

Political Policies, Foreign Investment and Drug Traffic

(Very Draft paper)

By

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Abstract

Drug trafficking in the world and especially in Latin America has been a growing problem in the last few decades. However, the effect of policies addressed to eradicate it seems ineffective. I develop a political-economic model in which a country receives Foreign Direct Investment from the rest of the world subject to the reduction of the amount of drug produced by this country. However, the drug producers lobby the government and offer political contributions whose impact depends on the level of corruption in the government. The government sets the optimal level of enforcement taking into account the payment received for the drug producers and the welfare of their honest nationals.

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1. Introduction

Drug trafficking in the world has been a growing problem in the last few decades. The 2002 *National Drug Control Strategy* (NDCS) of the White House Office of National Drug Policy estimates the total cost of drug abuse to American society to be approximately \$160 billion annually. The major components of this total are health care cost (\$14.9 billion), workplace productivity losses (\$110.5 billion) and losses related to crime (\$35 billion). According to the Congressional Research Service on a 2006 report entitled: *Drug Control: International Policy and Approaches*, more than 14 million Americans buy illicit drug and use them at least once per month spending over \$60 billion annually. Efforts to reduce the flow of illicit drug from abroad into the United States have so far not succeeded. It has been even worse.

Drug use is widely blamed for a broad range of personal and social ills. The market in illegal drugs promotes crime, destroys inner cities, spread AIDS, corrupts law enforcement officials and politicians, produces and exacerbates poverty and erodes the moral fabric of society. The most common response to these facts is a belief that governments should prohibit the production, traffic, sale and consumption of the currently illegal drugs.

This is not an easy task, governments in developed countries, which are generally the drug recipients, have failed to eradicate the problem, and they blame the weak policy efforts made by the drug senders developing countries to decrease their drug production.

However, for some developing countries, production of illicit narcotics and the narcotics trade has become a way of life that provides a reasonable and attainable level of income for to large numbers of people from whom those who rule draw their legitimacy. The moral considerations are simply ignored due to the economic needs.

There are two options for developed countries: promote a reduction of demand for illicit drugs or a reduction of supply. According to NDCS the American government spent 53% of the federal anti-drug control budget 2002 in reduction of

supply. This strategy has produced poor result in the fight against drug production and traffic. Even this strategy is a total failure; the developed countries are systematically forcing the developing countries to set a strict enforcement regime.

The most common policies used by developed economies to force developing economies to eradicate production and traffic of drugs is the Sanctions/Economic Assistance¹. This policy involves the threat of, or application of, sanctions against drug producer or trafficker nations. These range from suspension of foreign assistance to curtailment of air transportation. Who is subject to be included in this policy strategy?

Enacted by the U.S. congress in 1986, the certification policy adopted by the U.S. government mainly for the Latin America countries is a policy used by the U.S. to urge for a tough policy against drug production and drug trafficking (The White House, The National Drug Control Strategy, 1987-1998). This policy consists originally of a set of penalties and incentives for the Latin America Countries (LACs) and later to the rest of Low Development Countries (LDCs) involved in drug business. The certification policy is determined taking into account the efforts made in each country. A strong effort is rewarded with more foreign aid, reasonable loans and a well reputed image for the private investors. A weak effort means less foreign aid, closed financial markets and a high risk country label.

One of the most important effects of this policy has been on the flow of Foreign Direct Investment (FDI) into LDCs. U.S. FDI plays a vital role in these countries. However, the certification policy discourages multinational firms to invest in those LDCs, which have poor record in combating drug production and trafficking. This discouragement sometimes takes the form of a cost for the foreign investment located in those LDCs. The cost is produced by a bad reputation among producers-consumers or by security reasons or even by the delay in administrative and financial procedures inside the corrupted drug producers LDCs.

¹ According to the NDCS, U.S. international narcotics control policy is implemented by multifaceted strategy that includes the followings: (1) eradication of narcotics crops, (2) interdiction and law enforcement activities in drug-producing and drug-transiting countries, (3) international cooperation, (4) sanctions/economic assistance, and (5) institutions development.

This cost can be seen as a cost of those multinationals which invest in these LDCs which have been certified as having weak drug regime. Later on the paper, it is considered this cost as equivalent to a tax on repatriated profits levied by the drug receiving country to those firms located in the sending drug country.

It is expected those developing countries play in favor of a reduction in the drug production and trafficking in order to attract foreign firms and receive economic incentives. However, this situation is complicated by the fact that in many LDCs, drug barons have significant political influence and make political contributions to protect their interests. The government in these LDCs has to weigh the benefit (from FDI) and costs (loss of political contribution) in deciding the level of enforcement of domestic drugs levels². This paper develops a political economic model capturing the above stylised facts.

It is developed a partial equilibrium model in which two goods are produced in the recipient country of FDI. FDI produces a legal good, and drug is produced by a particular important domestic private sector. Both FDI and drug production create employment for the unemployed factors. The drug barons lobby the government not to enforce laws restricting drugs production and trafficking. On the other hand, because of the policies in the sending country of FDI, the number of foreign firms entering the country is inversely related to the amount of drugs reaching the home country of FDI.

Lobbying in the paper takes place in the host country which determines the level of enforcement on drug markets. I model lobbying by following the political contribution approach. That is, the lobbyists make political contributions to the political party in power, and the amount they contribute is contingent upon the policy that the government adopts. The political contributions approach, derived from the common agency problem analysed by Bernheim and Whinston (1986), was first introduced by Grossman and Helpman (1994) in modeling the political

² Opponents of sanctions policy linking aid and trade to developed countries international narcotics objectives argue that sanctions may have an undesirable effect on the political and economic stability of target countries, making them more dependent on the drug trade for income.

economy of trade protection with quasi-linear preferences.³ Dixit, Grossman and Helpman (1997) generalized the Bernheim-Whinston framework to allow for general preferences and therefore variability in marginal utilities of income. Given that our framework is a partial equilibrium one, I shall follow the original Grossman-Helpman approach but I set the problem according to Dixit, Grossman and Helpman approach.

