

LEGALIZING MARIJUANA: POSSIBLE FISCAL OUTCOMES FOR CALIFORNIA
AFTER LEGALIZATION

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Abstract

Marijuana legislation in the United States dates back to the early twentieth century. History has shown how policymakers have twisted the creed of marijuana to something dangerous and deadly. Yet, recent years have shown how individual states have been able to reduce the stigma surrounding this drug. Proposition 19 was defeated in California during November of 2010. This proposition would have legalized the consumption, production, and possession of marijuana in California for adults 21 years of age and older. This thesis illustrates the fiscal benefits that might be realized if marijuana were legalized, regulated, and taxed. While other results have recently been produced, this paper combines data, theory, and estimates from a number of renowned sources, to find the potential tax revenue that could be generated from legalization. The results are compiled with current budget deficit and revenue figures, to find the overarching fiscal impact. While others have offered different outcomes, the results indicate that legalization will only slightly improve the monetary situation in California.

KEYWORDS: (Marijuana, Legalization, Proposition 19)

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CHAPTER I

INTRODUCTION

“Since the early 1960’s, the use of marijuana by a sizable portion of the U.S. population is resulting in an issue of increasing national interest.”¹ Law enforcement efforts along with assertions of possible negative health effects have done little to hamper the widespread use of the drug. The latest survey data from the (2009 NSDUH) estimates that 104 million Americans 12 or older have tried marijuana in their lifetime, 28.5 million people age 12 or older reported using marijuana in the last year, and 16.7 million reported usage in the past month.² Although fluctuating from year to year, overall marijuana usage has increased since the 1960’s and has become a great topic of debate in both public and legislative settings. Still, decades of prohibition have done little to halt the illegal trafficking and use of marijuana.

The 1930’s saw the authoritarian view of Harry Anslinger. As the founder and head of the Federal Bureau of Narcotics from 1932 to 1962, Anslinger used all of the assets at his disposal through five presidential administrations.³ He tortured any positive

¹ Michael R. Caputo, and Brian J. Ostrom. "Potential Tax Revenue from a Regulated Marijuana Market: A Meaningful Revenue Source." *American Journal of Economics and Sociology* 53, no. 4 (1994): 475.

² "NIDA National Institute on Drug Abuse, NIDA InfoFacts: Marijuana." 11/10 [cited 2011]. Available from <http://www.drugabuse.gov/infofacts/marijuana.html>.

³ Rudolph J. Gerber. “*Legalizing Marijuana: drug policy reform and prohibition politics.*” Westport, Conn.: Praeger, (2004): 4.

opinions towards marijuana and fought to ensure it was treated like any other illicit drug. The 1937 Tax Act was the first step towards prohibition where the government attempted to strictly regulate the distribution and cultivation of marijuana. Despite many attempts by scientists and reports from other countries to prove the safe nature of the plant, the Anslinger born stigma surrounding pot was insurmountable.⁴ Finally being listed as a category 1 drug in the Controlled Substances Act of 1970, cannabis plunged into the realm of illegal on every level. Since 1970, marijuana has again gained favor in the medical realm yet a final push for complete legalization has still not been realized.

Increased medical use teamed with the inability of law enforcement to subdue the black market, has forced many to weigh the pros and cons of marijuana legalization. While this is not the first time that the idea of legalization has been voiced, recent years have allowed for a more liberal understanding of marijuana to take shape. The economic woes of the past decade helped bring new outlooks on marijuana to the forefront and it seems that little should be standing in the way of legalization and taxation of cannabis. In his paper, Jeffery Miron breaks down the costs of marijuana prohibition into three categories, Judicial, Police, and Prison. While monetary costs of prohibition can easily be avoided, tax revenue from a legal system can bring the profits of a lucrative black market into a public forum. Legalization on a Federal level could also help to decrease violence on the U.S. Mexican border along with domestic violence due to the illegal nature of the market. However, Federal legalization of marijuana can never be allowed until the system has been proven; in other words, until legal marijuana

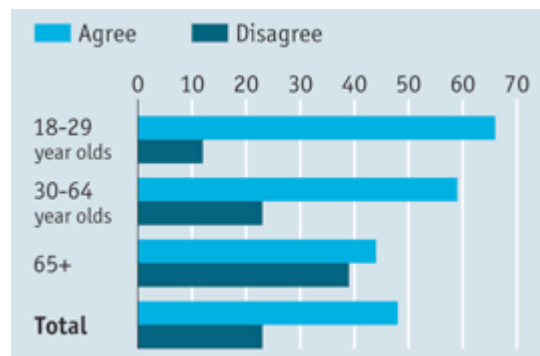
⁴ Gerber, 13.

laws are in place and upheld at the state level. Certain States have paved the road for more lenient marijuana legislature, and one in particular has come the closest.

On November 2, 2010 proposition 19 was on the statewide California ballot as an initiated state statute. "Proposition 19 legalizes marijuana under California but not federal law. Permits local governments to regulate and tax commercial production, distribution, and sale of marijuana."⁵ This proposition was defeated with 53.5 percent against vs. 46.5 percent for. Although this proposition did not pass, it brings discussion of legalization to new heights and raises the idea that legalization could be just around the corner. It has only been three months since proposition 19 was defeated; however, public outlook concerning marijuana has never been more in favor of legalization and taxation. Figure 1.1 is a chart from the Economist was created February 2011, and shows a poll taken of those for and against legalizing marijuana.

FIGURE 1.1

PERCENTAGE OF AMERICANS FOR/AGAINST LEGAL TAXED MARIJUANA



Source: "The Economist/YouGov Poll." February 5-8, 2011. Available from <http://media.economist.com/images/pdf/Toplines20110208.pdf>.

⁵ "Statewide Proposition 19 Official Description 2010 California General Election." [cited 2011]. Available from http://california.evoter.com/california/propositions/state/statewide_proposition_19.

If a vast majority of the population is for the legalization of cannabis why was proposition 19 defeated in November?

Michael R. Caputo and Brian J. Ostrom wrote a paper in 1994 titled, “Potential Tax Revenue from a Regulated Marijuana Market.” Their paper focused on national data regarding marijuana and estimated not only the demand for the drug, but also potential tax revenue that could be generated from a nationally regulated marijuana market. One major problem that these two economists faced was the overall timing of their study. “The 1991 National Drug Control Strategy called for a near doubling of the funds available (87 million) for the eradication of domestically grown marijuana, and on the legislative side, California and Alaska introduced bills that would stiffen penalties associated with possession.”⁶ Caputo and Ostrom conducted their analysis at a time when the overall public and governmental attitudes towards marijuana were anything but positive. Using their theory and several of their methods, one may be able to make a much stronger case for marijuana legalization today.

This study is an extension of Caputo and Ostrom’s 1994 paper; however, while national level data is taken into consideration, its primary focus is on the situation in California. Using data from the Substance Abuse and Mental Health Services Administration, an overall demand for marijuana in California is estimated from 2003-2008. After the demand is estimated, revenue estimates are generated using different pricing and an excise tax system. While many estimates of tax revenue and reduced prohibition costs have been offered in recent years, this study follows the most recent data sets and percentage estimates to reach an up to date result. Instead of focusing all

⁶ Caputo, Ostrom, 476.

the attention on the nation, examining one state will shed light on how legalization can potentially improve a single states' fiscal situation. Always on the front lines of marijuana policy reform, California has seriously been considering legalization as a form of increasing state revenues.⁷ With support from Govenor Schwarzenegger, policymakers and the population at large are taking the idea of legalization more seriously.⁸ Furthermore, if enough support can be generated and one state can lead the way to complete legalization, the federal government will be hard pressed to impede the progression. To what degree will the legalization of marijuana impact the California State deficit?

California was the second state to decriminalize marijuana in 1996; in addition, in 2010 it was the first state to cast a ballot including Proposition 19 that would have legalized marijuana at the state level. Although the proposition was defeated, in two years it will be up for vote yet again. Decriminalization, although substantially decreasing costs of enforcement, does not allow the state to fiscally benefit from the sale of marijuana. In 2006, 65,467 marijuana arrests accounted for 4.23% of all arrests in California.⁹ According to a percentage basis method of estimation, if not for decriminalization, marijuana arrests would have cost 1.34 billion in California for that year.¹⁰ Given the budget problems in California, new revenue sources would be beneficial in alleviating some of the deficit. With the 2008 California state budget

⁷ Peter H. Reuter et al., "Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets," RAND Corporation, (2010): 1.

⁸ Reuter, 1.

⁹ Jon Gettman, Ph.D., "Marijuana in California: Arrests, Usage, and Related Data." *The Bulletin of Cannabis Reform*, Nov. 5, (2009): 4.

¹⁰ *Ibid.*

deficit at 16 billion and rising, any and every option for generating more revenue must be explored in entirety.¹¹ Using Ostrom and Caputo's methodology and estimates from recent years, the results will help illustrate the total impact that legalization could have on California.

¹¹ "Los Angeles Times "California's Budget Gap at \$16 Billion"." February 21, 2008 [cited 2011]. Available from <http://www.latimes.com/news/local/la-me-budget21feb21,0,6427050.story>.

CHAPTER II

LITERATURE REVIEW

This first section briefly summarizes the history of marijuana in the United States. The past century of marijuana use and legislature surrounding its prohibition are discussed.

History of Marijuana Prohibition

In order for legalization of marijuana to take place, even on simply the state level, public opinion must be strong enough to vote in favor of a new law. As we have seen from the Economist, it is clear that public outlook thinks marijuana ought to be legal. However, these simple polls are not enough if citizens do not feel strongly about going out and voting for it.

Legislature written decades ago continues to drive political thought and continues to raise costs for taxpayers. In 2000, 734,497 people faced arrest on marijuana charges. As of 2003, it cost 1.2 billion annually to keep 60,000 people in prison on marijuana misconduct alone.¹ Ignoring many scientific studies and doctors' recommendations, politicians have succeeded in demonizing this harmless plant; yet, where did this utter hatred come from?²

¹ Rudolph J. Gerber, "*Legalizing Marijuana : drug policy reform and prohibition politics.*" Westport, Conn.: Praeger, (2004): xvi.

² Gerber, 14.

Negative views towards marijuana were born with rises in immigration in the southern part of the United States. When the Mexican Revolution of 1910 prompted immigration in the Southwest, anti-Semitism towards Mexicans was teamed with their marijuana habits.³ Officials in Texas and California, were convinced that marijuana induced a “Lust for blood” or violent behavior. Similar attitudes were born in the Deep South. When sailors and immigrants introduced marijuana to the region, law enforcement’s associated the plant with African Americans and jazz musicians simply because of their unconventional ways or music.⁴ Marijuana use spread quickly with the passing of the 1920 Volstead Act and the banning of all alcohol in the United States. People were looking for legal ways to alter their mood and, soon states were beginning to pass laws prohibiting the possession and sale of marijuana due to its behavior altering effects.⁵ Southern and Southwestern states began passing laws prohibiting the possession and sale of marijuana.

