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The Global Rate of Interception of Illicit Opiates and Cocaine 1980–94

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Introduction

This paper presents a methodologically simple means of deriving global interception rates for opiates and cocaine, and some preliminary interpretation. Global production and manufacturing estimates are compared to global seizure reports to estimate the proportion of illicit drug trafficking that is intercepted. While cocaine and heroin manufacturing and trafficking have increased rapidly over the last decade, the proportion of global cocaine trafficked that was intercepted increased rapidly in the 1980s, and is greater than that of opiates. In the first half of the 1990s, perhaps a third or more of the cocaine that was trafficked was intercepted, compared to less than a fifth of opiates. The differences are relatively easily explained in terms of increased enforcement effort by the United States, increasing the proportion of trafficking intercepted within source countries as well as internationally. An interception rate appears to be a straightforward performance indicator for enforcement efforts. However, as previous studies have argued, the dynamics of trafficking by essentially rational economic actors, are such that interception does not cause a proportional reduction in consumption, and may even drive increases in crop cultivation and illicit manufacturing. In addition, the actual interception rate for opiates and cocaine appears to be far below that which would be necessary to make illicit trafficking unprofitable. It is suggested that the global interception rate may present a useful baseline indicator with a variety of applications for the closer examination of international drug policy.

Data Sources and Method

The two data sources are the most comprehensive datasets currently available relating to global estimates of illicit production and manufacture, and global seizures of drugs in the illicit traffic. Both have strengths and weaknesses that deserve brief description.

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The main source of estimates of illicit crop cultivation, drug production and manufacture remain those of the United States State Department, and are used by many academic commentators, such as Paul Stares, LaMond Tullis, Peter Reuter and colleagues from the RAND corporation.\textsuperscript{3} It is acknowledged by the State Department that ‘the picture is not as precise as we would like it to be’,\textsuperscript{4} since, due to difficulties in measuring hectarage of cultivation and yield, production estimates are not perfect, and are sometimes at odds with estimates from other sources. A publication by the Peru Field Office of the United Nations International Drug Control Programme (UNDCP) gives an estimate for Peru of 298,000 hectares under coca bush cultivation, and over 199,000 in production, compared to the US estimate of 108,600 hectares in production.\textsuperscript{5} The limitations imposed by data quality are acknowledged, and while they may be reduced in future, some will always remain due to the covert nature of the illicit drug industry. It is despite these limitations that the US data currently remains the principal reference point for estimates of the global production and manufacture of opiates and cocaine.

The seizure data used in this paper are taken from United Nations public documents. It is intended that ‘the publication of technical data ... meets the needs of researchers, enterprises and the general public’,\textsuperscript{6} and the UN make available, from official documentation centres, a range of annual data collated by UNDCP and the International Narcotics Control Board (INCB).\textsuperscript{7} While not all countries report seizures to the United Nations on an annual basis, the UN seizure reports are supplemented with information collated by ICPO–Interpol and the World Customs Organisation (WCO).\textsuperscript{8} Since Interpol and WCO are the principal collation points for international law enforcement data relating to drugs, the UN statistics provide what is probably the most comprehensive set of global seizure data currently available.

With respect to the future of global drug production estimates, concerned researchers will be comforted to learn of preliminary efforts by the United Nations to estimate poppy cultivation in Afghanistan, and Vietnam, with the possibility of further surveys.\textsuperscript{9} While these surveys are not yet available in the public domain, it is significant that UNDCP has engaged in a dialogue with the US State Department regarding findings and issues of methodology, particularly since the two UNDCP ground-surveys of opium poppy cultivation in Afghanistan gave far higher estimates than the US remote sensing methods. While remote sensing may be technically sophisticated and efficient for use in sample areas, the aggregate figures for a country are also determined by the sampling method, whereby the areas are selected from which estimates are generated. It is to be hoped that, from
now onwards, the continuation of parallel estimates from different sources will reduce the scope for assertions that drug crop estimates are significantly influenced by political factors.

Both production and seizure data estimates reported at the country level were simply aggregated for the purposes of this paper. For opiates, reported seizures of heroin and morphine were converted to opium equivalent, using a standard conversion rate average of 10 kilograms of opium to one kilogram of heroin or morphine. For potential cocaine manufacture, coca leaf production estimates were converted to cocaine equivalents to facilitate comparison with seizures, using the estimate of 350 kilograms of leaf to one kilogram of cocaine. Particularly in relation to production data, a range of estimates was available, in which case a mid-point was used to generate a single point-estimate.