The intention of this paper is to construct a model in which the reasons for a particular enforcement level is found not only in the sanction imposed by the FDI sending country, but also in the way the domestic political equilibrium is determined. I shall focus on the determination of the optimal enforcement level and how it is affected by the changes in corruption parameter, demand for drugs, and the marginal cost of the incoming firms. The model is spelled in detail in the next section. In the section 3 it will be considered the case in which just the drug dealers lobby to the government in an export oriented economy. Section 4 analyzes the case in which I have two lobby groups: the drug dealers and the people working for the multinationals in a non-tradeable sector. In section 5 the determination of the number of foreign firms is endogenised. Finally it is conclude in the section 6.

2. The Model

I focus on a country which hosts n foreign owned firms. These firms come from another country called the source country and produce a homogeneous good X . There are two types of individuals in the host country: honest (labeled σ) and dishonest (labeled ζ). They are homogeneous within their own type. Dishonest people work and obtain their income from illegal activities, specifically from the

³ The importance of political process in economic decision making in general and international policy issues in particular is well recognized (see Dixit (1996)). The particular aspect of lobbying by interest group has derived a lot of attention from international economists. The alternatives approaches in modeling political equilibrium include the tariff-formation approach (Findlay and Wellisz (1982)), the political support function approach (Hilman (1989)), median voter approach (Mayer (1984)), the campaign contribution approach (Magee et. al. (1989)), and the political contribution approach (Grossman and Helpman, 1994)).

production of drugs which is sold to source country. Let's assume the drug dealers behave as a monopolist in the drug market so it will call just drug dealer⁴.

I assume, as in Brander and Spencer (1987), that there is unemployment in the host country. In particular, the variable input cost of the n firms' and the drug producer are taken to be the income of honest nationals of the host country⁵. In this sense, honest people work for both the owners of foreign firms and for the drug dealer⁶.

It is assumed that drug consumption imposes a negative externality on the people living in the source country. The number of foreign firms is determined by the amount of drug exported by the host country(D), i.e. $n = n(D)$. I assume that $n(D)$ is a linear and decreasing function such that $n'(D) < 0$ and $n''(D) < 0$. That is, the flow of firms to the host country will decrease when drugs export increases. This can be seen as a reduced form of a more general model for the source country which I do not model to start with. However, I shall specify this functional form in a later section and we shall see that the results are similar.

The host country government can apply enforcement policies to reduce the drug production by choosing a level of enforcement (ε) used to catch drug dealer⁷. The level of enforcement affects the probability of being successful (not being caught) in the production and trafficking of drug. $\mathcal{P} = \mathcal{P}(\varepsilon)$ is the probability of success, which is a linear and decreasing function of ε such that $\mathcal{P}'(\varepsilon) < 0$, $\mathcal{P}''(\varepsilon) = 0$, $\mathcal{P}(\bar{\varepsilon}) = 0$ and $\mathcal{P}(0) = 1$.

⁴ The ambition for power creates wars between the drug dealers in order to gain a larger market share. It is common that dealers dominate entire regions nationally or internationally.

⁵ Implicitly, we assume that there is a competitive sector in the background. This sector uses labor and a specific factor (say land) under constant returns to scale. The imperfectly competitive sector uses labor and constant returns to scale technology. The wage rate of labor (in terms of the numeraire competitive good) is exogenously given at a level higher than the market clearing one. With these assumptions, the total amount of labor used in the competitive sector and the rental rate of land would not depend on any of the policy parameters. Any policy induced change in employment in the non-competitive sector would be the total change in employment in the economy.

⁶ Probably the nationals of the host country do not work on the direct process of drug production and trade, but money laundry is the most common activity how the people is employed by drug dealers.

⁷ The enforcement is specified as the legal, political and judicial instruments addressed to stop the production and trade of illegal drugs. In this case, these instruments mean a cost for the government in order to finance them. As we see later, this cost is attached as a lump sum tax to the honest people.

Taking into account the considerations mentioned above, I shall specify the utility function of the honest people, drug dealer and the government, and using these functions to determine the optimal enforcement level. Assuming quasi-linear preferences the indirect utility of the honest people can be defined as

$$I^\sigma = nC_X X - \varepsilon + C_D D + CS \quad (1)$$

where C_X and C_D are the average and marginal costs in the production of the legal good X and drugs D respectively. In expression (1), the first term is the income of employed factors in the production of the legal good, second term is the cost of enforcement, which is levied by the host government and financed by taxing the honest people, the third term is the income of employed factors in the production of D . CS is the consumers surplus which satisfies:

$$dCS = -QdP, \quad (2)$$

where Q is the total consumption of X , and P is its price.

The indirect utility of drug producer is given by the expected income

$$I^\zeta = \vartheta [P_D - C_D] D + (1 - \vartheta) [-C_D D], \quad (3)$$

where P_D is the price of the drug. This expression states that income of drug baron is equal to profit $[P_D - C_D]$ that he will obtain if he is not detected multiplied by the probability ϑ , plus cost $[-C_D D]$ if he is detected multiplied by the probability $(1 - \vartheta)$. It is assumed that the drug producer do not consume X ⁸.