Certain people have played key roles in the war against and for marijuana legalization, and have single handedly changed views to match their own. Harry J. Anslinger is one such person who founded the Federal Bureau of Narcotics in 1932. Anslinger waged, what many claim as, a crusade against marijuana. His right-wing views on marijuana prohibition claimed that the plant threatened the country’s need for behavioral uniformity.⁶ Anslinger linked marijuana and its violent effects to Mexicans, African Americans, jazz musicians, and any other portion of society that was not

³ Ibid, 2-3.

⁴ Ibid, 3.

⁵ Ibid.

⁶ Ibid, 4.

Mainstream America. In his articles, Anslinger claimed that swing bands and jazz musicians became homicidal, suicidal, and insane from marijuana use, or that Mexicans' and Blacks' pot-induced promiscuity threatened the nations' stability.⁷ Anslingers' personal war knew no bounds when he regularly printed fictional stories about marijuana use and its effects. "Especially prominent was the story about the murder of the Licata family in Florida by and enraged son high on pot who, Anslinger Conveniently ignored, suffered from serious mental illness, the true factor in the murders."⁸ Regardless of the fictional nature of much of Anslinger's published works, he had support from his Bureau of Narcotics, International Narcotic Education Association, and many papers and magazines that would publish similar stories. Without strong advocates for marijuana at the time Anslinger began his crusade, there was little stopping the Federal Government from passing a law against marijuana possession and cultivation.

The 1937 Tax Act hearings saw more of Anslingers dogmatic and unprecedented views. He stated in his testimony, again with no scientific facts, that, "Most marijuana smokers are Negroes, Hispanics, Filipinos and entertainers. Their satanic music, jazz and swing result from marijuana usage. This marijuana causes white women to seek sexual relations with Negroes."⁹ During the hearings, the American Medical Association presented a futile argument to Congress that hoped for the continued legal use of marijuana as a harmless medicine.

⁷ Anslinger, H. J., and Courtney Ryley Cooper. "*Marijuana : assassin of youth.*" Springfield, Ohio: Crowell Pub. Co., (1937).

⁸ "Summary of Licata Case," 17 October 1933, AP, box 5, file "Scrapbook," vol. 7, 1931-1949.

⁹ Gerber, 9.

“The Marijuana Tax Act of 1937 controlled pot via a stamp and license transfer tax, for which the government refused to issue either stamps or licenses. Users of hemp for defined industrial or medical purposes had to register and pay a tax of 100 dollars per ounce. Failing to do so would result in fines or prison time for tax evasion.”¹⁰ This act did not make marijuana use and possession completely illegal; yet, it aimed at making it difficult for people to obtain. The Tax Act also aroused people in support of marijuana and against the idea of taxing, regulating, and potentially banning the substance. In 1939 a research group was put together at the New York Academy of Medicine. The group consisted of physicians, pharmacologists, chemists and public health officials who joined with the New York City Police Department to complete a comprehensive study on marijuana. After six years of research, the report provided evidence, similar to an 1894 British study, that marijuana caused negligible physiological effects; it played no role in crime; induced no physical, moral, or mental degeneration; and caused no permanent negative social effects.¹¹ With his persuasive ability, Anslinger convinced Dr. Ernest Cook, the chairman of the Committee on Revision of the United States Pharmacopoeia, to remove marijuana from the catalogue of recognized medicines, where it had been listed since 1850.¹² Soon after losing its medical credibility, marijuana was considered a category 1 drug in the Controlled Substances Act of 1970. Anslinger accomplished one of his goals, now pot had a high potential for abuse, no medical use in the U.S., and could not be used under medical

¹⁰ Ibid, 11.

¹¹ “Sociological, Medical, psychological and pharmacological studies by mayors committee on marihuana,” The LaGuardia Report, in D. Soloman, The marijuana papers (New York: Signet, 1968): 297-307.

¹² Gerber, 14.

supervision.¹³ “Its prohibition illustrated how Congress could succumb to emotional rhetoric rather than dispassionate science; and, its demonization thrived on cultural and racial rather than medical or criminal considerations.”¹⁴ The prohibition of marijuana may have put some politicians at ease; yet, marijuana cultivation and usage was anything but halted.

The 1960’s, Vietnam War, and the Kennedy administration brought about a softer political attitude towards marijuana use; and, enforcement seemed to mirror differing forms of cultural expression. New forms of contraception teamed with free love; and people were beginning to realize their rights to personal privilege and free expression. Marijuana found its place mainly among college students and was thought to be part of an expression of dissent.¹⁵ Anslinger was forced to resign by President Kennedy in 1962, his radical views no longer fit with the times. The White House Conference on Drug Abuse performed more research on marijuana and yet again found no link between marijuana and violent crime.¹⁶ The National Organization of Reform of Marijuana Laws or (NORML) was one such group working diligently to swing Congress in favor of decriminalization. However, the early sixties saw a very halfhearted approach to enforcement and mild punishment for those actually convicted

¹³ "The Controlled Substances Act 1970." [cited 2011]. Available from <http://nationalsubstanceabuseindex.org/act1970.htm>.

¹⁴ Gerber, 14.

¹⁵ Ibid, 18.

¹⁶ “The Drug Hang Up, America's Fifty-Year Folly, Chapter 22, The White House Conference 1962-63.” [cited 2011]. Available from <http://www.druglibrary.org/special/king/dhu/dhu22.htm>.

of marijuana crimes. “In 1960, only 169 pot felony convictions appeared for the nation. Pot had become an accepted symbol of rebellion and independence.”¹⁷

While the Kennedy-Johnson era felt some degree of sympathy towards marijuana legislature, the Nixon-Ford era brought the war against marijuana to “Anslinger” heights. The 1970’s brought about radical Right-wing conservative attitudes towards drugs in general. With the civil rights movement, Vietnam War, racial diversity, equal rights for women, and economic reconstruction, people were beginning to value control and structure in society; therefore, marijuana was yet again used as a scapegoat and thought to be a catalyst for national disorder.¹⁸ In a 1971 National Review, a Nixon supporter claimed, “The weed is an...instrument of initiation for a lifestyle that generally rejects or seeks to bring down ‘ordered life as we know it’”¹⁹ In 1972, Nixon ordered another study on marijuana; however, this time there were other countries interested in performing their own studies due to their own national drug problems. Even after assigning conservative Republican members to his research team, Nixon was disappointed when the results were brought forward. “The three commissions found marijuana about as dangerous as alcohol; but, like alcohol, marijuana was undeserving of criminal penalties. The English report went a step further: The evidence of a link with violent crime, it found, was far stronger with alcohol than with marijuana.”²⁰

¹⁷ Gerber, 19.

¹⁸ Ibid, 20.

¹⁹ S.K. Oberdeck, “Problems of Pot,” National Review, June 1, (1971): 597.

²⁰ Gerber, 23.

President Regan and his tenure in the 1980's brought the war against drugs to new heights. The Presidents' personal beliefs drove him to increase spending and involve the military in efforts to combat the drugs/marijuana problem. The first five years of the Regan administration brought military funding for the war against marijuana from 1 to 196 million; similarly, when he ended his 'fiscally conservative' administration, spending for police and prisons rose 600 percent.²¹ "In 1989 tobacco killed 395,000, alcohol 46,000, cocaine 3,618, heroin 2,743, marijuana 0."²² Desperate for legitimizing the prohibition of marijuana, Barry McCaffrey took one of the most drastic steps to offer proof that a legal marijuana system failed in every way. In 1998 McCaffrey claimed that the Netherlands, where pot was legal and regulated, had a murder rate that doubled that in the U.S., which was due to drugs.²³ In reality the death rate in the Netherlands was one-fourth of that in the U.S.; and, marijuana use in the U.S. was more than double of that in the Netherlands for every age group.²⁴

A personal campaign against Marijuana has been held by almost every presidential administration dating back to the 1930's. The Federal Government has shown their ability to enforce laws with little scientific evidence justifying criminalization. Small strides have been made in the twenty-first century; however, California holds the key to unlocking the door to the first ever legal marijuana cultivation and possession laws in the world.

²¹ Hendrickson, David C. "Smoke and Mirrors: The War on Drugs and the Politics of Failure." *Foreign Affairs* 75, no. 6 (1996): 153-153.

²² Gerber, 46.

²³ "In Drug War Fantasy beats reality," Chicago Tribune, July 25, (1998), and K. Zeese, "Gen. McCaffrey's History of Misinformation," Drug Scene Weekly, October 15, (1999).

²⁴ Gerber, 53.

Part II

This second section discusses facets of prohibition and potential positives and negatives of legalization. Costs of prohibition include Prison, Police, and Judicial, which are estimated at the state and national level. Positives and negatives of legalization are discussed for California and the nation as a whole. Finally, policy from other countries is examined to understand what legalization might bring.

Costs of Marijuana Prohibition

History has shown that great measures have been taken and obscene amounts of money spent on the war against drugs in the United States. Much of the resource allocation is justified when certain drugs are on the table for discussion. However, in the case of marijuana, it has been proven time and again that its prohibition is anything but warranted.

The effects of a recent recession combined with an even more devastating current economic downturn, have left both the federal and state governments in fiscal crises. The local, state, and federal governments must cut spending and reallocate resources to where they are most needed.

Marijuana is and has been the most widely used illicit drug in the United States. Similarly, as of 2006, there were more than 41,000 Americans in state or federal prison for marijuana charges; this number is greater than the total imprisoned in eight different

European Union countries combined.²⁵ The number of marijuana arrests has steadily risen throughout the nineties and in 2007, 831,516 set the record, with the majority being simply charges of possession.²⁶ These figures are only two pieces of what make up the total state and federal expenditures on marijuana prohibition every year. The heightened vigilance of law enforcement has been rationalized by the Presidents' Office of National Drug Control Policy. The aim of the ONDCP in 2005 was, "To disrupt the market for illegal drugs in a way that both reduces profitability of the drug trade and increases the costs of drugs to consumers."²⁷ Yet, with increased efforts and arrests, law enforcement has done little to combat the increased availability and relatively inelastic price of Marijuana throughout U.S. drug markets. The national average costs for a gram of marijuana declined from about 15 dollars in 1992 to 10 dollars in 2000.²⁸ Using data collected from specific school districts in Washington State along with national statistics, there is clear evidence that illustrates how increased government efforts have in no way produced the desired results. The combined evidence shows how the upward trend in marijuana arrests has been associated with decreased price, increased

²⁵ "Drug use and dependence, state and federal prisoners, 2004." in U.S. Dept. of Justice, Office of Justice Programs, Bureau of Justice Statistics [database online]. [Washington, D.C.]

²⁶ Federal Bureau of Investigation, Uniform Crime Reports, Crime in the United States, annually. http://www.mpp.org/assets/pdfs/download-materials/MJ_ProhibFacts092008.pdf.

