# **Legalization of Marijuana**

# **Abstract**

We will review relevant literature to examine the effects of marijuana prohibition on public health. We expect to find that wholesale prohibition leads to a proliferation of the drug market. Combined with inelastic demand, drug prohibition will cause increased revenue for dealers, leading to more violent crime and robust dealing operations. We will examine the effect of prohibition on crime rates, expecting to find no clear correlation between prohibition and decreased crime. We will also account for pro-prohibition arguments, such as the gateway drug hypothesis and include a discussion on medical marijuana as well as some additional research on the effect of legality on price and use. The issue of drug prohibition is particularly pertinent as more states begin to legalize and decriminalize marijuana. We propose that governments should establish excise taxes on marijuana, rather than prohibit them and expand addiction treatment programs instead of relying on the criminal justice system to fight the endemic.

**Background**

The debate over marijuana has been a popular topic over the last few decades. Before being prohibited in the United States, marijuana was considered a safe and common drug often prescribed by doctors. It was not until the early 1900s that marijuana legality was challenged. Most opponents used racist arguments to advance their message (Erwin et al. 2015). The debate led to the passing of the 1937 Marijuana Tax Act. While the act was enacted as a tax, it ultimately served as a prohibition that did not generate revenue for the state (Erwin et al. 2015).

In the 1970s, the controlled substance act passed and categorized marijuana as a schedule 1 drug, meaning it could not be sold in any capacity. Some questioned the CSA’s reasoning behind the placement of marijuana on the schedule 1 list (Kreit 2013). The push against marijuana continued through the 1980s when President Reagan declared the war on drugs. During President Reagan's tenure, antidrug legislation was passed, increasing both the law enforcement budgets for drug control and the penalties associated with drug violations (Ferraiolo 2007). The policies put in place during the 1980s persisted for the next decade.

Starting in the 1990s, states made amendments to their state laws, allowing the use of medical marijuana. In 1996, California was the first to legalize medical marijuana when voters approved the Prop. 215 (Ferraiolo 2007). President Obama hinted at relaxing marijuana laws during his campaign and ultimately released the Ogden memorandum, discouraging the use of federal funds to fight the war on drugs (Erwin et al. 2015). This memorandum became a turning point for the marijuana debate, granting marijuana advocates more leverage. In 2013, Colorado was the first state to legalize marijuana for recreational use.

The debate continues over whether or not marijuana should be legalized at the federal level. By exploring the economic and criminal arguments for prohibition and disproving arguments for the marijuana prohibition such as the gateway drug hypothesis, this paper will come to the conclusion that marijuana should be legalized at the federal level.

**Economic Case**

In the United States, politicians have fought drug use by using military and police forces in hopes of reducing overall drug use by granting harsh penalties to drug users (Becker et. al. 2004). There is some evidence that prohibition policies are able to decrease access to drugs. For instance, availability rates for harder drugs such as ecstasy is about 40% (Caulkins et al. 2014). However, the availability rate of marijuana is much higher at 82%, similar to rates for alcohol and tobacco (Caulkins et al. 2014). The greater access to marijuana could potentially be attributed to its easier production.

Even with harsh prohibition policies in place, marijuana is still relatively accessible. Prohibition will only be fully effective if demand is elastic. Evidence shows that marijuana has inelastic demand (Becker et al 2004). As seen in *Figure 1,* when drugs are prohibited, the cost of supply increases, shifting the supply curve up. Quantity demanded will only decrease marginally, dropping from *Q0* to *Q1* (Becker et al. 2004). Reinarman et al. (2004) furthers this argument by examining drug use in San Francisco and Amsterdam. They find that marijuana criminalization does not decrease usage and legalization does not increase usage (Caulkins et al. 2014).

