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ABSTRACT

Why do some people want to legalize cannabis use?*

Preferences and attitudes to illicit drug policy held by individuals are likely to be an important influence in the development of illicit drug policy. Amongst the key factors impacting on an individual's preferences over substance use policy are their beliefs about the costs and benefits of drug use, their own drug use history, and the extent of drug use amongst their peers. We use data from the Australian National Drug Strategy's Household Surveys to study these preferences. We find that current use and past use of cannabis are a major determinants of being in favor of legalization. We also find that cannabis users are more in favor of legalization the longer they have used cannabis and, among past users, the more recent their own drug using experience. This may be reflecting the fact that experience with cannabis provides information about the costs and benefits of using this substance. We also find some evidence that peers use of cannabis impacts on preferences towards legalization.

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1 Introduction

Globally, cannabis policy has being experiencing a renaissance. While the Californian referendum to legalize cannabis in 2010 attracted much attention, the legal landscape shaping US cannabis policy had already been vastly transformed by the introduction of medical marijuana laws in 14 states.[1] In Europe, a policy of tolerance has existed in the Netherlands since 1976. Under this policy, the possession and consumption of small amounts of cannabis is not pursued by the police or courts and cannabis can be freely purchased in so called "coffee shops". More recently, cannabis use has been decriminalized in Portugal and the Czech Republic. Not all policy changes have produced more lenient regimes for the use of cannabis. For example, in 2007 the UK Government controversially reversed its 2004 decision to decriminalize cannabis use and possession. Nonetheless, the UK appears to be the exception to the rule, with the prevailing policy changes generally bringing about more liberal regimes.

Cannabis policy directly affects the welfare of a large proportion of the population in many countries. In the US, the UK and Australia, over 30% of the population have used cannabis and, in doing so have broken the law. While there is a substantial literature analyzing optimal crime policy, there are surprisingly few papers on the question of optimal drug policy. The small number of papers that do exist provide some interesting insights but disagree over whether criminalization is optimal. Glaeser and Shleifer (2001) claim that criminalization is preferred to a regime in which drugs are legal and subject to taxation. Their conclusion reflects the assumption that illegal drug activities are easier to detect than tax evasion. Becker et al. (2006) provide results to the contrary. Their argument is based on enforcement costs being very high. Pudney (2010) argues that the empirical evidence is simply not good enough to determine whether criminalizing or legalizing drugs should be preferred. One aspect that has received very little attention is the role of preferences and attitudes of individuals in shaping drug policy.

[1] These laws provide for the legal use of cannabis when prescribed by a doctor. Combined with assurances from the US Attorney General Office that the Federal Government, whose laws strictly prohibit the use of cannabis in all circumstances, will not over-ride states law, medical marijuana laws have lead to the widespread establishment of "dispensaries" openly selling cannabis.

To understand the development of drug policies we need to know who is in favor of more lenient policies and why this is the case.[2] Our paper is the first to investigate individual preferences over cannabis policy and how these preferences are affected by individual experiences with using cannabis. There are various reasons why preferences may differ between individuals: expectations about the possible impact of cannabis use in terms of benefits and costs, family situation, and peer influences for example. In addition, personal experiences with cannabis use may be relevant. It is not clear how personal experiences affects preferences for particular types of cannabis policy. Past users may be more in favor of liberal policies than non-users if their personal experience suggests that harm from cannabis use is limited and casual use is possible without becoming addicted. Alternatively, past users may regret having used cannabis and favor a policy that will make it more difficult for others to start using cannabis. Current cannabis users may be in favor of liberalization because they expect that this will lower cannabis prices, thus making their habit cheaper to pay for. However, even current users may be against legalization of cannabis use for altruistic reasons if they perceive their own cannabis use as something which they would have rather avoided.

Our empirical analysis draws on information from six waves of the Australian National Drug Strategy Household Survey, spanning the period 1993 to 2007, and proceeds in three steps. First, we use individual level data to describe the empirical relationship between preferences for legalization and cannabis use status controlling for individual characteristics and the state level policy environment. Second, we construct a pseudo panel where the unit of analysis is cohort defined in terms of age in 1993, gender, and state of residence. This allows us to use panel data techniques and address potential endogeneity of user status and policy variables. Finally, we attempt to explore pathways by which current and past cannabis use impact on preferences for legalization. We find that after accounting for their potential endogeneity, current and past use of cannabis are a major determinants of preferences favoring legalization of cannabis use. There is some evidence that personal experiences with cannabis provide information on the risks associated with cannabis use

[2]See Scheve and Slaughter (2001) and Mayda and Rodrik (2005) for an analysis of preferences over immigration policy.

and this influences preferences over its legal status. We also find evidence suggestive of peer effects, with preferences in favor of legalization strongly associated with a greater proportion of friends who have used cannabis.