Opium, coca leaf, heroin and cocaine are consumed to varying degrees close to production and manufacturing areas. While the amount consumed locally would not reach the international traffic, interception within source countries is included in the global seizure data. Consequently, the global interception rate generated is a composite indicator of enforcement efforts to intercept trafficking across the board: within source countries; between production and manufacturing sites; and internationally in relation to transit states, and prior to and within countries of destination.

Global Production and Seizures

Opiates

Opium is illicitly produced mainly in three regions: the Southeast Asian region, including Myanmar, the Lao People’s Democratic Republic, Vietnam, and Thailand; the Southwest Asian region, primarily Afghanistan and Pakistan; and the Latin American region, primarily Colombia and Mexico. Estimates of potential global opium production, and global reported seizures, are shown as Figure 1 for 1980 to 1994.

The main changes in heroin manufacturing since 1980 have been the vast overall increases at the global level, mainly reflecting increases in Myanmar and Afghanistan, and the rapid increase in opium production and heroin manufacturing in Colombia in the 1990s. In the 1990s there have been reports of illicit opium production also occurring in the Central Asian Republics. Within the global trend there have been some specific instances of reductions in production and trafficking caused by reduced poppy cultivation, such as in Lebanon.
With regard to international heroin trafficking, Southwest Asia supplies the bulk of the European market, and Southeast Asia and Latin America supply the North American market. Seizure data suggest that between 80 and 90 percent of heroin entering Europe between 1992 and 1994 came from Southwest Asia, and travelled through Turkey along the Balkan Route, and that 57 percent of heroin trafficked to the United States in 1994 was from Southeast Asia, 32 percent from South America, 6 percent from Southwest Asia, and 5 percent from Mexico. 10

**FIGURE 1**

GLOBAL ILLICIT OPIUM PRODUCTION
AND SEIZURES 1980–94

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Seized</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>1000</td>
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</tr>
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<td>0</td>
</tr>
<tr>
<td>94</td>
<td>3800</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: see text.

Note: Heroin and morphine converted to opium equivalents.

Since Figure 1 did not make the trend in seizures particularly distinct, Figure 2 shows global seizures of heroin, morphine and opium, all as opium equivalent, with a regional breakdown. The regional categories presented are those used in United Nations documentation of seizures up to 1995, and are fairly straightforward geographically. While full listings are given in the UNDCP publications, for clarification, the key players included in the ‘Near and Middle East’ are Afghanistan, Iran, and Pakistan, while Turkey is included in Europe.
There have been changes in the regional distribution of seizures. Only ninety two tonnes opium equivalent were seized in 1980, compared to nearly 642 tonnes in 1993. Opiate seizures appear high in 1993, due to large amounts reported seized in Iran and Turkey. Of the 562 tonnes seized in 1994, 60 percent was seized in the Near and Middle East, 19 percent in Europe, 16 percent in Asia and the Pacific, and 5 percent or 28.1 tonnes in all of the Americas. From 1980 to 1994, only up to five tonnes opium equivalent (less than half a tonne of heroin) was reported, for any given year, as seized in either Africa or the South Pacific, and in 1994 the two regions accounted for 1 percent of the total amount seized.

Cocaine

Estimated global cocaine manufacture, and law enforcement seizures, are shown as Figure 3 for the period 1980 to 1994. In spite of some cultivation in other Latin American countries, almost half of all coca leaf currently appears to be produced in Peru, and around a quarter each in Bolivia and Colombia. Many farmers manufacture coca paste in order to add value to
the product before sale to middlemen and traffickers who transport it, mainly to Colombia, for the manufacture of cocaine. However, the proportion of cocaine manufactured in Bolivia, and particularly Peru, is increasing, which is attributable both to a recognition of the greater profit to be made from manufacture and trafficking, as well as government interception efforts at the borders between these countries. From the relatively concentrated manufacturing base, trafficking routes open wide, and cocaine is transported to the North American, and to a lesser extent, the European, markets, by a variety of routes and methods, from different parts of Latin America. Potential cocaine production increased around fourfold between 1980 and 1992, but declined to between 800 and 1200 tonnes in 1993 and 1994.

**FIGURE 3**
GLOBAL ILLICIT COCAINE MANUFACTURE AND SEIZURES 1980–94

Source: see text.

Note: Coca leaf seizures converted to cocaine equivalent (constituted 9 per cent).

The regional picture of trafficking derived from seizure data, shown in Figure 4, has been consistently highly skewed towards the Americas. In 1994, 290.3 tonnes of cocaine were seized globally, 90 percent of it in the Americas, and 10 percent in Europe. In Africa, the Near and Middle East,
and Asia and the Pacific, one tonne of cocaine was seized in 1994, of which over half was seized in Australia.

