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# MARIJUANA AND MARKET SIZE ESTIMATES

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## INTRODUCTION

The process of legalizing marijuana has generated a need to estimate the potential size of the market for various reasons. Perhaps the most important of these is the ability of legislators to estimate the amount of tax revenue the government will receive from the market. Another oft-cited reason is to license an appropriate number of businesses to meet market demand in command-and-control fashion. Private analytic firms provide similar reports for investors but, due to the proprietary nature of the reports and the capital at risk, these reports serve different functions. This paper first reviews the historical accuracy of government estimates of market size and then discusses potential uses and pitfalls.

## HOW ACCURATE ARE MARKET SIZE ESTIMATES?

Estimates for the potential size of a new legal marijuana market are often riddled with uncertainty and inaccuracy, and can also be skewed by tenuous assumptions, such as the degree to which legal status can affect a person's proclivity to consume marijuana. In many cases, market size estimates are based on questionable estimates of black market consumption, which in turn are based on estimates of black market supply or demand. There is reason to be skeptical of both. From a purely theoretical standpoint, many outside factors could influence both supply and demand for all goods, including marijuana. Factors such as weather, transportation costs, prices of input goods and services, droughts, cultural shifts, and many others could all impact marijuana supply and demand. The importance of each of these factors and their influence on total market supply, demand, or resulting prices are difficult to predict with accuracy, and this shortcoming is apparent from the inaccuracy of most attempts to do so.

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For example, official government estimates of Mexican marijuana production almost tripled in the 2000s. Meanwhile, demand-side estimates of marijuana use and border seizures remained almost constant. As another example of the unreliability of supply-side estimates, the 2010 International Narcotics Strategy Report and World Drug Report estimated the total net production of Mexican marijuana at 21,500 metric tons in 2008. A study conducted by the RAND Corporation calculated that, based on historical use of marijuana in the U.S. and Mexico and the net of border seizures, U.S. consumption of Mexican marijuana should be approximately 16,730 metric tons. This would amount to 25,100 metric tons of U.S. consumption in total since the 2006 World Drug Report found that about one-third of U.S. marijuana supply is produced domestically, although more recent estimates suggest California could supply up to 75% of illegal domestic marijuana.<sup>1</sup> If accurate, these extrapolations would indicate a market large enough to supply every American who admits to marijuana use within the past month about 1.2 kilograms of marijuana per year each. This high estimate also ignores imports from other countries and underreporting. Based on these

supply-side estimates, there was enough marijuana in the United States in 2008 for all 15.2 million past-month users to smoke one joint every two waking hours of the year.<sup>2</sup>

While supply-side estimates attempt to calculate drug production, demand-side estimates are typically based on self-reporting from those in substance treatment programs, those in the criminal justice system, students in schools, or responses to general population surveys. A main problem of demand-side estimates is that individuals are prone to underreport illicit behaviors. For example, in a U.S. survey of 4,000 individuals ages 12–25 who participated in the 2000/2001 National Survey on Drug Abuse, only 61% of marijuana users who tested positive actually admitted to marijuana use in the 30 days prior to the test. Demand-side estimates also lack information about the quantity of the drug consumed.<sup>3</sup>



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Another problem is that market size estimates cannot account for changes in use trends such as the growing popularity of edibles. For example, a 2014 study by the Marijuana Policy Group for the Colorado Department of Revenue used a demand-side approach to estimate that total marijuana demand was 130.3 metric tons for Colorado residents and tourists in 2014. The problem is that this estimate is entirely in dried flower weight because there was no way to estimate the marijuana equivalent of edible and concentrate products at the time of the report.<sup>4</sup> Thus, there is no way of even assessing the accuracy of this report. The 148,238 pounds of both retail and medical marijuana flower sold in 2014 (about 67 metric tons) is only a portion of the total market size. There were also over four million units of medical and retail edible infused marijuana products and over 700,000 units of non-edible infused products sold.<sup>5</sup>

Most estimates also fail to account for complications in implementing the legal market. In California, consumers bought \$339 million worth of marijuana products in the first two months of legal sales—13% behind projections. The state had estimated that the first six months of legal sales would bring in \$1.15 billion in sales, or \$383 million every two

months. Experts blame the lower-than-expected sales on regulations and high taxes as well as the fact that some firms are still operating under temporary regulations and therefore have no sales reporting requirements.<sup>6</sup> Similarly, experts predicted that the Illinois medical marijuana pilot program would have 70,000 cardholders by the end of 2017.<sup>7</sup> Instead, as of January 2018, there were only 30,000 qualifying patients. The disparity is largely due to the difficulty of acquiring a medical marijuana card relative to simply purchasing illicit marijuana.<sup>8</sup>

