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Evidence from Alcohol Prohibition Policies in India**

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Addiction, Debt and Moral Hazard: Evidence from Alcohol Prohibition Policies in India*

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Abstract

Two distinct trends in the recent decade have been widely documented in India - (a) one of the highest increases in per-capita alcohol consumption worldwide and (b) a substantial jump in household debt and default rates. In this paper, we examine whether, and the extent to which, the former explains the latter. The panel structure of the India Human Development Survey allows us to address unobserved heterogeneity at the household level. In addition, we exploit the variation in alcohol sale and consumption policies across the states of India to address the remaining concerns of simultaneity and measurement error. Our estimates imply that an additional expenditure of 1 INR on alcohol, increases a household's outstanding debt by roughly 100 INR. We find further evidence that the ease of borrowing and costs of defaulting determine the extent to which households are willing to spend more on alcohol even at the cost of over-borrowing and defaulting, suggesting the presence of moral hazard.

Keywords: Alcohol; Household Finance; Debt; Instrumental Variable

JEL codes: K12, L26, O17

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1 Introduction

Two distinct trends have been widely documented across policy writings, media and academia, in India. First, there has been a secular increase in household debt and default. For instance, Figure 1 shows that household debt as a fraction of GDP grew by close to 4 percentage points between 2010 and 2020. Between 2013 and 2017, personal loans, only from formal sources, went up by 89% (RBI, 2018). Of these, the most significant growth was seen in an undefined category termed other personal loans, which could not be categorized as consumption, vehicles, durables, housing or education (Ninan, 2019). In addition, defaults on agricultural loans and subsequent debt waiver policies have received massive coverage in media and in academic studies (Chakraborty and Gupta, 2017a; Mukherjee et al., 2018).

Second, and distinct from the first, is the concern that alcohol consumption is on a steady rise in India despite the wide-ranging regulations, from higher minimum legal age of drinking [MLDA] to a complete ban on alcohol sales and consumption, imposed across India. A Lancet report, by Manthey et al. (2019), notes that India has experienced one of the highest increases in per-capita alcohol consumption worldwide between 2010-2017, recording a 38% jump. Their study go on to predict that, at current rates, half of all adults will consume alcohol in India by 2030. Even in our data, we observe a significant increase in average expenditure on intoxicants between 2005-2012 across most states (see Figure 4).

Policymakers often face a dilemma when deciding on policies aimed at alcohol sales and consumption. On the one hand, alcohol taxes constitute a large share of a state's tax revenue. For instance, for the states of India without an alcohol ban, excise duty on alcohol contributes around 10-15% of a state's own tax revenue on average. For some states this number goes up to 20% as of 2018-2019 financial year (RBI, 2019). However, there is extant evidence regarding the health cost of excessive alcohol consumption. Alcohol is considered to be a leading cause of disease burden and mortality worldwide. (WHO, 2019; Rehm and Imtiaz, 2016; Rehm et al., 2017; Griswold et al., 2018). For instance, alcohol consumption has been causally linked to more than 200 distinct diseases, as per International Classification of Disease (Manthey et al., 2019), in addition to obesity (French et al., 2010). In the presence of publicly provided healthcare, increasing health costs raise the burden on a state's finances. In addition to the substantial health burden, recent research also points to the influence of alcohol consumption on the decision making capability of individuals. Alcohol, and intoxicants in general, can be categorised as a 'temptation good' i.e, goods which generate utility only at the point of consumption (Banerjee and Mullainathan, 2010). Excessive alcohol consumption has been shown to distort decisions by generating myopic behaviour (Steele and Josephs, 1990). This distortion has long run consequences for economic well-being through its impact on labour market outcomes (Berger and Leigh, 1988; Mullahy and Sindelar, 1996; Zarkin et al., 1998; Barrett, 2002; MacDonald and Shields, 2004), savings behavior in low income workers (Schilbach, 2019), investments on

human capital accumulation (Lye and Hirschberg, 2010), among others. Access to alcohol has also been shown to adversely affect human capital outcomes, like academic performance, in college students (Lindo et al., 2013; Williams et al., 2003). Hence, policy interventions, in the market for alcohol, need to weigh the revenue benefits against all the potential socio-economic costs.

However, in the Indian context, the literature on alcohol consumption is devoted to the estimation of its health impact. Much less is known about the socio-economic impact of alcohol addiction in India. Luca et al. (2015) is one study that estimates the effect of alcohol access on the prevalence of sexual violence. While their study improves the understanding of the policy interventions that might be effective in reducing sexual violence, it also adds value to the analysis of costs and benefits of policies that discourage alcohol consumption. We add to this literature by studying the effect of alcohol consumption on a household's financial situation the financial well-being of a household in India. To our knowledge, the only other study which estimates the impact of increased availability of alcohol on the financial well-being of individuals is by Ben-David and Bos (2021). They analyse the effect of alcohol consumption on indebtedness and default risk of individuals using an alcohol sales policy in Sweden. We also study the effect of alcohol consumption on indebtedness and default risk but in the context of India. An important difference between developed and developing countries is in the nature of financial markets. Informal finance is an integral part of financial markets in developing countries and it is possible that people differentiate between informal and formal markets depending on the purpose of their debt. For instance, if monitoring is higher in informal networks, people might use the formal loans for unproductive consumption and the informal loans for productive activities. This could have different implications for moral hazard in the formal financial markets - formal credit is likely to have a higher default risk in developing than in developed markets. We study these possibilities in Section 4.3.

We investigate whether two apparently distinct trends, viz. rising debts and increasing alcohol consumption of Indian households, are causally linked. We estimate whether increasing alcohol addiction of Indian households cause them to accumulate high debts and subsequently default on them. There is a widespread belief in India that poor households overspend due to alcohol addiction. There is some correlational evidence to support this hypothesis (Prabhu et al., 2010). A widely cited study by Saxena et al. (2003), based on roughly 200 poor households in Delhi, shows that households that have a drinking member were more likely to be in debt and had a lower expenditure on food and education compared to households that do not have a drinking member. In another work, Benegal et al. (2000), studied a sample of 113 patients enrolled in a de-addiction program and found that on average they spent roughly 16% more on alcohol than their earnings.

Increasing alcohol consumption could lead to increasing household debt for multiple reasons. First, risk preferences could explain both higher levels of borrowing and higher level of drinking. External conditions, like adverse macroeconomic

shocks can also lead to excessive alcohol consumption (Ruhm, 1995; Freeman, 1999; Dávalos et al., 2012) and high household debt. Second, there could also be a reverse causality. It is well established that stress is a risk factor that increases vulnerability to addiction and more frequent and higher alcohol consumption may be a response to the anxiety of accumulating debt (Sinha, 2008). Third, households with higher alcohol consumption could end up spending more on health costs resulting in higher debts. Finally, alcoholism could directly affect the employment and earnings potential by constraining labour market participation of an individual in turn affecting household debt (Mullahy and Sindelar, 1993). The presence of multiple channels through which alcoholism may affect debt burden of households implies that the causal direction is not clear. An observed positive relationship could either mean reverse causality - individuals take up drinking in response to accumulating debts - or omitted variables like risk attitudes.

We use a panel data on more than 41000 households from across India to estimate whether, and the extent to which, household debt is determined by alcohol consumption. In addition, we exploit quasi-random variations in alcohol prohibition policies across Indian states to identify the extent to which increasing alcohol expenditure contributes to increasing debt burden in India. We find a substantial impact of alcohol use on indebtedness of Indian households. Our instrumental variable estimates imply that an increase in a household's alcohol expenditure by 1 INR increases a household's debt by roughly 100 INR. However, we find significant heterogeneity too in the distribution of this effect. It is a predominantly a rural phenomenon. While increasing debt is likely to translate in to default, we do not have data to examine whether alcoholism also leads to defaults. However, we provide suggestive evidence about the existence of moral hazard in household's treatment of personal loans taken from various sources and how that depends on their alcohol addiction. We find that the effect of alcohol expenditure on debt is driven by formal loans as opposed to informal loans and is concentrated in households who are higher up in the social hierarchy. These findings suggest that the effect of higher alcohol expenditure on indebtedness perhaps depends on the underlying ease of borrowing and costs of defaulting.

The rest of the paper is organized as follows. Section 2 summarizes the data used for the analysis. Section 3 outlines the empirical framework. Section 4 reports the results from the baseline estimation. Section 5 discusses the two stage least squares strategy, the relevant data and the results from this estimation. Section 6 concludes.

2 Data

We use the India Human Development Survey (IHDS) for our analysis and supplement it with administrative records on alcohol prohibition laws across the states of India. The India Human Development Survey (IHDS) is a nationally representative, multi-topic survey that covered 42152 households in 1420 villages and 1042 urban neighborhoods across 384 districts of India in its second round in 2011-12. The IHDS data follows individuals in two rounds over a period of roughly 8 years. The first survey round was conducted in 2004-05 with a follow up round in 2011-12.¹ With some attrition, some intra-household separations and some new households, the second round of the survey had 42152 households. Overall, around 85% of the households covered in 2005 were re-interviewed in 2012. Our study sample includes all the major states in India. We exclude the North Eastern states of Nagaland, Manipur, Tripura, Meghalaya, Mizoram, Sikkim and Arunachal Pradesh. In addition, we exclude the union territory (UT) of Daman and Diu because most households from this state appear in only one round and the effective sample in the balanced panel is small and selected.²

IHDS has an extensive section on expenditure of households across various categories of consumption. One of these elicits a household's expenditure on intoxicants which includes Alcohol, Tobacco, Cigarette, Bidi(traditional Indian tobacco), Paan and other similar substances. Our main variable of interest is a household's total expenditure on intoxicants in the preceding month. The aim of this study is to estimate the effect of alcohol expenditure on the indebtedness of a household. However, we are unable to separately calculate the expenditure on alcohol as it is grouped with other intoxicants. Hence, in the baseline, we estimate the impact of a household's intoxicant expenditure on the indebtedness of households. However, in Section 5 we provide instrumental variable estimates which specifically identifies the effect of alcohol expenditure on household debt.

Our outcome variable is total outstanding household debt which is the sum total of debt outstanding from all borrowings of the household. Finally, the rich household data enables us to control for a range of economic and demographic characteristics of the household viz. land possession, asset ownership, household size, age, education and income of the household head and gender composition of the household. Panel-A of Table 1 summarizes these variables in our data.

