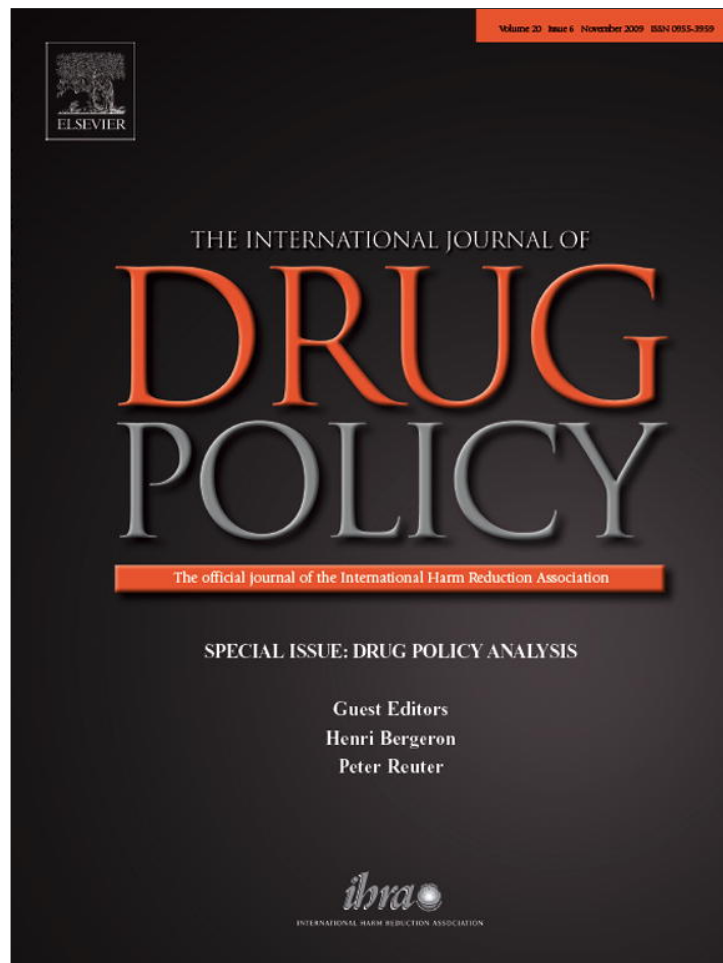


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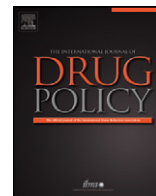
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Policy analysis

The cocaine and heroin markets in the era of globalisation and drug reduction policies[☆]Cláudia Costa Storti^{a,*}, Paul De Grauwe^b^a European Monitoring Centre for Drugs and Drug Addiction, R. Cruz de Santa Apolónia, 23-25, 1149-045 Lisboa, Portugal^b Katholieke Universiteit Leuven, Center for Economic Studies, Naamsestraat 69, 3000 Leuven, Belgium

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ABSTRACT

Background: Despite the large volume of public effort devoted to restrain drug supply and the growing attention given to drug demand reduction policies, the use of cocaine and heroin remains steady. Furthermore, retail drug prices have fallen significantly in Europe and the US. This puzzling evidence leads us to develop a model aiming at systematically analysing illicit drug markets.

Methods: We model the markets of cocaine and heroin from production to the final retail markets. One novelty of the analysis consists in characterising the retail market as a monopolistic competitive one. Then, upper level dealers have some market power in the retail market. This allows them to charge a markup and to earn extra profits. These extra profits attract newcomers so that profits tend to fall over time.

Results: Theoretical model was used to analyse the effect of supply containment policies on the retail market, the producer market and the export–import business. This introduces the discussion of the impact of demand reduction policies on the high level traffickers' profit. Finally, globalisation enters in the model. **Conclusions:** Law enforcement measures increase the risk premia received by the lower and higher level traffickers. Consequently, trafficking intermediation margins tend to increase. However, globalisation has the opposite effect. It lowers intermediation margins and, then, pushes retail prices down, thereby stimulating consumption. In doing so, globalisation offsets the effects of supply containment policies. Finally, we discuss how the effectiveness of supply containment policies can be enhanced by combining them with demand reduction policies.

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Introduction

Over the last 20 years, the use of cocaine and heroin in the world remained steady. Their “composite use perception indexes” growth rates were higher in Europe than in the US, during 1992–2005 (UNODC, 2007b). In parallel, over this period, the growth rate of the cocaine “perceived use” was higher in both regions of the world, as compared to those of heroin. UNODC (2008a) revealed little change in 2006.

Public policies to combat the drug phenomenon with drug supply reduction policies have been extensive. In Europe, according to the existing information about six countries EMCDDA (2007), the share of the overall public drug-related expenditure devoted

to supply reduction policies, i.e. law enforcement, varied from 40% to 77% in 2005 (excluding Hungary where they only represented 24%). In the US, according to the White House National Drug Control Strategy (2007), the percentage of drug control funding allocated by the Federal Government to supply reduction activities has increased from 53% in 2001 to 63% in 2007. This share rises exponentially when state and local government expenditure is considered.

