



Abt Associates Inc.

Cambridge, MA
Lexington, MA
Hadley, MA
Bethesda, MD
Washington, DC
Chicago, IL
Cairo, Egypt
Johannesburg, South Africa

Abt Associates Inc.
55 Wheeler Street
Cambridge, MA 02138

Illicit Drugs:

**Price Elasticity of
Demand and Supply**

Final Report

Executive Summary

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Prepared by
William Rhodes
Patrick Johnston
Song Han
Quentin McMullen
Lynne Hozik

Executive Summary

Objectives

The 1998 National Drug Control Strategy established an ambitious national agenda for reducing illicit drug use by 25 percent as of 2002 and by 50 percent as of 2007. When it established those targets, the Office of National Drug Control Policy recognized that achieving its goals would require a multifaceted mixture of supply-based and demand-based programs. The nature of that mix was unknown, however, because there was no solid quantitative evidence of how supply-based and demand-based programs would interact to reduce substance abuse. Indeed, there was no compelling evidence that available technology – treatment, prevention, or law enforcement – provided the means to achieve those targets.

Are those targets achievable with the tools at the Nation’s disposal? This study does not attempt to answer that general question, but it does address a more narrow one: How can supply-based programs, which restrict drug availability, consequently increase drug prices, and reduce the initiation and continuation of drug abuse in the United States? To answer that question, the study has four parts. This study:

1. Discusses how the prices of cocaine, heroin, marijuana and methamphetamine have changed over the last 20 years and assesses how law enforcement has affected those trends.
2. Estimates how changes in the prices of illicit drugs have influenced decisions by youth to initiate drug use.
3. Estimates how changes in the price of illicit drugs have affected continued use by hardcore and occasional drug users.
4. Projects the future prevalence of illicit drug use given different scenarios about the effectiveness of supply-based programs.

Methods and Data

This is an empirical study. Estimates of trends in drug prices come from an earlier study done by Abt Associates Inc. for the Office of National Drug Control Policy. That earlier study used data from two Drug Enforcement Administration data sources: the System to Retrieve Information from Drug Evidence and the Domestic Monitor Program. Data about the initiation and continuation of drug use come from multiple administrations of the National Household Survey on Drug Abuse, mostly from the years 1988 through 1996. Those data, which identified the places for matching with the price data, were provided by the Research Triangle Institute by special agreement with the Substance Abuse Mental Health Services Administration. We thank both RTI and SAMHSA for their support. Data about drug use by hardcore users come from multiple administrations of the Drug Use Forecasting data, mostly from 1989 through 1998. We required raw data, before recoding done by a National Institute of Justice contractor, which NIJ provided by special request. We are also grateful to ICPSR and NIJ for their assistance.

We used a survival model, developed especially for this study, to analyze whether or not drug prices affect the eventual probability that a youth would experiment with drugs and the age of experimentation if he or she did try an illicit substance. We used an ordered probit model, also developed especially for this study, to study how drug prices influenced decisions to use illicit substances by those who, at some time, had tried drugs at an experimental level. Finally, we used an ordered logistic model to analyze the relationship between illicit drug prices and the level of substance abuse among arrestees.

Based on the statistical findings, we projected drug use into the years 2002 and 2007 based on different scenarios about how future drug prices will change from their present levels. The purpose of this simulation was to estimate how closely a supply-based program that successfully increased drug prices could approach the national target of reducing drug use by 50 percent as of 2007.

Findings

Drug Prices

There seems little doubt that the combination of source area programs, interdiction and domestic law enforcement have successfully increased the price of illicit drug products to levels that are many times higher than would otherwise prevail. Cocaine, heroin and marijuana are basically agricultural products that require minimal inexpensive chemical processing. If it were not for law enforcement, they might sell for prices that are comparable to aspirin. Instead, users pay many times the price of aspirin for typical doses.

