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# TESTIMONY

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## Insights on the Effects of Marijuana Legalization on Prices and Consumption

BEAU KILMER

CT-351

September 2010

Testimony presented before the California State Assembly Public Safety Committee  
and California State Senate Public Safety Committee on September 21, 2010

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**Statement of Beau Kilmer<sup>1</sup>  
The RAND Corporation**

***Insights on the Effects of Marijuana Legalization on Prices and Consumption<sup>2</sup>***

**Before the Committee on Public Safety  
California State Assembly**

**Before the Committee on Public Safety  
California State Senate**

**September 21, 2010**



Chairman Ammiano, Chairman Leno, Members of the Committee.

I thank you for the opportunity to speak before you today. My name is Beau Kilmer and I'm the Co-Director of the RAND Drug Policy Research Center.

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<sup>1</sup> The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of RAND or any of the sponsors of its research. This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

<sup>2</sup> This testimony is available for free download at <http://www.rand.org/pubs/testimonies/CT351>.

## **About RAND**

- The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis.
- The RAND Drug Policy Research Center has informed drug policy debates for more than 20 years
- In July 2010, RAND released:

***Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets*** (B. Kilmer, J. Caulkins, R. Pacula, R. MacCoun, & P. Reuter)

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The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis.

RAND has informed drug policy debates for more than 20 years and in July 2010 we released a report assessing how marijuana legalization in California could influence marijuana consumption and public budgets.

Our goal was to systematically think through the factors that influence these outcomes and help decisionmakers understand the uncertainty surrounding them. We did not conduct a formal cost-benefit analysis of legalization.

RAND does not have an official policy position on marijuana reform and more generally RAND does not advocate for or against legislation at any level of government.

## ***Three Main Points***

- 1. After legalization, the pre-tax retail price will drop dramatically**
- 2. After legalization, consumption will increase; unclear by how much**
- 3. Policy makers and analysts need to think seriously about the optimal tax rate for marijuana**

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This presentation is based on research from the RAND report below, please reference for all citations:

Beau Kilmer, Jonathan P. Caulkins, Rosalie Liccardo Pacula, Robert J. MacCoun, Peter H. Reuter, *Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets*, RAND, 2010  
[http://www.rand.org/pubs/occasional\\_papers/OP315/](http://www.rand.org/pubs/occasional_papers/OP315/)

The annotated portion is largely reproduced from this document

## **1. Pre-tax Retail Price Will Drop Dramatically**

- **Currently high-quality marijuana (sinsemilla) costs \$250–\$400/oz in California**
- **Reasons to expect price decrease after legalization**
  - Reduce risk, more automation, economies of scale
- **Pre-tax retail price will likely drop by more than 80%**
  - Within range of other estimates (BOE, 2009; NORML, 2009)
- **If low-cost California sinsemilla is smuggled to other states, it will decrease their prices, too**

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As of September 2010, we think \$250 to \$400 ounce best captures the typical price for indoor-grown sinsemilla throughout the state, although we know there are examples of indoor-grown sinsemilla being sold for less than \$250 and greater than \$400. Bond and Caulkins (2010) estimate that the price for an ounce of indoor-grown sinsemilla ranges from \$300 to \$450. This range was based on estimates from law enforcement sources as well as price data from High Times magazine. Our examination of the on-line menu (which includes information about price and potency) at the new San Francisco Patient Resource Center (SPARC) suggests that prices for marijuana with high-THC levels range from \$240 to \$340/oz in San Francisco (<http://sparcsf.org/medicine/todays-menu>). Our sensitivity analyses reveal that our main conclusions about the price drop do not change if the mid-point drops from \$375 to \$325, or even to \$250.