The enforcement parameter ε is a policy instrument for the government of the host country, and this instrument is determined politically in a political equilibrium. I shall follow closely Dixit et. al. (1997) in specifying this equilibrium. The honest people do not lobby the government, but the drug dealer makes political contributions to influence the government's decisions. The political contribution schedule for the drug dealer is denoted by $c(\varepsilon)$. The host government's objective function is given by

$$G = \rho c + (I^\sigma + I^\zeta), \quad (4)$$

⁸ The dealer consumes the numeraire good.

where $\rho > 1$ is a constant parameter. (4) states that the government considers the total welfare of its nationals, as well as the total amount of political contribution that it receives.

The political equilibrium is the outcome of a two-stage game. In stage one of the game, the drug dealer chooses his contribution schedule. The government then sets its enforcement policy in the second stage. A political equilibrium is given by (i) a political contribution function $c^*(\varepsilon)$, such that it maximises the welfare the drug dealer given the anticipated political optimisation by the government, and (ii) a policy variable, ε^* , that maximises the government's objective function given by (4), taking the contribution schedule as given.

Dixit et. al. (1997) develop a refinement known as truthful equilibria that implement Pareto efficient outcomes. Stated formally, let $(c^o(\varepsilon^o, I^\infty), \varepsilon^o)$ be a truthful equilibrium in which I^∞ is the equilibrium per-capita utility level of the drug dealer. Then $(c^o(\varepsilon^o, I^\infty), \varepsilon^o, I^\infty)$ is characterised by

$$c(\varepsilon, I^\infty) = \text{Max}(0, \delta), \quad (5)$$

$$\varepsilon^o = \text{Argmax}_\varepsilon \{ \rho c(\varepsilon, I^\infty) + I^\sigma(\varepsilon) + I^\infty \}, \quad (6)$$

$$I^\sigma(\varepsilon_1) + I^\infty = \rho c(\varepsilon^o, I^\infty) + (I^\sigma(\varepsilon^o) + I^\infty), \quad (7)$$

where δ is defined in

$$I^\infty = (I^\varepsilon - \delta), \quad (8)$$

and

$$\varepsilon_1 = \text{Argmax}_\varepsilon (I^\sigma(\varepsilon) + I^\infty). \quad (9)$$

Equation (5) (together with (8)) state that the truthful contribution schedule is set to the level of compensating variation relative to the equilibrium utility level of the drug dealers. The definition of δ is the basic concept of the compensating variations. Under a truthful equilibrium payment function, for any change in ε , the change in the contribution received by the government will exactly equal the change in the dealer's welfare, provided that the payment both before and after the change is strictly positive. Equation (6) is self explanatory: the government takes the utility level of the drug dealer as given and chooses the enforcement level so

as to maximise its objective function. Equation (7) (together with (9) complete the characterisation of the truthful equilibrium and tie down the equilibrium utility level of the drug dealer, which is derived from the premise that the drug dealer would pay the lowest possible contribution to induce the government of pursue the equilibrium policy given in (6). For this to be the case, the government must be indifferent between (i) implementing the equilibrium policy and receiving contributions from the drug dealer, and (ii) implementing a policy by accepting no contribution. Equation (7) states precisely that.⁹

According to Grossman and Helpman (1994, pp. 845-846), in the case of one lobby group there is no opposition from competing interests, and the lobby group captures all of the surplus from its political relationship with the government. In this political equilibrium, the government derives exactly the same utility as they would have achieved by allowing no contribution. An interesting example with one lobby group can be found in Rama and Tabellini (1998, p. 1311).

As the drug dealer behave as a monopolist, the first order condition of his profit maximization is

$$\mathcal{G}DP'_D + \mathcal{G}DP = C_D. \quad (10)$$

From (10) I can get

$$D'(\varepsilon) = -\frac{\mathcal{G}'(\varepsilon)C_D}{2\mathcal{G}^2P'_D} < 0. \quad (11)$$

The foreign firms behave as Cournot oligopolist so that the first order condition is

$$P'(Q)X + P(Q) = C_X, \quad (12)$$

where $Q = nX$, and $P(Q)$ is the inverse demand function for the legal good. I assume $P(Q)$ to be a linear function. From (12) it can be found that

$$X'(n) = \frac{dX}{dn} = -\frac{X}{n+1}. \quad (13)$$

In the next sections I shall analyze three cases considering then in turn.

⁹ See Dixit, Grossman and Helpman (1997), pp. 756-759.

3. Case 1: Export Oriented Economy

Having described the properties of the political equilibrium, I shall analyze the comparative statics of the case in which only legal goods are exported. I shall examine how the enforcement level is affected by three parameters: the degree of corruption in the host country, the autonomous consumption of drugs, and the marginal cost of production of the legal good X . Starting from the equilibrium enforcement level, I shall also analyse the effect of an increase in the enforcement on the utility of both drug dealer and honest people.