¹We use 2005 and 2012 to refer to the time period of the first (2004-05) and second (2011-12) survey round respectively

²Every household in the IHDS sample is uniquely identified using a household ID. To trace a household over two time periods we used the linking file provided in IHDS. For all households from 2005, the linking file contains the details from 2012 of all variables used to create the household ID. Using these details and following IHDS documentation, we create a corresponding 2012 household ID for all households. For some households there was a mismatch in the household ID created in the linking file and the household ID present in the 2012 dataset. These households for whom we could not create a balanced panel came primarily from the states of Nagaland, Manipur, Tripura, Meghalaya, and Daman and Diu.

The average household has a debt of approximately 22900 INR in 2005 and 49600 INR in 2012³. There are about 29 households in the data with total outstanding debt greater than 2.5 million INR. We exclude these extreme values from our analysis. Since we study alcohol consumption, the relevant information related to household composition is proportion of adults and specifically proportion of male adults given the very low share of women consuming any alcohol or intoxicants in India.⁴ On average, in 2005 adults comprise 60% of the household, of whom roughly half are male. As we discuss in section 4 later, we conduct an instrumental variable analysis exploiting variation in legal drinking age across India. We find that on average a household has between 1 and 2 males who are legally eligible to drink. The head of the household is on average 47 years of age, with a little more than 5 years of education and an annual income (earning) of 16000 INR in 2005.

Panel-B of Table 1 provides further details about our sample. Roughly 80% of the sample is comprised of Hindu households, with 10% Muslims and 10% others. About 36% of the loans are taken from formal sources like banks and cooperatives in 2005, and a very high fraction are taken from informal sources like relatives, friends and money lenders. Finally, 70% of the sample lives in rural regions. We see that both debt and number of loans borrowed by a household have gone up over time, along with intoxicant expenditure. However, this could simply be an artifact of increase in household wealth as can be seen from the increases in household income and fraction of assets owned. Hence, in our analysis we account for changes in wealth of the household that could account for increases in both debt and intoxicant expenditure. We use asset ownership to proxy for a household’s wealth and economic status. IHDS data records information on assets owned by a household out of a list of 30 different asset categories. The average household has 40% of this list of assets in 2005. We measure land as an indicator for whether a household owns land. 50% of the households in the sample own some land in 2005. In addition to total household assets, we also control for the household head’s income in our specifications.⁵

³These roughly translate to USD 286 and 620, respectively, using an exchange rate of 1 USD to 80 INR

⁴As per IHDS data, around 17% of adult men consumed alcohol whereas only 0.6% of adult women consumed alcohol in 2012 in the states included in our study

⁵We use a control for a household’s asset and the income of the household head. This is because we face several challenges while using the household income variable. First, given that a substantial part of the labor force is self employed, the self reported information on household income is likely to be measured with significant error. Second – related to the first point – household income has many more missing values compared to household assets. This is partly also driven by the possibility that assets are observed by the interviewer as opposed to income. Third, in IHDS data, total household income is obtained by summing up income of all members of the households from eight different sources – farm income, agricultural wage, salary income, non-agricultural wage, business income, remittance income, government income transfer and other income which includes sale of property etc. Some of the components do not represent continuous income flow and can even be a onetime payment. This can provide us a misleading picture of the annual income of a household.

Figure 2 shows the percentage change in a household's monthly intoxicant expenditure, between 2005 and 2012. We see a substantial increase in intoxicant expenditure across the country. With the exception of a few, nearly all states have witnessed a rise in per month household intoxicant expenditure over time, albeit to different levels. Figure 4 shows the distribution of increase in mean household intoxicant expenditure across the different Indian states, during the time period of our study.

Figure 3 plots the state level averages of household debt against household intoxicant expenditure over 2005 and 2012 . While our primary interest is how alcohol expenditure affects household debt, Figure 3 gives a rough idea about this correlation, assuming that intoxicant expenditure reflects, in part, expenditure on alcohol. It shows that there is an overall positive association between total household debt and intoxicant expenditure. Our analysis in rest of the paper investigates the extent to which this association is causal.

3 Empirical Framework

Comparison of households across the spectrum of intoxicant expenditure to estimate the effect of intoxicant expenditure on borrowing behavior, as in Figure 3, is unable to account for household level unobserved heterogeneity. For instance, households that are more risk taking might drink more frequently and at the same time tend to borrow more. The panel structure of the IHDS data helps us to account for time-invariant household characteristics that might confound the linear effect of intoxicant expenditure on household debt. The richness of the IHDS data allows us to further control for a range of time varying household characteristics that are potentially correlated with household borrowing behavior as well as their drinking habits.

We start by estimating the following model with household fixed effects.

$$Debt_{hst} = \beta_0 + \text{Intoxicant-Expenditure}_{hst}\beta_1 + \beta_2 X_{hst}^H + \delta_h + \delta_t + \epsilon_{hst} \quad (1)$$

Where $Debt_{hst}$ is the total debt of household h in state s and survey year t . *Intoxicant-Expenditure* is the total expenditure incurred by the same household on all intoxicants in the preceding month. Both $Debt$ and *Intoxicant-Expenditure* are measured in 1000 INR. δ_h capture household specific fixed effects. δ_t capture survey-year fixed effects that are same across all households. Thus, any change in expenditure that is due to inflation, across India, over the 8-year period is accounted for by these time specific fixed effects. X_{hst}^H are time varying household characteristics that include assets, household head's income, landholding and gender composition of household h and time t .

Equation 1 compares the same household over the 8-year period of the two rounds of the IHDS to estimate whether higher intoxicant expenditure leads to greater indebtedness of the household, after accounting for India-wide price inflation. What still could confound the estimate of β_1 is the simultaneous determination of debt and intoxicant expenditure. We address this issue using state-level policies governing alcohol accessibility to provide exogenous variation in alcohol expenditure (see Section 5 for details). This approach also allows us to uncover the effects of household level alcohol expenditure, as opposed to intoxicant expenditure, on debt.

4 Results

4.1 Baseline

The baseline results from the estimation of Equation 1 are reported in Table 2. Column 1 reports the estimates of the effect of intoxicant expenditure on household debt from a bivariate model that only eliminates year fixed effects. In general, inflation would raise both debt and intoxicant expenditure, making it necessary to control for inflation. The year fixed effects account for inflation over the two rounds of the IHDS between 2005-2012. The estimate in column 1 implies that households which spend more on intoxicants also have higher levels of debt. An increase in intoxicant expenditure by a rupee increases a household's debt by 18 INR. These estimates are likely to be upwardly biased if, for instance, households that are more risk taking spend more on intoxicants as well as borrow more. Column 2 eliminates these time invariant household specific effects. As expected this reduces the size of the effect from column 1. Column 3-6 further includes time varying household characteristics sequentially. Asset and land ownership show a positive association with debt, possibly indicating their value as collateral. A higher fraction of adults in the household lead to a larger outstanding debt. Older heads of the household have lower levels of debt. The positive relation with income of the household head once again indicates that higher household income possibly makes it easier for the household to get a loan. Education of the household head does not seem to affect household debt significantly. Most importantly for us, the size of the effect of intoxicant expenditure on household debt remains the same once household fixed effects have been accounted for. The estimates in the full specification in column 6 indicates that a one INR increase in a household's intoxicant expenditure increases household debt by 8 INR on average.

4.2 Number of Loans

Table 2 indicates that higher intoxicant expenditure leads to higher debt of households. However, a higher average debt could indicate a higher number loans taken by a household or a higher size of loan or both. If a household uses borrowed money to sustain higher expenditure on intoxicants, then it is likely to take loans citing various purposes and from multiple sources since taking a larger loan for a single purpose might be more difficult to justify. Table 3 explores whether households that spend more on intoxicants take a higher number of loans. The dependent variable used in Table 3 is the total number of loans taken by the household in the last five years. The results indicate that households which spend more on intoxicants indeed take a higher number of loans. Further, the coefficient size remains unchanged across all columns.

4.3 Heterogeneity

Table 2 estimates the size of the effect of intoxicant expenditure on household debt for all households on average. However, the extent to which higher intoxicant expenditure increases default rates would depend on the cost associated with defaulting. For instance, banks or money lenders might be less likely to provide loans in the future to individuals with a history of default. We explore this mechanism in this section. While the individual cost of defaulting is difficult to observe and measure, it is likely that in general the cost of defaulting would vary depending on the underlying characteristics of households and underlying terms of borrowing. We test this possibility in Table 4 and discuss potential mechanisms implied by our findings. For ease of reading, Figure 6 depicts the coefficients from Table 4.

Columns 1 and 2 of Table 4 suggest that the average effect is entirely driven by the rural population. One reason for this could be that, with the expansion of rural credit and repeated agricultural loan waiver programs, the cost of defaulting is likely to be lower in rural areas compared to urban areas (Chakraborty and Gupta, 2017a).

The cost of defaulting also depends on the source of borrowing. Indian households can take loans from broadly two sources - formal and informal. Formal sources comprises of institutional lending channels like government and private banks, cooperatives, Regional Rural Banks etc. Informal sources comprise of non institutional channels like borrowing money from friends, relatives, money lenders etc. Column 3 and 4 explore variation in the average effect depending on the source of the loan taken by the household. We see that the effect is driven entirely by borrowing from formal lending sources. One possible explanation for this could be that defaulting on formal loans is likely to involve less stringent penalty compared to defaulting on a loan taken from say a moneylender where the stakes are usually higher. This makes cost of default on formal loans much lower compared to those from informal sources. Studies show that households that borrow from formal sources are less likely to repay the loan as it is mostly spent for unproductive expenditure (Chakraborty and Gupta, 2017b). This, points to the existence of moral hazard in the credit market as loans taken from formal sources are more likely to be misused for purchasing intoxicants.

We further explore whether there is heterogeneity in the size of the effect by caste of a household, in columns 5, 6 and 7. We find that while higher intoxicant expenditure accounts for higher debt for General and OBC category households, there is no such effect for the SC-ST category. Previous evidence points to the presence of widespread discrimination in access to credit. Particularly, loan approval rates for households belonging to SC-ST categories is much lower compared to General and OBC (Kumar and Venkatachalam, 2019). This suggests that defaulting is likely to be costlier for SC-ST households leading to a weaker link between intoxicant expenditure and default for SC-ST households but not for

General and OBC category households.

