

Can Production and Trafficking of Illicit Drugs Be Reduced or Only Shifted?

Peter Reuter

Cocaine and heroin are produced in poor countries and exported to consumers in both poor and rich countries, where their consumption and sale cause considerable damage in the form of crime, disease, and addiction. The producing nations are then blamed by the rich countries for their failure to control production, accusations sharpened by the ubiquitous corruption around drug production and by the large rewards that accrue to some developing-country players in the trade. While there is increasing acceptance that the fundamental problem for rich countries is their inability to control domestic demand for drugs,¹ the search for ways of controlling production continues, with rich countries both aiding and coercing poor producer nations in their efforts.

Findings on the effects of interventions are discouraging. Little of a systematic nature is known about the effects of such programs as interdiction, crop eradication, “alternative development,” or more general law enforcement aimed at reducing drug production and trafficking. The general impression is that such programs have been ineffective. It is certainly the case that the world drug trade has continued to flourish even as the rhetoric of control has sharpened during the last quarter-century and as the flow of funds for suppression has increased. See European

Commission (2009) for a review of how the world's drug problems and policies changed between 1998 and 2007.

This chapter focuses on cocaine and heroin for two reasons. First, cocaine and heroin are generally believed to account for the bulk of the income that flows to developing countries from illicit drugs, although the evidence is very soft; there are no systematic estimates of the flows from other drugs such as methamphetamines and marijuana.² Second, compared to drugs that are more widely used (in particular marijuana), cocaine and heroin produce particularly intense psychological and physical effects on users; cocaine use results in a form of psychological addiction by producing a high that encourages pursuit of more intense intoxication, whereas heroin use produces an actual physical dependence (Kleiman 1992). For example, opiates account for approximately 70 percent of all treatment demand in Asia, followed by 64 percent in Europe and 62 percent in Australia. They are the principal vector for the spread of HIV in a number of countries. Cocaine is the biggest problem drug in the Americas, accounting for 58 percent and 40 percent of total drug treatment in South America and North America, respectively.

The chapter begins by providing a description of how consumption, production, and trafficking are distributed among countries. The following section offers some hypotheses about why both production and trafficking are so concentrated in so few countries. The chapter then describes the ways in which governments have attempted to reduce both production and trafficking and summarizes what is known about the effectiveness of the different methods used. It concludes with comments on some major research questions.

Illicit Drug Trends and Developing Countries

This section provides background on the levels and trends in cocaine and heroin consumption; it shows which countries are most important and summarizes indicators of drug use in major developing countries.

Consuming Countries

There are no systematic estimates of worldwide consumption of illicit drugs. The United Nations Office on Drugs and Crime (UNODC) reports only the prevalence of illicit drug use (the percentage of the

population using specific drugs) through surveys of countries' governments in its annual *Global Illicit Drug Trends*. But with the exception of the United States and (more recently) a few other industrialized nations, countries have not developed the necessary capability to collect such information (and some have little desire to do so).³ Thus, the UNODC survey responses suffer from lack of data, varying estimation methodologies across different countries, and biases that governments bring to reporting the level of consumption.⁴

According to the UNODC (2008), cannabis is the most widely abused drug worldwide (around 160 million people), followed by amphetamine-type stimulants (35 million). Approximately 15 million people abuse cocaine, and a similar number abuse opiates. Tables 3.1 and 3.2 report recent UNODC figures on opiates and cocaine for major nations and regions, along with my judgment of recent trends. Use of cocaine in Asia and Africa is minimal.

Table 3.1. Estimated Prevalence Estimates of Opiate Abuse Worldwide, 2007

Regions and Countries	Number of Persons (millions)	Percentage of Population (over 15)	Trends
Asia	9.56	0.3	
India	2.80	0.40	Slow growth
China	1.9	0.20	Increasing
Pakistan	.75	0.8	Stable to declining
Iran	1.3	2.8	Stable
Other	2.81	0.34	Mixed by region
Europe	4.17	0.70	
West and Central Europe	1.57	0.6	Stable to declining
Russian Federation	2.00	2.0	Stable
Other Eastern Europe	0.60	0.38	Mixed
Oceania	0.09	0.40	Declining
Americas	2.28	0.40	
United States	1.30	0.50	Declining
South America	0.98	0.30	Some increases
Africa	0.91	0.20	Increasing
Global	15.84	0.4	Increasing

Source: Paoli, Greenfield, and Reuter 2009, table 3.3, based on UNODC 2007.

Table 3.2. Estimated Prevalence of Cocaine Use Worldwide, ca. 2007

Regions and Countries	Number of Persons (millions)	Percentage of Population (over 15)	Trends
Europe	4.01	.73	
West and Central Europe	3.89	1.22	Stable to increasing
South-East Europe	.07	.08	?
Eastern Europe	.05	.03	Mixed
Americas	10.20	1.74	
North America	7.10	2.42	Declining
South America	3.10	1.05	Increasing
Asia	.33	.01	?
Oceania	.30	1.37	Stable to increasing
Africa	1.15	.22	?
Global	15.99	.37	Stable

Source: UNODC 2008.

The use of opiates is very broadly distributed by both geography and relative wealth. The bulk of opiate users are in developing nations.⁵ Even though China has a very low estimated prevalence rate, which may reflect the low investment in data collection, it has more opiate addicts than all but three or four other nations, simply because of its population.⁶ India, with a moderate estimated prevalence, has by far the largest number of opiate addicts, for the same reason. In most of Western Europe and the United States, there has been little growth in opiate addicts; indeed, there has recently been a decline in many countries (European Commission 2009). Asia and Eastern Europe have seen sharp increases in recent years, with Central Asia being most affected (Ponce 2002; Roston 2002).

The bulk of cocaine users reside in a few rich countries. The United States dominates that market, but there has been substantial growth in Western Europe since about the mid-1990s, particularly in Spain and the United Kingdom.

Retail expenditures on heroin are dominated by rich-country consumers, simply because retail prices are so much higher in those nations.⁷ The prices received by growers and traffickers, however, are not dependent on the final destination. A shift of consumption from Western Europe

to China has no significance to the revenue of Afghanistan producers; the export price from Afghanistan is the same regardless of the final consumption destination. Hence it is approximately true that consumers in the developing world account for most of the earnings of opium producers, as opposed to the revenues of traffickers and retailers in developed countries.

While the data presented so far report only the numbers of users, estimates of the quantities consumed are needed to understand the market. Almost no data are available on the average quantities consumed annually by addicts in each country,⁸ because users can report only how much they spend on cocaine and heroin, not how much of the active drug they purchased, since the purity is highly variable and cannot be observed. Some evidence suggests that U.S. heroin addicts consume less per year than their counterparts in Europe, but without more specific data, it is necessary to assume that for the rest of the world the distribution of quantities consumed does mirror the distribution of users.

Producing Countries

A small number of nations account for the bulk of the production of coca and opium. According to official estimates by the UNODC (2008), three countries—Bolivia, Colombia, and Peru—account for the entirety of commercial coca production. Small amounts of coca are reportedly being produced in Brazil and Venezuela, but nothing that reaches the market. Table 3.3 displays the global production of dry leaf coca for various years between 1990 and 2007.⁹ As shown, most coca is currently produced in Colombia, although Peru was the primary producer a

Table 3.3. Production of Dry Leaf Coca in Bolivia, Colombia, and Peru, Selected Years 1990–2007
(in metric tons)

Country	1990	1995	2000	2002	2004	2006	2007
Bolivia	77,000	85,000	13,400	19,800	38,000	33,200	36,400
Colombia	45,300	80,900	266,200	222,100	164,280	154,130	154,000
Peru	196,900	183,600	46,200	52,500	101,000	105,100	107,800
Total	319,200	349,500	325,800	294,400	303,280	292,430	298,200

Source: UNODC 2008.

decade ago. Production in Bolivia increased between 2000 and 2002 but declined again after 2004. Production in Peru, however, declined sharply over the period of 2000 and 2002, although there has been a recent rebound in Peru.

Afghanistan and Myanmar accounted for over 90 percent of global production of opium in 2004 (4,570 out of 4,850 metric tons). This two-country dominance in opium production has occurred in every year since 1988 (when systematic estimates began), except for 2001 when the Taliban successfully cut Afghanistan's production by over 90 percent.¹⁰ Table 3.4 reports estimated global production of opium for various years between 1990 and 2007. As shown by the table, second-tier opium producers include Colombia, Laos, and Mexico. Pakistan, Thailand, and Vietnam comprise the third tier; once substantial producers in the 1980s and early 1990s, they now are almost insignificant.

