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The impact of price policy on demand for alcohol in rural India

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ABSTRACT

Whether raising the price of addictive goods can reduce its burden is widely debated in many countries, largely due to lack of appropriate data and robust methods. Three key concerns frequently raised in the literature are: unobserved heterogeneity; omitted variables; identification problem. Addressing these concerns, using robust instrument and employing unique individual-level panel data from Indian Punjab, this paper investigates two related propositions (i) will increase in alcohol price reduce its burden (ii) since greater incomes raise the costs of inebriation, will higher incomes affect consumption of alcohol negatively. Distinct from previous studies, the key variable of interest is the budget share of alcohol that allows studying the burden of alcohol consumption on drinker's and also on other family members. Results presented show that an increase in alcohol price is likely to be regressive, especially on the bottom quartile, with a rise in the budget share of alcohol given budget constraint. This outcome is robust to different econometric specifications. Preliminary explorations suggest that higher per capita income increases the odds of quitting drinking. Results reported have wider implications for the effective design of addiction related health policies.

1. Introduction

Since the theory of rational addiction (Becker and Murphy, 1988), in nearly every country, taxes on addictive goods are imposed to regulate its consumption (WHO, 2014). Yet, tobacco worldwide continues to kill nearly 6 million each year and alcohol related illnesses are cause for 3.3 million deaths globally in the year 2012 alone (WHO, 2014). From this evidence, it is unclear if the key prediction holds good of the most economic models of addiction, including the widely accepted rational addiction model pioneered by Becker and Murphy (1988) – that is, a higher price of the addictive good (due perhaps to a larger tax) reduces its burden in both the short and long run.

In this paper, we examine whether raising the price of alcohol can reduce its burden on drinkers and their families. This study uses individual level panel data from carefully designed and implemented several rounds of individual and household surveys in the Indian state of Punjab. More specifically, we use the longitudinal surveys among randomly selected sample of 895 alcohol drinkers and non-drinkers in the year 2008, and followed for six years tracking their alcohol drinking behaviour. During this period, three surveys each with a gap of two years were implemented to collect both individual and household information. Using the panel data, we implement fixed effect regressions to examine the impact of alcohol price policy on household burden. Results show that an increase in alcohol price is likely to be regressive, especially on the bottom quartile, with a rise in the budget share of alcohol given budget constraint. Our results are robust to different model specifications.

A number of recent studies have examined different models of alcohol addiction using data on price paid and quantity consumed of alcohol (price-quantity relationship) from both developed and developing countries, applying a range of econometric methods. Yet, these studies suffer from concerns related to lack of appropriate data and robust methods. Addressing these concerns our paper makes three novel contributions to existing literature. First, studies typically specify the price-quantity demand relationship to estimate the own-price elasticity for alcohol (Grossman et al., 1998; Baltagi and Griffin, 2002; Shrestha, 2015). However, the estimated parameter do not satisfy the restriction imposed (budget constraint that limits total expenditure) on them by demand theory (Sadoulet and de Janvry, 1995). Distinct from previous studies, our key variable of interest is the budget share of alcohol, which allows studying the household burden of alcohol consumption, not just on

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drinkers. Unlike quantity of alcohol consumed, the advantage of using alcohol budget shares is that it satisfies the budget constraint limiting household total expenditure.

Second, the identification of the demand equation from supply is difficult in existing studies. Recent studies estimating the price-quantity demand for alcohol relationship employ a range of econometric models. For instance, Manning et al. (1995) estimate quantile regressions, Ayyagari et al. (2013) use finite mixture model, while Shrestha (2015) estimates both two-part and finite mixture model on individual panel data. Although novel in some respect, these studies do not address the identification concerns. Some other studies however have tried to address the identification concern with instrumental variables, yet the instrument used by these studies did not uniquely shift supply without affecting demand (Bopp, 1983; Baruch and Kannai, 2011).

We address the identification problem, which is our primary focus and the main contribution to the literature, using the price of key input that strongly affect supply but not demand. We identify the price of the key ingredient *gur* as an important predictor of the price of alcohol. Detailed information was collected during field surveys on all the inputs used in the production of country liquor. One key ingredient in the production is *gur* (jaggry), which is purchased entirely from outside the village. The price of *gur* is a major determinant of supply of alcohol, and a potential predictor of the price of alcohol. Given that it is unlikely to affect the demand for alcohol significantly, price of *gur* appears to be a reasonably good instrument for the price of alcohol.

