

Deterrence, Economics, and the Context of Drug Markets

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Part I: An Argument for a Nuanced Discussion of Deterrence by Criminologists using Key “Economic” Concepts

Steven Durlauf and Daniel Nagin (2010) have reviewed the evidence for general deterrence, following up classic earlier reviews by Nagin (e.g., Nagin, 1998). This is a touchy subject, and one that often leads to contentious arguments that pit criminologists and fellow travelers against economists (e.g., Levitt and Dubner, 2005; Zimring 2008). Economists, committed to general deterrence by their belief in rationality (Bushway and Reuter, 2008), discuss deterrence without citing work by criminologists (Levitt, 2002; Levitt and Miles, 2007), and criminologists return the favor (Pratt et al., 2006). Durlauf and Nagin’s paper attempts to talk about deterrence research in more nuanced terms, with equal reference to research by economists and criminologists.

Michael Tonry, decidedly not an economist, has called for just this kind of nuance in research on deterrence, based directly on the observation that there are “differences in individuals’ susceptibility to changes in legal threats” (Tonry, 2008, p. 281). This observation is not a refutation of rational choice, but simply a call to recognize that there are different preference functions in the population (see also Cook, 1980), or alternatively, there are heterogenous treatment effects, a common observation now in the economics evaluation literature (Angrist, 2004; Djebbari and Smith, 2008; Heckman and Smith, 1997).

Although the rational choice framework itself is clearly not perfect, it has considerable power to predict and explain—and it can easily handle differences between individuals in

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the population. Productive conversations about policy can be had while staying within the confines of the model—a valuable constraint given the absence of other formal theories with comparable predictive power. A great example of this power comes from political scientist Bernard Harcourt’s critique of statistical discrimination, which is made using the rational choice model itself (Harcourt, 2007).

Durlauf and Nagin’s critique of policies that increase sentencing severity is an excellent example of a critique of deterrence policies that is rooted in rational choice theory. If criminals are rational, the fact that punishment (or money) 10 years from now is worth less than the same amount of punishment (or money) this year means by definition that a rational criminal will be less deterred by an extra year of punishment in a world where he already faces a threat of 10 years, versus a world where he currently faces only 6 months of incarceration. One year of punishment 10 years from now is simply not as “costly” as 1 year of punishment 6 months from now. This is especially true, if as we believe is the case, crime-prone individuals are likely to be impulsive (likely to discount the future heavily). Staying within the simple rational choice model, as we advocate, Durlauf and Nagin make this explicit using simple calculations in a clear and compelling manner.

The concepts of marginality, so central to the economic approach, is also relevant here, and again, Michael Tonry takes the lead in his 2008 article with his consistent reference to marginal deterrence. The question is not, as it is often phrased, does deterrence work, but, can the deterrence threat be heightened given the current level of threat. The United States already has a severe system of punishment; sentence lengths are high both by historical and international standards. The policy question is whether those who are not already deterred (by evidence of their continued commission of crime) can be deterred by additional punishment threats. This is a fundamentally different question than “does deterrence work.”

The concept of elasticity which is central to Durlauf and Nagin’s approach is linked directly to the issue of marginality. Elasticity as a concept is well developed in economics but is not often used in criminology, which tends to focus on effect size. That is unfortunate, because elasticity, unlike effect size, has inherent in its definition a relative assessment of returns. To be precise, an elasticity refers to the percent change in Y “caused by” the percent change in X. Percents can only be calculated if we know the current level of an activity. The same effect size can have a large elasticity if the initial investment in X was low, and a low elasticity if the initial investment in X is high (or vice versa). Responsivity, in a world of elasticity, depends on the location with respect to current efforts. The current discussion about incarceration depends crucially on the understanding of where we are along the margin. Additional expenditures on incarceration now occur on top of substantial sums already devoted to that effort; effects will be smaller because of declining elasticity compared to additional expenditures in a world where incarceration rates are less than they are currently (Donohue, 2009).