A better understanding of the drug supply phenomena seems urgent. Despite the public expenditure devoted to restrain drug supply, illicit trafficking has remained steady and retail prices in Europe and the US have fallen significantly in the last 20 years. The latest available data for 2006 show that retail prices of cocaine and heroin fell to less than half of their levels of 1990. Empirical research has showed that drug use is responsive to drug prices. Several studies point to a price elasticity faced by aggregate demand for cocaine different from zero. Consequently, the observed price decline contributes to the current use of heroin and cocaine in Europe and US.

In this paper we develop an economic model of the markets and of the price formation mechanisms of cocaine and heroin. First we concentrate on their retail segment. This will show the demand side of the model. Second, we model the production of cocaine and

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heroin in the origin countries. Third, we link the demand and supply sides by modelling the export–import business. We will then use this framework to analyse the influence of globalisation on the drug phenomena.

This paper develops a graphical and intuitive approach of the model. A more technical version is available in Costa Storti and De Grauwe (2008b).

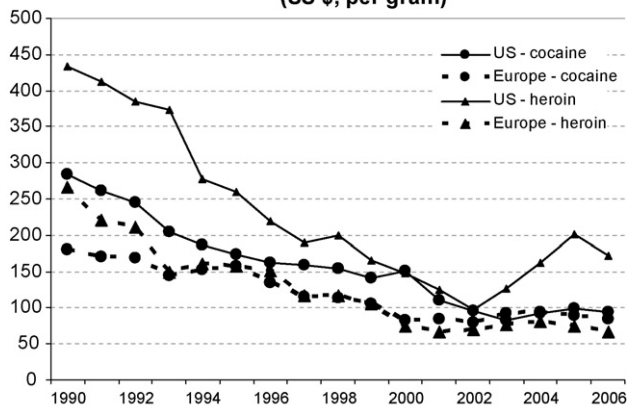
Recent developments in the cocaine and heroin markets

During the last 25 years important empirical phenomena have occurred in the cocaine and heroin markets. We analysed these phenomena in greater detail in a previous publication (see Costa Storti & De Grauwe, 2008). Here we summarize the most salient features. First, cocaine and heroin retail prices have declined significantly. Fig. 1 shows their evolution in the US and European retail markets since 1990.

Second, cocaine and heroin producer prices have increased or remained stable. These are the prices paid out at the farms gate in the producing countries. UNOCD (2008b) shows that the farm-gate prices of coca leaves have more than doubled since 1990 in Peru and Bolivia. Comparable data for Colombia (which currently accounts for about 60% of the total coca production) have only been published since 2006. These data show that Colombian coca leaves prices have experienced similar developments to those reported by the neighbouring countries. Price data for heroin are less comprehensive but the evidence suggests that these trends have been similar (see UNODC, World Drug Report 2007).

Third, and related to the previous observations, the intermediation margins in the cocaine and heroin business have declined dramatically over the same period. Fig. 2 shows the international intermediation margin, i.e. the margin between the wholesale price (in the drug importing country) and the price paid to the producers (in the exporting countries). Note that these wholesale drug prices are used as a proxy for import prices, since no better data is available. Thus, the difference between the export price (producer country) and the wholesale price (importing country) can be called the export–import margin. Fig. 3 shows the intermediation margin between the retail price and the wholesale price in the drug consuming countries. We see that both these margins have collapsed since 1990 for both cocaine and heroin.

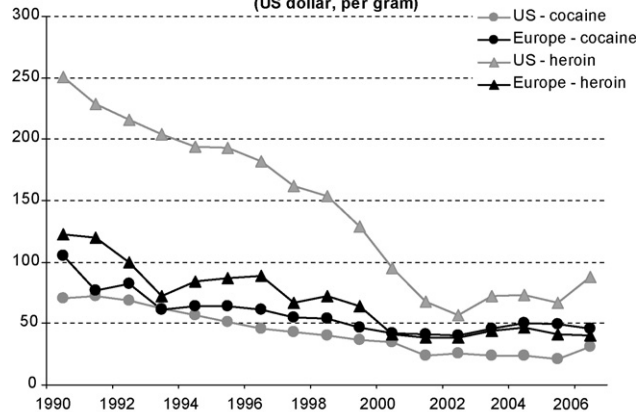
Cocaine and heroin retail prices, 1990-2006
(US \$, per gram)



Source: United Nations, World Drug Report 2008
Office on Drugs and Crime, New York (pp 255, 260)
Note: Prices are adjusted for inflation

Fig. 1. Cocaine and heroin retail prices, 1990–2006 (US \$, per gram), Source: United Nations, World Drug Report 2008, Office on Drugs and Crime, New York (pp. 255, 260). Note: Prices are adjusted for inflation.

Cocaine & heroin: margin between wholesale and producer prices, 1990-2006
(US dollar, per gram)



Source: For the methodology see Costa Storti and De Grauwe (2008)

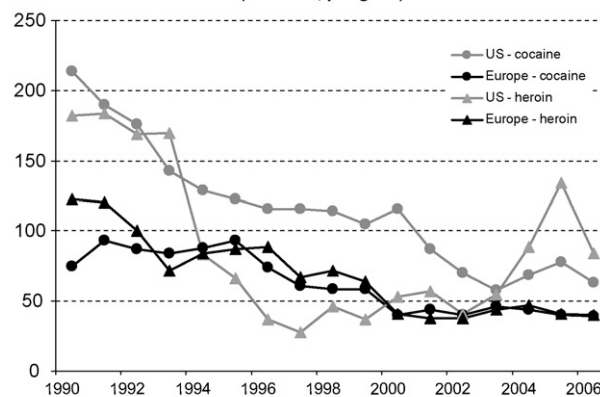
Fig. 2. Cocaine and heroin: margin between wholesale and producer prices, 1990–2006 (US \$, per gram), Source: For the methodology see Costa Storti and De Grauwe (2008).

