



The impact of minimum legal drinking age laws on alcohol consumption, smoking, and marijuana use revisited[☆]

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ABSTRACT

In volume 30, issue 4 of this journal, we used data from the National Longitudinal Study of Youth, 1997 cohort (NLSY97) to estimate the impact of the minimum legal drinking age (MLDA) laws on alcohol consumption, smoking, and marijuana use among young adults. In our analysis, we used a restricted sample of young adults and considered only those who have consumed alcohol, smoked cigarettes, or used marijuana at least once since the date of their last interview. In this paper, we revisit our original study using the full sample. We show that our results for alcohol consumption in the full sample are similar to those from the restricted sample. However, the effect of the MLDA on smoking and marijuana use is smaller and often statistically insignificant.

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1. Introduction

In Yörük and Ertan Yörük (2011), hereafter Y&EY, we exploited the discrete jump in alcohol consumption at the minimum legal drinking age (MLDA) of 21 and used a regression discontinuity (RD) design to estimate the impact of the MLDA law on alcohol consumption, smoking, and marijuana use among young adults. We used data from the National Longitudinal Survey of Youth, 1997 Cohort (NLSY97), who were asked a series of questions with regard to their alcohol consumption, smoking, and marijuana use habits. In particular, a respondent was first asked whether she consumed alcohol, smoked cigarettes, or used marijuana since the date of the last interview (DLI).¹ If the respondent's answer to this question was affirmative, she was asked about her alcohol consumption, smoking, and marijuana use habits during the past month. In Y&EY, we considered only those who have consumed alcohol, smoked

cigarettes, or used marijuana at least once since the DLI. However, this sample selection procedure was not clearly explained in Y&EY.

In Y&EY, for those who had consumed alcohol at least once since the DLI, we showed that MLDA is associated with a significant increase in alcohol consumption. For those who had smoked at least once since the DLI, we found no evidence of a significant relationship between the MLDA and smoking. We also found that under certain specifications, the MLDA was associated with a 5.6 to 7.3 percentage points increase in the probability of using marijuana in the past month, conditional on having used marijuana at least once since the DLI. However, we also document that for this group of young adults, the MLDA is not a significant determinant of the number of days that young adults used marijuana in the past month.²

In contrast to these results, Crost and Rees (2012) use data for the full sample from the NLSY97 and find that the increased alcohol consumption at the MLDA does not have a significant impact on the probability of using marijuana among young adults. In this paper, we revisit Y&EY and re-estimate our analysis for the full sample.

[☆] This research was conducted with restricted access to Bureau of Labor Statistics (BLS) data. The views expressed here do not necessarily reflect the views of the BLS.

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¹ The wording of these questions are as follows: "Have you smoked a cigarette since the last interview on [date of last interview]?", "Have you had a drink of an alcoholic beverage since the last interview on [date of last interview]?", "Since the date of last interview, have you used marijuana, even if only once, for example: grass or pot?"

² The exception is a parametric model specification that contained a cubic polynomial of age. For this particular specification, we find that the MLDA is associated with a significant decrease in the number of days that young adults used marijuana in the past month.

Table 1

The effect of the MLDA on alcohol consumption, smoking, and marijuana use.

	Y&EY (restricted sample)			Full sample		
	No. of obs.	Mean	δ	No. of obs.	Mean	δ
Alcohol	20477	0.869	0.049 (0.015)***	29111	0.652	0.103 (0.016)***
DaysAlcohol	20477	6.091	1.684 (0.292)***	29111	4.566	1.739 (0.240)***
NofDrinks	17255	4.601	−0.065 (0.187)	28885	2.967	0.484 (0.144)***
Binge	17469	0.610	0.052 (0.023)**	28971	0.397	0.094 (0.018)***
DaysBinge	17469	3.121	0.509 (0.228)**	28971	2.029	0.642 (0.161)***
AvgDrinks	17210	1.305	0.255 (0.108)**	28839	0.841	0.295 (0.075)***
Smoking	12700	0.867	0.002 (0.020)	29215	0.406	−0.006 (0.016)
DaysSmoking	12700	19.246	0.347 (0.672)	29215	9.020	0.061 (0.424)
NofCigarettes	10748	9.706	0.034 (0.511)	29222	3.860	0.017 (0.251)
AvgCigarettes	10672	8.935	0.053 (0.524)	29146	3.542	0.033 (0.247)
Marijuana	6975	0.759	0.073 (0.034)**	29510	0.193	0.005 (0.014)
DaysMarijuana	6975	9.516	−0.645 (0.786)	29510	2.422	−0.347 (0.237)

Note: All regressions include a second order polynomial of age that is fully interacted with the treatment variable. All regressions include control variables as discussed in the text and estimated using sample weights. The signs *** and ** indicate statistical significance at the 1 and 5% significance levels, respectively. Robust standard errors clustered at the individual level are reported in parenthesis.

2. Data and methodology

We use the same data set that we used in Y&EY (see our earlier paper for details). In the NLSY97, respondents were asked whether they consumed alcohol before and whether they consumed alcohol since the DLI. In Y&EY, we considered only those respondents who reported to have consumed alcohol since the DLI. In this paper, we also include those respondents who have never consumed alcohol before and who have not consumed alcohol since the DLI to our sample. Similarly, we include those respondents who have never smoked or used marijuana before and who have not smoked or used marijuana since the DLI to our sample. Our full sample consists of young adults aged 19–22, inclusive.

