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THE ECONOMIC EFFECTS OF NATIONAL MARIJUANA LEGALIZATION

by
Alexander Lee Robison

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford

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Approved by

Advisor: Dr. Bonnie Van Ness

Reader: Dr. Robert Van Ness

Reader: Dr. Dwight Frink

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ABSTRACT

Alexander Robison: The Economic Effects of National Marijuana Legalization

(Under the direction of Dr. Bonnie Van Ness)

In today's political and social climate, the legalization of marijuana has been a major topic of discussion across the nation. As more states pass legislation to legalize marijuana, whether it be for medicinal or recreational purposes, a market is being created that has economically beneficial possibilities that can be harnessed on a national level. This thesis seeks to highlight the economic effect marijuana legalization could possibly have on the national economy by examining the states that have legalized marijuana. States who have already passed such legislation provide a framework for state-level economic impact of marijuana legalization that can be projected to a national scale. The framework is based on the factors influencing marijuana's economic impact, which will be further explored in this study. A comparison of alcohol and tobacco tax revenue to marijuana revenue will be examined in states who have legalized marijuana in order to better understand the relation and potential revenue marijuana could bring to the nation. An analysis of the two marijuana markets, recreational and medicinal, will be conducted to examine the economic impact each market has. As marijuana legalization occurs in more states, the impact legalization potentially has on both a state and national economy is worth examining.

TABLE OF CONTENTS

| | |
|--|----|
| CHAPTER 1: INTRODUCTION | 1 |
| CHAPTER 2: MARIJUANA IN AMERICAN HISTORY..... | 4 |
| CHAPTER 3: TAXES..... | 9 |
| CHAPTER 4: EMPLOYMENT..... | 16 |
| CHAPTER 5: CRIMINAL ACTION COST..... | 19 |
| CHAPTER 6: MEDICINAL EFFECTS..... | 27 |
| CHAPTER 7: MEDICINAL VS RECREATIONAL MARIJUANA..... | 33 |
| CHAPTER 8: EFFECTS OF FINANCIAL MARKETS AND BANKING INSTITUTIONS..... | 36 |
| CHAPTER 9: CONCLUSION..... | 39 |
| WORKS CITED..... | 41 |

Chapter 1: Introduction

National legalization of marijuana has been a topic widely discussed by politicians, medical professionals, religious officials, and general citizens. The legalization of marijuana has been a major topic since President Nixon declared that drug abuse was the number one public enemy for the United States and thus began the “War on Drugs.” When most people discuss marijuana, they discuss it on a basis of the harm it causes to the environment, the harm it causes to users, and the medical possibilities. In this thesis, these topics will help facilitate a discussion of the economic and financial benefits possible from marijuana legalization on a national level. The economic and financial benefit of marijuana legalization is a topic often overlooked or not considered fully when trying to decide if marijuana should be nationally legalized. To determine some possible economic benefits on a national level, the economic effects that legalization of marijuana has had on a state level will be studied.

The intent of this thesis is to try to forecast what effect legalization of marijuana, both medicinally and recreationally, would have on the national economy. To make this forecast, the economic effect that has occurred in the many states that have legalized marijuana will be researched. To most accurately forecast the effect on the national economy, this study will look at taxes collected, revenue generated, employment opportunities created, law enforcement expenses (related to marijuana) incurred, imprisonment costs of marijuana related drug sentences, and medicinal marijuana’s impact on the opioid industry.

To better relate the impact of marijuana legalization on the states that have not fully legalized marijuana, marijuana revenue and taxes, in legalized states, will be compared to the revenue and taxes generated from alcohol and tobacco in nonlegalized states. I will then extend this comparative relation to alcohol and tobacco revenue and taxes collected nationally.

To better evaluate the economic effect of marijuana, an analysis of both the recreational market and medicinal market will be conducted. When analyzing the recreational market of marijuana, this study will highlight state laws pertaining to taxes, regulation of sale, establishment of dispensaries, creation of competitive pricing with the black market, population percentage admitting to usage, age groups of participants, and many other factors that will help understand the breadth of economic effect that will occur. The information on the legalization of recreational marijuana in the years prior to this thesis is limited. When analyzing the medicinal side of marijuana, the many different medical benefits said to be provided by marijuana will be researched as well as the medical effects of two of the many cannabinoid components of marijuana, THC and CBD. I believe it is impossible to understand the full magnitude of how medicinal marijuana will affect the economy without understanding how it affects the body. Medicinal marijuana has been legal in states slightly longer than recreational marijuana, but information is still limited due to the lack of empirical studies occurring. This lack of empirical studies is in part due to marijuana being registered as an illegal substance by the federal government.

This thesis will first explain the history of marijuana in the United States, so that there is a historical background to refer to when discussing the current public perception

surrounding marijuana. This will also allow me to more clearly relate the prohibition of alcohol to the current prohibition of marijuana.

Overall, this study will fully examine the national economic effect of the legalization of marijuana by researching identifiable sectors that marijuana usage impacts, both medicinally and recreationally.

Chapter 2: Marijuana in American History

Marijuana's history in America can be traced back to the beginning of the United States. According to an article from New Frontier Data's Bertie Song (2015), the earliest U.S. law on cannabis was passed in 1619, which would have been just twelve years after the first European settlers arrived in Jamestown, Virginia. The law required that every farmer grow hemp, since cannabis is a hardy, highly-adaptive crop that is able to be sustained in a variable range of climates. The crop was made into fibers used in sails, riggings, and other thread-bound products. Song reports that the plant flourished as the country grew, becoming a large agricultural crop in the southern states with Mississippi being one of these states. Considering the anti-marijuana climate currently in the south, few southerners may be aware of this bit of agricultural history. With the south's favorable climate and corresponding ability to grow crops, it could once again become a hot spot for cannabis cultivation if federal legalization occurred. Marijuana cultivation could bring much needed revenue to southern states to offset the diminishing healthcare and education budgets that most states currently face.

After the U.S. Civil War, marijuana began to be used for its medical benefits. Song (2015) said, "In the years after the U.S. Civil War, the use of cannabis for medicinal purposes began to take off. It became a popular ingredient in medicines to treat migraines, arthritis, and insomnia." Song's article discusses how marijuana was primarily used for medicinal purposes until the early 20th century, when Mexican immigrants introduced the practice of smoking marijuana recreationally after fleeing the Mexican Civil War. Recreational marijuana use spurred by Mexican immigrants led to the

prohibitionist movement beginning soon after, leading states to ban its use. Song reported that by 1920, nine states had banned marijuana usage: Massachusetts, Maine, Vermont, Colorado, Nevada, Indiana, Utah, Wyoming, and Iowa. Although states began to ban marijuana use, its medicinal properties continued to be explored, and pharmaceutical companies benefited financially by selling packages used to treat a multitude of illnesses. Song's (2015) says,

However, it wasn't in the 1930s that momentum against cannabis began to build in earnest. Opponents began calling it marijuana- the Mexican colloquialism-to disassociate it from cannabis and hemp, which were still popular and widely used. And in 1930 the Federal Bureau of Narcotics was formed to coordinate the government's drug control efforts (Song, 2015)

The Federal Bureau of Narcotics, led by Harry J. Anslinger, attempted to put marijuana in a negative spotlight by claiming that it caused insanity and drove people to commit criminal acts (Song, 2015). To deliver their message, The Federal Bureau of Narcotics funded a film called Reefer Madness, which displayed an array of characters who were dismantled by marijuana. The agency believed that if they could demonstrate the effects visually then more people would be deterred from using marijuana. Due to the perceived threat of marijuana among the public, Congress proposed the Marijuana Tax Act, which restricted the use of marijuana to medical use only and doctors prescribing it were required to pay an annual tax. The tax led to many doctors prescribing morphine and aspirin instead due to the inconvenience caused. In 1942, marijuana was removed from the U.S. Pharmacopeia, which ended its legal medicinal use (Song, 2015).