4.4 Robustness

We undertake several sensitivity checks to ensure that our estimates are robust to alternative specifications and estimation samples. Table 5 reports the results from modifications on the full specification, in column 6, of Table 2.

First, while the main specification, in Column 6 of Table 2, accounts for household fixed effect in addition to a range of household specific time varying characteristics, concerns about events that vary over time remain. In Column 1 of Table 5 we report a specification that incorporates district time varying effects to account for over-time changes specific to each district. For instance, it is possible that households in regions that received an agricultural loan waiver have a higher level of debt and having received a loan write off also start spending more on all consumption goods, including intoxicants. We find that our findings remain robust to the inclusion of district level time varying effects.⁶

Second, the main specification uses asset ownership as a proxy for a household's wealth and economic well being instead of household income level. Column 2 checks the sensitivity of our estimates when we control for household income instead of asset ownership. The results continue to hold.

Next, we check the sensitivity of the estimates to changes in the estimation sample. Column 3 reports the regression results after excluding the state of Gujarat, referred to as '*drystate*', as there was a complete prohibition on sale and consumption of alcohol during the time period of the study. Once again, the results are robust to these changes. Overall, these additional checks give confidence in our baseline estimates.

While these checks do give more confidence on our estimates, another challenge remains. We use expenditure on intoxicants as an imprecise measure of expenditure on alcohol. Hence, our estimates so far only captures the effect of expenditure on any intoxicants on household debt. In addition, the approach so far doesn't address the possibility of a potential reverse causality - high debts might lead individuals to drink more. Hence, in the next section, we adopt an instrumental variable strategy to recover the causal effect of alcohol consumption on debt.

5 Instrumental Variable Estimates

According to the Constitution of India, alcohol is a state subject which means that the laws governing alcohol consumption and sales vary substantially from state to state. While some states prohibit sale and consumption of alcohol altogether,

⁶Given the large number of interaction terms in this model, we maintain the more parsimonious model as our main specification.

the minimum legal drinking age (MLDA) varies widely across others. The map in Panel-I of Figure 5 shows the distribution of minimum legal drinking age across the states of India during the period of our study 2005-2012.

For instance during our sample period, Gujarat experienced blanket prohibition on sale and consumption of alcohol. On the other hand, the minimum legal drinking age has varied from 18 to 25 in other states. Extant literature reveals that legal access greatly impacts alcohol consumption, especially for men. Men above the legally mandated drinking age are much more likely to consume alcohol in India (Luca et al., 2015). Thus, MLDA ranging from 18 to 25 generates a potential variation in access to alcohol and its consumption across the states of India. The MLDA policy itself is likely to be exogenous to a household’s borrowing behaviour. We use this variation in alcohol regulation policies across states in India to construct an instrumental variable and use it to estimate the effect of alcohol expenditure of a household on its borrowing behavior.

In addition to cross-sectional variation, there is also variation in MLDA policies over time within some states, during our study period. For instance, the MLDA was raised from 18 to 21 around mid-2012 in Kerala. Similarly, Tamil Nadu and Maharashtra have also witnessed changes in their MLDA policy during our sample period. However, the over time changes in these three states happen towards the far end or beginning of our sample period. Hence, in our estimation equation we do not consider these changes for identification and instead only restrict to cross-sectional variation in the MLDA policy across states. For example, the MLDA in Kerala changed from 18 years to 21 years in mid-2012 while the field survey for the 2012-round of IHDS was conducted between November 2011 and October 2012. Hence, we consider 18 years as the MLDA for Kerala over our entire sample period between 2005 and 2012. Similarly, in Tamil Nadu the MLDA was raised from 18 years to 21 years in 2004 and remained unchanged throughout our sample period. Thus, we have taken 21 as MLDA for Tamil Nadu. Maharashtra raised its MLDA for hard liquor from 21 to 25 in 2011. Thus, in our analysis, we keep MLDA of Maharashtra as 21.⁷ The states included in the study and their corresponding MLDA, during the sample period, have been tabulated in Appendix Table A4.

We combine this information on state level alcohol regulation with household demographic composition to construct an instrumental variable at the household level that captures the effective exposure to alcohol. Specifically, we propose that a household’s potential alcohol expenditure would depend on the number of men above legal drinking age in the household.⁸ Thus, variation in potential

⁷In Karnataka, there exists a contradiction in the documentation of the legal drinking age. While the MLDA is 21 years according to the Karnataka Excise Department (1967), it is 18 years as per the Karnataka Excise Act (1965). Hence, in our main estimation we have taken 21 as MLDA for Karnataka. Column 12 of Appendix Table A3 provides the estimates assuming MLDA in Karnataka as 18.

⁸In India, women constitute a very small fraction of total drinking population. For instance, Prasad (2009) shows that 21% of adult men and around 2% of women drink in India. This would

alcohol expenditure comes both from a household’s state of residence, as well as whether the household has a man above the legal drinking age. Hence, we define an indicator for whether a household has at least one male member above the minimum legal drinking age [MLDA] and use it to instrument for the expenditure on intoxicants.

Since the minimum legal drinking age varies by state, our instrumental variable in effect varies along two dimensions. First, it varies across two households with otherwise similar demographic composition, but happen to reside in two different states with different minimum legal drinking age. Second, it varies across two households within the same state which happen to have different demographic composition. The map in Panel-II of Figure 5 shows the distribution of our instrumental variable across the states of India. As expected, the distribution of effective alcohol policy exposure at the state level varies from the MLDA policy shown in in Panel-I of Figure 5.

We estimate the following model in two stages:

$$Debt_{hst} = \beta_0 + \widehat{\text{Intoxicant-Expenditure}}_{hst}\beta_1 + \beta_2^H X_{hst}^H + \delta_h + \delta_t + \epsilon_{hst} \quad (2)$$

$$\widehat{\text{Intoxicant-Expenditure}}_{hst} = \alpha_0 + MLDA_{hst}\alpha_1 + \alpha_2^H X_{hst}^H + \gamma_h + \gamma_t + \eta_{hst} \quad (3)$$

Where, $MLDA_{hst}$, the instrumental variable, is a dummy variable that takes the value 1 if there is at least one man above the minimum legal drinking age in household h , state s and time t . If we compare two households with the same total number of men and an identical age composition of men, but residing in two states with different MLDA, then the household living in the state with a lower MLDA is more likely to have a potential drinker in the household and hence more likely to have higher alcohol expenditure. For households residing in states which have a complete alcohol prohibition (Gujarat in our sample), the instrumental variable $MLDA$ takes a value 0, as there are no male members above the legal drinking age in a household in these states. All other variables in equation 5 are identical to those included in Equation 1.

Table 6 reports the results from the instrumental variable analysis.⁹ For easy reference it also presents the OLS estimates from Tables 2 and 3. Column 6 of Tables 2 and 3 are reported in columns 1 and 2 of Table 6, respectively. Column 3 and 4 show the two-stage least squares (2SLS) estimates. The 2SLS estimates are larger than the OLS estimates, pointing to the possibility that alcohol expenditure

mean that including women in the analysis would generate a weak first stage since the link from alcohol regulation to alcohol consumption would be much weaker for women. Hence, we use variation in gender and age composition across households, along with variation in MLDA across states, to explain variation in intoxicant expenditure across households.

⁹The first stage results, reported in full in Appendix Table A1, imply that the instrumental variable is strongly related to intoxicant expenditure of a household.

has a much stronger effect on household debt compared to other intoxicants. The instrumental variable estimates imply that an increase in a household's alcohol expenditure by 1 INR (the average intoxicant expenditure in the sample in one month is around 114 INR) increases a household's debt by roughly 100 INR, as compared to a 8 INR increase in debt implied by the OLS estimates. This means that alcohol has a much bigger impact on household debt than other intoxicants. Tobacco, in different forms, is the most widely used intoxicant, but it could be that the channels through which intoxicants can affect household finances are likely to be weaker for tobacco than for alcohol.¹⁰ For instance, alcohol could have a more immediate effect on productivity and absenteeism at workplace than tobacco.

Due to lack of credible reference, we rely on online sources for the MLDA policy in the states of Jammu and Kashmir (JK), Dadra Nagar Haveli (DH) and Goa (GO). The Appendix Table [A2](#) and [A3](#) report the corresponding 2SLS and OLS estimates as reported in Table 6 after excluding these doubtful states using number of loans and total debt as the outcome variables respectively. The results remain unchanged.

¹⁰In 2012 round of the IHDS, 17% of adult men reported consuming alcohol compared to 36% who reported chewing or smoking tobacco.

6 Conclusion

In this paper we examine the trend of increasing indebtedness of Indian households and study the extent to which this is connected to the secular increase in a household's alcohol expenditure that has been widely reported in the media. We use data from the India Human Development Survey (IHDS) which elicits information on both indebtedness and intoxicant expenditure of household across India. In the absence of data for alcohol consumption at a household level, we use intoxicant expenditure as a proxy for alcohol expenditure. The panel structure of the IHDS data allows us to estimate the effect of alcohol expenditure on indebtedness of households by exploiting variation within the same household over time. The remaining concerns – first, about the simultaneity in the decision to consume alcohol and borrow and second, about the measurement error associated with using intoxicant expenditure as opposed to alcohol expenditure – are dealt with using an instrumental variable strategy. In India laws governing taxes, sale and consumption of alcohol are state subjects which creates extensive variation in the access to alcohol across states. While some states entirely prohibit sale or consumption of alcohol, others impose various minimum drinking age cut-offs. We use this variation, combined with variation in demographic composition of households, to construct an instrumental variable that is likely to affect alcohol consumption through a household's potential exposure to alcohol. Specifically, we use an indicator for whether a household has a male member above the above minimum legal drinking age of the state in which it resides to instrument for expenditure on intoxicants. While the first stage results show a strong relationship between household intoxicant expenditure and the instrument, we implicitly assume that the exclusion restriction is satisfied – that alcohol regulation policies can affect a household's borrowing behavior only through expenditure on alcohol. Our instrumental variable estimates are higher than the OLS estimates. One possible explanation for this is that the overall expenditure on intoxicants is a weak proxy for expenditure on alcohol and hence fraught with measurement error. Moreover, the effect of alcohol on household debt is likely to be stronger than the effect of the other primary intoxicant, tobacco, since the expenditure as well as the economic channels through which alcohol use affects household finances are likely to be weaker for tobacco. The instrumental variable estimates imply that an increase in a household's alcohol expenditure by 1 INR increases a household's debt by roughly 100 INR. Thus, overall we find a substantial impact of alcohol use on indebtedness of Indian households. However, we find significant heterogeneity too in the distribution of this effect. It is a predominantly a rural phenomenon, concentrated in households who are higher up in the social hierarchy and driven by defaults on formal loans as opposed to informal loans. These findings indicate that the effect of higher alcohol expenditure on indebtedness perhaps depend on the underlying ease of borrowing and costs of defaulting. Households in rural India are more likely recipients of repeated government loan waiver programs

making defaults less costly for them. Default on formal loans are less likely to face severe contractual punishments and are more likely to be covered by loan waiver programs. Households from SC-ST categories are more likely to face widespread discrimination in access to credit compared to households from General and OBC categories. In summary, the underlying incentives determine the extent to which households are willing to spend more on alcohol even at the cost of over-borrowing and defaulting. In other words, our findings point to the existence of moral hazard in the credit market.