2 Method

2.1 The National Drug Strategy Household Surveys and Sample Under Investigation

This research draws on information collected in the Australian National Drug Strategy Household Surveys (NDSHS). We use information from the NDSHS conducted in 1993, 1995, 1998, 2001, 2004 and 2007. The NDSHS is managed by the Australian Institute of Health and Welfare on behalf of the Commonwealth Department of Health and Aging. It is designed to provide data on attitudes and behavior relating to licit and illicit drug use by the non-institutionalized civilian population in Australia. The sampling framework is a multistage stratified sample design, where stratification is based on geographic region. In each sampled household, the respondent is the person with the next birthday who is at least 14 years of age in the waves prior to 2000 and at least 12 years old in the waves after 2000. Each of the waves used in this analysis asks the same question about the respondent's preferences about the legal status of cannabis as well as asking about lifetime and past year cannabis use. This enables us to use these six waves of cross-sectional data to analyze the relationship between preferences about the legal status of cannabis and cannabis use history.

We provide analysis based on individual level cross-sectional data and analysis based on cohort level panel data. The cohorts are defined by the age of the individuals in 1993: 15-19, 20-24, 25-29, 30-34, 35-39, 40-54; gender: male, female; and state of residence: New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania, Australian Capital Territory, Northern Territory. Thus we observe 96 groups of individuals homogeneous in terms of age, gender and state of residence in 6 survey years. This allows us to analyze the determinants of preferences for legalization of cannabis using a quasi-panel approach, which we explain below. Note that we use a balanced panel so that we observe

each of the 96 cohort groups in each of the six survey waves. Thus, the average age of the sample increases over time since individuals aged 15-19 year old are only represented in the 1993 wave. Individuals from this cohort are aged 17-21 in 1995, 20-24 in 1998 and so on. To ensure that results from the individual level and cohort level analysis are comparable, we limit the observations used in the individual level analysis to those used in the cohort level analysis.

2.2 Measures

Each of the six waves of NDSHS used in this analysis contains a direct measure of respondents preferences with respect to legalizing cannabis use. Specifically, individuals answered the following question: "To what extent do you support or oppose the following statement: the use of cannabis should be made legal." Possible responses range from 1 if the person strongly supports legalization to 5 if the person strongly opposes legalization. We re-scaled our dependent variable to 5 minus the original variable so that a higher value indicates more support for legalization. The transformed variable measuring preferences in favor of legalization ranges from 0 to 4 and larger values represent stronger support for legalization.

The top part of Table 1 shows attitudes to legalization for each survey year. The share of individuals who strongly support legalization has decreased since 1998 while the share of individuals who strongly oppose legalization has increased since 2001. On average, the support for legalization in our sample increased from 1.61 in 1993 to 1.86 in 1998 and then fell to 1.33 in 2007. In part, this pattern reflects the aging of the sample and the corresponding changes in their drug using behavior.

We measure cannabis user status as current user, past user and never user. Current use is measured by an indicator equal to one if the respondent has used cannabis in the past 12 months; past use is measured by an indicator equal to one if the respondent has used cannabis in their lifetime but not in the past 12 months; and never use is measured by an indicator equal to one if the respondent has never used cannabis in their lifetime. The bottom panel of Table 1 shows current and past use for each survey year. The share of individuals currently using cannabis declines from 19.1% in 1993 to 8.2% in 2007. In part, this is due to an overall decline in the use of cannabis and to the aging of the cohorts (in

2007 the average age of the individuals in our sample is much higher than the average age in 1993). However, the bottom part of Table 1 also shows that there is sampling variation. If our sample were truly a panel of individuals and there was no recanting, the percentage of past users could not decrease over time, while the percentage of never users could not increase. This is not the case in our sample. Whereas in 1998 46.1% of our sample report having never used cannabis, 56.8% report this to be the case in 2001. These fluctuations in cannabis use status imply that there are differences in the sampling of cohorts which we address by taking sampling characteristics into account in our analysis. The pattern in the measurement of cannabis use status may also reflect recanting within cohorts. Mensch and Kandel (1988) find some evidence that as people get older, they are less likely to report experimental drug use. When we use aggregate data, we address this issue by introducing survey year fixed effects in our analysis and by applying a mechanical correction to past use to account for potential under-reporting of past infrequent users.[3]

2.3 Controls

We control for the following individual characteristics in the analysis: gender is *Male* using an indicator variable with a value of 1 if the individual is male and a value of 0 is the individual is female; *Age* in 1993 at the time of survey; *Low educated* with an indicator equal to 1 if the individual has not completed highschool and a value of 0 otherwise; *Australian born* with an indicator equal to 1 if the individual is Australian born and a value of 0 otherwise; *Aboriginal* with an indicator equal to 1 if the individual is Aboriginal

[3]This correction is applied to observations for which the proportion of the cohort reporting to have ever used cannabis in the current period is smaller than the proportion of the cohort who have done so in some earlier period. This may be because, holding user status constant, current users consume cannabis less frequently and face lower expected penalties from consuming an illegal substance. The adjustment involves scaling the proportion of past use in cohort j in period t ($cp_{j,t}$), by the ratio of the maximum of the proportion of the cohort reporting having ever used and the proportion reporting having ever used in the current period, ($ce_{j,t}$).

$$\widetilde{cp}_{j,t} = cp_{j,t} * \frac{\max_t\{ce_{j,t}\}}{ce_{j,t}}$$

We note that the results are not sensitive to whether or not this adjustment is applied and to whether or not current use was also adjusted.

and a value of 0 otherwise; *Capital city* with an indicator equal to 1 if at the time of the survey the individual lived in a state capital city and a value of 0 otherwise; marital status with separate indicators for *Married* and *Divorced* at the time of the survey (reference group is single or widowed); indicator variables for state of residence at time of survey (*Victoria, Queensland, Western Australia, South Australia, Tasmania, Australian Capital Territory, Northern Territory*, reference group is *New South Wales*; and indicator variables for the year of the survey (1995, 1998, 2001, 2004, 2007, reference group 1993).

