

The Development Impact of the Illegality of Drug Trade

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Abstract

This paper reviews the unintended consequences of the war on drugs, particularly for developing countries, and weighs them against the evidence regarding the efficacy of prohibition to curb drug use and trade. It reviews the available evidence and presents new results that indicate that prohibition has limited effects on drug prevalence and prices, most likely indicating a combination of inelastic drug demand (due to its addictive properties) and elastic supply responses (due to black markets). This should turn the focus to the unintended consequences of drug prohibition. First, the large demand for drugs, particularly in developed countries, generates the possibility of massive profits to potential drug providers.

This leads to the formation of organized crime groups, which use violence and corruption as their means of survival and expansion and which, in severe cases, challenge the state and seriously compromise public stability and safety. Second, prohibition and its derived illegal market impose greater costs on farmers than on drug traffickers. In many instances, this entails the transfer of wealth from poor peasants to rich (and ruthless) traders. Third, criminalization can exacerbate the net health effects of drug use. These consequences are so pernicious that they call for a fundamental review of drug policy around the world.

This paper—a product of the Growth and the Macroeconomics Team, Development Research Group—is part of a larger effort in the department to investigate the causes and consequences of threats to security in developing countries. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at pkeef@worldbank.org and nloayza@worldbank.org.

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The Development Impact of the Prohibition of the Drug Trade*

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Prohibition has made the drug trade more attractive and profitable, promoting criminality and corruption at all levels... Seen in this way, the drug debate should not remain caught between war and liberty but, catching the bull by the horns, focus on diverse, feasible ways to manage legalization.

Gabriel García Márquez
***Cambio 16*, November 1993**

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1. Introduction

Motivated by the pernicious effects of narcotic drugs on individuals and society, most governments have proscribed their trade and consumption. Some have invested enormous resources to enforce these prohibitions. Despite these efforts, drug consumption has grown and its trade has flourished, while the efforts themselves have triggered a long train of unintended consequences, raising the possibility that the war against drugs causes more damage than the drugs themselves. The consequences, particularly for social stability, may be greatest in developing countries. However, because drug policies are largely dictated by the world's richest consuming countries, the policy costs in developing countries appear to receive little attention.

This paper begins by evaluating three unintended consequences of the war on drugs that are often not discussed in public debates about drugs. First, criminalization can exacerbate the negative health effects of drug use (see MacCoun and Reuter 2001). Second, the high demand for drugs, particularly in developed countries, generates the possibility of massive profits to potential drug providers. In important instances, these profits have catalyzed the formation of organized crime groups that use violence and corruption to protect markets and profits. These individuals and organizations expand and gain strength by associating themselves with guerrilla movements and common criminal activities. In severe cases, they pose a challenge to the state, and public stability and safety are severely compromised. Third, prohibition and its derived illegal market appear to impose greater costs on farmers than on drug traders.

Developing countries' own actions give rise to these costs: their laws and regulations criminalize drug cultivation and trafficking; and their police and armed forces, sometimes with outside assistance, enforce these laws through eradication, interdiction, and prosecution efforts. However, poorer countries cannot unilaterally relax their stance against narcotic drug cultivation and trafficking because of the threat of international sanctions that would be applied against them if they did.

Because drug policies in developed, consuming countries have such a large impact on developing, producer countries, we turn to the evidence on the costs and benefits of current strategies to curb drug use and trade within consuming countries. Like MacCoun and Reuter (2001), we adopt an economic perspective on the costs and benefits of the criminalization of the drug trade. This perspective necessarily includes an explicit consideration of the benefits to

society of suppressing drug use. Those benefits are of two kinds: the reduction of costs that drug use imposes on non-drug users (negative externalities); and the reduction of private costs that drug users unintentionally impose on themselves (e.g., by underestimating the risks of addiction). We make three points about the benefits of drug use reduction. First, the most serious tangible costs imposed by drug users on others are likely to be borne by their own families – for others in the society, the main externality depends on prevailing social norms and the degree of social opprobrium attached to drug use itself. Second, much drug use does not impose unintended private costs on users – most users calculate the costs to them of their consumption and accept those costs. And third, the benefits of drug use reduction vary significantly across individuals and types of drugs.

We then review the efficacy of drug prohibition, the drug suppression strategy that imposes, by far, the greatest costs on developing (and developed) countries. We also present new, cross-country comparisons that reinforce the conclusions reached by other authors, such as MacCoun and Reuter (2001): the evidence is equivocal that prohibition has reduced the harm from drug use sufficiently to justify the costs of prohibition even in developed countries. Adding the costs of prohibition in developing countries to the welfare equation notably weakens the welfare case for strictly enforced prohibition. Calling attention to the limitations and disadvantages of prohibition and the war on drugs should not be interpreted as either a defense of unrestricted drug trade or a justification for a hands-off policy approach towards drug consumption. Clearly, there are grounds for regulatory intervention and for public campaigns to reduce consumption. This paper does not address directly the difficult issue of identifying the right public intervention to control the use of narcotic drugs. Its analysis does imply, however, that, taking into account both international and domestic costs and benefits, the current strategy of prohibition coupled with criminalization should be subject to a thorough reevaluation.¹

The remainder of the paper is structured as follows. Section 2 discusses the unintended consequences of the war on drugs, highlighting its effects on the distribution of wealth, public health, and institutional stability in producing countries. Section 3 discusses the economic case for prohibition, outlining the basic economic framework that justifies intervention in any market and the limitations of its application to the case of drugs. Section 4 presents the current evidence available on efficacy of current policies in reducing drug consumption. Section 5 reviews explanations of why that efficacy is low. Section 6 presents the policy implications of these findings, and section 7 concludes the paper.

2. Unintended Consequences of Illegality and Repression

The net social benefits of any public policy depend on the costs that the policy imposes. The more extreme the policy, the larger those costs are likely to be. The dominant strategy among rich countries for suppressing drug consumption is prohibition, the eradication of supplies and interdiction. Some social costs of prohibition are well-documented and widely recognized by policy makers. These are, first, the opportunity costs of diverting financial resources to the police, judiciary system and prisons to enforce prohibition. Federal, state and

¹ As Van Ours and Pudney (2006) write, “Whereas in other, ‘normal’, markets there is plenty of research to back economic policy interventions, policy on illicit drugs is often driven more by emotions than by evidence-based evaluation of alternatives.”

local governments in the United States spent roughly \$35 billion annually on the war on drugs by the end of the 1990s, up substantially from \$10 billion in the mid-1980s (Reuter, 2001). MacCoun and Reuter (2001, p. 28) and Pacula (2008) conclude that at least three-quarters of national expenditures on drugs are spent on catching and punishing dealers and users; treatment expenditures account for, at most, one-sixth of total federal expenditures. Conclusive research on the efficacy of either enforcement or treatment and prevention is surprisingly thin. It is safe to say, though, that there is no evidence-based justification for the policy conclusion implicit in these budget decisions: that enforcement expenditures have a far more positive impact on social welfare than do expenditures on treatment and prevention.

Two other well-known costs of prohibition are the lives lost due to prohibition-induced violence and the productivity losses due to incarceration. In the U.S., for example, one in every four prisoners is in jail for drug-related, mostly non-violent offenses (Caulkins and Chandler, 2005). The imprisonment rate for drug-related offenses in the US is above the overall imprisonment rate of most Western European countries (*The Economist*, 2001, MacCoun and Reuter, 2001, p. 24). Chart 1 shows that the number of adults incarcerated for drug law violations in the US increased by more than ten-fold between 1982 and 2002. Though it might be the case that incarcerated drug offenders would not be highly productive were they employed outside of the drug sector, White House estimates still put production losses from the 660,000 incarcerated drug offenders at approximately \$40 billion (Executive Office of the President 2004).

While the costs of prohibition to consuming countries appear to be quite high, one unintended effect of prohibition is to impose even higher costs (at least relatively) on some developing countries involved in the international “War on Drugs”. The Uribe government in Colombia committed the country to increasing defense expenditures from 3.6 percent of GDP in 2003 to 6 percent by 2006, increasing security forces from 250,000 (150,000 military plus 100,000 police) to 850,000 over four years (Colombian Government, 2003). These expenditures are mostly intended to combat insurgency in the country, but the main source of insurgent financing is the revenues from participation in narcotics production and trafficking, made particularly lucrative as a result of their illegality. In contrast, public expenditures on health in Colombia were around 5 percent of the GDP in 2000 (World Development Indicators). The opportunity cost of these resources for developing countries, be it in terms of investments in health, education, or infrastructure, is almost surely larger than in richer countries and represents a substantial cost of the prohibition strategy that is generally neglected.

These are the direct, fiscal costs of prohibition. They are particularly large in countries, such as Colombia, that have chosen to strongly confront drug production and trafficking. But even in developing countries that invest less in outright interdiction and prosecution, three other categories of unintended costs of prohibition can be identified. These are not as clearly taken into account in weighing the costs and benefits of prohibition. Prohibition damages public health, as it may worsen the social costs of given drug consumption; prohibition exposes farmers to the risk of catastrophic loss, while creating large rents for organized crime involved in drug trafficking; and prohibition undermines public safety, security, and institutions in developing countries.

2.1. Public Health

The public health consequences of prohibition are of three kinds. First, prohibition drives drug traffickers – and drug consumption – to countries in which drug consumption would otherwise not be prevalent, and where governments are significantly less able either to curb consumption or to treat drug users. This phenomenon arises as drug traffickers seek friendlier countries through which they can export their product to rich consuming countries. Consumption grows in transit countries because the marginal costs of distributing drugs in transit countries is low, given that traffickers already must build up networks of collaborators to move the drugs through these countries. Even though transit countries are poorer, and drug prices therefore much lower, low marginal costs make even these markets highly lucrative. The link between transit and local distribution networks is particularly evident in the fact that drug traffickers pay local collaborators in-kind (in drugs).

