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Program Report

Health Economics

Michael Grossman

In the five years since my last report on the NBER's Program on Health Economics, members of the program have focused on the economics of substance use and abuse and on the determinants of pregnancy resolutions and their relation to infant and early childhood health. Studies in the former area consider the effects of prices, taxes, sanctions, and advertising on the use of such harmfully addictive substances as cigarettes, alcohol, and illegal drugs. They also consider the effects of marijuana, cocaine, and alcohol consumption on marriage and divorce, out-of-wedlock births, participation in welfare, employment and unemployment, and crime. Studies in the latter area investigate the effects of public policies on whether pregnancies result in live births or induced abortions; the effects on infant health outcomes of expansions in Medicaid income-eligibility thresholds for pregnant women and young children, and the process by which families allocate resources to the health and development of their children. All of this research takes seriously the distinction between health as an output and medical care as one of the many inputs in the promotion and maintenance of health.

Price Sensitivity of Cigarettes, Alcohol, and Illegal Drugs

The governments of the United States and many other countries have chosen to regulate some addictive substances (for example, cigarettes and alcohol) via taxation; minimum-age purchase laws; restrictions on consumption in schools, the workplace, and public places; and stiff fines for driving under the influence of alcohol. Other substances (for example, cocaine and marijuana) are outlawed completely. The prices of these substances will rise because of taxation, other forms of regulation, and bans. Thus, measuring their responsiveness to price is important in determining the optimal level of taxation and the impacts of legalization. Contrary to conventional wisdom, our studies find that the consumption of addictive substances is quite sensitive to price.

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Current antismoking initiatives in the United States focus on curtailing youth smoking. This is not surprising, as numerous studies show that 90 percent of all smokers begin the habit as teenagers. Thus cigarette control policies that discourage smoking in this age group may be the most effective way to achieve long-run reductions in smoking in all segments of the population. Using nationally representative samples for the 1990s, Frank J. Chaloupka and I show that excise tax hikes, which result in higher cigarette prices, have large negative effects on teenage smoking.¹ Our study capitalizes on the substantial variation in cigarette prices in the U.S. states, mainly caused by the very different state tax rates on cigarettes. The proposed settlement of the Medicaid lawsuits brought against the tobacco industry by the attorneys general of most states, and rejected by the U.S. Senate in June 1998, would have raised the price of a pack of cigarettes by approximately 34 percent. Based on our estimates, this price hike would have reduced the number of teenage smokers by approximately 24 percent. This would have translated into more than 1.3 million fewer smoking-related premature deaths in the current generation of people 17 and younger.

Chaloupka and Henry Wechsler report that smoking by college students is almost as responsive to price as smoking by high school students.² Chaloupka, John A. Tauras, and I indicate that a similar finding holds for the use of smokeless tobacco by teenage males.³ Chaloupka and Rosalie Liccardo Pacula find that the benefits, in terms of curtailments in youth cigarette smoking, attributable to price hikes are not shared equally by all demographic groups, though.⁴ For example, among male teenagers, a 10 percent increase in the price of cigarettes shrinks the number of whites who smoke by about 9

percent and of blacks who smoke by 16 percent. The effects are much smaller for white female teenagers and are nonexistent for black female teenagers.

Alcoholic beverage prices also vary among areas of the United States for the same reason that cigarette prices vary: states tax these beverages at very different rates. Chaloupka, Ismail Sirtalan, and I capitalize on this variation to estimate the demand among individuals between the ages of 17 and 29—the prevalence of alcohol dependence and abuse is highest in this age group—for alcohol (measured by drinks consumed in the past year).⁵ We report statistically significant and numerically large linkages among past, present, and future consumption of alcohol for these young people. These effects support Gary S. Becker and Kevin M. Murphy's theory of rational addiction.⁶ The long-run elasticity of alcohol consumption with respect to its price, negative 0.65, is substantial. This elasticity, which takes account of linkages in consumption over time, is 60 percent larger than the comparable short-run price elasticity (which holds past consumption constant), and is twice as large as the elasticity that ignores addiction. Thus, a tax hike designed to curtail consumption may not have a favorable cost-benefit ratio unless it is based on the long-run price elasticity.

Sara J. Markowitz and I provide direct evidence of the impact of changes in the cost of alcohol on one negative consequence of excessive alcohol consumption: domestic violence toward children.⁷ Using the 1976 Physical Violence in American Families survey, we find that a 10 percent increase in the state excise tax on beer would reduce the probability of severe violence by 2 percent and the probability of overall violence by 1 percent. Our estimates imply that a 10 percent hike in the beer tax would have lowered the

number of severely abused children by about 132,000 in 1975. By pooling data from the 1976 and 1985 Physical Violence in American Families surveys with a set of state dummies, Markowitz and I show that the negative tax effects are not attributable to unobserved state factors.⁸ In another study, Markowitz and I find that the incidence of four different types of violent behavior on college campuses falls as the price of beer rises in the state in which the student's college is located.⁹