Dealer revenue increases drastically when marijuana is prohibited. This revenue increase is defined by boxes A and B (*Figure 1*). When drugs are outlawed, the supply of drugs shifts left from *S0* to *S1*, shifting prices up from *C(0) to C(x)*. While dealers lose the profit in box B from the supply shift, the rise in prices, coupled with the small decrease in quantity demanded, causes dealers to replace the lost revenue with the larger levels noted by box C. Additional profits from prohibition help fund suppliers’ efforts to avoid law enforcement. These profits can be used to bribe law enforcement, fund more expansive dealing operations, and offset the costs of violent crime that may arise in the business (Miron & Zweibel 1995). Suppliers are incentivized to from cartels. Drug businesses are designed to avoid law enforcement, including antitrust laws. Cartels not only produce higher profits than smaller operations, but also incur much lower marginal costs, making them both more sustainable and prone to violence (Miron & Zweilbel 1995). Cartel formation amplifies the initial problems created by prohibition.

On the other hand, Keck & Correa-Cabrera (2015) argue that increased enforcement of marijuana laws has no significant effect on marijuana prices. These findings contradict the arguments made by Becker et al. (2004) and Miron & Zweibel (1995) and also deny economic theory. Thus, *if* prices of marijuana are not impacted by enforcement, then the theorized effects of criminalization would be negligible, causing prohibition to be more logical. Despite their findings, however, most of the literature (e.g. Reuter & Kleinman 1986; Caulkins & Reuter 2010) found contrary results, lending more credence to the theory of increased revenue.

The most effective way to decrease marijuana use is to legalize the drug with a large excise tax placed on it and enforcing large punishments for market subversion (Becker et. al. 2004). By legalizing marijuana, the government will receive a 7.7 billion dollar increase in revenue at the federal, state, and local level, as well as a 6.2 billion dollar decrease in expenditure (Miron & Egan 2007). Evans (2013) disagrees with this perspective, arguing that exogenous factors increasing costs could develop by legalizing marijuana, such as the cost of repealing laws, implementing reforms, caring for the increased abuse, and the increased criminal activity. While unintended consequences could occur, many of Evan’s examples are disputed by the literature. Marijuana does not increase crime, and the costs of legalization are smaller than the increased revenue and decreased expenditure from legalization (Maier et al. 2017).

**Medical Marijuana**

Many have claimed that marijuana and marijuana-related products have strong medicinal properties which help mitigate various health issues such as glaucoma, nausea relief for chemotherapy, and muscle spasm relief for those with multiple sclerosis (Iversen 1993). Many states have implemented medical marijuana laws, allowing for limited and approved medical uses of marijuana. Supporters of these laws argue that medical marijuana replaces drug dealers with transparent state entities and caretakers, which should reduce illegal, risky marijuana use (Anderson, Hansen & Rees). Critics of these laws argue that they “send the wrong message” (Anderson, Hansen & Rees, 495), causing an increase in teen marijuana use by 3 to 4 percentage points from mid-2000 to 2011. Others criticize this argument, stating that it is easy for those who do not have legitimate medical conditions to lie about their symptoms and wrongfully access the drug by arguing that they are in pain when they are not (Anderson, Hansen & Rees). This metric is relatively difficult to accurately measure, since people can rightfully use their medical conditions to legally access medical marijuana (Williams et al. 2016). However, a large number of studies have concluded that concerns of people cheating the system are inflated.

Anderson, Hansen and Rees (2015) argue that legalization of medical marijuana does not impact teenage recreational marijuana use. In their research on high schoolers’ use of recreational marijuana, they found the effects are “small, consistently negative, and are never statistically distinguishable from zero” (517). They also consulted the National Longitudinal Survey of Youth, or NLSY97. This dataset considers high-school dropouts who are more likely to illegally use marijuana, allowing the researchers to avoid unobserved heterogeneity issues, as it follows teenagers over time (Anderson, Hansen & Rees 2015). Thus, they found that legalization of medical marijuana does not significantly increase teenage illegal use of marijuana.

The legalization of medical marijuana has been linked to the reduction of suicides. Anderson, Rees and Sabia (2014) reported a small, but statistically significant negative correlation between the legalization of medical marijuana and suicide rates in males ages 20 to 39. Their model was adjusted for state effects, which refer to time-independent confounders at the state level; year effects, which refer to natural year-to-year changes in suicide rates that are not explained by his model; as well as many covariates which include unemployment rate, per capita income, and whether or not marijuana was decriminalized in a given state. Their findings that marijuana use causes a reduction in suicide rates, goes against some prior research (Petronis, Moscicki & Anthoney J 1990; Felts, Chenier & Barnes 1992; Borowsky, Ireland & Resnick 2001). Anderson et. al. argue that their difference-in-differences approach prevents problems of reverse causality and “difficult-to-measure confounders” (2373) that plague prior contradictory findings.