Durlauf and Nagin's discussion about when certainty-based policies might be more productive than severity-based policies, with its explicit use of rational choice theory, marginality and elasticity, naturally moves the discussion away from an all-or-nothing debate about the use of punishment threat to create deterrence. This is a natural and productive movement in the debate about deterrence. It mirrors the discussion about rehabilitation programs, which moved from a "nothing works" mentality, to a more nuanced "what works for whom" approach" (Cullen, 2004). We do not see why discussions of deterrent effects are any different from the discussion of job training or rehabilitation programs. In all cases, it is useful to adopt a nuanced perspective where the search is for different treatment effects for different types of programs aimed at different populations, with special awareness of the context in which the programs are being implemented (Bushway and Smith, 2007).

There are limits to how far the analogy should be pushed. While it is easy to think about offering more intensive treatment to conceited offenders at higher risk for reoffending, we hesitate to present different certainty of punishment to different groups of people. For example, sex-offender registries are in effect attempts to change the certainty of detection for a particular type of offenders. However, this type of differentiation already occurs with respect to severity of punishment based on criminal history. In effect, individuals with longer criminal history records (and higher recidivism risk) are facing a different deterrent threat. Drug court and other more active monitoring strategies, such as the HOPE Program (Hawken and Kleiman, 2009), are instances in which technology is used to increase the certainty of detection for particular individuals who have already been convicted; these might actually lead to better outcomes, for both the individual and the system as a whole. More explicit thought about the ways in which deterrence strategies can be ethically tailored for heightened effectiveness is clearly warranted.

Part II: Economics is About Markets Too

Part I contended that a productive and nuanced discussion about the relative merits of the punishment threat can be carried out within the context of the economic model of rational choice. Within this discussion, we pointed out that the model can predict, a priori, cases where particular deterrence strategies will be ineffective (e.g. severity-based strategies in a world where current punishments are already severe). But this use of the rational choice model is inherently limited, because it fails to exploit the "market" part of the basic rational choice model. This is particularly important when speaking about deterrence strategies in a world where much of the punishment is being directed at drug markets, and drug dealers, either directly or indirectly. This observation is true whether the issue is severity or certainty based strategies.

Specifically, Durlauf and Nagin's analysis about the potential for deterrence strategies needs modification to deal with enforcement against drug markets, particularly drug sellers. The distinctive feature of such enforcement is that price serves as a mediating factor; higher

risk in terms of either certainty or severity can be compensated for by higher returns to sellers, in the form of higher prices. The result is that the decline in drug selling may only be slight because of the overall increase in revenue caused by a shift in the supply curve; moreover, it is possible, indeed likely, that the higher price results in higher levels of property crimes by drug users. Either reality will counteract the increased deterrent threat with respect to crime, making it harder to activate the responsivity highlighted by Durlauf and Nagin.

II. A Theory

A principal goal of drug enforcement is reduction in the number of drug users and the amount of crime that drug use causes; the dealers are essentially instruments for the adverse consequences of drug use with which we are concerned. The dealers themselves are thus not the ultimate object of enforcement, a contrast with robbery or crimes of violence where the perpetrator is the sole object of the enforcement. Raising dealer risks and costs by increasing sentence severity or certainty is simply a method for making drugs less available and more expensive and thus inducing users to cut back or desist altogether.¹ Quantity serves as a summary measure of the two dimensions of harm, the number of users and the average quantity consumed; quantity also captures health harms (Reuter and Caulkins, 1995). Expenditures is of separate interest as it provides a measure of the potential income generating crime (both property and market) arising from drug use.²

The question then is whether Durlauf and Nagin's analysis and conclusion generalize to this situation. Is it possible, by raising the risk of apprehension of drug dealers, to simultaneously reduce the number of dealers incarcerated, the quantity of drugs consumed and the total expenditures?

This is not a minor matter for those interested in reducing the population in prisons and jails. Caulkins and Chandler (2006) estimate that the number of individuals incarcerated for drug offenses (including jails) rose approximately 10-fold over the period 1980 to 2005; the total in 2005 was close to 500,000, about 22% of the incarcerated population in the U.S. As with other crime, the rise in drug incarcerations is remarkable since it has continued long after the size of drug markets have apparently decreased (ONDCP, 2001).