²⁷ Katherine Becket, Steve Herbert. "The Consequence and Costs of Marijuana Prohibition," http://www.aclu-wa.org/library_files/BeckettandHerbert.pdf : 17.

²⁸ Becket, Herbert: 18.

availability, increased potency, and increased use.²⁹ Actual estimates are needed in order to understand the true faults experienced by the government.

Jeffery A. Miron, a Harvard Economics Professor, breaks down the prohibition costs experienced by both state and federal governments. The three main components of prohibition enforcement are the costs of police resources for marijuana arrests, the prosecutorial and judicial costs for marijuana prosecutions, and the correctional costs from marijuana incarcerations.³⁰ The report used the same method of estimation for each cost. The percentage of arrests, prosecutions, and incarcerations for marijuana violations were multiplied by the budgets for police, Judges, and prisons in each state.³¹ A national estimate for the cost of prohibition was reached after totaling each state estimate. Miron found that state and federal governments combined annual spending on marijuana prohibition was 7.7 billion dollars. Using similar methods of estimation, other studies have also reached a similar prohibition enforcement cost. The federal expenditure was calculated using rough estimates based on overall percentages from each year in question. A percentage taken from the DEA for 2003 indicates that 2.4 billion is a reasonable estimate for federal government expenditure.³² Therefore, using the methods described earlier, the remaining 5.3 billion is comprised of state and local expenditures for enforcement of marijuana prohibition. This estimate was calculated to also account for assets seized from marijuana violations, whether they are accounts,

²⁹ Ibid.

³⁰ Miron, Jeffrey A., and Marijuana Policy Project. *"The budgetary implications of marijuana prohibition."* Washington, D.C.: Marijuana Policy Project, (2005): 4.

³¹ Ibid.

³² Ibid, 10.

cars, boats, land, or houses; likewise, marijuana offenders must pay fines to slightly offset the cost of arrest. However, estimates of seized assets and fines paid were around 100 million per year, which does little to drive down total state and local costs.

Looking more closely at Miron's results, in 2003 California's expenditures on marijuana prohibition were by far the greatest of all fifty states. Its total spending of 981 million can be broken down to 71 million on corrections, 681 on judicial, and 227 on police.³³ Although this study was conducted in 2003, we can infer, through rising arrest and incarceration rates, that today this number has also risen. While state and federal governments have better understood the fiscal costs of marijuana prohibition, the numbers have failed to arouse any change in policy. Yet, problems on our southern border could be a driving force behind a shift to legalization.

Border Costs of Marijuana Prohibition

While monetary costs seem to have little effect on current U.S. Marijuana policy, perhaps a large enough body count will provoke change. Concerned with his countries ongoing war against violent drug cartels, Felipe Calderon stated in 2010 that, "The Americans, rather than regulating or establishing an adequate drug or immigration, or arms legislation, have allowed organized crime to regulate those markets."³⁴ When the Mexican President Felipe Calderon declared war against the drug cartels in 2007, he did not realize that simply sending in troops would not get the job done. Drug Cartels feed off of the demand from the U.S. and rely on the billions of

³³ Miron, Appendix.

³⁴ Talia Hagerty. "Legalizing the Marijuana Market: A Prescription for Peace on the US-Mexico Border?" Perspectives on Global Issues, May 1, 2011. 2.

dollars in profits that come mostly from U.S. Marijuana sales.³⁵ Since 2007, 30,000 lives have been lost in the war on the border.³⁶ Although it seems that little can be done to quell the profits and violence of the cartels, the recent increase in domestic supply of marijuana has shed more light on a possible solution. “A legal infrastructure for regulating and taxing marijuana sales can effectively redirect demand away from cartel drugs and dry up profits.”³⁷ While legalization seems like a reasonable and new kind of solution, Obama and Calderon seem to be only focused on throwing more money at the situation.³⁸ The lives lost in the war against drug cartels should be reason enough to not make the same mistakes again. The proposals from the Obama administration will not only suppress potential peace, but also create a situation similar to that in Columbia when the U.S. government intervened. History has shown that prohibiting marijuana and a war on drugs from either side of the border have not decreased sales or consumption; and, increased law enforcement and militarization have only brought about what both countries wanted to avoid, war.³⁹ If the financial costs along with the ever-increasing death toll are not enough to incite legalization of marijuana, then perhaps the potential benefits of legalization need to be profoundly expressed.

³⁵ Steve Fairnar, William Booth. “Cartels Face an Economic Battle.” The Washington Post, October 7, 2009.

³⁶ Hagerty, 1.

³⁷ Ibid.

³⁸ “Dealing with Drugs: On the Trail of the Traffickers.” [cited 2011]. Available from <http://www.economist.com/node/13234157>.

³⁹ Hagerty, 2.

Benefits of Marijuana Legalization

Miron's understanding of the national marijuana prohibition costs can be translated to savings for federal and state governments. Although legalization will be accompanied by certain costs of regulation, the estimated national spending of 7.7 billion in 2005 can be saved and allocated where needed for regulation. While cutting costs is one benefit, revenue generated is a more exciting prospect. Miron estimates that if marijuana were treated as any other good, and taxation was approximately 30% of expenditure, revenue generated would be 2.4 billion.⁴⁰ A high excise tax is another possibility for marijuana under legalization. While this type of tax has proven successful in some cases by not generating a black market, the case of marijuana production is a new situation entirely.⁴¹ Unknown outcomes must allow for all possibilities; therefore an upper bound of 9.5 billion in possible tax revenue could be generated by an 80% excise tax.⁴² Finally a mid-range estimate of 6.2 billion is most realistic to Miron. This estimation assumes a 50% excise tax, similar to the U.S tax on alcohol and tobacco.⁴³ These estimations assume legalization at the federal level; and, while they vary greatly in range, uncertainty dictates that all must be taken into consideration.

Tax revenue estimates and other legalization benefits for California are even more varied than Miron's national estimates. The NORML or the National Organization for the Reform of Marijuana Laws provides an array of optimistic and somewhat biased

⁴⁰ Miron, 10.

⁴¹ Ibid, 11.

⁴² Ibid, 15.

⁴³ Ibid.

estimations for legalization benefits in California. Dale Gieringer estimates that tax revenue in California could be between 1.5 and 2.5 billion along with additional economic benefits between 12-18 billion. Assuming the expected tax of 50 dollars per ounce of marijuana and using consumption data from the U.S. Department of Health & Human Services, Gieringer estimates revenue to be between 770-900 million.⁴⁴ Rough estimates from Caputo and Ostrom's study claim nationwide excise tax revenues between 3.5-12.25 billion; and, adjusted for population, California's potential share would be between 400 million and 1.5 billion.⁴⁵ Finally, a sales tax similar to that of tobacco would generate between 240-360 million. While Gieringer's actual estimation of total tax revenue in California is 1-1.2 billion, he attempts to provide higher estimates using tobacco and alcohol trends. His projections for possible economic benefits of 12-18 billion are roughly based off of the California Wine industry and its ripple effect through the state economy. Gieringer provides an optimistically biased view of a legal marijuana market in California while omitting vital facets that must be taken into consideration.

An article titled, "Altered State?" does not argue that marijuana should not be legalized; yet, provides a comprehensive and realistic look at what tax revenue might be under various systematic changes. Continuing to assume a 50-dollar excise tax per ounce of marijuana, tax revenue for California could be much higher or lower than 1.4 billion.⁴⁶ Uncertainty is yet again a major factor in this study; but, with careful

⁴⁴ "California NORML report, Benefits of Marijuana Legalization in California." Updated October 2009 [cited 2011]. Available from http://www.canorml.org/background/CA_legalization2.html.

⁴⁵ Ibid.

reasoning through many perceived situations, the conclusions are valid. Tax revenue estimates vary so dramatically because of the uncertainty about the federal governments' response to California's legalization.⁴⁷ Revenue estimates must also account for various levels of tax evasion. While pretax retail prices are expected to decline by nearly 80%, prices that consumers face depend on regulation, taxation, and enforcement of both.⁴⁸ Consumption will increase, yet, without knowing the demand curve, tax evasion rate, or home cultivation levels, revenue is even more difficult to predict.⁴⁹ While revenue estimates may not be as trustworthy, this study predicts that costs of enforcing marijuana laws will be less than 300 million.⁵⁰ Tax revenue aside, this number is much less than Miron's estimated 981 million dollar cost of prohibition. If nothing else, state costs will be cut if marijuana is legalized. The taxation of alcohol and tobacco was not perfect when first instituted and regulated; yet, a balanced or somewhat balanced system has been realized in each case. Marijuana legalization and taxation may not yield the desired revenue at first. This article proves why the system ought to be tested and tampered with so that the best tax structure and regulatory regime can be found. With so much uncertainty, it is difficult to argue for or against an unknown system until it is finally tested.

⁴⁶ Peter H. Reuter et al., "Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets," RAND Corporation, (2010): 2.

⁴⁷ Ibid.

⁴⁸ Caulkins, Jonathan B., "Cost of Marijuana Prohibition on the California Justice System," RAND Corporation, July (2010). 19.

⁴⁹ Ibid, 33.

⁵⁰ Ibid, 2.

Tax revenue along with cutting prohibition costs is a vital aspect of marijuana legalization in California. Still, the violent issue on the U.S. Mexican border could be the most important part of legalization. California, while not responsible for all of the marijuana demand in the U.S., borders Mexico and is a destination for drug cartels. These cartels have become involved in more than simply drug trafficking; nevertheless, marijuana sales in the U.S. are their primary source of revenue and profit.⁵¹ If California had legal system of taxation on marijuana, demand in the U.S. could shift dramatically in favor of domestically grown pot. This state legislative shift will not halt violence altogether, but, a legal system with lower prices could force demand to shift away from illegal marijuana. “Taxation at the retail level will prevent profit opportunities from growing large enough to cover the costs of violence; and violent market control will no longer be economically viable.”⁵² A single bordering state will not solve all violent problems on the border; yet, it may legitimize federal legalization.

Policy from other Countries

Finally, other countries must be examined to find evidence that marijuana legalization is more beneficial than prohibition. The Netherlands is the only country that has ever gone so far as to legalize the possession and consumption of marijuana. In the 1970’s the Netherlands allowed for the distribution of cannabis under very strict regulation.⁵³ While marijuana use, possession, and retailing have been legal in the Netherlands, cultivation of any kind remains illegal. Cultivation aside, a legal marijuana

⁵¹ Hagerty, 4.

⁵² Ibid.