A commonly practiced policy to discourage alcohol consumption is taxation. However, given the findings of this paper, households tend to consume more alcohol even at the cost of higher indebtedness. Hence, it is unlikely that higher prices of alcohol can dissuade households from consuming more alcohol. On the other hand, it is more likely to increase indebtedness of households, particularly of those households for whom the cost of borrowing and defaulting are lower.

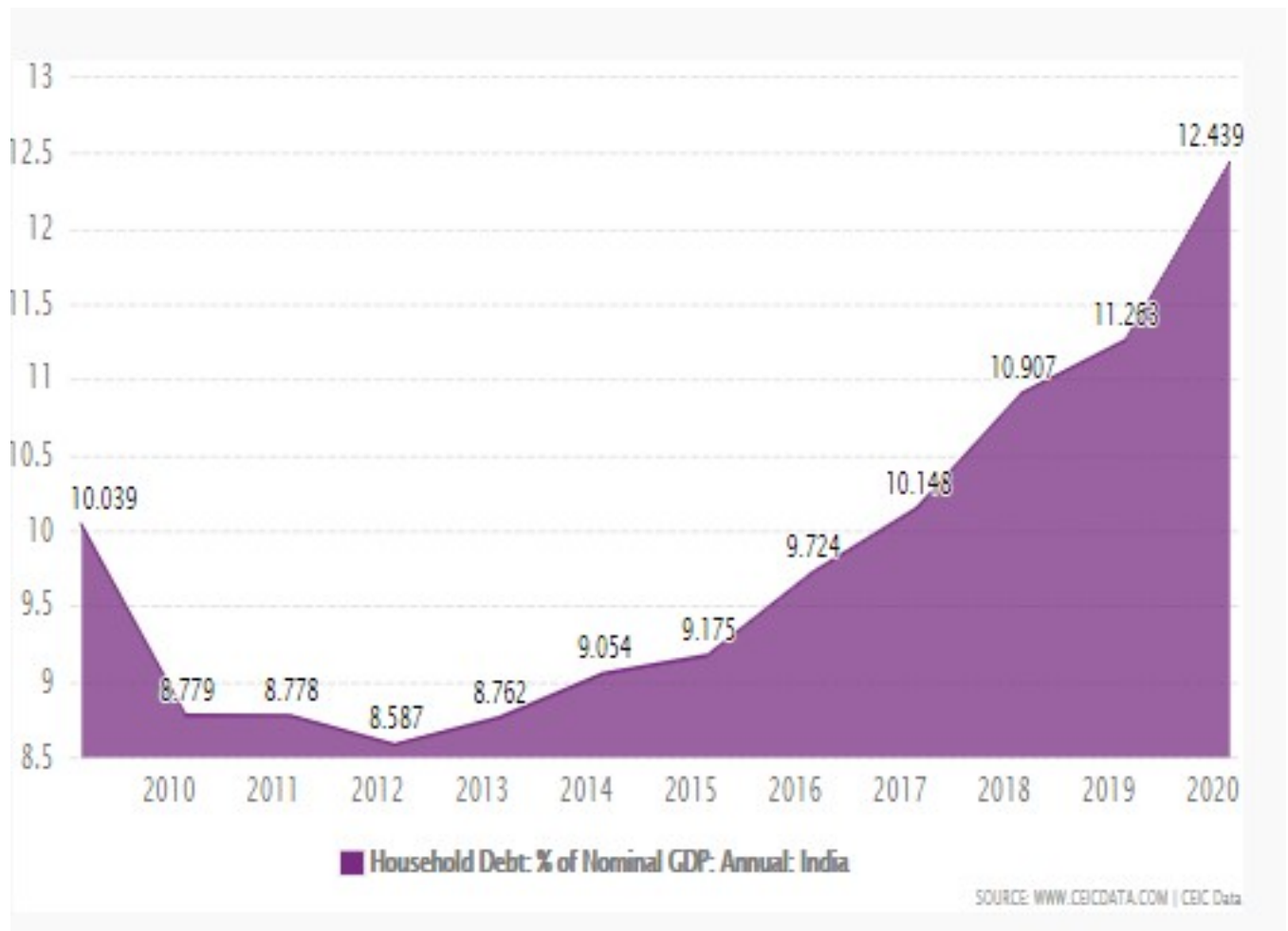
References

- Banerjee, A. and Mullainathan, S. (2010). The shape of temptation: Implications for the economic lives of the poor. Technical report, National Bureau of Economic Research.
- Barrett, G. F. (2002). The effect of alcohol consumption on earnings. *Economic Record*, 78(240):79–96.
- Ben-David, I. and Bos, M. (2021). Impulsive consumption and financial well-being: Evidence from an increase in the availability of alcohol. *The Review of Financial Studies*, 34(5):2608–2647.
- Benegal, V., Velayudhan, A., and Jain, S. (2000). The social cost of alcoholism (Karnataka). *NIMHANS JOURNAL*, 18(1/2):67–76.
- Berger, M. C. and Leigh, J. P. (1988). The effect of alcohol use on wages. *Applied Economics*, 20(10):1343–1351.
- Chakraborty, T. and Gupta, A. (2017a). Efficacy of loan waiver programs. *Department of Economics Working Paper, IIT Kanpur*, pages 1–50.
- Chakraborty, T. and Gupta, A. (2017b). Loan repayment behaviour of farmers: Analysing Indian households.
- Dávalos, M. E., Fang, H., and French, M. T. (2012). Easing the pain of an economic downturn: Macroeconomic conditions and excessive alcohol consumption. *Health Economics*, 21(11):1318–1335.
- Freeman, D. G. (1999). A note on economic conditions and alcohol problems. *Journal of Health Economics*, 18(5):661–670.
- French, M. T., Norton, E. C., Fang, H., and Maclean, J. C. (2010). Alcohol consumption and body weight. *Health Economics*, 19(7):814–832.
- Griswold, M. G., Fullman, N., Hawley, C., Arian, N., Zimsen, S. R., Tymeson, H. D., Venkateswaran, V., Tapp, A. D., Forouzanfar, M. H., Salama, J. S., et al. (2018). Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the global burden of disease study 2016. *The Lancet*, 392(10152):1015–1035.
- Kumar, S. M. and Venkatachalam, R. (2019). Caste and Credit: A woeful tale? *The Journal of Development Studies*, 55(8):1816–1833.
- Lindo, J. M., Swensen, I. D., and Waddell, G. R. (2013). Alcohol and student performance: Estimating the effect of legal access. *Journal of Health Economics*, 32(1):22–32.

- Luca, D. L., Owens, E., and Sharma, G. (2015). Can alcohol prohibition reduce violence against women? *American Economic Review*, 105(5):625–29.
- Lye, J. and Hirschberg, J. (2010). Alcohol consumption and human capital: A retrospective study of the literature. *Journal of Economic Surveys*, 24(2):309–338.
- MacDonald, Z. and Shields, M. A. (2004). Does problem drinking affect employment? Evidence from England. *Health Economics*, 13(2):139–155.
- Manthey, J., Shield, K. D., Rylett, M., Hasan, O. S., Probst, C., and Rehm, J. (2019). Global alcohol exposure between 1990 and 2017 and forecasts until 2030: a modelling study. *The Lancet*, 393(10190):2493–2502.
- Mukherjee, S., Subramanian, K., and Tantri, P. (2018). Borrowers’ distress and debt relief: Evidence from a natural experiment. *The Journal of Law and Economics*, 61(4):607–635.
- Mullahy, J. and Sindelar, J. (1996). Employment, unemployment, and problem drinking. *Journal of Health Economics*, 15(4):409–434.
- Mullahy, J. and Sindelar, J. L. (1993). Alcoholism, Work, and Income. *Journal of Labor Economics*, 11(3):494–520.
- Ninan, T. (2019). India’s household debt has risen 80% in 2017-18. It could bite if incomes don’t grow. Accessed: 19 May, 2021.
- Prabhu, S., Dulmus PhD, C. N., and Ratheeshkumar, K. (2010). Prevalence, nature, context and impact of alcohol use in India: Recommendations for practice and research.
- Prasad, R. (2009). Alcohol use on the rise in India. *The Lancet*, 373(9657):17–18.
- RBI (2018). *Handbook of Statistics on Indian states*. Reserve Bank of India, Mumbai.
- RBI (2019). *State finances: A study of budgets of 2017–18 and 2018–19*. Reserve Bank of India, Mumbai.
- Rehm, J., Gmel Sr, G. E., Gmel, G., Hasan, O. S., Imtiaz, S., Popova, S., Probst, C., Roerecke, M., Room, R., Samokhvalov, A. V., et al. (2017). The relationship between different dimensions of alcohol use and the burden of disease—an update. *Addiction*, 112(6):968–1001.
- Rehm, J. and Imtiaz, S. (2016). A narrative review of alcohol consumption as a risk factor for global burden of disease. *Substance Abuse Treatment, Prevention, and Policy*, 11(1):1–12.