The first step in this exercise is to obtain the first order condition for the optimisation problem given in (6). From (1), (3), and (4) I obtain

$$G_\varepsilon = \rho P_D D \mathcal{G}'(\varepsilon) + \frac{XC_X}{n+1} n'(D) D'(\varepsilon) - 1 + C_D D'(\varepsilon) = 0. \quad (14)$$

Taking the implicit derivative of (14) I get:

$$\frac{d\varepsilon}{d\rho} = -\frac{G_{\varepsilon\rho}}{G_{\varepsilon\varepsilon}}, \quad (15)$$

where $G_{\varepsilon\rho} = P_D D \mathcal{G}'(\varepsilon) < 0$. Combining this result with the assumption that the government's objective function is concave in ε ($G_{\varepsilon\varepsilon} < 0$), I obtain

$$\frac{d\varepsilon}{d\rho} < 0.$$

An increase in the corruption parameter increases the impact of the contribution on the government's objective function. Intuitively, the increase in the corruption parameter gives a greater weight to the bribe offered by the drug dealer. The government is willing to reduce the enforcement level encouraging an increase in the amount of drug produced. The benefit of an increase in the drug traffic comes from the increase in the payment made by the drug dealer, the reduction of taxes paid by the honest people, and the increase in income received by people working for the drug dealer. These gains exceed the losses due to reduction in the number foreign firms and therefore the income of people employed by them. Formally, I can say

Proposition 1 *When only the drug dealer lobbies the government, an increase in the degree of corruption reduces the level of drug enforcement.*

I next consider the effect of a shift in the demand for drugs in the source country on the level of enforcement. For this, I consider a linear form of the demand for drugs, $P_D = a - bD$. In such a case a shift in demand will be seen as a change in the parameter a . In this case, I obtain:

$$\frac{d\varepsilon}{da} = -\frac{G_{\varepsilon a}}{G_{\varepsilon\varepsilon}}, \quad (16)$$

where

$$G_{\varepsilon a} = \rho \frac{C_D g'(\varepsilon)}{b g} - \frac{2XC_X (n'(D))^2 D'(\varepsilon)}{b(n+1)^2}. \quad (17)$$

An increase in the demand for drugs increases (decreases) the enforcement level when the corruption parameter ρ is sufficiently small (large). In particular from (17) and (11),

$$\frac{d\varepsilon}{da} = \begin{cases} > 0 \text{ if } \rho < A_1 \\ < 0 \text{ if } \rho > A_1 \end{cases}, \quad (18)$$

where

$$A_1 = \frac{XC_X (n'(D))^2}{(n+1)^2 b g} > 0.$$

An increase in the demand for drugs will encourage the drug dealer to produce more D increasing the total contribution to the government and the income received by the honest people for working for the drug dealer. On the other hand an increase in D will reduce the incoming number of firms and consequently the income received by the honest people working for multinationals. When the corruption parameter is large, the former effect will dominate the latter. Formally,

Proposition 2 *When only the drug dealer lobbies the government, an increase in demand for drugs increases (decreases) the enforcement level if the corruption parameter is sufficiently small (big).*

Intuitively, when the corruption parameter is small the effect of a bribe on the government's objective function is negligible. An increase in the consumption of the drug will increase the enforcement level since the rise in the welfare from the increased contribution and income received for working for the drug dealer is smaller than the loss in the welfare given by the reduction in the income provided by the multinationals to the honest people. When the corruption parameter is large, an increase in the consumption of drug will reduce the enforcement level since the political contributions has a significant weight on the government's objective function. An increase in the consumption of drug will reduce the enforcement level since the effects of the increase in the contribution and in the income received for working for the drug dealer outweigh the loss due to the reduction in the income provided by the multinationals to the honest people.

Finally, starting from the equilibrium set in (14) I shall analyse the effect of an increase in the enforcement level on the utility of the honest and dishonest people. From (1) and (3)

$$\frac{dI^\sigma}{d\varepsilon}\Big|_{\varepsilon=\varepsilon^o} = -\rho P_D D\mathcal{G}'(\varepsilon) > 0, \quad (19)$$

$$\frac{dI^\zeta}{d\varepsilon}\Big|_{\varepsilon=\varepsilon^o} = P_D D\mathcal{G}'(\varepsilon) < 0. \quad (20)$$

Starting from the equilibrium level ε^o it is clear that an increase in the enforcement level will benefit the honest people and will harm the drug dealer. Formally I can say

Proposition 3 *Starting from the enforcement's equilibrium level, an increase in the level of enforcement will benefit the honest people and will harm the drug dealer.*

Intuitively an increase in the enforcement level will reduce the probability of success for the drug dealer, and consequently will reduce the amount of drugs produced. In this sense the profit obtained by the drug dealer, and consequently their utility, decreases. On the other hand the reduction in drug production will

increase the number of incoming firms. The utility of the honest people will be affected by two factors: first, there is a positive effect due to the increase in income from working for the multinationals. Second, the utility of the honest people will be reduced through a reduced income from the drug dealer and the increase in the tax levied by the government in order to obtain resources to finance drug enforcement. At equilibrium, the positive effect is greater than the negative effect and the increase in the level of enforcement will benefit the honest people.

4. Case 2: FDI in a non-tradeable sector

In this section I shall consider a variant of the model analysed in the preceding section, where the good produced by foreign firms are taken to be a non-tradeable good.

In this case I have two kind of honest people: those who are consumers of the output produced by the multinationals who also work for the drug dealer (labeled σ_1), and those who receive their income for working for the multinational firms (labeled σ_2). The former pay the tax to finance the drug enforcement policy. The drug dealer's utility function is the same than in section 3. Following (1) and (3) the utility functions can be written as

$$I^{\sigma_1} = -\varepsilon + C_D D + CS, \quad (21)$$

$$I^{\sigma_2} = nC_X X, \quad (22)$$

$$I^\zeta = \vartheta[P_D - C_D]D + (1 - \vartheta)[-C_D D], \quad (23)$$

$$G = \rho[c^1(\varepsilon) + c^2(\varepsilon)] + (I^{\sigma_1} + I^{\sigma_2} + I^\zeta). \quad (24)$$

