



Research paper

Globalization and the price decline of illicit drugs

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Abstract

Background: This study aims at understanding the mechanisms underlying the dramatic decline of the retail prices of major drugs like cocaine and heroin during the past two decades. It also aims at analysing the implications of this decline for drug policies.

Methods: We use a theoretical model to identify the possible causes of this price decline. This allows us to formulate the hypothesis that the major driving force behind the price decline is a reduction of the intermediation margin (the difference between the retail and producer prices). We also develop the hypothesis that globalization has been an important factor behind the decline of the intermediation margin. We then analyse the statistical information to test these hypotheses.

Results: We find that the decline in the retail prices of drugs is related to the strong decline in the intermediation margin in the drug business, and that globalization is the main driving force behind this phenomenon. Globalization has done so by increasing the efficiency of the distribution of drugs, by reducing the risk premium involved in dealing with drugs, and by increasing the degree of competition in the drug markets.

Conclusion: We conclude that the cocaine and heroin price declines were due to a sharp fall in the intermediation margin, which was probably influenced by globalization. This phenomenon might have a strong impact on the effectiveness of drug policies, increasing the relative effectiveness of policies aiming at reducing the demand of drugs.

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JEL classification: F10; K42*Keywords:* Illicit drugs; Globalization; Drug policies**Introduction**

In the past decades a remarkable empirical phenomenon has occurred in the drug markets: the price of hard drugs has declined spectacularly. We show this evidence in Fig. 1. It presents the price evolution (at the retail level) of cocaine and heroin in the US and in Europe. We observe that these prices have dropped by 50–80% since 1990.

There is evidence that these retail price declines started before 1990, and that it also applies to other drugs than cocaine and heroin. (See the Office of National Drug Control Policy, <http://www.whitehousedrugpolicy.gov>

[publications/price_purity/](#)). In this paper we will concentrate on the period since 1990 because that period has the most consistent set of data. Furthermore, we will focus on the analysis of cocaine and heroin since these drugs have a similar market structure.

How can such a spectacular price decline be explained? This is the question addressed in this paper. We start by presenting a simple classroom model of demand and supply of drugs. We use this model as a device to identify the potential factors that can explain this price decline. We then formulate our hypothesis, which is, first, that the price declines were made possible by a strong decline in the intermediation margins, and second, that globalization is the main force behind the decline of the intermediation margins. Globalization has fundamentally affected the drug industry in different ways. We will analyse these different mechanisms. In a further

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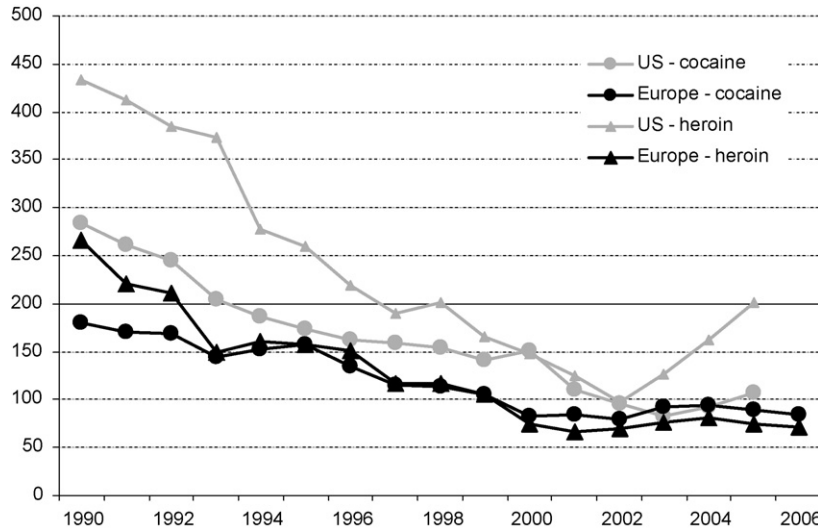


Fig. 1. Cocaine and heroin retail prices, 1990–2006 (US dollar, per gram), *Source*. United Nations, World Drug Report 2007 Office on Drugs and Crime, New York (pp. 223, 228). *Note*. Prices are adjusted for inflation.

section we present some empirical evidence that tends to confirm our main hypothesis. We conclude with a section on the policy implications of our findings.

Demand and supply of drugs

In this section we present a simple model of demand and supply in the drugs market (see the classic article by Reuter and Kleiman, 1986; see also Becker et al., 2005). The purpose of this classroom model is to identify the factors that can be invoked to explain the large decline in the retail price of drugs. We will call the drug in this very simple model “cocaine”.

Fig. 2 presents demand and supply for cocaine at the retail level. We focus first on the supply curve. This embodies an important characteristic of the drug market, i.e. that by far the largest part of the retail cost consists of the intermediation margin. The cost of producing coca leafs is a tiny fraction of

the total retail cost. It is variously estimated to be less than 1% of the retail price (see Caulkins, Reuter, Iguchi, & Chiesa, 2005; UNODC, 2007).

Thus the intermediation margin constitutes by far the largest part of the retail price. Fig. 2 does not give full credit to this feature, but only suggests this difference by locating the producers’ supply curve way below the retail supply curve.

The relation between the retail and producer (farmer) supply curves represented in Fig. 2 can be analysed as follows. We start by writing the producer supply curve as a simple linear function with unit price elasticity. This assumption of unit elasticity is made for the sake of convenience. It does not affect the nature of the analysis.

$$P_f = \alpha X_S \tag{1}$$

where P_f is the producer price and X_S is the supply of cocaine. We then write the retail price as follows:

$$P = P_f + M \tag{2}$$

Where P is the retail price and M is the intermediation margin. We specify the latter as:

$$M = \bar{M} + \beta X_S \tag{3}$$

where \bar{M} is the fixed component of the intermediation margin and βX_S is the variable component of the intermediation margin.

What are the factors affecting the intermediation margin? Let us list the most important ones.

First, the market structure. Economic theory tells us that the market structure affects the difference between the retail price and the marginal cost, i.e. the markup. If the distribution of drugs is monopolized we can expect a large markup. In addition, since the price elasticity of demand is relatively low

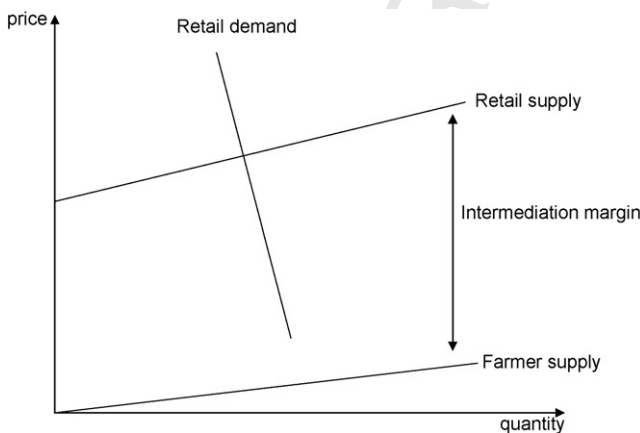


Fig. 2. Demand and supply of cocaine.

