

Konrad, Kai A.

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## Anti drug policy: fighting for migration?

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**Anti Drug Policy:  
Fighting for Migration**

by

Kai A. Konrad

April 1991

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Address of the author:

Dr. Kai A. Konrad  
Seminar für Versicherungswissenschaft  
der Universität München  
Ludwigstraße 33/III  
D-8000 München 22

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Volkswirtschaftliche Fakultät  
Ludwig-Maximilians-Universität München  
Ludwigstraße 28  
D - 8000 München 22

**ANTI-DRUG-POLICY:  
FIGHTING FOR MIGRATION?**

by

**Kai A. Konrad**

University of Munich, Germany  
and  
University of California at Irvine, CA

**Abstract**

Supply restricting anti-drug policy is inefficient from an economic point of view, but is nevertheless widely used. This paper explains this phenomenon as individually rational behavior for local government. Because supply restrictions give addicts an incentive to migrate it has an external effect. This effect makes a policy of supply restrictions individually rational but leads to socially wasteful competition between local governments in a federal system.

Address  
Kai A. Konrad  
Department of Economics  
University of California, Irvine  
Irvine, CA 92717  
Phone: 714-725-2885  
Fax: 714-856-8441

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## 1. Introduction

Anti-drug policy in many countries partly consists of actions which tend to impair the living conditions of drug addicts. Even more widespread are those policy actions which tend to increase the black market prices of hard drugs like heroin<sup>1</sup>. Public authorities try to intercept shipments as they cross borders, to obtain the cooperation of producing countries and to detect and eliminate major wholesale dealing. From an economist's perspective this policy is not appropriate for minimizing the social burden of heroin addiction - for lucid discussions of this point see Erickson (1969), Clague (1973), Phillips and Votey (1981) and White and Luksetich (1983). Nevertheless, politicians seem to ignore these economic insights, and continue to waste huge amounts of resources by increasing the costs of heroin dealing.

Attempts are often made to explain such behavior in terms of given moral preferences (Phillips and Votey (1981)). If drug dealing is considered ethically bad, this might in itself be a reason why people want its consumption to be suppressed and punished. There might be some truth in this argument. A certain differential between black market heroin prices and producer prices probably can also be justified from an allocative point of view, even without drawing on the morality argument. There are some negative externalities of heroin abuse and, in order to correct resulting market failures, heroin consumption could be "taxed" (cf., e.g., Culyer (1973) and Wagstaff (1987)).

This paper tries to show another economic mechanism which gives a country an individual incentive to increase heroin prices and to exert pressure on addicts by more than is efficient from a world wide (social) perspective. The paper assumes that each country can choose its black market heroin price by its supply restricting activities. The optimal price level of a country in autarchy is compared with the

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<sup>1</sup> It is still the declared policy, e.g. of politicians of the Federal Republic of Germany (cf., e.g., BMJFFG (1989), p. 6, and PIB (1989)).

price level chosen by a country which has neighbours and takes into account the fact that drug addicts can migrate. It is shown that migration provides an incentive to participate in a competitive struggle aimed at keeping addicts out or forcing them to leave. The equilibrium supply price and the level of punitive actions taken against addicts in an environment with migration is too high, compared with the policy of collectively acting countries. The final section discusses the result of too high prices and generalizes the result to punitive efforts against addicts and provides some evidence for the relevance of price-related migration incentives.

## 2. A simplified drug market model

To isolate the market failure that this paper concentrates on, it is necessary to simplify the exposition of the drug problem considerably, reducing it to those components which bring about the socially inefficient behavior. Consider a model with several countries  $r = 1, \dots, R$ . Each country has a population of  $N_r$  non-addicts and of  $A_r$  addicts. In each country there is an exogenous national income  $Y$  earned by non-addicts. Non-addicts use their income for consumption and derive utility from this consumption,  $u^n(c^n)$  with positive marginal utility  $u^n' > 0$ .

