# Restaurant menu labeling laws and alcohol use

Brandon J. Restrepo [a,*], Mir M. Ali [b]

[a] USDA Economic Research Service, 355 E Street, SW, Washington, DC 20024, United States
[b] Substance Abuse and Mental Health Services Administration, 5600 Fishers Ln, Rockville, MD 20857, United States

## ARTICLE INFO

## ABSTRACT

The goal of this study was to analyze the effect of local and state mandatory restaurant menu labeling laws on alcohol use. Using a difference-in-differences estimation approach and data on adults aged 21 and older ($n = 2,157,722$) from the 2002–2012 Behavioral Risk Factor Surveillance System, we estimated the effect of menu labeling laws on self-reported consumption of alcoholic beverages in the past month. The regression analysis indicates that on average implementation of menu labeling laws is associated with a 1.2 percentage-point drop in the fraction of survey respondents reporting that they drank an alcoholic beverage in the past month (95% confidence interval $= -0.020, -0.004$), compared with jurisdictions that had not implemented menu labeling laws. Moreover, we find that the estimated policy effects on alcohol use are larger among men than among women and larger among minorities than among non-Hispanic whites. Further provision of calorie information on foods and beverages in food service establishments, such as through federal menu labeling regulations, may have the potential to lead to a meaningful reduction in alcohol use throughout the U.S. and may result in larger reductions in alcohol use among men and minorities.

Published by Elsevier Inc.

## 1. Introduction

As obesity continues to be a major public health concern in the U.S. (Ogden et al., 2014) and more calories are coming from food prepared away from home (Lin and Guthrie, 2012), the provision of nutrition information on menus in restaurants and in other retail food establishments has increasingly become a viable policy tool to improve access to nutrition information at the point of purchase and to facilitate better informed and healthier food and beverage choices. While the provision of nutrition information on packaged foods has been mandatory in the U.S. since the Nutrition Labeling and Education Act took effect in 1994, foods and beverages available for purchase in restaurants were exempted from this requirement until recently. In March 2010, Congress passed the Patient Protection and Affordable Care Act (ACA), which requires chain restaurants with 20 or more locations nationwide to list the calorie contents of all standard menu items on point-of-purchase menus after final rules promulgated by the Food and Drug Administration become effective in 2018. Several U.S. jurisdictions have already mandated that chain restaurants post calorie counts on their menus. New York City (NYC) was the first to implement a local menu labeling law in July 2008, and other cities, counties, and states in the Northeastern and Western regions of the U.S. quickly followed suit by implementing similar laws between 2009 and 2011.

Evidence that menu labeling induces consumers to purchase fewer calories in chain restaurants is mixed (Long et al., 2015; Littlewood et al., 2016). More recent studies have found that implementation of menu labeling laws has been followed by modest reductions in body weight and the risk of obesity (Restrepo, Forthcoming; Deb and Vargas, 2016), but the channels through which these reductions occurred are still unclear. One important channel that has received very little attention in the literature is whether and how much the consumption of alcohol is affected by increased availability of calorie information in chain restaurants, which is a gap in the literature that this study helps to fill. We are aware of only one study that addresses this question in the chain restaurant setting. Using data from 7 outlets of a full-service restaurant chain in Philadelphia—2 outlets with and 5 outlets without nutrition information posted on menus—at a single point in time (August 2011), the study found no significant difference in the amount of alcohol calories purchased in locations with and without the nutrition information (Auchincloss et al., 2013). It is, however, unknown whether similar effects would be observed in other full-service restaurants, fast-food restaurants, or other communities.

Aside from being addictive goods, alcoholic beverages are high in calories and alcohol consumption can lead to an increase in body weight (French et al., 2010; Williamson et al., 1987; Shelton and Knott, 2014). The National Center for Health Statistics estimated that during the 2007–2010 period, the U.S. adult population consumed an average of about 100 cal per day from alcoholic beverages, which amounts to 5% of daily calorie intake for those on a 2000-calorie diet (Nielsen et al., 2012). On a per-gram basis, alcohol is the second most calorie-dense

source of energy, but unlike macronutrients such as fat or protein, alcohol calories are 'empty' in that they provide little to no other nutritional value. A survey of over 2000 U.K. adults conducted by the Royal Society for Public Health found that 60–80% of respondents either did not know or underestimated the number of calories in beer and wine (Royal Society for Public Health, 2014). Similarly, in the U.S., research has shown that most consumers and even nutrition experts systematically underestimate the amount of calories contained in meals and beverages in away-from-home establishments and underestimation tends to be greatest for high-calorie menu items (Robert Wood Johnson Foundation, 2009a; Backstrand et al., 2009; Franckle et al., 2016; Block et al., 2013; Elbel, 2011; Taksler and Elbel, 2014). Presenting consumers with alcohol calorie information on restaurant menus could potentially reduce the consumption of calories from alcoholic beverages, given their dual nature of often having calorie contents that are higher than expected and providing little to no nutritional value, which may translate into weight loss and other health benefits. Alcohol consumption choices may be influenced by both the calorie counts associated with alcoholic beverage choices themselves (direct effect) and the calories contained in food or non-alcoholic beverage choices (spillover effect). For the latter mechanism, the element of surprise associated with higher-than-expected calories contained in foods and non-alcoholic beverages may be enough to cause some individuals to opt out of consuming alcoholic beverages.