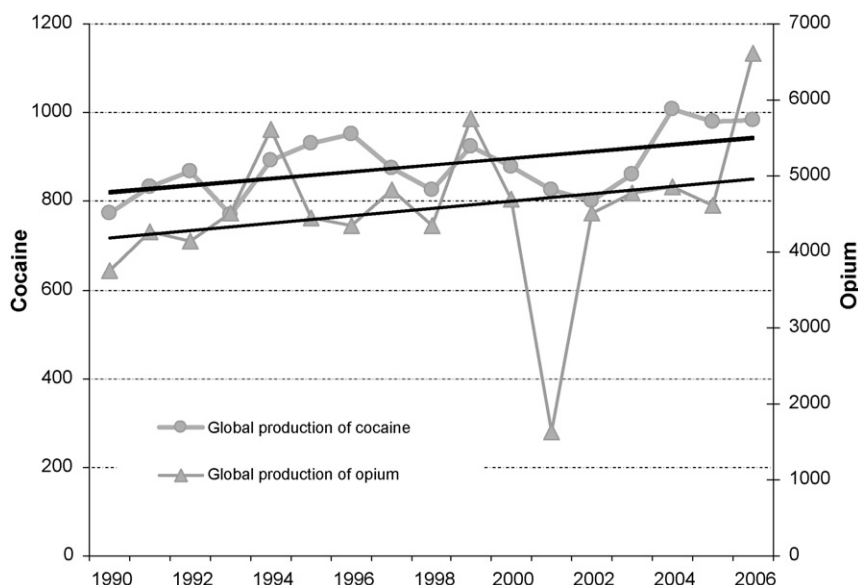


Fig. 3. Cocaine and opium global production, 1990–2006 (metric tonnes), *Source*. United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (p. 64). *Note*. Straight lines are trend lines estimated by OLS. The estimated equations are: cocaine $Y = 815 + 7.47X$, where Y is the production and X is time. Heroin $Y = 4200 + 43.0X$, where Y is the production and X is time.

in the drug markets, the markup applied by the monopolist is likely to be high. Conversely, if the distribution of drugs is perfectly competitive, the price will reflect the marginal cost of distributing the drugs (the markup will be zero). Therefore, when the distribution of drugs occurs in a market structure of perfect competition the intermediation margin will be lower than in a monopolized structure.

The second factor affecting the intermediation margin is the risk premium. Since the distribution and sale of drugs is illegal in most countries and since the penalty on these activities is stiff, those who engage in these activities take a risk (confiscation, prison, violence). They will only engage in these activities if they obtain an additional income, i.e. a risk premium (See Kuziemko & Levitt, 2003). Given the nature of the risk, this risk premium is likely to be large. This factor is likely to make the fixed component of the intermediation margin large.

Finally, the efficiency of intermediation is the third factor with impact on the intermediation margin. The more efficient the intermediation process (stock management, transportation and distribution) the lower the costs. There is a potential spillover here with the risk premium: a more efficient intermediation reduces the number of intermediaries involved and thus reduces the risk premium.

Substituting (2) and (3) into (1) yields:

$$P = (\alpha + \beta)X_S + \bar{M} \tag{4}$$

which describes the retail supply curve. Note that the slope of the retail supply curve (given by $\alpha + \beta$) will generally be different from the slope of the producer supply curve (given by α).

This simple model allows us to write the elasticity of the retail supply curve as

$$\frac{P}{P - \bar{M}} \tag{5}$$

Eq. (5) implies that if the fixed intermediation margin is high, the retail price elasticity of supply can become very large. Eq. (5) can be rewritten as

$$\frac{P}{P_f + \beta X_S} \tag{6}$$

One can simplify Eq. (6) further by assuming that $\beta = 0$, i.e. the intermediation margin has only a fixed component. This assumption makes sense as we really do not know how the supply affects the risk premium, i.e. we do not know whether β is positive or negative. With this assumption we obtain the following expression for the price elasticity of the retail supply:

$$\frac{P}{P_f} \tag{7}$$

i.e. the price elasticity of the retail supply curve is equal to the ratio of the retail price to the producer price (given that we have assumed a unit price elasticity of the producer supply curve. This assumption is made for the sake of simplicity. Nevertheless, a more general assumption would not alter the main result, since the price elasticity of the retail supply would be a multiple of the price elasticity of the producers' supply). The larger is this ratio, the higher is the price elasticity of the retail supply curve for any given elasticity of the producer supply curve. To illustrate the nature of Eq. (7), suppose that the retail price is 100 times higher than the producer

price (which is the order of magnitude observed in reality; see the evidence provided by Caulkins et al., 2005 cited earlier), then the price elasticity of the retail supply curve will be equal to 100 (given that the producer supply equation has unit elasticity). Thus in the drug market the price elasticity of the retail supply is likely to be several orders of magnitude higher than the price elasticity of the producers' supply.

The retail demand curve is represented by a relatively steep curve, reflecting the empirical evidence that the price elasticity of demand is relatively small. There is evidence, however, that the price elasticity is not zero, i.e. that demand does respond to price. Abt Associates (2000) find a price elasticity of the demand (by moderate users) for heroin of -0.17 and for cocaine of -0.26 . Saffer and Chaloupka (1995) find higher price elasticities, i.e. between -1.10 and -0.72 for cocaine and between -1.80 and -1.60 for heroin in the US. Dave (2004) computes the probability of an admission in hospital emergency departments in the US and finds that the elasticity of this probability is -0.27 for cocaine and -0.15 for heroin. Grossman (2004) computes similar elasticities and finds that these are between -1.7 and -0.1 for cocaine and between -0.6 and $+0.1$ for heroin in the US. The price elasticities estimated by Dave and Grossman are not conventional price elasticities. They do suggest, though that drug demand is sensitive to price. On the whole the evidence suggests that the demand for heroin and cocaine responds moderately to prices. It should be mentioned though that some authors find no evidence of price sensitivity of the demand for cocaine and heroin (e.g. Ramful & Zhao, 2003 for Australia).

The previous analysis allows us to identify the likely causes of the large observed decline in retail prices. Such a decline can be due to three different causes: first, to an increase in the amount supplied by producers; second, to the reduction of consumers' demand; and finally to the decline of the intermediation margin.

From Fig. 2 it can be seen that the first two factors are unlikely to be of great importance. We observe, first, that even if the producers' supply curve were to shift downwards so as to coincide with the X -axis (coca leaves would then have become free goods) the effect of this shift on the retail supply curve would be minimal, leaving the retail price of cocaine pretty much unchanged.

Second, the massive price declines are unlikely to have been the result of declines in demand. These would have had to be massive also. This follows from the fact that, as shown earlier, the retail supply curve is relatively elastic. Thus, in order to produce a retail price decline of 80%, a demand reduction should have been truly massive. We will analyse whether there is any empirical evidence for such a large decline of demand.