- Ruhm, C. J. (1995). Economic conditions and alcohol problems. *Journal of Health Economics*, 14(5):583–603.
- Saxena, S., Sharma, R., and Maulik, P. K. (2003). Impact of alcohol use on poor families: A study from North India. *Journal of substance use*, 8(2):78–84.
- Schilbach, F. (2019). Alcohol and self-control: A field experiment in India. *American Economic Review*, 109(4):1290–1322.
- Sinha, R. (2008). Chronic stress, drug use, and vulnerability to addiction. *Annals of the New York Academy of Sciences*, 1141:105.
- Steele, C. M. and Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist*, 45(8):921.
- WHO (2019). *Global Status Report on Alcohol and Health 2018*. World Health Organization.
- Williams, J., Powell, L. M., and Wechsler, H. (2003). Does alcohol consumption reduce human capital accumulation? Evidence from the college alcohol study. *Applied Economics*, 35(10):1227–1239.
- Zarkin, G. A., French, M. T., Mroz, T., and Bray, J. W. (1998). Alcohol use and wages: New results from the national household survey on drug abuse. *Journal of Health Economics*, 17(1):53–68.

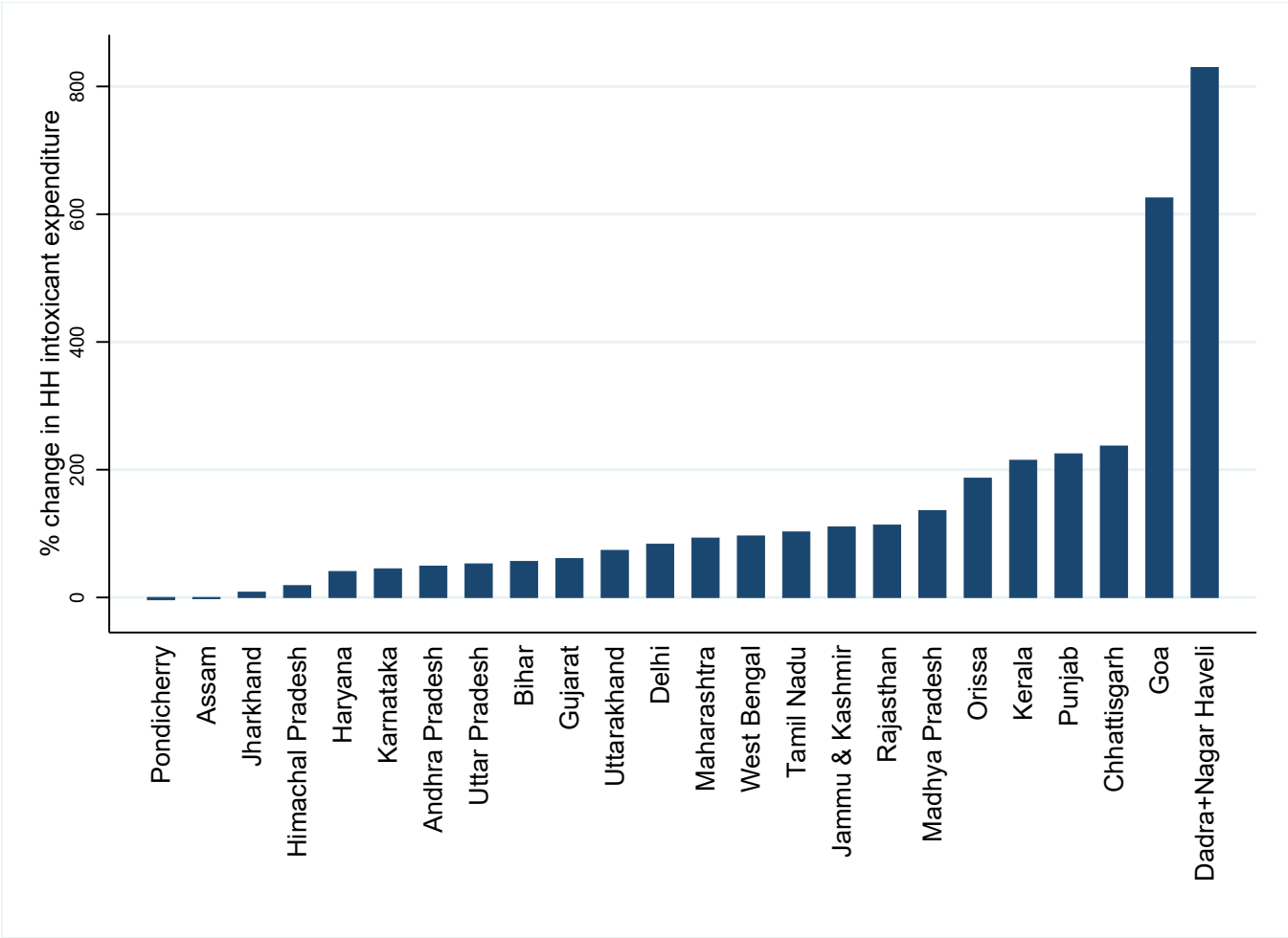
Figure 1: Household Debt as a fraction of Nominal GDP



Source: ceic.com

Notes: This figure shows the rising trend in household debt as a percentage of nominal GDP in India

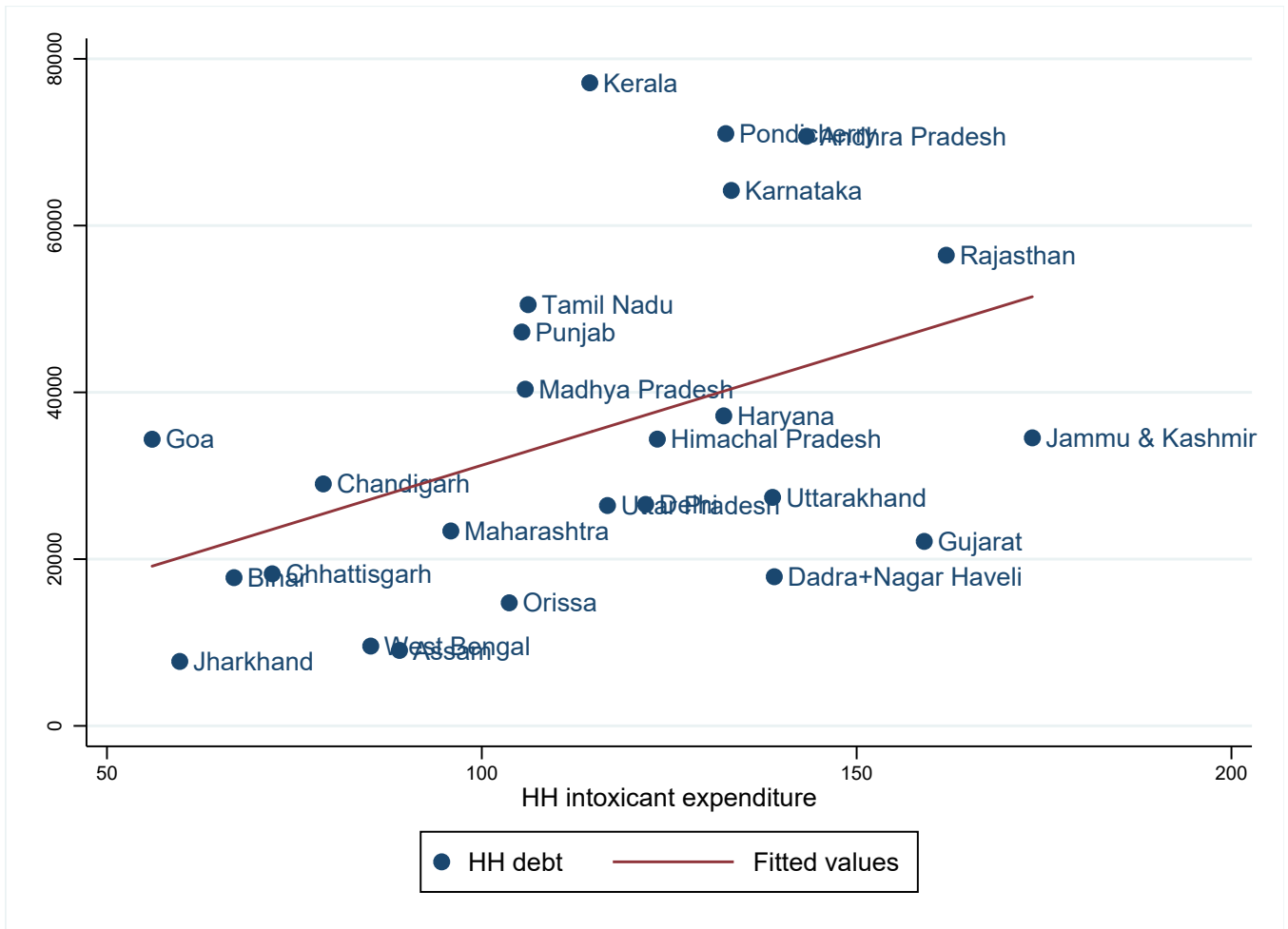
Figure 2: Percentage change in mean intoxicant expenditure across India between 2005 and 2012



Source: IHDS, own calculations.

Notes: This figure depicts percentage change in intoxicant expenditure in a household per month across states of India, between 2005 and 2012. Higher bar length implies greater rise in expenditure on intoxicants. Chandigarh has been excluded due to missing data in 2005. Intoxicant expenditure is measured in INR.