In order to expand their presence in European markets, for example, drug traffickers have opened a beachhead in Guinea-Bissau, where large shipments are bundled into small packages that can be brought into Europe with a lower risk of detection. Anecdotal evidence indicates that cocaine use is now significant in the country (“Route of Evil: How a Tiny West African Nation Became a Key Smuggling Hub for Colombian Cocaine, and the Price it is Paying,” *The Washington Post*, May 25, 2008, p. A1). More well-known is the case of Central Asia. Drug traffickers have long preferred an overland route through Central Asia to bring opiates from Afghanistan to Europe. As a consequence, Central Asian countries have experienced a dramatic increase in rates of drug consumption. Some (Uzbekistan and Kyrgyzstan, among others) have jumped from almost no drug dependency problems in 1990 to addiction rates close to those of many Western European nations today (Reuter et al, 2004). According to the International Narcotics Control Strategy Report (2006), released by the Bureau for International Narcotics and Law Enforcement Affairs, United States Department of State, <http://www.state.gov/p/inl/rls/nrcrpt/2006/vol1/html/62100.htm>, around 60 percent of opiate exports smuggled out of Afghanistan bound for the Persian Gulf, Turkey, Russia and Europe pass through Iran. Iran now has an estimated 3 million opiate abusers, as many as 60 percent of who are reported as addicted. Iran is vigorous in its efforts to prevent drugs from reaching its citizens: more than 3,400 Iranian law enforcement personnel have died in clashes with drug traffickers in the last twenty years.

Second, illegality undermines the usual vehicles of quality assurance upon which legal markets rely, ranging from reputation to government quality regulation. This is a cost of prohibition borne in all consuming countries. Though reputational investments in drug retail are possible, there is no open advertising, no investment in the vertical supply chain to ensure quality, and reduced horizon effects associated with the probability of future incarceration or loss of control over the business. In this context, overdoses due to uncertain strength and poisoning due to adulteration are both likely to be more frequent (see Bernardo 2003, Miron and Zwiebel 1995, Cameron and Collins 2006).

Third, illegality impedes efforts to treat drug users and to prevent the spread of disease via drug use. Since consumption is an illegal activity and, because of that, tends to take place under less than ideal conditions, the transmission of contagious diseases becomes more likely. This is clearly the case of heroin consumption through injection, as the spread of AIDS among

intravenous drugs consumers in recent decades has shown. Public health efforts to distribute free syringes for drug users and, in some circumstances, the availability of services to check for the purity of drugs may lessen these problems. However, users are reluctant to take advantage of these when consumption itself is criminalized (Godinho and Veen, 2005). In addition, implementation of these services is slow because of fears that they increase the total demand for drugs (by reducing the cost of use, improving quality, and reducing risks associated with consumption).

Of course, as we discuss in greater detail below, a reduction in the costs of drug use that flows from relaxing prohibition would result in some increased consumption and the negative health effects of consumption. The negative health consequences related to prohibition, therefore, need to be set against the health costs of increased addiction if criminalization were replaced by a less aggressive drug policy.

2.2. Farmer Losses and Rents to Traffickers

Even if supply eradication efforts associated with prohibition are unsuccessful, they still impose losses on farmers who cultivate poppies or coca. Except in rare instances, farmers cannot buy insurance against eradication and they are too poor to self-insure; moreover, eradication tends to target entire areas, so any informal safety-net arrangements between farmers break down (all the farmers holding up the net are eradicated). It is easy to see that for “eradicated” farmers, *ex post* losses could therefore be catastrophic. Farmer welfare losses are usually considered irrelevant to evaluations of prohibition, precisely because their farming activity is regarded as either criminal in and of itself or contributing to criminal activity in other countries. There are at least two reasons to take these welfare losses more seriously, however. First, the criminalization of cultivation of poppy seeds and coca has generally been a consequence of drug policies in rich consuming countries rather than from a broad popular rejection of this cultivation in producing countries; as a consequence, these farmers do not see themselves as criminals nor are they viewed by others in their societies as criminals. Second, because these farmers are generally poor, the welfare losses caused by economic setbacks are proportionally greater.

This latter argument is not that prohibition is, on average, bad for farmers. It is possible that farmers receive some (albeit quite small) share of the rents to which prohibition gives rise. The issue is rather that eradication as a strategy for effecting prohibition imposes extremely high costs on some farmers. The welfare implication of these extreme losses is relevant to the choice of eradication as a strategy for enforcing prohibition. However, policy decisions regarding eradication appear to give little weight to the welfare losses of individual farmers whose crops are eradicated in producer countries, even though such losses may be large in relation to the much-debated benefits of eradication.

Prohibition also affects the generation and distribution of profits along the production and distribution chain of the illegal drug. The organized criminal network required for trafficking the good (because of the illegality of its production, distribution and consumption) leads to funneling gains from farmers and farm-gate traders, upstream, and from consumers, downstream, to those criminal organizations. Because of the high barriers to entry into these links in the distribution chain –barriers imposed by violence and official corruption–, these

organizations can command high prices from consumers and offer lower prices to producers or farm-gate traders than they would receive if repressive policies were relaxed.

The extreme concentration of profits in the upper chains of the distribution network, and particularly in its last stages, is clear in all the estimates available. For example, Wilson and Zambrano (1994) estimate that 87% of the profit of the cocaine trade remains in drug consuming countries. More recently, Reuter and Greenfield (2001) and Smith (2005) estimate the price structure for one kilo of pure cocaine at different stages of the production and distribution chain. These numbers are presented in Chart 2. The results indicate that a major part of the profits end up in the hands of those who control the later stages of the production and distribution process. Proportionally, the highest jump in price is observed as cocaine leaves the producing country (Colombia in Chart 2), and reaches its destination country (U.S.). In this single step of the distribution chain the price increases by 17 times. This structure seems to support the idea that most profits are appropriated by intermediaries with large market power. This is the role that has been traditionally played by the international drug cartels.

2.3. Public Safety, Security, and Institutions

It is unsurprising that drug traffickers could overwhelm the institutions of a small, poor country such as Guinea-Bissau, with only 63 federal police officers (according to the *Washington Post*, May 25 2008, A1). However, the influence of organized drug traffickers is great even in far larger and wealthier countries. A recent, detailed report by the International Crisis Group (2008) on cocaine trafficking concludes that “Despite the expenditures of great efforts and resources, the counter-drug policies of the U.S., the European Union and its member states, and Latin American governments have proved ineffective and, in part, counterproductive, severely jeopardizing democracy and stability in Latin America.” This is not a surprising conclusion. Government intervention in any market also has institutional consequences that may influence both the effectiveness and the costs associated with the intervention. Whenever there are high rents from criminal activities and costs of bribing are low, intensified sanctions and policing may actually generate the perverse consequences of promoting organized crime, widespread corruption, and higher crime rates (Kugler, Verdier, and Zenou, 2005). These, in turn, may end up threatening the institutional environment even further and leading to an increase in the activity that they initially intended to reduce.

Arguably the most harmful of the unintended consequences of the criminalization of the drug trade are organized crime and the political instability they can unleash. The existence of a potentially large drug market means that there are large rents to be collected by producers and/or distributors. But since the market operates illegally, organized groups have a comparative advantage in setting up distribution network and the associated enforcement of distribution contracts. These groups substitute for both the state and other market institutions that would otherwise provide these services. However, the organized-crime enforcement of contracts entails violence, and violence is also used to raise entry barriers for potential competitors.

One immediate consequence of the usefulness of violence in drug markets is adverse selection into the drug business itself: individuals prone to or skilled at violence are more likely to enter the drug business than they are to become managers of beer and tobacco companies, for instance. Violent individuals are disruptive in any society; legal interventions that motivate them to organize have the unintended effect of exacerbating their influence (see Thoumi, 2005).

The escalation of violence in areas that have become a stronghold of illegal drug production and trade highlights these harmful effects. For example, 27,000 people died on average in Colombia in each year of the 1990s as a result of violence. This death toll due to violence implied a reduction of more than 2 years in the Colombian life expectancy at birth (Soares, 2005). Similar numbers have been observed in Brazil in recent years, where organized crime has reached a dimension not previously seen in the country. Linking the phenomenon of high crime with illegal drug trafficking, the governor of the Brazilian state of Rio de Janeiro, Sérgio Cabral, has declared that “A lot of crime in my state and city comes from [drug] prohibition, many young people die in wars over drug-selling spots,” calling then for a debate on drug legalization in Brazil and internationally (Drug War Chronicle, 2007). Violence is not universally associated with drug trafficking, but in settings where drug markets are heavily contested or where social or political institutions are weak, violence is more likely.

Much violence results from traffickers competing for market share. However, state efforts to fight traffickers also unleash substantial violence. Large-scale policy and army operations have resulted in high numbers of deaths throughout the world, from Mexico and Brazil to Thailand and Colombia. In Mexico, the army has recently been deployed to combat drug gangs, and they have responded in kind. Many people on both sides have died, but the drug trade continues unabated and, supported by their highly profitable activities, drug traffickers have proven to be exceptionally resilient.² In Thailand, the bloody 2003 government campaign against drug trafficking continues to be controversial. In only three months, over 2,500 people died. Even though initially the police blamed gang violence for the killings, a recent report found that they were due to a government “shoot-to-kill” policy and that over half of those killed had no links to drug trafficking (*The Economist*, 2008c). Adding to the multitude of concrete examples, the academic literature on the subject has found a clear and systematic causal link from drug prohibition to violence (see Dills, Miron, and Summers, 2008; and Fajnzylber, Lederman, and Loayza, 2002).

Organized crime groups link with other opponents of state institutions, magnifying the negative effects of drug traffickers on social and political stability. This is clear in the association between drug trafficking, guerrilla activities, and terrorism that recently became commonplace in South America and other drug producing regions. In Colombia (Revolutionary Armed Forces of Colombia, or FARC) and Peru (Shining Path), guerrillas and drug traffickers exchanged money and arms for protection until they eventually became undistinguishable from each other. In Colombia, guerillas became involved in the drug business in the 1990s, playing the role of the middlemen between coca growing farmers and the traffickers’ cocaine producing labs. Eventually, rough estimates reported by Reuter, et al., (2004) suggest that half of the resources of the FARC were estimated to come from drug production and trade. Scholars have documented a similar coincidence between terrorist or guerrilla groups and drug production and trafficking in other areas of the world, including the Middle East and South Asia (Reuter et al,

² Throughout Nuevo Laredo, Mexico (near the border), public advertisements like the following (loosely translated) are showing up everywhere: “Important Announcement: Operative Group *Los Zetas* is offering you, military or ex-military personnel, some dirty work. We offer: good salary: 5,000 pesos/week [about US\$500], stipends, and very good food. Interested people, call (044 867) 168 74 23. Deserters need not abstain.” (*Washington Post*, May 7, 2008, p. A13.) *Los Zetas* is a hit squad that works for the Gulf drug trafficking cartel, composed of elite Mexican army deserters. Drug traffickers in Mexico, just as under Pablo Escobar in Colombia, are preparing an army to counter government forces.