Given that shifts in the supply and demand curves are unlikely candidates to explain the large observed price declines, the core of the explanation is likely to be found in large reductions in the intermediation margin. In other words, the price declines are likely to be due to a combination of changes in the market structures making the intermediation

business more competitive, declines in the risk premium and increases in the efficiency of the intermediation.

In the next section we provide some empirical evidence on the evolution of the three factors identified in this section.

Empirical analysis

The way we proceed in this section is as follows. We first discuss some of the data problems. We then present statistical information on the three fundamental determinants of the retail price of drugs, i.e. on worldwide production, on consumption of drugs and on the intermediation margin.

Data problems

It is broadly accepted that data on the illicit drug industry are very poor. Due to the clandestine nature of the business, in most cases data can only be constructed based on indirect observation. Consequently, the quality of the statistical information is weak. Furthermore, the variety of information is limited. The need to produce statistics in this sector is recent, since it was considered that recognition of the problem was, by itself, a sign of its acceptance. So, for a long time official organizations invested little in data collection. Thus, the time series we have available are short and do not go far enough in the past. Furthermore, there are only a few producers of statistical information and it is almost impossible to compare or validate the published information. There is no doubt that the organizations which work in the field are very much aware of the problem and are concerned about the need to improve the quality of the data.

In general, even if the existing data are not very accurate when considering their levels, they are probably more reliable when trends are analysed. In this paper we have tried to keep this idea in mind. So, instead of paying too much attention to the levels we have focused on their main trends. In any case, the existing data are the only available tools for researchers who wish to base their conclusions on objective analysis and who desire to avoid prejudices.

Worldwide supply of drugs

We supply data on the two of the most important drugs, cocaine and heroin. Fig. 3 presents data on the global production of cocaine and heroin since 1990. The production of cocaine is concentrated in three countries Bolivia, Colombia and Peru. Fig. 3 shows that the global production of cocaine has increased slightly (at an average yearly rate of 0.9%) since 1990. This slight increase is probably biased upwards because of data revisions in 2004 which makes the post-2004 not fully comparable with the preceding period. Thus, all in all it is fair to conclude that global production has stagnated over the period 1990–2006. This stagnating global production is the outcome of two opposing forces. First, the global coca leaf cultivation area has declined from approximately 210,000 ha

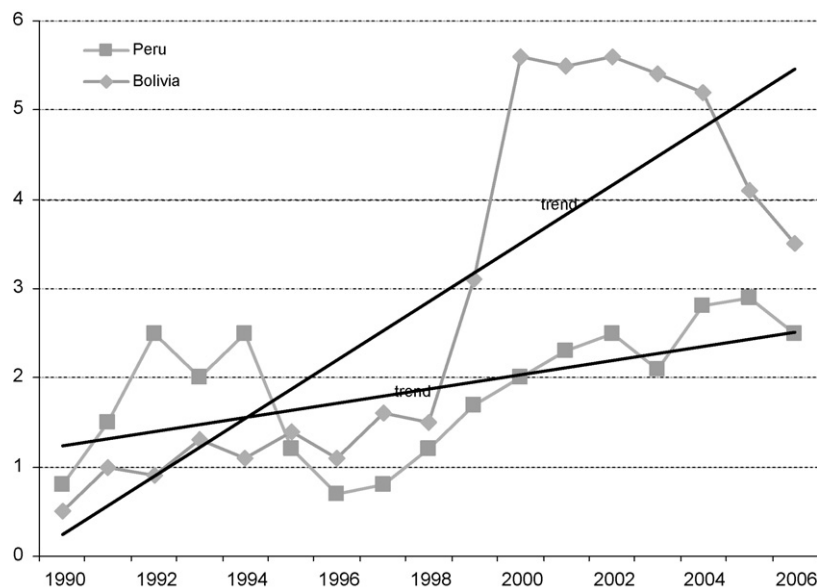


Fig. 4. Farm-gate prices for sun-dried coca leaves, 1990–2006 (US dollar, per kilograms). *Source.* United Nations, World Drug Report 2006 (pp. 250, 257) and 2007 (pp. 219, 203), Office on Drugs and Crime, New York. *Note.* Straight lines are trend lines estimated by OLS. The estimated equations are: Peru $Y=0.0797X + 1.1654$, where Y is the production and X is time, Bolivia $Y=0.3255X - 0.0824$, where Y is the production and X is time.

in 1990 to 160,000 ha in 2006. Second, this decline which was the result of eradication efforts was compensated by an increase of the average yield per ha.

The worldwide production of opium (used to produce heroin) is also shown in Fig. 3. The production of opium is concentrated in mainly three countries, Afghanistan, Myanmar and Laos. We observe a similar trend as in the cocaine market, i.e. a slight increase in worldwide production (at an yearly rate of 0.9%). As in the case of cocaine, this trend conceals two opposing tendencies. On the one hand, there is a significant decline in the worldwide area under cultivation from more than 250,000 ha in 1990 to about 200,000 in 2006. On the other hand, the international efforts at eradicating the cultivation of poppy have been countered by an increase in the yield per ha.

To conclude this discussion of the trends in production it is useful to analyse the price evolution at the producer level (“farm-gate prices”). The data that can be found are not as comprehensive as the production data. Also, the price data typically cover only part of the different producing countries.

In Fig. 4 we show the producer prices of coca leaves since 1990. Although yearly fluctuations in the three different countries can be quite different, an increasing trend in the producer prices can be detected from 1990 to 2006. We find that the average yearly rate of price increase was 4.2% in Peru and 11.4% in Bolivia, respectively.

The price data of opium are even scarcer. The UNODC collects the prices of dry opium in Afghanistan from 1997 to early 2007 only. It appears that over this period the price of dry opium has almost doubled (UN, World Drug Report 2007, Office on Drugs and Crime, New York, p. 198). Thus, in both the coca leaf market and in the opium market the evi-

dence suggests that producer prices have been on an upward trend.

Worldwide consumption of drugs

In Fig. 5 we present the evolution of the use of heroin and cocaine in the world. The general picture we obtain is that the world’s use of heroin and cocaine has been on an upward trend since the early 1990s. In Europe (including central Europe and Russia) the use of heroin and cocaine has increased faster than their worldwide use, while in the Americas the use of these same drugs has increased less fast than in the rest of the world. It should be stressed again that the quality of the data is poor. They are not data of consumption of drugs. The data relate to the number of people using drugs. We know very little about the dollar amounts spent by users.

Thus the picture we obtain from this analysis of drug use data and from the previous section’s analysis of the production side is the following. The increased demand for drugs (at the retail level) has put upward pressure on the producer prices. Production, however, has not increased much (in the cases of coca and opium) probably because of the efforts of eradication have reduced the cultivation areas. However, higher yields per ha have made it possible for producers to continue to supply slightly increasing amounts of drugs in the world markets.

From this analysis it appears that the sharp decline in the retail prices cannot easily be explained by the trends in world production and consumption. Indeed, the paradox we noted in the beginning is even stronger than we thought. Retail prices have declined dramatically despite an increase in the

producer prices during the same period. This leads us into an analysis of the intermediation margin.