Perhaps one of the best indicators of the inaccuracy of market-size estimates is an estimate of medical marijuana users in Florida updated on April 1, 2017. The report uses six different methods to estimate medical marijuana users and calculates a potential range of 1,586 to 1,752,277 users.<sup>9</sup>

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Tax revenue estimates suffer from the same methodological problems. In early 2014, Colorado Governor John Hickenlooper's office predicted that adult-use marijuana sales could bring in \$134 million in revenue from taxes and fees in the first fiscal year.<sup>10</sup> In the first fiscal year of legal sales (July 2014–June 2015), the state brought in about \$102.4 million in taxes and fees.<sup>11</sup> Many theoretical and practical gaps exist between these reports and the issues they claim to help solve.

## PURPOSE AND FUNCTION OF MARKET SIZE ESTIMATIONS

There is clearly a large margin of error for any attempt to estimate the size of a marijuana market ahead of time. But even if accuracy was reasonably assured, what is the purpose of these state estimates? They purport to be helpful in several regulatory activities, such as permitting the correct number of suppliers and retailers, estimating revenue, and promoting patient safety. Certainly, price and convenience of the legal industry can play a role in consumers' willingness to purchase marijuana products—but these factors are nearly impossible to predict before the market exists.

### ***Permitting the Appropriate Amount of Supply and Distribution***

One possible reason for producing market size estimates is so that policymakers can attempt to match the estimated demand to a pre-approved number of suppliers and retailers. Some states have placed a hard cap on the number of licensed growers, retailers, and/or wholesale suppliers of marijuana, although courts have already rejected those caps as unconstitutional in some cases.<sup>12</sup> However, using these reports to gauge and permit the correct number of suppliers is an implementation mistake that ignores the efficiency allowed by market forces in economic planning and substitutes state planning of the market for these forces, with all the attendant consequences familiar to students of the Cold War. These distortions are likely to create misdirected investments and distortion in the market, lack of supply for patients and consumers, and sustained black market activity.

Policymakers should be cautious of using demand estimates as justifications for limitations on supply, as it will likely lead to the market being underserved. Simple economics dictates that undersupply will result in higher prices on the legal market, making black-market alternatives more attractive. This undermines one of the major goals of legalization itself—eliminating black market activity. For those patients and consumers unwilling to turn to the black market, medical marijuana may not be an option until stores are re-stocked or changes in the law occur.

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From a regulatory perspective, there is no “right” amount of growers, suppliers, and retailers. Instead of attempting to preemptively gauge demand and then match supply, policymakers should instead look to the signals of supply and demand to let the market determine the efficient number of suppliers. While investors and business owners can’t exactly know what the demand will be, as financially vested actors they will be much quicker and more adaptive to consumer demand in order to minimize their losses and maximize their profit while still serving customers at the lowest possible price. Allowing the price system to

operate freely is one of the best tools policymakers have in ensuring access while simultaneously eliminating the black market.

A regulatory system that sets the number of suppliers based on market size estimates is likely to create uncertainty among investors, as they know they cannot use market methods to adjust their investment in supply but would rather be tied to the rules of the regulators. It could also lead to lack of access and sustained black market activity.

### ***Tax Revenue Estimates***

Another possible reason for market size estimates is so that policymakers can know how much tax revenue to expect. This is another poor utilization of these studies, as attempting to estimate government revenues can lead to budgetary shortfalls. There has been speculation that marijuana legalization will be a windfall to budgets—paying for roads, schools, and more. Unfortunately, the experience in Colorado has proven this rhetoric mostly false. Annual marijuana revenues in Colorado are around \$140 million, amounting to less than 3% of the total budget.<sup>13</sup> Indeed, the revenue potential of marijuana excise taxes has, in practice, closely rivaled that of tobacco excise taxes and should be considered in that light.

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Public finance professionals face a similar but opposing situation as the financiers and entrepreneurs of private industry: the danger that relying on estimates that overshoot the size of the market will lead to budget deficits if marijuana revenues are lower than expected. In other words, the use of market size estimates, which may overestimate tax revenues from marijuana, may encourage policymakers to plan for revenue that may never arrive. If some of this money is already accounted for, then states will have to go back on promises or cover the difference with debt.