While restaurants are not the primary source of alcoholic beverages in the marketplace, they generate a significant amount of revenue from alcohol sales. A recent report based on an analysis conducted by a food industry market research firm Technomic found that 54% of chain restaurants on its Top 500 list served beer, wine, or spirits in 2008, contributing an average of 12% of total sales (Nightclub and Bar Media Group, 2010). Among the top 50 casual chain restaurants, which are most likely to be affected by menu labeling regulations, the report indicated that alcohol accounted for between 5–35% of total sales in 2008. A more recent report by Technomic indicates that consumer spending on alcoholic beverages in away-from-home food service establishments was expected to grow by an average of 2.3% in 2016, with similar expectations for 2017 (PR Newswire Association LLC, 2016).

The recent implementation of local and state menu labeling laws provides a unique opportunity to examine the impact of calorie information provision on alcohol use and can shed light on how alcohol use might be impacted when the menu labeling provision of the ACA takes effect nationally in 2018 and more food service establishments that serve alcohol will be expected to comply with menu labeling requirements. This study contributes to the literature by providing an estimate of the impact of menu labeling laws on self-reported consumption of alcoholic beverages in the past month, using all the variation in policy mandates throughout the U.S. More specifically, this study uses variation in the availability of calorie information posted on chain restaurant menus over time brought on by implementation of menu labeling laws and the differential timing of implementation across various U.S. jurisdictions to identify the effect of menu labeling on alcohol use. In addition, given research indicating that sensitivity to calorie information may vary by demographic subgroup (Robert Wood Johnson Foundation, 2009b; Robert Wood Johnson Foundation, 2013), this study also provides evidence of the impact on alcohol use of menu labeling by age group, race/ethnicity, sex, education, and income.

## 2. Methods

### 2.1. Data, variables, and sample selection

The data used in the analysis were obtained from the 2002–2012 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a state-based system of health surveys that collects information on demographic characteristics, health conditions, and health-related risk behaviors

for individuals aged 18 and older. We restrict our sample to adults who can legally purchase alcohol in the U.S., those aged 21 and older. The dependent variable in our analysis is based on the following question: "*During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?*" We construct a binary variable equal to 1 if the survey respondent reported consuming an alcoholic beverage one or more days in the past 30 days and is otherwise equal to 0. The alcohol consumption data in the BRFSS are self-reported and may be subject to social desirability or recall bias. For example, prior work has found that underreporting of substance use tends to increase with the perceived stigma of the substance under discussion (Johnson, 2014). The perception of alcohol use has been found to be especially variable depending on level of use in question (e.g. any alcohol use versus drinking to intoxication) (Sher, 2016). To minimize the influence of such biases on our policy evaluation, in the analysis, we focus on alcohol consumption on the extensive margin (i.e., any alcohol use) and not on the intensive margin (i.e., frequency or intensity of alcohol consumption). Any social desirability or recall bias associated with the self-report of past alcohol consumption behavior is likely to be less severe when focusing on any alcohol use in the past month, compared with focusing on the intensity of alcohol consumption.

Information on the timing of implementation of local and state mandatory restaurant menu labeling laws was obtained from the Center for Science in the Public Interest and was verified using law documentation provided on local and state Public Health Department websites.[1] Our main independent variable is a menu labeling law binary variable, which is equal to 1 if a city, county, or state has implemented a menu labeling law that requires calorie information provision on chain restaurant menus and is otherwise equal to 0.[2] Chain restaurants may comply before a law's effective date (Bollinger et al., 2011), so we also include in regression models a binary variable equal to 1 if a local or state jurisdiction has adopted (but has not implemented) a menu labeling law and is otherwise equal to 0. These policy variables are coded according to the exact date of a given law's adoption or effective date.

In the regression analysis, we control for the following individual demographic characteristics that may be associated with use of calorie information in chain restaurants and alcohol use: age (and its square to account for the quadratic path in alcohol intake over the adult life cycle), sex, race/ethnicity, marital status, educational attainment, number of children, and family income. Since economic conditions may influence the demand for alcohol, we include in regression models the unemployment rate and per-capita income at the county level.[3] And, finally, in order to reduce the risk of overestimating or underestimating the association between menu labeling laws and alcohol use, we account for a wide variety of state policies that might have affected the demand for alcohol among adults over our study period. The first set of policies we consider includes those that affect the (full) price or availability of alcohol. These policies include beer excise taxes, a blood alcohol concentration limit of 0.08 for adult operators of motor vehicles, a prohibition of open containers of alcohol in motor vehicles, beer keg purchase or sale registration requirements (as they might affect adult alcohol consumption decisions during gatherings attended by individuals aged under 21), alcohol beverage service training requirements, and the repeal of blue laws (i.e. lifting restrictions on Sunday alcohol

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[1] Please see Online Appendix A (Appendix Table A1) for detailed information on the timing of adoption and implementation of local and state menu labeling laws.

[2] The jurisdictions that implemented a menu labeling law over our sample period include New York City, NY, Westchester County, NY, Ulster County, NY, Albany County, NY, Schenectady County, NY, Suffolk County, NY, Montgomery County, MD, Philadelphia, PA, King County, WA, California, Oregon, and Vermont. While Nassau County, NY, Maine, Massachusetts, and New Jersey adopted a menu labeling law, they never implemented and enforced it. Using 2012 population estimates from CDC, we estimate that about 19% of the U.S. population lived in a jurisdiction that had implemented a menu labeling law.

[3] Please see Online Appendix A (Appendix Table A2) for detailed information on data sources for the county-specific and state-specific characteristics.