We augment the individual level NDSHS data with time varying information on cannabis price and policies measured at the state level. *Cannabis price* is based on information from the Illicit Drug Data Report prepared by the Australian Crime Commission, the Australian Illicit Drug Report and its predecessor, the Australian Drug Intelligence Report, prepared by the Australian Bureau of Criminal Intelligence.[4] The legal environment surrounding cannabis use varies across Australias eight states and territories. We capture these differences using separate indicators for living in a state where cannabis *decriminalization* has been legislated and an indicator for living in state that has introduced a *diversion* program. Decriminalization refers to the removal of criminal status and criminal penalties for cannabis use.[5] Under this system, it is still illegal to use, possess, or grow cannabis for personal use, but (for small quantities) the offense is punishable by payment of a fine, with no conviction recorded. Diversion refers to changes in legislation or police standing orders to ensure that minor cannabis offenses are diverted out of the criminal justice system. The specifics of what diversion involves differs across Australian states. In New South Wales and Victoria, on admitting to the offense, diversion involves a caution notice being issued and an educational brochure is provided along with referral information for optional education. Queensland has a diversion program that requires eligible offenders to agree to undertake a drug assessment or brief intervention that includes an education program.

[4]This information is supplied by covert police units and police informants. Following the method outlined in Saffer and Chaloupka (1999), we constructed a predicted price of a gram of high-quality cannabis (see Van Ours and William (2007) for details).

[5]South Australia was the first to adopt this system, introducing it in 1987. The Australian Capital Territory followed suit in 1992, the Northern Territory in 1997, and Western Australia in 2004.

2.4 Descriptive Statistics

Table 2 presents descriptive statistics for the data used in our analysis. Statistics are reported for the individual level cross sectional data and for the cohort level panel data. Starting with the individual level data, as shown in the table on a scale of 0 (no support) to 4 (full support), the average support for legalizing cannabis is 1.61. On average 13% of the individuals in our sample used cannabis in the year prior to the survey, while 31% have used cannabis in their lifetime but not in the year prior to the survey.[6] The average price of cannabis for the sample period is $23.00 per gram, measured in constant 1989 dollars. Furthermore 25% of the individuals in our sample lived in a state that had decriminalized the use of cannabis while 63% lived in states that had introduced a diversion program.[7] In terms of demographic characteristics, 43% of the sample are male, 46% have a low level of education, 77% are Australian born, and 2% are Aboriginal. Two-thirds of the individuals live in a state capital, 60% are married and 15% divorced at the time they were surveyed. Table 2 also shows the characteristics of the dataset after collapsing individuals into gender-age-state of residence cohorts and creating the cohort level panel data. The sample means for the cohort data are very similar to the sample means for the individual level data. Instead of individual characteristics, the variables now refer to cohort averages.

Figure 1 shows the proportion of current cannabis users in each of the surveys years for each of the age-groups (15-19, 20-24, 25-29, 30-34, 35-39, 40-54), for females and males separately. For the 15-19 year old age group, cannabis use goes up from 1993 to 1995. Except for this cannabis use declines over time for each age group. It is also clear that younger individuals – except for the youngest age category – are more likely to use cannabis than older individuals while males are more likely to be cannabis users than females.

[6] Note that the rate of past year use is quite low because the sample is quite old (in terms of studying cannabis use) and, as we confine analysis to observations used to construct the panel data, the sample is aging. For example, the average age for the sample is 35 in 1995 and 43 in 2007.

[7] There are two main reasons that the proportion of the sample who lived under a regime of a diversion program is so large. First, diversion programs were introduced from 1997 and were all in place by 2001, and this timing corresponds with the an expansion in the size of samples collected by the NDSHS. In effect 80% of the data are from the post 2000 period. Second, the most populous states introduced diversion programs.

Figure 2 shows the relationship between age group and support for legalizing cannabis use by cannabis use status. Clearly, conditional on cannabis use status, there are only mild age effects.[8] Either the support does not vary with age or there is a mild increase of support among older individuals. On a scale from 0 to 4, the average support for legalization of cannabis use among never users is approximately 1, among past users it is about 2, while among current users it is about 3. Apparently, the "closer" individuals are in terms of personal experiences with cannabis use, the more likely they are to support legalization.

2.5 Statistical analysis

We provide an analysis of preferences for legalization of cannabis use at two levels. First, we analyze the determinants of preferences about legalization using individual level data. Second, we form a quasi-panel by taking cohort averages of the individual level data where cohorts are defined in terms of age in 1993 (6), gender (2), state of residence (8). Thus we observe 96 cohorts homogeneous in terms of age, gender and state of residence in 6 survey years. This allows us to analyze the determinants of preferences for legalization of cannabis using a panel approach, which we explain in more detail below.