The collapse of the intermediation margins

The spectacular decline in the retail prices of cocaine and heroin can only be explained by what happened with the intermediation margins in these markets. We show the evidence about these intermediation margins in Figs. 6 and 7. We first concentrate on the margin between the retail and the wholesale price. The latter is not the producer price but the price paid by the dealers in the consuming markets. Thus it can also be interpreted as the intermediation margin within the consuming country. We can call it the retail markup. We will analyse the margin between the wholesale price and the producer price subsequently.

Fig. 6 shows the intermediation margin between the retail and wholesale prices (retail markup) for cocaine and heroin. The decline of these margins is spectacular amounting to 50% or more from 1990 to 2005–2006. Only in the case of the US heroin margin, we observe that it declined by “only” 32% due to a surge in this margin during 2004–2006.

We obtain a similar result with the intermediation margins between the wholesale and the producer prices. These can be interpreted as the margins realized in the international trade of drugs. We can call these the import–export markups. We show these margins in Fig. 7. When computing these margins we assumed that the producer prices remained constant at their 2004 levels. We do this because we only have fragmentary information of these producer prices (see previous section). We know that these prices tended to increase though. Thus we tend to underestimate the decline of the margin.

Is there any evidence that the retail markups and the import–export markups declined at different speeds. In

Table 1
Reduction in intermediate margins (1990–2006)

	Import/export (%)	Retail (%)
Cocaine		
US	–70.0	–59.8
Europe	–56.2	–48.0
Heroin		
US	–71.5	–32.3
Europe	–78.5	–67.5

Source. Own calculations based on United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (pp. 223, 228).

Table 1 we compare the cumulative decline (in percent) of these markups. We observe that the import–export markups tended to decline faster than the retail markups since 1990. Except for the case of heroin in the US the differences are not very high though.

From the previous evidence it can be concluded that the spectacular decline in the retail prices of cocaine and heroin can be explained almost exclusively by the sharp declines in the intermediation margins between producers, wholesalers and retailers. Thus the story that can be told about the observed decline in retail prices is the following. For some reason (to be analysed in next section) the intermediation margins in the cocaine and heroin markets dropped spectacularly since at least 1990. This had the effect of reducing retail prices substantially. The latter then stimulated the demand for drugs by end-users. This increased demand in turn had the effect of pushing up producer prices for coca leaves and opium. As the producer prices make up only a tiny fraction of the retail value of drugs (even after the decline in the retail prices) the second round effect of the increased producer prices in the retail markets were extremely small.

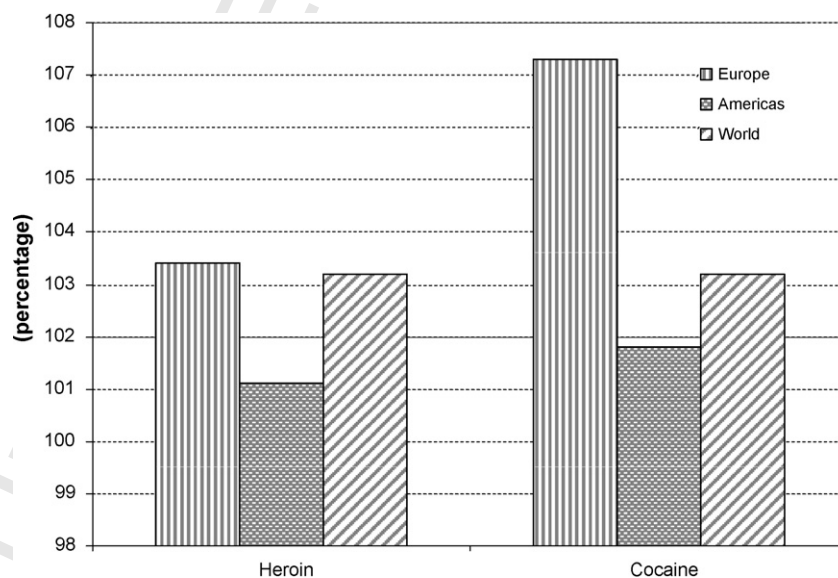


Fig. 5. Indices of drug use, 1992–2005 (baseline: 1992 = 100), Source. United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (p. 84).

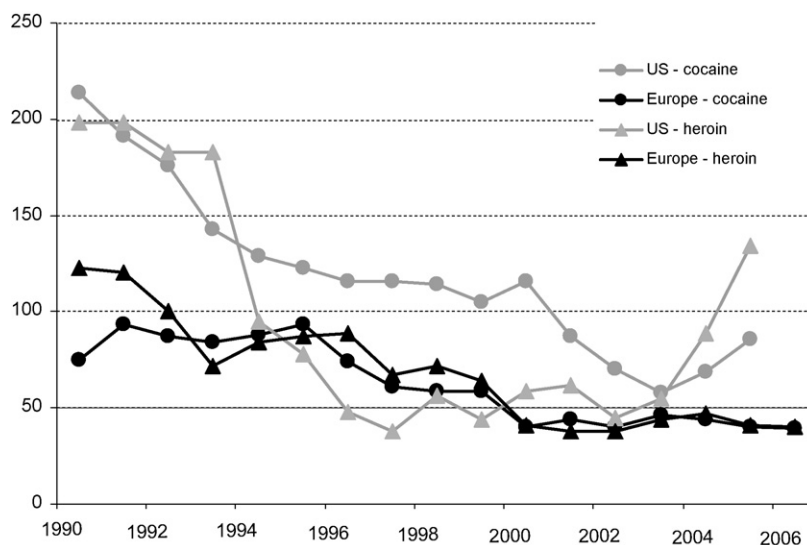


Fig. 6. Cocaine and heroin: margin between retail and wholesale prices 1990–2006 (US dollar, per gram), *Source*. United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (pp. 223 and 228) and own calculations. *Note*. margins are adjusted for inflation.

We now come to the question of why the intermediation margins declined so much, which leads us to the analysis of the effects of globalization on the drug market.

Globalization and the intermediation margins in the drug markets

Our hypothesis is that globalization has worked in three ways to reduce the intermediation margins in the drug business. The first one is the *market structure effect* of globalization. In a very general way globalization tends to open markets, thereby changing the market structure away from monopolistic towards more competitive structures. The the-

oretical foundation of this effect was developed by [Helpman and Krugman \(1985\)](#). They showed that in a model of monopolistic competition, the opening up of markets to international trade increases the number of firms entering the market. This in turn increases competition, lowers prices and increases consumption. In each country, the number of product varieties offered increases, but the consumption pattern will be more equal, i.e. consumers will face the same (but enlarged) consumption bundle. At the same time the production is likely to be more regionally concentrated ([Krugman, 1991](#)).