Figure 3: Household Debt and Intoxicant Expenditure

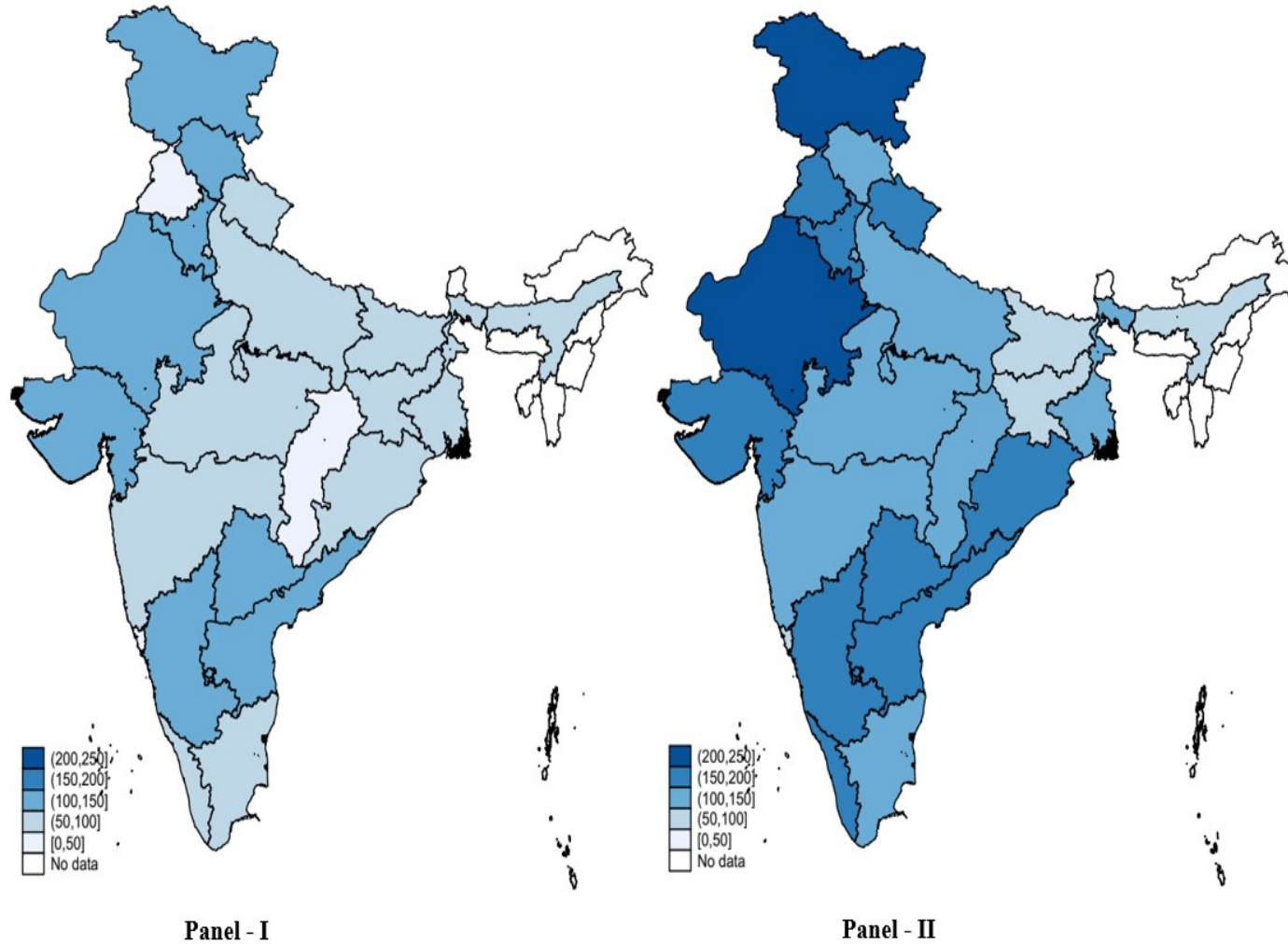


Source: IHDS, own calculations.

Notes: This figure depicts the relationship between household debt and intoxicant expenditure in a household per month across the states of India, using both 2005 and 2012 rounds of the IHDS. Household debt and intoxicant expenditure measured in INR.

Figure 4: Household level expenditure on intoxicants across India: 2005 and 2012

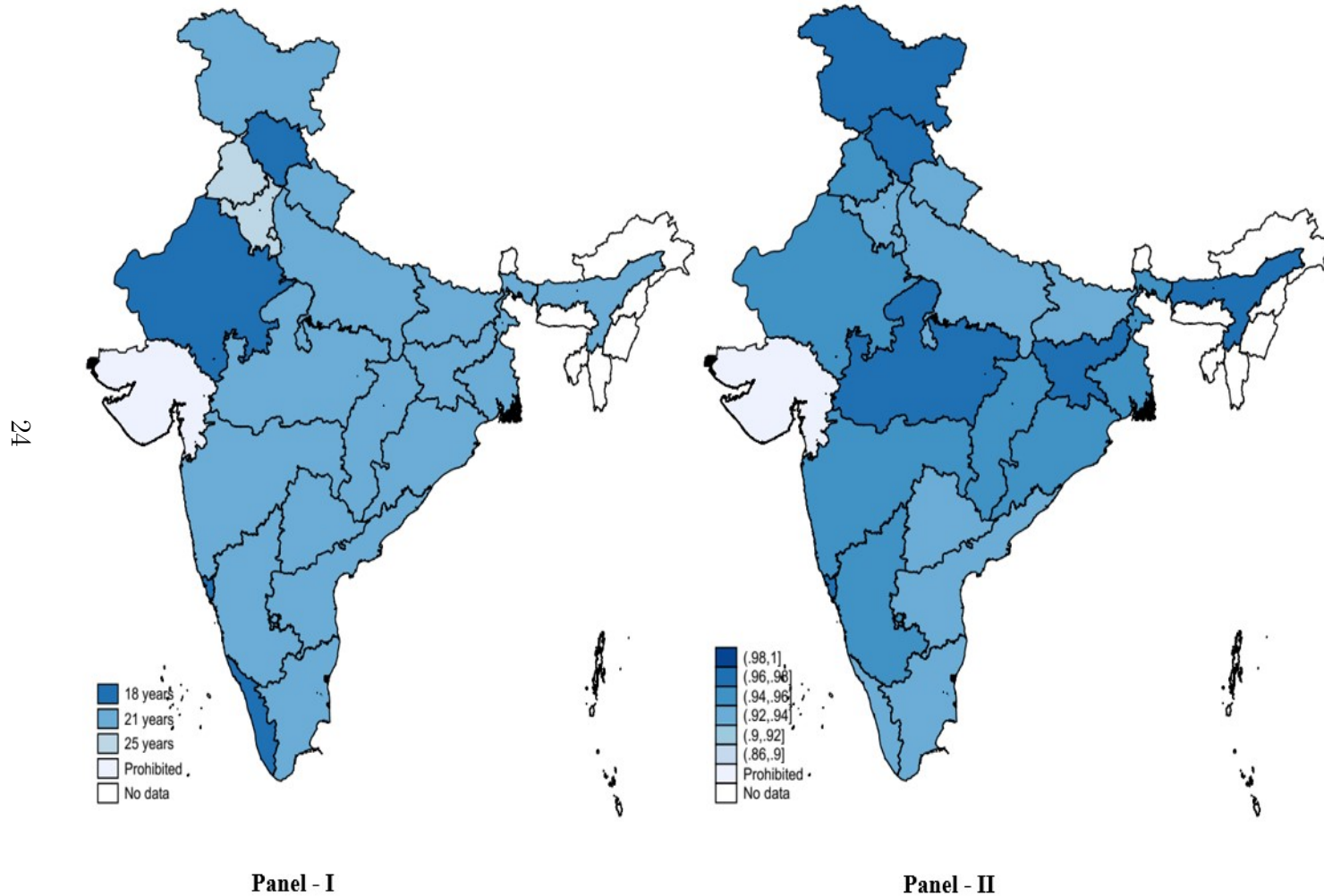
23



Source: IHDS, own calculations.

Notes: This figure depicts average intoxicant expenditure in a household per month, across the states of India. 2005 values are shown in Panel-I; 2012 values are shown in Panel-II. Lighter shades imply lower expenditure. The study excludes the following states and Union territories (UT) : Nagaland, Manipur, Tripura, Meghalaya, Mizoram, Arunachal Pradesh, Sikkim and Daman and Diu. These are indicated by the category 'no data'

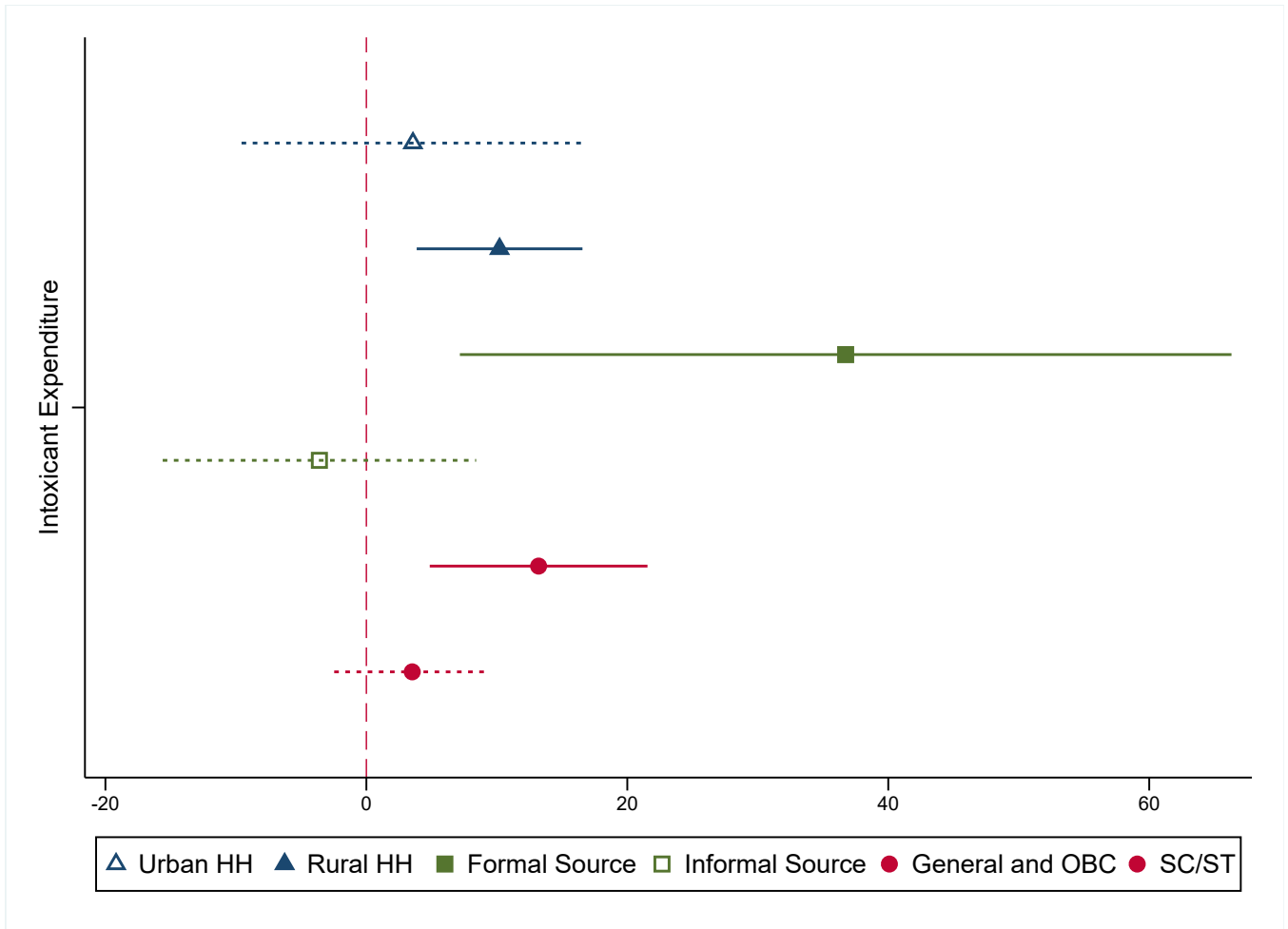
Figure 5: Distribution of and effective exposure of households to MLDA policy across India



Source: IHDS, own calculations.