Third, most existing data sets on alcohol consumption for developed countries are collected through telephone interviews or mail surveys with little reliability checks (Grossman et al., 1998; Shield and Rehm, 2012), while for developing countries they are collected as part of household consumption data, often with no information on who within the household drinks (McKenzie, 2002; John, 2008; Guindon et al., 2011; Jumrani and Birthal, 2017). Generally, households have only one or two drinkers, so any estimates based on this data are biased downwards showing lower consumption, although money spent on consumption of this good is much higher. Since poor households tend to have larger family size, the downward bias is much higher and serious. Besides, aggregate-level demand estimates for alcohol will mismeasure individual-level price responsiveness. The individual-level panel data contains both individual consumption and purchase price of alcohol within the same database, providing consistency across information.

Finally, results from this paper have the potential to inform alcohol policy in India. Different states in India have followed various policy options, ranging from prohibition (Gujarat, Bihar and Nagaland) to government provision (Tamil Nadu), and private provision (Delhi) of alcohol. Besides, higher tax rates to regulate production and consumption of alcohol have also been imposed (Saldanha, 1995). Despite these policies, per capita consumption of alcohol by adults in recent years have increased by 115 percent (Rehman, 2003). Given that higher taxes are likely to be regressive, prohibition may be an attractive policy for India. However, enforcement and unintended consequences such as crime and corruption may pose a greater challenge (Thornton, 1991). An income policy with the potential to increase the cost of inebriation such as cash transfer programs or employment programs could perhaps enhance the welfare of poor households.

2. Methods

2.1. Study design and data sources

Data used in this study is based on the initial survey conducted by the National Council of Applied Economic Research (NCAER), New Delhi with selection of households in the respective villages based on stratified random sampling. Subsequent surveys were implemented in collaboration with the Institute for Social and Economic Change (ISEC), henceforth; we will refer to the data as NCAER-ISEC panel data set. Historically, the district of Patiala in the Indian Punjab is known for its extravagant military culture and strong "pegs of whiskey", popularly known as Patiala Peg. The state of Punjab has the highest alcohol consumption figures in contemporary India. From this district, three villages were randomly selected that are representative of the district in several dimensions, including alcohol consumption. Based on stratified random sampling method, about 150 households were randomly selected from these villages.

All households in the three villages were first stratified into cultivating and non-cultivating households, and then the cultivating households were stratified in terms of marginal farming households (less than 2.5 acres); small farming households (2.51–5.0 acres), medium farming households (5.01–10.0 acres) and large farming households (above 10.0 acres). From each village, approximately 10 households were randomly selected for each category. Thus, about 40 households were selected from each village with a total of 120 farm households selected from all the three villages. In addition to cultivating households, a total number of 10 landless agricultural labour households were also randomly selected from every village. The aggregate sample consists of 895 alcohol drinkers and non-drinkers from 150 households surveyed.

The survey collected two types of information: (a) Household survey: Survey recorded household level information for all the sample households. The head of the household was interviewed to gather detailed item wise monthly information on food and non-food consumption, household assets owned, land owned, and information on the demographic characteristics of each household members. Monthly expenditures for all the food and non-food items consumed by all the households were recorded for the past month to arrive at the total monthly expenditure. Information on food includes about 33 items including food consumed both inside and outside the house, including wages and gifts received. The non-food items were of two types with items that are purchased regularly every month (such as expenditure on fuel and electricity, products for cleaning and personal care and telephone bills) and the other annual (such as clothing and footwear, medicine and health cost, ceremonies, education and taxes).

(b)Individual survey: The alcohol drinkers were interviewed and closely followed for six years, monitoring and recording the type of alcohol consumed, quantity consumed, price paid, year started to drink, and reasons for drinking. Similar information was also collected for smoking, although its prevalence in general is very low. Two alcohol types are consumed, Indian made foreign liquor (IMFL) and country liquor. Although individuals across quartiles drink both types of alcohol, drinkers from the bottom quartile largely consume country liquor (85 percent) while IMFL are consumed mostly by the top quartile (25 percent). The country liquor is manufactured either within the village or just outside using *gur* as the key ingredient, while IMFL are imported from the urban centres. About 83 percent of the alcohol consumed across all three villages and quartiles are country liquor and the rest IMFL. We focus our analysis on individuals aged 15 years or older because of the presence of strong taboo, so either the children do not consume alcohol or they are miss-reported. Since income is often a more sensitive topic than consumption in developing countries, we follow Deaton (2000) in using household total consumption expenditure as proxy for household income. We combine data from both household and individual surveys to derive total consumption expenditure.