As articulated by Reuter and Kleiman (1986) and more recently updated by Caulkins and Reuter (forthcoming), the "risks and prices" theory of price formation for an illegal drug

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1. We are not dealing here with the separate issue of whether more intense enforcement against drug dealers increases aggregate harm by, for example, inducing violence, a key argument in the case for harm reduction approaches to drug policy (see MacCoun and Reuter, 2001).
 2. There is a substantial literature on the positive relationship between crime and drug use. See MacCoun, Kilmer and Reuter (2003) for a review; a more skeptical assessment of the strength of the relationship is given in Stevens (2010).

posits that price is determined largely by the intensity of enforcement, that is, the probability that a dealer will be punished. The punishment affects two hazards faced by drug dealers; it increases directly the risk of incarceration and other criminal justice penalties (including seizures of drugs and assets³) and indirectly the risks of violence from other participants. The indirect effect comes through concerns about informants and through prices.⁴ The model does not distinguish between the probability and severity of punishment, and we conclude that the certainty-based deterrent threats proposed by Durlauf and Nagin are equally valid in this context.

Durlauf and Nagin have introduced the concept of an elasticity, the percentage response of one outcome variable on to a 1% change in some other variable. As noted in Part I, this is an important concept, and it plays a central role in any economist's discussion of market dynamics. But there are two critical elasticities here; the elasticity described by Durlauf and Nagin, which is the elasticity of the supply of risky labor with respect to expected punishment, which we will designate $e(L)$ and the elasticity of the demand for the drug with respect to its price $e(D)$, which has no counterpart for non-market crimes. Assume, as required by Durlauf and Nagin, that $e(L)$ is very high, that is, that there are many other individuals willing to sell the drug for a slightly higher reward than that generated by current prices (and that a slight increase in deterrence from an increase in certainty of punishment will drive potential drug sellers out of the market). Assume also that the $e(D)$ is low, so that the quantity consumed is not much reduced by the higher price needed to bring in the marginal seller; in the following discussion the parameter is set at -0.3 .⁵

Now assume that police are able to increase the probability of arrest for a cocaine selling offense from 2% to 3%; postarrest risks stay unchanged. This has two kinds of effects on the supply side. First, some current dealers are removed from the population; for simplification assume that the system was in steady state before, with an equal number of dealers exiting (through incarceration) and returning to the market each year. The higher arrest rate means that there will now be a shortage of sellers; buyers will bid up the price as a consequence. That will attract in some new sellers, who were not willing to deal drugs at the previous price. The higher price will also lower the amount that users are willing to buy so that the total number of dealers will decrease.⁶ Whether the total number of dealers incarcerated in the new equilibrium decreases along with the decrease in drug sales depends on $e(L)$. As noted by Durlauf and Nagin, if this parameter is high enough then the price rise will be small

3. Note that it is only a rise in apprehension that affects seizures.

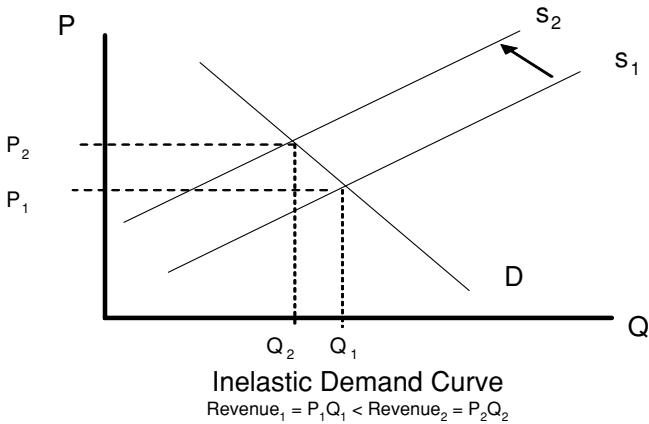
4. The use of violence against informants is a common source of injury and death in these markets. The higher the risk to which an informant can expose a dealer, the greater the incentive to retaliate against him. Higher prices increase the incentives for theft of drugs.

