

# WORKING PAPER

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## Estimating the Non-Price Effects of Legalization on Cannabis Consumption

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MacCoun (1993) distinguished 6 different mechanisms by which a change in marijuana laws or their enforcement might influence drug use, as depicted in Figure 1. The figure is complex, yet it already embodies some simplifying assumptions – e.g., that the effects of each mechanism on use are additive rather than multiplicative, and that each effect can be isolated from any reverse causal effect of drug use on each mechanism. Note that some of the mechanisms have a “-” sign indicating that they are ways in which laws can act to reduce drug use. Two mechanisms – forbidden fruit and the labelling theory effect -- are perverse effects of laws on use.

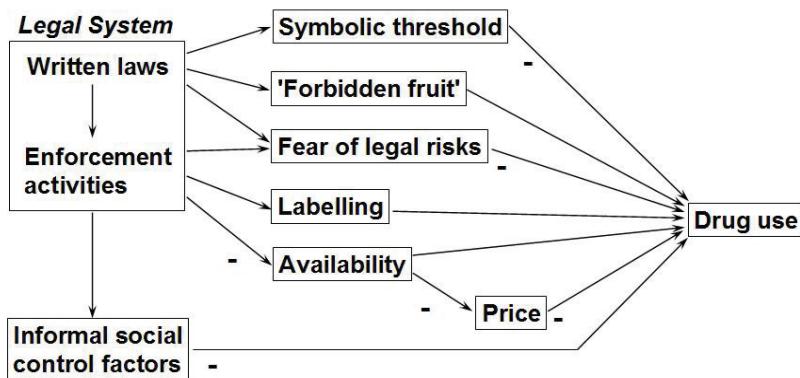


Figure 1. Mechanisms of legal influence on drug use (MacCoun, 1993)

Table 1 (adapted from MacCoun & Reuter 2001) suggests, in a rough qualitative sense, the likely mediating effect of each mechanism on how use might change under legalization. For four mechanisms, the effect of legalization would be to increase use; for two, it would decrease use; and for one, there is no clear prediction. Unfortunately, we don't know enough about each mechanism to specify the relative importance of each mechanism, and so we can't specify the net impact with any confidence.

**Table 1**  
**Effects of Legal Change on Drug Use**

<b>Drug Law Mechanism*</b>	<i>Impact of Legalization:</i>	
<b>On Mechanism</b>	<b>On Use</b>	
Availability (-)	Greater availability	Increases
Price (-)	Lower price	Increases
Fear of formal sanctions (-)	Less fear	Increases
Symbolic threshold (-)	Weaker effect	Increases
Forbidden fruit (+)	Eliminates (adults) or weakens (youth)	Decreases
Stigmatization/labeling (+)	Eliminates (adults) or weakens (youth)	Decreases
Bolstering of informal norms (?)	Unclear	Unclear

\*(+) mechanism encourages use; (-) mechanism discourages use.

Empirically, there are some case studies that provide relevant evidence:

1. the experience with various jurisdictions with depenalization of cannabis use;
2. the Alaska and South Australia home cultivation experience;
3. the effect of increasing the legal drinking age in US states; and
4. the Dutch cannabis coffeeshop experience.

### Cannabis Depenalization

There is a fairly large literature on the effects of depenalizing the possession of cannabis in various US states as well as the Netherlands, Portugal, and parts of Australia. Because we have reviewed this literature in detail elsewhere (see Kilmer, 2002; MacCoun, Pacula, Reuter, Chriqui, & Harris, 2009; Pacula, MacCoun, Reuter, Chriqui, Kilmer, Harris, Paoli, & Schaefer, 2005), we will just briefly summarize the key conclusions:

- Depenalization has either no or very small effects on the prevalence of cannabis use.
- Many citizens don't even know whether cannabis has been depenalized in their jurisdiction, and correspondingly, many citizens in non-depenalization states believe that it has been depenalized there. It seems likely that legalization would be far more salient to citizens.

- Depenalization and non-depenalization jurisdictions often differ far less than one might expect in terms of actual enforcement and sanctioning since almost no one receives a sentence of incarceration for simple possession of small amounts of marijuana.
- Depenalization has little or no impact on the operation of forbidden fruit effects, price effects, or availability effects. Theoretically, these mechanisms should be important for legalization than for depenalization.
- Depenalization involves marginal changes in deterrence and other effects within a prohibition regime, and for various reasons, these changes at the margin probably underestimates the impact of crossing the threshold from prohibition to legalization.