It is useful to contrast these data with those on cannabis, the other prominent psychoactive drug that has its source in a plant. In North America, the most recent data suggest that the Canadian market is now considered self-sufficient (Bouchard 2008; Royal Canadian Mounted Police 2004) and that in the United States over 50 percent of the available cannabis is domestic (Gettman 2006). In Western Europe, it is thought

Table 3.4. Global Production of Opium, Selected Years 1990–2006
(metric tons)

Country	1990	1995	2000	2001	2002	2004	2006	2007
Afghanistan	1,570	2,335	3,276	185 ^a	3,400	4,200	6,100	8,200
Colombia	0	71	88	80	52	49	13	14
Laos	202	128	167	134	112	43	20	9
Mexico	62	53	21	91	58	73	108	107
Myanmar	1,621	1,664	1,087	1,097	828	370	315	460
Pakistan	150	112	8	5	5	40	39	43
Thailand	20	2	6	6	9	^b	^b	^b
Vietnam	90	9	^b	^b	^b	^b	^b	^b
Other	45	78	38	32	56	75	16	38
Total	3,760	4,452	4,691	1,630	4,520	4,850	6,611	8,871

Source: UNODC 2008.

a. Reflects production crackdown by Taliban.

b. Included in other.

that the Netherlands accounts for a large share of the cannabis consumed in Europe.¹¹ Morocco and Mexico supply substantial quantities of cannabis resin and cannabis herb to Western Europe and the United States, respectively, but they are certainly not dominant. The exceptional status of cannabis probably rests on four factors:

- The bulkiness per unit value raises smuggling costs substantially.
- The high dollar yield per acre reduces risks of detection per dollar of production.
- A boutique market of users and growers is interested in developing better breeds of the plant. In addition, many users now “grow their own.”
- Entry into the market is easy, since the seeds are widely available. There are probably few economies of scale in growing beyond quite a small number of plants, and there is no further processing.

Trafficking Countries

As with production, the trafficking of coca and opium involves a relatively small number of nations. One indicator of which countries are involved in trafficking is drug seizures, but it requires careful interpretation.¹² Seizures can be driven by production, local consumption, and transshipment; nations that experience large seizures but are neither producers nor major consumers are likely to be involved in trafficking to other countries. It is a one-sided indicator; some transshipment nations—as a result of either corruption or limited enforcement effort—may have few seizures. Illustrating the weakness of seizure as an indicator are the figures for Russia. It constitutes one of the three largest markets for heroin and serves as a transshipment country for Eastern Europe; yet Russia was seizing barely 1 ton of heroin annually in the early part of this decade.

Table 3.5 lists the highest-ranking countries for seizures of cocaine and opiates (that is, heroin, morphine, and opium) in 2006 by the percentage of the world total. The table shows that almost half the cocaine seized in 2006 was seized in the United States (21 percent), the largest consumer country, and in Colombia (26 percent), the largest producer country. Spain, which accounted for the next-largest amounts of seized cocaine, represents a gateway for cocaine traveling into Europe.

**Table 3.5. Highest-Ranking Countries for Seizures of Cocaine and Opiates, 2006
(percent of world total)**

Cocaine			Opiates in Heroin Equivalents ^a		
Country	%	Tons	Country	%	Tons
Colombia	26	181	Iran	37	52
United States	21	147	Pakistan	26	36
Spain	7	49	Turkey	8	11
Venezuela	6	39	Afghanistan	6	9
Panama	5	36	China	5	6
Portugal	5	34	Russian Federation	2	3
Ecuador	5	34	Myanmar	2	2
Costa Rica	3	23	Tajikistan	2	2
Mexico	3	21	United Kingdom	1	2
Peru	3	19	United States	1	2
Other countries	16	108	Other countries	10	12
Estimate of seizures in tons		413			139
Estimate of production in tons		984			606
Amount seized as percentage of estimated production	42			23	

Source: UNODC 2008.

Note: Individual countries' seizures as reported (street purity).

a. Heroin, morphine, and opium.

Interestingly, Ecuador and Venezuela were also responsible for smaller, although significant, amounts of seized cocaine. These countries border the important source countries of Colombia and Peru. As compared to heroin, total seizures of cocaine account for a much larger share of estimated production (42 percent as opposed to 23 percent).

Table 3.5 also shows that over one-third of the opiates seized in 2006 came from Iran alone (37 percent). Pakistan accounted for 26 percent of the opiates seized, the second-largest amount. Other major countries with opiate seizures, Turkey and China, are located in Asia. Turkey, with a small domestic opiate market, is a principal transshipment route for European heroin, while China not only has a large domestic market but also serves as a transshipment route for heroin into some Western markets.¹³ Afghanistan, where 6 percent of the world's seizures were made, is also a country noteworthy for its 2006 seizures.

Possible Explanations for The Pattern of National Involvement in the Drug Trade

The concentration of coca and opium production in these few developing countries is an important fact for policy makers. It creates the sense, probably illusory, that success is just around the corner because only two or three countries need to exit the industry. The concentration is a paradox for three reasons:

- First, many nations are capable of producing each drug. Historically, substantial opium production has been recorded in China, Iran, and Macedonia, for example, none of which now produces.¹⁴ Australia, France, and Spain have entered the legal opiate market in recent times, obtaining production quotas from the International Narcotics Control Board under an international treaty agreement for that market (INCB 2002). Coca has been grown commercially in Java (while under Dutch rule) and Taiwan (while under Japanese rule) and could be grown in parts of the Andes that are not now involved (Spillane 2000).
- Second, technically it is possible to produce cocaine or heroin in industrialized nations. Hydroponic techniques, for example, can be used for both coca and opium poppies in regions with less than suitable climates. And with local production come associated savings in transportation costs and the elimination of interdiction risks. The enforcement risks faced by producers in the United States or Western Europe, however, are substantial, and the compensation costs for these risks are sufficiently high that local production has never developed.
- Third, many developing countries that neighbor coca and opium producers are not or have not been major producers, although they might be involved in trafficking. Consider Thailand, for example, which was a major producer of opium in the early 1970s. Thailand has had a substantial heroin addict population since the 1970s. It continues to suffer from high levels of corruption, both in the military and in the civilian government. Consequently, Thailand would seem to be a strong candidate for a large opium production sector. However, Thailand now produces very little opium and serves primarily as a consuming and transshipping country for Myanmar. Similarly, Venezuela and Ecuador have many of the preconditions for coca production and are regularly put on the list of candidate producers but

have, after two decades of being at high risk, not entered the industry. Very specific factors may account for the observed differences.

The concentration and precise pattern of trafficking, as opposed to production, is also not easy to explain. Transshipment across other countries is not a universal feature of the drug trade. Substantial quantities of cocaine are shipped directly from Colombia to Western Europe, although Argentina and Brazil, with close commercial connections to the Iberian Peninsula (as indicated by Spain's high seizures), also play a role. In the 1980s, some Pakistani-produced heroin was sent directly to the United Kingdom. Transshipment, then, is never simply geographic destiny, but geography is clearly a risk factor. Consequently, it is important to understand how the various economic, sociological, and political factors in different countries can drive the production and trafficking of coca and opium.

Structure of the International Drug Industry

One approach to exploring the question of which countries are more likely to produce and traffic in illicit drugs is to examine the structure of international drug industries. Table 3.6 provides approximate figures on the cost of cocaine and heroin at different points in the distribution system to the United States and Western Europe in 2007.¹⁵ As shown, the principal costs of these drug industries are associated with distribution rather than production. One kilogram of pure cocaine exported from Colombia in 2007 cost traffickers \$2,400; of this amount, \$800 covered farmers' cultivation costs. Traffickers, however, priced this same kilogram of pure cocaine for U.S. importers at \$19,000. And, moving down to the retail level (through perhaps four transactions), the kilogram can fetch about \$122,000 from consumers. It is important to note that along the distribution chain purity and cost are often inversely related. That is, as the product drifts down to the retail level, buyers dilute the product to increase profits, meanwhile increasing prices for the next buyer. The story with heroin distribution was similar: a kilogram of pure heroin produced in Afghanistan for about \$900 in 2007 was exported from Turkey for \$10,000, and by the time it reached consumers in the United Kingdom, it was priced at \$239,000 (at 100 percent purity).

Table 3.6. Reasonable Price and Purity Estimates for 1 Kilogram of Cocaine and Heroin, circa 2007

Stage	Cocaine			Heroin		
	Raw Price (\$)	Purity (%)	100% Pure (\$)	Raw Price (\$)	Purity (%)	100% Pure (\$)
Farm price*	800	100	800	900	100	900
Export	2,200	91	2,400	3,400	73	4,700
Import at wholesale (kg.)	14,500	76	19,000	10,000	58	17,000
Mid-level wholesale (oz.)	19,500	73	27,000	33,000	50	66,000
Typical retail price	78,000	64	122,000	105,000	44	239,000
			Location			Location
			Colombia			Afghanistan
			Colombia			Afghanistan's neighbors
			Los Angeles			Turkey
			Los Angeles			England/Wales
			United States			United Kingdom

Source: Kilmer and Reuter 2009.

The figures in table 3.6 suggest three general propositions:

- The cost of production, as opposed to distribution, is a trivial share of the final price. That statement holds true even if one adds the cost of refining to that of growing coca leaf or opium poppies.
- Smuggling, which is the principal transnational activity, accounts for a modest share but much more than production and refining.
- The vast majority of retail prices in Western markets are accounted for by domestic distribution in the consumer country. Most of the domestic distribution revenues go to the lowest levels of the distribution system. If the retailer and lowest-level wholesaler each raises their purchase price by 75 percent, which until recently was a low estimate of the margin, they account for two-thirds of the final price.

What explains these observations? A plausible, though still untested, explanation is that retail prices reflect the costs of the risks, both from the government and from others in the business,¹⁶ that traffickers and dealers, rather than producers, must bear (Reuter and Kleiman 1986). First, coca and opium are grown in countries where prices for labor and land are low relative to those in North America and Europe (Kennedy, Reuter, and Riley 1993). The comparative advantage of these countries is reinforced by the reluctance or inability of governments in Bolivia and Peru (for coca) and Afghanistan and Myanmar (for opium and heroin) to act aggressively against growers or early-stage refiners. Low opportunity costs for factors of production in conjunction with low enforcement risks result in very modest prices for the refined product, and they also ensure that production does not move upstream geographically.