⁵³ Peter H. Reuter. “Marijuana Legalization: What Can be Learned from Other Countries,” RAND Corporation, July (2010): 1

system for adults in the Netherlands has allowed for a lower rate of teenage use than that in the United States.⁵⁴ The ability to ID minors and significantly reduce black market sales, has allowed for a much more controlled and safe marijuana culture in the Netherlands.⁵⁵ “The Ammiano bill or the Regulate, Control, and Tax Cannabis initiative will lead California into essentially uncharted waters.”⁵⁶

Negatives of Marijuana Legalization

Throughout history, marijuana has been used as medicine to help patients with various terminal and non-terminal illnesses. Studies conducted by the White House Conference on Drug Abuse have shown time and again the harmless facets and potential benefits of medical marijuana; nonetheless, recent studies illustrate the negative effects of marijuana and its potential legalization. Alcohol, when consumed in moderation, has proven to have positive health effects. On the other hand, the National Institute on Drug Abuse claims that long-term marijuana use has more than one negative health effect.⁵⁷ “Long-term use has shown to impair the ability of T-cells in the Lungs’ immune system to fight off certain infections.”⁵⁸ Excessive marijuana use has also proven to impair short-term memory. More specifically, the memory, executive

⁵⁴ Reuter, 12.

⁵⁵ Ibid, 10.

⁵⁶ Ibid, 12.

⁵⁷ "NIDA National Institute on Drug Abuse, NIDA InfoFacts: Marijuana." 11/10 [cited 2011]. Available from <http://www.drugabuse.gov/infofacts/marijuana.html>.

⁵⁸ Ibid.

function, and manual dexterity have been negatively affected by long-term marijuana use.⁵⁹

Areas in California have experienced increased crime rates, which can be attributed to cannabis clubs' influence. Los Angeles Police have reported 200 percent increases in robberies and 50 percent increases in assaults in areas surrounding cannabis dispensaries.⁶⁰ Other negative social costs are expected from increased marijuana usage around the work place. Long-term cognitive deficiency from regular marijuana usage would hamper productivity and perhaps create a dangerous work environment.⁶¹ A ripple effect may in turn send healthcare costs through the roof for not only regular users, but also by society at large.⁶² The most alarming negative effect may be the potential impacts on the nation's youth. Younger children and teens are constantly developing their own identities and refining their social skills.⁶³ While drinking alcohol is associated with sex, popularity, and fun, legal advertising for marijuana could aim to maximize sales by identifying themselves in a similar way.⁶⁴ Adolescents are in a vulnerable time of maturation, changing social norms will in turn offer new paths for adolescents to follow; still, these paths created by a legal marijuana market may not be the best to pursue.

⁵⁹ Bolla, K.I. et al., "Dose-related Neurocognitive Effects of Marijuana Use," *American Academy of Neurology*, March 18, (2010): 1341.

⁶⁰ Charles D. Stimson. "Legalizing Marijuana: Why Citizens Should Just Say No." *The Heritage Foundation*, No. 56, September 13, (2010): 6.

⁶¹ *Ibid*,10.

⁶² *Ibid*.

⁶³ Joffe, Alain, and W. S. Yancy. "Legalization of Marijuana: Potential Impact on Youth." *Pediatrics* 113, no. 6 (2004): e645

⁶⁴ *Ibid*.

A legal market for marijuana use, possession, and cultivation has never been permitted. It is impossible to accurately predict all of the benefits and problems associated with such a new system. In the U.S., adamant arguments for and against marijuana legalization have been presented throughout the past century; yet, until a legal system of taxation is put to test, there is no way of knowing, which is best.

CHAPTER III

Estimated Size of the Legal Marijuana Market

This section illustrates how the data is compiled and the methods used for calculating the various results. A general estimation for potential marijuana tax revenue in California is found using assumptions from the literature and estimates from available data. Marijuana is still illegal which makes data collection more difficult than if it were a legally taxed good. Assumptions are made in some cases where data was simply not available.

Size of the Legal Marijuana Market

The first step is to use the data collected and find an estimate for the legal marijuana market. The estimates begin in Figure 3.1 where the size of the market for marijuana is estimated for California. The statistics needed to find the market size were available for the years from 2003-2008. The Substance Abuse and Mental Health Services Administration (SAMHSA) provided national and statewide data on marijuana usage. The age groups of 12-17, 18-25, and 26+ are how the SAMHSA breaks down their findings, as reported in Figure 3.1. The SAMHSA also breaks down their data by people that have used marijuana in the last year or the last month. The “Prediction Interval” column in Figure 3.1 depicts the estimates for last year users and breaks them down into percentage intervals. Likewise, the “Percentage Estimate” column uses the median percentage within the intervals as the percentage for that particular age group.

The “Actual Usage” column requires an extra step because the SAMHSA does not include actual numbers for each state every year.

FIGURE 3.1

ESTIMATED SIZE OF MARIJUANA MARKET BY AGE GROUP AND YEAR

Year	Age Group	In Last Year (percentages)		Actual usage (thousands)
		Prediction Interval	Percentage Estimate	
2003	Ages 12-17	(12.76-15.56)	14.11%	970,195
	18-25	(26.35-30.31)	28.29%	1,009,704
	26+	(6.82-8.93)	7.81%	1100277.564
	Total	(10.48-12.23)	11.33%	2000558.834
2004	Ages 12-17	(13.23 – 16.09)	14.60%	1016523.686
	18-25	(25.88 – 29.85)	27.82%	1000442.253
	26+	(6.53 – 8.58)	7.49%	1657704.327
	Total	(10.25 – 11.95)	11.07%	2848129.452
2005	Ages 12-17	(12.59 - 15.37)	13.92%	976582.3776
	18-25	(25.80 - 29.74)	27.73%	994375.616
	26+	(7.04 - 9.22)	8.06%	1794909.046
	Total	(10.53 - 12.36)	11.41%	2950085.508
2006	Ages 12-17	(11.81 - 14.59)	13.14%	900693.783
	18-25	(26.48 - 30.32)	28.36%	1073178.701
	26+	(6.89 - 9.08)	7.91%	1786692.923
	Total	(10.47 - 12.27)	11.34%	2990573.687
2007	Ages 12-17	(11.73 - 14.46)	13.03%	876077.0014
	18-25	(26.28 - 30.12)	28.16%	1079097.114
	26+	(6.75 - 8.92)	7.77%	1771694.499
	Total	(10.38 - 12.16)	11.24%	2993633.725
2008	Ages 12-17	(11.94 - 14.57)	13.20%	879102.972
	18-25	(27.45 - 31.29)	29.33%	1130316.02
	26+	(6.84 - 9.14)	7.91%	1820213.526
	Total	(10.61 - 12.51)	11.53%	3097573.356

The “Actual Usage” estimates for Figure 3.1 are found using data from the U.S. Census Bureau combined with SAMHSA estimates. Figure 3.2 contains the U.S. Census Bureau data. There are new population estimates each year for California; however the age group breakdown does not match up with the SAMHSA data.

Therefore, rough estimates are made by adding or subtracting certain Census age groups to match the SAMHSA age groups.

FIGURE 3.2

CENSUS VALUES BY AGE GROUP AND YEAR IN CALIFORNIA

Geographic Area						
Year	2003	2004	2005	2006	2007	2008
Total	35484453	35893799	36132147	36457549	36553215	36756666
Under 5 years	2544024	2633972	2686184	2678019	2660386	2704659
5 to 13 years	4818333	4821851	4805011	4657507	4524590	4499890
14 to 17 years	2057613	2140640	2210667	2197088	2198948	2159981
18 to 24 years	3569122	3596126	3585920	3784128	3832021	3853788
16 years and over	27072097	27328932	27491426	28012563	28283442	28492781
18 years and over	26064483	26297336	26430285	26924935	27169291	27392136
15 to 44 years	15949926	15960947	15896509	16195966	16168220	16091480
45 to 64 years		8085096	8300847	8441510	8660887	8819342
65 years and over	3764870	3822957	3868574	3931514	4003593	4114496
85 years and over	488574	514013	543323	555473	584500	612463
Ages 12-17	6875946	6962491	7015678	6854595	6723538	6659871
18-25	3569122	3596126	3585920	3784128	3832021	3853788
26+	14088061	22132234	22269343	22587774	22801731	23011549
total	24533129	32690851	32870941	33226497	33357290	33525208

The “12-17” age group for Figure 3.1 each year is over estimated by adding the “5-13” and “14-17” Census age groups together. The “18-25” Figure 3.1 age group for each year is slightly underestimated by using the “18-24” Census estimate. The “26+” age group for Figure 3.1 is slightly overestimated by adding “65 years and over”, “45-64”, “15-44”, and subtracting “18-24” and “14-17” in Figure 3.2. The “Totals” column in

Figure 3.2 adds up the estimated age groups. Finally, the “Actual Usage” estimates in Figure 3.1 are found by multiplying the newly totaled age groups in Figure 3.2 with the corresponding “Percentage Estimate” column in Figure 3.1. The “Totals” column in Figure 3.2 is multiplied by the “Totals Percentage” in Figure 3.1 to yield a total for each year.

Frequency of Use

Figures 3.3 and (Table 4) are to show how frequently people were using marijuana and the quantity in which they were using. The National Survey on Drug Use and Health (NSDUH) provides national percentage estimates for regular marijuana users. This study is only interested in regular marijuana usage because regular users make up the majority of the market. The “Last Year Total Usage” column in Figure 3.3 shows the totals for each year from Figure 3.1.

FIGURE 3.3
CONSUMPTION ESTIMATES

Year	Last Year Total Usage	Last year regular usage 18+	Total Grams Used	Total Ounces Used
2003	2000558.834	244,068	61,017,044	2152312.897
	12.2% used 250 times			
2004	2848129.452	361,712	90,428,110	3189757.725
	12.7% used 250 times			
2005	2950085.508	392,361	98,090,343	3460035.041
	13.3% used 250 times			
2006	2990573.687	367,841	91,960,141	3243798.528
	12.3% used 250 times			
2007	2993633.725	425,096	106,273,997	3748704.942
	14.2% used 250 times			
2008	3097573.356	464,636	116,159,001	4097388.199
	15% used 250 times			

The “Last Year Regular Usage” column in Figure 3.3 is found by multiplying the “Total Usage” by the NSDUH percentage listed below it. The number of regular users must be multiplied by the estimated frequency of use. Ostrom and Caputo estimated that a regular user uses 250 times per year; they also found that a gram is consumed during each use. Therefore the “Total Grams Used column” in Figure 3.3 is found by multiplying the “Last Year Regular Usage” by 250.

(Table 4) uses all of the same estimates and methods of calculation; however, the assumption is that a regular user uses 116 times per year instead of 250, as estimated by Reuter. These two estimate help to provide an upper and lower limit for a regular marijuana user.

Pre-Tax Retail Value Estimate

The next step is to take the consumption estimates and find the retail value of sales in California at illegal prices. Figure 3.4 and (Table 6) show estimates for the retail value of marijuana sales in California. Average prices for marijuana are most readily available when ounces are the used weight standard. Retail value is measured in ounces because the suggested tax policy is that legalized marijuana will be taxed on an ounce-by-ounce basis; yet, Figure 3.4 calculates the pre-tax retail value.