The drug business has been subjected to the same forces of globalization. The reduction of trade barriers and transport costs has led to a change in market structure, characterized by increased competition in the drug consuming countries,

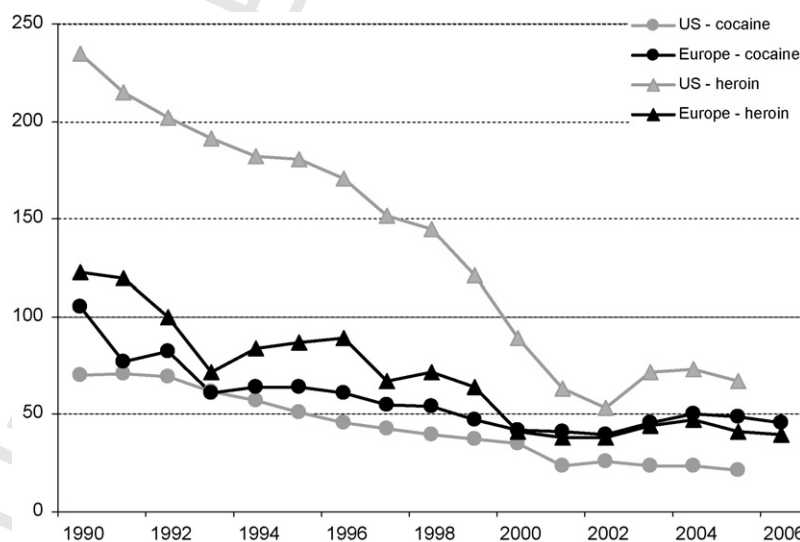


Fig. 7. Cocaine and heroin: margin between wholesale and producer prices, 1990–2006 (US dollar, per gram), *Source*. United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (pp. 223 and 228) and own calculations. *Note*: margins are adjusted for inflation.

lower intermediation margins and a greater worldwide spread of consumption, making the consumption more than before a worldwide phenomenon. At the same time, globalization has made it possible to concentrate the production in those regions of the world that have a comparative advantage in the production of these drugs. At the bottom of the cocaine and heroin production cycles this is particularly relevant. In these industries localization plays a big role due to both the importance of natural resource availability and to the lack of efficient law enforcement policies. Consequently, globalization allows for a high concentration of production at the farm gate level.

Clearly, these effects of globalization are not restricted to the drug business, but can be found in many areas of economic activity that are subject to the forces of globalization.

The second effect of globalization can be called the *efficiency effect*. Transport costs have been reduced and the use of the new IT has allowed to dramatically improve the efficiency of the distribution of drugs and made it possible to cut on the number of intermediaries. This new IT has also made the communication between demand and supply safer and quicker, leading to better stock management, and has much improved communication among dealers. In addition, the explosion in the size of international trade flows has made it possible to better conceal the transport and the distribution of drugs. Finally, the sophistication of the international

financial markets has greatly increased the scope for money laundering to remain undetected. All this has led to a decline in the cost of distributing drugs.

The third mechanism through which globalization has lowered the intermediation margin is through the *risk premium effect*. Globalization has opened the borders of many countries with a surplus of poor and low skilled workers. As a result, millions of “have-nots” who have little to loose, may have been attracted by the fantastic intermediation margins provided by the drug market. This massive entry into the business of transporting and distributing drugs by people who are willing to take risks may help to explain the decline in the risk premium.

It is clear that there is some interaction between these different effects of globalization, e.g. between the first and third effect. The inflow of new intermediaries driven by the increased worldwide supply of cheap labour has had the additional effect of increasing competition in the drug distribution, thereby changing the market structure. We also noted earlier a potential interaction between the efficiency and risk premium effects.

Empirical evidence for the globalization hypothesis

In this section we provide some evidence for the three effects of globalization identified in the previous section.

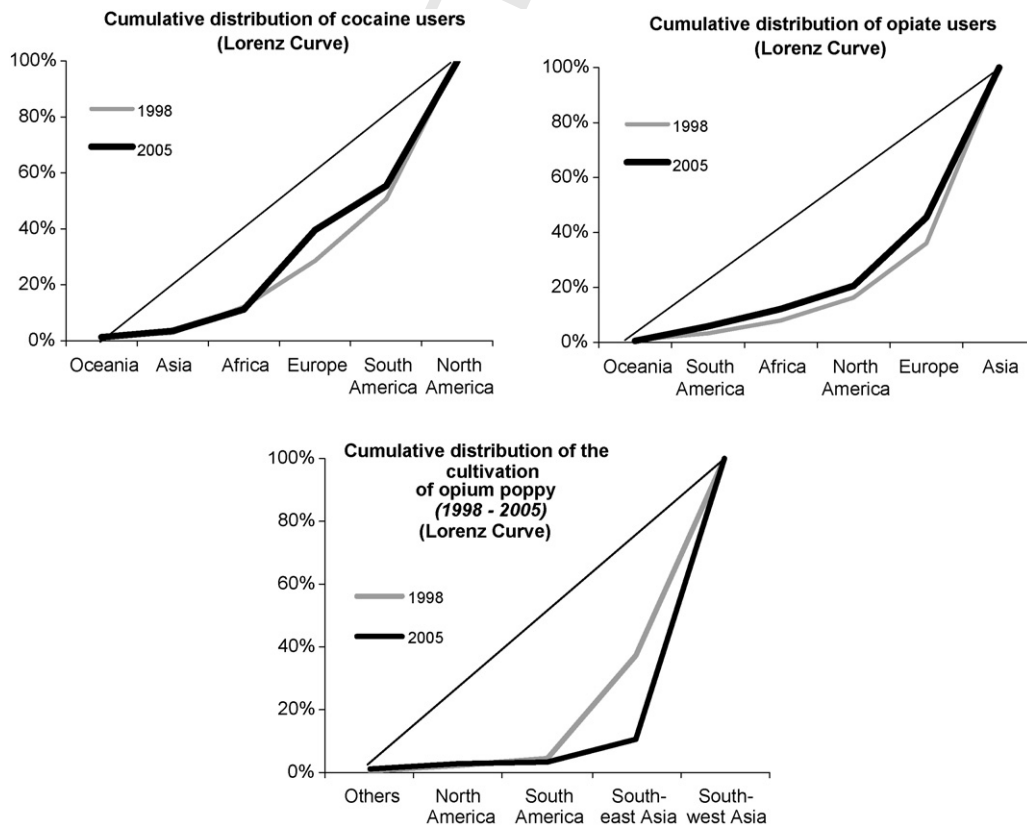


Fig. 8. Lorenz curves of the consumption and the production (cultivation) of drugs. Source: own calculations based on data from United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (pp. 40, 56, 64).

Some of the evidence will be direct (the first one); others will be indirect, due to absence of better data, which prevent us from testing these hypotheses directly.

The market structure effect

It is not feasible to test all the predictions of the market structure effect of globalization. For example, there is no direct information on the number of traffickers and its evolution over time, or on the degree of competition in the drug markets. We can only test a few of the predictions. We will focus on the evolution of the spread of consumption and production.