The number of workplace fatalities have decreased since the passage of medical marijuana laws. Five years after the passage of medical marijuana laws, there was a 33.7% reduction in workplace fatalities among workers aged 25 to 44 (Anderson, Rees, Tekin 2018). This finding is robust to include state and year fixed effects, along with adjustments for covariates.

The passage of medical marijuana laws is also linked to reductions in traffic fatalities. Some evidence shows that passing medical marijuana laws is associated with a 10.4% decrease in traffic fatalities, but it loses significance when state-specific linear time trends are introduced (Anderson, Rees & Hansen 2013). Anderson et. al’s time-series analysis, however, provides some evidence that the impact of this legalization wanes over time: the first full year gives an 8-11% reduction in suicide rates; this peaks after four years after legalization, at 10% to 13% reduction; then after five years after legalization reduction rates drop to 4% to 10%. All are significant only when state-specific effects are omitted.

**Effects on Crime**

Marijuana was also originally prohibited due to fear that the drug caused violent crime (National Commission on Marihuana and Drug Abuse 1972; Ferraiolo 2007). Some individuals still believe there exists a connection between marijuana and crime due to either the direct chemical effects (Brook et al. 2003; Fergusson et al. 2002) or addicts’ desire to support their habit (Goldstein 1985; Hughes et al. 2014). If crime is caused by marijuana use, it has a direct impact on public health (Middleton 2013). Wolf, Gray & Fazel (2014) find that violence prevention can be reduced through public health policies aimed at decreasing income inequality. Massetti, Simon & Smith (2016) argue that violence and substance abuse share mutual risk factors. They state that both issues can be mitigated by working to reduce addiction. If marijuana is to blame for violent crimes, legalization may not be an appropriate path.

Although there is indication of a correlation, evidence for a causal relationship between marijuana and crime is lacking. The correlation between marijuana and crime was found to be caused by the fact that marijuana itself is illegal, not by other crimes committed under the influence (Pedersen & Skardhamar 2009). When marijuana is legalized, the change in crime is minimal and black market demand and associated crime is reduced (Maier et al. 2017).

There is evidence of a spurious relationship between marijuana and crime fueled by exogenous factors. Many variables linked with marijuana use in urban, black neighborhoods, including impoverishment and pre-existing drug use indicate that environmental and social pressures lead to increased marijuana use and crime (Reboussin et al. 2015). Reboussin et al. (2015) finds evidence of an inverse relationship where neighborhoods with more violence end up having more drug use. Pre-availability of drugs along with individual factors such as crime, child abuse and neglect, lack of a positive role models, and poverty may increase use (Delva et al. 2014; Reboussin et al. 2016). Reboussin et al. (2016) explains the relationship by suggesting that similar individuals group together and normalize drugs. Doherty et al. (2012) finds support for violent victimization and poverty leading to drug use. Marijuana may be related to systemic problems that also lead to crime, but it is unlikely that it causes increased crime directly.

**Effect of Legality on Price and Use**

Much of the current literature in favor of marijuana legalization relies on the assumption that the drug is price inelastic. Reinarman et al. (2004) and Becker et al. (2004) argue that decriminalization of marijuana does not have significant impact on marijuana use. Caulkins et al. (2014) refute this assumption, arguing that marijuana use does increase from decriminalization.

The effect of legality and price on use can more closely be examined by using data from the Substance Abuse and Mental Health Services Administration’s (2017) National Survey on Drug Use and Health. *Figure 2* in the appendix shows the model that estimates for the regression of legality on price with additional regional fixed effects. The model shows that legality does not have a significant impact on price. This lack of significance can be explained by taxes imposed on the drug that artificially raise their price.

