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POLICIES TO ACHIEVE DISCRIMINATION  
ON THE EFFECTIVE PRICE OF HEROIN

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# Policies to Achieve Discrimination on the Effective Price of Heroin

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## I. Opportunities for Discrimination on the Effective Price of Heroin

### A. *The Effective Price of Heroin*

Traditional representations of demand curves assume that the dollar price of a good is the only significant element of the cost to the consuming individual. For most goods, other aspects of consumption such as transaction costs and uncertainty about quality are assumed to play a minor role. Not so with heroin.

Heroin is different because, first, users face significant transaction costs. Often they must search intently for an opportunity to "score." In addition, in any attempt to score they risk being arrested or victimized by other addicts. The consequences of these transaction costs include withdrawal symptoms, beatings, and jail. Second, users face quality uncertainties which may be even more significant. The amount of pure heroin and the toxicity of adulterants vary widely among street bags. The possible consequences include fraud and death.

Against these possible consequences of purchasing and using heroin, the dollar price may be relatively unimportant. Consequently, in describing the cost of consuming heroin, it is best to speak in terms of an effective price of heroin. The effective price is defined as an index including the following elements: dollar price, amount of pure heroin, toxicity of adulterants, access time, and threats of victimization and

arrest. Many of these elements are uncertain quantities from the point of view of the consumer.

### B. *Elasticity of Demand for New and Old Users*

The effective price to users may vary because: (1) individual users place different weights on the elements of the price index; and (2) the market conditions confronting individuals may be quite different. In general, these factors result in new users perceiving higher effective prices than experienced users. The disutility of a new user's first arrest is likely to be subjectively much larger than the disutility of an experienced user's eighth arrest. The expected access time for a new user who has no regular connection is likely to be longer (and have a larger variance) than for experienced users who have several regular connections.

The observation that new users face relatively higher effective prices gains added importance when one observes that at any given price the elasticity of demand for heroin is likely to be greater for new users than for experienced users. The reason is simply that new users are not yet addicted to heroin. Consequently, when tightening supplies boost prices, new users are the first to drop or be dropped from the market.

### C. *Why Discrimination on the Effective Price is Desirable*

The possibility that the effective price of heroin differs systematically between new users and experienced users resolves a crucial

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dilemma in the design of heroin policy. We would like a high effective price to new users to reduce the probability that they become regular users. We would like a low effective price to experienced users to reduce the pressure to commit crimes and to restore some dignity and comfort. Without the possibility of price discrimination, we would face a difficult tradeoff between the prevention objective and the crime reduction objective. With price discrimination, we can pursue both objectives simultaneously.

Since virtually everyone wishes that fewer people became heroin users, we may assume that our utility increases monotonically as the effective price to experimental users increases. Since most people wish that experienced users would commit fewer crimes and suffer less harassment, we may also assume that our utility increases with decreases in the effective price to old users.

#### *D. Factors Determining the Effective Prices to New and Experienced Users*

Before turning to the analysis of policy alternatives, it is useful to analyze the factors which determine the effective prices to new and old users. The first factor is, of course, the aggregate supply of heroin. If the supply is large, effective prices to both new and experienced users will be driven down.

A second factor is the strength of the incentives which motivate suppliers to discriminate against new users. Doctors will be more or less strongly motivated to discriminate against new users depending on their beliefs about the evils of heroin addiction and the penalties they must accept if they prescribe heroin to nonaddicts. Illegal dealers will be more or less strongly motivated depending on their perception of the profits and risks associated with dealing to new users. The stronger the motivation of suppliers to discriminate, the greater the

price differential that is established.

A third factor is the ability of the suppliers to distinguish new users from experienced users. If new users look very much like experienced users on the signals which dealers use in deciding which customers to accept, then dealers will make many Type I errors (identifying a person as a new user who is in fact an experienced user) and Type II errors (identifying a person as an experienced user who is in fact a new user). A Type I error results in experienced users facing higher effective prices than is desirable. A Type II error results in new users facing lower effective prices than is desirable. The more frequently these errors occur, the less will be the price differential that is established.

