

The Market for Illegal Goods: The Case of Drugs

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- ▶ The enforcement of quantity restrictions or excise taxes through apprehension and punishment is largely omitted from these analyses
- ▶ This paper concentrates on the positive and normative effects of efforts to reduce quantities by making production illegal
- ▶ It compares the effectiveness of such this quantity approach with an excise tax on legal production

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- ▶ Every U.S. president since Richard Nixon has fought a “war” on the production of drugs
- ▶ Despite the wide scope of these efforts, no president or drug czar has claimed victory

Overview

- ▶ Simple Graphical Analysis
- ▶ The Elasticity of Demand and Optimal Enforcement
- ▶ Extension to allow for heterogeneous producers
- ▶ Comparison of making all production illegal with alternative of taxing legal production and punishing illegal production
- ▶ Should government try to discourage consumption of goods through advertising

Simple Graphical Analysis

- ▶ Weitzman (1974) argues that excise taxes and direct quantity restrictions give basically equivalent results, but ignores the costs of enforcement
- ▶ Glaeser and Shleifer (2001) argue that when the goal is to restrict quantities, quantity reductions are better
- ▶ Discovery of quantities implies illegal production whereas it is more difficult to prove excise taxes were not paid on underground production
- ▶ Discovering illegal production requires considerable public resources
- ▶ This reverses the conclusion that quantity reductions are cheaper to enforce than monetary taxes

- ▶ Demand for drugs is assumed to depend on market price and costs imposed by government on drug users

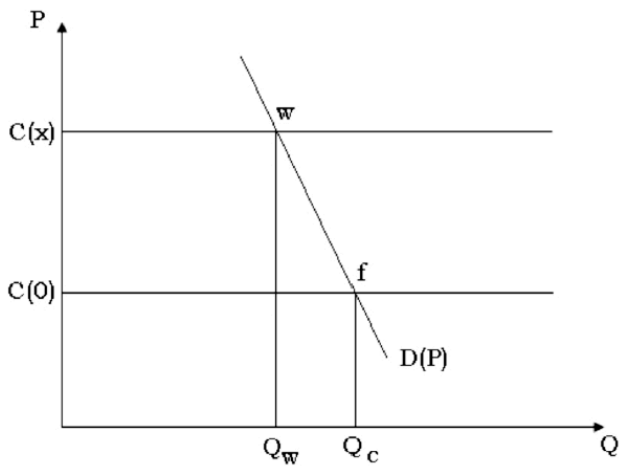
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- ▶ With a war on drugs focused on interdiction and prosecution of drug traffickers, $E > 0$ but $T = 0$
- ▶ This would raise the street price of drugs and reduce consumption



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- ▶ From revenue equation above, resources devoted to supplying drugs will rise when demand is inelastic and will fall when demand is elastic

The Elasticity of Demand and Optimal Enforcement

► Results:

1. Elasticity of demand determines the optimal level of enforcement
2. With elastic demand, intervention lowers production costs and consequently enforcement costs
3. With inelastic demand, intervention raises production costs and enforcement costs
4. It takes very low social values of consumption, or very high demand elasticities to justify intervention

Model: Notation

F : monetary equivalent of punishment to convicted drug traffickers per unit of drugs smuggled

c : competitive per unit cost of drugs without tax or enforcement, $c = c(0)$

A : private expenditure on avoidance per unit of output

E : level of government enforcement per unit of output

$p(E, A)$: probability of conviction; $\frac{\partial p}{\partial E} > 0$, $\frac{\partial p}{\partial A} < 0$

Model: Assumptions

- ▶ When smugglers are caught, drugs are confiscated and they are penalized F
- ▶ Markets are perfectly competitive and technology is CRS
- ▶ Price is thus determined by the minimum unit cost
- ▶ The expected unit cost for a producer (given E, A) is
$$u = (c + A)(1 + \theta) + \theta F$$
- ▶ Where $\theta(E, A) = \frac{p(E, A)}{1 - p(E, A)}$ is the odds ratio of being convicted