*Figure 3* shows the results of the regression of marijuana use as the percentage of residents over the age of twelve on marijuana legality and price within a state, along with region fixed effects. This model corroborates Becker et al.’s (2004) notion that marijuana is price inelastic: price has a statistically insignificant effect on use, only increasing use by 0.012% per dollar. In contrast to Reinarman et al.’s (2004) and Becker et al.’s (2004) findings, legality does have a statistically significant impact on marijuana usage. States where marijuana is legal have a rate of marijuana usage that is 6.463% higher than those in states where the drug is prohibited.

The paired 2004 studies by Reinarman et al. and Becker et al. likely lacked in data because of how few localities and even fewer states had legalized the drug. Reinarman et al. (2004) may have been particularly limited in assessing the effects of legality in the United States due to their reliance on Amsterdam as a case study. They compared Amsterdam to San Francisco, a city where medical marijuana was legal and only loosely restricted. Caulkins et al. (2014) was able to utilize more relevant data, as Colorado and Washington had both recently begun to sell recreational marijuana legally, possibly granting their findings more validity.

**Gateway Drug Hypothesis**

The most prevalent social argument against the legalization of marijuana is the gateway drug hypothesis. This hypothesis states that the use of marijuana leads to the consumption of harder, more destructive drugs such as heroin or cocaine. Dupont argues that “the prevalence of substance use disorders in adults is higher if substance use is initiated during adolescence, underscoring the importance of youth substance use prevention” (2018). Using data from the 2014 National Survey on Drug Use and Health, Dupont et al. shows that after controlling for age, sex, and ethnicity, children ages 12 to 17 who have used marijuana are 9.9 times more likely to consume other illicit drugs. This result builds upon previous works by Kandel and Faust (1975) and Palmer et al. (2012), all of which agree that early use of “recreational” drugs is a strong predictor for future substance abuse (Dupont 2018).

However, Dupont’s work does not control for other societal factors that may induce marijuana use, such as negative familial relations, negative peer pressure, or poverty (Doherty et al. 2012; Delva et al. 2014; Reboussin et al. 2015; Maier et al. 2017). Furthermore, Dupont et al’s paper (2018) acknowledges that the NSDUH dataset does not account for the homeless and other exogenous factors which may easily skew their results. Dupont’s study also does not consider that some individuals may be genetically predisposed to consuming drugs (Cleveland & Wiebe 2008; Hall & Lynsky 2005).

**Policy Recommendations**

Legalizing marijuana at the federal level gives the government the capability to better control the use and negative consequences by implementing new policies. We suggest that Congress impose an excise tax on marijuana. Becker et al. (2004) suggest that a high tax on marijuana would result in decrease in use of marijuana, as long as policies are enacted disincentivize market subversion. The tax would also generate revenue for the federal government. With marijuana prohibition, price increases lead to increased revenue for dealers (Miron & Zweibel 1995). A sin tax would be a more efficient way at reducing marijuana use, while generating government revenue.

In addition to the tax, we recommend the government implement programs that help reduce addiction, rather than criminalizing it. Criminalizing drug addiction leads to mass incarceration in the prison system. Using a recovery program is more efficient at curing addiction, while also lifting the burden drug addicts have on the current prison system, decreasing government expenditure (Miron & Egan 2007; Whitelaw 2017). Needle exchange programs and addiction treatment programs demonstrate the advantages of using public health methods (Greenwald 2009). Portugal increased needle-exchange programs and decriminalized marijuana, causing a drop-in drug related arrests by 50% and a decrease in marijuana use (Whitelaw 2017). If the government were to place an excise tax on marijuana, then the additional revenue generated could go to funding new public health programs in the United States. These programs would serve as more effective method of decreasing drug use, as they target the addiction instead of the user.

**Conclusion**

Despite the long history of fear and prohibition, there is little evidence that marijuana should be banned. While the economic argument in favor of prohibition is spotty, with predicted changes in use varying depending on the data set, there is no indication that an increase in use is necessarily a bad thing. Medical marijuana has been linked to positive health benefits for society, and marijuana does not appear to have an effect on crime. Despite some evidence that marijuana is linked to more drug use, much of this correlation lacks a causal basis. Overall, the legalization of marijuana may prove beneficial, generating greater revenue for the state and increasing the quality of life for many Americans who wish to partake.