**FIGURE 4**
GLOBAL COCAINE SEIZURES BY REGION 1980–94

![Graph showing global cocaine seizures by region from 1980 to 1994.](image)

- **All other regions**
- **Europe**
- **Americas**

*Source: see text.*

Four countries accounted for around 80 percent of the 290 tonnes of cocaine reported as seized in 1994, shown in Figure 5. The United States and Colombia accounted for 59 percent of the amount of cocaine reported seized globally. Seizures reinforce intelligence reports of Mexico, Brazil, Panama, Venezuela, and Ecuador being important transit routes for cocaine moving towards markets in the United States and Europe, the Dominican Republic on the Caribbean transit route, and Argentina a transshipment point for cocaine en route to European destinations. It is despite these interception efforts that consumption indicators suggest that the United States remains the principal target for cocaine traffickers.

While the absolute amount of cocaine intercepted in Europe was far lower than that in the Americas, it increased quickly in the mid-1980s, stabilised somewhat in the early 1990s, and rose in 1994 to over 28 tonnes. Cocaine retail and wholesale prices, in contrast, declined fairly steadily in a
similar manner to those of heroin. In 1994, the European average real retail price of cocaine was about 45 percent of the 1983 price. 11

FIGURE 5
GLOBAL COCAINE SEIZURES IN 1994

metric tonnes
United States 100.8
Colombia 69.6
Europe 28.4
Mexico 22.1
Brazil 11.9
Peru 10.6
Bolivia 10
Panama 8.8
Canada 8.4
Venezuela 8.3
Dominican Rep. 7.2
Argentina 4.2
Ecuador 1.8
Costa Rica 1.4
Chile 1.2
All others 7.4

Source: Annual reports questionnaires to The Secretary General; WCO; ICPO.

The Global Interception Rate 1980–94

Figure 6 shows the estimated global interception rates for opiates and cocaine for 1980 to 1994. The interception rate is the percentage of estimated production that was seized. As discussed above in relation to the data source and method, there will be an error factor in the rates that derive from uncertainty regarding the original production estimates. This is an uncertainty which will always exist and is the case with most information relating to the illicit drug industry. However, if such errors hold constant over time then, at the very least, a relatively accurate picture of trends is provided.
The global interception rate for heroin fell from around 15 percent in 1980, wavered around 10 percent as heroin trafficking increased in the mid-1980s until the early 1990s, and moved back to over 15 percent in 1993 and 1994. The more recent increase could reflect an adjustment of the balance of enforcement resources towards the Balkan Route. In contrast, the estimated interception rate for cocaine was much lower in the early 1980s at less than 5 percent, rose fairly consistently despite increased trafficking through the 1980s, and appears to have stabilised at around 30 percent or greater in the 1990s. The differences between the interception rates for the two drugs, the impact upon production, manufacturing and trafficking, and the possible policy implications, are areas that deserve further delineation.

Impact of Interception Upon Production, Manufacturing, and Trafficking

The difference between the interception rates, and the increased cocaine interdiction rate almost certainly reflect, in large part, greater emphasis on
interception of international trafficking, and the strengthening of enforcement efforts within source countries. These both may largely reflect large expenditure by, and pressure upon source countries from, the United States. However, despite the estimated global interception rate for cocaine increasing around sixfold in Figure 6, because estimated production trebled, the potential amount reaching consumers almost doubled.

Figure 6 suggested that around a third of cocaine trafficked has been intercepted annually in the 1990s. The impact upon the profitability of trafficking would be expected to be great. It might be expected that, in time, the economic feasibility of trafficking would decline, and trafficking along with it. The fact that trafficking has not only continued, but increased, seems counterintuitive. The most likely explanation is the huge variation in drug prices across the chain between production and consumption, since the bulk of the economic costs that interception efforts impose are absorbed prior to the retail distribution stage. The replacement costs of intercepted drugs are low in relation to the profit that is made upon sale, and the wages of couriers, while far higher than earnings from licit alternatives, are small in comparison to the value of their cargo. Many of these and related issues have been discussed elsewhere, but it is hoped that the additional empirical evidence presented here, and the global perspective across drug types, may shed some further light on the issues. The 'value added' at different points in the chain between production and consumption are shown in Figures 7 for heroin trafficking between Pakistan and the European market, and in Figure 8 for cocaine travelling to the United States Market. The retail cocaine price used in Figure 8, a mid-point of the range reported to UNDCP by the United States for 1994, is lower than the estimates for the US published by Rhodes, Hyatt and Scheimann, and so may give a conservative estimate of value-added in the later stages of distribution.