Fourth, the world production of cocaine and heroin has remained steady. Fig. 4 shows the evidence.

Fifth, the available evidence suggests that all in all the worldwide prevalence of cocaine and heroin has remained steady. According to the UNODC, the drug use (as measured by prevalence) of cocaine and heroin was 3% higher in 2005 as compared to 1992. These growth rates were 7.3% and 3.4% in Europe and 1.8% and 1.1% in the US over the same period.

Finally, during the same period supply containment policies have been intense. In the US, these policies have been stepped up dramatically. According to Basov, Jacobson, and Miron (2001), from 1980 to 2000, the DEA budget increased threefold, in real terms. Boyum and Reuter (2005) show that state and local governments' expenditure in enforcement-oriented policies has also strongly funded these activities. Drug arrests in the US more than doubled during the same period. Caulkins and Reuter (2006) reported that incarcerations for drug law violations (primarily pertaining to cocaine and heroin) increased 11-fold between 1980 and 2002. One could expect that such an intensification of supply containment policies would have passed through higher retail prices, and declining prevalence and trafficking. This could not be observed in the US.

Cocaine & heroin: margin between retail and wholesale prices 1990-2006
(US dollar, per gram)



Source: For the methodology see Costa Storti and De Grauwe (2008)

Fig. 3. Cocaine and heroin: margin between retail and wholesale prices, 1990–2006 (US \$, per gram), Source: For the methodology see Costa Storti and De Grauwe (2008).

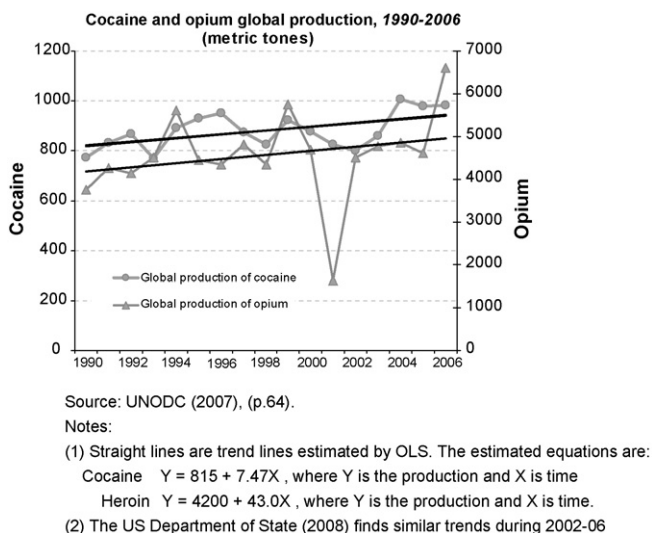


Fig. 4. Cocaine and opium global production, 1990–2006 (metric tonnes), Source: UNODC (2007b) (p. 64). Notes: (1) Straight lines are trend lines estimated by OLS. The estimated equations are—cocaine: $Y = 815 + 7.47X$, where Y is the production and X is time; heroin: $Y = 4200 + 43.0X$, where Y is the production and X is time. (2) The US Department of State (2008) finds similar trends during 2002–2006.

These are puzzling phenomena. Our theoretical model will attempt to make sense of it.

Modelling the retail drug market

The retail market structure

We assume that the retail market is characterized by monopolistic competition, i.e. there are many suppliers of drugs, each of which has some limited local market power. The model that will be presented in this section is an extension of the Krugman (1979) model. See also Ferguson (2006). It has its origin in the work of Chamberlin (1936) and Robinson (1933) on monopolistic competition.

The emergence of monopolistic competitive structures at the retail level can be seen as originating from asymmetric information between the buyer and the seller of drugs, i.e. the seller knows the quality of the drug better than the buyer. This does not mean that the seller exactly knows the quality of the drug offered. The information of the seller is often imperfect, but nevertheless somehow better than that of the buyer. This is the classic analysis of the “lemon problem” as developed by Akerlof (1970). Reuter and Caulkins (2004) and, more recently, Galenianos, Pacula, and Persico (2008) presented alternative ways of applying this assumption to the drug field.

This asymmetry of information leads to a market failure: the high quality drug tends to disappear and only the low quality drug is left over. This market failure, however, can be partially overcome when buyers and sellers establish a relationship based on trust, achieved by repeated transactions between the same sellers and buyers. This in turn creates a network structure in the retail market which allows the information about the quality of the drug and the reliability of the seller to be shared. Once trust is achieved, the seller can charge a quality premium. These relations based on trust in a network environment have been described by criminologist research (see e.g. Deroches, 2007; Matrix Knowledge Group, 2007).

The market structure that emerges from these phenomena is akin to monopolistic competition, in which drug dealers have a certain market power and apply a high markup initially. The markup tends to diminishes over time because new dealers are tempted to join the market. A characteristic of this market structure is that

there are no strong barriers deterring newcomers (see Reuter and Haaga, 1989).