## **Home Cultivation in Alaska and South Australia**

Decriminalized home cultivation of cannabis for personal use but not sale is partially analogous to full-scale legalization; it increase the potential access to cannabis, reduces legal risks, and probably reduces stigma and forbidden fruit effects. It conceivably has some effect on prices, though the effect may be modest for the small quantities permitted in the cases examined here.

Due to a complicated string of political events and legal decisions, Alaska has had two separate periods in which home cultivation of small numbers of plants was decriminalized.<sup>1</sup> In May 1975, Alaska passed a law that treated possession of cannabis (an ounce or less in public, any amount in private) as a civil offense subject to a maximum \$100 fine. Later that month, the Alaska Supreme Court (*Ravin v. State*, 537 P.2d 494 [Alaska 1975]), ruled that the state's constitution protected the privacy of marijuana possession and use in the home, except for amounts "indicative of intent to sell," which the legislature in 1982 established as four ounces. In 1990, a ballot initiative "recriminalized" marijuana, upgrading possession of less than eight ounces to a misdemeanor potentially punishable by 90 days of jail time. But *State v. McNeil*, a 1993 Superior Court decision, argued that "Ravin was founded in the Supreme Court's interpretation of the Alaska Constitution. The legislature - nor for that matter the people through the initiative - cannot "fix" what it disliked in an interpretation of that document by legislation." During the next decade, there was considerable confusion about whether the *McNeil* ruling had in fact voided the recriminalization, and the issue was not clarified until the Alaska Supreme Court upheld a Court of Appeals decision (*Noy v. State*, 2003) reaffirming *Raven*.

The available data are too sparse to assess the earlier period. Examining 1988 data on 12-17 year olds and high school seniors, MacCoun and Reuter (2001) argued that:

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<sup>1</sup> See MacCoun & Reuter (2001) and for more recent developments, the documents posted at <http://regulatemarijuanainalaska.org>

Alaska exceeded the comparison sites by 74 percent for cannabis, 16 percent for tobacco and 13 percent for alcohol. Conservatively, this pattern might indeed suggest that, controlling for the specific Alaska community influences common to all three substances, the Alaska regime is indeed associated with higher levels of use. But Alaska exceeds the other sites by an average of 121 percent for cocaine—almost twice the excess marijuana rate. It is difficult to plausibly attribute the latter gap to the Alaskan cannabis regime; e.g., no plausible gateway mechanism would predict a cocaine increase exceeding the marijuana increase. Thus the Alaskan data are quite ambiguous.

It is possible to provide only a crude assessment of the more recent data. As seen in Figure 2, Alaska had higher rates of cannabis and other drug use prior to the late 2003 decision that re-decriminalized home cultivation. The available data show that if anything, the difference between Alaska and the US has shrunk somewhat; the most reasonable interpretation of the data is that the 2003 decision didn't influence cannabis use. The figures do suggest that Alaska exceeds the rest of the nation in cannabis use (as in 1988), but that it no longer exceeds the rest of the nation in the use of other illicits as it did in 1988. Whether these results implicate home cultivation is difficult to determine with the available data.