Since the bulk of value added to, or 'mark-up' in, drug prices, occurs in the latter stages of distribution, replacement of intercepted international drug trafficking appears relatively cheap and economically rational to traffickers, a point developed further below. While the interception of trafficking within source regions appears attractive because shipments are larger and less dispersed than in the international traffic, the proximity to the production source means that the replacement costs of the drugs to traffickers are relatively small.
FIGURE 7
GENERATION OF ‘VALUE ADDED’ OF HEROINE IN DISTRIBUTION NETWORK TOWARDS EUROPE (1992)

Source: see text.

FIGURE 8
GENERATION OF ‘VALUE ADDED’ OF COCAINE IN DISTRIBUTION NETWORK TOWARDS UNITED STATES (1992)

Source: see text.
What interception rate would be required to drive out traffickers?

The reason that intercepted drugs are replaced appears to be due to the fact that, upon sale in developed countries, only a small fraction of cocaine trafficked covers the costs of the large amounts of cocaine and heroin that are intercepted. A kilogram of cocaine in Colombia in 1992 cost around $US 2,000, but had a wholesale price in the United States of $US 11,000 to $US 42,000, and a retail value between $US 15,000 to $US 150,000. From such information, an interception rate required to drive trafficking out of the market can be estimated, even if crude and utilising a limited number of variables. If traffickers received only the middle of the range of the estimated wholesale price, each courier transported 1 kilogram and was paid $US 4,000 per trip, then, only one successful trip would have to be completed for every three intercepted in order for traffickers to break even. While prices vary over time and space, in this conservative example, the interception rate would have to be at least 75 percent to eliminate the economic viability of organised trafficking. This is almost certainly an underestimate. If any of the profit from retail sale returns to trafficking organisations, perhaps from connected cells of retail distributors, then the profitability of international trafficking is greater. If the mid-point of the retail value is returned to traffickers, then 1 successful trip would cover around 13 intercepted trips, and the interception required to make traffickers break even would be around 92 percent. While 75 percent and 92 percent are not minimum and maximum constraints, it does not seem unreasonable to assume that reality may lie somewhere between the two. If this were the case, then it seems highly improbable that a rate of interception sufficiently high as to make trafficking unprofitable, could ever be achieved.

Impact of interception upon opium poppy and coca bush cultivation

Rapidly increasing cocaine seizures are an indication of the immense effort of enforcement agencies in the Americas in recent years. However, an inadvertent side-effect of these efforts to intercept international trafficking may be that, as some of the seized drugs are replaced, if demand is not reduced through interception, then seizures can have the inadvertent effect of stimulating illicit cultivation. To the extent that this occurs it would impose a proportional reduction upon the impact that seizures have upon reducing supply. Hence in the medium term, the impact of interception upon illicit supply is effectively negated.
Deterrent and price effects of interception

The discussion in this section so far may under-state the role that interception plays with respect to two preventive mechanisms. The deterrent effect deriving from the risk of interception and arrest is difficult to isolate, in quantifiable terms, from the more general deterrent effect of prohibition and other enforcement measures. Similarly, interception, along with prohibitive laws and other aspects of enforcement, plays a role in maintaining the prices of illicit drugs. Though retail prices of illicit heroin and cocaine have declined fairly steadily throughout the 1980s and 1990s in the United States,\textsuperscript{17} and in Europe,\textsuperscript{18} they are still far above the price of these drugs on the licit market. An independent comparison of the 1990 prices of illicit heroin to licit morphine, and of illicit cocaine to licit cocaine, suggests that illicit market prices in the United States were, respectively, 70 and 8 times greater.\textsuperscript{19} It is via the mechanism of these high prices that demand and consumption are, in theory, reduced.

Displacement of drug trafficking relative to other types of crime

Viewing drug trafficking in a wider criminological perspective, it seems likely that displacement of trafficking, and replacement of drugs and traffickers, is almost certainly greater than it would be for the displacement of many other types of crime that are prevented. There is increasing evidence that crime prevention efforts against many types of crime, from burglary and car crimes through to domestic violence, result in far less than complete, and sometimes minimal, displacement.\textsuperscript{20} A difference in the likelihood of displacement with respect to drug trafficking may arise because of the more organised and less opportunistic nature of drug trafficking, and the transnational inter-related chain of ‘value-added’ stages that provide additional economic driving forces for trafficking. This latter ‘value-added’ aspect, and the possibility that consumer demand may be less flexible to change in drug prices than for other illicit products, may distinguish drug trafficking from other types of transnational organised crime. While these are issues that deserve further exploration, the implication is that is is possible to be far more optimistic in relation to the prevention of many types of crime, including other organised crimes, than in relation to drug trafficking.
Conclusions and Possibilities for Future Research