Prosecution of marijuana use increased in the 1950s when a succession of laws was enacted. Song explains that,

The 1951 Boggs Act established two to five-year minimum sentences for first time marijuana offenders, including those charged with simple possession, and the inclusion of marijuana in the 1956 Narcotics Control Act further increased the sentencing minimums to two to ten years, with a fine up to \$20,000 (Song, 2015).

The largest legislative action taken against marijuana was in 1970, when Congress passed the Controlled Substance Act and classified marijuana as a Schedule 1 narcotic, the highest level of the five-tier system. To be a schedule 1 narcotic meant that marijuana was considered to have no current acceptable medical use and a high potential for abuse. Marijuana remains a Schedule 1 substance today along with LSD, ecstasy, heroin, and other drugs. In 1971, President Richard Nixon launched the War on Drugs, claiming that drug abuse was America's number one public enemy. President Nixon's war on drugs led to the formation of the Drug Enforcement Agency in 1973. It is estimated that the Federal and State governments have spent over one trillion dollars on the war on drugs over the last four decades and is now spending seventy-eight billion per year (Feldman, 2018). Although all these measures were being put in place, some at the Federal and state levels were still focused on harnessing marijuana's medical properties (Song, 2015).

Song (2015) reported that, in 1976, a judge ruled in favor of a glaucoma patient named Robert Randall, who had been arrested on criminal cultivation of marijuana. Randall was freed since his marijuana was being used as a "medical necessity." Randall then successfully petitioned the government to provide him FDA-approved medical marijuana, becoming the first U.S. citizen to receive marijuana from the U.S. government

for medical purposes. In 1983, New Mexico released a report describing marijuana's anti-emetic properties for cancer patients suffering from the nauseating effects of chemotherapy as well as the concomitant symptoms of pain and depression (Song, 2015). Notably, the state found that ingesting a synthetic version of THC was not as effective as smoking the plant. Although many reports similar to New Mexico's were surfacing, the Investigational New Drug Applications, which provided federally grown marijuana to patients, was suspended in 1991 due to its perception of undercutting the Bush Administration's anti-drug policy. It wasn't until California became the first state to legalize medical marijuana in 1996 that national support began to culminate for the medical use of marijuana. By 1999, four more states (Alaska, Oregon, Washington, and Maine) legalized medical marijuana (Song, 2015). The legalization occurring in these states lead to a revolt from federal officials and law makers, saying that states could not supersede Federal law. The Supreme Court eventually ruled that states could not supersede Federal law. Despite this ruling, twelve more states approved medical marijuana by 2007. In 2008, the American College of Physicians vocalized support of marijuana's rescheduling to allow for more research to be conducted (Song, 2015). In 2009, the Department of Justice issued the Ogden memo, which stated the agency would not target individuals or businesses that provide or use marijuana in clear compliance with their state's medical marijuana laws (Song, 2015). That same year, the American Medical Association recommended the rescheduling of the drug. In 2012, Colorado became the first state to fully legalize marijuana for medical and recreational use, followed by Washington. Marijuana legalization in those states led to sale, possession, and use to be legal for adults. Although momentum was gaining, all lawsuits calling for rescheduling failed due to lack of proof of medical use. By 2016, four states and the

District of Columbia had legalized recreational and medicinal adult use, twenty-four states allowed medicinal use, and an additional eleven states had approved therapeutic use of low-THC/high-CBD products. In 2014, Congress passed a law barring the Department of Justice from using funds to enforce the federal ban on marijuana in states that have legalized use (Song, 2015). Currently, in the first quarter of 2019, ten states and the District of Columbia have legalized adult use and many more states are seeking to take advantage of the financial benefits that legalized states have gained (Berke, 2019). Nevertheless, political atmosphere has not changed dramatically on a federal level though and many large pharmaceutical companies and other organizations continue to lobby and protest against leniency for marijuana use.

Chapter 3: Taxes

Even though marijuana is not legal at the federal level, legalization of marijuana in certain states has proven to have economic benefits for those states that have fully legalized it, and the many arguments and concerns discussed for not legalizing it can be extinguished with research and/or government funded health studies. If the only reason marijuana has not been legalized on a national level is health concerns, then it seems that neither alcohol or tobacco would be legal. Alcohol and tobacco both come with many health concerns, short-term and long-term personal effects, and external societal effects. The injurious effects of alcohol and tobacco are considered to be offset by programs funded with the excise taxes, or sometimes called harmfulness taxes, charged on the sale of alcohol and tobacco. Dale Gieringer in “Economics of Cannabis Legislation” describes why he believes an excise tax on marijuana would not work,

Higher taxes are often justified simply as a disincentive to prevent people from overindulging in what is presumably an unhealthy habit. This argument is most persuasive in the case of highly addictive drugs such as nicotine, where naïve users run a high risk of getting themselves trapped in an unhealthy habit due to initial misjudgment. Punitive taxation appears less justifiable in the case of cannabis, not only because it has low addictivity, but also because of the ease with which home growers can evade excessive taxes. (Gieringer, 1994)

However, evidence shows that home growers would not be prevalent to the extent that a marijuana tax would be ineffective (Bates, 2004). Gieringer (1994) goes into more detail on the reasoning for an excise tax for marijuana, alcohol, and tobacco in “Economics of Cannabis Legislation” when he says,

Examples of external costs of drug abuse include increased insurance costs, accidents affecting third parties, and drug induced violence and criminality. In principle these costs must be distinguished from “internal costs” that fall on the user, such as ill-health, reduced personal income, poor achievement, etc. Because users already pay for the latter, there is no sense in making them pay again through a tax. (Gieringer, 1994)

Table 1
External Costs of Drug Use

| | Cigarettes (pack of 20)* | Alcohol (1 excess oz)* | Marijuana (1 joint) |
|------------------|---|------------------------|----------------------|
| Net Health Costs | \$0.15 smoking diseases \$0.23 passive smoking | \$0.26 | \$0.01 - .02 smoking |
| Accidents | | \$0.93 | \$0.38 - 0.93 |
| Total | \$0.38 | \$1.19 | \$0.40 - 0.95 |

Note: Gieringer, Dale. (1994). Economics of cannabis legalization. Retrieved from https://www.researchgate.net/publication/255612333_Economics_of_Cannabis_Legalization

In Table 1, taken from Gieringer (1994), the author shows his calculations on marijuana’s external costs that go into deciding the amount of the excise tax. Marijuana has less net health costs than tobacco in both smoking diseases and passive “second-hand” smoke related illnesses, and marijuana is shown to have little negative influence on a user’s health. Compared to alcohol, the net health costs of marijuana are lower, but the accident cost may be just as high in extreme circumstances due to users driving under the

influence of marijuana. The external accident cost is why the majority of excise tax is charged on addictive substances.