A fourth factor is the extent to which old users can act as "brokers" for new users. The amount of "brokering" depends on the experienced users' ability to get more heroin than they need for their own consumption, their incentives to conceal their heroin use from nonusers in the society, and the extent to which they circulate throughout the society. The existence of brokers will reduce the price discrimination that results from successful discrimination by regular suppliers.

By looking at how these factors are influenced by different policy instruments, we can make tentative judgments about the impact of these policy instruments on the effective price to new and experienced users.

## II. Policy Alternatives

### *A. The Choice Between Legal Prescription and Prohibition*

The major policy alternatives are to continue the prohibition of heroin or to allow heroin to be legally prescribed. Variants within these major policies are created by different enforcement strategies and different levels of supervision over doctors and users.

Some observers argue that the legal prescription policy has a clear advantage compared to the prohibition policy in terms of achieving a sharp price discrimination. The doctors in the legal prescription system are assumed to have stronger incentives and greater ability to discriminate against new users than illegal dealers. Indeed, dealers under the prohibition system are sometimes assumed to prefer selling to new users in order to gain additional lifetime customers. Differences in the opportunities for established users to act as brokers are not usually analyzed.

However, illegal dealers *do* have strong incentives to discriminate. Illegal dealers wish to maximize a utility function which includes income and the probability of arrest as arguments. This utility function gives them clear preferences for certain kinds of customers; those known not to be undercover police, those known to be "stand-up guys" (i.e., non-squealers), those who buy heroin regularly, and those who buy large quantities at each transaction. These customers yield higher incomes at lower risk. A marginal customer is one who has no solid reputation, who buys irregularly, and who buys little. The characteristics which dealers prefer in customers are positively correlated with duration of use. Consequently, although illegal dealers may be indifferent on the issue of selling to new or old users, they have incentives to discriminate on the basis of characteristics correlated with a customer's previous experience as a user. A *de facto* discrimination against inexperienced users and in favor of old users results.

Further, it can be argued that the opportunities for established users to act as brokers may be less under a prohibition policy than under a legal prescription policy. Under a prohibition policy, the user has some incentive to conceal his heroin use from strangers. In addition, since users in an illegal system depend on one another

for current information about good places to score for both heroin and money, they have an incentive to congregate in specific areas. Under a legal prescription policy, users would have weaker incentives to conceal their heroin use. In addition, the users under a legal prescription system would be more widely dispersed throughout the society. Thus, the opportunities for inexperienced users to encounter, discover, and persuade established users to act as brokers may be greater under a legal prescription policy than under the prohibition policy.

Given that regular dealers have incentives to discriminate in favor of experienced users and against inexperienced users under both policies, and that opportunities for established users to become brokers may be more numerous and more widely dispersed in a legal prescription system, there is no clear advantage for legal prescription.

#### B. Variants Under the Prohibition Policy

The prohibition policy can be enforced by a variety of police strategies, each with different targets and ploys. Four that are commonly employed or advocated are: (1) surveillance of known locations; (2) use of old addicts as informants; (3) use of young policemen as undercover agents to make purchases at street levels; and (4) attacks directed at intermediate or high levels of the industry.

Figure 1 shows the possible outcomes of employing the different tactics both alone and in combinations. The specific estimates are justified below.

(1) The surveillance of known locations gives users and dealers incentives to avoid those locations. Although this tactic has no effect on the regular dealer's desire to discriminate among his customers, it does affect the ease with which experimental users can locate suppliers and brokers. Consequently, the mean and the variance in the access time to new users increase.

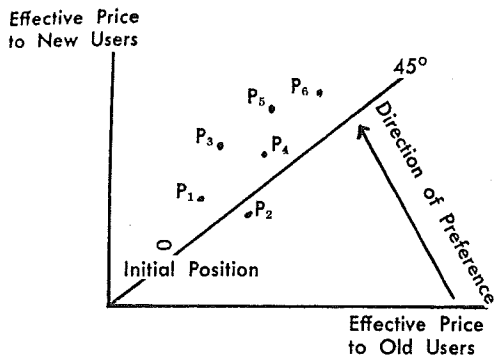


FIGURE 1. OUTCOMES OF DIFFERENT POLICE STRATEGIES UNDER A PROHIBITION POLICY.