Addicts use all income for heroin consumption only. Their demand for heroin is determined by physical necessity and the price elasticity of demand is assumed to be zero. This assumption is a slight exaggeration of the findings of Little (1967) who estimated that price elasticity ranged from 0.0067 to 0.009, which is quite close to zero<sup>2</sup>. Higher estimates are sometimes explained by the possibility of substituting

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<sup>2</sup> There is also some reason to believe that these estimates overestimate the true elasticity of demand. They do not take into account the demand reaction of a price increase in a region which might have induced some addicts to emigrate, thereby decreasing aggregate demand of the region, but not the demand of the whole group of addicts. The basic result of this paper does not depend on the assumption of extreme inelasticity. An elasticity of demand less than one is all that in principle is needed.

other illegal drugs for heroin. Considering only the demand of the group of addicts, it can be expected that the price elasticity of their demand for the whole basket of substitutable drugs is much lower<sup>3</sup>.

Standardizing the heroin demand of a single addict as one unit, the heroin demand of a country is  $A_r$ . Assume that addicts earn their income by illegal activities, i.e., they somehow take away some of the income of the non-addicts. This assumption is justified by the empirical findings of Holahan (1972, p. 292) and Baridon (1976) and Silverman and Spruill (1977), showing that there is a significant correlation between the price of heroin and property crime<sup>4</sup>. If  $p_r$  is the supply price of a per person dose of heroin in country  $r$ , each addict then lowers the income of non-addicts by this amount.

Anti-drug policy is directed towards increasing the supply price, i.e., increasing  $p_r$ . The probability of catching dealers and intercepting shipments etc. can be increased, e.g., by expanding the activity of the drug police department and other government activity and these efforts will be measured by the cost  $m_r$ . If the heroin market is competitive or, at least, is a contestable market, supply prices reflect true costs, i.e., production costs  $k$  per unit of heroin (assumed to be given and constant), and the costs of dealing, including risk costs of being caught and sentenced, transportation costs, costs of camouflage etc. These true costs per unit of supply are a function  $\pi(m_r)$  of effort<sup>5</sup>  $m_r$ , with  $\pi' > 0$ . Moreover, it can be assumed that the price increases less than proportionally with effort, i.e.,  $\pi'' < 0$ . This is due to the fact that effort consists of several possible actions with those actions with the highest relative effectiveness being used first. Under these conditions the supply

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<sup>3</sup> For a dissertation on the appropriateness of the assumption of an inelastic demand see also Wagstaff (1989, pp. 1176-1178).

<sup>4</sup> The result is still controversial, however. For recent evidence cf. Hammersley and Morrison (1987) and Bean and Wilkinson (1988).

<sup>5</sup> The effect on prices of different activities is discussed, e.g., in Moore (1973).

price of heroin is given by

$$(1) \quad p_r = k + \pi(m_r),$$

consisting of the pure production costs and the induced supply costs. Given an inelastic demand, the quantity traded in a country equals the number of addicts in this country, i.e.,  $A_r$ . Per-capita consumption of non-addicts now is

$$(2) \quad c_r^n = (1/N_r)[Y - p(m_r)A_r - m_r].$$

It equals gross income,  $Y$ , minus effort minus what addicts acquire from the non-addicts group to finance heroin consumption, divided by the number of non-addicts. Let non-addicts be risk neutral. In this case the per-capita consumption level determines the average utility of non-drug addicts<sup>6</sup>.

### 3. The case of autarchy

Addicts in most countries are not a strong political pressure group, but, usually are a small minority group. Often they are considered to be seriously ill and their preferences are not taken as "correct". Their revealed preferences are probably not very strongly reflected in the democratic political process. Therefore, it might be appropriate here and in the following section to determine the politician's decision on  $p_r$  or  $m_r$  without taking the interests of addicts into account, determining it instead as the optimum from the viewpoint of non-addicts. Given that addicts

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<sup>6</sup> Clearly, if they are risk averse and there is no perfect instrument for income redistribution, the fact that drug addicts' theft hits the non-addicts randomly increases the social costs of high drug prices. I also abstract from private preventive activities against crime here. Taking these issues into account, however, does not change the results qualitatively.



dislike being thieves or prostitutes, taking their preferences into account could even strengthen the results. This will be considered in section 5.

The optimal choice of  $m_r$  in the model described in section 2 obviously is  $m_r = 0$ . This policy maximizes the per capita consumption of non-addicts at  $(1/N_r)[Y - kA_r]$ . Moreover, it makes life easiest for the drug addicts, thus minimizing their effort to generate income by criminal activity. This policy minimizes the social costs of addiction recognized among economists to be the aim of a rational anti-drug policy (cf., e.g., White and Lusetich (1983), p. 562).