The money from excise taxes on abusive and addictive substances often go to creating programs to help users struggling with substance abuse and addiction, programs that study the health effects of these substances and how to minimize those effects, programs to deter youth from using these substances before brain maturation, and programs to mitigate the number of people operating motor vehicles while under the influence of these substances (McGreevy, 2018). Tamar Todd, director of the Office of Legal Affairs for the Drug Policy Alliance, was quoted saying the following about the way California is budgeting the excise taxes from marijuana in an article by LA Times Patrick McGreevy (2018), “(The money) is allocated to important state concerns such as youth treatment and prevention, environmental protection and remediation, and investment in communities most harmed by the war on drugs.” McGreevy’s interview of Tamar Todd specifies that the money will be going to universities and the highway patrol to study marijuana impact, local health departments and community-based nonprofits supporting treatment, programs aimed at preventing and alleviating environmental damage from illegal marijuana producers, and fighting legalization’s possible negative impacts on health and safety.

To gain an understanding regarding taxes received on marijuana, the predictions on market size in the state that most recently legalized recreational marijuana, which is California, were studied. Jeremy Berke (2017) from Business Insider discusses a report from BDS Analytics, which estimates sales of cannabis in California to hit \$3.7 billion by the end of 2018 and \$5.1 billion in 2019. For comparison purposes, adult beer sales in California hit \$5 billion in 2017. The relation between estimated cannabis sales and beer

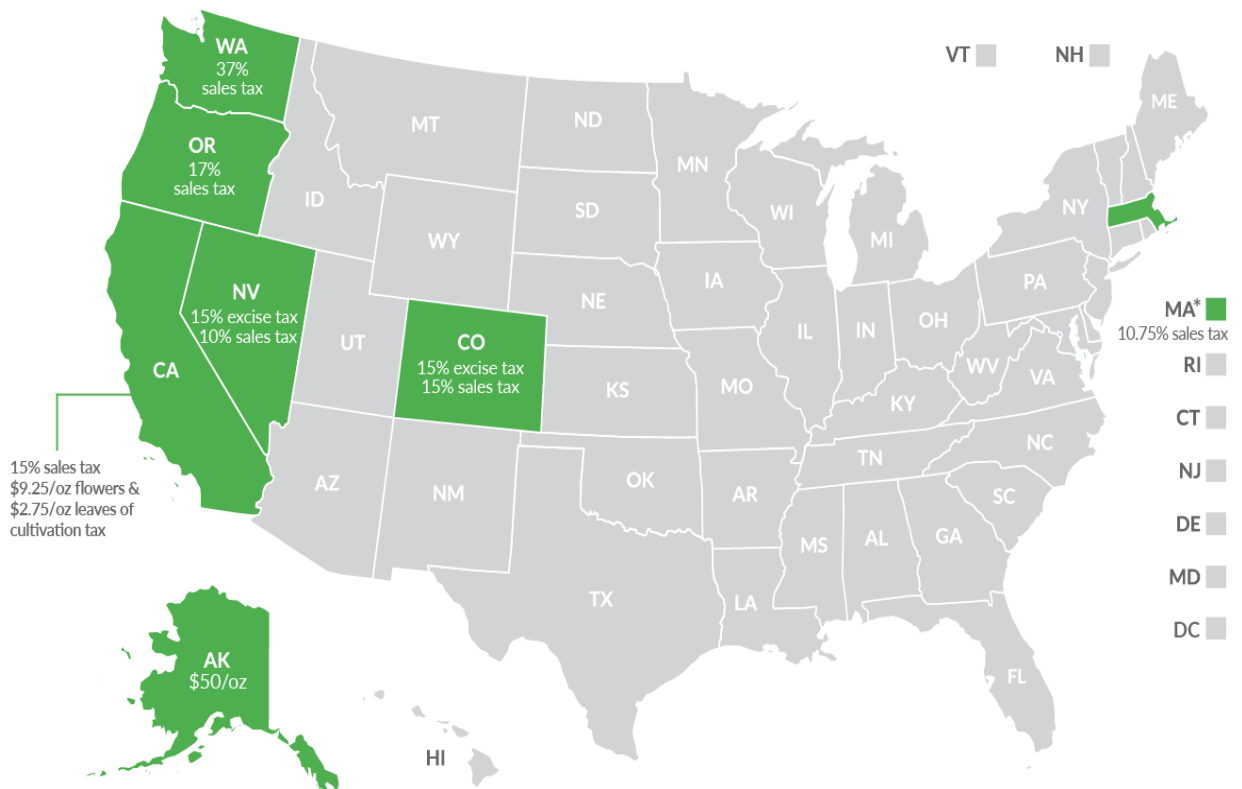
sales will be used to help calculate the possible national effect. These projections from BDS Analytics are based on the size of the market since January 1st, 2018, when recreational marijuana was legalized. In the article from the LA Times, Patrick McGreevy (2018) discusses California Governor Jerry Brown's estimate that the state will receive \$643 million from excise taxes on marijuana in the first full year of legalization. Gov. Jerry Brown also states that it will cost \$52 million to create a regulatory agency that will create and operate a licensing system and enforce new rules. The state of California has already begun to see the benefits of legalized marijuana through implementing an excise tax. I believe that the entire nation could see benefits of similar relative magnitude.

The tax foundation's Katherine Loughead and Morgan Scarbora reported on other states receiving extra tax revenue from the legalized adult sales of marijuana (Loughead & Scarbora, 2018). Loughead and Scarbora report that most states are structuring the tax in the form of an excise tax or increased sales tax on end-users. Alaska is the exception to this trend with it being the only state that does not charge taxes similarly. "In Alaska, which has no states sales tax, marijuana growers pay a tax of fifty dollars per ounce when selling the product to marijuana dispensaries or retailers. While the cost of taxes paid is passed on to customers in the form of higher prices, end-users do not pay a sales tax when purchasing marijuana." The tax foundation reports that Colorado imposes a 15 percent excise tax on the cultivator selling to a retailer and 15 percent sales tax to customers. The sales tax was increased from ten percent in 2017. Although Maine legalized recreational use in 2016, a legal market has yet to be established. When the market is established, Maine plans to assess a ten percent sales tax on customers and an excise tax on cultivators. The excise tax would be \$335 per pound of flower, \$94 per

pound of marijuana trim, \$1.50 per immature plant or seedling, and \$0.30 per seed.