2004). Most notably, in present-day Afghanistan, the Taliban-led insurgency relies on the production of poppy-related drugs to finance its operations (a remarkable irony since the Taliban had successfully banned poppy cultivation during its last year in power). The commanders of NATO's International Security Assistance Force recognize that Taliban insurgents and drug traffickers function symbiotically. This led *The Economist* (2007b) to conclude that "Arguably the biggest danger to the future of Afghanistan comes not from the external Taliban enemy but from two interconnected internal ones: corruption and opium."

Summed together, these factors generate political instability that can eventually lead to direct challenges to the state power by organized crime. The blatant, public recruitment of hit men in Nuevo Laredo, Mexico, cited earlier, is one obvious example of such a challenge. More generally, Thomas Shannon, the senior U.S. official for the Western Hemisphere, has said that "It's obvious that democratic states in Mexico and Central America are under assault by the organized crime, drugs- and weapons-traffickers" (*The Economist*, 2008b). In the case of the guerilla movements, this is obviously true, since the motivation for the existence of the movements themselves is typically to challenge the established political order. But this is also present when organized drug traffickers challenge the state purely in pursuit of their economic interests. Probably the most widely cited example in this respect goes back to Pablo Escobar, the leader of the once powerful Medellin Cartel. In Colombia, the Cartel was responsible for the murder of a Minister of Justice, a Supreme Court Judge, an Attorney General, a chief of the Narcotics Police, and a front-runner presidential candidate, to cite only a few. At one point, Escobar publicly declared that the Cartel would pay US\$50 for each policeman killed.

In Brazil, the two most powerful organized crime groups with clear links to drug trafficking – the Red Command (CV) and the First Command of the Capital (PCC) – have coordinated simultaneous rebellions in as many as 29 different prisons and maintained effective control of power in certain slums and poorer areas. Assassinations of police officers, members of the judicial system, and authorities of the prison system are regular tactics of these groups. Threats to ruling institutions sometimes also take subtler forms, which are less violent and do not explicitly challenge the established order. A widespread culture of violence and lawlessness that oftentimes is associated with the presence of organized crime raises doubts about the legitimacy of the state and its capacity to provide the basic public goods demanded by citizens such as public safety. Petty corruption of police and customs officials, and grand corruption involving financing of political campaigns and judicial system, also undermine the institutional stability of a country and can be very damaging in the long-run (Thoumi, 2005). In some Central Asian countries (such as Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan and Kyrgyzstan), organized crime associated with the drug trade has become politically and economically influential (Reuter et al, 2004). In Colombia, paramilitaries involved in trafficking have exercised significant political power in vast areas of the country (Thoumi, 2005).

In the cases of Bolivia and Peru, coca cultivation has become a symbol of the indigenous population and of its lack of access to political representation. In these countries, coca has a long history of cultivation and use among the indigenous population and is closely related to their cultural identity. In the last few years, it has been used as a catalyst to organize nationwide protests against the political elites and the wealth expropriation perceived by the poorer indigenous population (see *The Economist*, 2004 and 2007c). In the recent experience of Bolivia, President Sanchez de Lozada was removed from office after protests over rights on natural gas and coca production. Evo Morales, a coca-grower ("cocalero") organizer, was the leader of these protests and is the current president of the country. Politically active "cocalero"

organizations are also present in Peru, where they have gained parliamentary representation and demanded in Congress to legalize coca cultivation (Thoumi, 2005).

3. Why Prohibit Drugs? The costs of drug consumption

The costs of prohibition borne by producer countries are largely a product of policies made in consuming countries and justified on the basis of costs and benefits within consuming countries. Since welfare calculations in consuming countries are most important for policy making in those countries, it is only if those calculations, or perceptions of those calculations, change that we can expect significant policy changes. It is therefore important to review the basis for those calculations, and to this issue we turn now.

A necessary condition for the prohibition of a specific good to be economically rational is the existence of negative externalities associated with its consumption or production that outweigh the consumer and producer surpluses associated with the good. Given the high costs of prohibition, even in consuming countries, one might expect the externalities associated with drug consumption in consuming countries to be particularly high and prohibition to be particularly effective in suppressing consumption relative to alternative strategies. However, as discussed next, the evidence on whether the costs of consumption externalities are higher than the costs of prohibition is debatable; the evidence on whether consumption externalities prevented by prohibition outweigh the costs of prohibition is even weaker.

There are few estimates of the tangible externalities imposed by drug users on society and none of the intangible externalities (the welfare costs of drug use for those morally opposed to drug use). The existing estimates adopt extremely divergent methodologies and are often aimed at calculating costs other than pure externalities. For example, the White House estimates of the economic costs of drug abuse yield total costs of \$181 billion (1.7 percent of GDP) in 2002 (Executive Office of the President 2004). Of these, however, productivity losses account for 71.2 percent, due in part to drug users own lost productivity (most of which are private to the drug user and not an externality) but mostly due to the incarceration of 660,000 drug offenders (whose lost productivity does not result from drug use, per se, but from drug criminalization). A study undertaken for the British Home Office (Godfrey, et al. 2002) reached similar conclusions about the total cost of drug use in the UK (approximately £15 billion in 2000, or 1.6 percent of GDP). However, productivity losses play little or no role in this estimate; by far its largest component is the victim costs of crime committed by problem drug users, amounting to £12.3 billion.

Victim costs of crime are an authentic externality, to the extent that they are driven by drug use. However, methodologies for estimating victim costs of crime by drug users and separating crimes that were due to drug use and crimes that would have been committed by drug users regardless of their drug use are again entirely divergent. The White House estimates also take into account crime, for example. Most of these costs are not the social costs of drug abuse, but rather relate to the budgetary costs of arresting and incarcerating individuals for drug offenses, which, together with the productivity losses of incarceration, account for most of the \$107.8 billion of total drug abuse costs it attributes to crime. The White House report concludes that the victim costs of property crimes committed *because* of drug use are only on the order of \$200 million. This constitutes the report's estimate of the cost of crimes committed by addicted

drug users, for whom it could plausibly be claimed that they “needed” to commit property crimes to finance their drug usage.

In contrast, in their report for the British Home Service, Godfrey, et al. (2002) assume that all property crime associated with problem users is caused by drug use. Problem users are defined as *all* users of opiates or crack cocaine (as opposed to only addicted users). The crime attributed to problem users is based on a longitudinal study of patients in drug treatment programs, reported in Gossop et al. (2001), and is the amount by which these patients reported reducing their criminal activity from the three months prior to intake to the period 9-12 months after entering treatment. Godfrey, et al. (2002) conclude that the entire reduction can be attributable to the reduction in drug use and assume that reductions would be similar if all non-treated problem drug users were also to reduce their consumption. This estimate is likely to be severely upwardly biased, however. First, both crime and drug use are the product of unobserved individual proclivities; drug treatment addresses these proclivities. The observed association between drug use and crime is therefore likely to be spurious, driven by the direct effect of treatment on crime rather than its indirect effect on crime through reduced drug use. Second, problem users who enter treatment are more likely than other users to have committed crimes in the first place, again biasing upwards the amount of crime that can be attributed to *all* drug users.

Estimates of the number of problem users are controversial. In principle, they are those for whom drug use is “no longer controlled or undertaken for recreational purposes and where drugs have become a more essential element of the individual’s life” (Godfrey, et al. 2001, p.2). In practice, standards for estimating the fraction of problem users among all users, and the fraction itself, vary widely. In the Godfrey, et al. study, problem users in England and Wales are all crack or opiate users, and are estimated to be at about 15 percent of all (class A drug) users. This is below the fraction of cocaine and crack users among all drug users in the United States (about 19 percent from the HHS estimates reported above), but higher than the 6 percent of drug consumers who are regarded as problem users in the US, according to the estimates reported in Reuter (2001) of two million people.

Existing analyses reveal significant uncertainty about the tangible social costs of drug use. It seems unlikely, given significant upward biases in the measurement of costs, that they actually exceed 0.5 percent of GDP, but the possibility that they are as much as one percent of GDP cannot be excluded. The victim costs of crime by addicted drug users are surely higher than the \$200 million estimated by the White House, but also likely to be only a fraction of the more than £12 billion estimated for the British Home Office. Other social costs (e.g., those from reckless driving, or intra-family abuses committed by drug users) have not been estimated at all, although these are likely to be low compared to the same costs imposed as a result of alcohol abuse.

These calculations leave out the intangible social costs of drug use – the costs that, in fact, may actually be driving drug policies in some countries. Social norms are in some places so strong and social opprobrium regarding drug use so great that the tangible social and private costs of drug production may be irrelevant in the evaluation of drug policies. Instead, policy debate is driven by the disutility that non-users feel from having drug users in their midst.³ Such a social reaction is often culturally rooted and may bear no relationship to the tangible

³ It may also be the case that prohibition is favored because the largest domestic costs of prohibition are borne by groups that have less political influence (e.g., residents of inner cities).

consequences of drug use; it can nevertheless have a significant effect on policy outcomes. Indeed, public policy mirrors the inconsistency of social views on drugs: some drugs are prohibited while others, such as alcohol or nicotine, with significant externalities and addictive properties of their own, are much more lightly regulated. Social opprobrium may determine why private interests of market participants are ignored in policy debates regarding drugs, in contrast to regulatory debates on legal markets.

Levels of social opprobrium vary widely, however, and can change significantly: several US states have decriminalized the medical use of marijuana, where before none had. Even within political parties there is substantial variation in views regarding decriminalization: decriminalization in New Mexico was signed into law by Republican governor Gary Johnson, but vigorously opposed by members of his own party. The existence of such externalities may justify some government intervention in the drug market, provided it is efficacious and does not impose high costs of its own.