The access time for experienced users also increases. However, given their extensive leads, connections, and experience in finding junk, the increase is less than for new users. The effect of this policy, then, is to raise the effective price to both new and old users, but more for new users than for old users.

(2) Using old addicts as informants increases the dealer's desire to discriminate among his customers. Unfortunately, he begins to discriminate *against* experienced users and in favor of new users. In addition, the informants may be granted some immunity by the police. The immunity may not extend to serious dealing, but might easily cover brokering. The proximate effects of this tactic, then, are to encourage dealers to discriminate against experienced users and to permit old users to become more brazen in their brokering activities. This results in somewhat higher effective prices for both old and new users and a reduction in the degree of discrimination that is achieved.

(3) The use of young patrolmen as undercover agents again gives dealers strong incentives to discriminate among their customers. However, with this tactic the regular dealer is motivated to discriminate against people with characteristics associated with inexperience, i.e., in the direc-

tion that we prefer. Note that the worse a policeman is in terms of his ability to imitate hardcore junkies (i.e., the more inexperience he reveals), the better is his performance in motivating dealers to avoid inexperienced users. This should relieve those who were worried about the ability of police to imitate the behavior and posture of real junkies. The effect of this tactic is to raise the effective price to new users by a large amount and to have only a minor effect on the effective price to old users.

(4) For regular street dealers the important effect of attacks directed at intermediate and high levels of the distribution system is that the attacks lead to a reduced aggregate supply. If the dealers were simply profit maximizers, they would exploit the situation by charging higher effective prices for all users. However, the dealers would also like to reduce their risk. Consequently, they are willing to take some of their gain in the form of actions designed to reduce their risk. This tactic alone does not suggest any specific ways that the dealer might reduce his risk. However, if the dealer judges that his risks could be reduced by reducing the number of transactions or discriminating among his customers, this tactic may result in new users facing relatively higher effective prices. If the dealer does not believe that reducing his transactions or cutting out marginal customers will reduce his risks, the outcome of this tactic will be simply to raise the effective price equally to new and old users.

(5) The analysis of attacks directed at intermediate and high levels hints strongly that combinations of tactics (given a constant budget) are more powerful than any one tactic pressed alone. The reason is simply that reductions in the aggregate supply of heroin will motivate dealers to look for ways of reducing risk as well as gaining more profits. In this situation dealers might respond to slight increases in the probability that young users could be

undercover police with a dramatic increase in the extent to which they discriminate against young users. Thus, a combination of sufficient high-level arrests to keep inventories tight and a modest increase in undercover activities at the street level might achieve  $P_5$  on Figure 1.

(6) The tactics aimed at dealers' incentives to discriminate can be complemented by policies aimed at reducing the incentives and opportunities for established users to act as brokers. The surveillance of known locations would accomplish this reduction in opportunities to encounter brokers. The effect would be to boost the price to new users above levels reached by strategy  $P_5$ . The price of achieving this higher effective price to new users is an even larger increase in the effective price to old users. It is they who will bear the brunt of this tactic. The outcome of a three-pronged strategy involving the use of undercover police, attacks at intermediate levels, and the surveillance of known locations might lie in the vicinity of point  $P_6$  in Figure 1.

### C. Variants Under the Legal Prescription Policy

Legal prescription policies vary for several different reasons. Doctors can be more or less conservative in diagnosing addiction. In making their diagnoses, the doctors can use tests of varying quality. The dose provided to users can be more or less generous. The users who receive heroin can be vulnerable to varying degrees of supervision. Finally, the legal prescription policy can be combined with more or less aggressive enforcement against residual "unauthorized use." From the set of possible variants, we can distinguish four that are advocated or employed.

- (1) Permitting doctors to prescribe heroin without close government supervision (the British policy until 1968).
- (2) Permitting heroin to be prescribed by

doctors serving in government-supervised clinics (the British policy from 1968 to the present).

- (3) Permitting heroin to be prescribed only to be used under the supervision of the government.
- (4) Prescription for use only under supervision and aggressive enforcement against unauthorized sales and use.

Figure 2 presents speculative estimates of the outcomes of these four different policies. These estimates are supported below.

