *g (t)* – probability density distribution *t*;
- *r* – individual discount rate.

Prerequisites of the analysis

- An individual involved in criminal activity, until the moment of his detention by law enforcement agencies, receives income only from criminal activity.
- Income (W_i) directly depends on the number of crimes committed θ.
- After the arrest at the time t the offender will have to pay a fine of F. After that, he will no longer be able to engage in criminal activities and will be forced to earn a living legally (W_i).

Model choice – 1

- Discounted expected future income of the individual:

$$W_d = \int_0^{\infty} \{W_i(\theta)[1 - G(t)] + W_l G(t) - Fg(t)\} e^{-rt} dt$$

- *G (t)* – random variable distribution function *t*, i.e. the probability that the criminal activity of the individual will be stopped at any time prior to the moment *t*.

Model choice – 2

- The probability that the violator will be detained at the moment *t* provided that so far society has not been able to stop its activities:

$$P(\theta, E) = \frac{g(t)}{1 - G(t)}$$

- E – the means that society spends on the detention of this criminal.

$$\frac{\partial P}{\partial \theta} > 0, \frac{\partial P}{\partial E} > 0, \frac{\partial^2 P}{\partial \theta^2} > 0$$

Model choice – 3

- Discounted the expected income of the offender:

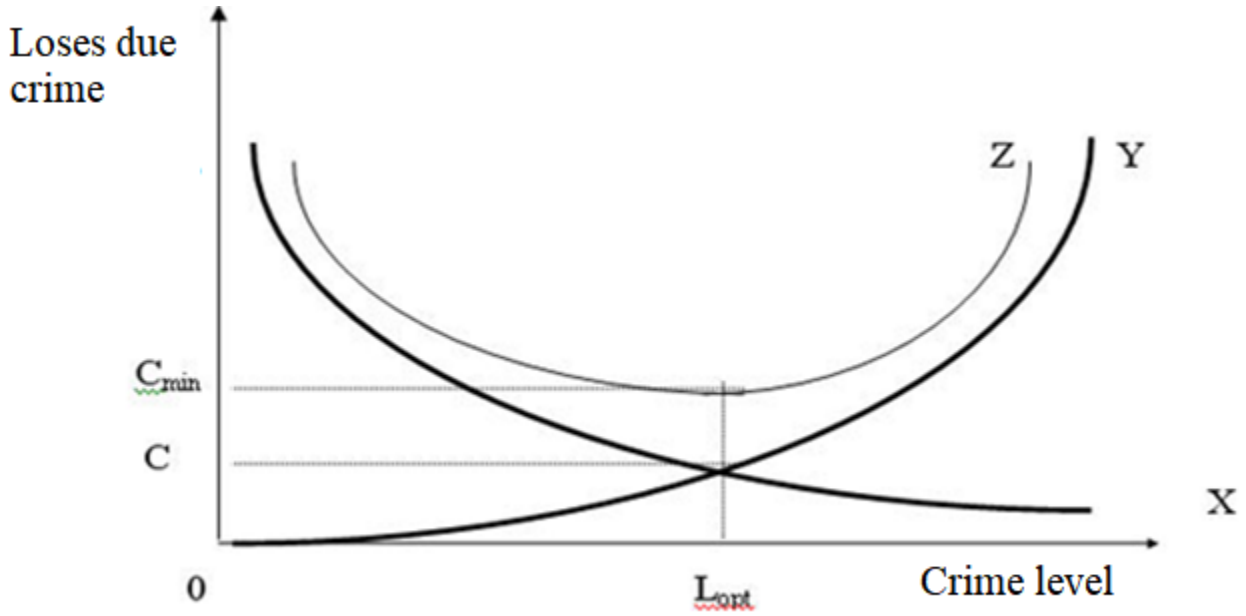
$$W_d = \frac{W_i - W_l - FP}{P + r} + \frac{W_l}{r}$$

- Conditional probability of detention criminal at the time *t (P)* doubly affects discounted expected future income individual:
  - reduces expected income from illegal activities (*PF*),
  - increases discount rate (*P + r*) in denominator.

Optimizing the crime rate

Model

- X – the cost of crime prevention;
- Y – losses from committed crimes;
- Z – total costs.



Conclusions of the model

- General the goal of law enforcement should not be to "eradicate" crime, but to keep it at the optimal level from the point of view of society.
- The criminal optimum is quite mobile and depends on both the efficiency of resources use by law enforcement agencies and the "efficiency" of the activities of criminals (i.e. losses from them).

Models of bureaucracy

Bureaucracy

- Bureaucracy – the administrative system of the organization, consisting of a number of officials, positions, a hierarchy.

Bureaucracy and corruption

- **Corruption** (from Latin. corrupt – spoil) – illegal activities, which consists in the use of officials of their rights and job opportunities for personal enrichment; bribery and corruption of public and political figures.
- **A characteristic feature of corruption** – conflict between the actions of an official and the interests of his employer or a conflict between the actions of an elected official and the interests of society.
- **The main incentive for corruption** – the possibility of obtaining economic profit (rent) associated with the use of power.
- **The main deterrent** – risk of exposure and punishment.