Most of the public debate on the costs of drug use focuses on the social costs and benefits of drug consumption, such as criminal behavior, reckless driving, aggressive behavior, and other types of potentially irresponsible and dangerous actions by drug users. Little attention is given to the private costs and benefits of drug use, although these affect a very large fraction of the population. The US Department of Health and Human Services estimates that slightly more than 35 million Americans aged 12 or over used an illicit drug in 2004. 5.5 million reported cocaine use and 1.4 million reported crack use. The US Office of National Drug Control Policy (2001) uses survey, incarceration and treatment data to estimate roughly the number of chronic heroin and cocaine users (who are believed to account for approximately 75 percent of total consumption). In 2000, according to these calculations, there were approximately 2.7 million chronic cocaine users (down from approximately 4 million in 1988), and 900 thousand chronic heroin users (down from 1.34 million in 1988). There are about as many occasional users of cocaine (3 million) as chronic users, but not surprisingly (given its greater addictiveness), there are far fewer occasional users of heroin (253 thousand).

A strict economic evaluation of drug use policies should also take into account private costs and benefits of these drug users: the welfare gain or loss to them from consuming the good and the monetary gain to producers from being able to sell it above its average cost. Social opprobrium or simply the pre-conception that drug use has no private benefits both contribute to the lack of attention to the private side of the cost-benefit ledger. Nevertheless, in a market with 35 million consumers in the US alone, the private net benefits (or costs) of consumption are likely to be of a magnitude similar to the social costs of consumption.

In general, one can imagine three scenarios under which individuals might decide that the private benefits of drug use exceed their private costs, and in the first two of these scenarios net benefits are indeed positive. First, for many individuals, the private costs of drug use are low: they are either less vulnerable to addiction or they prefer to consume low enough quantities that the risks of addiction are low or they prefer drugs that are less addictive. This characterizes the vast majority of individuals who have ever used drugs. It also, arguably, characterizes those chronic users who are not regarded as needing treatment (for example, chronic users for whom the procurement and consumption of drugs has become the central focus of their lives). While a large fraction of chronic heroin users are viewed as in need of treatment, roughly one-half to two-thirds of chronic cocaine users do not fall into this category (Executive Office of the President, 2001). Chronic users of marijuana are least likely to be regarded as needing treatment; the private net benefits of marijuana use are most likely to be positive among these users.

Second, more controversially, consumers might actually choose addiction and derive utility from the consumption plan that addiction entails. Economic theories of rational addiction have been developed (see Becker and Murphy, 1988, and Lee, 1993, for example) that clarify the plausibility and characteristics of this scenario. In either of these cases, the economic or welfare justification for public policies cannot be the negative private costs of drug use, since these are, for most users of at least less addictive drugs, likely to be positive. Instead, the justification for policies that suppress consumption depends entirely on the magnitude of the externalities that drug users impose.

Finally, it is now widely accepted that a third scenario is possible, in which individuals under-estimate the future consequences of their actions, leading to decisions that may be subsequently regretted. In many cases, these decisions can be reversed, limiting the costs of mistakes. Drug addictiveness, though, limits self-corrective behavior and, under these conditions, creates net private costs of consumption. For example, drug consumption itself may change the individual's future preferences and thinking capacity; people may at first be unaware of the negative health consequences of drug use; individuals may not know that they are more vulnerable to addiction; and individual preferences may evolve as individuals age (for example, teenagers have higher discount factors than more mature individuals).⁴ In these cases, addiction prevents consumption patterns from adjusting to changes in preferences or in abilities. In the presence of this type of time-inconsistency, government intervention may be required in order to guarantee an efficient allocation, even from the strictly individual perspective and in the absence of externalities.

Bhattacharya and Lakdawalla (2005) discuss time-inconsistency under more general settings and analyze the possibility of implementation of economically efficient outcomes in these circumstances. Ample empirical evidence indicates that time-inconsistency is pervasive in economic decision, and not exclusive to drug use. For example, time-inconsistent behavior is commonplace in individual saving and credit decisions (Shui and Ausubel 2005). It is also common in individuals' decisions to use legal addictive substances, as evidence related to smoking reveals (Gruber and Köszegi, 2001). Given this evidence, and the strong addictive properties of drugs such as crack and heroin, it is likely that for many of the "problem users," private costs could exceed private benefits at some moment in life.

4. The Uncertain Efficacy of Prohibition

Even if they are uncertain, the social and unanticipated private costs of drug use appear to be high enough to justify some government regulation. This regulation could rationally take the form of prohibition if the costs of prohibition were low enough and its efficacy in reducing consumption is sufficiently high. The earlier discussion suggests that these costs are, in fact, high. The evidence on efficacy, though, is disappointing in both its quality and its conclusions.

⁴ According to bio-psychological theories of addiction, exposure to drugs changes the way the brain works, through enhancement of dopamine neurotransmission. In some cases, this change can be permanent, following repeated use of addictive drugs (Robinson and Berridge, 1993). This provides a biological basis to time-inconsistency in decisions related to drug-consumption (as long as individuals are not fully aware of the change that they may be subject to).

The design of public interventions to reduce externalities and to ensure that individuals do not take actions that they may subsequently regret is fraught with difficulty. Efficient regulations would take into account the fact that externalities created by drug use vary widely across individuals and drug type, as do the propensity to addiction and awareness of its costs. The wide variation in frequency of consumption across users and across drugs is one obvious indicator of this heterogeneity. It is difficult to design restrictions on drug use that take these variations into account, since information on which individuals are most likely to impose externalities or more vulnerable to unwitting addiction is difficult or impossible to get. Social opprobrium itself is a major constraint on a modulated approach to reducing the costs of drug use. In many societies, the use of any narcotic drug is simply rejected by large segments of the population.

Given the high costs of prohibition and criminalization, it is particularly important to ask whether policies of interdiction and penalization of drug trade and consumption achieve their stated objectives of reducing consumption and/or production. Overall, there is little evidence that they do. In the U.S. drug market, although the intensity of prohibition enforcement has grown over time, prices have been stable or declining. In fact, Mejía and Posada (2005) observe that the price of cocaine in the US and Europe has declined to its lowest levels in history, while purity seems to have stayed roughly unchanged. Declining prices may be a sign of success for prohibition aimed at reducing demand (punishing or informing users) but may also be a sign of failure for prohibition aimed at reducing supply (punishing traffickers). The evidence points to the latter: Estimated production has decreased slightly, consumption has changed little, and drug-related hospitalizations have actually increased (Grossman, 2004).

Despite increased international efforts dedicated to suppressing drug supplies, production has decreased only modestly. Opium cultivation in Afghanistan, which is responsible for 80% of world production, reached one of its highest points historically in 2004 and has almost doubled since then. And prices, after skyrocketing during the Taliban regime, dropped substantially (Byrd and Ward, 2004, and Thoumi, 2005). In the case of coca, aggregate cultivation in Bolivia, Colombia, and Peru in 2004 was similar to the level observed in the end of the 1990s, despite the fact that reported eradication is supposed to have risen substantially in all three countries (which are together responsible for virtually all the world production).

Chart 3 shows that heroin and cocaine prices in the US have declined monotonically since the early 1980s, while marijuana prices fluctuated without a clear trend until the mid 1990s, and then also started a consistent decline. Chart 4 shows that marijuana and cocaine use among high school seniors in the US declined between the 1970s and the early 1990s, but since then either remained stable or increased slightly. Although drug use seems to have dropped significantly from the mid-1970s to the mid-1980s, figures reported by the White House confirm that, from 1988 to 2001, self-reported use of drugs was essentially unchanged.⁵ For example, 7.7 percent of respondents reported having used drugs in the past 30 days in a 1988 survey; 7.1 percent reported the same in a (non-comparable) 2001 survey.

These data indicate that the proportion of users is likely to have been fairly constant. Harm per dose may have increased, however, consistent with the earlier discussion about the public health consequences of prohibition. Chart 5 indicates that drug-related admissions experienced a sustained increase between 1978 and 2002, and more than doubled – for

⁵ See <http://www.whitehousedrugpolicy.gov/publications/factsht/druguse/index.html>.

marijuana, cocaine, and heroin – in the shorter time interval between 1990 and 2002. Evidence from other countries is consistent with the US experience. Following the legalization of marijuana in the Netherlands, usage appears to have increased, but observers attribute the increase not to legalization, *per se*, but to significant retailing and marketing efforts that were permitted under the particular rules that accompanied legalization (MacCoun and Reuter, 2001). The lower private costs of marijuana use also contributed to the demand increase. However, increased marijuana consumption was not associated either with any significant increase in marijuana-related health problems or with an increase in hard-drug usage or drug-related crime (p. 303). MacCoun and Reuter (2001, p. 306) also report that Italy relaxed penalties on all drugs and saw an increase in heroin deaths. However, similar patterns of mortality were observed in both Spain (where policy was consistently permissive) and Germany (where drug use was consistently penalized).

Historical evidence from other episodes of prohibition, such as the American alcohol prohibition during the inter-war period, also point to only small movements in consumption. Miron and co-authors (Dills and Miron, 2004, and Dills, Jacobson, and Miron, 2005), for example, find that alcohol prohibition reduced consumption by no more than 10-20% in the medium run, and may have had no impact whatsoever over the long-run.

Tables 1 and 2 present new cross-country evidence that reinforces the conclusion that prohibition has weak effects on consumption. Prices, qualities, and quantities of drugs supplied and consumed vary considerably across countries (much more than across and within regions, cities, and households). While national level data on drug prices and qualities are crude and highly approximate, their analysis can still inform critical questions. We focus on the markets for cocaine and heroin, the two drugs that are most traded internationally and that are most relevant to developing countries. In an exploratory effort, we look at these data and ask whether the determinants of variation in drug prices, quality, and demand found in the analysis of cross-country data are consistent with the conclusions of within-country studies. Enforcement is bound to have an effect on retail drug prices. However, the direction and amount of the price change depends on the particular enforcement strategy and on the elasticity of demand. Effective enforcement strategies that emphasize penalties for users, suppressing demand, *reduce* prices. Enforcement that emphasizes penalties for suppliers, on the other hand, *increases* prices. The increase is particularly large in the presence of inelastic demand. In fact, actual enforcement strategies are much more strongly focused on the supply side (attacking supply networks, interdicting supplies, arresting dealers).⁶ Consequently, if enforcement expenditures are effective, we should observe significantly higher retail prices of cocaine and heroin.⁷

We consider three types of variables to explain prices, measured at the national level: the country's drug supply availability, economic and social development, and law enforcement resources. Supply availability is proxied by a binary variable indicating whether the country is a major cocaine or heroin producer and by the intensity of drug seizures in the country.⁸ As is

⁶ A large fraction of prisoners in the US are incarcerated for violation of laws against the possession of drugs, but Sevigny and Caulkins (2004) argue that most of these are dealers who reached plea agreements with prosecutors.