Using individual level repeated cross-sectional data, preferences over the legal status of cannabis are modeled as a function of personal characteristics, cannabis policy and cannabis use status:

$$y_{i,m,j,s,t} = \alpha_m + \alpha_j + \alpha_s + \alpha_t + \beta x_{s,t} + \gamma z_{i,m,j,s,t} + \epsilon_{i,m,j,s,t} \tag{1}$$

where y represents the preferences for legalizing cannabis use of individual i, of gender m, in the jth age cohort residing in state s in year t and x represents a vector of policy variables that vary only by state and year (an indicator for decriminalization, an indicator for diversion program, the price of cannabis). Furthermore, z is a vector of dummy variables representing cannabis use status (past or current cannabis use) and personal characteristics (an indicator for not completing high-school, an indicator for being born in Australia, an indicator for being an Aboriginal, an indicator for living in a capital city, an indicator for

[8] Note that each line on the graph represents the average level of support for the age group averaged over all those in the age group from the 6 survey waves and hence captures both age and time effects.

marital status is married or in a common law relationship, an indicator for marital status is divorced, with never married or widowed as the omitted category). The α's represent fixed effects for gender, age cohort, state and survey year, respectively.[9] And, β and γ are vectors of parameters while ϵ is an error term. We estimate the parameters of this model using Ordinary Least Squares.[10]

When linking a persons preferences for legalizing cannabis consumption with their own cannabis use history, we have to address the issue of the potential endogeneity of their past and current cannabis use. This is because the same unobserved determinants of preferences for legalizing of cannabis could also affect their users status. If this is the case, then a correlation between cannabis use and preferences could exist even if no causal relationship exists. The policy variables are also potentially endogenous. In analysis using cross-sectional data, Instrumental Variable (IV) estimation is often employed to address this issue. However, it requires one or more instruments for each of the potentially endogenous regressors. Instruments for cannabis use, for example, must fulfill the requirements that they are correlated with cannabis use but have no direct effect on preferences about its legal status. However, all of the personal characteristics that are available in our data set affect both cannabis use and policy preferences. As there are no instruments for cannabis use, instrumental variable estimation is not an option here.

Given that we have six years of cross-sectional data, an alternative strategy is to form a pseudo-panel and use panel data techniques to address the issue of potentially endogenous regressors. More specifically, we construct a panel where the unit of analysis is cohort defined in terms of age in 1993, gender, and state of residence. As a first step in the analysis of the cohort panel data we perform a similar regression as was done using the individual data:

$$\bar{y}_{m,j,s,t} = \alpha_m + \alpha_j + \alpha_s + \alpha_t + \beta x_{s,t} + \gamma \bar{z}_{m,j,s,t} + \epsilon_{m,j,s,t} \tag{2}$$

where $\bar{y}$ indicates the average preference for legalization in each of the 96 cohorts, and $\bar{z}$ is

[9] Note that the parameters of interest do not change when we add a full set of cohort-gender-state interactions.

[10] In estimation we account for clustering of observations by state and calendar year. When we use an ordered probit specification the results are very much the same.

a vector of variables calculated as cohort averages.

With panel data, potential endogeneity of user status as well as the policy variables, can be addressed using the Arellano-Bond estimator. This estimator first differences equation (3) to remove the time invariant fixed effects and then instruments variables that are not strictly exogenous with appropriate lags in levels. Arellano and Bond (1991) developed the estimator in the context of dynamic panel data models and show that if the error term $\epsilon_{j,t}$ is serially uncorrelated, then lags of the endogenous regressor of order two or greater are orthogonal to the fist difference of the endogenous regressor. Lags of order 1 or greater can serve as instruments for first differenced predetermined variables that are potentially correlated with past errors. Thus, the first differenced model can be estimated by Generalized Method of Moments where the first difference of endogenous regressors are instrumented with lags of the variable's level of order two or greater and the first difference of predetermined variables are instrumented with lags in the level of order 1 or greater.

3 Parameter estimates

3.1 Baseline results

Table 3 provides the parameter estimates for the model of preferences over legalization of cannabis use based on individual level cross-sectional data (columns 1 and 2) and cohort level panel data (columns 3 and 4). Although not reported, all models include state fixed effects. Panel a includes the potentially endogenous state level policy variables (cannabis price, an indicator for decriminalization and an indicator for diversion program), whereas they are omitted in the specifications reported in panel b. A comparison of panels a and b reveals that the parameter estimates are almost identical, suggesting that policy endogeneity is unlikely to be a significant issue in this case.