It goes without saying that this result crucially depends on the assumption that  $A_r$  does not depend on drug prices. By assumption, there is no flow of new users (neophytes) from the group of non-addicts to the group of addicts. It has been argued that cheap heroin prices might increase the number of addicts, but this argument is highly controversial (cf., e.g., Baridon (1976), Moore (1973) and White and Lusetich (1983)). The question of whether or not heroin prices affect the number of neophytes is an open one, and there is some evidence at least for both views. For simplicity, the problem is disregarded here by *assuming* that non-addicts never become addicts and addicts never stop being addicts. This allows a mechanism to be shown which makes it optimal for non-addicts in a local government area to choose  $m_r > 0$ , even if, given autarchy,  $m_r = 0$  would be their optimal choice.

#### 4. Migration

Addicts must make an effort to get resources for their drug consumption needs. This effort is larger if the heroin price is higher. They probably dislike making this effort, and prefer a low price to a high one. Given several countries or states and being permitted to choose their place of residence freely, addicts might be willing to migrate from one place to another if the price differential between the places is

sufficiently high to cover their moving costs<sup>7</sup>.

Probably not all addicts are willing to migrate, at least not all at the same critical price difference, but there is some price induced migration. Let

$$(3) \quad A_r = A_r(p_1, \dots, p_r, \dots, p_R)$$

be the number of addicts in country  $r$  given the prices in different countries. The willingness to migrate as a function of prices can be expressed by

$$(4) \quad \partial A_r / \partial p_r < 0, \quad \text{and} \quad \partial A_r / \partial p_j > 0 \quad \text{for } j \neq r.$$

Taking these migration incentives into account, the decision on  $p_r$  is more complicated than in autarchy. Let the prices of all other countries be given by the equilibrium values which maximize their individual welfare and determine the associated equilibrium condition for country  $r$ . Welfare is measured as the per-capita consumption of non-addicts,  $c_r$ . Differentiation of (2) with respect to  $m_r$  yields the first-order condition

$$(5) \quad MC \equiv 1 + p_r' A_r = - p_r (\partial A_r / \partial p_r) p_r' \equiv MB.$$

The left hand side of (5) describes the marginal costs of increasing the effort level: There is a marginal unit of additional effort plus additional drug consumption costs which arise from the induced price increase. The right hand side of (5) describes the marginal benefit of the increment of effort: the induced price increase makes some

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<sup>7</sup> Moving costs include travel and transportation costs as well as search costs for building up new social and dealing relations, and finding a place to live, and includes the subjective costs of leaving old places, old friends etc. Such costs can be substantial.

addicts migrate and tends to lower the number of addicts in country  $r$ .

Figure 1 illustrates the equilibrium. The individually optimal level  $m_r^*$  of effort is determined by the intersection of marginal costs and marginal benefits of effort. To describe a stable equilibrium, it is necessary for the marginal benefit curve to cross the marginal cost curve from the upper left to the lower right. It is clear that there is no necessity for the existence of such a stable inner solution. Its existence is, however, ensured, if  $\partial A_r / \partial p_r$  is large enough to overcompensate the costs of higher effort and the higher costs of providing addicts with resources to buy the more expensive drugs for values slightly smaller than  $m_r^*$ , and if  $p_r$  is sufficiently concave. To illustrate the importance of these conditions, notice that, for  $\partial A_r / \partial p_r = 0$  the situation is identical to autarchy, and, consequently, the equilibrium value would be  $m_r = 0$ . On the other hand, if  $p_r'$  were constant and  $\partial A_r / \partial p_r$  sufficiently high, it would be advantageous to increase effort, given any level of  $m_r$ . The savings of a country which result from migration always would overcompensate the costs of inducing it.

The equilibrium depicted in Figure 1 is not a welfare optimum. Consider a symmetric world with identical countries. A joint policy of all countries for lowering effort to  $m_r = 0$  would yield savings characterized by

$$(6) \quad N_r \Delta c_r = A_r (p_r(m_r^*) - k) + m_r^*$$

in each country. Addicts have no incentive to migrate. All countries stay with  $1/R$  of the total number of addicts, and there is no effort and no effort-induced additional costs. However, this equilibrium can be reached only by joint action or agreement among the countries: given that all countries choose  $m_r = 0$ , there is a strong incentive for each country to deviate, to increase the black-market price and to solve its drug problem while the other countries bear the burden of this policy.