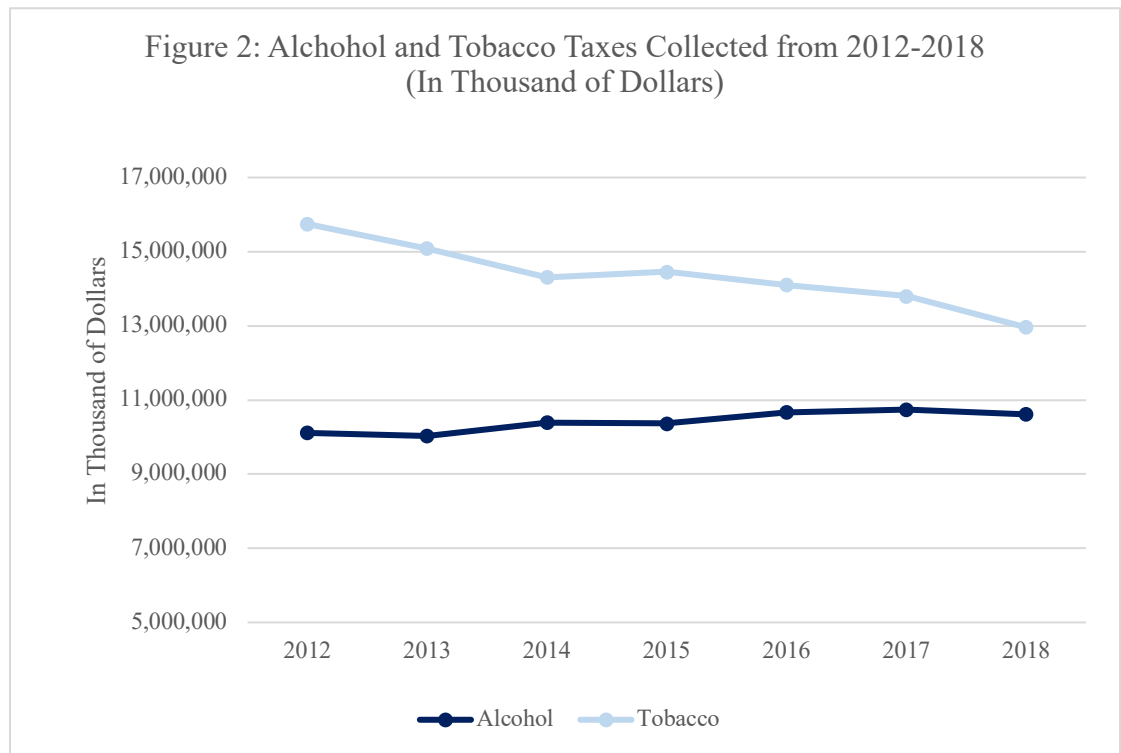
Massachusetts raised its excise tax to 10.75 percent in 2017 after concern that the initial 3.75 percent would lead to missed tax revenue. Nevada uses an excise tax on the sale by a cultivator to a distributor. The rate is set at 15 percent of the Fair Market Value as determined by the Nevada Department of Taxation. In 2017, Nevada began a 10 percent sales tax paid by consumers. Oregon, another state in which a general sales tax is not used, has a 17 percent sales tax on marijuana. Washington state has the highest sales tax rate at 37 percent on recreational marijuana. All of the information discussed above is also depicted in Figure 1.

Figure 1: Individual State Tax Rates



Note: Loughead, K., & Scarboro, M. (2018, August 16). How high are marijuana taxes in your state? Retrieved from <https://taxfoundation.org/state-marijuana-taxes-2018/>

The Alcohol and Tobacco Tax and Trade Bureau (TTB) records data on taxes collected on alcohol and tobacco sales nationally. Figure 2 shows taxes collected on alcohol and tobacco from 2012 to 2017 compiled from the Alcohol and Tobacco Tax and Trade Bureau data (Alcohol and Tobacco Tax and Trade Bureau, 2018). The Alcohol and Tobacco Tax and Trade Bureau reports are released quarterly and can be found on the bureau’s website.



The information in Figure 2, along with the relation of projected growth in cannabis and beer, will be used to project tax revenues from cannabis sales. The marijuana market is already predicted to outpace the alcohol market in California by 2019. California is the sixth largest economy in the world and is the largest producer of beer in the nation (Berke, 2018). If the marijuana market size exceeds the beer market in California, it is reasonable to assume a similar nationwide trend. Using this assumption and taxes reported by California collections, I analyzed the Alcohol and Tobacco Tax and

Trade Bureau's tax collections to project an estimate of possible Marijuana taxes. In 2018, the TTB collected \$3,476,725,000 in tax revenue from the sale of beer. The TTB also collected \$12,959,742,000 in tobacco taxes, \$1,129,745,000 in wine taxes, and \$6,010,460,000 in distilled spirits taxes. If marijuana were to generate taxes similar to these other addictive substances, then these tax collections could assist with spurring government fiscal stability or growth. The taxes generated would likely be higher due to tax structure with marijuana and the low cost allows for large tax rates to reach a fair and comparable market price. The tax effect is only one aspect and is ignoring how big the marijuana market would have to be for this amount of taxes to be generated and that it would help infuse more cash into the economy from lowering the unemployment rate and increasing spending.

Chapter 4: Employment

Another way marijuana legalization has improved the economy in legalized states is through increased employment opportunities. Limited legalization has created tens of thousands of jobs through hiring for licensing and regulation agencies, dispensaries, and agriculture and cultivation. The Marijuana Policy Project reports,

In Colorado, the first state where retail sales began for adults' use, taking marijuana off the criminal market and regulating it has created many thousands of jobs. As of June 2016, 30,391 occupational licensees had been issued for jobs created directly by Colorado's marijuana industry. (Marijuana Policy Project, 2016)

If 30,391 occupational licensees had been issued in Colorado for jobs, the impact on employment due to legalization nationally could be quite large. According to the United States Census Bureau, Colorado is estimated at 5.53 million citizens in 2016 compared to 323.4 million citizens in the United States (United States Census Bureau, 2016). If the ratio of licensees to citizens was proportionate on a national scale, there would've been 1,777,296 licenses handed out nationally in 2016. Debra Borchardt from Forbes references a report by New Frontier Data projecting that the legal cannabis market will create more than a quarter of a million jobs by 2020 (Borchardt, 2017).

Salaries for positions in the marijuana industry are relatively high compared to average salaries in legalized states. Some position titles with salary ranges reported by

Cannabis Training University (2018) are marijuana grower, dispensary manager, marijuana edibles chef, budtender, and marijuana trimmer. The minimum salaries in order are \$50,000; \$60,000; \$40,000; \$31,200; and \$12 per hour. Some of the maximum salaries reported are well over \$1 million a year.

Summer Meza from Newsweek, reports that New Frontier Data estimates that 782,000 jobs would be created immediately if marijuana was legalized federally and that number would be expected to rise to 1.1 million jobs by 2025 (Meza, 2018). With that many jobs being created, the economic impact could be quite large. For example, using the 2018 unemployment rate of 4%, reported by the National Conference of State Legislatures (2019), and the 2019 estimated US population estimate of 328,454,456 people reported by the United States Census Bureau (2019), the total number of unemployed individuals is 13,138,178 people. The Bureau of Labor Statistics reported the unemployed in February 2019 as 6.2 million work-worthy citizens. (Bureau of Labor Statistics, 2019) The growth in available jobs from marijuana legalization could assist in giving those seeking employment an avenue to a well-paying career. It could also give many employed citizens a field for them to utilize relevant experience and get paid well for such experience. For example, bartenders that are highly sociable and experienced in public service could be successful as budtenders by creating a safe and fun environment to experience the hallucinogenic aspect of marijuana. Another example is to have farmers with a lot of experience in large scale cultivation become master growers.

Marijuana legalization could indirectly provide a large economic cash flow by directly providing more financially beneficial opportunities to millions of citizens. With the average salary of one of these positions being around \$45,000, that estimates \$49.5 billion a year in legal salary to be spent by the 1.1 million marijuana workers by 2025.

This increase in consumer spending, due to increase in obtainable salary, could provide growth to retail industries, housing market, city infrastructures, and restaurant industries. If these industries experienced growth or more fiscal stability, this could lead to less layoffs or more hiring. The causational effects on employment from marijuana legalization could provide support to many industries if the marijuana industry achieves the levels of growth expected.