⁷ The appendix provides details on definitions and sources of all variables used in the empirical analysis.

⁸ The latter can also indicate the strength of enforcement but since this is controlled for by the other determinants, drug seizures' remaining explanatory power is likely to be related to drug availability.

customary, economic and social development is represented by GDP per capita. Ideally, we would use enforcement variables that directly tracked a country's drug enforcement effort. One such measure is the number of people prosecuted for drug offenses (weighted by population). We also investigate the number of police personnel (also weighted by population), and the per capita outlays for public order and safety (requiring us to assume that unobserved spending on anti-drug enforcement varies systematically with observed total spending).

The results on the determinants of cocaine and heroin retail prices are presented in Tables 1 and 2, respectively. The R-squared for cocaine and heroin retail prices is around 0.30 and the same variables turn out to be significant in both regressions. For both, as we expect, retail prices are lower when supply is more abundant: the coefficients on the cocaine and heroin producer country indicators are significantly negative in most regressions. Maybe more surprising, the coefficients on drug seizures are also always negative and statistically significant. This is notable because, if seizures only reflected enforcement effort, we would expect them to be positively associated with retail prices. Most likely, here we have seizures responding to supply itself. So seizures are more likely in Colombia, a major world producer of cocaine, or Mexico, a transit country to the U.S., than in a country where the supply of drugs is relatively small. Other variables that may influence drug prices through their supply availability—such as drug purity—seem to be captured by our two proxies (since they do not exhibit significant coefficients when included as additional explanatory variables).

For both cocaine and heroin, retail prices increase with the country's average income. This has two possible explanations. First, the organized criminals who exercise monopoly control over the illicit drug trade can charge higher profit markups when consumers' purchasing power is greater and elasticity of demand lower, as may be the case in richer countries; and, second, complex entry and distribution channels in wealthier countries raise supply costs. The second factor would be related to the severity of barriers of entry and in general drug trade enforcement put in place by the government. Paradoxically, higher drug prices can be due to stronger organized crime or stronger government!

The second explanation for the positive association between income and drug prices is that enforcement works, since richer countries can enforce drug laws more effectively than poor countries. However, the estimated effects of variables that *directly* represent law enforcement resources—drug offense prosecution, police personnel, and public order budget—are not statistically significant. Moreover, they are not robustly significant even when GDP per capita is excluded from the regression (results not reported). This suggests a limited role for sheer police and judicial enforcement in curtailing the consumption of illicit drugs. To the extent that income per capita raises drug prices through its effect on the enforcement of drug laws, this effect must operate through the efficiency with which drug enforcement resources are deployed.

5. Explaining the low market response to prohibition

There are three possible reasons for the potential lack of efficacy of prohibition. One is that the demand for drugs is highly inelastic and therefore insensitive to interventions that increase the price of drugs, such as anti-drug enforcement. As the evidence below indicates, this is persuasive in the case of heroin, but not cocaine. The second explanation, supported by evidence from both heroin and cocaine markets (as presented above), is that the efficacy of enforcement efforts to reduce supply is low. A third possible explanation is that prohibition's

effects are simply poorly measured, leading to a downward bias in the estimated effects of prohibition on consumption.

Becker, Murphy, and Grossman (2006) analyze the effect of demand elasticity on prohibition, observing that it is difficult and costly to enforce a prohibition on the consumption of goods with inelastic demand. Even interventions that significantly increase the price users pay for the good have a small effect on demand. The elasticity of demand for drugs varies significantly with the drug in question (underlining the case for modulated public interventions to reduce drug consumption). MacCoun and Reuter (2001, p. 76) report a very low elasticity of demand for highly addictive heroin (-0.2 to -0.3 percent), slightly less elastic than cigarettes (around -0.4 percent). There is more uncertainty surrounding the elasticity of demand for cocaine. MacCoun and Reuter report estimates ranging from -0.7 and -2.0 percent. Most studies find price elasticities below one in absolute value in the short-run, while others have estimated higher price responses in the long-run and, in some cases, also in the short-run (see discussion in Mejía and Posada, 2005). This may indicate that cocaine is not as addictive as it is commonly believed or that people may find suitable substitutes for it.

Cross-country comparisons reinforce the conclusion that more addictive heroin exhibits very low price elasticity, but that cocaine usage is more price sensitive. In Tables 3 and 4, we present two empirical models to explain the prevalence of cocaine and heroin consumption across countries. They are formulated in the spirit of demand functions, with the caveat that consumption prevalence is more an indicator of number of users than quantity demanded. The working assumption for this analysis (i.e., quasi demand function) is that cross-country variations in the supply of drugs drive price differences, and that this, in turn, determine the variation in consumption prevalence across countries. The assumption comes from the evidence discussed before, that variations in price across countries seem to be driven mostly by differences in the availability of drugs. In principle, these differences could arise from the natural availability of different types of drugs in different regions of the world, according to geographic patterns of production and trade routes, but also potentially from differential degrees of repressive policies targeted at supply.

In Tables 3 and 4, the first regression is a basic model, where the own drug's retail price and the country's per capita income are the sole explanatory variables. The second is an extended model, where the retail prices of alternative illicit drugs and other socio-economic characteristics are additionally included. The main advantage of the first model is that, since it imposes few data requirements, the sample of countries is quite large (82 and 98 for cocaine and heroin prevalence, respectively). The advantage of the extended model is that it takes into account a fuller array of relevant determinants (at the cost of a smaller sample, 39 countries for both cocaine and heroin).

Tables 3 and 4 indicate a striking difference in the ability of the models to explain the prevalence of the two drugs. Whereas for cocaine prevalence the simple and extended models do reasonably well (with R-squared coefficients of 0.17 and 0.53, respectively), they have poor explanatory power for heroin prevalence (with corresponding R-squared coefficients of 0 and 0.28). Moreover, for cocaine prevalence, the basic and even some of the additional variables have significant coefficients; while for heroin consumption only one of the additional variables appears to be significant.

The prevalence of cocaine consumption (Table 3) is lower in countries with higher cocaine retail prices and higher in richer countries. These price and income effects are familiar

from the demand functions for regular goods. The prevalence of cocaine consumption increases with cocaine purity, which suggests that potential consumers are aware of the deleterious health consequences of contaminated cocaine. The retail prices of marijuana and ecstasy carry significantly positive coefficients, suggesting that both drugs act as substitutes for cocaine. Finally, a larger share of youth population is linked to higher prevalence of cocaine consumption, even controlling for other development-related variables (such as per capita income and urbanization).

The prevalence of heroin consumption is harder to explain than that of cocaine. Table 4 shows no significant own- or cross-price effects, and no significant link with per capita income or with other development-related variables. The only variable that seems to be related to heroin consumption prevalence is the consumption of alcohol, which is suggestive of a (perhaps culturally or socially rooted) taste for addictive drugs. In any case, it is not clear whether the inability of the econometric model to explain heroin consumption derives from problems of measurement in the data or from a very low responsiveness of heroine demand to any economic variable.

Miron (2003) and Grossman (2004) estimate that the price of cocaine in the U.S. would drop by 50 to 80 percent in a legalized market. Assuming that the price elasticity of cocaine demand is -1.0 percent over this entire range, well within the bounds of existing, sparse estimates of cocaine elasticity, their estimates imply that legalization of cocaine would increase consumption by 50 to 80 percent.

Our cross-country evidence points to a similar increase in consumption. The cross-country data allow us to compare the experience of countries that span a large range of cocaine prices: from less than \$5 per gram in Bolivia, Colombia, Ecuador, and Peru to more than \$200 per gram in Australia, Norway, and Singapore. If cocaine prices were to decrease from the 75th percentile of their distribution –around \$95 per gram in, for instance, Austria and Great Britain—to the 25th percentile –around \$12 per gram in Chile and Costa Rica—then the prevalence of cocaine consumption would increase by 0.4 percent of the population. (For comparison purposes, note that the world mean and standard deviation of cocaine consumption prevalence are 0.62% and 0.59% of the population, respectively.) These calculations are based on the conservative estimates given by the empirical model where only own drug price and per capita income are considered as determinants of prevalence (Table 3, Col. 1). Using the extended empirical model (Table 3, Col. 2) and considering a more drastic change in cocaine prices, from the 95th percentile of the distribution (corresponding to, for instance, Austria and Norway) to the 5th percentile (e.g., Colombia and Peru), the increase in the prevalence of cocaine consumption would amount to 2.1 percent of the population (up from 2.8 percent of the population). This 75 percent increase in consumption is consistent with what one derives from the elasticities reported in Miron or Grossman.

In sum, as with the social and private unanticipated costs of drug use, the effects of prohibition on consumption are uncertain. It is undeniable, however, that the relaxation of prohibition would lead to an increase in drug consumption. In the case of cocaine, consumption prevalence is likely to increase in the order of 50 to 80 percent. Though significant, this increase would not amount to widespread or epidemic cocaine consumption. Moreover, there are reasons to believe that the associated effects of the relaxation of cocaine prohibition on social and unanticipated private costs of consumption should be less (than on consumption *per se*).

First, problem usage is more clearly linked to certain types of drugs --heroin and crack rather than marijuana and cocaine; therefore, problem drug abuse would increase less than overall drug consumption if the relaxation of prohibition applied to the less addictive drugs. Second, users with personality types that are more prone to problem usage are more heavily represented among current than among potential users. Third, and most importantly, the nature of the “legalization” regime against which prohibition is being compared is not clear. If consumption is regulated and resources are diverted to other policies, such as treatment and education, with proven efficacy in reducing either consumption or problem usage (e.g., as detailed in Pacula 2008), it is likely that the types of drug use that imposes the largest social and unanticipated private costs could fall.