We first analyse the distribution of the consumption of cocaine and heroin in the world. We use consumption data aggregated at the level of continents in order to have a global perspective. We would have liked to use long time series, but these were not available. We had to restrict our analysis to the available period with a comparable set of data, 1998–2005. We computed the Lorenz curves and the associated Gini coefficients of the consumption by continents.

The Lorenz curve orders the consumption data by increasing use and plots the cumulative distribution. The Gini coefficients measure how concentrated versus dispersed the distribution can be. A Gini coefficient equal to 1 means complete concentration, so in our context it would mean that the consumption is concentrated in just one continent. A Gini coefficient equal to 0 indicates an equal distribution of consumption across continents.

The results are given in the top panel of Fig. 8 (Lorenz curves). We observe that the Lorenz curve has shifted upwards from 1998 to 2005 for both the consumption of cocaine and heroin, indicating that the consumption has become more equally distributed among continents.

The Gini coefficients confirm this. Concerning cocaine consumption the Gini coefficient declined from 0.51 in 1998, to 0.46 in 2005, which means that consumption became more spread in the world, over this period. The same conclusion holds for heroin consumption. The Gini coefficient of world heroin consumption declined from 0.62 in 1988 to 0.55 in 2005.

We did the same exercise for the distribution of the production. Concerning the cocaine production, we observe that production continued to be fully concentrated in one continent over the sample period (South America). So, the Gini coefficient has always been equal to 1 (full concentration). Furthermore, Fig. 8 (lower panel) shows the Lorenz curve for the production of opium poppy in 1998 and 2005. We find that the Lorenz curve has shifted downwards indicating that the production has become more concentrated. The Gini coefficients for opium production confirm this result, since it increased significantly from 0.62 in 1988 to 0.73 in 2005. The Gini coefficient of cocaine has remained equal to 1, over this period, meaning full concentration (cocaine is fully cultivated in South America.)

Thus, we are lead to conclude that the productions of cocaine and heroin have either maintained their extremely high level of concentration (cocaine) or have even increased it (in heroin case).

On the whole the evidence confirms that globalization is changing the drug markets structure. The increased trade has made these markets more global and, consequently, has intensified competition at the consumption level while it has allowed for more concentration on the production side.

The previous results may seem to introduce a paradox. On the one hand, by leading to concentration on the production side, globalization leads to less competition in the production market (tending to increase prices). On the other hand, it increases competition in the consumption market (tending to diminish prices). As a result the net effect on the retail prices could be indeterminate. However, as was noted earlier, the share of the producer price in the final (retail) price is so low that the price increasing effect of concentration at the producer level is overwhelmed by the enhanced competition in the transportation and distribution of drugs. Table 2 confirms this. It shows the shares in the final prices of local production, international trade and distribution within the consuming countries (US). We find for both cocaine and heroin that the intermediation margins (international trade, distribution within consuming countries) make up close to 99% of the final (retail) prices in 1997. This share has declined to about 98% in 2005 as a result of the decline in intermediation margins. However, these remain so large that the forces of competition in the distribution chain easily overwhelm the forces of concentration at the level of the production.

The previous evidence is based on a short time period. Thus, it should be interpreted cautiously. However, there is more indirect evidence supporting the market structure effect. This comes from the number of countries reporting drug seizures (see Fig. 9). It appears that the number of countries reporting drug seizures has increased by more than threefold since 1980, confirming that the use of drugs has become a global phenomenon, raising the concern of national authorities worldwide.

The efficiency effect

The efficiency effect was described as follows. Lower transport, communication and information costs have increased the efficiency of the intermediation in the drug business. In addition, lower transport costs have increased international trade in general allowing to better concealing drug trade. Finally, globalization has increased financial capital flows making it easier to make payments associated with drug traffic.

The evidence we provide in this section is indirect in nature. We could not find evidence on transport and information costs in the drug business, or on illicit payments. We found evidence of transport and information costs in general as it applies to international trade as a whole. There is little

Table 2
Share in value added

	1997		2005	
	Price (\$ per kg)	Share (%)	Price (\$ per kg)	Share (%)
Cocaine				
Producing country		1.0		1.7
Coca paste	610	0.4	910	0.8
Wholesale price	1500	1.0	1860	1.7
Export/import margin	38,500	25.7	18,640	16.9
Consuming country (US)		73.3		81.4
Wholesale price	40,000		20,500	
Retail price	150,000		110,000	
Heroin				
Producing country (Pakistan)		1.0		2.0
Opium (farm gate price)	90	0.0	NA	
Wholesale price heroin	2870	1.0	4159	2.0
Export/import margin	77,130	26.6	60,841	29.3
Consuming country (US)		72.4		
Wholesale price	80,000		65,000	68.7
Retail price	290,000		207,500	

Q9 Source. UNODC, World Drug Report (1997 and 2007), Office on Drugs and Crime, New York. Note: For cocaine, the producing country is Bolivia in 1997 and Colombia in 2005.

557 reason to believe that the general trends are different in the
558 drug trade.

559 Evidence about the general decline of transport costs in
560 international trade is obtained from the differences between
561 CIF versus FOB export values. These differences can be inter-
562 preted as reflecting transaction costs in international trade
563 (transport cost, insurance cost). David Hummels (1999) pro-
564 vides evidence showing that these differences have dropped
565 from a high of 13% (of FOB values) in 1949 to 2% in the
566 late 1990s. Thus while in the 1950s transaction costs in inter-
567 national trade represented about 13% of the (FOB) value of

568 exports, this percentage has dropped to 2% at the end of the
569 1990s.

570 The source of this decline is mainly the sharp drop in air
571 transport cost; not in sea transport cost which has not declined
572 much (in real terms) since the 1960s (see Hummels (1999)
573 who documents this in detail).

574 There can be no doubt that the sharp decline in transport
575 costs has contributed to the large expansion of international
576 trade. The latter has increased at much faster rates than GDP.
577 We show the evidence in Table 3. We see that the percentage
578 of trade in world GDP has increased from 39% in 1980 to

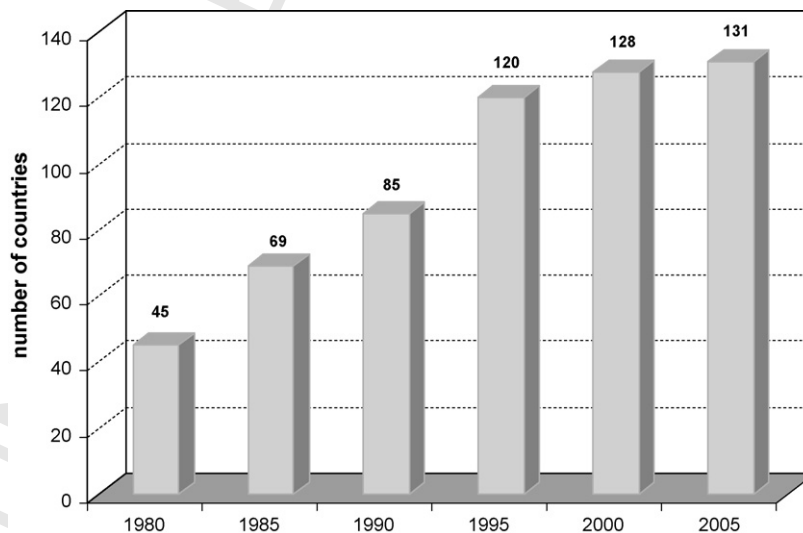


Fig. 9. Number of countries reporting cocaine seizures, Source. United Nations, World Drug Report 2007, Office on Drugs and Crime, New York (p. 70).

close to 50% in 2004. For developing countries the increase of international trade as a percent of their GDP has been even more pronounced, reaching almost 60% in 2004. This means that a significantly larger part of total production is now transported worldwide.