We start by discussing the results based on individual level cross sectional data. The first column of Table 3 shows parameter estimates for a specification that excludes variables capturing (potentially endogenous) user status. Indicators for past and current users are included in the specification in column 2. As can be seen, accounting for user status does not much affect the qualitative findings. Living in a state with programs designed to divert

simple cannabis offenses away from the criminal justice system, being male, being born in Australia, being Aboriginal, and living in a capital city are associated with being more in favor of legalizing cannabis use. Living in a state with higher prices or a state that has decriminalized cannabis use is associated with less support for legalization, as is not being single. However, the magnitude of these effects tend to be smaller in the specification that accounts for users status. This is because these characteristics effect whether a person is a current or past cannabis user, and therefore is affecting preferences for legalizing cannabis directly and indirectly in column 1.[11] The main parameters of interest in this analysis are the coefficients on the indicator for being a current cannabis user and for being a past user. In line with Figure 2, we find that being a current cannabis user has a large positive effect on preferences for legalization while being a past cannabis user has a positive effect but only around half the size of the effect of being a current cannabis user.

We next turn to the results for analysis based on the cohort level panel data, contained in column three and four. In column three we replicate the analysis of the second column. A comparison of the parameter estimates in both columns reveals that the point estimates of the parameters of interest, current use and past use, are not much affected by the aggregation of individuals into cohort groups. Our main results, the positive effects of current and past cannabis use on preferences for legalization remains in tact. We note that, with the exception of the coefficients on cannabis price, Aboriginality and cannabis use status, none of the parameter estimates are significantly different from zero. Apparently, these parameter estimates are mainly identified from within-cohort variation.

Finally, in the fourth column we present our panel data estimates based on the Arellano-Bond estimator. These results account for the potential endogeneity of cannabis use status, as well as the potential endogeneity of the price, decriminalization and diversion program policy variables.[12] At the bottom of each panel we report two diagnostic tests for the AB

[11] It is interesting that we find that higher prices are associated with less support for legalizing cannabis. This may because, holding user status constant, current users consume cannabis less frequently when prices are higher, and hence its legal status becomes less costly to them.

[12] Strictly speaking current use, price and the indicator for living in a state that has decriminalized cannabis and the indicator for living in a state that has a diversion program are treated as endogenous and instrumented with lags of two or greater while being a past user is treated as a predetermined variable and

results. The first, labeled AR(2), examines the validity of using lags as instruments in terms of their exogeneity. The null hypothesis is that there is no second order autocorrelation in the first differenced error term, in which case the instruments are exogenous.[13] As can be seen from Table 3, the AR(2) test finds no evidence of autocorrelation of order two in the first differenced errors, hence lagged levels of variables can serve as instruments. The second diagnostic test we report is the Sargan test of over-identifying restrictions. This tests the null hypothesis that the over-identifying restrictions are valid. As can be seen from the table, we cannot reject the null hypothesis. Taken together, these results indicate that the use of the AB estimator is appropriate for these data. In terms of the parameters of interest, as shown in the table, addressing the endogeneity issue does not affect our main results. We still find that being a past cannabis user has a significant positive effect on support for legalization, while being a current cannabis user has an even larger and also highly significant positive effect.

3.2 Potential Mechanisms linking Cannabis Use and Preference for Legalization

We next investigate potential pathways by which cannabis use might influence preferences for legalizing cannabis. While it may be expected that current cannabis users will, on average, be in favor of legalizing cannabis as it would reduce the full cost of their cannabis use, it is not obvious that past cannabis users should be in favor of legalization. For example, past cigarette smokers tend to be more vehement in their dislike of smoking than those who have never smoked. This type of reaction can occur if one regrets having used a substance. The finding that past cannabis smokers are more in favor of legalization than never users is therefore interesting and deserves some further exploration as it may provide some insight into the mechanisms linking cannabis use in general to individuals' policy preferences. We focus on two potential explanations: peer influences and informational effects.

instrumented with lags of one or greater.

[13]Note that, by construction, fist order autocorrelation is expected since $D\epsilon_{j,t} = \epsilon_{j,t} - \epsilon_{j,t-1}$ should be correlated with $D\epsilon_{j,t-1} = \epsilon_{j,t-1} - \epsilon_{j,t-2}$ as both contain $\epsilon_{j,t-1}$.

Stated simply, the peer effects hypothesis we have in mind is that the degree to which individuals are pro legalization will be positively related to the prevalence of cannabis use amongst their peers. The reasoning underlying this hypothesis is that current cannabis users are more in favor of legalization, and if individuals tend to be sympathetic to their friends point of view, then the more friends who use cannabis an individual has, the more likely the person is to be pro legalization irrespective of its own user status. If past cannabis users have more friends who are current cannabis users compared to those who have never used cannabis, then one possible reason that they are more pro legalization is that they are influenced by their peers point of view. A competing, but not mutually exclusive hypothesis is that, in addition to being in favor of legalizing cannabis because it reduces the full user cost of cannabis consumption, current cannabis users may be pro legalization because their experience with cannabis provides them with additional information on the costs and benefits of cannabis use. If this is the case, past cannabis users may be better informed about the costs and benefits of cannabis use compared to those who have never used and hence their support for legalization may reflect better information. It is likely, however, that the informational value of their past experience diminishes the longer it has been since they have quit use (and hence the older is their information on harms and benefits of use).