5. That is within the ranges reported by Grossman (2004) in his review of the elasticity of demand for addictive substances.

6. We assume here that the optimal amount for a drug dealer to sell per unit time does not change.

FIGURE 1

The Effect of Increased Dealer Deterrence on Drug Prices and Consumption



enough that the total number of incarcerations (apprehension probability times number of dealers) will rise.

But this is only the first part of the analysis. There is also the effect on drug users; does total expenditure, a surrogate for related crime, go down? There is a standard exposition for this, as shown in Figure 1. The higher arrest rate lowers the amount that will be offered at each price. That is indicated by the shift in the supply curve. The shift of the supply curve moves the equilibrium along the demand curve: since the elasticity of demand is less than one in absolute value, the result is that consumption declines but total expenditures increase.⁷

In this simple model, only the elasticity of demand matters for the second effect. We will observe an increase in expenditures on the illegal drug, whether the shift in the supply curve is large (i.e., the price has increased a lot to attract in the marginal dealers to replace those who are being incarcerated now) or small, so long as it leads to a shift along the demand curve characterized by inelastic demand. The key to this result is that this increased return from crime will potentially counterbalance the increase in punishment offered by the increase in certainty, and the expected punishment may not in fact increase. Since there are few estimates of price elasticity for cocaine or heroin that are greater than one in absolute value, it seems that even increased police efficiency does not save us from the opposite of Durlauf and Nagin's conclusion; better policing that increases a dealer's risk of

7. For example, If price rises by 10% and the result is a decline in demand of 3%, then revenue will be $1.10 \times 0.97 = 1.067$.

arrest and punishment may generate both more incarceration and more crime, even with high elasticity of labor supply.

There are numerous assumptions built into this analysis and hence a number of avenues for chipping away at this conclusion. We consider just two here:

- (1) Markets may become less efficient as they become smaller. At some stage the higher incarceration rates may make dealers few enough in number that the costs of users and sellers finding each other become high. This in effect shifts the demand curve down, since the nonmonetary costs have risen.
- (2) Dealers are also users; indeed many of them are very frequent users (Pollack, Reuter and Sevigny, forthcoming). Thus incarcerating dealers also reduces demand. A much higher incarceration rate shifts the demand curve down at the same time as it shifts the supply curve out. The consequence may be a reduction in quantity consumed and in price.

II. B Policy Implications

Critiques of the war on drugs abound (e.g., Tonry, 1995); it is essentially impossible to find academic defenders of the U.S. campaign to suppress drug markets through extensive incarceration. The arguments against the current campaign are empirically strong but analytically casual. Does the above analysis help?

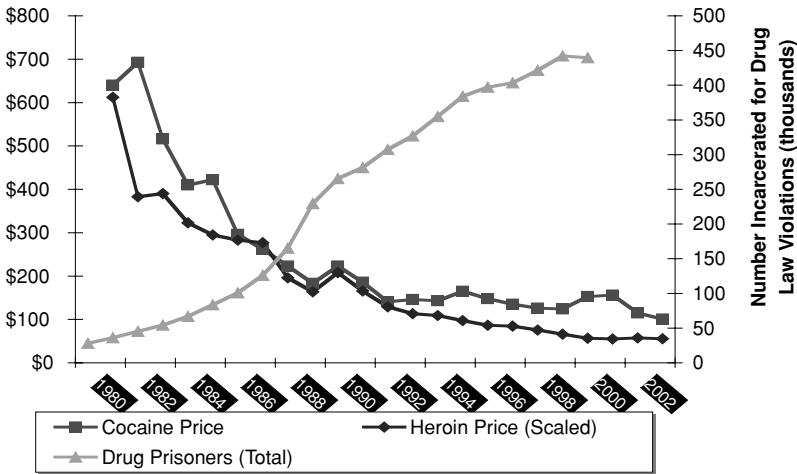
The empirical case is straightforward enough. Apart from the extraordinary racial disparity in incarceration, even greater than for crime generally, the mass incarceration of drug dealers has not managed to make drugs more expensive and harder to obtain. The failure with respect to price of cocaine and heroin is captured in Figure 2. Incarceration has risen sharply and prices have unexpectedly fallen over the same time period.