The drug dealer and the employees of the multinationals lobby the government in order to maximise their own benefits. Therefore I have two contribution schedules: one for the drug dealer who lobby to reduce the enforcement level and thereby increase the probability of success in drug and trafficking. The other is for the employees of the multinationals who lobby to increase employment by increasing enforcement and therefore increasing the incoming number of firms. With these utility functions let $(c^{1o}(\varepsilon^o), I^{\sigma_2 o}, c^{2o}(\varepsilon^o, I^{\zeta o}), \varepsilon^o)$

be a truthful equilibrium in which I^{σ} is the equilibrium utility level of the drug dealer and $I^{\sigma_2^o}$ is the equilibrium utility level of the employees of the multinationals. Equilibrium drug enforcement ε^o is characterised by

$$c^1(\varepsilon, I^{\sigma_2^o}) = \text{Max}(0, \delta_1), \quad (25)$$

$$c^2(\varepsilon, I^{\sigma}) = \text{Max}(0, \delta_2), \quad (26)$$

$$\varepsilon^o = \text{Argmax}_{\varepsilon} \left\{ \rho \left(c^1(\varepsilon, I^{\sigma_2^o}) + c^2(\varepsilon, I^{\sigma}) \right) + \left(I^{\sigma_1}(\varepsilon) + I^{\sigma_2^o} + I^{\sigma} \right) \right\} \quad (27)$$

where δ_1 and δ_2 are defined in

$$I^{\sigma_2^o} = nC_X X - \delta_1, \quad (28)$$

$$I^{\sigma} = I^{\zeta} - \delta_2. \quad (29)$$

I shall first of all obtain the first order condition corresponding to the optimisation problem given in (27). From (21), (22), (23), and (24) I obtain

$$G_{\varepsilon} = \rho P_D D \mathcal{G}'(\varepsilon) + \rho \frac{XC_X}{n+1} n'(D) D'(\varepsilon) - 1 + C_D D'(\varepsilon) - \frac{nX^2}{n+1} P_X'(Q) n'(D) D'(\varepsilon) = 0 \quad (30)$$

The analysis is again made at a tractable level by assuming linear demand functions for drugs and legal good X of the form $P_D = a - bD$, and $P_X = \alpha - \beta Q$. From (30) I get:

$$\frac{d\varepsilon}{d\rho} = - \frac{G_{\varepsilon\rho}}{G_{\varepsilon\varepsilon}}, \quad (31)$$

where

$$G_{\varepsilon\rho} = \frac{P_D S_D \mathcal{G}'(\varepsilon)}{2} + \frac{S_X C_X}{(n+1)^2} n'(D) D'(\varepsilon). \quad (32)$$

where S_X and S_D are the size of the market for multinational output and the size of the drug market.¹⁰

¹⁰ Market sizes are explicitly defined as $S_X = \frac{\alpha - C_X}{\beta}$ and $S_D = \frac{a - C_D}{b}$. (See Stephen Martin (1993, p.15)).

Using (32) and the assumption that the government's objective function is concave in ε ($G_{\varepsilon\varepsilon} < 0$), from (31) I see that

$$\frac{d\varepsilon}{d\rho} = \begin{cases} > 0 \text{ if } S_D \ll S_X \\ < 0 \text{ if } S_D \gg S_X \end{cases}. \quad (33)$$

Formally I can say

Proposition 4 *When the drug dealer and employees of the multinationals lobby the government of the host country, an increase in the corruption parameter increases (decreases) the enforcement level if the size of the drug market is sufficiently smaller (greater) than the size of the legal good market.*

An increase in the corruption parameter increases the impact of political contributions on the government's objective function. When the drug market is small, the drug dealer has few incentives to produce a large amount of drugs, and their contribution to the government will be small. With a low level of drug production, the number of incoming firms and consequently the income of the employees of the multinationals will be large. This effect is magnified if the size of the market for X is large. In this case the n firms have the incentive to produce a large amount of output and both consumers' surplus and the contribution offered by the employees will be large. With an increase in corruption the government is willing to increase the enforcement level since the benefit obtained by the contribution made by the workers is greater than the contribution made by the drug dealer. The opposite is true when the market for drugs is large.

I turn now to the effect of a change in the demand for drugs on drug enforcement. The effect is given by

$$\frac{d\varepsilon}{da} = -\frac{G_{\varepsilon a}}{G_{\varepsilon\varepsilon}}, \quad (34)$$

where

$$G_{\varepsilon a} = \frac{g'(\varepsilon)C_D}{bg} [\rho(1-A_1) - A_2], \quad (35)$$

$$A_2 = \frac{b_x n'(D)^2 S_x^2 (2n-1)}{2b(n+1)^4 g} > 0, \quad A_1 = \frac{S_x C_x (n'(D))^2}{(n+1)^3 b g} > 0.$$

The effect of a change in the demand for drugs on the enforcement level will depend on the market size for X . With a large market for X , A_1 and A_2 are sufficiently large and consequently (35) is positive. On the other hand, when the market for X is sufficiently small, (35) will be negative. From (34) I have

$$\frac{d\varepsilon}{da} = \begin{cases} > 0 \text{ if } S_x \gg 0 \\ < 0 \text{ if } S_x \rightarrow 0 \end{cases} \quad (36)$$

Formally I can say

Proposition 5 *When the drug dealer and the employees of the multinationals lobby the government of the host country, an increase in the demand for drugs will increase (decrease) the enforcement level if the market for X is sufficiently large (small).*

Intuitively, an increase in the demand for drugs will encourage the drug dealer to increase drugs production, which will reduce the number of incoming firms. This increase in drug consumption will increase the contribution made by the drug dealer and the income of the employees of the drug dealer. On the other hand, an increase in the demand for drugs will reduce the income of factors employed in the industry X , and will also reduce consumers' surplus. When the market for good X is large the government will increase the enforcement level since the fall in consumers surplus and in contribution made by the employees of the multinationals exceed the benefits of the contribution made by drug dealer and the income of the employees of the drug dealer. On the other hand, when the market for X is small, the government will reduce the enforcement level since the reduction in consumer surplus and the contribution of the employees of the multinationals is outweighed by the increase in the contribution made by the drug dealer and in the income of the employees of the drug dealer.