In order to investigate the potential pathways by which cannabis use in general, and past cannabis use in particular, affects preferences for legalizing cannabis we require information on peers use of cannabis and on the duration of time since past users quit use. Information on individuals quitting behavior has only been collected in the 1998 wave of the NDSHS. As this information is vital to exploring the mechanisms by which preferences over legalizing cannabis are linked to cannabis use, the following analysis is based on data from the 1998 wave of the NDSHS only. This precludes the use of the Arellano-Bond (AB) estimator to address issues of endogeneity of current and past cannabis use. We note, however, that the OLS and AB estimates of the parameters of interest reported in Table 3 are quite similar. For this reason it is unlikely that there are large biases arising from the potential endogeneity of past and current use.

OLS parameter estimates based on data from the 1998 NDSHS are shown in Table

4. The first column shows that the estimated effect of current use and past use on the preference for legalization using individual level data from 1998 only is very similar to the estimated effect based on individual level data from the six waves. The second column shows that if we assume linear effects of duration of use and duration since quitting we find the duration of use amongst current users has a significant positive effect, while for past users the duration since last use has an insignificant negative effect on preferences for legalization. Column three relaxes the assumption that the effects of duration of use and duration since quitting use are linear. The results in column three do in fact suggest that the effects of the duration of use and duration since quitting use are nonlinear. Going from less than 1 year of use to 1-2 years of use increases the preference for legalization from 1.45 to 1.76 but a further increase only occurs with a duration of use of more than four years. The strongest effect occurs for a duration of greater than 10 years. For past cannabis users there is no significant difference in the support for legalization between those who quit less than a year ago and those who quit up to four years ago. However, the support for legalization falls from 0.71 to 0.47 amongst those who quit more than four years ago. This pattern in the effects of duration of use and duration since quitting use is consistent with the notion that the relationship between cannabis use and preferences towards legalization is in part explained by information on the costs and benefits of use.

Finally, column four reports results for a specification in which we control for the proportion of the respondents friends who have ever used cannabis with indicators for most, half and few have ever used (the omitted category is none of their friends have ever used cannabis). As can be seen from Table 4, peer use of cannabis is positively and significantly related to preferences in favor of legalizing the use of cannabis. Moreover, respondents for whom at least one half of their friends have ever used cannabis are significantly more in favor of legalization compared to those with fewer than half or no friends who have ever used cannabis. It is also interesting to note that the size of the point estimates on past and current use of cannabis are almost halved once we account for peer use, duration of respondents use and duration since quitting for past users. This may suggest that the strong positive relationship between users status and preferences for legalizing cannabis in part reflect information on the costs and benefits of cannabis use acquired from experience with

the drug, and the influence of their friends in forming opinions on the issue of legalization.

4 Discussion

Cannabis policy is back in the political arena. More often than not, the debate on legalization of cannabis use is based on moral stances and emotional arguments rather than on evidence about potential costs and benefits of the policy. Given that a desire to better align policy with public opinion is often the stated motivation for changes in the treatment of cannabis under the law, understanding how opinions over cannabis' legal status are formed is a necessary first step in examining optimal cannabis policy.

As far as we are aware, research on preferences for particular types of cannabis policy is absent. We provide a first empirical study on the determinants of preferences for legalization of cannabis use. Amongst the key factors impacting on an individual's preferences over substance use policy are their beliefs about the costs and benefits of drug use, their own drug use history, and the extent of drug use amongst their peers. In order to untangle the interaction of these factors on preferences, we exploit data from the Australian National Drug Strategy's Household Surveys covering the period 1993-2007. The Australian data are informative about past and current cannabis use of individuals and about their preferences for particular types of cannabis policy.

Our results indicate that, after accounting for the potential endogeneity of cannabis use, current cannabis users are very much in favor of legalization, while past cannabis users are also in favor but to a smaller degree. We also find that cannabis users are more in favor of legalization the longer they have used cannabis and, among past users, the more recent their own drug using experience. This suggest that more experience with cannabis provides better information about the costs and benefits of using this substance. We also find some evidence that peers' use of cannabis impacts on preferences towards legalization. This may reflect information flows about the costs and benefits of cannabis use or it may reflect "herding" with respect to preferences over legalization.

All in all, we conclude that personal experience with cannabis use leads to strong preferences for legalization. Because past cannabis users also have a strong preference

for legalization, it appears that these preferences go beyond direct personal interest of current cannabis users who benefit from legalization if cannabis prices go down. From this we conclude that on average, for past and current cannabis users, the benefits of legalization outweigh potential costs. The fact the cannabis use is not as harmful as for example alcohol or tobacco may explain why individuals are more inclined to be in favor of legalizing cannabis once they have used cannabis themselves.