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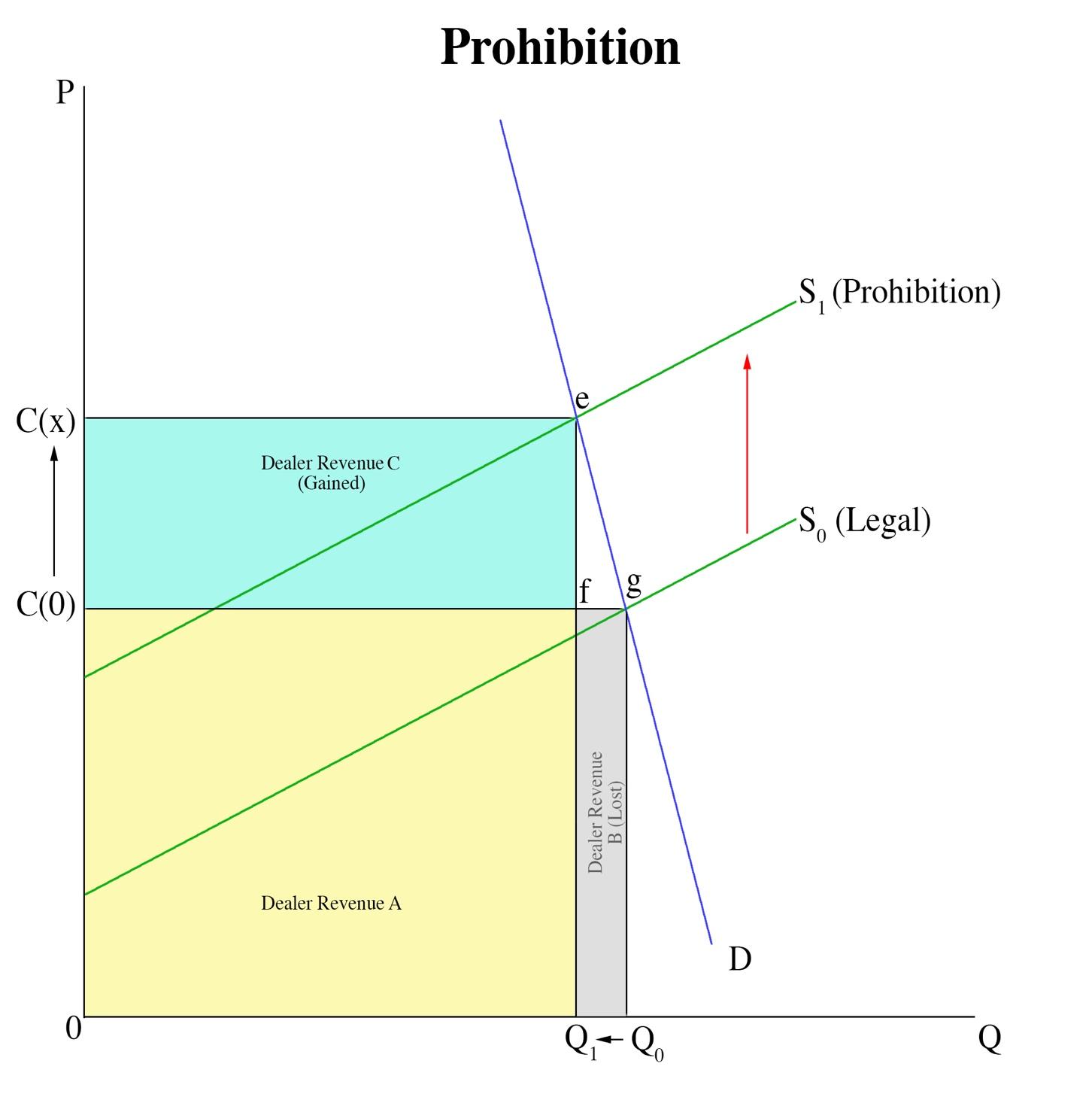
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**Appendix I: Figures**

Figure 1:

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| Figure 2: | Figure 3: |