The assessment of whether the social and private costs of these additional drug users are high is, of course, a matter for debate. Most of them, though, would not be the source of significant externalities or to bear high private costs from consumption. Given this, the net social benefits of relaxing prohibition and replacing it with a regulated, but decriminalized legal regime paired with significant expenditure on treatment and prevention are likely to be positive, particularly for the less addictive drugs. Even for crack, one of the most damaging drugs from the personal and social perspectives, indirect social costs due to repression are estimated to be higher than direct social costs due to addiction (Fryer, Heaton, Levitt and Murphy, 2005). Moreover, these analyses do not take into account the unintended effects of prohibition, particularly in developing countries. Consideration of the heavy costs borne by some countries in the war on drugs would further weaken the case for prohibition.

6. Policy Implications

Eradication strategies and prohibition appear to have significant negative effects on the health of users and on the efficacy of treatment; they unnecessarily impose costs on poor farmers; and they catalyze the formation of organized groups specialized in the exercise of violence, with a demonstrated capability to undermine the state. To the extent that the criminalization of drugs is driven by the abhorrence of drug consumption under all circumstances, regardless of its tangible costs, these effects of prohibition may appear to be inconsequential. However, to the extent that criminalization is meant to maximize social welfare – to reduce the social and unanticipated private costs of drug consumption using interventions that, themselves, do not impose high social costs –these unintended negative effects of prohibition are further evidence that current policies are far from achieving their goals.

One might argue that the problem is not prohibition and supply eradication *per se*, but the implementation of these policies. It is more plausible, however, that these are simply extraordinarily difficult policies to undertake in drug markets. Eradication and interdiction strategies, no matter how well-implemented, are unlikely to succeed for three reasons. First, relatively small quantities are actually transacted. For example, the estimated imports of cocaine into the US amount to only around 400 tons, equivalent to the proverbial “needle in a haystack.” Second, interdiction and eradication efforts aim to increase the price of production inputs and transportation. These, however, are only a fraction of the final retail price, with the compensation for both risk in consumer countries and violence-induced market power up and down the supply chain accounting for most of the final price. Third, there are many alternative regions for cultivation and, given the cost structure of production and distribution, any increase

in cost induced by the change in area of production ends up being almost irrelevant for the final price (Reuter, 2001).

A large body of analysis agrees that, regardless of drug addictiveness and supply side considerations, aggressive anti-drug enforcement is unlikely to succeed in stable, mature drug markets (Pacula, 2008). This applies not only to the market for highly addictive heroin, but also to the cocaine market. This is also the reason that shifting prohibition efforts to the demand side – by imposing large penalties on users – is unlikely to succeed.⁹

Instead, the evidence argues for modulated drug policies that emphasize regulation, education and treatment. There are strong precedents for consumption declining under a decriminalized regime. For example, when it was decided that public policy should be explicitly geared toward reducing tobacco consumption through taxation and regulation, the price of cigarettes immediately started increasing (see Chart 6). The change in policy led to an increase of almost three times in the price of cigarettes between the early 1980s and 2003, together with a well known reduction in demand.

Modulation requires, as well, tailoring policies to particular circumstances. MacCoun and Reuter point out that there are three dimensions of harm from drug use that policy interventions can affect: the number of users, the average dose per user, and the harm per dose (p. 10-11). Drug control strategies need not focus on prevalence reduction (reducing total number of drug users) to reduce the social costs of drug consumption.¹⁰ They can also focus on quantity reduction; micro harm reduction (average harm per use of drugs); and macro harm reduction (total drug-related harm). Decisions among these strategies depend on answers to a number of questions.

For example, which drugs impose the largest social and unanticipated private costs per user/dose? Heroin (high cost) and marijuana (low), for example, are far apart in this regard. Second, which drugs are most responsive to price changes? For instance, heroine consumption does not seem to respond to price changes, while cocaine consumption does. Policies towards more addictive heroin are more likely to emphasize treatment; policies towards more price-sensitive cocaine are more likely to include taxation. Third, how entrenched and large are drug markets? Even if drug policies are modulated and generally avoid outright prohibition, prohibition can be low-cost and effective in some limited circumstances. Pacula (2008) points out, in criticizing large enforcement expenditures and scant treatment outlays in attacking entrenched drug markets, that strong enforcement can discourage the spread of new drugs. At that point, addicted users are few; distribution networks are unsettled; and supplier organization is weak. Consequently, enforcement may be the appropriate response to new drugs (e.g., methamphetamines) even as treatment or taxation may be the most appropriate strategy to reduce consumption of well-established drugs.

⁹ Vigorous enforcement against users is not generally regarded as a viable policy option, largely because users could account for more than 10 percent of the population of many consuming countries.

¹⁰ Policies that focus on a reduction in the number of users, for example through criminalization of drug use, may increase the harm per user/dose and may increase the dose per user. Policies that reduce the harm per user/dose, such as needle exchange programs, could increase the number of users (although in their survey of many studies of needle exchange programs, MacCoun and Reuter (2001) conclude that they do not increase drug consumption).

7. Conclusion: Drugs and development

The evidence seems to indicate that the effectiveness of prohibition and drug criminalization in actually reducing consumption and production is limited. This is true in developed, consumer countries (such as the U.S.), in developing, producer countries (such as Colombia and Peru), as well as in some developing countries that have seen an upsurge in drug use and trafficking in recent years (as, for example, Mexico, Iran, and other countries in Central Asia). Although the benefits of prohibition are apparently low across countries, the costs of prohibition seem to be borne disproportionately by developing countries that traditionally grow crops associated with the production of drugs or that serve as trade routes to drug consumers in rich countries. These costs range from direct expropriation of the wealth of poor farmers involved in the cultivation of these crops to the increased institutional instability caused by criminal organizations that distribute drugs.

Countries do not tend to attach significant weight to the costs imposed on other countries by policies that they believe crucially serve their national interests. Prohibition has long been seen as such a policy by developed, consumer countries. However, even there, the lack of success of prohibition efforts raises questions about the wisdom of the substantial resources they have demanded.¹¹ In the context of this debate, developing countries can play a role both by insisting that the costs and benefits of drug policies be shared more equitably and by helping design policies that improve on prohibition in every dimension: by being less costly, by achieving greater reductions in drug abuse, and by shifting the burden of the policy away from drug consumers, poor farmers, and developing countries. But as of now, organized crime has been the only clear winner from the prohibition policy.

¹¹ The sense of unfairness regarding who bears the costs of the “war on drugs” is not only perceived in developing countries. Increasingly, voices in developed countries are alerting to the limitations of this strategy, as the following concluding remarks in *The Economist* (2006) exemplify, “A ‘clear-cut victory’ over coca is impossible, Anne Paterson [the senior anti-drug officer at the U.S. State Department and a former American ambassador in Colombia] concedes. ‘It’s just a question of containing it where it breaks out.’ The problem is that containment carries heavy political costs for democratic governments in the Andes. The drug trade itself undermines democracy, but so do the heavy-handed American efforts to contain it. As long as rich-country governments insist on imposing an unenforceable prohibition on cocaine consumption, Andean governments will continue to be faced with the thankless task of trying to repress market forces.”

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Table 1. Cocaine Prices*Dependent variable: Cocaine Retail Prices, constant 2000 US\$ per gram*

	[1]	[2]	[3]	[4]
Cocaine Producer Countries	-29.5567***	86.1653	-29.0034**	-28.4576***
(dummy: 1 if cocaine cultivation is reported)	-2.75	1.39	-2.41	-2.70
Cocaine Seizures	-17.7584***	-60.1301**	-16.4860***	-17.5289***
(base and salts; kg per 1,000 population)	-3.66	-2.47	-3.39	-3.78
GDP per capita	26.1167***	21.8078**	28.8456***	22.0757***
(PPP, 2000 international \$, in logs)	6.39	2.55	4.36	3.17
People Prosecuted for Drug Offenses		0.3280		
(per 100,000 population, in logs)		0.06		
Police Personnel			1.4132	
(per 100,000 population, in logs)			0.14	
Outlays for Public Order and Safety				1.8510
(per capita, PPP, 2000 international \$, in logs)				0.60
Constant	-160.6463***	-111.9611	-193.6502***	-127.6881**
	-4.52	-1.50	-3.41	-2.14
No. of observations	102	57	69	70
R-squared	0.35	0.29	0.35	0.27

Notes:

1. Method of estimation: Ordinary Least Squares with Robust Standard Errors
2. t-statistics are presented below the corresponding coefficients.
3. ** and *** denote significance at the 5 percent and 1 percent levels, respectively.
4. Variables are an average of 1997-2005 by country, except for a dummy variable for cocaine producer countries. See Appendix 1 for their definitions and sources.

Source: Authors' estimation

Table 2. Heroin Prices*Dependent variable: Heroin Retail Prices, constant 2000 US\$ per gram*

	[1]	[2]	[3]	[4]
Opium Producer Countries (dummy: 1 if opium cultivation is reported)	-24.0690*** -2.71	-12.2853 -0.75	-36.3882*** -3.26	-17.8953 -1.37
Heroin Seizures (kg per 1,000 population)	-1,256.8726*** -4.11	-1,556.1643*** -3.31	-2,271.8705*** -3.75	-1,298.9731*** -3.61
GDP per capita (PPP, 2000 international \$, in logs)	41.0077*** 6.66	41.6148*** 3.76	45.7050*** 4.19	48.0526*** 5.37
People Prosecuted for Drug Offenses (per 100,000 population, in logs)		7.2830 0.85		
Police Personnel (per 100,000 population, in logs)			3.4987 0.18	
Outlays for Public Order and Safety (per capita, PPP, 2000 international \$, in logs)				3.1290 0.65
Constant	-272.0587*** -5.65	-299.7051*** -3.41	-320.7294*** -3.54	-350.4739*** -4.40
No. of observations	110	66	70	76
R-squared	0.32	0.29	0.30	0.31

Notes:

1. Method of estimation: Ordinary Least Squares with Robust Standard Errors
2. t-statistics are presented below the corresponding coefficients.
3. *** denotes significance at the 1 percent level.
4. Variables are an average of 1997-2005 by country, except for a dummy variable for opium producer countries. See Appendix 1 for their definitions and sources.