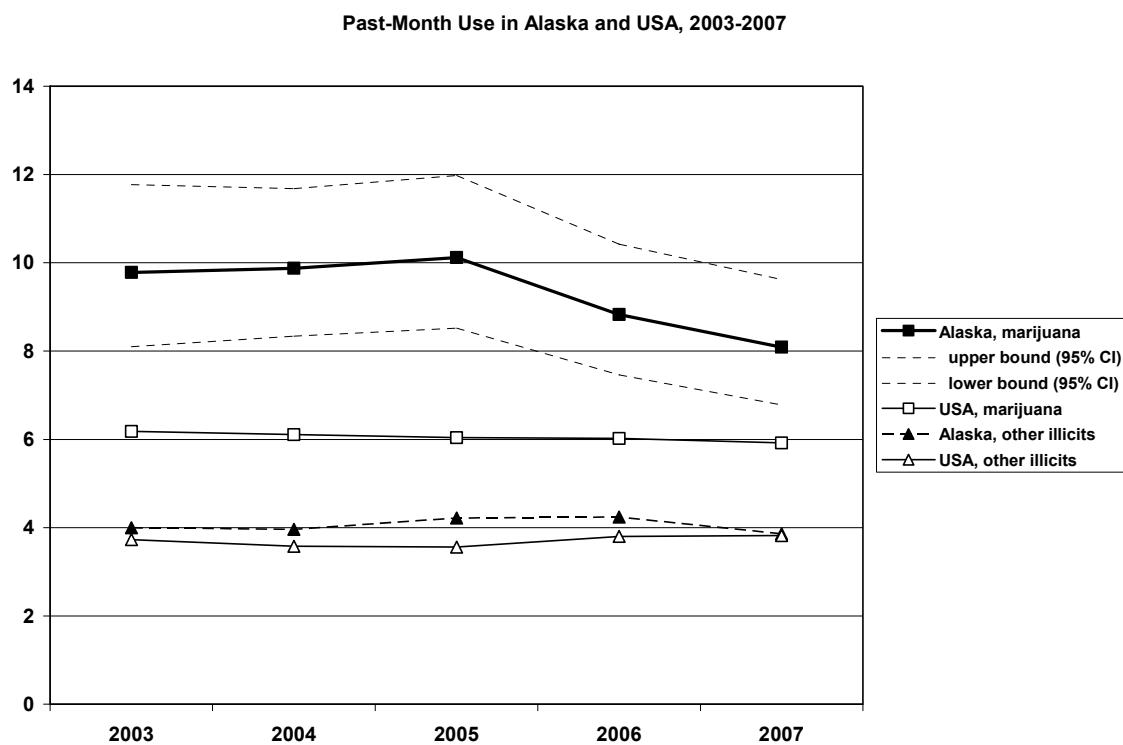


Figure 2. Past month drug use in Alaska and the entire USA, 2003-2007. (SOURCE: NSDUH health data from Appendix B, Tables B3 and B6, for various years. <http://www.oas.samhsa.gov>)

South Australia's 1987 Cannabis Expiation Notice (CEN) policy also depenalized home cultivation, although it put in place a system of modest monetary fines that rise with the quantity in possession, or if the plants are "artificially enhanced." The initial CEN scheme allowed for up to 10 plants. This was later reduced to 3 plants in 1999, and is now down to only one plant. Although there are no stated limits on the size of the plant, a single plant is probably sufficient to supply one to three regular users for a year.

Although the policy change is more subtle than the Alaska model, we know more about its effects due to a number of cross-sectional and longitudinal analyses.

Analyzing survey data for 1985 to 1995, Donnelly, Hall, and Christie (1998) show that the lifetime prevalence of cannabis rose in South Australia from 26 percent to 36 percent. But they conclude that "it seems unlikely that this increase is due to the CEN system," because Victoria, Tasmania, and New South Wales showed similar increases (without adopting the legal change), and because South Australia did not differ from the rest of the country in the rate of weekly cannabis use. (See Figure 3.)