Our estimates are based on a grow-house production model where a 1,500 square foot residential house is essentially filled with hydroponic growing under artificial lights, producing four harvests per year with a total yield of a little under 550 pounds per year of sinsemilla. After factoring in the cost of artificial lighting, rent for a house (which is much more expensive than for a greenhouse), labor, and other expenses, post-legalization house-based production costs would still only be on the order of \$300–\$400 per pound, including harvest and processing (Caulkins, 2010). In our base case, we assume typical producer and retailer markups of 25 percent and 33

percent, respectively, and allow an additional \$40 per pound for logistics and distribution, suggesting an untaxed legal retail price of about \$38 per ounce (see Caulkins, 2010).

The BOE analysis of the Ammiano bill asserted a 50% price decrease and NORML testified: “Profit margins for growers would be drastically cut by elimination of prohibition. In a totally unregulated market, the price of marijuana would presumably drop as low as that of other legal herbs such as tea or tobacco – on the order of a few dollars per ounce - 100 times lower than the current prevailing price of \$300 per ounce - or a few cents per joint.”

[http://norml.org/pdf\\_files/AssPubSafety\\_Legalization.pdf](http://norml.org/pdf_files/AssPubSafety_Legalization.pdf)

While we do not know how much marijuana California currently exports to other states, such activity would likely increase postlegalization, given the expected drops in California production and processing costs. Indeed, as Bond and Caulkins (2010) note, sinsemilla produced legally in California would undercut sinsemilla prices throughout almost the entire United States, even if it is successfully taxed at \$50 per ounce and allowance is made for the cost of smuggling illegal marijuana.



## **2. Consumption Will Increase Post-Legalization**

- **Non-price effects**
  - Changes in availability and perceived harmfulness
  - Promotion and advertising
- **Price effects**
  - Current and potential users are sensitive to price changes, including youth (Pacula, 2010)

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There are many mechanisms by which a change in marijuana laws or their enforcement might influence drug use, including changes in legal risks, employer risks (through drug testing), price and availability, and social attitudes and norms (MacCoun and Reuter, 2001). Unfortunately, we do not know enough about each mechanism to specify the relative importance of each one; thus, we cannot specify the net impact with any confidence. Taken together, the available evidence suggests that the nonprice impact on consumption might be on the order of a 35-percent increase in past-month use. Given the ambiguity and noisiness of the data, estimates in the range of 5 to 50 percent seem plausible.

From Pacula (2010): “Results from these studies suggest that regular use of marijuana will increase both in prevalence and in terms of average level of use with a fall in the monetary price of marijuana and a reduction in the enforcement risk of using marijuana. The precise increase in use, particularly in terms of average quantities consumed among users, remains unclear because of inadequate analyses of conditional demand. However, it is clear that the number (prevalence) of regular users will rise in response to both.”

There are no truly satisfying estimates of this “total price elasticity” in the marijuana literature. For tobacco, the total elasticity is roughly 1.5 or 2 times as large as the participation elasticity (Harris and Chan, 1999; Chaloupka and Grossman, 1996; Hu et al., 1995; Lewit and Coate, 1981). Thus, in the absence of marijuana-specific information, we multiply our participation elasticity of  $-0.3$  by

1.75 to proxy the total elasticity. After accounting for possible income effects, we settle on a baseline total price elasticity of  $-0.54$ .

From Pacula (2010): "Our review of the current literature on initiation and use among youth (age < 18 years of age) is that initiation and consumption by this group is in fact sensitive to changes in prices. Lower monetary prices that could accompany legalization will mean more kids will initiation use. How much? Price elasticities are imprecise measures given that the probable change in price is unlikely to be small, but if we use the literature to provide a very conservative estimate then it suggests that youth initiation rates could increase 3 to 5 percent with every ten percent reduction in price from the current black market levels. This of course represents only a change in consumption associated with the change in monetary price, and has been noted throughout, initiation and use by youth is sensitive to other factors that will be influenced by legalization, such as legal penalties and enforcement risk.