FIGURE 3.4

RETAIL VALUE OF ILLEGAL MARIJUANA SALES

Year	Consumption (Ounces)	Average Price NNICC	Average Price High Times	Total Retail Value Billions
2003	2152312.897	\$233		\$0.50
2004	3189757.725	\$233	\$352	\$0.74-\$1.1
2005	3460035.041	\$233	\$340	\$0.8-\$1.1
2006	3243798.528	\$233	\$334	\$0.75-\$1.0
2007	3748704.942	\$233	\$388	\$0.87-\$1.4
2008	4097388.199		\$394	\$1.60

The “Consumption” column in Figure 3.4 is measured in ounces of marijuana. The “Total Grams Used” column in Figure 3.3 is converted to ounces for Figure 3.4. Price estimates for each year are difficult to find; but the National Narcotics Intelligence Consumers Committee (NNICC) provides a national average price estimate from 2003-’07. Similarly, “High Times” provides yearly estimates of prices in California from 2004-’08. Each year “High Times” lists the prices of the most popular brands of

marijuana. Through medicinal marijuana dispensaries, “High Times” provides a range of prices each year for different grades of marijuana. All prices were added up and averaged to find the most relevant price for each year. While the national estimates are relatively low compared to the High Times California price estimates, a range is established to allow for various situations. The “Total Retail Value” column in Figure 3.4 is computed into billions and shows the low value from NNICC prices, and the high value from High Times prices. (Table 6) uses the same assumptions and methods of calculation as Figure 3.4; but the “Consumption” column in (Table 6) reflects the lower consumption figures from (Table 4).

Tax Revenue Estimates for California

The next step is to use the overall demand estimates and find what the potential tax revenue would be after legalization. Figure 3.5 and (Table 8) are the basic tax revenue tables for California. Based on consumption estimates from Figure 3.4 and (Table 6), multiplying “Consumption (ounces)” by a \$50 dollar excise tax yields potential tax revenue for California. “The Ammiano Bill, also known as Proposition 19, would allow the state to regulate production and distribution and initially apply an excise tax of \$50 per ounce.”¹ This tax can allow the government to set the market price lower than illegal prices, which will therefore diminish illegal distribution.²

¹ Peter H. Reuter et al., “Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets,” RAND Corporation, (2010): iii.

² Michael R. Caputo, and Brian J. Ostrom. "Potential Tax Revenue from a Regulated Marijuana Market: A Meaningful Revenue Source." *American Journal of Economics and Sociology* 53, no. 4 (1994): 485.

FIGURE 3.5
TAX REVENUE WITHOUT PRICE/ELASTICITY ADJUSTMENTS

Year	Consumption (Ounces)	Excise Tax	Total Tax Revenue
2003	2152312.9	\$50	\$107,615,645
2004	3189757.73	\$50	\$159,487,886
2005	3460035.04	\$50	\$173,001,752
2006	3243798.53	\$50	\$162,189,926
2007	3748704.94	\$50	\$187,435,247
2008	4097388.2	\$50	\$204,869,410

The tax revenue estimates in Figure 3.5 are baseline estimates because legalization will alter prices and consumption and drive current estimates up or down.

Using demand, price, and elasticity estimates, (Tables 9-16) in the Appendix illustrate the complexities of taxing a former illegal good. The Price Elasticity of Demand is the important variable in these tables because as prices change and a tax is imposed, quantity demanded will change. These eight tables in the Appendix represent possible tax revenue for California for 2003 alone. The “Price” Column in Figure 3.7 shows the NNICC estimated price per ounce of \$233. The Price slowly decreases by five percent each time to account for possible price reductions as high as seventy percent after legalization. Figure 3.7 uses a price elasticity of demand of -0.54, which is estimated by Peter Reuter in his paper “Altered State”.

Elasticity is a measure for consumers' responsiveness to changes in the price of a good. This negative elasticity estimate implies that as the price of marijuana decreases, more people will be more willing to purchase marijuana. In this case total price elasticity is a combination of participation elasticity and total elasticity. Participation elasticity is a measure of how changes in price affect the number of users.³ It is estimated that a 10% decrease in price will in turn increase the number of users by 3%.⁴ Unable to find a more suitable estimate for the total price elasticity, Reuter uses a rough estimate of 1.75 based on tobacco elasticity estimates.⁵ Lastly, on average a marijuana consumer spends around 5 percent of their income on marijuana; therefore, a 70% decrease in price would seem like a 3.5% increase in income.⁶ Figure 3.6 illustrates how Reuter calculated the elasticity for his paper.

FIGURE 3.6

$(3\% / -10\%) = -0.3$ $(-0.3 * 1.75 * 1.035) = -0.54$
--

Uncertainty surrounding total elasticity means that the overall estimate of -0.54 must be constant along the demand curve.

The "Quantity Demanded" column in Figure 3.7 begins with the "Consumption" estimate from Figure 3.5. The "% Change in Demand" column in Figure 3.7 is found by multiplying the "Elasticity" times the "% Decrease in Price" column. The "Actual Change in QD" column is found by multiplying the "% Change in Demand" with the

³ Reuter, 23.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

first row of the “Quantity Demanded” column. Once the “Actual Change in QD” is known, it can be added to the “Quantity Demanded”. Therefore the “Quantity Demanded” column increases each time by the particular amount calculated from the decrease in price and elasticity. The price is expected to decrease because there will be no risk premium paid to workers when marijuana is legal.⁷ Legalization also means greater availability of labor-saving automation and the potential for economies of scale.⁸

FIGURE 3.7

TAX REVENUE GIVEN AN ELASTICITY AND PRICE DECREASE

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-0.54	2152312.897	0	0	50	107615644.9
2003	221.35	-5%	-0.54	2210425.345	0.027	58112.44822	50	110521267.3
2003	209.7	-10%	-0.54	2268537.793	0.054	116224.8964	50	113426889.7
2003	198.05	-15%	-0.54	2326650.242	0.081	174337.3447	50	116332512.1
2003	186.4	-20%	-0.54	2384762.69	0.108	232449.7929	50	119238134.5
2003	174.75	-25%	-0.54	2442875.138	0.135	290562.2411	50	122143756.9
2003	163.1	-30%	-0.54	2500987.586	0.162	348674.6893	50	125049379.3
2003	151.45	-35%	-0.54	2559100.035	0.189	406787.1375	50	127955001.7
2003	139.8	-40%	-0.54	2617212.483	0.216	464899.5858	50	130860624.1
2003	128.15	-45%	-0.54	2675324.931	0.243	523012.034	50	133766246.5
2003	116.5	-50%	-0.54	2733437.379	0.27	581124.4822	50	136671869
2003	104.85	-55%	-0.54	2791549.827	0.297	639236.9304	50	139577491.4
2003	93.2	-60%	-0.54	2849662.276	0.324	697349.3786	50	142483113.8
2003	81.55	-65%	-0.54	2907774.724	0.351	755461.8268	50	145388736.2
2003	69.9	-70%	-0.54	2965887.172	0.378	813574.2751	50	148294358.6

The “Revenue” column is simply calculated by multiplying each subsequent demand figure with a fifty-dollar tax. Eight tables are needed for each year in question because of uncertainty between two variables. Four tables are needed to account for four

⁷ Reuter. 19.

⁸ Ibid

different elasticity estimates. Peter Reuter's paper "Altered State" offers the price elasticity of demand estimate of -0.54. Likewise, Ostrom and Caputo's paper offers a range of elasticity's from (-0.4 to -1.51) and settle on an estimate of -1. The uncertainty surrounding this study makes it important to consider all possible scenarios. (Tables 9-12) in the Appendix use the four different elasticity's and the high demand or high "Consumption" estimates from Figure 3.5. Tables (13-16) in the Appendix use the four different elasticity's and low "Consumption" estimates from (Table 8) in the Appendix; which assume 116 uses per year for a regular user. The same procedure is duplicated for each year yielding a total of 48 tax revenue Tables, which are not all included in the Appendix. Difficulty arises when conclusions are drawn from 48 different Figures; therefore, the Results section consolidates the data and uses averages to reach conclusions.

Ostrom and Caputo's paper contributes greatly to this analysis; however, while their study drew conclusions from national estimates, California is the emphasis here. To see how California differs from the national average, the analysis is repeated for the national estimates.

CHAPTER IV

RESULTS

This section discusses the empirical results from the previous section where all data collection and calculation methods were explained.

California Results

The costs of marijuana prohibition could be converted into savings and revenue; yet, what exactly will legalizing marijuana mean for state and federal budgets? Perhaps previous estimates have been a bit too optimistic. The results show how previous projections have been overestimated.

First we must understand the different results and what they all mean. Figure 3.3 and (Table 4) show us our first understanding of what the market looks like for regular users. The “Last Year Total Usage” columns show the total usage in California adjusted to only account for 18 years of age or older. Proposition 19 will legalize marijuana for people 21 years or older, yet it was too difficult to distinguish between the age groups provided by the U.S. Census Bureau. This study only calculates for regular users in California and their estimated usage. Ostrom and Caputo claimed that in 1991 irregular users made up 10% of the market. While demand figures this study include no estimate for irregular users, it is assumed that the total demand will be slightly underestimated. The range of total grams/ounces used, is important to understand. Specific values for

frequency of use were not available for each year and therefore had to be generalized. Ostrom and Caputo along with Peter Reuter offer their own estimates of how many times a regular user used per year. This study uses both 250 and 116 for the number of uses a regular user has in a year.

Figure 3.4 and (Table 6) begin to translate the consumption values into possible retail value. These two tables do not account for change in demand or price and therefore yield crude results. Nevertheless, the range of .2-1.6 billion for total estimated illegal retail value is very low compared to other estimates.

Figure 3.5 and (Table 8) also do not take price elasticity of demand into account in their totals. The Total Tax Revenue columns in these two tables illustrate the lowest possible tax revenue that could be earned at current consumption and price. The elasticity's provided by Reuter and Ostrom/Caputo range from -0.4 to -1.51 which means that consumers will be more sensitive to price changes in certain situations. This study uses four different price elasticity's of demand and two different initial quantity demanded estimates. (Tables 9-16) in the Appendix represent 2003. And, while they are not included in the Appendix, years 2004-2008 were calculated the same way as the 2003 tables. (Tables 9-16) are broken down by year; each year has eight different tables that adjust for either a different elasticity or quantity demanded. Instead of looking at each table to see every possible scenario, using previous assumptions will allow us to narrow down the tax revenue possibilities.

Price variations present a problem when attempting to read the results. Ostrom and Caputo speculate but do not attempt to estimate future price because their focus is illegal retail value. On the other hand Reuter expects that the legal taxed price per ounce

will be \$91.¹ This estimate is similar to an estimation by RAND which claims legal marijuana prices will decline as much as 80%. Using these assumptions it is easier to locate the possible scenarios.

Figure 4.1 shows that a 70% decrease in price could yield between 63 and 221 million in tax revenue for 2003. This range is found using the four different elasticity's and one specific percentage decrease in price. The 2008 revenue estimates yield a range of 121 and 421 million in tax revenue. Figure 4.2 illustrates the same results graphically, and it is already clear to see how the elasticity's impact the revenue estimates.