Chapter 5: Criminal Action Costs

“The Federal Drug Enforcement Administration lists marijuana as a Schedule I substance, along with drugs like heroin, ecstasy and peyote. This means, according to the U.S. government, the drug has “no currently accepted medical use and a high risk for abuse.” (Lavalle, 2017)

With marijuana being a Schedule I substance, it is necessary that resources be spent to control the trafficking, selling, and harvesting of it nationwide. Although it is legal in many states, it is not at a federal level, and this disparity puts a burden on the government and thus the taxpayers. According to a 2010 study from Harvard economist Jeffrey Miron (2010), full marijuana legalization would save the United States more than \$13 billion a year; about \$8 billion of these savings would come from no longer having to enforce prohibition. In my opinion, this amount of money being spent on prohibiting a drug without definitive proof of harmful effects is fiscally irresponsible. A major cost attributed to marijuana relates to imprisonment for drug possession, distribution, and etc. “According to the Vera Institute of Justice, incarceration costs an average of more than \$31,000 per inmate, per year, nationwide. In some states, it's as much as \$60,000. Taxpayers foot the bill for feeding, housing and securing people in state and federal penitentiaries.” (Mills, 2017) With imprisonment costs being this high, it is my opinion that it would make monetary sense to lower prosecution rate and find measures that are more preventive than punitive. State governments spend more money on prisoners than they do on students in public schools. CNBC’s Abigail Hess says, “According to 2015

figures from the U.S. Census Bureau, the United States spends \$11,392 per student every year. This figure, referred to as per pupil current spending (PPCS), varies dramatically by state. Some states spend over \$20,000 per student while others spend less than \$7,000 (Hess, 2017). Education and the spending to improve it is one of the preventative measures that could be improved. A study by Lance Lochner and Enrico Moretti (2004) discusses that an increase in the education level lowers imprisonment rates. The effect of education on imprisonment is demonstrated in Table 2 obtained from Moretti and Lochner's study.

Table 2: Census Incarceration Rates for Men by Education (in percentage terms)

| | All Years | 1960 | 1970 | 1980 |
|--------------|-----------|------|------|------|
| White Men | | | | |
| HS Drop Out | 0.83 | 0.76 | 0.69 | 0.93 |
| HS Graduate | 0.34 | 0.21 | 0.22 | 0.39 |
| Some College | 0.24 | 0.21 | 0.13 | 0.27 |
| College + | 0.07 | 0.03 | 0.02 | 0.08 |
| Black Men | | | | |
| Drop Out | 3.64 | 2.94 | 2.94 | 4.11 |
| HS Graduate | 2.18 | 1.80 | 1.52 | 2.35 |
| Some College | 1.97 | 0.81 | 0.89 | 2.15 |
| College + | 0.66 | 0.00 | 0.26 | 0.75 |

Note: Lochner, L., & Moretti, E. (2004). The effect of education on crime: evidence from prison inmates, arrests, and self-reports. *The American Economic Review*, 94(1), 155-189. Retrieved from <http://www.jstor.org/stable/3592774>

Table 2 shows that as education percentage increases, percentage of males imprisoned decreases. If more money was allocated to education and less to imprisonment, then it seems reasonable to assume there would be a decrease in the need for future imprisonment. Also, the funds saved by ending prosecution of legal distribution, possession, consumption and imprisonment of the thousands of inmates

imprisoned on minor marijuana charges could be incremental in changing our educational environment and even help past the high school level. If the topic was researched and the findings made public on the effects of how decreasing prosecution associated with marijuana possession and distribution would benefit the economy and society, then it would be easier and logical to lobby governmental representatives to push for reform.

The United States has the highest incarceration rate in the world with 2,205,300 people being incarcerated in 2016. In 2017 alone, there was 659,700 people arrested for marijuana law violations, with 599,282 of those being arrested for possession. (Drug Policy Alliance, n.d.) Washington Post's Christopher Ingraham (2017) states that marijuana arrest is so frequent that one arrest is made every minute in the United States. The American Civil Liberties Union cites Carl Bromley from The Nation stating, "Under New York state law, the penalty for possession of 16 ounces of marijuana is equivalent to that for illegally selling a firearm, or for possession an explosive bomb: a minimum jail sentence of one to three years with a max of seven" (Bromley, 1999).

The Washington Post's Christopher Ingraham (2017) reports that more people were arrested for marijuana violations than for all crimes the FBI considers violent. Some examples of crimes the FBI considers violent are murder, rape, aggravated assault, and robbery. The United States has more people in prison for marijuana possession than for life altering crimes such as murder and rape (Ingraham, 2017) The high level of imprisonment due to minor marijuana charges leads to the growing public support for decriminalization of marijuana and other illicit drugs. The Washington Post article by Christopher Ingraham (2017) mentions that many public health experts are calling for illicit drug use to be decriminalized due to the negative effects resulting from individuals going to violent black markets to obtain drugs, which often times are laced with harmful

substances. If marijuana was legalized and then regulated with consistent monitoring these occurrences would decline. Ingraham (2017) also states that Portugal has one of the lowest drug overdose rates in western Europe since personal possession and use of drugs was decriminalized in 2001. Many health experts are constantly cited as stating that alcohol and tobacco, both legal substances, are much more harmful and more people die annually from than marijuana. Kent Hutchinson (2017), stated that a study he co-authored showed alcohol use, in adults who had been drinking for many years, was associated with reduction in gray and white matter of the brain. However, Hutchinson stated that marijuana use had no impact on the structure of gray or white matter in teenagers or adults (Hutchinson, 2017).

The first state to legalize recreational marijuana and remove criminal prosecution for its possession was Colorado. Colorado's marijuana legalization stirred controversy and discussion nationwide with some thinking the action would be disastrous and some thinking it would be beneficial to the state. A reduction in criminal prosecution has supported the state. According to Art Way (2013), before Amendment 64, the amendment legalizing recreational marijuana in Colorado, was voted on and passed, the state averaged 10,000 arrests per year over the prior decade for marijuana possession. Further, the state saved \$60 million in the first year of legalization by eliminating marijuana prosecution for legal possession, distribution, and consumption, and some believe that this estimate is conservative. For a state to save \$60 million in the first year of loosening prohibition on marijuana alone, in my opinion, this provides impressive support for federal legalization.

The California marijuana legalization process has been misunderstood nationally. Possession of an ounce or less and private recreational use became legal in November 2016 when voters approved Proposition 64 (Patterson, Mogensen, & Drum, 2018). It wasn't until January 1, 2018 that licensing for local businesses to sell pot to anyone 21 years and older began. Proposition 64 also allowed for legal possession of eight grams of marijuana concentrates and private cultivation of up to six plants per residence (Patterson et. al, 2018). Shockingly, possession of small amounts of marijuana has been a ticket-only offense since 2011 (Patterson et. al, 2018). California cannabis reform coming from the approval of Proposition 64 was wide reaching in that prisoners could apply to have their sentences lessened or redesignated to allow them opportunities prevented by a felony charge over marijuana pertaining to employment and student loans (Patterson et. al, 2018). The application process would frequently lead to prisoners being released or having their sentences lessened after presenting before a judge for consideration. Also, California prioritized dispensary licensing applicants with past marijuana-related convictions and applicants who lived in communities with high marijuana-related arrest rates to help spur development accompanied with the revenue benefits (Patterson et. al, 2018). RAND Drug Policy Research Center's Johnathan Caulkins (2010) estimated that California was spending \$300 million a year on enforcing marijuana laws. California has seen major enforcement and incarceration cost savings since legalization of marijuana.

Another major cost of marijuana prosecution and the war on drugs in general had is the opportunity cost of attention it demands and diverts from preventing and prosecuting violent crimes. In Robert Hardaway's book, "Marijuana Politics: Uncovering the Troublesome History and Social Costs of Criminalization," he writes,

“In 1987, more than 400,000 Americans were arrested for possessing marijuana, clogging the court system, leading to the release of thousands of violent offenders, and making a virtual mockery of the integrity of the U.S. justice system” (Hardaway, 2018).

Hardaway also expresses that alcohol use leads to more violent crimes than marijuana use saying, “ In any case, it has already been noted that alcohol was a major factor in 9,967 traffic deaths (nearly one-third of 2014 total traffic fatalities), 32-50 percent of homicides, 33 percent of sexual assaults, nearly 25 percent of violent crimes, and 66 percent of intimate partner violence (all criminal data are for 1995-1997).”