Notes: Panel-I depicts the variation in alcohol regulation policies across India between 2005-2012. Lighter shades imply more restrictive policies with a higher legal drinking age cut-off. The lightest shade indicates a complete prohibition on sale and consumption of alcohol. Panel-II depicts the proportion of households with at least one male member above the MLDA across India in 2005. Darker shades imply a larger proportion of households with at least one male member who is legally eligible to drink alcohol. The study excludes the following states and Union territories (UT) : Nagaland, Manipur, Tripura, Meghalaya, Mizoram, Arunachal Pradesh, Sikkim and Daman and Diu. These are indicated by the category 'no data'

Figure 6: Intoxicant expenditure estimates for different groups



Source: Estimates from Table 4

Notes: This figure depicts estimates of β_1 from Equation 1, along with their respective 95% confidence intervals, for different groups. They correspond to estimates reported in row-1 of Table 4. For easy comparison, caste categories are grouped as General-OBC and SC-ST in this figure.

Table 1: Summary

	(1)	(2)	(3)	(4)
	2004-05		2011-12	
	mean	(sd)	mean	(sd)
Panel A				
Total HH debt	22.9	(72.6)	49.6	(139.6)
Number of Loans	1.6	(2.8)	1.8	(2.9)
Intoxicant expenditure	78.7	(158.4)	145.8	(291.9)
Asset	0.4	(0.2)	0.5	(0.2)
Land	0.5	(0.5)	0.5	(0.5)
Adults /HH size	0.6	(0.2)	0.7	(0.2)
Adult Males/ HH size	0.3	(0.2)	0.3	(0.2)
Males above MLDA	1.4	(0.9)	1.4	(0.9)
HH Income	51	(78.9)	130	(205.9)
Household Head Characteristics:				
Age	47.3	(13.3)	51.8	(12.6)
Years of education	5.1	(4.7)	5.3	(4.9)
Income	16	(30.8)	33	(72.1)
No of observations	27,166		31,355	
Panel B				
HH Caste (Percentage):				
General	27.1		28.4	
OBC	41.5		40.8	
SC/ST	29.3		29.1	
HH Religion (Percentage):				
Hindu	82.7		82.8	
Muslim	10.8		11.4	
Others	6.5		5.8	
Loan Source (Percentage):				
Formal	36.4		44.7	
Informal	63.6		55.3	
Residence Area (Percentage):				
Rural	71.2		67.2	
Urban	28.8		32.8	

Notes: Table provides summary of all variables used in the analysis in the estimation sample. Debt, household income and income of household head are expressed in 000 INR. Intoxicant expenditure is measured in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Males above MLDA measures number of male members in the household with age above the minimum legal drinking age. Standard deviation reported in parentheses.

Table 2: Intoxicant Expenditure and Household Debt

Dependent Variable: Total Household Debt						
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	+HH FE	+HH Asset	+HH Land	+HH Composition	+HH Head Characteristics
Intoxicant expenditure	18.275*** (1.957)	10.411*** (2.996)	9.073*** (2.998)	8.839*** (2.998)	8.730*** (2.997)	8.395*** (3.004)
Asset			57.751*** (7.651)	56.204*** (7.659)	56.474*** (7.657)	56.130*** (7.708)
Land				9.765*** (2.453)	9.824*** (2.452)	10.382*** (2.462)
Adults/HH size					14.808*** (4.158)	16.076*** (4.222)
Household Head Characteristics:						
Age						-0.238** (0.096)
Education						-0.373 (0.330)
Income						0.000*** (0.000)
Constant	21.424*** (0.704)	20.557*** (0.701)	-1.819 (3.046)	-5.647* (3.193)	-14.206*** (3.996)	-3.130 (6.276)
HH FE	NO	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Observations	58,639	58,639	58,639	58,639	58,639	58,550
R-squared	0.015	0.039	0.041	0.041	0.042	0.043
Number of HH		33,270	33,270	33,270	33,270	33,267

Notes: Estimates using total household debt as the dependent variable in Equation 1. Total household debt and expenditure on intoxicants is expressed in 000 INR. Household heads' income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household heads' education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table 3: Intoxicant Expenditure and Number of Loans

Dependent Variable: Number of Loans						
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	+HH FE	+HH Asset	+HH Land	+HH Composition	+HH Head Characteristics
Intoxicant expenditure	0.680*** (0.049)	0.663*** (0.079)	0.636*** (0.079)	0.627*** (0.079)	0.628*** (0.079)	0.634*** (0.080)
Asset			1.174*** (0.203)	1.112*** (0.203)	1.109*** (0.203)	1.150*** (0.204)
Land				0.396*** (0.065)	0.396*** (0.065)	0.401*** (0.065)
Adults/HH size					-0.139 (0.110)	-0.058 (0.112)
Household Head Characteristics:						
Age						-0.011*** (0.003)
Education						-0.005 (0.009)
Income						-0.000** (0.000)
Constant	1.581*** (0.018)	1.541*** (0.019)	1.086*** (0.081)	0.930*** (0.085)	1.011*** (0.106)	1.502*** (0.166)
HH FE	NO	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Observations	58,610	58,610	58,610	58,610	58,610	58,521
R-squared	0.004	0.006	0.008	0.009	0.009	0.010
Number of HH		33,263	33,263	33,263	33,263	33,260

Notes: Estimates using total number of loans taken by the household as the dependent variable in Equation 1. Expenditure on intoxicants is expressed in 000 INR. Household head's income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household head's education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table 4: Heterogeneity: Intoxicant Expenditure and Household Debt

Dependent Variable: Total Household Debt							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Urban	Rural	Formal Loan	Informal Loan	General	OBC	SC/ST
Intoxicant expenditure	3.572 (6.701)	10.209*** (3.241)	36.736** (15.078)	-3.595 (6.127)	13.814** (6.988)	12.630** (5.317)	3.518 (3.052)
Asset	46.694** (18.169)	58.936*** (8.159)	31.315 (44.403)	47.937*** (15.839)	74.703*** (18.386)	53.926*** (11.866)	33.009*** (8.935)
Land	26.224*** (7.313)	7.531*** (2.437)	30.040* (17.663)	3.459 (4.519)	14.044** (6.085)	9.196** (3.883)	11.312*** (2.666)
Adults/HH size	23.460** (9.467)	11.196** (4.540)	24.400 (24.186)	19.982** (8.526)	16.185 (10.075)	16.006** (6.614)	13.345*** (4.782)
HH Head Characteristics:							
Age	-0.287 (0.224)	-0.155 (0.103)	-1.283** (0.591)	0.024 (0.197)	-0.116 (0.225)	-0.410*** (0.150)	0.027 (0.111)
Education	-1.019 (0.687)	0.027 (0.370)	-2.128 (2.052)	0.914 (0.732)	-0.046 (0.751)	-0.588 (0.519)	-0.425 (0.390)
Income	0.000*** (0.000)	-0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Constant	1.782 (15.761)	-3.706 (6.453)	71.179* (42.521)	-8.829 (11.453)	-23.895 (16.636)	9.900 (9.789)	-10.222 (6.369)
HH FE	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES
Observations	18,128	40,421	12,992	18,662	16,285	24,065	17,093
R-squared	0.031	0.051	0.096	0.095	0.035	0.057	0.047
Number of HH	10,895	23,046	10,719	14,768	9,365	13,496	9,698

Notes: Estimates using total household debt as the dependent variable in Equation 1. Total household debt and expenditure on intoxicants is expressed in 000 INR. Household heads' income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household heads' education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table 5: Robustness

Dependent Variable: Total Household Debt			
	(1)	(2)	(3)
	+ Dist-Time FE	+ HH Income	- Dry state
Intoxicant expenditure	5.636* (3.037)	6.764** (3.095)	8.376*** (3.079)
Income*		0.000*** (0.000)	
Asset	53.315*** (7.984)		57.140*** (7.891)
Land	5.579** (2.479)	9.177*** (2.474)	10.878*** (2.526)
Adults/HH size	13.642*** (4.204)	15.231*** (4.254)	14.419*** (4.329)
Household Head Characteristics:			
Age	-0.140 (0.096)	-0.296*** (0.097)	-0.235** (0.099)
Education	-0.171 (0.330)	-0.354 (0.330)	-0.353 (0.339)
Income	0.000*** (0.000)		0.000*** (0.000)
Constant	-35.249** (17.504)	18.473*** (5.738)	-2.471 (6.420)
HH FE	YES	YES	YES
Time FE	YES	YES	YES
District - time FE	YES	NO	NO
Observations	58,550	57,620	55,899
Number of HH	33,267	33,122	31,711
R-squared	0.086	0.054	0.045

Notes: Estimates using total household debt as the dependent variable in Equation 1. Total household debt and expenditure on intoxicants is expressed in 1000 INR. Household income and household head's income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household head's education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table 6: Instrumental Variable Estimates