The functioning of the retail market

The local market power of the supplier is represented in our model by the assumption that each “upper level trafficker” or supplier faces a downward sloping demand curve for the drugs he sells. Empirical evidence suggests that the price elasticity varies typically between 0 and 1. Caulkins and Hao (2008), have an interesting discussion about the European and the US demand elasticities for cocaine and heroin. They put the market elasticity for the US within a range of 0.5–1 (absolute values). Other authors arrive at comparable results (Abt Associates, 2000; Bretteville-Jensen & Biorns, 2004; Caulkins, 2001; Caulkins & Peter, 1998; Dave, 2004; Grossman, 2004; Saffer & Chaloupka, 1999). Different levels of addiction lead to different responses of drug users to prices changes. The impact of increasing drug prices on drug users’ available income play also a role in this analysis, as cross drug price elasticities.

We assume there are n suppliers of drugs in the retail market. The number of suppliers is endogenously determined in the long run by imposing a long term no profit condition. The model produces a short-term equilibrium which is characterized by the condition that the number of drug suppliers is given. In the short run suppliers apply a markup pricing rule, i.e. they pass on price increases of the wholesale drug into the street price using a markup. This markup is determined by the local “market power” of the supplier. In the long run, the entry of newcomers forces down the markup and eliminates excess profits. The analytical model is described in detail in Costa Storti and De Grauwe (2008b).

Fig. 5 represents the short-term and long-term equilibrium. On the vertical axis we show the street price of the drug; on the horizontal axis the consumption of drugs (drug use) by the representative consumer. The PP-line is the graphical expression of the short-term equilibrium. It is a positively sloped line because with a higher level of drug consumption the market power of the drug supplier increases, and he applies a higher markup. Then a higher retail price is charged.

The QQ-line is the graphical representation of the long-run equilibrium condition. The negative slope derives from the fact that as consumption increases, suppliers’ average costs decline. In the long run this leads to a declining retail price.

The equilibrium values of the price and the consumption of the representative drug user are given by the intersection of the PP- and QQ-lines.

This model will allow to analysing important questions. First, the effect of drug seizures in the retail market will be discussed.

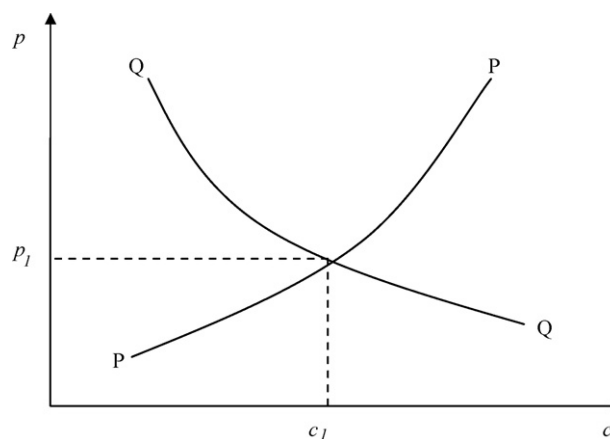


Fig. 5. Equilibrium of the retail market.

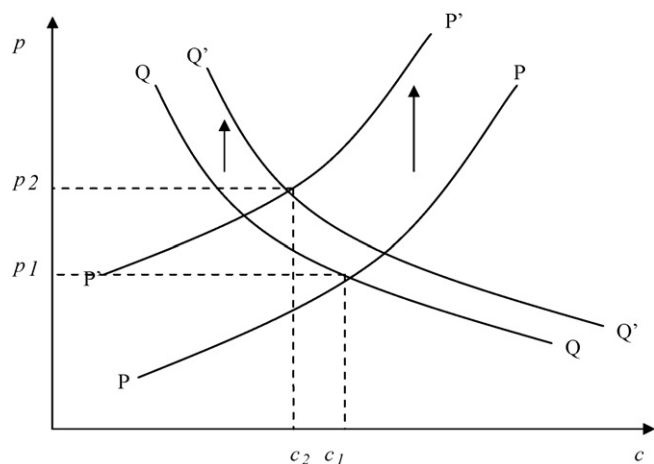


Fig. 6. Effect of increase in probability of seizures.

Second, it will analyse how demand reduction policies can reinforce the impact of supply containment policies. Finally, globalisation will be introduced.

The impact of law enforcement in the retail market

When law enforcement seizes drugs, suppliers will take into account the probability that part of the drugs sold in the retail market is lost. Call this probability s . Fig. 6 shows the effect of changing the probability of having retail traffickers' drugs seized brought about by tighter law enforcement. An increase in s has the effect of shifting both the PP- and the QQ-curves upwards, because selling the same amount of drugs will have a higher cost for traffickers, since part of the merchandise is lost in the process. So, traffickers use their market power to charge higher prices.

However, the upward shift of the PP-curve is higher than that of the QQ-curve. This comes from the fact that in the short run the response of the suppliers is influenced by the markup (which is larger than 1, due to the competitive monopolistic structure of the market). This markup does not play a role in the long-run response. For a detailed discussion of this point see Costa Storti and De Grauwe (2008b).

We conclude that an increase in the probability of seizures raises the retail price of drugs and reduces the amount of drug used. The latter effect follows from the fact that drug users are sensitive to a price increase.