An increase in the marginal cost C_X will have an ambiguous effect on drug enforcement. From (30) I have

$$\frac{d\varepsilon}{dC_X} = -\frac{G_{\varepsilon C_X}}{G_{\varepsilon\varepsilon}}, \quad (37)$$

where

$$G_{\varepsilon C_X} = \frac{n'(D)D'(\varepsilon)}{n+1} \left[\rho \left(\frac{S_X}{n+1} + C_X X'(C_X) \right) - \frac{2nS_X}{n+1} \right]. \quad (38)$$

From (38) it is clear that an increase in the marginal costs of the multinationals will have three effects on the government's objective function: a direct positive effect on employment through increased marginal cost, an indirect negative effect on employment due to the reduction in the optimal output of the incoming firms, and a negative effect from the reduction in consumers surplus. The effect of this on the enforcement level will depend on the market size of X and the corruption parameter. With a sufficiently small market size S_X (37) will be negative. With a sufficiently large S_X the effect on (37) will depend on the level of corruption. Formally I can say

Proposition 6 *When the drug dealer and the honest people working for the multinationals lobby the government in the host country, an increase in the marginal cost C_X will produce the following results:*

$$\frac{d\varepsilon}{dC_X} = \begin{cases} \text{if } S_X \rightarrow 0 < 0 \\ \text{if } S_X \gg 0 \end{cases} \begin{cases} > 0 \text{ if } \rho \gg 1 \\ < 0 \text{ if } \rho \rightarrow 1 \end{cases} .$$

When the market size of X is sufficiently small, the contribution made by the employees of the multinationals and the consumers surplus is negligible. With an increase in the marginal cost of the multinationals, the loss due to the reduction in the optimal output and consumers' surplus exceed the benefit of an increase in employment. There will be a reduction in the contribution by the employees and the government will reduce the enforcement level since the benefit of having more

drugs traffic is greater than the benefit of extra employment created by the multinationals.

On the other hand, when the market size of X is sufficiently large I have two possible outcomes. With an increase in C_X and large corruption parameter, the contribution made by the employees will outweigh the fall in consumers surplus. In this case the government will increase the enforcement level. If the corruption parameter is sufficiently small, the contribution made by employees is negligible and the government will reduce the enforcement level.

Starting from the equilibrium obtained in (30), I now analyze the effect of an increase in the enforcement level on the utility of the various parties. From (21), (22), and (23) I have

$$\frac{dI^{\sigma_1}}{d\varepsilon} \Big|_{\varepsilon=\varepsilon^o} = \frac{P_D S_D g'(\varepsilon)}{2} + \frac{S_X C_X}{(n+1)^2} n'(D) D'(\varepsilon), \quad (39)$$

$$\frac{dI^{\sigma_2}}{d\varepsilon} \Big|_{\varepsilon=\varepsilon^o} = \frac{X C_X}{n+1} n'(D) D'(\varepsilon) > 0, \quad (40)$$

$$\frac{dI^{\varsigma}}{d\varepsilon} \Big|_{\varepsilon=\varepsilon^o} = P_D D g'(\varepsilon) < 0, \quad (41)$$

Starting from the equilibrium level ε^o , it is clear that an increase in enforcement will benefit the employees of the multinationals and will harm the drug dealer. However, the effect of an increase in the enforcement on employees of the drug dealer is ambiguous; they receive income from the drug dealer and are taxed to pay for the enforcement policy, but their consumers' surplus is obtained via the consumption of X . The effect of an increase in the enforcement level on the utility of this group depends on the difference in the market size of the drug and the market size of the legal good X . Formally I can say

Proposition 7 *Starting from the equilibrium enforcement level, an increase in the level of enforcement will benefit the employees of the multinationals, will harm the drug dealer, and the employees of the drug producers will benefit (be harmed) if $S_D \ll S_X$ ($S_D \gg S_X$).*

An increase in the enforcement level will reduce the probability of success in drug trafficking, and consequently will reduce the amount of drugs produced. In this case the profits obtained by the drug producers decreases. This reduction in drug production will increase the number of incoming firms and therefore increase employment.

The increase in the enforcement level will have three effects on the utility level of the employees of the drug producers. First, a positive effect given by the increase in the consumers surplus; second, a negative effect given by the reduction in the income provided by the drug producers; and third, an increase in tax levied by the government in order to obtain resources to finance the policy of enforcement. When the drugs market is sufficiently small relative to the market for X , the increase in the consumers surplus outweighs the increase in tax and the reduction in the income provided by the drug producers.

5. Case 3: Export Oriented FDI and Endogenously Determined Number of Firms

In the previous sections the number of firms in the host economy has been given as a linear function of the amount of drugs produced. There was no consideration of how this function was determined. In this section I shall determine endogenously the number of firms in an export oriented economy as set in section 3. Having set up the model, I shall analyze the effect of a change in the corruption parameter and demand for drugs on the optimal enforcement level, as well as the effect of a change in the enforcement level on the equilibrium utility levels of the various parties.