Niskanen's model – 1

- Model assumptions:
  - Bureaucrats maximize the entire budget of their office at a given demand and cost;
  - The budget must be equal to or greater than the minimum cost of equilibrium output;
  - The bureau exchanges specific products for a certain budget.
- Features of the model:
  - budget maximization is an adequate task for a bureaucrat;
  - the bureau exchanges its output for the total budget, not the budget per unit of output;
  - the bureau has "market" power, which has a monopoly on the market, where there is a choice of "all or nothing".

Model – 2

- Marginal value for consumers:

$$V = a - bQ$$

- Marginal office expenses:

$$MC = c - 2dQ$$

- Total budget of the bureau:

$$B = aQ - \frac{b}{2}Q^2$$

- Minimum total costs of the bureau:

$$TC = cQ + dQ^2$$

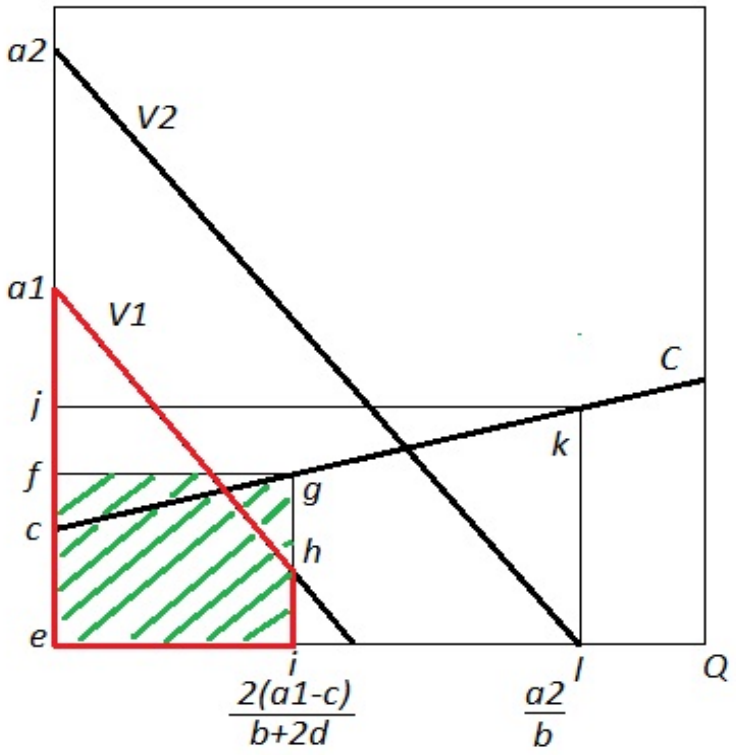
Model – 3

- Equilibrium volume, Q

$$Q = \begin{cases} \dfrac{2(a-c)}{b+2d}, & for\ a < \dfrac{2bc}{b-2d}, \\ \dfrac{a}{b} & for\ a \geq \dfrac{2bc}{b-2d}. \end{cases}$$

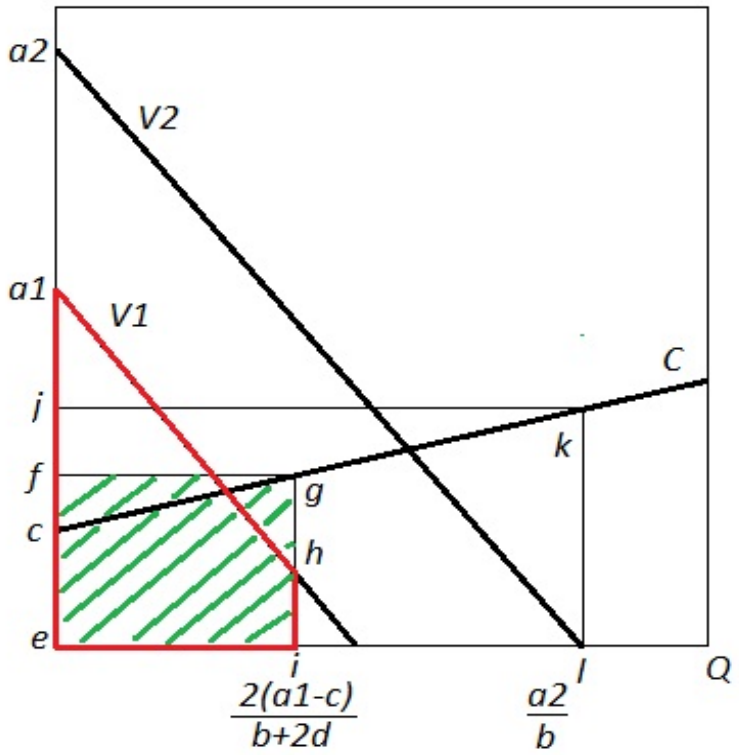
Model – 4

- For demand V1 the equilibrium issue of the bureau is within the budget constraint where the area of the polygon is ea1hi is equal to the area of the rectangle efgi. At the equilibrium level of output, the total budget simply covers the total minimum costs.



Model – 5

- In terms of demand V2 the equilibrium output will be in the limited range, where the output threshold is zero. In this case, the total budget will be equal to the triangle ea2l and more than the minimum total cost of a rectangle ejkl.



Thank you!