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Table 1: **Attitudes to legalization and cannabis use by survey year**

	1993	1995	1998	2001	2004	2007	Total
support for legalization							
0	30.3	29.6	25.7	31.6	32.4	38.8	32.4
1	19.0	15.4	15.6	15.3	16.8	19.2	16.7
2	19.2	19.0	20.3	19.1	20.0	19.9	19.7
3	22.3	24.1	23.9	21.2	20.8	14.6	20.3
4	9.2	11.8	14.5	12.9	10.0	7.5	10.9
Total	100	100	100	100	100	100	100
Average	1.61	1.73	1.86	1.68	1.59	1.33	1.61
Cannabis Use							
Never	54.6	54.2	46.1	56.8	57.8	60.7	56.4
Past	26.4	27.1	36.1	29.0	30.9	31.1	30.6
Current	19.1	18.8	17.8	14.2	11.4	8.2	13.0
Total	100	100	100	100	100	100	100
Observations	2,438	2,596	6,674	16,504	17,550	11,052	56,814

Table 2: **Means for individual level data and cohort data**

	Individual data	Cohort data
Cannabis price/100	0.23	0.24
Decriminalization	0.25	0.37
Diversion	0.63	0.31
Preference for Legalization	1.61	1.75
Current user	0.13	0.18
Past user	0.31	0.33
Low educated	0.46	0.44
Australian born	0.77	0.79
Aboriginal	0.02	0.02
Capital city	0.67	0.71
Married	0.6	0.62
Divorced	0.15	0.12
Male	0.43	0.5
Age in 1993		
15-19	0.14	0.17
20-24	0.15	0.17
25-29	0.15	0.17
30-34	0.13	0.17
35-39	0.12	0.17
40-54	0.31	0.17
State		
New South Wales	0.25	0.13
Victoria	0.20	0.13
Queensland	0.18	0.13
Western Australia	0.11	0.13
South Australia	0.09	0.13
Tasmania	0.05	0.13
ACT	0.06	0.13
Northern Territory	0.06	0.13
Survey year		
1993	0.04	0.17
1995	0.05	0.17
1998	0.12	0.17
2001	0.29	0.17
2004	0.31	0.17
2007	0.19	0.17
Observations	56,814	576

Table 3: **Parameter estimates of the support for legalizing cannabis use; 1993-2007**

	Support for legalization (0–4)			
	Individual data		**Grouped data**	
			OLS	**AB**
a. Including policy variables				
Current user	–	1.95 (77.0)**	2.04 (11.9)**	2.78 (6.8)**
Past user	–	0.83 (42.8)**	0.88 (8.2)**	1.41 (5.4)**
Cannabis price/100	-0.24 (1.9)*	-0.21 (2.4)**	-0.31 (4.6)**	-0.30 (1.7)*
Decriminalization	-0.07 (1.6)	-0.06 (2.1)**	0.01 (0.5)	0.06 (0.8)
Diversion	0.05 (1.8)*	0.01 (0.6)	0.01 (0.2)	-0.00 (0.1)
Male	0.21 (15.9)**	0.05 (4.6)**	0.03 (1.0)	–
Low educated	-0.11 (6.0)**	-0.12 (9.4)**	-0.02(0.1)	-0.04 (0.2)
Native Australian	0.10 (3.5)**	0.03 (1.8)*	-0.01 (0.0)	0.24 (1.2)
Aboriginal	0.20 (5.2)**	0.13 (3.7)**	0.82 (3.6)**	0.92 (2.0)**
Capital city	0.02 (1.2)	0.02 (1.8)*	-0.01 (0.1)	0.05 (0.4)
Married	-0.36 (23.3)**	-0.15 (11.7)**	-0.27 (2.7)**	-0.26 (2.0)**
Divorced	-0.06 (2.8)**	-0.05 (2.4)**	-0.24 (0.9)	-0.30 (1.1)
AR(2) - p value				0.94
Sargan test - p value				0.82
b. Excluding policy variables				
Current user	–	1.95 (77.4)**	2.05 (12.4)**	2.66 (5.7)**
Past user	–	0.83 (42.7)**	0.89 (8.4)**	1.39 (5.3)**
Male	0.10 (15.9)**	0.05 (4.6)**	0.03 (0.9)	–
Low educated	-0.11 (6.0)**	-0.12 (9.4)**	0.00 (0.0)	0.09 (0.1)
Native Australian	0.10 (3.5)**	0.03 (1.8)*	-0.02 (0.1)	0.22 (1.2)
Aboriginal	0.20 (5.2)**	0.13 (3.7)**	0.80 (3.5)**	0.95 (2.4)
Capital city	0.02 (1.2)	0.02 (1.8)*	0.01 (0.1)	0.03 (0.2)
Married	-0.36 (23.3)**	-0.15 (11.7)**	-0.27 (2.7)**	-0.28 (2.5)
Divorced	-0.06 (2.8)**	-0.05 (2.4)**	-0.24 (0.8)	-0.30 (1.2)
AR(2) - p value				0.99
Sargan test - p value				0.77
Observations	56,814	56,814	576	480

Note: Both the individual level and the grouped level estimates contain age group fixed effects, state fixed effects and year fixed effects; in the Arellano-Bond (AB) estimates in panel *a* (panel *b*) 52 (36) instruments are used; in parentheses: absolute *t* statistics based on robust standard errors; ** (*) indicates significance at a 5% (10%) level.