One possible policy option for the authorities in the countries affected by drugs is to levy a tax on all firms that invest in the sending drugs country. In the extreme, the authorities could transfer to the multinational firms the entire social cost of the drug trade. This can be written as

$$nT = \kappa D, \tag{42}$$

where κ is the marginal disutility of drug consumption (in terms of the numeraire good) and T is the lump-sum tax levied by the government on each firm. This expression can be re-written as

$$T = \frac{D\kappa}{n}. \quad (43)$$

I assume that the host country is small in the market for FDI, i.e., firms would move into (out of) the host country if the profits it makes in the host country is larger (smaller) than the reservation profits $\bar{\Pi}$ it can make in the rest of the world. Thus, the FDI equilibrium condition is given by

$$\Pi = (P_x - C_x)X - T = \bar{\Pi} \quad (44)$$

With linear demand function, as presented in the previous section, at profit maximising equilibrium I have

$$\beta X^2 - T = \Pi, \quad (45)$$

and

$$X = \frac{\alpha - C_x}{\beta(n+1)} = \frac{S_x}{n+1}.$$

Therefore, the number of firms is a function of α , C_x , κ , D and $\bar{\Pi}$ such that

$$n_D = \frac{\kappa}{n\Pi_n} < 0, \quad (46)$$

$$n_{\alpha_x} = -\frac{2}{(n+1)\Pi_n} > 0, \quad (47)$$

$$n_{\bar{\Pi}} = \frac{1}{\Pi_n} < 0, \quad (48)$$

where

$$\Pi_n = \frac{\beta X^2}{n(n+1)} [1-n] - \frac{\bar{\Pi}}{n} < 0. \quad (49)$$

Considering the lobby problem from section 3, from (4), (1), (3), and (43)-(48) I obtain the first order condition

$$G_\varepsilon = \rho P_D D \mathcal{G}'(\varepsilon) + \frac{XC_x}{n+1} n'(\varepsilon) - 1 + C_D D'(\varepsilon) = 0, \quad (50)$$

where from (46) and (11) I have

$$n'(\varepsilon) = \frac{g'(\varepsilon)C_D\kappa}{2g^2bn\Pi_n} > 0. \quad (51)$$

Differentiating (50) I get the following results:

$$\frac{d\varepsilon}{d\rho} = -\frac{G_{\varepsilon\rho}}{G_{\varepsilon\varepsilon}}, \quad (52)$$

where $G_{\varepsilon\rho} = P_D Dg'(\varepsilon) < 0$. Combining this result with the assumption that the government's objective function in ε is concave ($G_{\varepsilon\varepsilon} < 0$), I obtain

$$\frac{d\varepsilon}{d\rho} < 0.$$

Formally this can be written as the following proposition:

Proposition 8 *When only the drug producer lobbies the government and n is explicitly determined, an increase in the degree of corruption will reduce drug enforcement.*

An increase in the corruption parameter increases the impact of the contribution on the government's objective function, as a more corrupt government gives greater weight to the political contribution made by the drug producers. The government will reduce the enforcement level, and thus drugs production will increase. The benefit of an increase in the drugs traffic comes from the increase in the payment made by the drug producers to the government, the reduction in taxes levied on the employees, and the increase in the income received by those who work for the drug producers. These gains will exceed the loss due to the reduction in employment by the multinational firms.

Again under the assumption of a linear demand for drugs $P_D = a - bD$, the change in the enforcement level for a change in the demand for drugs is given by

$$\frac{d\varepsilon}{da} = -\frac{G_{\varepsilon a}}{G_{\varepsilon\varepsilon}}, \quad (53)$$

where

$$G_{\varepsilon} = \rho \frac{C_D \mathcal{G}'(\varepsilon)}{b \mathcal{G}} - \frac{XC_X n'(\varepsilon)}{((n+1)n)^2} \left[\frac{T(n+1)}{n} - \frac{2\beta X^2}{n+1} \right]. \quad (54)$$

Equation (54) states that when the marginal disutility of drug consumption is sufficiently small an increase in the demand for drugs will reduce the enforcement level. When the marginal disutility of drug consumption and the market for X are both sufficiently large, the government in the host country will then increase the enforcement level. On the other hand, when the marginal disutility of drug consumption is sufficiently high and the market for X is sufficiently small, the government in the host country will reduce the enforcement level. Formally I can say,

Proposition 9 *When only the drug dealer lobbies the government and n is explicitly determined, we have*

$$\frac{d\varepsilon}{da} = \begin{cases} \text{if } \kappa \rightarrow 0 < 0 \\ \text{if } \kappa \gg 0 \end{cases} \begin{cases} < 0 \\ > 0 \text{ if } S_X \gg 0 \\ < 0 \text{ if } S_X \rightarrow 0 \end{cases}$$

Intuitively, when the disutility of drug consumption is very small, an increase in the demand for drugs will reduce the level of enforcement since the sanction applied will be small and host government benefits more by allowing an increase in drugs trade.

When the marginal disutility of drug consumption is sufficiently large, an increase in the demand for drugs will reduce the number of firms and the income of employed factors in the industry X . However, such an increase increases the income of employed factors in the drug industry, the profits of the drug producers and consequently the contribution they pay to the host government. With sufficiently large market for the legal good S_X , the reduction in the number of firms and consequently in the income of factors employed in industry X will be greater than the benefits from a reduction in the tax paid to the host government, the increase in the contribution paid by the drug producers, and the increase in the

income of employed factors in the drug industry, and the government will find in its interest to increase the enforcement level.