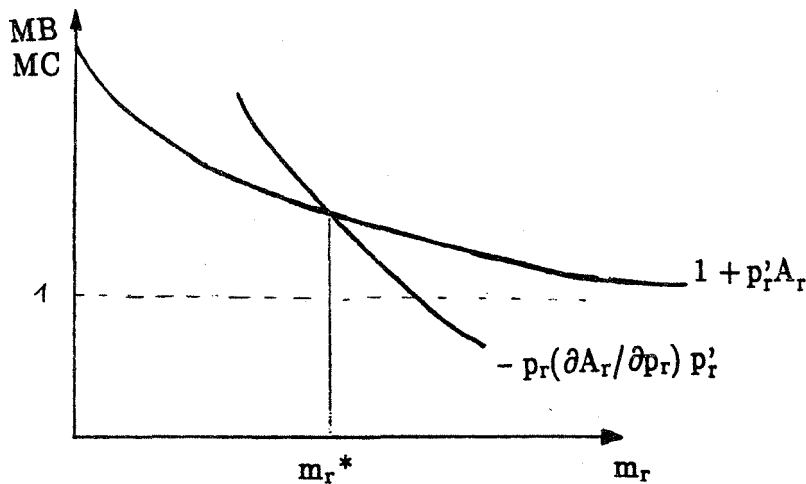


Figure 1: migration equilibrium

### 5. Comparative statics and generalizations

The theoretical framework suggests that migration patterns and the relation between effort to increase the black-market price and the black-market price itself are important determinants of drug market equilibrium in an international model with migration. The model is an application of a more general inefficiency results of federalism with externalities<sup>8</sup>. Both functions,  $A(p)$  and  $p(m)$  clearly are endogenous in a broader framework. Migration patterns can be influenced by changing the costs of moving. Border controls or immigration restrictions are examples. Tendentially, an increase of mobility would increase the equilibrium value of  $m_r$ , as the marginal benefit curve shifts upward.

A second major determinant of the equilibrium in the model of section 4 is the  $p(m)$  function. Consider a shift of the  $p(m)$  curve upward, e.g., an increase of producer prices  $k$ . We get from (5) that

<sup>8</sup> For a general exposition of this result see Sinn (1989).

$$\partial MC / \partial k = 0$$

and

$$\partial MB / \partial k = -(dA_r / dp_r) p_r' > 0.$$

A general price increase for heroin increases the marginal benefit while it leaves marginal costs unchanged. A practitioner's advice to take action to restrict supply in producer countries, would basically increase  $p(m_r)$  for any  $m_r$ . The advice, therefore, should be considered with some caution.

The analysis in previous sections has neglected many aspects of the addiction problem. I consider some of them briefly, as far as they are related to the problems discussed here.

First, considering only the police effort to restrict supply or to increase prices and the involuntary resource transfer from non-addicts to addicts disregards some important cost factors. Anti-drug policy does not only restrict supply. In most countries drug consumption is illegal and is punished. This induces additional risk-bearing costs for addicts, and additional effort to camouflage and hide drugs. It makes addiction "less enjoyable". Differences with regard to living conditions of this type also may affect migration decisions of addicts. Drug addicts prefer to live in the country or state or city with the least painful regulations. The driving force of these types of regulations may be even stronger than that of price differentials.

If a region adopts more painful regulations, some addicts may decide to emigrate or others may be successfully deterred from immigrating. On the other hand, such regulations are not costless. Legal restrictions must be enforced by police effort, punishment must be carried out etc. It is well-known that keeping all addicts imprisoned is financially not supportable.

Additional costs of this policy arise if the well-being of addicts enters into the preferences of politicians. Addicts usually have parents or other relatives who do feel for them, and do not like them to be regarded as outcasts. There may also be

Christian or humanitarian convictions, violating which might raise psychological costs.

All these costs can be taken into account. The mere existence of the migration incentive and the external effect on neighbouring countries, states or cities of migration is sufficient to establish that there is too much social oppression of addicts and too much effort involved in making their living conditions worse. The "arms race" argument, which was formally developed in the previous sections, can easily be extended to the amount of effort made to worsen the living conditions of addicts.