It should be noted, though, that cheap labor, plentiful land, conditions that support coca or opium production, corruption, and weak governments are found in many nations.¹⁷ Francisco Thoumi (2003) contrasts the distribution of illicit drug production across nations with that for legitimate agricultural products. Thoumi notes that coffee can be grown in many countries and that, in fact, a large number of those countries do have producing and exporting industries. But very few potential producers are active in the coca and opium markets. With respect to government corruption, the totality of Myanmar's corruption and the need of the central government to allow indigenous groups to maintain independent export industries surely play a role in opium production, as does the extreme

weakness of the central government in Afghanistan since 1989. In contrast, neither Bolivia nor Peru stands out as having a particularly weak government among those in the region. A history of illicit drug production is also a risk factor, but it is not essential. Mexico had no indigenous opium production until the U.S. government started limited production there during World War II because of interruptions to traditional sources.¹⁸ Colombia also had no history of opium production before the development of poppy fields in the mid-1990s. Thus, we can only suggest the factors that lead specific countries to acquire important production roles.

One might ask whether the new republics of Central Asia are likely to become major players in the international heroin business, providing more than transshipment to the Russian and Eastern European market. They certainly have low-cost land and labor, as well as apparently favorable agricultural conditions for growing opium poppies and a traditional expertise. Some governments, such as those of Tajikistan and Turkmenistan, are desperate for foreign currency and have few alternative sources and little concern about their standing in international organizations; they are unlikely to aggressively enforce prohibitions against growing opium poppies or to have the capability to do so even if they desired to. They are certain to be low-cost producers.

But are they advantaged, compared to current low-cost producers, notably Afghanistan and Myanmar? Although they are closer to Europe and have significant populations resident in Russia and perhaps even in Western Europe, their commercial connections with Western Europe are likely to be weak compared to those of Myanmar, which has established Thai and Chinese trafficking networks. The Central Asian republics will probably become major players in the European opiate markets only if there are disruptions (including rapid economic development) in the current major supplier countries.

This discussion has identified factors that might make a nation attractive for drug production and trafficking but has not explained why the numbers of actively participating countries are so small. It may be that drug-related corruption shows sharply declining marginal costs per transaction or that there are high fixed costs to establishing international trading networks. The literature is silent on this matter, although Thoumi (2003) offers some suggestions on those noneconomic factors that are most likely to affect national participation in the drug trade.

The modest share of Western retail prices associated with cocaine smuggling and illustrated in table 3.6 is also easily explained.¹⁹ Cocaine travels in large bundles at that stage; seizures suggest that shipments of 250–500 kilograms are quite common. Although large sums may be paid to American pilots for flying small planes carrying cocaine or to Honduran colonels for ignoring their landing, these costs are defrayed over a large quantity. A pilot who demands \$500,000 for flying a plane with 250 kilograms generates costs of only \$2,000 per kilogram, less than 2 percent of the retail price. Even if the plane has to be abandoned after one flight, the capital cost of replacing the plane adds only another \$2,000 to the kilogram price. For shipments in container cargo, seizure constitutes little more than a random tax collection; replacement cost of the seized drugs is substantially less than the landed price, so that high seizure rates have modest effect even on wholesale prices.²⁰ These costs contrast sharply with those of street-level dealing, where the risks of arrest and incarceration can be spread over only the few grams that the dealer sells (see Caulkins and Reuter 1998 for a discussion of these issues).

Heroin smuggling appears to be less efficient than cocaine smuggling, at least as measured in dollars per kilogram. Heroin that exits Afghanistan at \$1,000 per kilogram (in bundles of 10 kilograms or more) sells on arrival in the United Kingdom for \$50,000 per kilogram.²¹ There have been a few multihundred kilogram shipments of heroin, but they are very rare compared to those for cocaine. The drug often travels in small bundles that are swallowed (typically wrapped in condoms) by individual couriers.²² “Body-packing,” where the couriers are low-wage earners, produces per kilogram smuggling costs of less than \$10,000 in the United States. A body-packer can apparently carry about three-quarters of a kilogram. A payment of \$5,000 for incurring a 1 in 10 risk of prison (perhaps acceptable for couriers whose legitimate wages are only about \$2,000 per year), along with \$3,000 in travel expenses, produces a per kilogram smuggling cost of just over \$11,000 compared to a retail price of \$500,000.²³ The remainder of the smugglers’ margin is for assuming other kinds of risk.²⁴

Smuggling costs depend significantly on the ability to conceal drugs in a flow of legitimate commerce and traffic. Colombia and Mexico serve as the principal smuggling platforms to the United States in part because they have large immigrant populations in the United States and extensive air traffic and trade.²⁵ Although Mexico is a high-cost producer—farm-gate

prices for opium in Mexico being typically \$2,000 to \$5,000 per kilo, compared to less than \$50 in Afghanistan before 2001—the low smuggling costs equalize total landed price. Colombia, a new source for heroin, also represents high farm-gate production with relatively low smuggling costs (Uribe 2005).²⁶ Although Colombia and Mexico are minor producers of opium worldwide, accounting for perhaps 3 percent of the total, they are now the source of nearly two-thirds of U.S. heroin.²⁷

But geography also matters. Afghanistan's neighbors are at risk, for example. Iran's total dominance as a transshipment country until recently was probably a function of the existence of a substantial domestic Iranian market and the relatively good connections with Turkey, itself a traditional supplier of the United States and Western Europe until 1970.²⁸ As the Russian market grew after 1995, Tajikistan became an important transshipment country. The border between Afghanistan and Tajikistan was particularly porous, reflecting the flow of Tajik citizens to Afghanistan during the Tajikistan Civil War of the early 1990s, the weakness and corruption of the Tajikistan coalition government, and the ease of exit from Tajikistan through Kazakhstan to Russia. Uzbekistan, another Afghan neighbor with good links to Russia, has a much narrower, more defensible border and a stronger, richer central government; Uzbekistan, although suffering from a substantial drug-use problem, seems to have only a modest trafficking role.

Mexico is perhaps the nation for which geographic destiny is strongest; it has been called a “natural smuggling platform” for the United States. Mexico serves as the principal entry country for cocaine, heroin, marijuana, and methamphetamine imported by the United States. At various times Caribbean nations and some nations in Central America have also served as transshipment countries; the latter are way stations to Mexico.

The drug trade readily uses indirect paths for smuggling. Seizures in Germany sometimes turn out to have traveled through Scandinavia into Russia and then exited through Poland to their final market. Ruggiero and South describe

a joint Czech-Colombia venture to ship sugar rice and soya to Czechoslovakia... This operation was used to smuggle cocaine, destined for Western Europe. In 1991, police say that 440 lbs. of cocaine were seized in Bohemia and at Gdansk in Poland, which would have been smuggled onward to the Netherlands and Britain. (1995, 75)

Nigeria is an interesting transshipment anomaly, a nation that seems to have little potential role in the international drug trade. It is isolated from any of the principal producer or consumer countries and lacks a significant base of traditional domestic production or consumption. Nonetheless, Nigerian traffickers have come to play a substantial role in the shipping of heroin between Southeast Asia and the United States and also to Europe; recently these traffickers have even entered the cocaine business, although the cocaine production centers are still more remote from their home country. Nigerians have been identified as pioneers in the heroin trade in Russia and Central Asia as well, implausible as that may seem.²⁹

The explanation is perhaps to be found in a complex of factors. Nigerians are highly entrepreneurial, have been misruled by corrupt governments over a long time, and have large overseas populations, weak civil society, very low domestic wages, and moderately good commercial links to the rest of the world. Thus, it is relatively easy to buy protection for transactions in Nigerian airports (corruption and a weak governmental tradition); to establish connections in both the source and the rich consuming nations (large overseas populations); and to use existing commercial transportation (note that the drugs travel with passengers rather than cargo since Nigerian exports, apart from oil, are modest); smuggling labor is cheap (low domestic wages). Moreover, Nigeria's entrepreneurial tradition produces many competent and enthusiastic smuggling organizers. Nigeria is not unique in most of these dimensions; however, its size and connections with the rest of the world distinguish it from other West African nations. Perhaps accident played a role in that country's initiation into the trade, but these other factors plausibly play a major role.

Immigrants in the destination country who are from the producing and trafficking countries have advantages in managing exporting, with better knowledge of potential sellers and corruption opportunities. Few potential U.S. importers speak any of the languages of the Golden Triangle (Laos, Myanmar, and Thailand); English has more currency in Pakistan but not much in Afghanistan. Corrupt officials may be much more at ease in dealing with traffickers whose families they can hold hostage. Moreover, nonnative traffickers are likely to be conspicuous in the growing regions. Nor are the exporters merely agents for wealthy

nations, in sharp contrast to the international trade in refined agricultural products. Khun Sa, a quasi-military leader associated with irredentist ethnic groups on the periphery of Myanmar, was the dominant figure in opium exports from the Golden Triangle for many years (Booth 1996). The Colombian cocaine trade has spawned some spectacular figures, such as Pablo Escobar and Carlos Lehder, all of them of Colombian descent. If there are major U.S. or European individuals in the exporting business in the source countries, they have managed to escape detection.

