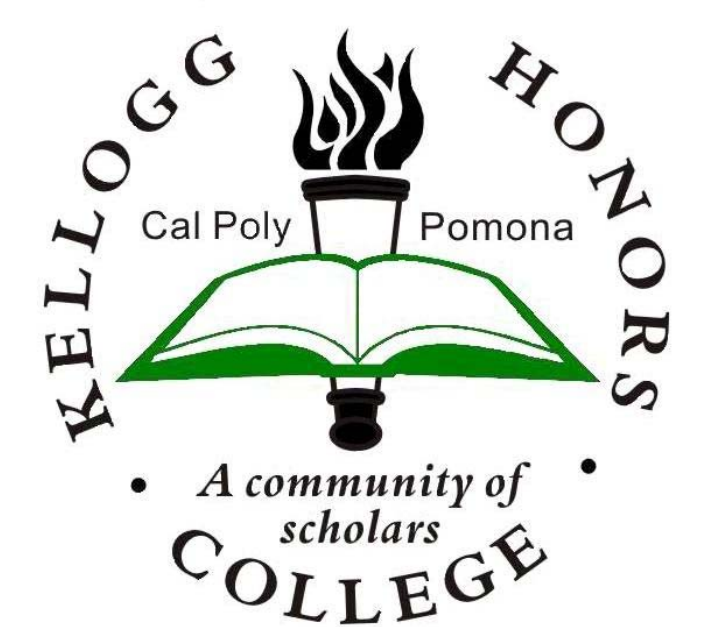# Estimating the Tax Impact of Marijuana Legalization

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## Factors that Effect Tax Revenue

Price Elasticity of Demand

➤Price Elasticity is the change in quantity demanded of a good per the change in its price.
➤Mathematically it is the percent change in quantity demanded divided by the percent change in price. It is represented by a negative number since price and quantity are inversely related. For example a price elasticity of -2 means that if there is a 1% increase in price then the result will be a 2% decrease in price.
➤Elasticity is an important factor because it determines how much consumption of marijuana will change after legalization incurs a large change in price.
➤Elasticity is measured empirically over time through simply calculating the percent change in quantity as the price of the good changes.
➤Two papers that I analyzed were "Potential Tax Revenue from a regulated Marijuana Market: Meaningful Revenue Source" (1994) by Michael Caputo and Brian Ostram, and Budgetary Implication of Marijuana Prohibition" (2005) by Jeffery Miron.

Abstract

In the 2012 election cycle, Washington and Colorado both voted to legalize marijuana. While the legal battles may demand all the headlines, there will also be a lot of attention on the effect that legalization will have on both prices and tax revenue in those states. California has a long history with marijuana. The drug has been steadily decriminalized over the years, and there have been ballot measures to legalize marijuana, like Prop 19 in 2010, that have been narrowly defeated. The added difficulties that California face in regards to the large cuts in tax revenue have made the prospect of added revenues through marijuana taxation even more appealing. This project will analyze the methods used to estimate the impact that legalization of marijuana will have on tax revenue. Marijuana provides an interesting case study since it is illegal, highly regulated, but still is widely consumed. There are also competing conclusions regarding this topic. The National Organization for the Reform of Marijuana Laws has estimated that California would gain $1.2 billion in additional tax revenue. Conversely, the CATO Institute's "The Budgetary Impact of Ending Drug Prohibition (2010)" estimated that California would only receive $352 million in additional revenue with $960 million in savings on expenditures. I analyzed the different factors involved, which include price elasticity of marijuana, marijuana consumption, and market structure. This project will focus on explaining the process involved in this sort of estimation and will also draw conclusions using parameters from other papers and secondary data.