Still, the Nation's ability to reduce drug availability and to increase drug prices appears to be limited. Since about 1988, the prices of cocaine, heroin and methamphetamine have all fallen or remained about the same, despite what was inaugurated in the late 1980s as a war on drugs. The price of marijuana increased into the early 1990s, apparently because of a successful program of interdiction, but prices have declined since then as domestic production has supplanted foreign production. Thus, while law enforcement efforts have maintained high domestic prices for illicit substances, an expansion of law enforcement resources in the 1990s has not had a commensurate effect on drug prices.

Elasticity of Demand

Marijuana

When marijuana has been relatively unavailable, as reflected in high marijuana prices during the late 1980s and early 1990s, young Americans have been less likely to experiment with marijuana. Thus, Americans who came of age during the early 1980s, when marijuana was relatively inexpensive, were more likely to try marijuana than were Americans who came of age in the early 1990s, when marijuana cost more. Marijuana prices have fallen toward the end of the 1990s, while the best evidence, available from several sources, indicates that youth have increasingly returned to marijuana use. There seems to be strong evidence that price and availability influence the decisions of children and young adults to experiment with marijuana.

The evidence is also strong that adults are sensitive to the price of marijuana. The higher the price, the smaller the number of people who use marijuana at both weekly and occasional levels. This is true for members of households, who tend to use on an occasional basis, as well as for arrestees, who often use at a weekly level or higher.

Cocaine

There is some evidence that experimentation with cocaine is less frequent when cocaine prices are high, but the evidence is weak. It would be a mistake to conclude that cocaine prices do not matter, however, because these data are not well suited to answering the question. Because cocaine prices have decreased fairly steadily since 1981, with just a few short-term perturbations, we could not readily distinguish the effect of changes in cocaine prices from other secular trends.

We did not find household members to be sensitive to cocaine prices. However, arrestees reacted strongly to cocaine prices, decreasing their consumption when prices were high and increasing their consumption when prices were low.

Heroin

Heroin prices seemed to affect experimentation with heroin. However, the effect was difficult to quantify because prices decreased fairly steadily from 1981 through 1998. We may not have been able to distinguish price responsiveness from other trends.

It was not practical to study the demand for heroin using NHSDA data because so few respondents admitted heroin use. Arrestees seemed to be only mildly responsive to heroin prices (and this relationship was statistically significant only at the 10 percent level).

Methamphetamines

The NHSDA did not ask the requisite questions about methamphetamine use, so the NHSDA data did not enter this analysis. Data from five places that had an appreciable amount of methamphetamine use indicated that methamphetamine users were very responsive to prices. The prevalence of methamphetamine use, both by heavy and occasional users, was greatest when prices were low and least when prices were high.

Projections

Marijuana

The key question was whether or not the targets set by the National Strategy are obtainable. The good news is that the prevalence of marijuana use among household users is likely to fall toward the national goal even if marijuana prices remain about the same as they were during the latter 1990s. The projected decline in use is much less for arrestees. This follows because cohorts who came of age during the late 1970s and early 1980s were at the highest risk of experimenting with marijuana, but continued marijuana use is age sensitive. As those high-risk cohorts grow older, fewer of their members will be active marijuana users. Because initiation rates have been lower in the late 1980s and early 1990s, the disappearance of marijuana use by high-risk cohort members will not be offset by an equal increase in new marijuana users. Higher marijuana prices would reinforce this change, of course; as of yet there is no evidence of domestic programs that would substantially increase marijuana prices by increasing the production and distribution costs of domestic producers.

The uncertainty regarding this otherwise positive conclusion stems from recent increases in marijuana use by eighth, tenth and twelfth graders who reported substance use to the Monitoring the Future Survey. Although the analysis reported here identified the beginning of that upturn in experimentation with marijuana use, our data ended in 1996, so we may have understated this resurgence in marijuana use. The future may not be as bright as is painted here.