In several studies, my colleagues and I have analyzed the issue of legalizing cocaine, marijuana, and heroin by providing estimates of the price elasticities of those substances. In addition, we have examined whether these substances are substitutes or complements for alcohol. Chaloupka and I focus on cocaine "participation" and "frequency-of-use-given-positive-participation" in a group of individuals between the ages of 17 and 29, the age range in which the prevalence of cocaine consumption is at its highest.¹⁰ Our study draws on cocaine prices based on purchases made by drug enforcement agents who were apprehending drug dealers. As in the case of alcohol, we find positive linkages among past, present, and future participation or frequency. Our results suggest that a permanent 10 percent price reduction that is attributed to legalization would cause the number of young adult cocaine users to grow by approximately 10 percent in the long run; the frequency of use among users would increase by a little more than 3 percent. Further, the effects of temporary police crackdowns on drugs or a temporary federal war on drugs may have created a misleading impression about the reaction to permanent price changes. According to our estimates, a 10 percent price hike for one year would reduce total cocaine consumption (that is, participation multiplied by frequency) by

approximately 5 percent, whereas a 10 percent price hike that is permanent would lower consumption by 14 percent.

Chaloupka, Tauras, and I confirm that negative effects of cocaine price also are observed in cross-sections of high school seniors.¹¹ Moreover, we report that residents of the 11 states that decriminalized the possession of small amounts of marijuana in the 1970s are more likely to use this drug. Henry Saffer and Chaloupka estimate demand functions for cocaine, marijuana, heroin, and alcohol in a large national sample of persons of all ages.¹² They obtain a consistent pattern of negative own-price effects and of complementarity between alcohol and illicit drugs. In a related study, Saffer and Chaloupka report that these price effects do not differ among demographic groups.¹³ In both a cross-sectional study and a longitudinal study of young adults, Pacula finds complementarity between alcohol and marijuana.¹⁴ One important implication of these findings is that the effects of policies that curtail alcohol consumption are reinforced because the same policies also curtail drug consumption.

Effects of Advertising on Alcohol Abuse and Cigarette Smoking

In addition to excise tax increases, restrictions on advertising can be used to reduce alcohol abuse and cigarette smoking. For these restrictions to be effective, though, it must be demonstrated that advertising stimulates consumption. Many previous studies have failed to do this because they use aggregate time-series data with little variation in advertising. In a time series of U.S. cities, Saffer addresses this deficiency by estimating the effects on highway fatality rates, more than half of which involve the use of alcohol, of spot television, spot radio, and billboard

advertising of alcoholic beverages.¹⁵ The advertising measures vary considerably among places at a moment in time. Saffer's results indicate that alcohol advertising increases motor vehicle fatalities of persons of all ages and fatalities of persons between the ages of 18 and 20. The last finding is notable because young drivers account for a disproportionate share of those involved in motor vehicle collisions.

In two other studies Saffer uses international data for approximately 20 countries over a 20-year period to assess the effects of banning advertising of alcohol and cigarettes. In the alcohol study he reports that alcohol consumption, motor vehicle mortality, and liver cirrhosis mortality (a standard proxy for heavy alcohol consumption) are lower in countries that ban broadcast advertising.¹⁶ In the cigarette study, he finds that per capita cigarette consumption is lower in countries that ban broadcast, magazine, billboard, and other advertising of cigarettes.¹⁷

Effects of Illicit Drug and Alcohol Use

Robert Kaestner addresses the effects of marijuana and cocaine use on three outcomes: marriage and divorce rates; the probability of being a single parent; and welfare participation. In one study, he finds that nonblack drug users are more likely to be unmarried because their first marriage occurs later and their marriages do not last as long as those of nondrug users.¹⁸ Thus, by causing a delay in the age of marriage, substance abuse may increase the time at risk for an unintended pregnancy. In a second study, Kaestner finds that drug use is a significant predictor of being an unwed mother and of having an out-of-wedlock birth.¹⁹ In the final study from this project, Kaestner shows that past-year marijuana use is positively related to future welfare

participation (participation in the four years following use) by women.²⁰ In related research, John Mullahy and Jody L. Sindelar find that heavy consumption of alcohol by men and women results in substantial reductions in employment rates and similar increases in unemployment rates.²¹

H. Naci Mocan and Hope Corman study the effects of drug use on crime in New York City. They use monthly data on crime rates and drug-related deaths (a proxy for drug use) for 1970 to 1990.²² Controlling for arrests, the size of the police force, and the prevalence of poverty, they find significant positive effects of drug use on the property-related crimes of robbery and burglary. Contrary to popular belief, however, they find no significant relationships between drug use and the violent crimes of felonious assault and murder.