Supply-Side Controls Targeted at Producing and Trafficking Nations

Many different approaches are used to attempt to reduce illicit drug use and related problems. Few policies and programs have been subject to systematic evaluation. Particularly striking is the absence of any research on the effectiveness of the principal class of programs used in most Western nations (particularly the United States), namely, enforcement of prohibitions on selling drugs (Manski, Pepper, and Petrie 2001). Far more is known about the effectiveness of treatment of drug abuse and addiction.

Since almost all the research has been conducted in the industrialized world, predominantly the United States, evaluations reflect Western perspectives. In particular, there are almost no evaluations of interventions aimed at the demand side of poorer nations. This section reviews what is known about programs relevant to developing nations involved in production and trafficking; Boyum and Reuter (2005, chapters 3–4) provide a broader review.

Production and Refining Controls

Three types of programs have been used to reduce source-country drug production: eradication, alternative crop development, and in-country enforcement against refiners. Eradication, involving either aerial spraying or ground-based operations, has direct and indirect effects. It aims both to limit the quantity of the drug available for shipment to foreign consumers (in the short run) and to raise the cost of producing those drugs or otherwise discourage farmers from growing them (in the long run).

Alternative development is the soft version of production controls; it encourages farmers growing coca or poppies to switch to legitimate crops by increasing earnings from these other products. Alternative development strategies include introducing new crops and more productive strains of traditional crops, improving transportation for getting the crops to market, and various marketing and subsidy schemes. The concept can be broadened to alternative livelihoods, where the shift may be to nonagricultural activities (UNODC 2005). Finally, source countries can pursue refiners more vigorously, perhaps using military equipment and training; much of the U.S. support for source-country control has taken this form. There is little discussion of aggressive use of criminal sanctions against the peasant farmers.

Eradication. Few producer countries use aerial eradication, which is believed by many observers to cause environmental damage.³⁰ It is also politically unattractive since the immediate targets, peasant farmers, are among the poorest citizens, even when growing coca or poppy. Colombia and Mexico, neither one a traditional producer of drugs, have been the source countries most willing to allow spraying. In a few other nations (for example, the Plurinational State of Bolivia), the government has allowed manual eradication, which is very labor intensive.

The term *eradication* has also been used for a program that mixes coercion and financial incentives: “voluntary eradication.” In the Plurinational State of Bolivia in the 1990s, with U.S. funding, the national government offered farmers \$2,000 per hectare for tearing out coca plants and agreeing not to cultivate any others (Riley 1996). Without a good registration of preexisting fields, this intervention also ran perilously close to being a price support program, since the unsuccessful coca farmer could sell his cultivated land to the government for the nominated price.

Little evidence suggests that eradication has been effective in recent years, but rigorous evaluations are not available and are difficult to carry out. The share of the crop eradicated has been quite high in some recent years; for example, in 2001 Mexico reported that it had eradicated 15,350 hectares out of the estimated 19,750 hectares in production (UNODC 2002). However, Mexico’s estimated potential production has not consistently declined, perhaps because of the dubious nature of the estimates

of eradication or the fact that poppy prices are high enough that eradication of 80 percent of crops still provides farmers with an incentive to plant poppies. Both explanations are plausible and both may apply.

In 2003, both the U.S. State Department (2003) and UNODC reported substantial reductions in Colombian coca production, reasonably ascribed to increased spraying with U.S.-supplied planes and helicopters. The 2004 figure showed little change. In 2004, the U.S. government reported that voluntary eradication in Bolivia may have substantially reduced coca production there in the 1990s. Prices for cocaine in the United States dropped steadily through this period.

Eradication has one major success story in modern times: Mexican opium production in the mid-1970s. An industry that had operated fairly openly in five northern states, with large, unprotected fields, took approximately five years to adjust to the sudden introduction of spraying. Production subsequently became much more widely dispersed, and growing fields were smaller and more frequently hidden in remote locations; good data are lacking, but farm-gate prices may have been substantially higher as a result. By the early 1980s, Mexico was supplying as much heroin as before the spraying, but for about five years there was a substantial reduction in availability in the United States, particularly in Western states where Mexican supply dominated heroin markets (Reuter 1992).

Alternative Development. In contrast to spraying, alternative development—a whole panoply of programs, almost always funded by Western donors—is politically attractive, since it provides resources for marginalized farmers.³¹ However, there are numerous obstacles to successful implementation. For example, it requires persuading farmers that the government will maintain its commitment over a long period; otherwise, they will not be willing to incur the costs of shifting to new crops. In situations of political instability, there will understandably be skepticism about the ability of, say, the Peruvian government to ensure a dependable market and a reliable transportation infrastructure for tropical fruits from the Upper Huallaga Valley.³² Moreover, in some regions, such as the Chapare in the Plurinational State of Bolivia, coca is grown in areas that have been cleared precisely for that purpose, and the land is not promising for other crops. In this case, finding ways of moving immigrant farmers

back to their original communities has been an important part of the effort. In a few instances of well-executed local crop substitution programs, farmers in a small area have been persuaded to move from coca or poppy to legitimate crops. For example, in northern Thailand, replacing opium poppy with commercial flowers greatly increased annual revenues per acre. In Bolivia, rubber has turned out to be more profitable in some areas of the Chapare (Mansfield 1999). However, these programs do not appear to have reduced drug production in any region of the world, as opposed to the specific areas targeted by the interventions.

A recent report by the Independent Evaluation Unit of the UNODC reached very pessimistic conclusions:

There is little empirical evidence that the rural development components of AD [alternative development] on their own reduce the amount of drug crops cultivated. Agriculture, economic and social interventions are not seen to overcome the incentive pressure exerted by the market conditions of the illicit drug trade. Where reduction in drug cropping occurs it seems other factors, including general economic growth, policing, etc., can be identified as contributors to the change that takes place. (UNODC 2005a)

A recent study of the Chapare for the World Bank Institute (Reuter 2006) suggests that a combination of large-scale development funding and aggressive enforcement can move the locus of production. Whereas in the early 1990s the Chapare was the principal producer of coca leaf for the illicit market in Bolivia, by 2005, before the election of Evo Morales as president, only 7,000 hectares were in coca cultivation (UNODC 2005b). As the result of heavy investment of aid by both the U.S. and European governments, the Yungas had become a relatively attractive rural area, with good-quality physical and social infrastructure. Production had shifted both within Bolivia (to the Yungas) and to other countries.

There are two distinct frames for assessing production controls: those of the targeted nation and those of the global market. It is entirely plausible that a well-executed eradication or alternative development program could reduce production in a specific country or subnational region; less plausible is that successes even in a few nations could substantially reduce global production of either opium or coca. The reasoning is

simple and rests largely on the fact that production costs (both cultivation and refining) constitute a trivial share of the retail price of drugs in the major Western markets. As noted earlier, the cost of the coca leaf that goes into a gram of cocaine is usually less than \$0.50; the retail price of that same gram sold at retail in the West is more than \$100.

Suppose that stepped-up eradication led to a doubling of the price of coca leaf, so that it cost \$1 for refiners to buy the leaf that goes into one gram of cocaine. Assuming that the \$0.50 per gram cost increase was passed along to traffickers and dealers, the resulting change in the retail price of cocaine would be negligible.³³ Indeed, leaf prices in the Andes have increased further since the mid-1990s, with no evident effect on the retail price of cocaine, which declined over the period.

The story for alternative development is analytically identical. If the introduction of new infrastructure in Afghanistan increases the returns from growing wheat, so that many farmers now switch from growing poppies, then refiners will raise their prices to keep sufficient land and labor in poppy production. That adjustment may lead to shifts in production across provincial or national boundaries or simply to increased payments to the current growers. The change in Western heroin prices from the higher farm-gate opium price is so slight that production will be unaffected. It should be noted, though, that the poppy farmers are now better off than they were before the alternative development programs; alas, they are still growing poppies.

This argument, however, views the issue exclusively from the side of the rich consumer countries. A very successful program in one country, whether it be eradication or alternative development, might raise poppy or coca costs sufficiently to make another nation more attractive as a production center. For the innovating country, this result is still desirable, even if global drug consumption is hardly changed. For the other nation or nations that see increases in production, or that enter the industry for the first time, the result is increased damage. We return to this issue later.

In-Country Enforcement. The United States has also invested in building institutional capacity to deal with the drug trade in major producer countries. Each year the State Department's *International Narcotics Control Strategy Report* (INCSR) argues that the central problem of drug

control in other countries is political will and integrity. Training investigators, strengthening the judiciary, and improving extradition procedures are the stuff of efforts to deal with this issue. Unfortunately, in both Colombia and Mexico the corruption problems have seemed endless, embedded in a larger system of weak integrity controls. In Colombia, for example, where the army has taken on a major role in drug control, particularly with respect to coca growing, allegations of involvement in mass killings are well substantiated and have been a major source of controversy about U.S. funding (Youngers and Rosin 2004). Mexico has also had a succession of drug-related corruption scandals at the highest levels; for example, in 1998 the Mexican drug czar, an Army general, was convicted of involvement with major drug traffickers. Despite the election of a president (Vicente Fox) in 2000 who had no ties to the old system of corruption, the problem continues, as illustrated by a flood of drug-related murders involving police both as victims and as assailants. The story for Pakistan and Thailand among Asian trafficking and producing nations differs only in that the violence is less conspicuous.