Further, Hardaway says the following regarding criminalization:

It now appears that deadly consequences flow directly from criminalization of marijuana. As already noted, more than 4 million crimes a year- including more than 1,600 murders- are committed by drug dealers and users who are denied any legal means of obtaining their drug. But other social consequences of criminalization are equally tragic. At a time when African Americans continue to struggle for economic opportunities, 90 percent of those actually prosecuted for drug-related offenses are black. The devastating impact this has on the families, social fabric, and economic opportunities of African Americans is enormous and almost impossible to measure. (Hardaway, 2018)

The crime discussed by Hardaway and the increased patrolling of officers looking for marijuana offenses can cause many neighborhoods to feel dangerous and cause citizens to have bad perceptions of these neighborhoods. This unfavorable neighborhood perception can also lead to economic harm via decreased real estate values, which can

lead to an illiquid housing market. In “Interactions Between Crime and Schooling in the Housing Market” Billy Mardsen (2014) says, “For a 1% increase in violent crime rates, holding all other factors constant, housing prices decreased by .25%.”

Robert Hardaway (2018) believes that U.S. drug enforcement policies are actually causing more harm than they are preventing. According to Hardway,

A perverse effect of U.S. drug-enforcement policies is that even modest enforcement victories serve to intensify the drug problem. For example, after billions of dollars were spent on the drug war, federal enforcement agencies claimed that as much as 5 percent of drug imports had been intercepted as the fruits of victory. What those enforcers did not realize, however, was even this great “victory” did nothing but raise the price of the prohibited drugs, increase the profit margin for drug dealers, and send an economic signal to drug producers to increase production (which, of course, is exactly what happened). As Walter Block has observed, every time a battle is won in the [drug war], paradoxically, the enemy is strengthened, not weakened. [Interdiction] only succeeds in raising profit motives attendant upon production. Thus, the more vigorous and successful the activities of the Drug Enforcement Administration, the greater the strength of the illicit drug industry (Hardaway, 2018).

Supporting the above statement, the Drug Enforcement Administration’s budget has increased from \$65 million in 1973 at its inception to \$2.6 billion in 2009 (Nelson, 2010). The Office of National Drug Control Policy reported that marijuana arrests accounted for 45% of all drug arrests annually from 1992 to 2002 (Gettman, 2004). I

believe it is safe to assume that the DEA's budget could significantly decrease if marijuana was legalized, thus saving the United States Government millions or billions of dollars.

The basic economic concept of supply and demand provides support for marijuana legalization. Our society has shown a strong demand for intoxicants. It seems to me that the rational thing to do would be to supply that demand in a legal and safe manner and reap the rewards for society. When law enforcement agencies make impactful "drug busts" confiscating large quantities of marijuana, they are only lessening the supply and hence causing the price to rise. This reduced supply leads to users of marijuana paying more to get their fix and thus less money to be stirred into the national economy and more money into the illegal drug market. If marijuana was legalized on a federal level, this effect could be reversed or at least lessened. Also, the tax revenue collected could be put towards education, recovery programs, or many of the other programs that are beneficial to society yet underfunded. This is exactly what many states that have legalized marijuana are doing with the cost-saving and revenue generating benefits marijuana brings. Hardaway (2018) supports this use of savings and revenue by discussing how drug usage declined dramatically in Holland when it was decriminalized in 1976, and that they have a much lower percentage of high school drug users than in the United States. Hardaway also states,

In contrast to the United States, countries that have legalized drugs share a common policy view- namely, that one dollar spent on education and treatment can have a greater effect on reducing drug addiction than a thousand dollars spent on arrest, incarceration, military mobilizations, and wiretaps.

Chapter 6: Medicinal Effects

Another major economic impression marijuana legality has the ability to make is in the medical industry in particular with pharmaceuticals. An article from The National Institute of Drug Abuse (NIDA), a part of the National Health Institute (NIH) states,

There is growing interest in the marijuana chemical cannabidiol (CBD) to treat certain conditions such as childhood epilepsy, a disorder that causes a child to have violent seizures. Therefore, scientists have been specially breeding marijuana plants and making CBD in oil form for treatment purposes. These drugs are not popular for recreational use because they are not intoxicating. (NIDA, 2018)

In 2015 the Centers for Disease Control and Prevention (CDC) reported that there were 3.4 million people nationwide with epilepsy, consisting of 3 million adults and 470,000 children (NIDA, 2018). A study from Begley and Durgin (2015) states that the annual direct cost of epilepsy treatment is 12.5 billion nationwide. If medicinal marijuana and more specifically CBD can affect other disabilities and diagnostic costs as much as it could epilepsy treatment costs, then a lot of money could be redistributed throughout the economy or used for other medical research. Beside from the financial effects, millions of patients could benefit from cheaper, more easily administered medications that are efficient. For example, the brand name epilepsy medication, Aptiom, is \$800 for thirty 400-mg tablets or about \$27 a pill (GoodRX, n.d). Medical marijuana

comes in many forms from buds, concentrates, edibles, and tinctures. Buds are what most people picture when discussing marijuana as it is the flower of the plant. Buds price at around \$20 a gram (Stamberger,2018). Concentrates come in wax and oil form that have higher levels of THC and cost \$20-\$60 a gram (Stamberger, 2018). Edibles are usually in brownie or cookie form and cost \$3-\$5 a dose. Tinctures are a concentrated liquid form that can be dropped into food or drinks for those who don't like smoking. A one-ounce bottle can cost \$20-\$40, depending on concentration (Stamberger, 2018).

The prices for these units of medical marijuana and medical marijuana extracts are much lower than the cost of Aptom and do not include the harsh side effects such as urinary tract infections, suicidal thoughts, and high blood pressure (Aptom, n.d.). If there is a cheaper medical alternative with less side effects, then it should be allowed to be used. Also, epilepsy is just one of the many illness or diagnoses that can be treated with medicinal marijuana.

For example, a list of illnesses or diagnoses that can be treated with medicinal marijuana are multiple sclerosis, insomnia, cancer side-effects, arthritis, inflammatory bowel disease, and many more (Carrier, 2017). Cost for common medicine to treat these illnesses are as followed: \$8,000/yr, \$156 for 30 pills, \$374/month, \$11/dose, and \$225 for 90 pills (GoodRx, n.d.). Medicinal marijuana would help tens of millions of Americans who struggle with these illnesses and would lessen the infrastructure costs of the extensive treatment for these illnesses. The article earlier mentioned from the NIDA (2018) says,

“Additionally, data suggests that medical marijuana treatment may reduce the opioid dose prescribed for pain patients, and a recent study showed that availability of

medical marijuana for Medicare patients reduced prescribing of medications, including opioids for pain.”

Our bodies produce cannabinoid chemicals that play a role in pleasure, memory, thinking, concentration, body movement, appetite, pain, and senses (NIDA, 2018). Harvard Health’s Dr. Peter Grinspoon (2018) discuss how marijuana component CBD can reduce the pain from multiple sclerosis without the sedative effects that Lyrica and Neurontin causes, which allows people to resume a normal pace of life and even fill vacant employment positions. Grinspoon (2018) discussed that another major study going on is the effect that medical marijuana can have on PTSD of veterans. If more research could be done to validate the results of many of these studies in a national spotlight, it could reduce the economic burden of PTSD costs of the 572,612 veterans diagnosed with PTSD in 2012 (Reisman, 2016). Reisman said that the cost incurred treating PTSD among Iraq and Afghanistan veterans was \$2 billion in the first year, averaging around \$8,300 per veteran.