Finally, starting from the equilibrium (50) I shall analyse the effect of an increase in the enforcement level on the utility of the drug producers and employees. From (1) and (3) I have

$$\frac{dI^\sigma}{d\varepsilon} \Big|_{\varepsilon=\varepsilon^o} = -\rho P_D D \mathcal{G}'(\varepsilon) > 0, \quad (55)$$

$$\frac{dI^\theta}{d\varepsilon} \Big|_{\varepsilon=\varepsilon^o} = P_D D \mathcal{G}'(\varepsilon) < 0. \quad (56)$$

Formally I can say

Proposition 10 *Starting from the enforcement's equilibrium level, an increase in the level of enforcement will benefit the honest people and will harm the drug dealer.*

Intuitively, an increase in the enforcement level will reduce the probability for being successful in the drug traffic, and consequently will reduce the amount of drug produced. The profits obtained by the drug producers will decrease. The increase in enforcement will also increase the number of incoming firms. This will affect the utility of the employees in two ways. There will be a positive effect due to the increase in the income provided by the multinationals (the increase in the number of firms is greater than the reduction in X), a negative effect from the reduction in income provided by the drug dealer, and another negative effect due to the increase in taxes levied by the government in order to finance the drug enforcement policy. At equilibrium, the positive effect outweighs the negative effects, and the increase in the level of enforcement will benefit the employees.

6. Conclusions

The big effort to stop drugs traffic going to the U.S. has had disappointing results. Misunderstanding the action of the drug producers on the society's interests may

lead to unsuccessful enforcement policies. The production and traffic of drugs is not a typical criminal activity like raid, kidnap or rape, which are widely rejected by the community. Drug production is more complicated. Historically in many developing countries the drug consumption is inherent to their culture, idiosyncrasy and sometimes religion. Nowadays drugs represent a source of income for people and governments of these countries. Drug producers are important players in the political process.

This paper attempted to explain why some sanctions made by the international community on the producers' countries have failed. The corruption in the government and the benefit that drug traffic gives to the inhabitants of producing countries can inhibit any action leaded by the international community. Bribes are the origin and the consequences of the corruption; the drug dealer makes payments to the party in the power to guarantee the level of enforcement according to thier needs. Likewise, the governments have to consider the benefits of its citizens and a part of the benefits come from drug production and trafficking. The drug dealer lobbies the government taking into account their interests, and the government takes into account both the interest of the drug producers and their nationals.

I model lobbying following the common agency problem as developed by Grossman and Helpman (1994). In this framework the government accepts political contributions from the lobbyists and the level of contribution depends on the policy that the government pursues. On the other hand, the sanction applied by the international community is the reduction in the number of firms going to the producer country (producing a legal good) and consequently the reduction in its employment and consumers surplus. I analyzed the effect of the corruption parameter, demand for drugs and marginal cost of the incoming firms on the optimal drug enforcement.

In this paper I presented three cases. First, the case in which only the drug producer makes political contributions. In this case an increase in the corruption will reduce the enforcement policy. The weight given to the payment is large and the government find more profitable reduce the enforcement policy. On the other

hand, an increase in the demand for drugs will reduce (increase) the enforcement if the corruption parameter is sufficiently small (big). In this case, the benefit of the income of the honest people is greater than the effect of a payment made by the drug dealer. A small corruption parameter inhibits the effect of a bribe, and the response of the government to an increase in the demand of drugs is an increase in the enforcement level.

In the second case, the people working for the incoming firms and the drug producers lobby the government. In this case the increase in the corruption will reduce (increase) the enforcement if the drug market is sufficiently larger (smaller) than the market for the legal good. The difference in market size will determine the difference in the amount of payment. Who pay more will obtain the benefit of the policy change. The government will apply the policy required by the group who pays more. On the other hand, an increase in the consumption of drug will reduce (increase) the enforcement if the market for the legal good is sufficiently small (big). Because the honest people also lobby to the government, as long as they offer a sufficiently large payment, the government will increase the enforcement level.

In the last case the number of firms is determined endogenously. The affected country transfers the social cost of drugs to the multinational firms. In this case only the drug dealer lobbies the government and the number of firms is determined endogenously. An increase in the corruption parameter reduces the enforcement level. On the other hand, an increase in the demand for drugs will reduce the enforcement level if the marginal disutility produced by the consumption of drugs is sufficiently small. In the presence of a sufficiently large marginal disutility of drug consumption, a sufficiently small (large) market size for the legal good will reduce (increase) the drug enforcement. With a large marginal disutility the result obtained by the case one and three hold.

The political pressure on developing economies in order to stop the traffic of drugs may produce ambiguous results. On this paper we have seen how corruption and unemployment play a significant role on the final policy decision. Political corruption may magnify or inhibit any political action of the local agents and

produce some unexpected results in the fights against drug traffic. Actually, corruption may play in favor of enforcement policies as long as the honest agents get involved in the lobby game.

Fighting against corruption seems to be more suitable strategy than trying to stop drug from the source countries. We have seen that the policy addressed to stop the production and traffic of drugs may generate more incentives to produce and traffic drugs because the economic temptation offered by drug dealers and the social acceptance of drug activities is larger than the economic incentives to obtain for stopping drug traffic. It seems an institutional reform joint with an economic incentives program addressed to substitute the place of drug dealers on society is the best way to eradicate the drug problem. Under this view the worst option is a penalty strategy.

As another option, the receiving drugs countries may play (and sometimes they do) with the same rules played by drug dealers. It is called "learning from corruption" and it is a very common practice in the every day life for millions of people living in developing economies. Corruption reduces the transaction costs in the short term making easy the life. The formal and legal institutions lack of a efficient structure and process on those developing countries and corruption emerges as a more cheaper and efficient option.

As we see on this paper, using the same corrupted schedule, drug production and traffic can be reduced significantly once the honest agents lobby the government in order to get some economic benefit. But again, even in this case, it is not an economic restriction on developing economies the answer to eradicate the drug problem.

7. References

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