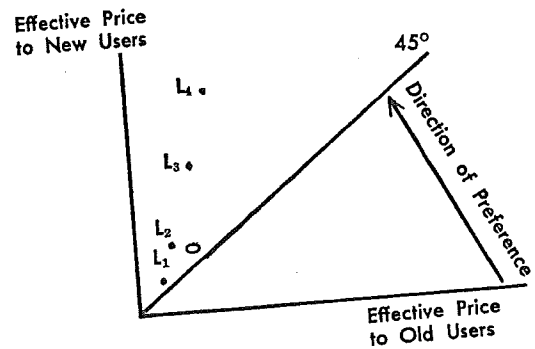


FIGURE 2. OUTCOMES OF VARIANT POLICIES UNDER A LEGAL PRESCRIPTION POLICY.

(1) The policy of not supervising doctors allows them to do as they wish in diagnosing addiction and in prescribing maintenance doses of heroin. We can, of course, rely on a strong motivation to discriminate against new users and to avoid overprescription. Unfortunately, it is difficult for doctors to distinguish reliably between experienced users and new users and to calibrate "maintenance" doses of heroin. In diagnosing addiction doctors may look for track marks, perform urinalyses, require documented histories of addiction, or induce withdrawal symptoms. Of these tests only the last is reliable—and it is expensive, both for doctors and patients. In deciding on the appropriate dose, the doctor can bargain with the addict or admit him

to a hospital for a series of titrating experiments. Again, only the expensive test is accurate.

In practice private doctors have been unwilling to invest in the expensive but accurate tests. Further, they have used a relatively liberal criterion in diagnosing addiction and in deciding on the appropriate dosage. The combination of crude tests and liberal criteria implies that many Type II errors are made: nonaddicts are diagnosed as addicts; addicts receive substantially more heroin than they need for their own consumption. Because doctors cannot reliably distinguish new users from old users, and because overprescriptions subsidize extensive brokerage activity, the price differential under this policy is small. Both new and old users face low effective prices.

The government has two basic options to increase the price differential between new and old users. The first is to attempt to control the number of Type II errors in both diagnosis and prescription. The second is to exercise some level of supervision over the established users to reduce the extent of brokerage activities. Acting on these diverse fronts yields policies  $L_2$  and  $L_3$ .

(2) The government can control the number of Type II errors by punishing doctors for Type II errors, or by gaining direct control over the diagnostic and prescription procedures. There is a strong argument for the government to gain direct control.

Private physicians can respond to punishment for Type II errors in two different ways. They can continue to use the same tests, but use a more conservative criterion. Or, they can shift to a more accurate test. Both moves reduce the frequency of Type II errors. However, the moves have much different implications for the frequency of Type I errors. Moving to a more accurate test secures a reduction in Type

II errors without a large corresponding increase in Type I errors. Shifting to a more conservative criterion without changing the test secures a reduction in Type II errors only at the price of an increase in Type I errors. We care about Type I errors (which represent discrimination against experienced users and underprescription) for two reasons: experienced users face higher effective prices than is desirable; the experienced users who are excluded from the legal distribution system may support a residual illicit market in heroin which is relatively hospitable to new users. The difficulty of controlling the responses of doctors to punishment for Type II errors and the significant costs of increasing the number of Type I errors are strong justifications for the government to control the diagnostic and prescription procedures. They can guarantee the use of high quality tests.

However, even with the high quality tests, both Type I and Type II errors will occur in diagnosis and prescription. No matter what criterion we adopt in making diagnostic and dosage decisions, these errors will tend to reduce the price differential that might otherwise be established. If we adopt a conservative criterion, we will raise the effective price to old users by more than we would like (because of incorrect exclusions and underprescription), and we will fail to raise the effective price to new users by as much as we would like (because of the support our Type I errors provide for a residual black market). If we adopt a liberal criterion, we can keep a low effective price to old users, but risk a low effective price to new users as a result of extensive brokering by old addicts and successful penetration of the legal system by new users. Assuming the government chooses a conservative criterion, the outcome of this policy may be in the vicinity of  $L_2$  on Figure 2.