The United States has also promoted efforts to crack down on refining facilities in producer countries. This approach may have limited potential because refineries have little fixed capital and can be cheaply and rapidly replaced.

Trafficking and Smuggling Controls

Another set of control programs aims at the smuggling of drugs into the wealthy nations. Most large seizures are made through interdiction, that is, as cocaine or heroin is being moved across or toward borders. Indeed, interdiction seizures may account for as much as 38 percent of total cocaine production; large seizures are made by the exporting Andean countries, by some of the transshipment nations (particularly Mexico), and by U.S. Coast Guard and Customs. Opiates seizures appear to be a much smaller share of total production, perhaps only 24 percent, as indicated in table 3.5.³⁴ Most of the opiates seizures are made in Asia, close both to the production centers (Afghanistan and Myanmar) and to the largest consumer populations (India, China, Iran, Pakistan).

The effect of interdiction on the availability of cocaine has been examined in only a small number of studies (for example, Reuter, Crawford,

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and Cave 1988; Crane, Rivolo, and Comfort 1997). Interdiction is like a stochastic tax; shipments and agents (crew members, pilots, unloaders) are subject to a probability of interception, and the smuggler incurs the costs of replacing the shipment and providing compensation to agents for the risk of being incarcerated. This “tax” will be reflected in the margin that smugglers charge, that is, the difference between the price at which they purchase (export from source and transshipment country) and the price they charge in the destination country.

In table 3.7 (abbreviated from Reuter and Greenfield 2001), the difference between export and import values for world agricultural trade amounted to about 6 percent of the export value; in the absence of data for a particular product or market, the Food and Agricultural Organization typically applies a standard “add factor” of 12 percent. In glaring contrast, the cross-border markup on, for example, Tajikistan–Russia heroin shipments is thought to be vastly larger, perhaps a tenfold increase, even though what is crossed is just a pair of land borders.³⁵ Another indication of the effectiveness of interdiction is the high price per kilo of shipping drugs across international borders. It costs less than \$100 to send a kilogram of coffee by express mail from Bogota to London; it costs \$10,000 to send a kilo of cocaine between the same two cities.

Table 3.7. World Trade in Selected Agricultural and Industrial Commodities, 1999
(billions of current U.S. dollars)

	Agricultural Products		Industrial Products		
	Exports	Imports	Exports	Imports	
Cereals and preparations	54	57	Iron and steel	126	138
Fruits and vegetables	71	79	Chemicals	526	547
Sugar and honey	16	17	Automotive products	549	566
Coffee, tea, and spices	31	32	Office and telecom equipment	769	792
Beverages and tobacco	57	57	Textiles and clothing	334	352
Alcoholic beverages	30	30	Other manufactures	1,182	1,966
Tobacco	22	21			
Total agricultural products	417	441	Total industrial Products	4,186	4,361

Source: Reuter and Greenfield 2001, based on United Nations Food and Agriculture Organization 2000; World Trade Organization 2000.

Note: Exports valued FOB and imports valued CIF; totals may not add due to rounding.

Unfortunately, tougher interdiction does not seem to raise prices much. Figures for the United States in recent years suggest that seizures of cocaine have increased as a share of total shipments, while import prices have fallen. Reuter, Crawford, and Cave (1988) built a simulation model in which smugglers used past interception data to make decisions about which routes to pursue. Given the low export price of cocaine and the low inputs of both equipment and personnel costs per gram, it turned out to be difficult to raise retail prices substantially with more aggressive interdiction. Crane, Rivolo, and Comfort (1997) examined the effects of temporary spikes in seizure rates in source zones and found that they did increase retail prices substantially; there has been considerable controversy about the researchers' development of a price series³⁶ and of their approach to modeling the short-run effects of interdiction events to reach this conclusion (see Manski, Pepper, and Thomas 1999).

That leaves open the question of why cross-border prices are so high and yet more enforcement does not have the desired consequence. Consider again the border between Afghanistan and Tajikistan, whose passage increases the price of a kilogram of opium many fold. This border has been porous throughout the period in which the heroin trade between the two countries has developed. As a share of the estimated flow, seizures have been modest; Paoli, Greenfield, and Reuter (2009) present figures for seizures and flow that suggest the rate is less than 5 percent. Nor do smugglers face much threat of incarceration from law enforcement, requiring high payments to smuggling labor. Perhaps the border guards who seize a small share of the flow have the capacity to incarcerate the smugglers but are charging high prices for withholding their authority. Detailed descriptions of smuggling activities are inconsistent with this interpretation, however. Multiple border-control agencies (including, until recently, a Russian military division, staffed by Russian officers and Tajik soldiers) are thinly spread out along a border that has many difficult-to-guard mountain passes.

Perhaps the market for smuggling is characterized by cartel or monopoly control, which would account for both the high margin and the lack of sensitivity to the higher interdiction (that is, tax rate). While a cartel or monopoly is possible in some markets, the best-known ones for shipment to the United States have been characterized by large numbers of small smuggling enterprises since the fall of the Cali and Medellin cartels in the

early 1990s. Perhaps they continue to coordinate, but there is no obvious mechanism for them to impose the discipline that even legal cartels have rarely managed over sustained periods of time.

I can offer no good account for the high margins charged by drug smugglers in so many settings. The data on risks (seizure, incarceration) and prices (the difference between import and export prices) are not nearly precise enough to allow formal empirical modeling. The apparent lack of response to increased interdiction severity also remains a puzzle.

Nontraditional Drug Control Methods

In addition to the supply-and-demand interventions noted above, a variety of approaches—which I broadly label *nontraditional*—have not been widely discussed but probably bear closer examination: de facto legalization of production or trafficking, buying up the crop, and choosing a strategic location to allow production for the global market. Each has substantial operational or political risk, but explicating these risks helps clarify the considerations involved in policy toward drugs and development.

De Facto Legalization of Production or Trafficking

Can a nation simply ignore drug production and trafficking? In addition to treaties that require prohibition of such activities, legalization is so shocking to other nations that legalizing and openly taxing or regulating the production and distribution of these drugs for international markets are clearly not an option. It is very different, however, if a nation simply fails to enforce laws against producing or trafficking in these drugs as the result of explicit policy consideration. There are at least three reasons for considering this option:

- First, it might lead to minimal corruption around the trade; neither producers nor traffickers would have reason to pay police or other authorities if the latter are known to lack the political backing to eradicate crops or arrest producers and refiners.
- Second, it reduces political tension, since the government is not seen as opposed to the interests of small producers.
- Third, it increases earnings of peasant farmers, since it may induce a rise in their share of world production.

Pursuing such a policy, however, also poses substantial risks. Some important nations with major drug problems would object and might retaliate through official development assistance cuts, both bilateral and multilateral. Second, the state would not be able to tax the industry, which now takes a larger share of productive resources; to levy explicit taxes would be a move so close to legalization as to raise the question of treaty compliance. The Netherlands, which has de facto legalized sale of small amounts of cannabis at coffee shops, has not been able to subject these sales to an explicit tax (MacCoun and Reuter 2001). Third, it creates ambivalence toward the role of the state in enforcing generally agreed upon norms.

It is striking that no nation has actually adopted such a policy. In some regions of the world, such as the Shan State in Myanmar or the Upper Huallaga Valley in Peru in the 1980s, the national government takes little action against producers or traffickers. Such examples, however, appear to be ones in which the state has generally weak authority; it simply could not take action.

Buying Up the Crop

The fact that global production and trafficking are quite concentrated presents an opportunity for effective interventions, particularly if it is possible to coordinate across sectors within countries and across nations. One policy option mentioned from time to time is preemptive purchase of the drugs in the dominant producing country by Western governments, perhaps acting through an international agency. The total cost of purchasing all of Afghanistan's opium production before 2001 might have been no more than \$250 million,³⁷ a small fraction of what is spent by wealthy nations to deal with the problems of their heroin addicts. Such a preemptive purchase, if successful in making heroin much harder to obtain, might drive many addicts into treatment or otherwise lead them to desist from heroin use for a period of time.³⁸

There are two standard objections to this approach, however, one practical and the other conceptual. The practical objection is that it would be impossible to make this preemptive purchase discreetly. Traffickers would soon become aware of the new entrants in the market and would bid against them. The price of opium in Afghanistan would soar, and the program would end up costing taxpayers a great deal more and

still not prevent opium from continuing to flow into the illegal market, albeit at higher prices. The conceptual objection is that the intervention would exacerbate long-term problems. In face of the increase in demand at the farm-gate level, growers would now plant more, thus worsening the world heroin problem after the preemptive buying program ended.

Although both objections have some power, neither individually nor jointly are they decisive. The traffickers in the short run might not have access to funds to bid the prices very much higher than they are now; over time, they could increase their sales revenues enough to do so but perhaps not in the first year. Nor does failure to buy the whole crop mean that users would be unaffected by the program; if the governments succeed in purchasing half the product, for example, there could still be substantial hikes in export prices. These might be large enough to raise retail prices in some countries, motivating a large number of addicts to desist, with or without formal treatment.