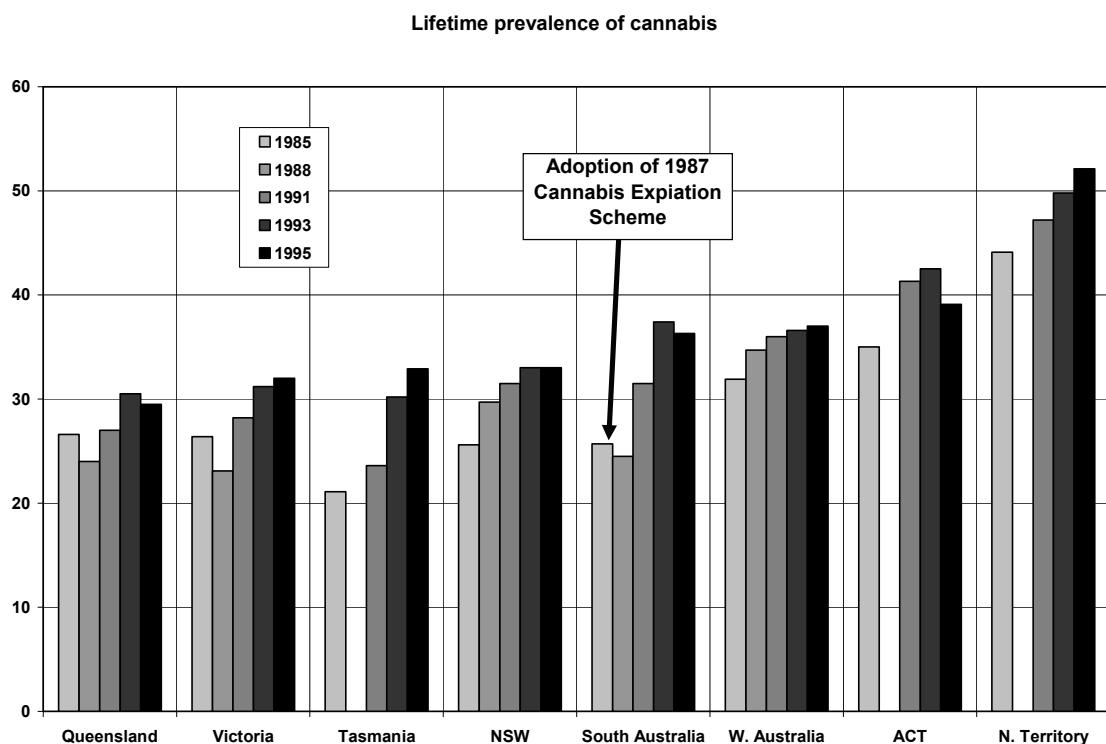


Figure 3. Trends in lifetime cannabis prevalence 1985-1995, for Australian states and territories. SOURCE: Data from Donnelly, Hall, & Christie (1998), Table 2.1.

As seen in Table 2, data from the 2007 National Drug Strategy Household Survey (Australian Institute of Health and Welfare, 2008) suggest that by 2008, South Australia looked quite similar to the rest of Australia with respect to both cannabis and other illicit drug use.

Table 2. Patterns of cannabis prevalence in South Australia vs. other Australian states and territories.

	South Australia	MEAN for other states/territories	MEDIAN for other states/territories
Past-year cannabis use (%)	10.2	10.0	9.3
Ratio of cannabis users to cocaine users	7.8	7.9	6.3
Ratio of cannabis users to ecstasy users	3.5	2.8	2.6
Recent cannabis use by 14-24 year olds	17.5	18.1	18.1
Any illicit excluding cannabis by 14-24 year olds	4.6	5.4	4.4

Williams (2004) analyzed data from the same household survey (for the years 1988, 1991, 1993, 1995, and 1998) using a more ambitious econometric analysis, concluding that "no evidence is found that either participation or frequency of use is sensitive to the criminal status of marijuana" in the sample as a whole. She does find that the change in law was associated with an increase in the likelihood of marijuana use among males over 25 years of age.

Thus we see that there were the parallel increases in cannabis use throughout various parts of Australia a few years after South Australia adopted the 1987 CEN scheme, and it is possible that the scheme played some role in this effect, at least for some users. Could the parallel increases have been attributable to increases in the distribution of South Australian cannabis to other states and territories, due to increased supply and/or a decrease in price? This does seem possible. Figure 4 shows that in 1991-1992, the price off cannabis did drop in South Australia, a period that roughly coincides with the increases in use. Prices for the rest of the nation did dip soon thereafter, and their declines were lagged somewhat and were smaller than the South Australia decline – two features that one would expect if the South Australian effect was diffusing to other states and territories. This was several years after the CEN policy was adopted, and if it was due to the scheme, the effect appears to have been short-lived.

Another factor to consider in interpreting the CEN experience is that, at least in the short run, it still involved considerable criminal justice sanctioning by the state. Using data on yearly CEN issuances and prosecutions, Christie and Ali (2000) show that the CEN scheme actually had a "net-widening" effect – an increase in prosecutions for minor cannabis offenses, apparently caused by the large fraction of fines that went unpaid.