There are other risks that could be analysed in our model. One is the risk of incarceration. This will introduce a risk premium in the wage of the low level traffickers. In addition, it leads to an increase in the risk premium that upper level dealers have to receive in order to deal the drug. This has the same qualitative effect as the risk of seizures, i.e. it leads to a higher retail price. Note that in this case the increase in the retail price reflects a higher profit margin which is necessary to induce agents to engage in dealing drugs. Caulkins and Peter (1998) make an in-depth analysis of this issue. We will return to this risk when we discuss the import–export trafficking activity.

The impact of globalisation in the retail market

The model also allows us to analyse the effects of globalisation. Globalisation may play different roles. First, it may affect the retail market by reducing the import cost of drugs, as discussed in the section devoted to the import–export trafficking activity. Second, it increases the availability of drug dealers. It has been noted that one of the most fundamental effects of globalisation is that countries like China, India, the Soviet Union and Eastern Europe which used

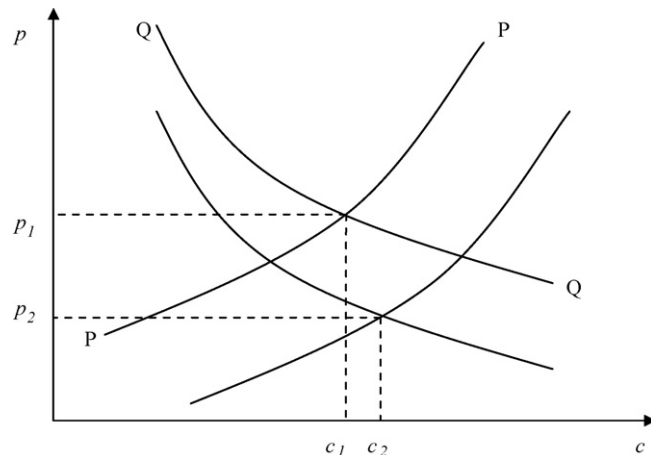


Fig. 7. Effect of globalization—increasing supply of low level drug dealers.

to be closed off from the world economy, now are a full part of it. The integration of these countries amounted to approximately doubling the world supply of labour (mainly willing to accept very low wages). As a result, it puts a downward pressure on dealers' wages.

Fig. 7 shows the implications of this wage decline. Both the PP- and the QQ-curves shift downwards producing a decline in the retail price (and in the intermediation margin). The effect on consumption however is ambiguous and depends on the parameters of the model, concerning drug use responsiveness to prices. Different studies point to a positive price elasticity faced by aggregate demand for cocaine. Costa Storti and De Grauwe (2008b) discuss this issue in further detail.

From the previous analysis we note that globalisation and supply containment policies have opposite effects on the retail price of drugs. This implies that, as globalisation proceeds, supply restrictions must increasingly become tighter to offset the price reducing forces of globalisation. Thus, as globalisation is an ongoing process, it forces the authorities to continuously increase the amount of resources used to prevent the retail price from declining. Considering that law enforcement may be subject to diminishing returns, it is very likely that the effects of globalisation may prevail.

The impact of demand policies

The retail model previously derived allows us to shed some light on the relation between demand and supply policies. Demand policies (prevention, treatment and harm reduction), if successful, reduce drug consumption of a representative user. In this framework, demand reduction policies can be effective if they increase the price elasticity of the demand for drugs. This effect is based on the assumption that treatment policies constitute an alternative to drug use. Then, treatment increases the responsiveness of drug users (see Caulkins & Hao, 2008). Put differently, the success of demand policies can be gauged by their capacity of increasing the price sensitivity of the demand for drugs (which also implies that the power of the traffickers is reduced). This feature of successful demand policies in turn affects the effectiveness of supply containment policies. The reason is the following. A reduction of the supply of drugs raises the retail price. With a higher price elasticity of the demand for drugs, this supply-induced price increase has a stronger negative effect on consumption. As a result, supply policies become more effective in reducing drug use. Thus, our model of the retail market has as an implication that when supply policies are combined with demand policies, the former become more effective in reducing drug use.

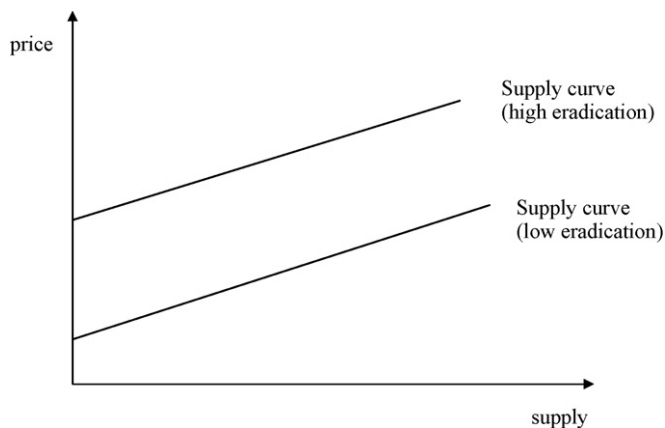


Fig. 8. The supply curve with different levels of eradication.

Modelling the production market

In this section we derive the producers' supply of drugs in the source countries. We will focus our analysis on the first step of the processing stages when coca leaf is produced. For the sake of simplicity we will not take into consideration the trans-shipment of precursor chemicals and intermediate products such as paste and base.