A Supplier's Problem

- ▶ Suppliers set price by minimizing expected unit cost,

$$P = \min_A (c + A)(1 + \theta) + \theta F$$

- ▶ Which implies the first-order condition,

$$-\frac{\partial \theta}{\partial A}(c + A + F) = 1 + \theta \rightarrow A^*$$

- ▶ This implies that the competitive price is

$$P^*(E) = (c + A^*)[1 + \theta(E, A^*)] + \theta(E, A^*)F$$

- ▶ Expenditures on avoidance are interpreted as all extra costs related to operating an illegal enterprise such as lack of access to courts and less efficient means of production, transportation and distribution
- ▶ The competitive price will thus exceed the costs in a legal environment because of these avoidance costs, the loss of drugs due to confiscation and penalties imposed on convicted traffickers
- ▶ The competitive price shown above can be written as,

$$P^*(E) = c + A^* + (c + A^*)\theta(E, A^*) + \theta(E, A^*)F$$

- ▶ A higher F raises the cost and lowers the profits of an individual supplier
- ▶ The second order condition from cost minimization implies that avoidance expenditure must be increasing in F
- ▶ But in a competitive equilibrium, a higher F has no impact on expected profits as it raises price through increased expected cost
- ▶ Greater realized profits for suppliers who avoid apprehension

- ▶ The increase in price lowers consumption, depending on the elasticity of demand, ϵ_d
- ▶ This can be shown as follows,

$$\frac{dP}{dE} = \frac{\partial \theta}{\partial E} (c + A^* + F) \rightarrow \frac{d \ln P}{d \ln E} = \epsilon_\theta \left[\frac{\theta(c + A^* + F)}{P} \right]$$

- ▶ Which implies,

$$\frac{d \ln Q}{d \ln E} = \epsilon_d \frac{d \ln P}{d \ln E} < 0$$

- ▶ So, the reduction in consumption depends on the elasticity of demand (obviously) as well as the elasticity of the odds ratio, $\epsilon_\theta > 0$

Optimal Enforcement

- ▶ Assume the government wants to reduce the consumption of drugs by choosing enforcement
- ▶ This is modelled using a social planner who values drug consumption less than private willingness to pay (P)
- ▶ $V(Q)$ is the social value function, with $\frac{\partial V}{\partial Q} \equiv V_Q \leq P$
- ▶ The cost of enforcement is $C(Q, E, \theta) = C_1 E + C_2 QE + C_3 \theta Q$

The Planner's Problem

- ▶ The social planner solves the following,

$$\begin{aligned} \max_E W = & V[Q(E)] - P(E)Q(E) - C_1E - C_2Q(E)E \\ & - C_3\theta[E, A^*(E)]Q(E) \end{aligned}$$

- ▶ Assuming marginal enforcement costs are zero, the first-order condition simplifies to

$$V_Q = MR \equiv P \left(1 + \frac{1}{\epsilon_d} \right) \rightarrow \frac{V_Q}{P} = 1 + \frac{1}{\epsilon_d}$$

- ▶ Where $\frac{V_Q}{P}$ is the ratio of the social marginal willingness to pay to the private marginal willingness to pay

- ▶ If $V_Q \geq 0$, and demand is inelastic ($MR < 0$), the above FOC implies that optimal enforcement is zero
- ▶ This is because reduced consumption and increased production costs lead to a decrease in total social utility
- ▶ This differs from the common taxation result that reducing output below the free-market level is always optimal when $V_Q < P$
- ▶ Even if demand is elastic, it may not be socially optimal to reduce output if consumption has positive marginal social value
- ▶ Intervention is justified when the social value of consumption is low, or demand elasticity is high
- ▶ Intervention is best justified when $V_Q < 0$

A Comparison With Monetary Taxes

- ▶ What if the desired decrease in consumption is addressed through an excise tax as opposed to a direct quantity reduction?
- ▶ If the monetary tax is set too high, then some drug producers will enter the underground economy to avoid payment
- ▶ An optimal monetary tax on a legal good is always better than optimal enforcement on an illegal good
- ▶ If suppliers go underground, they face a higher unit cost of production
- ▶ If the monetary tax is slightly less than the markup, underground firms will be less profitable and will either go out of business or have to enter the legal market
- ▶ Then, governments will incur only the fixed component of enforcement costs, as no one produces underground in equilibrium

Conclusions

- ▶ Elasticity of demand plays a major role in our efforts to reduce drug consumption
- ▶ The greater the enforcement efforts to reduce consumption, the higher the social cost
- ▶ Thus, it does not pay to reduce consumption below free-market levels as demand is assumed to be fairly inelastic
- ▶ Excise taxes in a legal market are far more effective at reducing consumption, regardless of the elasticity of demand
- ▶ Enforcement need only raise the cost of production in the underground economy above legal production costs which will discourage illegal production

Questions?