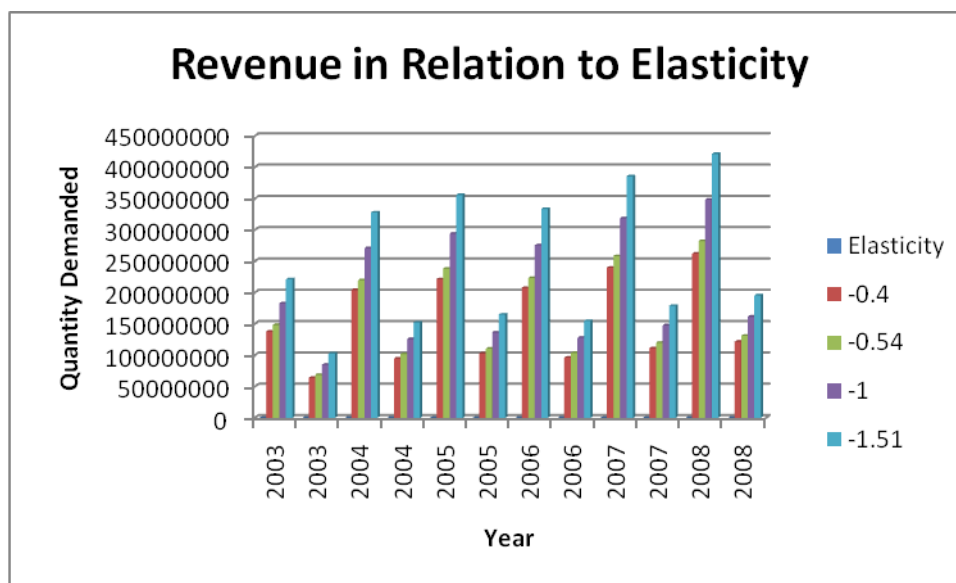
FIGURE 4.1

TAX REVENUE ESTIMATES ACCORDING TO DIFFERING ELASTICITY'S

		Revenue in Response to Different Elasticity's			
Year	High/Low QD	-0.4	-0.54	-1	-1.51
2003	High QD	137748025	148294359	182946596	221365381
2003	Low QD	63915085	68808584	84887222	102713539
2004	High QD	204144494	219774307	271129407	328066582
2004	Low QD	94723045	101975278	125804045	152222894
2005	High QD	221442243	238396414	294102978	355864604
2005	Low QD	102749200	110615936	136463782	165121176
2006	High QD	207603106	223497719	275722875	333624679
2006	Low QD	96327840	103702940	127935413	154801849
2007	High QD	239917116	258285771	318639920	385554303
2007	Low QD	111321543	119844598	147848924	178897198
2008	High QD	262232845	282310047	348277997	421416376
2008	Low QD	121676039	130991861	161600989	195537197

¹ Peter H. Reuter et al., "Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets." RAND Corporation, (2010): 25.

FIGURE 4.2
 TAX REVENUE FROM HIGH AND LOW DEMAND ESTIMATES AND
 VARYING ELASTICITY'S



Still, a high and low estimate for pre-tax quantity demanded makes it difficult to understand a clean estimate for tax revenue. In order to better understand how price changes and different elasticity's effect tax revenue, the quantity demanded estimates in Figure 4.1 are averaged.

Figure 4.3 still assumes a 70% decrease in price; and, after averaging demand estimates, the results are more consolidated.

FIGURE 4.3
AVERAGE TAX REVENUE FOR EACH YEAR ASSUMING 70% PRICE
DECREASE

Year	Revenue in Response to Different Elasticity's			
	-0.4	-0.54	-1	-1.51
2003	100831555	108551471	133916909	162039460
2004	149433770	160874793	198466726	240144738
2005	162095721	174506175	215283380	260492890
2006	151965473	163600329	201829144	244213264
2007	175619330	189065184	233244422	282225751
2008	191954442	206650954	254939493	308476787

FIGURE 4.4
GRAPH FOR AVERAGE TAX REVENUE WITH 70% PRICE DECREASE

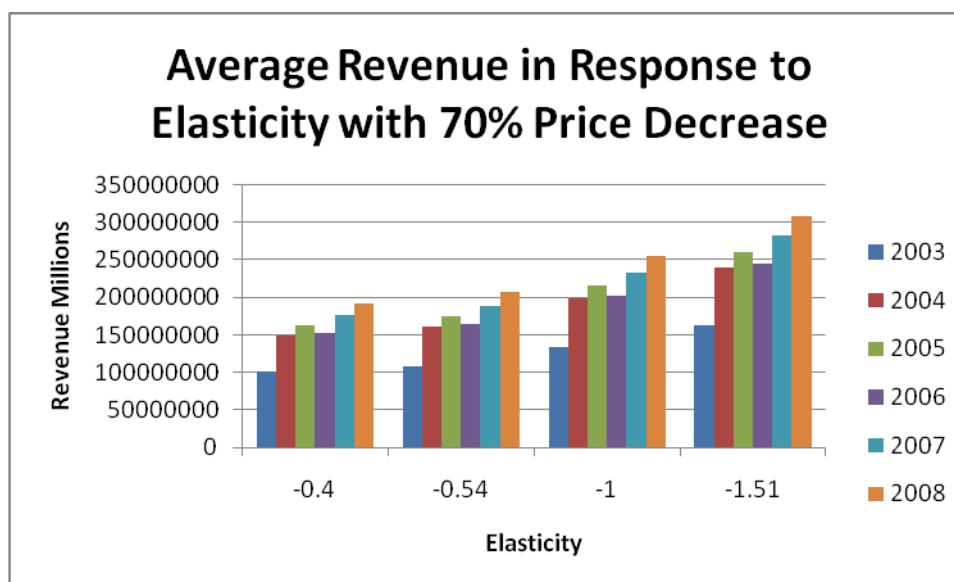


Figure 4.4 graphically represents the new averaged results in response to changing elasticity and a 70% decrease in price. While it is more than likely that prices will dramatically decrease after legalization, Figures 4.5 and 4.6 illustrate a 20% decrease in price.

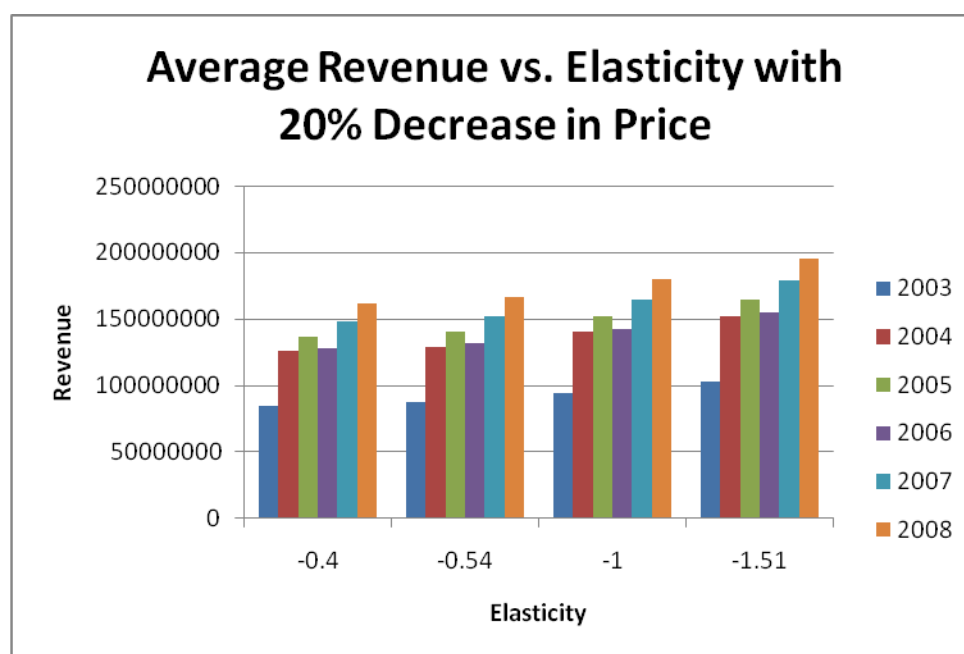
FIGURE 4.5

AVERAGE TAX REVENUE ASSUMING A 20% PRICE DECREASE

Revenue in Response to Different Elasticity's				
Year	-0.4	-0.54	-1	-1.51
2003	85076625	87282315	94529583	102564598
2004	126084743	129353607	140094159	152002163
2005	136768265	140314109	151964739	164881742
2006	128220868	131545113	142467631	154577380
2007	148178809	152020482	164643121	178637787
2008	161961560	166160564	179957289	195253659

FIGURE 4.6

GRAPH OF AVERAGE TAX REVENUE WITH 20% PRICE DECREASE



These four figures show how variations of prices teamed with high or low elasticity's can greatly impact the potential tax revenue for California. Yet, the ranges that are found as a result of consolidating data, are still rough around the edges.

The estimated ranges for each year are slightly underestimated due to the fact that each table only reduces the price by 70%, whereas Reuter estimated that prices may

drop by almost 80%. Knowing that underestimating skews the results slightly, there is also the problem of overestimating. This paper does not account for any percentage of tax evasion that might occur or a percentage of marijuana users who begin growing at home and no longer consuming in the market. These statistics would most likely lead to more accurate data; however, these numbers are likely to be positive which means we can assume that the current results are slightly overestimated. Still, what do the estimates mean for the California State Budget?

Legalization of marijuana in California will mean that costs of prohibition are replaced by costs of enforcing legally taxed marijuana dispensaries along with tax revenue earned from excise taxation. While Miron offered both national and state prohibition costs with seemingly reliable methods, his cost estimate for enforcing marijuana prohibition of 981 million in California is believed to be too high.² Reuter's estimates for prohibition costs are between 245-330 million while Gieringer estimated 203 million in 2009.³ Lastly, in 2010 Caulkins estimated the cost of marijuana prohibition in California to be between 90 and 145 million.⁴ No doubt Miron's 2005 estimate of 981 million might have been closer to the truth before decriminalization; however Reuter and Caulkins both illustrated better methods of calculation and where Miron went wrong. Therefore using Caulkins, Gieringer, and Reuter's estimates, are found through averaging so that a reliable and all encompassing cost estimate can be found. Averaging their five estimates yields a final cost estimate of 202 million.

² Jonathan B. Calukins, "Cost of Marijuana Prohibition on the California Justice System," RAND Corporation, July (2010): 6.

³ Ibid, 2.

⁴ Ibid, 11.

The 2008 results from a 70% or 20% decrease in price are between 161 and 308 million in tax revenue. The combination of 202 million in savings and possible tax revenue could be between 363-510 million for California. Still, how does this impact California's overall budget deficit and total revenue?