Many of the major reasons given to as why marijuana is not legalized is the adverse health effects and the burden it would have on society if it was so easily accessible. There have been few to no recorded adverse health effects with medical marijuana and few even with recreational marijuana. It is also impossible to overdose on marijuana unlike with many common prescription opiates (Reisman, 2016). Opiate overdoses are becoming an epidemic and are constantly discussed on local and national news of being a major national problem. An article by the Huffington Post’s Kim Bellware (2015) mentions how the CDC has reported zero deaths from overdose of marijuana while 17,465 people have overdosed on illicit drugs and 25,760 have overdosed on prescription drugs. Bellware also said that the CDC reported 30,700 people dying from alcohol induced

causes last year not including deaths related to drunk driving accidents, which would almost triple the number of deaths. An article from the Marijuana Policy Project states,

In the Netherlands, where adult possession and purchase of small amounts of marijuana are allowed under a regulated system, the rate of marijuana use by both teenagers and adults is lower than in the U.S., as is use of hard drugs such as cocaine. Under a regulated system, licensed merchants have an incentive to check ID and avoid selling to minors. Such a system also separates marijuana from the trade in hard drugs such as cocaine and heroin. (Marijuana Policy Project, n.d.)

If the same effects were shown here in the United States, then one of the largest supported reasons for marijuana to not be legalized, which is increase in teen usage, would be alleviated.

Medical marijuana is not something that our country's citizens and politicians should fear but something that they should embrace. There are countries all over the world that are embracing it and are showing positive results. The least politicians could do is to move marijuana off the Schedule 1 substances list and allow it to begin more research to prove how effective its medical benefits truly are. These benefits, as discussed earlier, assist with multiple sclerosis, chronic pain, and mental ailments such as depression and PTSD. An article by Dr. Peter Grinspoon from Harvard Health Publishing (2018) discusses that marijuana can assist people with chronic pain who cannot use NSAIDs due to kidney issues or ulcers. Grinspoon also discussed that marijuana eases the pain of multiple sclerosis and general nerve pain without being highly sedating like common opiates. Most of the articles from medical journals report this sedating effect of opiates being a problem and that it is extremely difficult to

prescribe marijuana even if the physician would like to due to federal regulations and the fact that most insurance companies will not cover the cost.

Another medical benefit of legalizing marijuana is the possible displacement of alcohol use for marijuana. It is highly researched and reported that alcohol has many harmful effects on an individual and societal level. The CDC reports that 88,000 alcohol-related deaths occur each year while marijuana accounts for zero (Villa, 2016). To overdose on marijuana, an individual would need to consume 15 to 70 grams of THC, which is equivalent to 238 to 1,113 “joints” in a day. Alcohol use also increases being in a car accident by 2,200% while marijuana only increases the odds by 83% (Villa, 2016). New Frontier Data surveyed people to determine the possible displacement effect marijuana would have on alcohol and pharmaceuticals. If the displacement of alcohol and pharmaceuticals was as severe as this report and Figure 3 displays, then the improvement would be significant. Pharmaceutical opiates overdose alone kill more than 130 people in the United States every day. (NIH, 2019)

Figure 3: Cannabis Displacing Alcohol and Pharmaceuticals



Note: Song, B. (2018, December 03). Cannabis displacing alcohol and pharmaceuticals. Retrieved from <https://newfrontierdata.com/marijuana-insights/frequency-of-cannabis-use-among-consumer-archetypes-2/>

Chapter 7: Medicinal vs Recreational Marijuana

Marijuana and marijuana by-products used for medical purposes can be the whole unprocessed plant, oil, or many other forms that can provide the medicinal benefits of marijuana. The majority of marijuana used for medicinal purposes is higher in CBD concentration than THC to avoid the psychoactive effects. This being said, recreational marijuana has a much higher THC concentration because the users often seek the psychoactive effects such as a feeling of euphoria or hallucination. (Docmj, 2018).

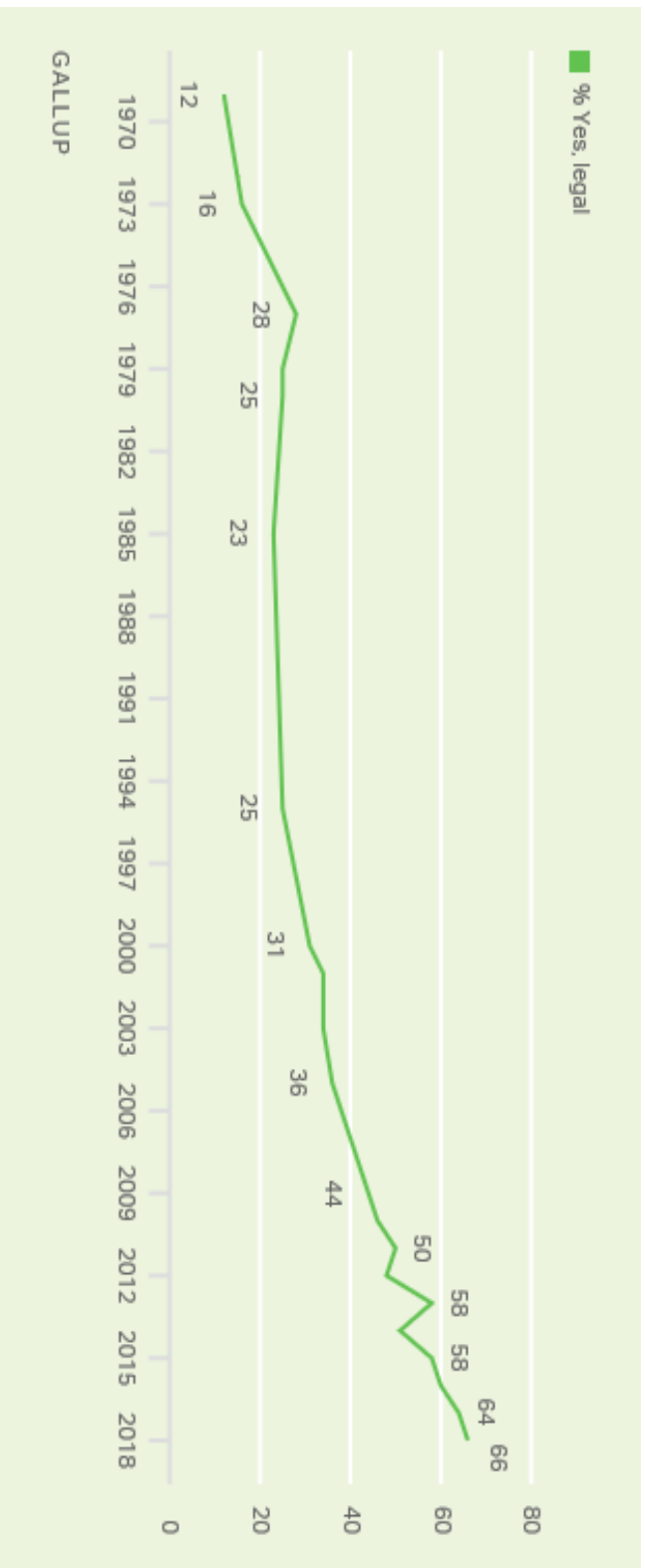
An article by Visual Capitalist's Jeff Desjardins (2019) states that the history of medicinal marijuana begins over 6000 years ago. The first recording of its use was in Pan-p'o village around 4000 BC, where cannabis was regarded as one of the "five grains" in China and was farmed as a major food crop. The earliest record of cannabis as a medicinal drug was when Emperor Shen-Nung recognized its treatment properties for over 100 ailments such as gout, rheumatism, and malaria (Desjardins, 2019). Marijuana continued to be used for its medicinal properties for thousands of years and grew heavily controversial in the United States in the early 1900s.