## ***Uncertainty about Size of Consumption Increase***

- **We do not know:**
  - Retail price after taxes and level of tax evasion
  - Levels of advertising and promotion
  - Federal response
  - Shape of the supply and demand curves for marijuana
- **Our models suggest total consumption could increase by 50-100% or more, but we do not know for sure**
- **If the share of past-month marijuana users in CA increased 100%, we'd be back to the 1970s**

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Demand curves tell us how much of a good will be consumed at any given price; however, we have evidence concerning the demand curve's shape over the range of prices observed over only the past 30 years or so, and legalization would push prices down to levels not seen in that period. Here, we consider two demand curves that are often assumed in elementary economic analyses (linear and constant elasticity demand), but we have no reason to believe that either is correct. We use the curves because they are familiar (at least to economists) and illustrate how consequential such seemingly innocuous assumptions can be, not because we believe one or the other is in any sense preferred. We also stress that demand-curve shape is by no means the only structural assumption embedded in our model.

Consumption will increase, but it is unclear how much because we know neither the shape of the demand curve nor the level of tax evasion (which reduces revenues and the prices that consumers face).

For the sake of exposition, we consider a doubling in consumption as a bright line for defining whether consumption changes are small or large. This threshold is not entirely arbitrary. It roughly distinguishes between prevalence rates that have and have not been observed in the United States in the past (MacCoun, 2010a). Marijuana use peaked in the United States in 1978–1979, and past-month use (our best available proxy for consumption) was twice as high in the student

and household populations compared to what it was in 2008. The share of high-school seniors using daily was also twice as high (37 percent and 19 percent, respectively).

### **3. Need to Think Seriously About Tax Rates**

- Tax evasion will occur if tax is too high
- Tax evasion will reduce revenues and lower prices
- Lots of debate about tobacco tax evasion in California
  - 1% to 4.2% (Alamar et al., 2003); 14.7% (BOE, 2007)
  - In no state is the excise tax for a pack > \$6.50/ounce (CA = \$1.23/oz)
- What tax rate will maximize revenue, minimize evasion?
  - May also want to think about minimizing social costs

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There is sharp disagreement in the literature about the extent of tobacco tax evasion in California. To generalize and simplify, public-health researchers downplay the extent of smuggling; for example, Alamar, Mahmoud, and Glantz (2003) estimate that, in California, only 1–4.2 percent of cigarettes are smuggled to evade excise taxes. In contrast, BOE (1999a) estimates that 12–27 percent of cigarettes in California are sold without payment of excise taxes. In 2007, BOE generated an estimate close to 15%.

In no state is the excise tax for tobacco > \$6.50/ounce.

<http://www.ncsl.org/default.aspx?tabid=14349>

We assume a pack of cigarettes = 20 grams. In California the excise tax is \$1.23/oz  
(\$0.87/20g\*28.35g)

## ***If Proposition 19 Passes, Policy Makers Will Need a Strategy to Prevent a “Race to the Bottom”***

- **Proposition 19 allows local jurisdictions to create their own tax rate**
- **There is a possibility of a “race to the bottom” as jurisdictions lower taxes to stay competitive**
- **Key challenge for policy makers is how to prevent this from happening**
  - **One strategy: Make certain government funds dependent on a certain tax rate**
  - **This idea—and others—deserve rigorous analysis**

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Our analysis reveals that projections about the impact of legalizing marijuana in California on consumption and public budgets are subject to considerable uncertainty. Although the state could see large increases in consumption and substantial positive budget effects, it could also see increases in consumption and low revenues due to tax evasion or a “race to the bottom” in terms of local tax rates.

If Proposition 19 passes and decisionmakers are worried about a “race to the bottom” with respect to taxes, one option would be for federal officials to use their considerable enforcement discretion to tolerate production in jurisdictions that kept the tax rate above a certain threshold. Of course, these are not the only options available to the federal government.

The state government could also make certain government funds dependent on jurisdictions imposing a certain tax rate. These ideas and others deserve rigorous analysis.



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