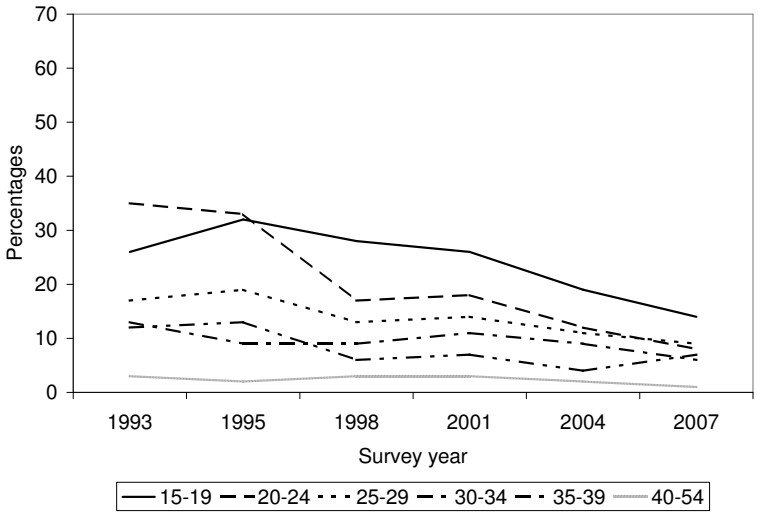
Table 4: **Parameter estimates of the support for legalizing cannabis use; 1998**

	(1)	(2)	(3)	(4)
Current user	2.02 (29.9)**	1.53 (18.3)**	1.45 (20.9)**	1.12 (13.8)**
Past user	0.84 (13.6)**	0.74 (6.8)**	0.71 (8.5)**	0.49 (5.6)**
Duration of use (years)/10	–	0.36 (19.4)**	–	–
Duration since last use (years)/10	–	-0.06 (1.4)	–	–
Duration of use (years)				
1-2			0.31 (2.8)**	0.25 (2.3)**
2-3			0.23 (3.8)**	0.17 (2.9)**
3-4			0.26 (4.9)**	0.18 (3.0)**
4-5			0.45 (4.9)**	0.37 (3.7)**
6-10			0.58 (22.6)**	0.47 (13.2)**
10+			0.65 (17.4)**	0.51 (14.8)**
Duration since last use (years)				
1-2			0.05 (0.5)	0.01 (0.1)
2-3			-0.11 (0.8)	-0.15 (1.1)
3-4			0.08 (0.7)	0.08 (0.7)
4-5			-0.24 (3.6)**	-0.25 (2.9)**
6-10			-0.28 (3.2)**	-0.27 (2.9)**
10+			-0.24 (3.2)**	-0.19 (2.5)**
Peer group -most have used				0.86 (20.1)**
Peer group -half have used				0.77 (10.8)**
Peer group -few have used				0.42 (9.2)**

Note: The estimates are based on 6,330 observations from the 1998 survey; the estimates also include the same personal characteristics and policy variables as Table 3, but the related parameter estimates are not reported.

Figure 1: **Evolution of the percentages current cannabis users by age-cohort and gender**

a. Females



b. Males

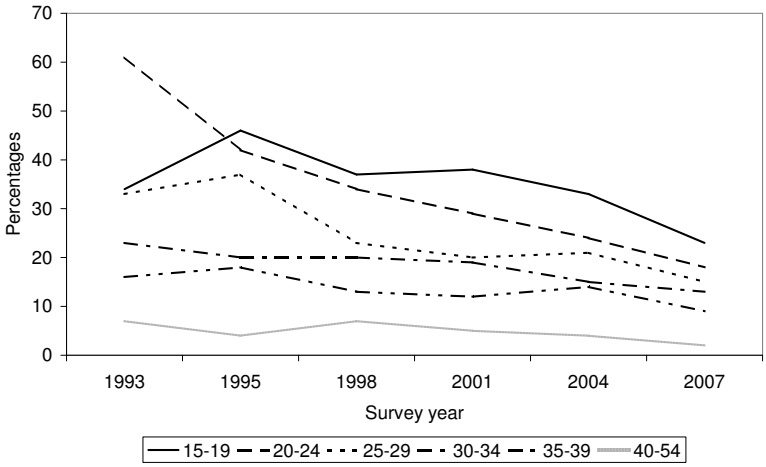
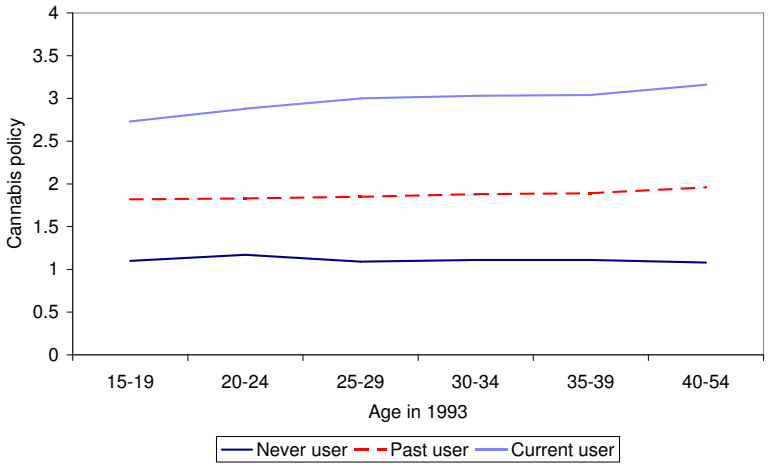


Figure 2: **Support for legalizing cannabis by age-cohort, gender and cannabis use**

a. Females



b. Males