A problem with this estimation approach is the high assumed tax rates. According to Reason Foundation research,<sup>14</sup> many states are taxing marijuana at too high of a rate, some at above

25%. As it pertains to market studies, these rates attempt to maximize government revenue from marijuana sales, but can unintentionally drive consumers to untaxed black market alternatives. The famous “Laffer Curve” tells us that government revenue amounts to zero at tax rates of 0% and 100%, and that the revenue-maximizing point falls somewhere in between. Policymakers should not dismiss this lesson when they set marijuana policy, as excessively high tax rates may actually reduce government revenues. Policymakers should consider a cumulative tax rate of 10%–15% in both modeling and in practice in order to gain a realistic estimate of potential marijuana revenues.

Nonetheless, policymakers should not rely on market size estimates to account for revenues far into the future while debating the legalization of marijuana. Instead, they should use a conservative estimate of how much it will cost to implement proposed regulations and employ fiscally responsible budgeting practices to ensure necessary costs are covered. If marijuana revenues come in higher than is necessary to regulate the industry or higher than expected, states could use this money to pay down long-term liabilities, instead of promising new schools and roads. Nevada has provided a good model of fiscal planning for marijuana tax revenues by directing the proceeds of its retail excise tax into the state’s rainy day fund rather than appropriating it for new or expanded programs.<sup>15</sup>

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### ***Patient Safety and Consumer Welfare***

Patient safety and consumer welfare are other plausible reasons for needing market estimates. Many policymakers are concerned about the proximity of marijuana dispensaries to schools, public spaces, jails, and other sensitive areas. Given the medical benefits of marijuana, many consumer groups want to ensure that patients have ready access. Market estimates purportedly help policymakers navigate these issues, yet these issues could be dealt with sans market estimates.

A purported social welfare issue regarding market size is the proximity of retailers to schools and how that might affect youth use. Studies are showing that states that have legalized, and have reasonable proximity regulations regarding schools, such as not allowing retail locations less than 500 feet from a school, are not experiencing surges in youth use.<sup>16</sup> This suggests that even in heavily dense areas where the market is big, allowing that market to regulate its own supply will not affect youth use. Again, a major goal of legalization is to eliminate black market activity, which is where youth users have purchased marijuana since long before the first states began to create legal markets.<sup>17</sup> By using overly restrictive practices, such as bans on dispensaries within 500 feet of a school or jail, policymakers only increase the chance that consumers turn to the black market where marijuana remains relatively less expensive and more accessible.<sup>18</sup> It does not serve public safety to have more illegal marijuana dealers closer to schools.

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Policymakers also should not place unnecessary purchase restrictions on consumers, such as transactional limits of an amount thought to be one week’s worth of use. First, this policy is almost impossible to enforce without a centralized database that is shared between retailers so consumers can’t go store to store buying the daily limit, effectively skirting the regulation. This is especially ineffective given, as we have shown, how variation and inaccuracies in reported use make it difficult to determine what a week’s worth of marijuana should be for any given consumer. Regardless, placing these limitations in order to curb demand or the prevalence of marijuana will likely fail, and repeated experience has shown the black market will fill in gaps in the legal market.

Policymakers will not improve the price, quality, or access of marijuana by using market estimates to limit medical suppliers. Suppliers, doctors, and patients will coordinate with each other using market forces to ensure that the appropriate amount of supply and products is delivered to medical patients if policymakers don’t place restrictions on that market.



## CONCLUSION

In conclusion, market size estimates can be helpful in some instances but are generally not useful for many of the regulatory issues facing marijuana legalization. These estimates misreport actual supply and demand estimates to a wide degree, in one case up to a magnitude of three times. Relying on these reports to handle common regulatory issues in marijuana is ineffective and could lead to several market distortions that would undermine the overall goals of legalization.

Market size estimates should primarily be tools of private investors to help them gauge how much they need to invest to meet demand and still maximize gains. Of course, these estimates will not always be correct, but policymakers should let private forces sort the structure and volume.

## ABOUT THE AUTHORS

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*For more on cannabis policy, see [reason.org/topics/drugpolicy](https://reason.org/topics/drugpolicy)*



# ENDNOTES

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