As in Y&EY, we employ a RD design to estimate effect of the MLDA laws on alcohol consumption, marijuana use, and smoking habits. We estimate both parametric and non-parametric RD models. Our parametric RD models contain linear, quadratic, cubic, and quartic splines of age and can be expressed as:

$$Outcome_i = \beta'X_i + \delta T_i + \sum_{j=1}^k \alpha_j age_i^j + \sum_{j=1}^k \lambda_j (T_i \times age_i^j) + \varepsilon_i \text{ for } k = \{1, 2, 3, 4\}. \quad (1)$$

In Eq. (1), $Outcome_i$ is a particular youth outcome such as alcohol consumption, smoking, or marijuana use by individual i . The vector of observable characteristics for individual i are denoted by X_i and includes dummy variables for household income, educational attainment, marital status, gender, race, and student and employment status of the respondent as well as a dummy variable which controls for the birthday celebration effect and equals one if the respondent was interviewed during the first month after turning 21.³ The treatment variable is denoted by T_i and takes the value of unity if the respondent is at least 21 years old at the interview date. The coefficient δ indicates the impact of the MLDA law on the relevant outcome. Finally, the variable age_i represents the number of days before or after the 21st birthday for each respondent.

For our non-parametric specifications, we use local linear regressions to estimate the left and right limits of discontinuity at age 21. The difference between the two limits is the local treatment

Table 2

The effect of the MLDA on the probability of using marijuana: robustness checks.

	Y&EY (restricted sample)	Full sample
Parametric models		
Linear	0.072 (0.021)***	0.012 (0.009)
Quadratic	0.073 (0.034)**	0.005 (0.014)
Cubic	0.048 (0.051)	0.008 (0.024)
Quartic	0.032 (0.072)	0.034 (0.034)
Non-parametric models		
Bandwidth = 30	0.067 (0.118)	0.055 (0.032)*
Bandwidth = 60	0.060 (0.080)	0.049 (0.045)
Bandwidth = 120	0.034 (0.056)	0.051 (0.023)**
Bandwidth = 240	0.048 (0.040)	0.035 (0.017)**
Bandwidth = 480	0.056 (0.027)**	0.019 (0.012)*

Note: All parametric regressions include control variables as discussed in the text and estimated using sample weights. The signs ***, ** and * indicate statistical significance at the 1, 5 and 10% significance levels, respectively. For the parametric models, robust standard errors clustered at the individual level are reported in parenthesis. For the non-parametric models, standard errors are calculated using 1000 replications and reported in parenthesis.

effect of the MLDA law on the outcome variable. The details are as in Y&EY.

3. Results

In Table 1, we report the impact of the MLDA law on alcohol consumption, smoking, and marijuana use among young adults. In this table, we report a parametric specification, which contains a quadratic polynomial of age that is fully interacted with the treatment variable.⁴ We also report our earlier findings from Y&EY in order to provide a comparison between the restricted and full samples. For the full sample, the MLDA is associated with significant increases in several indicators of alcohol consumption: a 10.3 percentage point increase in the probability of consuming alcohol in the past month, a 9.4 percentage point increase in the probability of engaging in binge drinking in the past month, a 1.7 day increase in the number of days that young adults consume alcohol per month, a 0.6 day increase in the number of days that they engage in binge drinking per month, a 0.5 drink increase in the number of drinks that they consume on the days they actually consume alcohol, and a 0.3 drink increase in the average number of drinks that they consume per day. Compared with the results

³ The description and summary statistics of control variables are presented in Y&EY.

⁴ Although not reported here, we also consider alternative parametric and non-parametric specifications. The results are similar to those reported in Table 1.

from the restricted sample, the effect of the MLDA on alcohol consumption is either similar or larger. As in the restricted sample, the effect of the MLDA on smoking among young adults remain insignificant.

In line with [Crost and Rees \(2012\)](#), [Table 1](#) shows that with the quadratic polynomial in age, the effect of the MLDA on marijuana use among young adults is small and not significant. Since [Crost and Rees \(2012\)](#) mainly focus on the relationship between the MLDA and the probability of marijuana use, in [Table 2](#), we provide a more detailed analysis of the relationship between these two outcomes under several different specifications. [Table 2](#) shows that for the full sample the effect of the MLDA on the probability of using marijuana in the past month is not significant under parametric RD models. However, under certain non-parametric specifications, our findings for the full sample imply that young adults are up to 5.5 percentage points more likely to use marijuana at the MLDA.⁵

4. Conclusion

Our earlier results in Y&EY examined only young adults who had used alcohol, smoked, or used marijuana since the DLI. Extending

the analysis to full sample of NLSY97 respondents shows the same or larger effects for alcohol consumption. Similarly, our analysis for the full sample shows that the MLDA law does not have a significant impact on smoking behavior. However, the parametric estimates of the impact of the MLDA on marijuana use are smaller than with the restricted sample, though some of the non-parametric estimates are large and statistically significant.

Under some model specifications, our results for the relationship between the MLDA and the probability of using marijuana contradict those of [Crost and Rees \(2012\)](#). This calls for further research that would investigate the spillover effects of the MLDA law on substance use among young adults.

References

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⁵ Although not reported, the relationship between the MLDA and the number of days that young adults used marijuana in the past month is insignificant under all specifications. This finding is in line with Y&EY's findings for the restricted sample.