Pregnancy Resolutions and Infant and Early Childhood Health Outcomes

Theodore J. Joyce and Kaestner assess whether recent changes in two state policies—parental notification laws for minors seeking an abortion and Medicaid income-eligibility expansions—are associated with changes in pregnancy resolution. They treat changes in these policies as exogenous shifts in the cost of abortion and birth. They find that parental involvement laws have small effects on minors as a group but have relatively large effects on white teens who are 16 years of age.²³ They also report that expansions in Medicaid eligibility raise the probability that a pregnancy is carried to term for non-blacks but they uncover no effect for blacks.²⁴

The estimated effects in this last study are based on data for three states and do not indicate whether the reduction in the probability of an abortion is attributable to a fall in

abortions, a rise in births, or both. Joyce, Kaestner, and Florence Kwan expand the analysis to 15 states and investigate birth rates (births to unmarried women aged 19 to 27 divided by the number of women in this age range) and abortion rates as separate outcomes.²⁵ They find that the Medicaid expansions are associated with a 5 percent increase in the birth rate among white women, but the expansions do not influence the rate among black women. Overall, there is no apparent effect on the abortion rate. They conclude that subsidized health care for low-income pregnant women may encourage white women to have more children than they would have without coverage.

The Medicaid income-eligibility expansions increased the quantity of prenatal care received by poor pregnant women in the late 1980s and in the 1990s. Joyce reports, however, that the incidence of low birth weight among infants born to these mothers did not decline in New York City.²⁶ Kaestner obtains similar results in a national sample.²⁷ While these findings raise questions about the payoffs to infant health of investments in medical care, Christopher J. Ruhm indicates that investments in parental time may produce benefits.²⁸ Using aggregate data for nine European countries over almost three decades, he shows that entitlements to parental leave are negatively correlated with postneonatal and child mortality rates, presumably because leave provides parents with more time to invest in their young children.

Joyce, Kaestner, and Sanders Korzenman take a broader approach to the production of infant and early childhood health and development by considering the effects of pregnancy intentions on the resources allocated to infants and children.²⁹ They find little evidence that unintended pregnancy is associated with low birth weight, retarded cognitive

development, or other behavioral problems, particularly in estimates that they obtain from sibling differences. These estimates compare a sibling who was unwanted to his or her wanted sibling, thus eliminating the effects of a common home environment. The authors do find that these outcomes are related to factors correlated with family resources, such as income, mother's education and cognitive development, and family structure. This suggests that policies that reduce births resulting from unwanted pregnancies may have smaller payoffs than policies that reduce the social and environmental deprivations suffered by households into which unwanted children are born.

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² F. J. Chaloupka and H. Wechsler, "Price, Tobacco Control Policies, and Smoking among Young Adults," *Journal of Health Economics*, 16 (3), (June 1997), pp. 359-73.

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⁴ F. J. Chaloupka and R. L. Pacula, "An Examination of Gender and Race Differences in Youth Smoking Responsiveness to Price and Tobacco Control Policies," NBER Working Paper No. 6541, April 1998.

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¹³ H. Saffer and F. J. Chaloupka, "Demographic Differentials in the Demand for Alcohol and Illicit Drugs," NBER Working Paper No. 6432, February 1998.

¹⁴ R. L. Pacula, "Does Increasing the Beer Tax Reduce Marijuana Consumption?" *Journal of Health Economics*, 17 (5), (October 1998), pp. 557-86; and "Adolescent Alcohol and Marijuana Consumption: Is There Really a Gateway Effect?" NBER Working Paper No. 6348, January 1998.

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¹⁶ —, "Alcohol Advertising Bans and Public Health," paper presented at the annual meeting of the Western Economic Association International, San Francisco, June 1996.

¹⁷ —, "The Effect of Cigarette Advertising Bans and Warning Labels on Cigarette Smoking," paper presented at the Third Pacific Rim Allied Economic Organizations Conference, Bangkok, Thailand, January 1998.

¹⁸ R. Kaestner, "The Effects of Cocaine and Marijuana Use on Marriage and Marital

Stability," *Journal of Family Issues*, 18 (2), (March 1997), pp. 145-73.

¹⁹ —, "Drug Use, Culture, and Welfare Incentives: Correlates of Family Structure and Out-of-Wedlock Birth," *Eastern Economic Journal*, forthcoming.

²⁰ R. Kaestner, "Drug Use and AFDC Participation: Is There a Connection?," NBER Working Paper No. 5555, May 1996; published in *Journal of Policy Analysis and Management*, 17 (3), (Summer 1998), pp. 495-520.

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²² H. N. Mocan and H. Corman, "A Time-Series Analysis of Crime, Drug Abuse, and Deterrence in New York City," NBER Working Paper No. 5463, February 1996; revised February 1998.

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²⁸ C. J. Ruhm, "Parental Leave and Child Health," NBER Working Paper No. 6554, May 1998.

²⁹ T. Joyce, R. Kaestner, and S. Korenman, "The Effect of Pregnancy Intention on Child Development," paper presented at the annual meeting of the Population Association of America, Washington, D.C., March 1997.