In 2008 California earned total direct revenue of 274.18 billion and GDP was 1921.49 billion dollars.⁵ With an annual state deficit of 16 billion in 2008, California still needs to cut costs and increase revenue wherever possible.⁶ The highest estimate of 510 million for tax revenue and reduced costs, translates to less than 1% of total revenue and even less for the GDP. Yet, 3% of the deficit could be corrected by cutting prohibition costs and earning tax revenue. While not contributing much to revenue or GDP, the 510 million possibly cutting 3% of the deficit is still significant. These estimates make it difficult to see what little impact legalization would have on California's financial situation. And, a more reliable prohibition cost estimate, along with understanding total retail value of legal marijuana sold, might allow for better understanding of the total economic effect that marijuana legalization would potentially have.

Many assumptions were used to reach the final results of this paper. Even though many credible sources were used, greatly underestimating the true demand is very plausible. Secluding irregular users along with unknown amounts of increased

⁵ "U.S. Government Revenue." 5-4-2011 [cited 2011]. Available from <http://www.usgovernmentrevenue.com/#usgs302a>.

⁶ "Los Angeles Times "California's Budget Gap at \$16 Billion"." February 21, 2008 [cited 2011]. Available from <http://www.latimes.com/news/local/la-me-budget21feb21,0,6427050.story>.

tourism means that official demand could be much higher. However there will always be a degree of uncertainty surrounding a never before legalized market. All of the same assumptions are used to calculate the national estimates, which also yield surprising results.

National Results

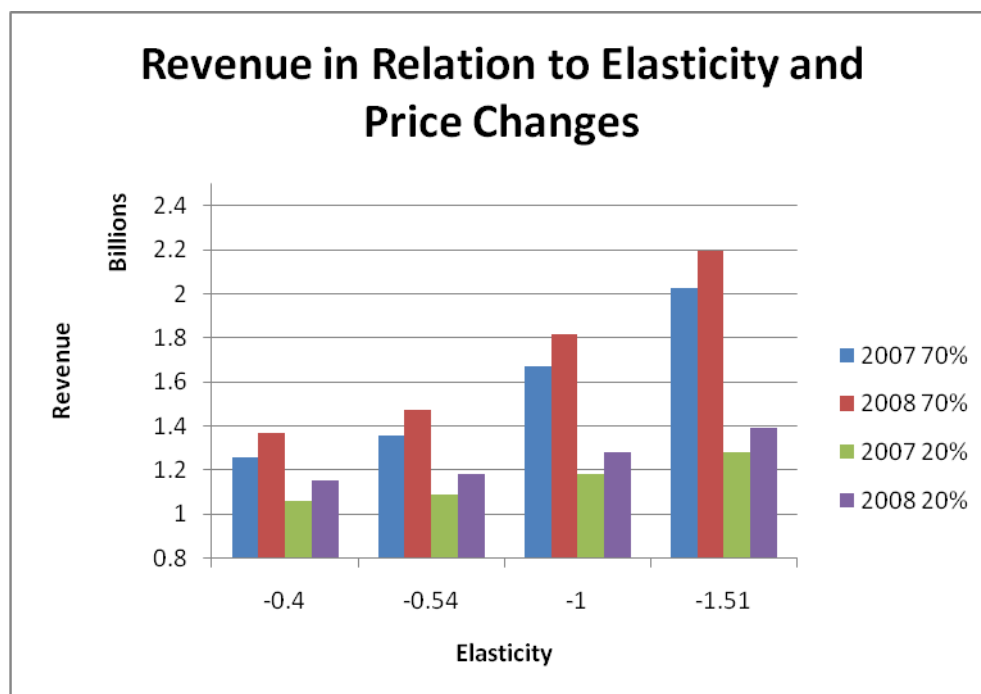
The National estimates follow the same calculation methods as the California data. After splitting the consumption between 250 and 116 uses per year the tax revenue results are shockingly low. Figure 4.7 includes tax revenue results for 2007 and 2008. Similar to the California data, the high and low demand estimates are averaged to produce a clear range for tax revenue. Figure 4.8 graphically depicts the results for each year, price decrease, and different elasticity.

FIGURE 4.7

AVERAGE TAX REVENUE ASSUMING TWO DIFFERENT PRICE DECREASES

Elasticity	Average Revenue Estimates for Each Price Decrease			
	2007 70%	2007 20%	2008 70%	2008 20%
-0.4	1258836289	1062143119	1366695196	1153149072
-0.54	1355215942	1089680162	1471332797	1183045529
-1	1671891946	1180159021	1815142057	1281276746
-1.51	2022989255	1280472537	2196321889	1390185270

FIGURE 4.8
GRAPH FOR NATIONAL TAX REVENUE FOR 2007 AND 2008



Focusing on 2008, either a 20% or 70% decrease in price could yield a tax revenue range of 1.1 to 2.1 billion. Combined with national costs of prohibition, what might these results mean for national GDP, Revenue, and Debt?

While criticized for his statewide estimates, Miron's National estimate for the cost of prohibition is the most recent figure that is widely supported by other studies. Miron recently estimated that legalizing marijuana could cut government costs by 7.7 billion.⁷ This estimation combined with the estimated tax revenue range would mean that a potential 8.8-9.8 billion could be realized if marijuana were taxed and legal.

⁷ Jeffrey A. Miron, and Marijuana Policy Project. "The budgetary implications of marijuana prohibition." Washington, D.C.: Marijuana Policy Project, (2005): 2.

In 2008 the annual federal deficit was 459 billion, GDP 14 trillion, total direct revenue of 2.5 trillion.⁸ The best estimate of 9.8 billion in potential tax revenue and reduced costs can be understood as correcting about 2% of the annual federal deficit. However, this best case scenario is not even 1% of GDP or total revenue on the Federal level. While the same assumptions are held constant in both the California and National results, these low results give a new perspective on the short term fiscal impacts that legalization might have, or not have.

Limited to using data only as recent as 2008, this paper cannot necessarily reach any definite conclusions on matters of 2011. Yet this study has witnessed nearly steady increases in quantity demanded from 2003-2008, and assuming no drastic unexpected change in demand, this number has most likely risen in the past three years. Finally, while tax revenue estimates may not be as high as previously predicted, there is still little reason to continue defeating a bill that would most likely cut costs and create some revenue, if nothing else then perhaps at a local level. Likewise, if the State will not greatly benefit monetarily, violence surrounding the illegal marijuana market will be drastically decreased.

⁸ "U.S. Government Revenue." 5-4-2011 [cited 2011]. Available from <http://www.usgovernmentrevenue.com/#usgs302a>.

CHAPTER V

CONCLUSION

Proposition 19 will permit for the first time the cultivation, possession, and consumption of marijuana. A century of marijuana prohibition in the United States has allowed for only speculation when supply, demand, and revenue estimates are being calculated for a legal framework. Fiscal benefits from legalizing marijuana have been roughly calculated over the past decades with varying uncertainty. While the illegal marijuana market is not monitored or regulated, supply estimates from drug seizures and crop eradication have helped value the market in the multibillion-dollar range. Supply figures can only show so much; the issues arise when estimates must be calculated for a legally taxed marijuana market, which has never before existed in the United States.

A legal marijuana market most likely means lower prices, higher demand, and much less violence. The uncertainty surrounding particular variables is what leaves any result in a vulnerable state. No price decrease or demand estimate can be one hundred percent certain, just as no price elasticity of demand can be exactly correct. Economists have found varying results for California and the possible tax revenue from legalization.

Jeffery Miron, Dale Gieringer, and Peter Reuter, in their own separate studies between 2005-'10, estimated that marijuana tax revenue for California could be between 1 and 2.5 billion. Different theory, and variable estimates, made each result

unique. However this paper considers many of the same assumptions used by each economist along with its own.

What impact will the legalization and taxation of marijuana have on the California State deficit? A legal market of marijuana will permit adults age twenty-one and over to cultivate, possess, and consume marijuana. Unlike other studies or estimates concerning legalization of marijuana, this paper found that the benefits from legalization might not be as lucrative and optimistic as others may have claimed. While there is no discussion of all the economic and social benefits that could come from legalization, the results show the short-term fiscal benefits that could be realized. Assuming the estimate of 202 million for the costs of prohibition are somewhat realistic, California could experience combined savings and tax revenue between 363-510 million. If this estimate of 510 million could decrease the annual 16 billion dollar deficit by 3%, then policymakers must be hard pressed not to vote in favor of Proposition 19.

Understanding that certain assumptions led to over and underestimations, is vital for this paper. While it is difficult to understand exactly how incorrect these results might be, it is also difficult to think that these estimates are very far off. More reliable variables and more recent demand and price estimates would allow for more dependable results. Still, since this is a never before legal black market, the empirical results are dependable to a certain degree.

The low estimates for California mirror what is to come from federal legalization. Similar to the California results, federal tax revenue could be between 1.1 and 2.1 billion. Yet again these estimates are less than half of what has been estimated

by others; and, when combined with the estimated cost of prohibition the overall short-term impact could be between 8.8 and 9.8 billion.

Despite being much lower than previously estimated, these results still show that legalization will be more beneficial to local and state governments than prohibition. Legalization will not unlock the door to a multi-billion dollar industry, yet unknown long-term impacts and uncertainty surrounding current estimates means that an attempt at legalization must be made in order to better understand this underground market.

APPENDIX

Table 4
California Data

	Last Year Total Usage	Last year regular usage 18+	Total Grams Used	Total Ounces Used
2003	2000558.834	244,068	28,311,909	998673.205
	12.2% used 116 times			
2004	2848129.452	361,712	41,958,643	1480047.583
	12.7% used 116 times			
2005	2950085.508	392,361	45,513,919	1605456.254
	13.3% used 116 times			
2006	2990573.687	367,841	42,669,505	1505122.502
	12.3% used 116 times			
2007	2993633.725	425,096	49,311,135	1739399.107
	14.2% used 116 times			
2008	3097573.356	464,636	53,897,776	1901188.108
	15% used 116 times			

Table 6
California Data

Year	Consumption (Ounces)	Average Price NNICC	Average Price High Times	Total Retail Value Billions
2003	998673.205	233		0.2
2004	1480047.583	233	352	\$0.35-\$0.52
2005	1605456.254	233	340	\$0.37-\$0.54
2006	1505122.502	233	334	\$0.35-\$0.5
2007	1739399.107	233	388	\$0.4-\$0.67
2008	1901188.108		394	0.75

Table 8
California Data

Year	Consumption (Ounces)	Excise Tax	Total Tax Revenue
2003	998673.205	\$50	\$49,933,660
2004	1480047.58	\$50	\$74,002,379
2005	1605456.25	\$50	\$80,272,813
2006	1505122.5	\$50	\$75,256,125
2007	1739399.11	\$50	\$86,969,955
2008	1901188.11	\$50	\$95,059,405