Around 1930, the states looked to the federal government to help fight the rising use of marijuana, leading the government to fund an anti-marijuana movie called "Refer-Madness" in 1936 (Song, 2015). Refer Madness was a movie meant to scare people from ever using the drug by depicting the main character as a drug addict who was violent and enraged after his very first-time using marijuana. In 1937, Congress was led to pass the Marijuana Tax Act in an attempt to mitigate the spread of marijuana by essentially prohibiting the sale and use of marijuana (History, 2018). Marijuana use went

underground and was used by poets, musicians, and other artists and was often seen as part of their creative awakening. In the 1960's, marijuana became part of the hippie and anti-Vietnam communities' culture and began to hold a political presence. To contain and mitigate the political effect these communities were having on society, the government decided to go after the drug they believed was the motivator behind the communities' problems. This trend of community problems led to President Nixon beginning what is known as the "War on Drugs" when he signed a bill placing marijuana on the list of Schedule 1 drugs. Schedule 1 drugs also on the list were heroin, LSD, meth, and many other drugs. This sentiment towards the "War on Drugs" was later picked up politically in Ronald Reagan's term when he appointed the First Lady as the press-speaker against drug use. First Lady Reagan's saying was simply, "Just say no." (History, 2018)

This political disposition has continued on to today with politicians such as Jeff Sessions causing uproar against marijuana leniency. Jeff Sessions even went to the point to rescind an Obama era legislation that mandated no federal resources be used actively to stop marijuana use in states that have decided to legalize its use. Marijuana legalization could become a highly discussed campaign topic in the 2020 Presidential election due to the ever-growing demand by citizens and states to have marijuana federally legalized. For example, a recent poll by Gallup surveyed American citizens and reported that 67% of Americans support legalization. Along with citizens support, there are now 10 states with legalized marijuana (McCarthy,2017).

Figure 4: Support for National Legalization



Note: McCarthy, J. (2017, October 25). Record-High Support for Legalizing Marijuana Use in U.S. Retrieved from https://news.gallup.com/poll/221018/record-high-support-legalizing-marijuana.aspx?g_source=Politics&g_medium=newsfeed&g_campaign=titles

Chapter 8: Effects on Financial Markets and Banking Institutions

Marijuana being a Schedule 1 narcotic and not legalized federally is causing a lot of difficulty to banks when serving state-licensed dispensaries. The federal government requires all banks to file suspicious activity reports that assist federal investigators with discovering criminal enterprises. Aaron Klein (2018) from Brookings Center on Regulation and Markets explains how the suspicious activity reports become nonsensical when he states, “The purpose of these reports is to help law enforcement identify criminal activity and be able to follow the money to catch leaders of criminal operations. If the federal government wants to find Oregon’s marijuana-related businesses, there is a far more efficient and less costly way: Google Maps” (Klein, 2018). Although Klein ends with a joking tone, the suspicious activity reports are additional compliance forms for banks to file that become unnecessary when dealing with dispensaries who knowingly profit from a federally illegal activity of selling marijuana. Having to file these reports leads to banks being forced to dedicate staff and therefore funds to file these reports, and those costs can become quite large as activity increases.

Klein also discusses how the requirements on banks goes further than the suspicious activity reports to having to file reports for anyone depositing funds “derived from illegal activity” (Klein, 2018). Klein then goes on to state,

According to that logic, banks must also file a report when a state government deposits tax revenue paid by marijuana firms into the state’s bank account. The result is banks telling the Uncle Sam that Oregon is a possible money launderer. Not only does it not make sense to consider a state government a money

launderer, there is no reason for banks to be the ones reporting to the U.S. Treasury that Colorado, Washington, Oregon, Alaska, California, Massachusetts, Maine and Nevada are profiting from the sale of marijuana. Voters and state legislators did not exactly make it a secret this was their plan (Klein, 2018).

A study by Comizio, Kaplan, Kowalski, and Anderson (2015) discusses some specific regulations that financial institutions face when stating,

Financial institutions that engage with marijuana-related businesses face a range of regulations and potential violations of the Controlled Substance Act, the Bank Secrecy Act, the Racketeer Influenced and Corrupt Organizations Act, certain provisions of the USA Patriot Act, and other federal statutes. The recent refusal of master accounts and federal deposit insurance for financial institutions seeking to engage with state-legalized marijuana businesses has made entry into the market even more difficult. (Comizio, Kaplan, Kowalski, & Anderson, 2015)

Possibly violating these many regulatory acts leads to many banks being fearful to do business with marijuana dispensaries. The costs of being regulatory complaint, such as the dedication of workers and purchase of software that streamlines the reporting process, can often become quite large. These costs can also lead to some banks not accepting deposits from businesses associated with marijuana. Businesses that are unable to find a bank willing to accept their deposits are then forced to hold a lot of cash on hand at the dispensaries. These large sums of cash held on site at dispensaries and carried by customers of the dispensaries has made crime increase in the areas adjacent to them. A study conducted by Bridget Freisthler (2017) of Ohio State University showed that areas

adjacent to dispensaries in Denver had 84 more property crimes per year than neighborhoods without a nearby dispensary. Although Freisthler's study shows that areas adjacent to dispensaries have increased in crime, a study by Gavrilova, Kamada, and Zoutman (2019) showed that crimes such as robberies, murders, and aggravated assaults dropped by around 13 percent in areas close to medical marijuana states. It is my opinion that if regulations were removed from banks and financial institutions so that dispensaries did not operate with as much cash, then crime would lower in the surrounding areas.

Another area of finance that is showing prominence that I believe would be beneficial for the national economy are stocks with association to marijuana. I believe that if marijuana was nationally legalized that it could bring growth to the many publicly traded stocks of marijuana businesses. I also feel that an increase in marijuana businesses would provide added liquidity to the overall stock market and provide an investment opportunity similar to that of large beer and tobacco companies. If marijuana stocks showed growth that could improve consumer sentiment and increase consumer spending, that would benefit the economy.

Chapter 9: Conclusion

Legalization of marijuana on the national level can have a profound impact on the United States economy. From looking at states that have legalized both medical and recreational marijuana, the trends show that taxation of marijuana is a beneficial fiscal opportunity from the collection of excise tax and sales tax on the cultivation, distribution, and sale to end customer. The majority of excise tax collected would mainly go to the funding of programs that help with substance abusers and programs that help mitigate the societal cost of marijuana use.

Legalization of marijuana also has the potential to create many employment opportunities, ranging from cultivating to dispensing marijuana. Salaries from these created employment opportunities in states that have legalized marijuana have been shown to be higher than the national average salary. This trend can be expanded to the national scale if marijuana was legalized nationally. Another possible economic benefit of national legalization is the savings and/or reallocation of law enforcement resources previously allocated to minor marijuana-related prosecutions. Another major economic effect possible from marijuana legalization, is its medical potential. Medicinal marijuana can be used to relieve symptoms for a number of medical conditions and also can become a cheaper alternative to prescription drugs with the same indication. With national legalization of marijuana, banks would find regulatory relief due to no longer needing to file suspicious reports concerning marijuana business, thus saving banks time and resources. Although marijuana legalization is a controversial topic in the United States, it

is my opinion that the financial and economic benefit seen on the state level can be seen on the national scale following national legalization of marijuana.

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