We assume that the supply of drugs in the producing country (e.g. Colombia) is organized in a perfectly competitive market (see Kennedy, Reuter, & Riley, 1993). For a full analytical description of the model see Costa Storti and De Grauwe (2008). Here we restrict the analysis to its graphical representation. Fig. 8 shows the supply curve of drugs in the producing country. It is an upward sloping line expressing the idea that an increase in the price of drugs makes the production of drugs more profitable thereby attracting resources (land and labour) to its production. Eradication programs reduce the supply of output. Graphically an increase in eradication shifts the supply curve upwards.

An increase in productivity has the opposite effect on the supply of output. Graphically, productivity increases lead to a downward shift in the supply curve.

There is substantial evidence that the eradication efforts in Andean countries have been offset by increased productivity leaving the supply more or less unchanged (for evidence see Costa Storti & De Grauwe, 2008). It can be argued that much of these productivity increases have been facilitated by globalisation. The latter has contributed to greater access of local drug farmers to new and improved production techniques. In this sense globalisation has contributed to making eradication efforts relatively ineffective.

Modelling the import–export market

Linking up demand and supply of drugs

In this section we link up the retail and the producer markets. It will be remembered that the retail market determines the retail price for a given import cost of the drug. The producer market in turn determines the supply of the drug for a given export price. We can represent this graphically as follows. Fig. 9 presents the retail market in the importing country, as shown when the retail drug market was analysed. The D_r curve represents the prices the representative drug user is willing to pay for different levels of the drug supplied at the retail level, in the importing country.

The lower D_m curve presents the different levels of the import price, p_m , which the importer is willing to pay, given the retail price

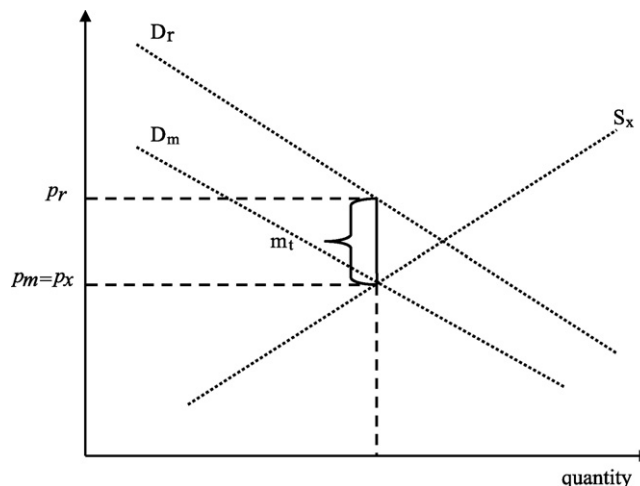


Fig. 9. Equilibrium in the absence of import–export margin.

he receives in the retail market. Note that we assume here that the “upper level drug trafficker” of the retail market is also the importer. This assumption could be relaxed without affecting the results. Caulkins and Hao (2008) analyse the different distribution layers between the importer and the retailer. The vertical distance between the two curves is the retail margin, as described in the retail drug market section.

The producer supply equation was previously derived (see Fig. 8). We assume here that the total supply is exported. Thus the price the producer is facing is the export price, p_x . An increasing export price leads producers to increase their supply.

Fig. 9 brings together the demand and the supply side of the model. Without intermediation costs in the export–import business the equilibrium of the model would be obtained where the supply curve S_x intersects the import demand curve, D_m , producing a retail price p_x . In this equilibrium point, the import price of cocaine in the retail market, p_m , equals the producer's export price p_x . This is, however, highly unrealistic as the export/import of cocaine involves transaction costs and risks, introducing a margin between the import price of the drug (cif) and the export price (fob) when it leaves the producing country. The difference between these two prices is the intermediation margin in the export and import business, which we will call m_t . The latter linked up the retail market determining demand conditions with the main stages of drug supply.

The intermediation in the export–import business

The components of the intermediation margin, m_t , can now be analysed as follows. First we have to take into account that the import price in the EU or the US is expressed in euros (or dollars), whilst the export price paid in Andean countries is expressed in local currency. Second we have to take into consideration a margin paid to the import/export activity (m_t). Thus, we write the following definition

$$\frac{p_m}{p_x e} = 1 + m_t \tag{1}$$

where as before, p_m is the import price in the market of the final drug user. This price is expressed in that country's currency (e.g. euros or dollars); p_x is the export price in the producing country, expressed in that country's currency. Multiplying by the exchange rate, e , yields the export price expressed in the importing country's currency.

The margin, m_t , includes the costs incurred in export/import business. This margin introduces a difference between the import

price (cif) and the export price (fob) even after translating both prices in the same currency (the euro or the dollar).

From Eq. (1) we see that a depreciation of the euro (an increase in the exchange rate, e) has the effect of either increasing the import price p_m or reducing the export price p_x , or a combination of these. This follows from the fact that the variables on the right hand side of (1) are independent from the changes of the exchange rate. As a result, the ratio between the two prices on the left hand side of (1) must remain unchanged.

The next step is to specify the costs that affect the intermediation margin m_t . We identify several factors that affect this margin.