The fact that there will be an increase in production, and presumably lower prices, in the following years, has relatively little consequence for the global market. A decline in the price of opium has minimal effect on the price of heroin in the major consumer markets. The claim here is of an asymmetry. A sharp reduction in physical availability might generate a price spike that would in fact affect final demand. A glut, though, cannot have the opposite effect because declines in farm-gate prices of opium have minimal effect on retail prices. Thus, the short-term gain from the price spike may not be offset by any harm from the increased production that it generates, whether in Afghanistan or in some other nation that entered the market because of the perception that returns had increased.

I offer this example not as a complete analysis of the effects of a preemptive purchase but rather to indicate the kind of innovation that needs careful analysis. The sudden rise in prices might lead another nation to enter the market, thus spreading the problem and eliminating one of the attributes that make preemptive purchase possible. If crops can be expanded rapidly, then the program might be so short-lived as to be not worth the effort. One would have to consider not only whether it is possible to obtain the desired spike but also whether it is possible to coordinate treatment efforts in consumer countries to provide resources so that the system is able to take advantage of the short-term opportunity.

Strategic Location

It is plausible that even programs that succeed in raising the price of coca and opium will fail to reduce world consumption of cocaine and heroin substantially. The reason is simply that the elasticity of retail price with respect to the price of opium or of coca paste is too low; raising Afghan opium prices by 50 percent may generate, even in Iran (a middle-income neighbor of Afghanistan), no more than a 5 percent increase in retail price³⁹ and thus a very modest decline in consumption. That has important policy implications, as it suggests that control efforts will result in shifts in location rather than in reductions in the volume of production. Afghanistan's decline in production will be compensated, perhaps with a lag, by increases in production elsewhere.

Drug production then becomes a global public "bad," like toxic waste disposal. Some nations will have to bear the consequences of the global demand for drugs so long as that demand cannot be suppressed.

The global policy decisions are, then, Is it desirable to have production dispersed across many countries or concentrated in a few? Should production be stably located in specific countries or moved around? Is it possible to determine which countries are likely to suffer the least bad consequences from becoming major producers and traffickers? And is it possible to develop compensation mechanisms for those nations that end up with the industry?

Many or Few? It may be argued that many countries with a small opium industry will result in less total harm than a few countries each with a large industry. A few hundred opium farmers scattered across a broad area will generate only opportunistic corruption, and the funds available from the farmers will not be sufficient to purchase central government protection. That may not be a stable equilibrium, however; subnational regional concentration may develop and pose a substantial threat to provincial, if not national, government integrity.

Allowing two or three nations to dominate production—in effect, the situation that has characterized the past 20 years—results in fundamental undermining of governmental authority in those countries. The term *narco-state* has been thrown around loosely,⁴⁰ but it is fair to say that the task of reestablishing the central government in Afghanistan has been made substantially more difficult by the flow of revenues from opium

and heroin, a situation that has allowed regional warlords to maintain and equip substantial independent militias. Similarly, Colombia's long-running civil war has been deepened and prolonged by the ability of both FARC (the Revolutionary Armed Forces of Colombia) and the newer paramilitaries to finance their activities with funds from taxing coca production and refining. However, at the margin, shifting 25 percent of the industry to, say, Ecuador, might do less to reduce the damage in Colombia than it does to worsen Ecuadorian integrity and stability. It may be that globally it is preferable to manage the problem in Colombia, rather than pressure it to act aggressively and motivate reemergence in Bolivia.

Move or Stabilize?. The damage caused by the industry is also partly a function of whether it has been stably located. Systemic corruption is not irreversible, but once the norms and networks supporting it have developed, restoring good governance is difficult. Pushing Myanmar's production into Cambodia and then on into Vietnam may cause the other two countries great harm without much helping the fight to improve the welfare of the people of Myanmar.

Which Nations?. If it is accepted that the global community can make a strategic choice about where the industry locates, then one can ask whether total harm can be reduced. For example, size is a consideration. A small nation such as Tajikistan may be substantially corrupted by accounting for trafficking even as little as 20 percent of Afghanistan's production, whereas Brazil is so large that a shift of trafficking networks for Colombia's cocaine output to that nation would have only modest effects. Brazil may also be more capable of moderating the adverse effects of the trafficking-related corruption. The population potentially affected by government failure, however, is very much greater in the larger nations. Should the world prefer that 5 million citizens of Tajikistan have their government totally captured by the drug trade, rather than have governance for 70 million Iranians somewhat worsened by trafficking?

Compensation Mechanisms. Whether it is possible to create a mechanism that is politically acceptable and that does not encourage weak nations to seek out the industry is another matter. Indeed, it could be argued that

simply letting the producing nations keep the revenues from the drug trade without sanctioning them is compensation enough.

There is generally something disturbing about such policy realism, and it is not clear that it is a politically stable option. What if global public opinion does not accept the premise that drug production is demand driven? Can the government of Colombia responsibly accept that it will continue to be a major cocaine producer without acting aggressively to suppress the trade? The taint of the drug business may simply be too great for any nation that has prospects for attracting substantial legitimate foreign investment.

Concluding Observations

I have taken a speculative approach in this chapter because there is little empirical or conceptual literature. Gross facts about global drug problems are readily available: for example, Afghanistan produces most of the world's opium and the United States consumes a large share of the world's cocaine production. However, magnitudes are imprecise; estimates of Colombian cocaine production, for example, have been revised by 50 percent around the year 2000 because of new information on yields of alkaloid and the frequency of crops, while the error bands around estimates of the number of heroin addicts in Europe are very broad indeed.

The body of research and evaluation on drug policy interventions, apart from drug treatment, is thin. No more than three empirical studies (using that term generously) of the effects of increased intensity of interdiction have been carried out. No evaluations of the consequences of crop eradication or lab seizure efforts for major drug markets in producer countries have been done.

Conceptual matters are no better. Barely a handful of articles by economists on the peculiar configuration of the global drug market have addressed the subject. Economists' curiosity has largely been confined to clever possible explanations for the paradoxical effects of enforcement (Poret 2003, for example). I will conclude this chapter by identifying three questions that seem worthy of economists' attention:

- What factors determine a nation's comparative advantage in the production or trafficking of illegal drugs?

- How stable is the configuration of producer and trafficker countries?
- Is long-term reduction in global supply possible?

Comparative Advantage

The factors of production for cocaine or heroin at first glance appear to be those of any agricultural commodity: labor and agronomically suitable land. Under conditions of prohibition, however, the scarce factor is some form of “domestic tranquility,” with the ability to grow, process, and transport the commodity at low risk. In explaining Colombia’s dominant role in the South American cocaine industry, Thoumi (2003) offers a conceptual model that emphasizes the lack of social capital and weak governance as the basis for low operating costs for the industry. He also notes the difficulty of disentangling the relationship between historically weak government institutions and the presence of the drug trade, which itself weakens those institutions.

The configuration is state dependent (pun intended). A principal cost is presumably that of obtaining official cooperation. The cost of such cooperation is highest for the first transaction, since in subsequent transactions both sides know that the other can be trusted. An established producer country is one in which many such corrupt relationships have been created, providing lower costs for all phases of the industry within that country.

International transportation costs take on a new meaning in this setting as well; they are also determined less by the conventional factors than by the risk of seizure and the penalties faced by interdicted couriers; the relevant risks may those imposed by other countries. Thus, if it were possible to make transportation through all neighboring countries (China, Iran, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan) very risky and expensive, Afghanistan might lose its attraction as a producing site. This observation is not intended as a policy option: closing trafficking is harder than eradicating production, which does require fixed sites.

Stability

Cocaine and heroin look like “footloose” industries. The specific knowledge, personnel, and capital required are minimal. Small changes

in the profitability of specific nations should lead to rapid changes in location. Yet there has been surprising stability. The same three nations have dominated cocaine, and the same two have dominated heroin for the past 20 years. The only new entrant has been Colombia into heroin production.

At the subnational level, there has been much more change. For example, Afghanistan's opium production—long concentrated in a few southern and eastern provinces—is now spread throughout the country. Bolivian coca production was concentrated in the Jungas until about 1980, when unemployed tin miners moved to the Chapare; it is now moving back to the Jungas. What this movement suggests is that the nation is a relevant unit of analysis; there is a system of distribution and trafficking that can accommodate changes in the site of production.

Note that in the trafficking sector, nationalities rather than nations may be involved. Nigeria is not an important trafficking location. Rather, it is the diaspora of Nigerians throughout the world that serves as a supply of trafficking labor, linked loosely to the mother country. The decision may be which nations Nigerians find most advantageous to use for transshipment. However, the reverse relationship is also possible: some nations are advantaged for transshipment, and it is Nigerians as labor who are advantaged for certain roles in those countries.

Global Supply Reduction

This chapter reflects what is now nearly a traditional pessimism about the long-term prospects for reducing supply in source countries. The elasticity of demand for cocaine and heroin with respect to source-country prices appears to be almost zero; as noted above, the raw material costs of opium and coca are barely 1 percent of the retail price in rich countries and perhaps no more than 10 percent in the large markets in poorer nations.

This model of price formation, however, is static and crude. Is it possible to impose a series of short-run supply disruptions that might cumulatively make a difference? The market for these drugs appears to be less well integrated globally than markets for many legal commodities, perhaps reflecting the high fixed costs and risks of establishing new trafficking routes. These drugs are the subjects of epidemics (see, for example, Caulkins and others 2004). A supply disruption for two or three

years at the right moment in an epidemic can make a substantial difference for a particular country. Paoli, Greenfield, and Reuter (2009) expand considerably on this issue.