A further aspect of the addiction problem are the costs involved in the involuntary resource transfer to addicts. Addicts get most of what they use for drug consumption by illegal activities. Burglary or theft, however, do not simply involve allocatively neutral redistribution. This type of resource transfer wastes a huge amount of resources. Thieves have to put a lot of effort in carrying out their business. Police effort is necessary to deter them. There are risk-bearing costs for criminals and their victims. There are private anti-theft devices which may or may not be rent-seeking activities (cf., e.g., Tullock (1967)), but do involve social costs. Finally, the actual criminal act often involves a lot of damage (glass broken, people killed or injured etc.), which, in most cases might cost even more than the value of resource transfer. For detailed estimates see, e.g., Phillips and Votey (1981).

Given that the demand for drugs per addict is inelastic, criminal activity strongly increases with price, and, thus, non-addicts do not only lose the resources needed for financing addiction, but also incur a lot of additional costs. The analysis in the preceding section might therefore considerably underestimate the true costs of addiction. The equilibrium price might be lower than the one predicted by condition (5), but the welfare losses associated with this price may even exceed the ones described in the analysis which led to (5).

## 6. Empirical evidence and conclusions

At present producer prices of heroin are only a small fraction of the street prices. Even the cross-border blackmarket price per gram is still about 50 DM for quantities in the kilogram range (cf. BKA 1990). The black market price for single gram doses of much lower purity, however, was reported to range between DM 80 and DM 500 in Germany in the first half year in 1990 (BKA 1990). Wagstaff and Maynard (1988) provide similar data for Great Britain. The selling price of heroin at the retail level is approximately 500 per cent higher than the import prices<sup>9</sup>. This shows that the policy intended to increase the black-market price is effective.

This paper has stressed the argument that supply restrictions and punitive behavior towards addicts could be a means of driving addicts to emigrate. There are few, if any, data which describe the migratory behavior of addicts and its dependence on price differentials. Particularly in the case where single cities are fighting one another, the data base is bad. Direct oppression of addicts by increasing controls, imprisonment etc. might even be more effective with regard to the migration decision. The data base for estimating such effects may be even worse.

However, there is some casual evidence that the number of drug addicts is larger where prices are lower, and this could be the result of past migration processes. The Netherlands, e.g., with a deliberately liberal drug policy (cf., e.g., Engelsman (1989) and Wijngaart (1988)) may have attracted many addicts from Belgium and Germany. Bavaria, on the other side, has been very successful in increasing black market prices of heroin and it has the lowest percentage of drug deaths per capita of residents in the former West Germany in recent years. In 1988 (second half), e.g., the Bavarian heroin blackmarket prices were on average 600 DM/gr which is

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<sup>9</sup>Rottenberg (1968, p. 87) estimated a price relation between producer prices in the producer countries and the final consumer price of approximately 1 : 6000. Phillips and Votey (1981) report drugstore retail prices of 4 cents compared to blackmarket consumer prices of 30 to 40 dollars for equivalent quantities.

approximately 275 % of the average of all other reported prices of other states in the former West Germany in this period (cf. BKA (1988)). The per capita rate of drugdeaths, which may be a close proxy-measure for the number of drug-addicts in this region<sup>10</sup> in 1988, is only 4.5 per million of population compared to an unweighted average of 20.3 per million in other states of the FRG in 1988. This is less than 1/4 of the average in other states in 1988 (cf. Statistisches Bundesamt (1990) and Deutsche Hauptstelle gegen die Suchtgefahren (1989)).

An addict consumes per day approximately 1 gram of that heroin quality which is dealt in gram doses on the street market. The precise quantity depends on various factors, among them the purity of the heroin which is dealt in the black-market. Using average prices, Bavarian addicts therefore spend DM 400 per day or DM 12,000 per month more on heroin than addicts do on average in other states of Germany. It is to be expected that such differences provide a strong migration incentive.

The number of per-capita drugdeaths is sometimes used as a measure for judging the performance of regional drug policy. The analysis in this paper has shown that this is a highly unsatisfactory procedure. If there is migration between regions, taking the regional death-statistics as a measure of success can even stimulate the struggle over migration. Policymakers should not be praised for their success in carrying out an expensive policy which shifts their problems to the neighbours. A coordinated anti-drug policy is needed, one which probably would be less supply side oriented, but which would really try to solve the problems and not just sweeps them under the neighbours' carpets.

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<sup>10</sup> There are many reasons why there is no perfect correlation between this measure and the fraction of the population which is drug-addicted. However, if the disturbances are not systematically different for different states, this measure can properly measure the differences of "addiction density".



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