Source: Authors' estimation

Table 3. Prevalence of Cocaine Consumption

Dependent variable:

Prevalence of Cocaine Consumption, % of the population aged 15-64

	[1]	[2]
Cocaine Retail Prices (constant 2000 US\$ per gram)	-0.0048*** -2.97	-0.0083*** -2.88
GDP per capita (PPP, 2000 international \$, in logs)	0.2725*** 3.52	0.3939* 1.76
Cocaine Retail Purity (%)		0.0119*** 3.11
Heroin Retail Prices (constant 2000 US\$ per gram)		-0.0009 -0.74
Marijuana Retail Prices (constant 2000 US\$ per gram)		0.0694** 2.30
Ecstasy Retail Prices (constant 2000 US\$ per gram)		0.0332* 2.04
Urban Population (% of total population)		0.0088 1.41
Youth Population (aged 10-24, % of total population)		0.0740** 2.25
Alcohol Consumption (liters of pure alcohol per capita)		0.0296 0.91
Constant	-1.5589** -2.41	-6.2923** -2.21
No. of observations	82	39
R-squared	0.17	0.53

Notes:

1. Method of estimation: Ordinary Least Squares with Robust Standard Errors
2. t-statistics are presented below the corresponding coefficients.
3. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.
4. Variables are an average of 1997-2005 by country. See Appendix 1 for their definitions and sources.

Source: Authors' estimation

Table 4. Prevalence of Heroin Consumption*Dependent variable:**Prevalence of Heroin Consumption, % of the population aged 15-64*

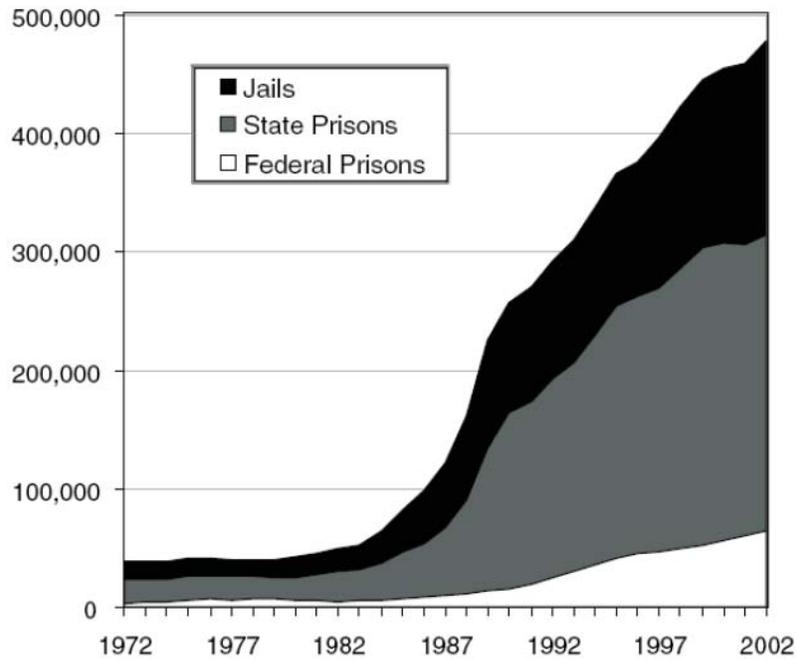
	[1]	[2]
Heroin Retail Prices (constant 2000 US\$ per gram)	-0.0002 -0.57	-0.0013 -0.88
GDP per capita (PPP, 2000 international \$, in logs)	-0.0042 -0.10	-0.1979 -1.55
Heroin Retail Purity (%)		-0.0037 -1.05
Cocaine Retail Prices (constant 2000 US\$ per gram)		0.0006 0.64
Marijuana Retail Prices (constant 2000 US\$ per gram)		0.0062 0.61
Ecstasy Retail Prices (constant 2000 US\$ per gram)		0.0166 1.05
Urban Population (% of total population)		0.0018 0.47
Youth Population (aged 10-24, % of total population)		-0.0082 -0.42
Alcohol Consumption (liters of pure alcohol per capita)		0.0459** 2.06
Constant	0.4614 1.10	1.9053 1.47
No. of observations	98	39
R-squared	0.00	0.28

Notes:

1. Method of estimation: Ordinary Least Squares with Robust Standard Errors
2. t-statistics are presented below the corresponding coefficients.
3. ** denotes significance at the 5 percent level.
4. Variables are an average of 1997-2005 by country. See Appendix 1 for their definitions and sources.

Source: Authors' estimation

Chart 1: Number of Adults Incarcerated for Drug Law Violations in the US, 1972-2002



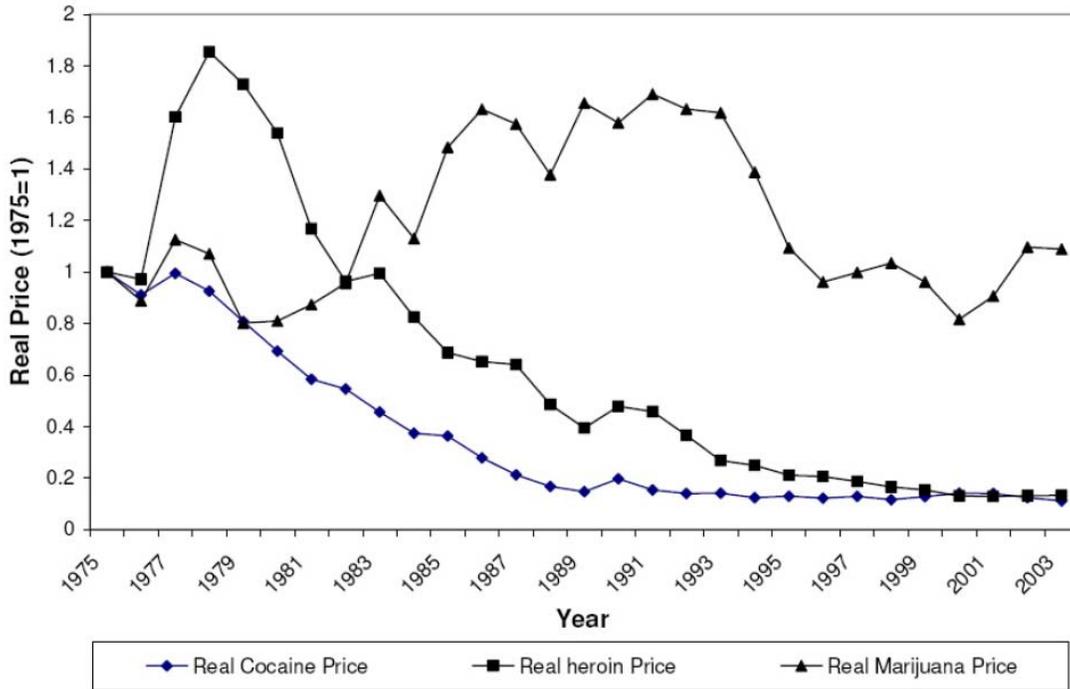
Source: Caulkins and Chandler (2005)

Chart 2: Price Structure of One Kilo of Pure Cocaine (mid 1990s)

Coca leaf (farm gate in Peru)	\$370
Export of finished product (Colombia)	\$1,200
Import of finished product (Miami)	\$20,500
Wholesale by kilo (Chicago)	\$31,000
Wholesale in one-ounce packets (Chicago)	\$62,000
Final retail value (Chicago)	\$148,000

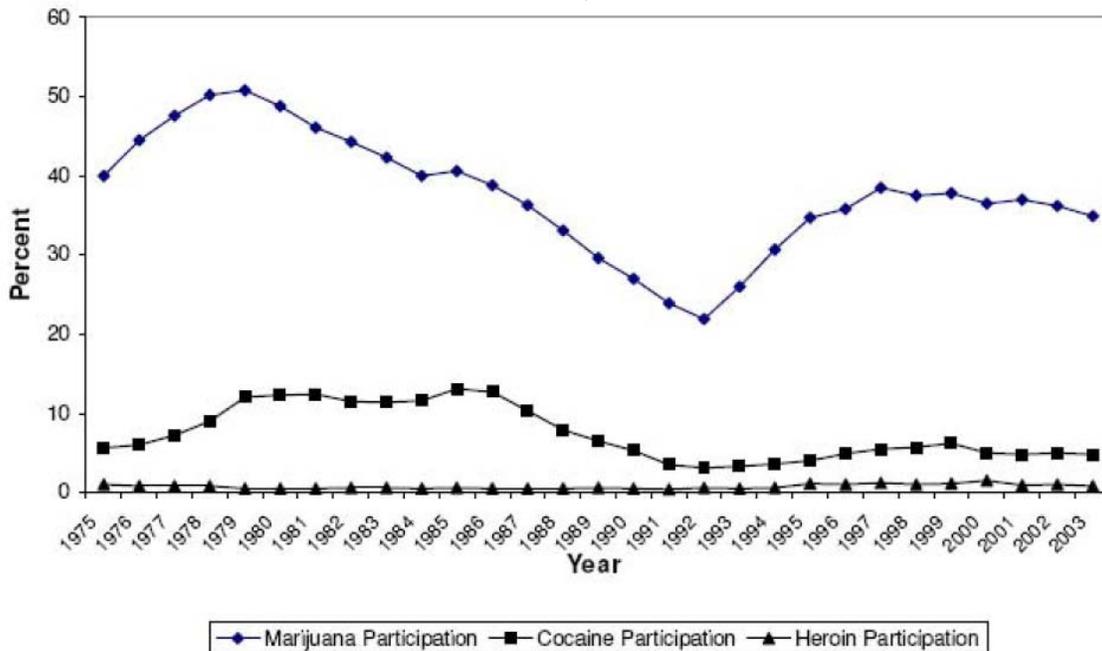
Source: Smith (2005)