Cocaine

Similar patterns apply to cocaine, although for cocaine, the pattern is not so strong. We project a very gradual downward trend in cocaine use among household members. Higher cocaine prices would reinforce that trend, but the analysis showed little if any consumer responsiveness by household members to increased cocaine prices. On the other hand, the analysis showed very strong price responsiveness by arrestees, whose prevalence of cocaine use was diminishing anyway. Higher cocaine prices would reinforce that trend among heavy users, helping the Nation move toward its targets.

Heroin

We are less certain about projections for future heroin use. The NHSDA is not especially informative about heroin use, so we relied exclusively on the DUF data. Results suggested that the prevalence of heroin use would decline even without a price increase, apparently because heroin users are an aging population whose use would decrease naturally. This conclusion is tentative, because relatively low-priced high-purity heroin, available since about 1995, may have induced increased use of heroin.

Methamphetamine

We are much less certain about future levels of methamphetamine use because of the small and narrowly based sample of arrestees. Trends imply lower levels of future use among arrestees, and those trends would be reinforced by higher prices. A problem with that inference is that it is based on past reports, which are very cyclical and do not point clearly toward less use. Furthermore, methamphetamine use is currently limited to the West and (to a lesser extent) the Midwest. It is difficult to anticipate whether or not methamphetamine use will spread to the rest of the country. If it does, projections are probably in error.

Conclusions

On the whole, prospective and confirmed drug users are sensitive to the price of drugs, so if the Nation can increase the effectiveness of source country programs, interdiction and domestic law enforcement, then drug abuse can be reduced appreciably. Given experiences since the beginning of the war on drugs, which initiated major expansions in expenditures on supply-based programs, it seems more reasonable to conclude that the Nation will not be able to have any large future influence on decreasing the availability and increasing the price of illicit drugs. Of course, this conclusion rests on observations of past trends, and it could be reversed by the introduction of technological advances, such as improved ways of detecting cocaine, better informed decisions about the placement of interdiction resources, and improved means of detecting domestic marijuana cultivation. But until those improvements happen, it is difficult to be sanguine that supply-based programs can be the major means by which the Nation reaches its 2002 and 2007 targets.

On the other hand, there are reasons to believe that those targets can be obtained. Excluding the use of alcohol and tobacco by youth, marijuana is by far the most widely abused illicit substance.

Evidence presented in this report finds that marijuana use will decrease in the future even if marijuana prices remain the same. If marijuana prices could be returned to near the levels they attained in the early 1990s, then drug use in the household population would decrease even more. Thus, targets that pertain to the drug use by household members are within the Nation's grasp, although supply-side programs alone cannot guarantee they will be reached.

Trends by hardcore drug users are also encouraging. If the Nation can hold the line on the initiation of illicit drug use, preventing it from returning to the epidemic proportions experienced during earlier decades, then as more hardcore drug users age out of their addictions, there will be fewer replacements to take their place. These trends, by themselves, do not appear adequate to reach the Nation's targets for reducing hardcore drug use. But with the reinforcement of supply-based and expanded demand-based programs (especially treatment), the Nation can be hopeful, if not expectant, that drug abuse and its sequela will abate.

The fly in this prediction ointment is that our data stopped in 1996 and, of course, predictions had to be based on data as of that date. In fact, the Monitoring the Future Survey (University of Michigan, 1999) shows that lifetime prevalence of any illicit drug use by seniors reached a peak (since 1975) with the class of 1981 and decreased more or less steadily until the class of 1993. Thereafter, experimentation has increased more or less steadily through the class of 1999. Our analysis may not fully account for this recent resurgence of use, although nothing in our findings contradict the recent trend reported by the MTF.

The final conclusion, then, is the inevitable call for further research. If it is important to monitor and explain trends, in order to predict the future, it seems imperative to do this with the most recently available data. This study provides a template for how data obtained through annual surveys might be analyzed, to gain a better understanding of drug abuse.