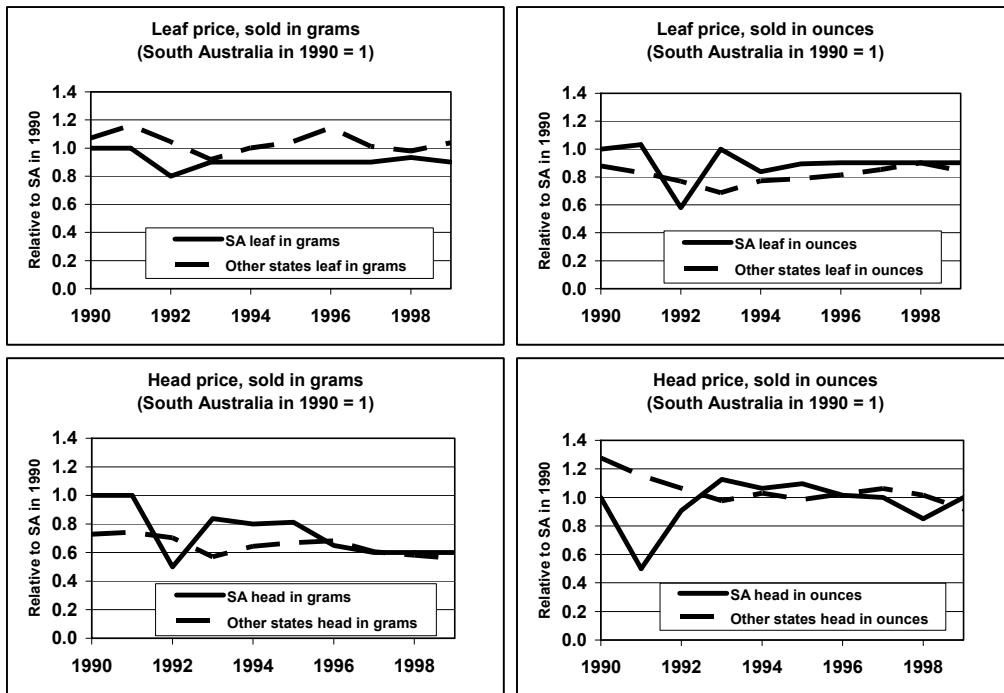


Figure 4. Changes in cannabis prices relative to 1990 South Australia levels.  
SOURCE: Author calculations based on data from Clements (YEAR), Tables 1 and 2.

## Raising the Drinking Age

The alcohol literature is vast, and a potent resource for understanding the effects of various regulatory schemes for influencing alcohol consumption and drinking behaviors (see Babor et al., 2003; MacCoun & Reuter, 2001). Here we limit the focus to the effects of a relatively change in the legal availability of alcohol, at least for some drinkers.

Increases in the legal minimum drinking age (usually from 18 to 21 yrs) are a form of partial prohibition because those who were once able to purchase legally can no longer do so. Although the effects of creating a prohibition and ending a prohibition may not be symmetrical, the drinking age literature provides another real world check on our order-of-magnitude estimates. Estimates of the effect of the raised age requirement on consumption and traffic fatalities are in the 5 percent to 30 percent range (see Wagenaar & Toomey's 2002 meta-analysis of 241 studies from 1960-2000; Carpenter & Dobkin, 2007).

## Dutch Cannabis Coffeeshops

I review this case in detail in Chapter/Appendix X, so again here I simply summarize the key lessons for modeling the impact of a form of quasi-legalization on use.

- The Dutch model seems to have had relatively little impact on prices; as such it can be seen as a source for the net "non-price" impact of legalizing cannabis.
- Although the Dutch depenalized use in the 1970s, there was little impact until the retail coffeeshop outlets began proliferating in the 1980s. Past-month prevalence from 8.5 percent to 11.5 percent between 1984 and 1992, and the growth in this period (relative to other nations) was plausibly attributable to the commercialization of cannabis; see MacCoun and Reuter (1997, 2001a, 2001b). This implies a potential increase of around 35 percent in past-month use.
- This increase was short-lived. By 2005, Dutch cannabis prevalence was below that of Spain, England, Italy, and France, and well below that of the US.<sup>2</sup>
- The leveling off of cannabis use in the Netherlands is plausibly attributable to various ways in which the Dutch tightened the regulations of the shops during the 1990s and 2000s – including a significant reduction in the number of coffeeshops, raising the legal age for entry to the shops from 16 to 18, and curtailing advertising.

## **Conclusion**

Neither theory nor the available evidence provide a basis for confident predictions of the "non-price" effect of legalization on use. But the theory and cases I briefly review here suggest that cannabis legalization would plausibly lead to increases in consumption, even without significant price drops. Correctly identifying causal impact is difficult in each of these cases, but if we attribute the largest estimated effects exclusively to the policies, then the Dutch experience suggests a temporary increase of around 35 percent in past-month prevalence. The Alaska and South Australian experiences and the change in the drinking age suggest smaller effects, but these were presumably less dramatic changes than the Dutch experience. Taken together, they suggest that the "non-price" impact on consumption might be on the order of a 35 percent increase in past-month use. Estimates in the range of 5 to 50 percent seem plausible; the available evidence provides no basis for anticipating non-price effects larger than 50 percent.

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<sup>2</sup> See <http://www.emcdda.europa.eu/>; <http://www.espad.org/>

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