The first cost is the “the plain vanilla” transport cost (e.g. the cost of the maritime transport from the producing to the consuming countries). The second cost arises from the risk of losing the trafficked drug due to being seized. The third one is the wage traffickers pay to their employees (lower level traffickers and “mules”) involved in the smuggling activity. Finally, the last cost we consider is the profit earned by the upper level cocaine traffickers.

We can formalize this as follows:

$$\frac{p_m}{p_x e} = (1 + \tau_t)(1 + \tau_s)(1 + \tau_l)(1 + r) \quad (2)$$

where τ_t is the “plain vanilla” transport cost; τ_s is the cost of seizure; τ_l is the labour cost and r is the profit margin in the export–import business. We now specify the different variables that affect costs.

“Plain vanilla transport costs”

The transport cost, τ_t , is a function of the number of hours the trip from the exporting country to the importing country lasts and its price (e.g. the introduction of low costs flights or faster boats influence transport costs). An increase in one of the components of these transport costs increase τ_t .

Costs of seizures

Seizures add to import price in the following way. Call ρ the probability of a unit of cocaine being seized. Then shipping one dollar of the drug will lead to an expected value at arrival of $1 - \rho$. Thus in order to ensure that one dollar value of drugs reaches destination, $1/(1 - \rho)$ should be exported. As a result, the transport cost can be said to have increased by a factor of $1/(1 - \rho)$. Thus we can write

$$1 + \tau_s = \frac{1}{1 - \rho} \quad (3)$$

The probability of seizure, ρ , is a function of the supply reduction policies of the countries involved and the associated resources invested in supply reduction policies.

Labour costs

The third cost component is labour cost. Let us write the wage cost per dollar of drug transported, w . We assume that the wage rate is determined by the shadow wage of the drug carriers (i.e. the wage they would earn in their best alternative job) plus a risk premium. The latter arises because drug trafficking involves the risk of incarceration (see Caulkins & MacCoun, 2003 for a further discussion on how this risk may affect drug dealers wage). People will only engage in a risky activity if they are compensated by a higher wage. The higher wage above the shadow wage is the risk premium. This risk premium depends, for instance, on the resources invested in supply reduction policies activities.

However, globalisation not only increases the pool of agents who are capable and willing to enter trafficking at a lower shadow wage but it can also supply lower level traffickers willing to accept high risks for small reward (less risk adverse labour force). This tends to reduce the risk premium. The section of this paper that analyses

the development of the Western African cocaine route presents an example of this effect.

Profit margins

The final component in Eq. (2) is the profit margin in the export–import business. Resources invested in the export–import business should earn a rate of return which reflects the return of alternative activities plus a risk premium. Thus we can write

$$r = \bar{r} + \pi_r \quad (5)$$

As in the case of the wage rate, the risk premium π_r is influenced by the risk of incarceration and by the supply of new entrants in the exporting/importing business. The risk of incarceration increases the risk premium while the supply of new entrants tends to reduce it.

Note that in a similar way as in the retail market, we implicitly assume two types of agents in the trafficking business. There are the “higher level traffickers”, who are the entrepreneurs, organising the traffic and earning profits, r . Then there are the “lower level traffickers”. They are hired by the higher level traffickers and earn the wage rate, w . Both are affected by the same factors, i.e. the resources invested in supply reduction policies and globalisation which affects the entry of newcomers in the business.

Simultaneous equilibrium: retail, producers and import/export markets

The full equilibrium of the model is described graphically in Fig. 10. S_x is, as before, the producer supply curve in the exporting country. S_m is the supply curve at the point of import in the retail market. The vertical distance between the two lines is given by the intermediation margin of export/import activity, m_t .

Equilibrium is obtained where supply of imported drugs (S_m) and demand for exported drugs (D_m) intersect. This intersection point determines the import price in the retail market (p_m).

The retail price p_r is then obtained by adding the retail margin m_r . We then obtain an equilibrium in the retail market, where the upper level drug dealer operates in a monopolistic competition framework. The intermediation margin m_r includes costs such as the lower level dealer wage, productivity and markup. The latter is a function of the demand elasticity of the representative drug user.

Finally, the producer price (export price) p_x is obtained by subtracting the export–import margin, m_t , derived in this section.

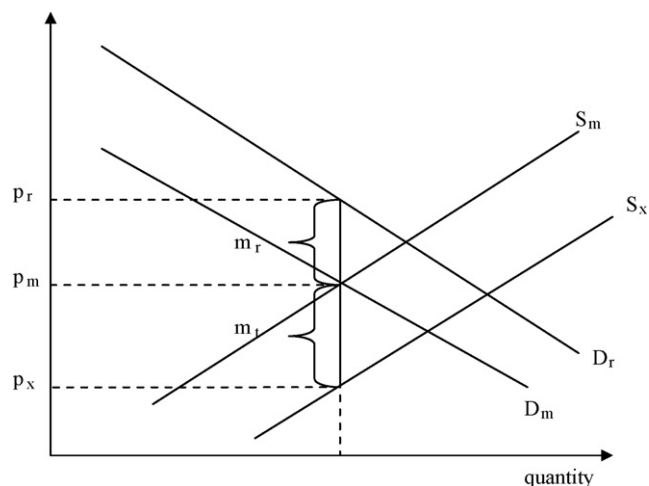


Fig. 10. Equilibrium with import–export margin.