Table 9

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-0.54	2152312.9	0	0	50	107615645
2003	221.35	-5%	-0.54	2210425.35	0.027	58112.4482	50	110521267
2003	209.7	-10%	-0.54	2268537.79	0.054	116224.896	50	113426890
2003	198.05	-15%	-0.54	2326650.24	0.081	174337.345	50	116332512
2003	186.4	-20%	-0.54	2384762.69	0.108	232449.793	50	119238134
2003	174.75	-25%	-0.54	2442875.14	0.135	290562.241	50	122143757
2003	163.1	-30%	-0.54	2500987.59	0.162	348674.689	50	125049379
2003	151.45	-35%	-0.54	2559100.03	0.189	406787.138	50	127955002
2003	139.8	-40%	-0.54	2617212.48	0.216	464899.586	50	130860624
2003	128.15	-45%	-0.54	2675324.93	0.243	523012.034	50	133766247
2003	116.5	-50%	-0.54	2733437.38	0.27	581124.482	50	136671869
2003	104.85	-55%	-0.54	2791549.83	0.297	639236.93	50	139577491
2003	93.2	-60%	-0.54	2849662.28	0.324	697349.379	50	142483114
2003	81.55	-65%	-0.54	2907774.72	0.351	755461.827	50	145388736
2003	69.9	-70%	-0.54	2965887.17	0.378	813574.275	50	148294359

Table 10

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-1	2152312.9	0	0	50	107615645
2003	221.35	-5%	-1	2259928.54	0.05	107615.645	50	112996427
2003	209.7	-10%	-1	2367544.19	0.1	215231.29	50	118377209
2003	198.05	-15%	-1	2475159.83	0.15	322846.935	50	123757992
2003	186.4	-20%	-1	2582775.48	0.2	430462.579	50	129138774
2003	174.75	-25%	-1	2690391.12	0.25	538078.224	50	134519556
2003	163.1	-30%	-1	2798006.77	0.3	645693.869	50	139900338
2003	151.45	-35%	-1	2905622.41	0.35	753309.514	50	145281121
2003	139.8	-40%	-1	3013238.06	0.4	860925.159	50	150661903
2003	128.15	-45%	-1	3120853.7	0.45	968540.804	50	156042685
2003	116.5	-50%	-1	3228469.35	0.5	1076156.45	50	161423467
2003	104.85	-55%	-1	3336084.99	0.55	1183772.09	50	166804250
2003	93.2	-60%	-1	3443700.64	0.6	1291387.74	50	172185032
2003	81.55	-65%	-1	3551316.28	0.65	1399003.38	50	177565814
2003	69.9	-70%	-1	3658931.92	0.7	1506619.03	50	182946596

Table 11

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-0.4	2152312.9	0	0	50	107615645
2003	221.35	-5%	-0.4	2195359.15	0.02	43046.2579	50	109767958
2003	209.7	-10%	-0.4	2238405.41	0.04	86092.5159	50	111920271
2003	198.05	-15%	-0.4	2281451.67	0.06	129138.774	50	114072584
2003	186.4	-20%	-0.4	2324497.93	0.08	172185.032	50	116224896
2003	174.75	-25%	-0.4	2367544.19	0.1	215231.29	50	118377209
2003	163.1	-30%	-0.4	2410590.44	0.12	258277.548	50	120529522
2003	151.45	-35%	-0.4	2453636.7	0.14	301323.806	50	122681835
2003	139.8	-40%	-0.4	2496682.96	0.16	344370.064	50	124834148
2003	128.15	-45%	-0.4	2539729.22	0.18	387416.321	50	126986461
2003	116.5	-50%	-0.4	2582775.48	0.2	430462.579	50	129138774
2003	104.85	-55%	-0.4	2625821.73	0.22	473508.837	50	131291087
2003	93.2	-60%	-0.4	2668867.99	0.24	516555.095	50	133443400
2003	81.55	-65%	-0.4	2711914.25	0.26	559601.353	50	135595713
2003	69.9	-70%	-0.4	2754960.51	0.28	602647.611	50	137748025

Table 12

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-1.51	2152312.9	0	0	50	107615645
2003	221.35	-5%	-1.51	2314812.52	0.0755	162499.624	50	115740626
2003	209.7	-10%	-1.51	2477312.14	0.151	324999.247	50	123865607
2003	198.05	-15%	-1.51	2639811.77	0.2265	487498.871	50	131990588
2003	186.4	-20%	-1.51	2802311.39	0.302	649998.495	50	140115570
2003	174.75	-25%	-1.51	2964811.02	0.3775	812498.119	50	148240551
2003	163.1	-30%	-1.51	3127310.64	0.453	974997.742	50	156365532
2003	151.45	-35%	-1.51	3289810.26	0.5285	1137497.37	50	164490513
2003	139.8	-40%	-1.51	3452309.89	0.604	1299996.99	50	172615494
2003	128.15	-45%	-1.51	3614809.51	0.6795	1462496.61	50	180740476
2003	116.5	-50%	-1.51	3777309.13	0.755	1624996.24	50	188865457
2003	104.85	-55%	-1.51	3939808.76	0.8305	1787495.86	50	196990438
2003	93.2	-60%	-1.51	4102308.38	0.906	1949995.48	50	205115419
2003	81.55	-65%	-1.51	4264808.01	0.9815	2112495.11	50	213240400
2003	69.9	-70%	-1.51	4427307.63	1.057	2274994.73	50	221365381

Table 13

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-0.54	998673.205	0	0	50	49933660.3
2003	221.35	-5%	-0.54	1025637.38	0.027	26964.1765	50	51281869.1
2003	209.7	-10%	-0.54	1052601.56	0.054	53928.3531	50	52630077.9
2003	198.05	-15%	-0.54	1079565.73	0.081	80892.5296	50	53978286.7
2003	186.4	-20%	-0.54	1106529.91	0.108	107856.706	50	55326495.6
2003	174.75	-25%	-0.54	1133494.09	0.135	134820.883	50	56674704.4
2003	163.1	-30%	-0.54	1160458.26	0.162	161785.059	50	58022913.2
2003	151.45	-35%	-0.54	1187422.44	0.189	188749.236	50	59371122
2003	139.8	-40%	-0.54	1214386.62	0.216	215713.412	50	60719330.9
2003	128.15	-45%	-0.54	1241350.79	0.243	242677.589	50	62067539.7
2003	116.5	-50%	-0.54	1268314.97	0.27	269641.765	50	63415748.5
2003	104.85	-55%	-0.54	1295279.15	0.297	296605.942	50	64763957.3
2003	93.2	-60%	-0.54	1322243.32	0.324	323570.118	50	66112166.2
2003	81.55	-65%	-0.54	1349207.5	0.351	350534.295	50	67460375
2003	69.9	-70%	-0.54	1376171.68	0.378	377498.471	50	68808583.8

Table 14

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-1	998673.205	0	0	50	49933660.3
2003	221.35	-5%	-1	1048606.87	0.05	49933.6603	50	52430343.3
2003	209.7	-10%	-1	1098540.53	0.1	99867.3205	50	54927026.3
2003	198.05	-15%	-1	1148474.19	0.15	149800.981	50	57423709.3
2003	186.4	-20%	-1	1198407.85	0.2	199734.641	50	59920392.3
2003	174.75	-25%	-1	1248341.51	0.25	249668.301	50	62417075.3
2003	163.1	-30%	-1	1298275.17	0.3	299601.962	50	64913758.3
2003	151.45	-35%	-1	1348208.83	0.35	349535.622	50	67410441.3
2003	139.8	-40%	-1	1398142.49	0.4	399469.282	50	69907124.4
2003	128.15	-45%	-1	1448076.15	0.45	449402.942	50	72403807.4
2003	116.5	-50%	-1	1498009.81	0.5	499336.603	50	74900490.4
2003	104.85	-55%	-1	1547943.47	0.55	549270.263	50	77397173.4
2003	93.2	-60%	-1	1597877.13	0.6	599203.923	50	79893856.4
2003	81.55	-65%	-1	1647810.79	0.65	649137.583	50	82390539.4
2003	69.9	-70%	-1	1697744.45	0.7	699071.244	50	84887222.4

Table 15

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-0.4	998673.205	0	0	50	49933660.3
2003	221.35	-5%	-0.4	1018646.67	0.02	19973.4641	50	50932333.5
2003	209.7	-10%	-0.4	1038620.13	0.04	39946.9282	50	51931006.7
2003	198.05	-15%	-0.4	1058593.6	0.06	59920.3923	50	52929679.9
2003	186.4	-20%	-0.4	1078567.06	0.08	79893.8564	50	53928353.1
2003	174.75	-25%	-0.4	1098540.53	0.1	99867.3205	50	54927026.3
2003	163.1	-30%	-0.4	1118513.99	0.12	119840.785	50	55925699.5
2003	151.45	-35%	-0.4	1138487.45	0.14	139814.249	50	56924372.7
2003	139.8	-40%	-0.4	1158460.92	0.16	159787.713	50	57923045.9
2003	128.15	-45%	-0.4	1178434.38	0.18	179761.177	50	58921719.1
2003	116.5	-50%	-0.4	1198407.85	0.2	199734.641	50	59920392.3
2003	104.85	-55%	-0.4	1218381.31	0.22	219708.105	50	60919065.5
2003	93.2	-60%	-0.4	1238354.77	0.24	239681.569	50	61917738.7
2003	81.55	-65%	-0.4	1258328.24	0.26	259655.033	50	62916411.9
2003	69.9	-70%	-0.4	1278301.7	0.28	279628.497	50	63915085.1

Table 16

Year	Price	% Decrease in Price	Elasticity	Quantity Demanded	% Change in QD	Actual Change in QD	Tax	Revenue
2003	233	0%	-1.51	998673.205	0	0	50	49933660.3
2003	221.35	-5%	-1.51	1074073.03	0.0755	75399.827	50	53703651.6
2003	209.7	-10%	-1.51	1149472.86	0.151	150799.654	50	57473642.9
2003	198.05	-15%	-1.51	1224872.69	0.2265	226199.481	50	61243634.3
2003	186.4	-20%	-1.51	1300272.51	0.302	301599.308	50	65013625.6
2003	174.75	-25%	-1.51	1375672.34	0.3775	376999.135	50	68783617
2003	163.1	-30%	-1.51	1451072.17	0.453	452398.962	50	72553608.3
2003	151.45	-35%	-1.51	1526471.99	0.5285	527798.789	50	76323599.7
2003	139.8	-40%	-1.51	1601871.82	0.604	603198.616	50	80093591
2003	128.15	-45%	-1.51	1677271.65	0.6795	678598.443	50	83863582.4
2003	116.5	-50%	-1.51	1752671.47	0.755	753998.27	50	87633573.7
2003	104.85	-55%	-1.51	1828071.3	0.8305	829398.097	50	91403565.1
2003	93.2	-60%	-1.51	1903471.13	0.906	904797.924	50	95173556.4
2003	81.55	-65%	-1.51	1978870.96	0.9815	980197.751	50	98943547.8
2003	69.9	-70%	-1.51	2054270.78	1.057	1055597.58	50	102713539

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