Chart 3: Real Cocaine, Heroin, and Marijuana Prices, 1975-2003



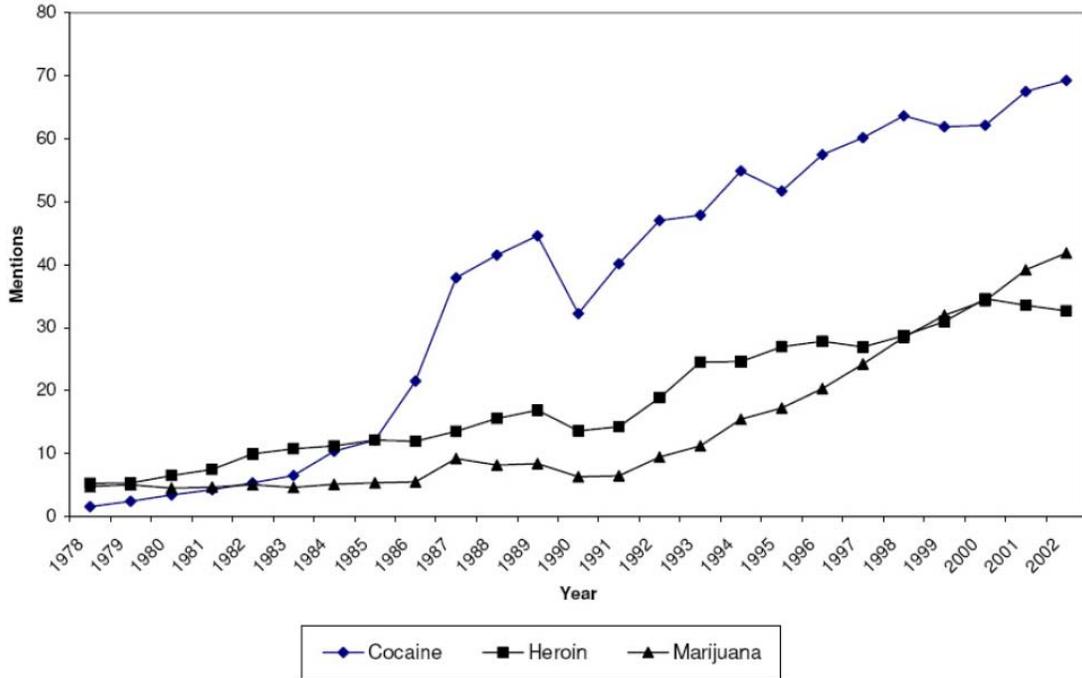
Source: Grossman (2004)

Chart 4: Annual Prevalence of Marijuana, Cocaine, and Heroin Use among High School Seniors, 1975-2003



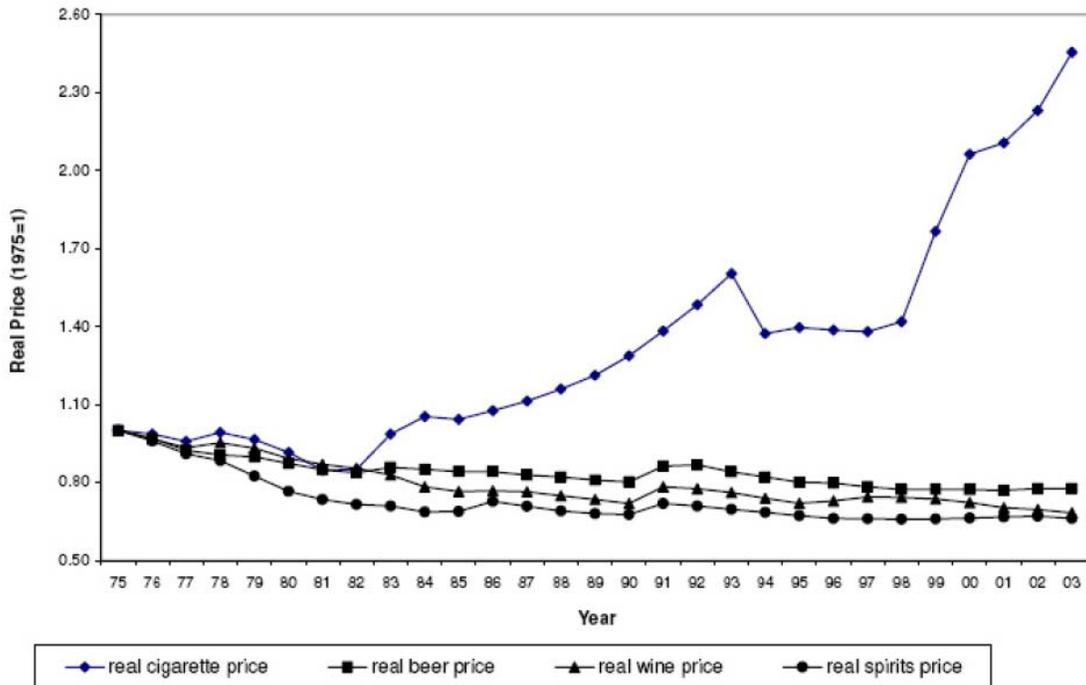
Source: Grossman (2004)

Chart 5: Rate of Hospital Emergency Room Marijuana, Cocaine, and Heroin Mentions, 1976-2002 (per 100,000 population)



Source: Grossman (2004)

Chart 6: Real Alcohol and Cigarette Prices, 1975-2003



Source: Grossman (2004)

Appendix 1. Definitions and Sources of Variables

Variable	Definition and Construction	Source
Prevalence of Cocaine Consumption	Prevalence of abuse of cocaine as percentage of the population aged 15-64.	World Drug Report and Global Illicit Drug Trends (United Nations Office on Drugs and Crime (UNODC), various years).
Prevalence of Heroin Consumption	Prevalence of abuse of heroin (opiates) as percentage of the population aged 15-64.	World Drug Report and Global Illicit Drug Trends (UNODC, various years).
Cocaine Retail Prices	Typical retail (street) price of cocaine expressed in the constant 2000 US\$ per gram. The Consumer Price Index (CPI) is used to deflate. Prices of crack cocaine are not included. Also, prices of coca base are ignored unless no other price information is available.	World Drug Report and Global Illicit Drug Trends (UNODC, various years), and World Development Indicators (World Bank, various years).
Heroin Retail Prices	Typical retail (street) price of heroin expressed in the constant 2000 US\$ per gram. The CPI is used to deflate. Prices of black tar and homebake heroin are excluded. When multiple prices are available (for most cases, those of heroin no.3 and no.4), an average is used.	World Drug Report and Global Illicit Drug Trends (UNODC, various years), and World Development Indicators (World Bank, various years).
Cocaine Retail Purity	Typical retail (street) purity level of cocaine in percentage. When only the range (minimum and maximum) of purity level is available, an average is computed. Purity levels of crack cocaine are excluded, and those of coca base are also ignored unless no other information is found.	World Drug Report and Global Illicit Drug Trends (UNODC, various years).
Heroin Retail Purity	Typical retail (street) purity level of heroin in percentage. When only the range (minimum and maximum) of purity level is available, an average is computed. Purity levels of black tar and homebake heroin are not included. When multiple purity information is available, an average is used.	World Drug Report and Global Illicit Drug Trends (UNODC, various years).
Cocaine Producer Countries	A dummy variable for countries where cultivation of cocaine is reported in any year during 1997 to 2005. The following three countries are pertinent: Bolivia, Colombia and Peru.	World Drug Report (UNODC, 2007), Global Illicit Drug Trends (UNODC, 1999), and International Narcotics Control Strategy Report (U.S. Department of State, 1998).
Opium Producer Countries	A dummy variable for countries where cultivation of opium is reported in any year during 1997 to 2005. The following ten countries are pertinent: Afghanistan, Colombia, Guatemala, India, Lao PDR, Mexico, Myanmar, Pakistan, Thailand and Vietnam.	International Narcotics Control Strategy Report (U.S. Department of State, 1998 and 2007).
Cocaine Seizures	Seizures of cocaine (base and salts) expressed in kilogram equivalents per 1,000 population.	Illicit Drug Seizure Reports (UNODC, data retrieved from www.unodc.org), and United Nations Common Database (UN, data retrieved from unstats.un.org).
Heroin Seizures	Seizures of heroin expressed in kilogram equivalents per 1,000 population.	Illicit Drug Seizure Reports (UNODC, data retrieved from www.unodc.org), and United Nations Common Database (UN, data retrieved from unstats.un.org).

Appendix 1. Definitions and Sources of Variables (*continued*)

Variable	Definition and Construction	Source
Marijuana Retail Prices	Typical retail (street) price of marijuana (cannabis herb) expressed in the constant 2000 US\$ per gram. The CPI is used to deflate.	World Drug Report and Global Illicit Drug Trends (UNODC, various years), and World Development Indicators (World Bank, various years).
Ecstasy Retail Prices	Typical retail (street) price of ecstasy expressed in the constant 2000 US\$ per gram. The CPI is used to deflate.	World Drug Report and Global Illicit Drug Trends (UNODC, various years), and World Development Indicators (World Bank, various years).
GDP per capita	PPP-adjusted real GDP per capita (2000 international \$), in logs.	World Development Indicators (World Bank, various years), and Penn World Table 6.2 (Heston, Summers, and Aten, 2006, data retrieved from pwt.econ.upenn.edu).
People Prosecuted for Drug Offenses	Number of people prosecuted for all drug offenses per 100,000 population, expressed in logs.	United Nations Surveys of Crime Trends and Operations of Criminal Justice Systems (UNODC, various years, data retrieved from www.unodc.org), and United Nations Common Database (UN, data retrieved from unstats.un.org).
Police Personnel	Number of police personnel per 100,000 population, expressed in logs.	United Nations Surveys of Crime Trends and Operations of Criminal Justice Systems (UNODC, various years, data retrieved from www.unodc.org), and United Nations Common Database (UN, data retrieved from unstats.un.org).
Outlays for Public Order and Safety	PPP-adjusted central government expenditure on public order and safety (constant 2000 international \$) per capita expressed in logs. Public order and safety includes: (i) police services, (ii) fire protection services, (iii) law courts, (iv) prisons, (v) research and development for public order and safety, and (vi) not elsewhere classified.	Government Finance Statistics Yearbook (IMF, various years), and World Development Indicators (World Bank, various years), United Nations Common Database (UN, data retrieved from unstats.un.org), and Penn World Table 6.2 (Heston, Summers, and Aten, 2006, data retrieved from pwt.econ.upenn.edu).
Urban Population	Percentage of the total population living in urban agglomerations.	World Development Indicators (World Bank, various years).
Youth Population	Population aged 10-24 as the percentage of the total population.	World Population Prospects: The 2004 Revision (UN, 2005), LABORSTA-Internet (International Labour Organization, data retrieved from laborsta.ilo.org), United Nations Common Database (UN, data retrieved from unstats.un.org), and World Development Indicators (World Bank, various years).
Alcohol Consumption	Per capita recorded alcohol consumption (liters of pure alcohol) among adults (aged 15 years or older). It is computed as the sum of alcohol production and imports, less alcohol exports, divided by the adult population.	WHO Statistical Information System (World Health Organization, data retrieved from www.who.int).