UNODC (2007a) estimates that in 2000 total seizures in West Africa only amounted to 97 kg, while in 2007 preliminary estimates point to 6458 kg. Despite the fact that this indicator is insufficient to accurately assess traffic, as it is influenced by factors such as the level and effectiveness of police activity, it is certainly indicative of the dimension of the problem. In any case, all the sources reporting on drug trafficking stress the role of West Africa as a hub towards Europe (see *Europol*, 2007; *INCB*, 2008; *UNODC*, 2007a; *US Department of State*, 2008). *Costa Storti and De Grauwe* (2008b) describe this cocaine trafficking route in some detail.

Here we will briefly analyse how the West African route of cocaine towards Europe is a good illustration of the impact of globalisation in the European drug markets.

Applying the model to the West African route

The West African route illustrates some of the points we made in our analysis of how globalisation affects the drug business and how it tends to interfere with supply containment policies. We find the three effects of globalisation identified in the previous section.

The market structure effect. The entry of newcomers has affected international trafficking. The emergence of a new route has introduced more competition in the business of international trafficking, undermining the market power of the older participants, both of lower level traffickers who are willing to traffic by a lower wage (*UNODC*, 2007a) and of upper level traffickers (part of the import–export trafficking business has been transferred to African hands, for instance when traffic is associated with Moroccan pre-existing cannabis routes or of body-packer traffickers). The market structure has become more competitive and less cartelized, thereby lowering markups.

The risk premium effect. The abject poverty of West African countries has made available a large number of cheap workers who are willing to take large risks in drug trafficking, such as ingesting larger amounts of drugs as compared to South American traffickers (*UNODC*, 2007a). This has reduced the risk premium to be paid to lower level trafficking and, in so doing, has lowered the intermediation margin in the export–import business.

The reduction of the risk premium is also related to the relatively low level of enforcement observed in West Africa as compared to alternative routes. In this sense globalisation is a mechanism searching for the route of least resistance. As a result, law enforcement tends to lag new developments.

The efficiency effect. The emergence of low cost air carriers has made it possible to organize the drug traffic in small quantities carried by cheap African traffickers. Technical innovation on the side of maritime transportation (*ONDCP*, 2008) together with the exponential growth of air traffic has complicated detection. In addition, the openness of the international trading system has allowed the spillover of existing knowledge and experience of the older cannabis routes to be used in the new ones. All these effects have lowered the cost of international trafficking, contributing to the decline in the retail price of cocaine in Europe. Recent estimations suggest that the proportion of individual cocaine seizures made in Europe, that transited Africa (where the ‘origin’ had been identified) increased steadily, from 5% in 2004 to 9% in 2005, 12% in 2006 and 22% in 2007. In this last year, the total volume of cocaine seized where the trans-shipment was known amounted to 28% (*UNODC*, 2007a, 2008a).

These different effects have been stimulated by the increased tightness of supply containment policies in alternative routes. The West African route can be seen as a mechanism aimed at escaping law enforcement policies. Globalisation has facilitated the organisation of such an escape mechanism.

Conclusion

Retail prices of cocaine and heroin have declined significantly during the last decades while at the same time producer prices have tended to increase. Thus, intermediation margins in the business of transporting and dealing these drugs have declined spectacularly. In addition, consumption and production of cocaine and heroin have continued to increase. These are puzzling developments because at the same time public expenditure devoted to limit the supply of drugs by law enforcement methods is substantial and has intensified. Supply containment policies should have increased retail prices, increased intermediation margins, reduced consumption and production. The opposite occurred. We argued in this paper that this has happened because the forces of globalisation have overwhelmed the supply containment policies.

To understand these developments we developed a model of the cocaine and heroin markets. The retail market is a market characterized by monopolistic competition. This is a market structure often analysed in economics. We consider the upper level dealers to have some market power allowing them to charge a markup and thus to earn extra profits. This is the ‘monopolistic’ part. Simultaneously, this extra profit attracts newcomers in the business so that these profits tend to diminish. This is the ‘competition’ part in the model. This assumption is based on criminologist research which shows that upper level dealers seek local market power by developing networks but that this market power is eroded by the entry of newcomers.

Much of our analysis was focused on modelling the different ways globalisation affects the drug markets. We distinguished between a market structure effect, a risk premium effect and an efficiency effect of globalisation.

We found that in general globalisation has the opposite effects of supply containment policies. It lowers intermediation margins and as a result tends to lower retail prices, thereby stimulating consumption. At the same time it increases the prices obtained by the producers, tending to increase production. In so doing, globalisation offsets the effects of supply containment policies.

Finally, using the model of the retail market, we discussed how the effectiveness of supply containment policies can be enhanced by combining them with demand reduction policies. The latter, if successful, tend to increase the price sensitivity of drug users. This is so because demand policies create alternatives for drug users in the form of treatment. As a result, policies that reduce the supply of drugs in the retail market become more effective in reducing the consumption of drugs because they operate in an environment in which consumers react more strongly to price increases.

The focus we have put on globalisation does not mean that it is the only explanation of the empirical puzzles observed in the cocaine and heroin markets. There are other factors that may play a role that we briefly discussed in this paper. More research will be necessary to find the relative importance of these different explanations.

Paul De Grauwe is employed by the Katholieke Universiteit Leuven, Belgium.

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