Consumption

➤Consumption is measured by the ounces of marijuana consumed and relies heavily on estimates.
➤Consumption is measured through two different methods. The first is to use the amount of marijuana seized by the government and then estimate the percentage of total product seized to calculate the total amount consumed. Another method is using data from the Office of National Drug Control Policy, a government organization that uses surveys to determine the amount of marijuana consumption in the country.
➤There are a few problems with each method. The estimation using seizure data relies on estimating the percentage of marijuana that is seized. There is a large possible error in making this calculation. The household survey relies on people voluntarily answering questions over the phone about drug use and many people will be hesitant to answer questions truthfully about illegal activities.
➤Also the annual incidence is used to measure how fast the market is growing.
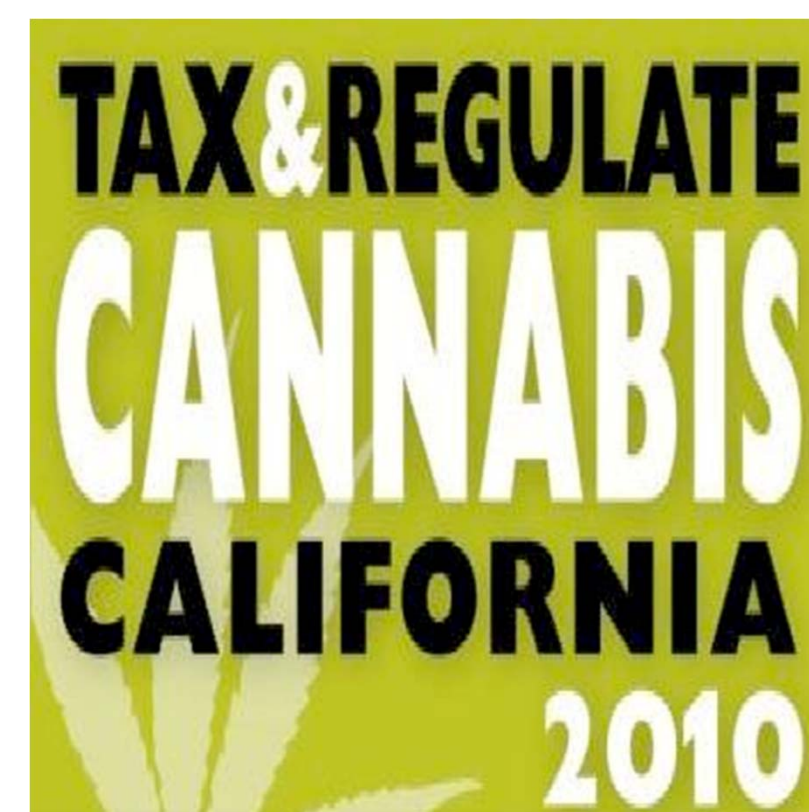
Data

➤The data for marijuana consumption is taken from the National Survey on Drug Use and Health (NSDUH). This is the prime source of data for estimating national and state marijuana consumption. Below is an example of the interview questions which are done online.

Market Structure

➤According to economic theory, the market structure, or the type and number of firms that are producing a good, has a large impact on the price of the good.
➤The number of firms is inversely related to the price of the good. The more firms that are present in the market the more they bargain down the price.
➤There are also questions of the product differentiation between types of marijuana that will be sold in the market. According to microeconomic theory, the more differentiation between products, the higher the price will be. An example of this is Coca-Cola and Pepsi. Both companies can maintain higher prices because their products are differentiated enough for both companies to have loyal customers.

➤Another measure of marijuana consumption is the annual incidence. This measure takes the amount of new marijuana users and divides this number by the number of new users plus the amount of people who have never used. This number is written as a percentage and represents percentage of new users. This measure is important because post-legalization will most likely result in "new users", and this increase in demand will factor in to determining revenue. The calculation for the average annual incidence is below.

Price

➤The price of the good is determined through market equilibrium.
➤It is estimated that the current price of an ounce of marijuana is around $100.
➤Most policy makers prefer two types of tax on marijuana. One is an excise tax, which is most often a tax that depends on quantity and not price. The other tax, the sales tax, is dependent on the price of the good.
➤Most economists have estimated a one dollar cost of production per joint produced.
➤Past experience and comparison with other countries says that price could drop between 50-100%.
➤Post-legalization price is determined by price elasticity of demand because it determines how many people still consume the good after the price shock has occurred.

$$Average\ annual\ rate = 100 * \{[X_1 \div (0.5 * X_1 + X_2)] \div 2\}$$