The increased international trade is likely to have had a significant effect on the intermediation margin. It has made it possible to conceal drug transport better. The “haystack” has become bigger every year making it more difficult to find the “needle”. From the point of view of the traffickers, the distribution of drugs has become more efficient. This effect may have been enhanced by the strong increase in international travel.

Furthermore, the intensity of international traffic of persons has also risen sharply in the last decades. Since human intervention is still required in the drug smuggling, the sharp increase of human mobility, due both to tourism and migration has contributed to better concealing of drug transport. We show in Table 3 how the flow of international tourists has quadrupled from 1980 to 2004.

Globalization has also led to an explosion of cross-border financial transactions. We show an indicator of cross-border financial transactions in the same Table 3. We observe that the *daily* turnover in the foreign exchange market as a percent of world GDP (which is a measure of production on a *yearly* basis) has increased from 0.7% in 1980 to 4.6% in 2004, a multiplication by 7. Since during this period world GDP increased from \$12 trillion to \$41 trillion, the daily turnover increased from \$82 billion in 1980 to \$1881 billion in 2004. This vast increase in cross-border financial transactions creates many more opportunities for the drug business to hide the nature of their transactions. (In this connection, see States, 1996 and especially Naím, 2005 for detailed descriptions of how globalization had changed the drug business).

Finally, globalization has also led to a significant reduction of information costs. We observe from Table 3 that international calls have tripled since 1990, and the use of internet has exploded. These phenomena have dramatically reduced information and communication costs, necessary for international transactions.

The risk premium effect

Finding direct evidence for this effect is even more difficult than for the previous one. There is, however, some indirect evidence available that tends to support the risk premium effect. There is first the evidence provided by Richard Freeman who has estimated that the opening up of China, India, Russia since the 1980s has doubled the world supply of cheap and unskilled workers (Freeman, 2005). Coupled with the increased possibility of international travel, this has increased the pool of individuals who have little to use and who want to profit from the large intermediation margins in the drug business.

The evidence of Table 3 also contains indirect evidence supporting the risk premium effect. The explosion of international travel can be seen as having expanded the pool of potential drug traffickers.

Finally, there is the number of drug seizures observed since 1990. The evidence provided by the Office on Drugs and Crime of the United Nations, (see World Drug Report 2007, New York) indicates that there is a dramatic increase in the worldwide seizures of heroin and cocaine. Since 1980 the number of worldwide seizures has increased by a factor of 10. (A similar phenomenon is observed with other drugs). Such an increase in seizures can be interpreted in two ways. First, it can be used as evidence that the effectiveness of law enforcement has increased. Second, it can be the result of increased trafficking. If the first hypothesis is the correct one, we should observe an *increase* in the intermediation margin. The reason is that more forceful law enforcement increases the risk of distributing drugs. The strongly declining margins observed in the previous section, however, cast doubts on this interpretation. We may then conclude that the large increases in drug seizures have also been influenced by increased trafficking. This lends support to our hypothesis that globalization has led to an increased supply of individuals willing to enter the drug distribution business. It also follows that the large increases in drug seizures have been insufficient to curb the surge in trafficking.

As mentioned earlier, there is a potential interaction between these effects. The worldwide increase in the number

Table 3
Globalization indicators (1980–2004)

		1980	1985	1990	1995	2000	2004
Exports + imports of goods and services	%World GDP	38.8	38.7	38.3	42	50	47.8
Developed countries	%GDP	39.8	39.9	38.1	40.5	48.2	45.3
Developing countries	%GDP	33.9	32.6	39.3	48.3	57.2	59.5
Daily currency exchange turnover	%World GDP	0.7	1.3	3.8	5.6	6.8	4.6
	Bill. US dollars	82	168	862	1641	2145	1881
International tourist arrivals	%World population	3.5	6.7	8.6	9.5	11.4	12.2
International calls	Minutes per capita	NA	NA	7.1	11.1	19.5	22.8
Users of internet	%World population	NA	NA	0.1	0.8	6.5	13.9
Developed countries	%Population	NA	NA	0.3	4	31.9	54.5
Developing countries	%Population	NA	NA	0.0	0.1	1.6	6.2

Source. Mauro Guillen, The Wharton School, University of Pennsylvania, 2005.

of persons willing to enter the drug business may have undermined local cartels in the distribution of drugs. As a result the market structure has become more competitive, which in turn has contributed to lowering the intermediation margin.

In concluding this section, we want to stress again that most of the evidence about how globalization has affected the intermediation margins in the drug business is indirect. More research will be necessary to confirm this hypothesis.

Globalization and inflation

The effect of globalization on the retail prices of drugs is not an isolated phenomenon. There is a large academic literature analysing the impact of globalization on the rate of change of consumer prices (inflation) in general even in situations where there are some very strong pressures to increase inflation as during the last oil crises. There is a broad consensus that globalization has tended to put downward pressure on the consumer price indices of the industrial countries. One of the mechanisms is akin to the market structure effect we identified in the previous sections. Globalization has increased the intensity of competition. The new industries emerging in Asia compete ferociously with older industries in the developed countries. This tends to lower import prices and to reduce profit margins in the import competing industries of the developed countries. As a result the aggregate price levels in these countries tend to decline.

There are other mechanisms leading to a downward pressure on the consumer prices. In particular, the integration of the low wage workers of China, India and other Asian countries has exerted a downward pressure on wage levels in the developed countries. This has tended to reduce the rate of growth of consumer prices. For an analysis of these effects see Rogoff (2004), BIS (2006), IMF World Economic Outlook (2005), Borio and Filardo (2006), Kohn (2006).

Thus the way globalization affects the general price level in developed countries is similar to the mechanisms that operate in the drug markets. The difference is one of size of the effects. The effect of globalization on the aggregate price indices has been smaller than the effects on the retail prices of drugs. The IMF (2005) for example, estimates that globalization may have reduced inflation by 1% per year. When one accumulates this over a 15-year period this would amount to a decline of the consumer price levels of approximately 20%. This is sizable but still significantly lower than the 50–80% decline in the retail price of drugs during the last 15 years. It should be noted, however, that in individual markets, e.g. textile, computers, price declines of similar magnitude as in the drug markets have been recorded.