The explanations offered for this failure generally focus on the ease of replacement. Locking up one dealer simply provides an opening for another is a standard commentary. What we offer here is a more theoretically grounded basis for that claim. There may well be a limited supply of individuals willing to take the specific risks prevailing at the current prices and earnings, so that the removal of a dealer now creates not a niche but a gap. However, the supply of risk-taking labor is upward sloping, so that for higher incomes (associated with higher prices), there will indeed be another individual willing to take the place of the incarcerated dealer. As described above, that higher price will reduce consumption but probably will increase total expenditures on drugs and thus other crime.

Would less incarceration improve matters? That raises a difficult question about the optimal price of an illegal drug. The assumption has always been that society's interest is served by high drug prices, since they serve to discourage initiation and encourage desistance. There has been acknowledgment of the problem created by an inelastic demand but the tension has not been made explicit, with one exception. Moore (1973) argued that society

FIGURE 2

U.S. Drug-Related Incarceration and Retail Heroin and Cocaine Prices



Note: Prices are adjusted for inflation.

wanted drugs to be cheap for addicts and expensive to new users. He suggested that targeting enforcement against sales to new users was a way to accomplish this; dealers would then presumably be willing to offer lower prices to known addicts. That has never been put into practice, though it is possible to imagine undercover officers simulating new rather than experienced customers. However the aging of the cocaine and methamphetamine populations suggests that there are limits to this tactic; there simply aren't many new users of these drugs in contemporary America. One would hope though to aspire to policy recommendations that are less contingent.

One way out is again to note that many drug sellers are frequent users of the drugs they sell. If prison or community supervision can reduce their drug use, it may lead to lower aggregate demand for drug and thus to fewer drug deals. That would permit higher apprehension to generate lower incarceration in the long run. This is the insight of Kleiman's (2009) mandated desistance; as Durlauf and Nagin note, Kleiman presents a whole range of approaches aimed at lowering both prison and crime. There is some evidence, notably Hawken and Kleiman (2009), that close supervision with frequent drug testing followed, most importantly, by immediate graduated sanctions can generate much lower recidivism. Thus it is possible that more aggressive policing of drug markets may, as Durlauf and Nagin seek, generate less incarceration and fewer drug deals, but the mechanism for achieving that is more like specific than general deterrence.

Part III Concluding Comments

The analysis in Part II does not disturb either the findings or policy recommendations that Durlauf and Nagin offer. It does how point to a limited domain of generalization. Enforcement against drug sellers involves price mechanisms that complicate the analysis both directly (whether the number of drug dealers in prison falls) and indirectly (whether there will be more incarceration of drug users as a result of their income generating crime).

This analysis covers enforcement against sellers. What about deterring drug users through arrest? Here the price mechanism works in favor of deterrence. A higher risk of arrest for users increases the “full price” of the drug, which includes both money cost and time and risks of acquisition (Moore, 1973). Thus tougher enforcement will reduce the demand for drugs; there will be a shift down the supply curve, to lower price and lower quantity; fewer drug deals at lower prices and thus lower revenue.

Is this an important insight? Though many inmates of state prison are there for possession offenses, the self-reports of the inmates themselves indicate that most of them have pled to possession charges in order to avoid being convicted of more serious offenses of distribution (Sevigny and Caulkins, 2004) The incarceration of users is not a major tool of drug control; the incarceration of dealers for possession offenses is important but our analysis does not apply there.

Finding ways of reducing both the numbers imprisoned because of their drug selling and the amount of drug distribution is an important policy objective. Deterrence does not seem likely to help in this case because of the nature of the market, and the inelasticity of demand in the drug market.

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