In addition, an implicit model of price formation underlies this assumption; small dollar but large percentage increases in raw material costs do not affect final prices because they are passed along additively. Caulkins (1990) has argued that the relationship might be multiplicative, at least for price increases somewhat further up the chain. The historical record is inconsistent with the multiplicative model for coca and opium prices; these have been subject to large fluctuations that have not been seen in retail prices reported in the United States, although the quality of the price data is low. More serious testing might find that this model is not correct.

Cocaine and heroin appear likely to present global problems for the foreseeable future. A better understanding of the economics of production and trafficking would help policy makers both assess existing options and develop new ones.

Notes

1. President George W. Bush made such a statement in a meeting with President Vicente Fox of Mexico in 2001: “One of the reasons why drugs are shipped—the main reason why drugs are shipped through Mexico to the United States is because United States citizens use drugs. And our nation must do a better job of educating our citizenry about the dangers and evils of drug use” (Office of the Press Secretary 2001).
2. The most systematic effort to produce truly global estimates is contained in the 2005 *World Drug Report* (chapter 2), prepared by the United Nations Office on Drugs and Crime. Opium (mostly in the form of heroin) and cocaine are estimated to yield \$65 billion and \$70 billion in retail sales. Amphetamine-type stimulants (ATS) yield \$44 billion and cannabis resin \$25 billion. For cannabis herb (marijuana), the report cites a figure of \$113 billion but concedes this estimate has a weak base; the figure is far higher than can be reconciled with the systematic and well-documented estimates for the U.S. marijuana market (ONDCP 2001). The *World Drug Report* contains estimates of “wholesale revenues,” but it is unclear what share should be assigned to developing nations. A recent study by Kilmer and Pacula (2009) has come up with lower estimates for the countries that are most important for these trades but could not estimate total global revenues. However, the results suggest that for cannabis the correct figure might be only half as large as the UNODC estimate.

3. Among those that now regularly conduct general population surveys and attempt to estimate the number of *problematic drug users*, a term coined by the European Monitoring Center for Drugs and Drug Addiction, are Australia, the Netherlands, Switzerland, and the United Kingdom. There are good-quality data from school surveys of 15–16 year olds in most European nations; the European School Project on Alcohol and Other Drugs can be found at www.espad.org.
4. On occasion, there are gross inconsistencies that undermine confidence; for example, a nation might report more opiate addicts than opiate consumers or wholesale purity that is lower than retail purity.
5. Opiates are products of the opium poppy; they include opium, which is usually smoked, morphine (rarely used), and heroin.
6. An unpublished estimate based on a 2004 survey by Chinese researchers (Chen Xiaobo, Xie Hua and Zhou Tie) has generated an estimate of about 2 million heroin addicts.
7. For example, it was estimated that in Thailand, a relatively successful developing nation, the annual expenditure for a heroin addict in the mid-1990s was approximately \$1,150, compared to \$30,000 in Italy (UNDCP 1997).
8. The first fully documented quantity estimate outside the United States is provided in Singleton, Murray, and Tinsley (2006).
9. A kilogram of cocaine requires approximately 400 kilograms of leaf as input. The precise figure varies, depending on the alkaloid content. There is variation among regions within the Andes; however, there are no estimates of the quantities produced in each region and how they differ in terms of alkaloid content. See Drug Availability Working Group (2003).
10. Even in that year, Afghanistan still supplied large quantities of opium and heroin to the world market out of stockpiles.
11. No credible estimates of either marijuana consumption in Europe or of marijuana production in the Netherlands are available.
12. The annual series for most countries are quite noisy because a few large seizures can substantially affect the total. Over the long term, however, seizure data tend to suggest the actual level of trafficking. UNODC (2005) has shown that seizures track an independently generated estimate of total production well.
13. While China does indeed share a border with Afghanistan, it appears that few of the seizures of heroin come out of that border; they occur either near the border with Myanmar or in the interior. See Townsend (2005) for a discussion of the risk that Afghanistan will become a major source of opiates for the China market.
14. On China's historic involvement in production, see Dikotter, Laamann, and Xun (2004). Iranian production before the 1979 Islamic Revolution is discussed in Hansen (2001).
15. I have chosen 2000 rather than 2002 because Afghanistan's opium price has been at a historic high following recovery from the cutback in production in 2001 and is now falling back closer to the levels of the late 1990s.

16. The government imposes costs through arrest, incarceration, and seizures. Other participants impose costs through violence and theft.
17. Norman Lyoaza (personal communication) has suggested that some countries may be advantaged in terms of how easily the drug production may be concealed. He suggests, for example, that Afghanistan's mountainous terrain makes it harder for the government to detect small fields.
18. Mexico has always had plentiful supplies of marijuana, but that drug appears not to have been commercially produced until the 1960s.
19. This analysis draws heavily on Reuter (1988).
20. This is not an argument for abandoning interdiction but for recognizing the limits of its effectiveness in making cocaine or heroin more expensive and less available in mature markets.
21. It is the absolute difference between export and import that measures smuggling efficiency. For purposes of final consumption, however, the absolute price difference is not the interesting figure here; heroin doses are much smaller than those for cocaine (25–50 pure milligrams versus 200 pure milligrams).
22. Nigerian traffickers seem to specialize in such smuggling. Mark Kleiman (personal communication) has estimated that Nigerian couriers body-packing heroin into New York in the early 1990s accounted for over 500 kilograms per year, 3–5 percent of estimated U.S. consumption. That requires only three body-packers every two days.
23. The risk and payment figures here are moderately informed guesses; the purpose is simply to provide a sense of the magnitudes involved.
24. The body-packer costs are much lower for exports to Russia from Central Asia; body-packers in Tajikistan may receive only \$500 for smuggling heroin. Russia seizes very little heroin, and the opportunity cost of the smugglers in legitimate wages is no more than a few hundred dollars per year. It is particularly difficult to explain the high markups for smuggling heroin into Russia.
25. The 2000 U.S. Census counted 9 million residents born in Mexico. The figure for Colombia was only 600,000, but this number was twice as many as for any other South American nation.
26. Uribe reports the price of a kilogram of opium latex, the raw production material in Colombia as about \$340 in 2000. A kilo of heroin requires roughly 10 kilos of opium latex; the same figure applies to opium.
27. There is substantial disagreement about the share from these two nations (Drug Availability Working Group 2003) but no disagreement that they are major suppliers to the United States and to no other major markets.
28. Turkey had a substantial traditional opium market until the 1970s; thus the poppy industry served both domestic and export markets. There is now little domestic consumption of opium.
29. On Nigerians in the Central Asia trade, see Reuter, Pain, and Greenfield (2004).
30. See, for example, Washington Office on Latin America (n.d.).

31. Thoumi (2003) offers the following list of programs under the general rubric of alternative development: crop substitution, development of markets for legal agricultural products, industrialization of agricultural products to increase value added in rural areas, providing social infrastructure, and, finally, organization development in the communities involved and development activities in nonillicit crop-producing regions that expel migrants to coca and poppy areas (chapter 11).
32. Infrastructure development has potentially counterproductive effects. It is believed that the creation of better roads in the Chapare in Bolivia during the 1980s, intended to help the distribution of legitimate agricultural products, had the effect of providing easier access for small planes to pick up coca paste (Riley 1996).
33. There is a controversy over whether price increases are additive rather than multiplicative across successive distribution levels (Caulkins 1990). However, the arguments for a multiplicative relationship do not apply at the preimport level. Since the largest proportionate increases occur at the smuggling stage, even the Caulkins model would suggest very modest retail price increases from rising leaf prices. As a matter of historical observation, there appears to be substantial variation in coca leaf prices that is not reflected in retail cocaine prices in rich nations.
34. This is the percentage of estimated total world production reported as seizures in UNODC (2003). It may be an overestimate because seizures are not purity adjusted and are often very much less than 100 percent pure.
35. Tajikistan is separated from Russia by Kazakhstan. Citizens of both Kazakhstan and Tajikistan have the right to enter Russia without visas; the Russian border is, moreover, very long and lightly guarded.
36. That price series did not distinguish transactions by size but assumed a fractal distribution for transactions along the chain from import to wholesale.
37. The figure would be higher for 2002–5, given that opium prices have remained higher than before the Taliban opium ban (UNODC 2005).
38. A number of U.S. studies have found that higher prices for cocaine have increased treatment seeking.
39. The retail price of a kilo of pure heroin in Iran (sold in small and somewhat dilute units) in the year 2000 was about \$5,000–10,000 at a time when the 10 kilograms of opium required to produce that kilo of heroin cost less than \$500. The figures on Iranian prices come from the UNODC *Global Illicit Drug Trends*; they show broad ranges. For example, the 2002 report quoted the street price as \$0.70–2.30 for a gram that was 4–20% pure.
40. Shortly after Jacques Chirac became president of France in 1995, he canceled his first meeting with the Dutch prime minister, accusing the Netherlands, with its tolerant drug policies, of being a “narco-state.” The Dutch were appropriately horrified at the mischaracterization of their country (Dejevsky 1996).