Policy implications

We provided some evidence that the forces of globalization may have contributed to the large declines in the

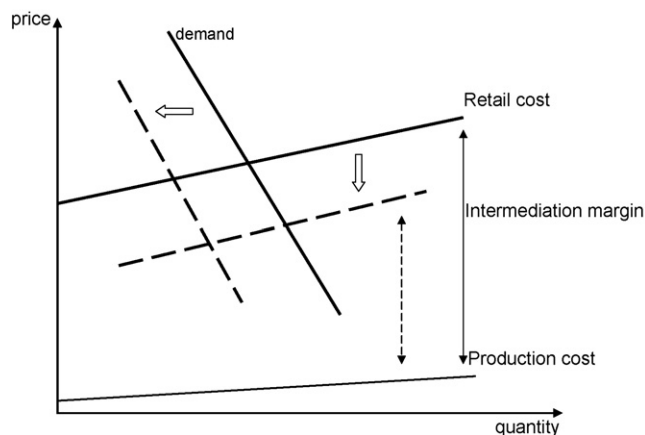


Fig. 10. Effects of demand policies.

retail prices of drugs (cocaine and heroin). This together with the evidence about the price elasticity of the demand for drugs suggests that globalization may have contributed towards increasing drug use. Thus globalization has conflicted with the stated objectives of governments in the world. Almost everywhere these governments aim at reducing drug use.

These governments have followed different approaches towards achieving the objective of a lower drug use. A first approach consists in containing supply by law enforcement measures (control and interdiction of production and distribution). A second approach consists in undertaking measures that reduce demand for drugs (prevention, information, education, treatment and harm reduction).

Most governments use a combination of these two types of policies. Some put more emphasis on supply policies while others focus more on demand policies. Within the spectrum of demand reduction policies, there are other intermediate objectives that governments may intend to attain in the combat of drug use, such as harm reduction (some governments give harm reduction a central place in their overall drug policies; other governments give it only scant importance). Nevertheless, the role of harm reduction in drug policies is outside the scope of this paper.

The results of our paper allow us to draw a tentative conclusion on the relative effectiveness of the two main approaches to drug combat in the context of a globalized environment, namely demand versus supply reduction policies.

Our conclusion is that globalization has tended to make demand policies relatively more effective than supply policies. We show this in the context of the model of demand and supply of drugs in Fig. 10. We assume that globalization continues to induce a decline in the intermediation margin. Graphically, the retail supply curve continues to shift downwards. As a result, demand is stimulated further. These forces of globalization tend to undermine the effectiveness of supply containment policies. The reason can be seen as follows. Supply containment policies tend to raise the margin between retail and producer prices. In the absence of globalization

749 this would raise the retail supply curve upwards. Globaliza- 802
 750 tion, however, greatly reduces this upward movement, and on 803
 751 balance continues to push it downwards. The main reason fol- 804
 752 lows from a paradox contained in supply policies: as the latter 805
 753 raise the intermediation margin, they increase the profitabil- 806
 754 ity of the drug business and thus they tend to attract many 807
 755 new agents seeking to capture the enlarged profit opportuni- 808
 756 ties (see Becker, Murphy, & Grossman, 2004 who shows that 809
 757 if the demand of illicit drugs is relatively inelastic, interdic- 810
 758 tion and law enforcement will actually increase the resources 811
 759 devoted to the supply of drugs). 812

760 The reduced effectiveness of supply policies in a world 813
 761 of globalization creates the scope for an enhanced use of 814
 762 demand policies. Even if the latter are not more effective than 815
 763 before, their *relative* effectiveness may have increased. We 816
 764 show the effects of demand policies in Fig. 10 by a downward 817
 765 movement of the demand curve. We also note that the high 818
 766 elasticity of the retail supply curve has the effect of making 819
 767 this shift in the demand curve relatively effective in reducing 820
 768 demand because it has only a very small impact on the price 821
 769 of drugs. These policies can be used to counteract the effects 822
 770 of globalization on the supply curve. 823

771 This conclusion, it should be stressed, can only be ten- 824
 772 tative. More research effort should go toward analysing the 825
 773 conditions in which demand policies can be made to work. 826
 774 Furthermore, the development of comparative empirical anal- 827
 775 ysis on the success of different drug policies on prices of drug 828
 776 should be of much use. Unfortunately, fundamental data are 829
 777 still missing on this issue to allow for a comprehensive anal- 830
 778 ysis. In addition, our conclusion does not imply that supply 831
 779 containment policies should be abandoned. These are likely 832
 780 to remain an important part of any drug policy aiming at 833
 781 reducing drug use.

782 Conclusion

783 The retail prices of major drugs like cocaine and heroin 834
 784 have declined dramatically during the last two decades. 835
 785 This price decline has tended to offset the effects of drug 836
 786 policies aimed at reducing drug use in major industrial 837
 787 countries.

788 The main finding of this paper is that the decline in the 838
 789 retail prices of drugs is related to the strong decline in the 839
 790 intermediation margin (the difference between the retail and 840
 791 producer prices) in the drug business. This margin has tended 841
 792 to decline by more than 50% since 1990 in the US and in 842
 793 Europe. 843

794 We developed the hypothesis, and gave some evidence, 844
 795 that globalization has been an important factor behind the 845
 796 decline of the intermediation margin. Globalization has 846
 797 achieved this effect in three ways. We called the first one 847
 798 the *market structure effect*. The lowering of trade barriers 848
 799 and transport costs has opened up markets and has led to a 849
 800 worldwide spread of the use of drugs, while the production 850
 801 of drugs has become more concentrated. This has increased

802 the intensity of competition in the markets of the consuming 803
 804 countries, reducing the intermediation margins. 805

806 The second effect was called the *efficiency effect* of glob- 807
 808 alization. Lower transport costs and the use of the new IT 808
 809 have allowed to dramatically improve the efficiency of the 809
 810 distribution of drugs. In addition, the greater efficiency of 810
 811 the distribution process had the effect of making it easier to 811
 812 conceal the transport and the stock management of drugs. 812
 813 Finally, the vast increase of cross-border financial transac- 813
 814 tions has helped traffickers organizing more efficient payment 814
 815 networks. 815

816 The third mechanism through which globalization has 816
 817 lowered the intermediation margin is through the *risk pre- 817
 818 mium effect*. Globalization has opened the borders of many 818
 819 countries with a surplus of poor and low skilled workers. Mil- 819
 820 lions of “have-nots” who have little to loose, may have been 820
 821 attracted by the fantastic intermediation margins provided by 821
 822 the drug market. This massive entry into the business of trans- 822
 823 porting and distributing drugs by people who are willing to 823
 824 take risks helps to explain the decline in the risk premium. 824

825 We concluded with some thoughts about the effects 825
 826 of globalization on the effectiveness of drug policies and 826
 827 argued that globalization may have increased the *relative 827
 828 effectiveness* of policies aiming at reducing the demand of 828
 829 drugs. 829

830 It is clear that more empirical research will be necessary 830
 831 to estimate the impact of globalization on the intermediation 831
 832 margins in the drug business. Our estimates have been mainly 832
 833 indirect, and are in need of further confirmation. 833

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