The two objectives of this paper were (1) to present a method for deriving a global interception rate, while acknowledging its limitations and possibilities for improvement, and (2) to develop and describe apparent trends in the interception rate between 1980 and 1994 for opiates and cocaine, shown as Figure 6. It is hoped that this may open up avenues for further research. The first and most obvious is the monitoring of interception efforts over time and space. The rates generated here present baseline indicators for comparative purposes. A second possibility might be to try and link this to some measure of cost-effectiveness of enforcement, such as that developed in the innovative work of Wagstaff, Sutton and Maynard in the UK. A next step might then be to attempt to tease out the impact of different types of enforcement, at different stages in the trafficking chain, and upon consumption.

A third research possibility might be to relate revealed post-interception trends in global trafficking to global and regional trends in consumption. While it appears that twice as much cocaine was passing through the enforcement net in 1994 as in 1980, indicators of consumption in the United States have suggested declining per capita consumption in at least those areas of the population covered by the National High School Senior Survey, and the National Household Survey of Drug Abuse. However, the prevalence of frequent users, who account for the bulk of consumption, remained far more stable. European indicators suggest that cocaine use in Europe increased over the same period, and the interaction between these regional changes may deserve further exploration.

A more difficult research prospect would be the development of interception rates for other types of illicit drug. The simple method used here might not be appropriate, since global estimates of cannabis cultivation, from which production estimates are derived, are not as readily available as those of opium poppy and coca bush. Estimates for other illicit drugs, including the amphetamine-type stimulants, LSD, methaqualone and other depressants, are even more difficult to come by since they have their origins in clandestine synthesis, and diversion of drugs from licit channels, rather than cultivation. These are only a few possibilities for research, and others could emerge in due course. Nevertheless, the global interception rate may prove a useful baseline indicator with a variety of applications for the closer examination of international drug policy.
NOTES

1. Thanks are due to Kalman Szendrei, Peter Storr, Jeff Hart, Thomas Pietschmann, Patrick Seramay and Thomas Larque of UNDCP, for comments and criticisms of aspects of the work. Views expressed and terminology used are not necessarily those of the United Nations or the University of Huddersfield.

2. ‘Production’ is taken to refer to the separation of opium, coca leaves, cannabis and cannabis resin from the plants (i.e. harvesting), and ‘manufacture’ all processes, other than production, by which drugs are obtained, including refining and transformation. For simplicity, these definitions are in line with those of the 1961 United Nations Single Convention on Narcotic Drugs (article 1).


7. See, for example, UNDCP, Seizures of Narcotic Drugs and Psychotropic Substances in 1993. Document v.95–51704, UNDCP/1995/NS. (Vienna: United Nations, 7 March 1995). Global seizure data, and prices of heroin and cocaine, as reported to UNDCP, are also available in spreadsheet format on disc from: Patrick Seramy, Room E1526, Technical Services Branch, UNDCP, P.O. Box 600, Vienna International Centre, A1400 Vienna, Austria. Seizure data dating from 1980 are annual data by country an drug type, and wholesale and retail price data (with some information on purity) are available, by country, from 1983.

8. UNDCP, Seizures of Narcotic Drugs and Psychotropic Substances in 1993, p.3.


14. Source for Figure 8: G. Farrell and P. O’Brien, ‘Estrategias para la reduccion de oferta de drogas ilicitas’ (Illicit Drug Supply Reduction Strategies), Debate Agrario, Peru, 22, 81–117, 1995, and annual reports questionnaires to the CND. The categories of the original data presented in Figure 8 differ marginally from those in Figure 7. The F.O.B (Fresh On Board) Producer price uses the Colombian wholesale price of cocaine, and the value added for
'international trafficking' of cocaine is derived from the US wholesale price. As the closest approximations available for comparison with the stages presented for heroin in Figure 7, these categorisations are not misleading, and any specific discrepancies and more than outweighed by the magnitude of the value-added at each stage.


16. Total costs are $6,000 per trip ($2,000 for wholesale cocaine purchase, $4,000 for the courier) for cocaine of potential retail value $27,500, leaving net profit of $21,500, so that using these crude estimates one successful trip would cover the cost of 3.58 intercepted trips. This may be slightly lower if other costs are incurred, and so a figure of 3 trips is given in the text.