(3) The problem with policy  $L_2$  is that

we do not adequately control the behavior of old users. It is their brokering or their support of an illicit market which causes us problems. Policy  $L_3$  seeks to solve this problem by securing effective supervision of old users. There is a problem of how much supervision of the user's drug consumption and other activities is optimal. At one extreme is the policy of permitting users to take their week's supply out of the clinic. At another extreme is an inpatient program. One quickly discovers that neither of these extremes is a satisfactory policy for achieving price discrimination. With the weekly take-out system, one expects to encounter widespread brokering early in the week when users have excess supplies of heroin, and widespread purchases of illegal heroin late in the week when users have consumed or sold all their legal heroin. With an inpatient system, one will fail to attract a large number of old users to the legal system. They will support a residual black market. The optimal level of supervision may be a program in which old users are obliged to consume all their prescribed heroin under government supervision. The problem with this program is that it is vulnerable to the charge that it is antitherapeutic. This charge is made on two different grounds. First, since heroin must be injected at the clinic several times a day, the user may be prevented from holding a regular job and be forced to associate frequently with other addicts. Both effects are considered antitherapeutic. Second, in order to attract addicts to the program and to guarantee that they do not supplement, the prescribed doses may have to be generous enough to give users a "rush" and allow them a lengthy "nod." In both England and the United States doctors resist such a program. To avoid the antitherapeutic charge, doctors are likely to compromise on both the generous dose requirement and the close supervision requirement. If doses are not sufficiently

generous, many users will supplement in illicit markets. If supervision is not sufficiently close, some brokerage activities will undoubtedly occur—particularly if the dose is generous. The outcome of this policy, then, will probably be to raise the effective price to new users (due to some reductions in both brokering and the size of a residual illicit market), and to raise slightly the effective price to old users (due to less generous prescriptions and the difficulty of showing up at the clinics).

(4) A final step the government can take to achieve price discrimination under a legal prescription policy is to have effective law enforcement against remaining unauthorized use. The residual black market under a legal prescription policy is often overlooked on the assumption that legal competition will drive out illegal distributors. The arguments supporting this assumption are (1) that profits in the distribution system will decrease by so much that dealers will turn to more attractive occupations, or (2) that there is a minimum economic size for the illegal industry which is larger than the demand that remains unsatisfied after the creation of a legal distribution system. Both these assumptions appear highly doubtful. Heroin dealers almost certainly have low opportunity costs. In addition, the minimum economic size of an illegal distribution firm is probably small. The residual demand composed of supplementing users, users who wish to stay out of the legal system, and experimenting users may be large enough to keep the illegal distributors in business.

Note that only a few of these illegal dealers need to remain in business for inexperienced users to confront *lower* effective prices than they confront under a prohibition policy. Suppose that 10 percent of users at any given time were inexperienced users. Because they were not particularly heavily addicted, they would constitute



less than 10 percent of total heroin consumption—perhaps as little as 2–3 percent. Now suppose that a legal distribution system is developed. Many of the addicted people flock to the legal prescription system. Many illegal dealers decide to go out of business. However, if less than 97 percent of the former illicit supply capability disappears, inexperienced users will face *improved* supply conditions; the supply to them will be greater than under the prohibition policy. The small proportion of total consumption required to support large growth rates in the using population requires that one has to drive out nearly 100 percent of the illegal supply capacity.

These observations suggest that one must have a law enforcement strategy to attack the residual illicit market and that it must be very effective to reduce the aggregate supply to new users. The strategies available for enforcing narcotic laws have been previously analyzed. If the government used the most successful law enforcement strategy to control the residual black market, it might be able to achieve  $L_4$  on Figure 2. The argument is that the law enforcement policy would disproportionately raise the effective price to new users who are solely dependent on that market for opportunities to score.

### III. Conclusion

The purpose of this extremely speculative discussion of the impact of various

policies toward the supply of heroin is not to demonstrate that one general policy or one specific variant is the most desirable policy. Rather, the purpose is to suggest that these policies could be usefully evaluated in terms of their impact on the effective price to new and old users. A secondary purpose is to identify the various factors which determine the level of the effective prices to the different consuming groups and to show that an analysis of these factors can facilitate the design and a priori evaluation of various policies.

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