References

- Booth, Martin. 1996. *Opium: A History*. New York: St. Martin's Press, 1996.
- Bouchard, Martin. 2008. Towards a Realistic Method to Estimate Cannabis Production in Industrialized Countries. *Contemporary Drug Problems* 35(no. 2/3): 291–320.
- Boyum, David, and Peter Reuter. 2005. *An Analytic Assessment of U.S. Drug Policy*. Washington, DC: American Enterprise Institute.
- Caulkins, Jonathan P. 1990. "The Distribution and Consumption of Illicit Drugs: Some Mathematical Models and Their Policy Implications." PhD diss., Massachusetts Institute of Technology.
- Caulkins, Jonathan P., and Peter Reuter. 1998. "What Can We Learn from Drug Prices?" *Journal of Drug Issues* 28 (3): 593–612.
- Caulkins, Jonathan, Doris Behrens, Claudia Knoll, Gernot Tragler, and Doris Zuba. 2004. "Markov Chain Modeling of Initiation and Demand: The Case of the US Cocaine Epidemic." *Health Care Management Science* 7: 319–29.
- [[AU: Issue number?]] Xiaobo, Chen, Xie Hua and Zhou Tie. 2004. "An Empirical Study on Heroin Market in China." unpublished.
- [[AU: Provide additional information, eg, location]] Crane, Barry, Rex Rivolo, and Gary Comfort. 1997. *An Empirical Examination of Counterdrug Interdiction Program Effectiveness*, P-3219. Alexandria, VA: Institute for Defense Analyses.
- Dejevsky, Mary. 1996. "Chirac Unveils New Jobs Deal for EU States for EU Summit." *The Independent*. March 26. <http://www.independent.co.uk/news/world/chirac-unveils-new-jobs-deal-for-eu-states-foreu-summit-1344144.html>.
- Dikotter, Frank, Lars Laamann, and Zhou Xun. 2004. *Narcotic Culture: A History of Drugs in China*. Chicago: University of Chicago Press.
- Drug Availability Working Group. 2003. *Drug Availability Estimates in the United States*. Washington, DC: Office of National Drug Control Policy.
- European Commission. 2009. *A Report on Global Drug Markets 1998–2007*. Edited by Peter Reuter and Franz Trautmann. Brussels. http://ec.europa.eu/justice_home/doc_centre/drugs/studies/doc/report_10_03_09_en.pdf.
- Gettman, J. 2006. Marijuana Production in the United States [Electronic Version]. *The Bulletin of Cannabis Reform, December*, 1–29. Retrieved November 1, 2008 from http://www.drugscience.org/Archive/bcr2/MJCropReport_2006.pdf.
- Hansen, Bradley. 2001. "Learning to Tax: The Political Economy of the Opium Trade in Iran, 1921–1941." *Journal of Economic History* 61 (1): 95–113.
- International Narcotics Control Board (INCB). 2002. *Report of the International Narcotics Board Control*. <http://www.incb.org/e/ar/2002>.
- Kennedy, Michael, Peter Reuter, and K. Jack Riley. 1993. "A Simple Economic Model of Cocaine Production." *Computer and Mathematical Modeling* 17 (2): 19–36.
- [[AU: Provide complete cite]] Kilmer, Beau, and Rosalie Pacula. 2009. "Estimating the Size of the Illicit Drug Markets." In Reuter and Trautmann 2009, 61.

- Kilmer, Beau and Peter Reuter. Forthcoming. "Prime Numbers: The Drug Trade." *Foreign Policy*.
- Kleiman, Mark. 1992. *Against Excess: Drug Policy for Results*. New York: Basic Books.
- MacCoun, Robert J., and Peter Reuter. (2001). *Drug War Heresies: Learning from Other Vices, Times, and Places*. Cambridge: Cambridge University Press.
- Mansfield, David. 1999. "Alternative Development: The Modern Thrust of Supply-Side Policy." *United Nations Bulletin on Narcotics* 51:19–44.
- Manski, Charles, John Pepper, and Carol Petrie, eds. *Informing America's Policy on Illegal Drugs*. Washington, DC: National Academy Press.
- Manski, Charles, John Pepper, and Yvette Thomas, eds. 1999. *Assessment of Two Cost-Effectiveness Studies on Cocaine Control Policy*. Washington, DC: National Academy Press.
- Matrix Knowledge Group. 2007. *The Illicit Drug Trade in the United Kingdom*. London: Home Office.
- Office of the Press Secretary. 2001. "Remarks by President George W. Bush and President Vicente Fox of Mexico in Joint Press Conference, February, 16, 2001." <http://www.whitehouse.gov/news/releases/2001/02/print/20010216-3.html>.
- Paoli, Letizia, Victoria A. Greenfield, and Peter Reuter. 2009. *The World Heroin Market: Can Supply be Cut?* New York: Oxford University Press.
- Ponce, Robert. 2002. "Rising Heroin Abuse in Central Asia Raises Threat of Public Health Crisis." *Eurasia Insight*. <http://www.eurasianet.org/departments/insight/articles/eav032902a.shtml>.
- Poret, S. 2003. "The Illicit Drug Market: Paradoxical Effects of Law Enforcement Policies." *International Review of Law and Economics* 22(4): 465–93.
- Reuter, Peter. 1988. "Can the Borders Be Sealed?" *Public Interest* (Summer): 51–65.
- . 1992. "After the Borders Are Sealed: Can Domestic Sources Substitute for Imported Drugs?" In *Drug Policy in the Americas*, edited by Peter Smith, 163–77. Boulder, CO: Westview Press.
- . 2006. *Drug Control in Bolivia*. Unpublished paper. Washington, DC: World Bank Institute.
- Reuter, Peter, Gordon Crawford, and Jonathan Cave. 1988. *Sealing the Borders: Effects of Increased Military Efforts in Drug Interdiction*. Santa Monica, CA: RAND, R-3594-USDP.
- Reuter, Peter, and Victoria Greenfield. 2001. "Measuring Global Drug Markets: How Good Are the Numbers and Why Should We Care about Them?" *World Economics* 2 (no. 4): 155–73.
- Reuter, Peter, and Mark Kleiman. 1986. "Risks and Prices: An Economic Analysis of Drug Enforcement." *Crime and Justice: An Annual Review* 9:128–79.
- Reuter, Peter, and Emil Pain, with Victoria Greenfield. 2004. "The Effects of Drug Trafficking on Central Asia." Unpublished project report. Santa Monica, CA: RAND.
- Riley, K. Jack. 1996. *Snow Job: The War against International Drug Trafficking*. New Brunswick, NJ: Transaction Publishers.

- Roston, Aram. 2002. "Central Asia's Heroin Problem." *Nation*. March 25. <http://www.thenation.com/doc/20020325/roston>.
- Royal Canadian Mounted Police. 2004. *Drug Situation in Canada—2003*. Criminal Intelligence Directorate. Royal Canadian Mounted Police, Ottawa.
- Ruggiero, V., and N. South. 1995. *Eurodrugs: Drug Use, Markets and Trafficking in Europe*. London: University College London Press.
- Singleton, Nicola, Rosemary Murray, and Louise Tinsley. 2006. *Measuring Different Aspects of Problem Drug Use: Methodological Developments*. <http://www.homeoffice.gov.uk/rds/pdfs06/rdsolr1606.pdf> 16/06. London: Home Office.
- Spillane, Joseph F. 2000. *Cocaine: From Medical Marvel to Modern Menace in the United States: 1884–1920*. Baltimore, MD: Johns Hopkins University Press.
- Thoumi, Francisco. 2003. *Illegal Drugs, Economy and Society in the Andes*. Baltimore, MD: Johns Hopkins University Press.
- Townsend, Jacob. 2005. *China and Afghan Opiates: Assessing the Risk*. Silk Road Papers. School for Advanced International Studies, Johns Hopkins University. http://www.silkroadstudies.org/new/inside/publications/Townsend_Total.pdf.
- United Nations Drug Control Program. 1997. *World Drug Report*. Oxford: Oxford University Press.
- United Nations Office on Drugs and Crime (UNODC). 2002. *Global Illicit Drug Trends*. New York: United Nations.
- . 2004. *Global Illicit Drug Trends*. New York: United Nations.
- . 2005. *Alternative Development: A Global Thematic Evaluation*. New York: United Nations.
- . 2005a. *Thematic Evaluation of UNODC's Alternative Development Programs*. Vienna: United Nations.
- . 2005b. *Bolivia Coca Cultivation Survey*. La Paz: United Nations.
- . 2007. *World Drug Report*. Vienna: United Nations.
- . 2008. *World Drug Report 2008*. New York: United Nations. <http://www.unodc.org/unodc/en/data-and-analysis/WDR-2008.html>
- United States Office of National Drug Control Policy (ONDCP). 2001. *What America's Users Spend on Illicit Drugs 1988–2000*. Washington, DC: White House.
- United States Department of State. Annual. *International Narcotic Control Strategy Report*. Washington, DC: Department of State.
- Uribe, Sergio. 2005. "Development of the Colombian Heroin Industry, 1990–2003." Unpublished project memorandum.
- Washington Office on Latin America. N.d. *Aerial Fumigation: Stop U.S. Sponsored Chemical Spraying in Colombia*. http://www.wola.org/Colombia/citizen_action_guide_fumigation.pdf.
- Youngers, Collete, and Eileen Rosin, eds. 2004. *Drugs and Democracy in Latin America: The Impact of U.S. Policy*. Boulder, CO: Lynne Rienner.

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