	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
Dependent Variable	Total Debt	No of loans	Total Debt	No of Loans
Intoxicant expenditure	8.395*** (3.004)	0.634*** (0.080)	113.491** (50.241)	3.743*** (1.336)
Asset	56.130*** (7.708)	1.150*** (0.204)	41.085*** (10.668)	0.705** (0.284)
Land	10.382*** (2.462)	0.401*** (0.065)	8.624*** (2.656)	0.349*** (0.071)
Adults/HH size	16.076*** (4.222)	-0.058 (0.112)	14.941*** (4.356)	-0.091 (0.116)
Household Head Characteristics:				
Age	-0.238** (0.096)	-0.011*** (0.003)	-0.290*** (0.101)	-0.012*** (0.003)
Education	-0.373 (0.330)	-0.005 (0.009)	-0.503 (0.344)	-0.009 (0.009)
Income	0.000*** (0.000)	-0.000** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Constant	-1.357 (6.247)	1.577*** (0.165)	0.849 (6.331)	1.642*** (0.168)
HH FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
First Stage F stat			95.05	95.31
Observations	50,566	50,522	50,566	50,522
R-squared	0.043	0.010	-0.003	-0.050
Number of HH	25,283	25,261	25,283	25,261

Notes: Columns 1 and 2 are estimates from Tables 2 and 3, respectively. Columns 3 and 4 report estimates from Equation 5. Total household debt and expenditure on intoxicants is expressed in 000 INR. Household heads' income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household heads' education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Appendix

Table A1: First Stage for IV Estimates

	(1) Intoxicant Expenditure
IV	0.074*** (0.008)
Asset	0.133*** (0.016)
Land	0.015*** (0.005)
Adults/HH size	0.000 (0.009)
Household Head Characteristics:	
Age	0.000 (0.000)
Education	0.000 (0.001)
Income	0.000*** (0.000)
HH FE	YES
Time FE	YES
Observations	50,566
Number of HH	25,283

Notes: First Stage results corresponding to Table 6. Household expenditure on intoxicants expressed in 1000 INR. Household head's income is expressed in INR. 'Asset' is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household head's education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table A2: IV: Number of Loans

Dependent Variable: Number of Loans												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All States		- Jammu & Kashmir (JK)		- Dadra Nagar Haveli (DH)		-Goa (GO)		- JK DH GO		Karnataka LDA=18	
	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS
Intoxicant expenditure	3.743*** (1.336)	0.634*** (0.080)	3.650*** (1.358)	0.638*** (0.080)	3.750*** (1.339)	0.637*** (0.080)	3.748*** (1.339)	0.635*** (0.080)	3.663*** (1.366)	0.643*** (0.081)	3.688*** (1.329)	0.634*** (0.080)
Asset	0.705** (0.284)	1.150*** (0.204)	0.755*** (0.285)	1.178*** (0.206)	0.705** (0.284)	1.150*** (0.204)	0.703** (0.285)	1.149*** (0.205)	0.753*** (0.286)	1.178*** (0.207)	0.713** (0.283)	1.150*** (0.204)
Land	0.349*** (0.071)	0.401*** (0.065)	0.350*** (0.071)	0.396*** (0.066)	0.351*** (0.071)	0.401*** (0.065)	0.345*** (0.071)	0.399*** (0.066)	0.348*** (0.071)	0.396*** (0.066)	0.350*** (0.071)	0.401*** (0.065)
Adults/HH size	-0.091 (0.116)	-0.058 (0.112)	-0.091 (0.117)	-0.060 (0.113)	-0.092 (0.116)	-0.058 (0.112)	-0.091 (0.116)	-0.058 (0.112)	-0.092 (0.117)	-0.060 (0.113)	-0.090 (0.116)	-0.058 (0.112)
Household Head Characteristics:												
Age	-0.012*** (0.003)	-0.011*** (0.003)	-0.012*** (0.003)	-0.010*** (0.003)	-0.012*** (0.003)	-0.011*** (0.003)	-0.012*** (0.003)	-0.011*** (0.003)	-0.012*** (0.003)	-0.010*** (0.003)	-0.012*** (0.003)	-0.011*** (0.003)
Education	-0.009 (0.009)	-0.005 (0.009)	-0.006 (0.009)	-0.002 (0.009)	-0.009 (0.009)	-0.005 (0.009)	-0.009 (0.009)	-0.005 (0.009)	-0.006 (0.009)	-0.002 (0.009)	-0.008 (0.009)	-0.005 (0.009)
Income	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000** (0.000)
Constant		1.577*** (0.165)		1.546*** (0.167)		1.577*** (0.166)		1.582*** (0.166)		1.552*** (0.167)		1.577*** (0.165)
HH FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
First Stage F stat	95.31		92.53		94.98		94.95		91.86		96.03	
Observations	50,522	50,522	49,890	49,890	50,458	50,458	50,340	50,340	49,644	49,644	50,522	50,522
R-squared	-0.050	0.010	-0.046	0.010	-0.050	0.010	-0.050	0.010	-0.046	0.010	-0.048	0.010
Number of HH	25,261	25,261	24,945	24,945	25,229	25,229	25,170	25,170	24,822	24,822	25,261	25,261

Notes: Column 1 and 2 are the same 2SLS and OLS estimates as in Column 2 and 4 of Table 6. MLDA for Jammu Kashmir (JK), Dadra Nagar Haveli (DH), Goa (GO) rely on online sources, therefore column 3 to 8 report the corresponding 2SLS and OLS estimates after excluding them one by one. Column 9 and 10 are estimates when all regions are excluded simultaneously. Column 11 and 12 are the 2SLS and OLS estimates taking MLDA for Karnataka to be 18 instead of 21. Household expenditure on intoxicants is expressed in 000 INR. Household head's income is expressed in INR. 'Asset' is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household head's education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively.

Table A3: IV: Total Household Debt

Dependent Variable: Total Household Debt												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All States		- Jammu & Kashmir (JK)		- Dadra Nagar Haveli (DH)		-Goa (GO)		- JK DH GO		Karnataka LDA=18	
	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS
Intoxicant expenditure	113.491** (50.241)	8.395*** (3.004)	112.975** (51.253)	8.704*** (3.040)	114.232** (50.381)	8.506*** (3.008)	114.077** (50.353)	8.407*** (3.009)	114.316** (51.513)	8.832*** (3.051)	102.195** (49.806)	8.395*** (3.004)
Asset	41.085*** (10.668)	56.130*** (7.708)	43.756*** (10.738)	58.436*** (7.784)	41.165*** (10.682)	56.283*** (7.714)	40.331*** (10.710)	55.496*** (7.731)	43.098*** (10.794)	57.968*** (7.814)	42.702*** (10.599)	56.130*** (7.708)
Land	8.624*** (2.656)	10.382*** (2.462)	8.633*** (2.659)	10.244*** (2.482)	8.710*** (2.655)	10.434*** (2.466)	8.197*** (2.680)	10.047*** (2.472)	8.290*** (2.682)	9.955*** (2.497)	8.813*** (2.643)	10.382*** (2.462)
Adults/HH size	14.941*** (4.356)	16.076*** (4.222)	15.500*** (4.391)	16.579*** (4.261)	14.761*** (4.362)	15.916*** (4.226)	15.001*** (4.370)	16.152*** (4.234)	15.381*** (4.412)	16.497*** (4.277)	15.063*** (4.335)	16.076*** (4.222)
Household Head Characteristics:												
Age	-0.290*** (0.101)	-0.238** (0.096)	-0.291*** (0.103)	-0.239** (0.097)	-0.290*** (0.102)	-0.239** (0.096)	-0.287*** (0.102)	-0.235** (0.097)	-0.288*** (0.103)	-0.235** (0.098)	-0.284*** (0.101)	-0.238** (0.096)
Education	-0.503 (0.344)	-0.373 (0.330)	-0.393 (0.347)	-0.270 (0.334)	-0.508 (0.344)	-0.377 (0.330)	-0.490 (0.345)	-0.358 (0.331)	-0.383 (0.348)	-0.259 (0.335)	-0.489 (0.342)	-0.373 (0.330)
Income	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Constant		-1.357 (6.247)		-2.857 (6.309)		-1.301 (6.251)		-1.326 (6.262)		-2.779 (6.329)		-1.357 (6.247)
HH FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
First Stage F stat	95.05		92.28		94.72		94.69		91.6		95.81	
Observations	50,566	50,566	49,934	49,934	50,502	50,502	50,384	50,384	49,688	49,688	50,566	50,566
R-squared	-0.003	0.043	-0.002	0.043	-0.004	0.043	-0.003	0.043	-0.003	0.044	0.006	0.043
Number of HH	25,283	25,283	24,967	24,967	25,251	25,251	25,192	25,192	24,844	24,844	25,283	25,283

Notes: Column 1 and 2 are the same 2SLS and OLS estimates as in Column 1 and 3 of Table 6. MLDA for Jammu Kashmir (JK), Dadra Nagar Haveli (DH), Goa (GO) rely on online sources, therefore column 3 to 8 report the corresponding 2SLS and OLS estimates after excluding them one by one. Column 9 and 10 are estimates when all regions are excluded simultaneously. Column 11 and 12 are the 2SLS and OLS estimates taking MLDA for Karnataka to be 18 instead of 21. Total household debt and household expenditure on intoxicants is expressed in ₹000 INR. Household head's income is expressed in INR. Asset is measured as fraction of assets owned by a household out of 30 assets defined in IHDS. Household head's education is measured as years of education completed. Standard errors are reported in parenthesis below the estimated coefficients. ***, **, * Significant at 0.01, 0.05, 0.10 level, respectively

Table A4: Minimum legal drinking age across India

S No.	State	2004–05	2011–12	Source
1	Andhra Pradesh	21	21	CL
2	Assam	21	21	CL
3	Bihar	21	21	CL
4	Chandigarh	25	25	CL
5	Chhattisgarh	21	21	CL
6	Dadra+Nagar Haveli	25	25	https://www.hindustantimes.com/india-news/as-delhi-lowers-legal-drinking-age-to-21-here-is-a-look-at-the-rules-in-other-states-101616422982126.html https://en.wikipedia.org/wiki/Alcohol_laws_of_India
7	Delhi	25	25	CL
8	Goa	18	18	https://www.newslaundry.com/2015/09/30/indias-prudish-alcohol-laws-that-preach-victorian-morality-and-insult-intelligence/ https://en.wikipedia.org/wiki/Alcohol_laws_of_India
9	Gujarat	P	P	CL
10	Haryana	25	25	CL
11	Himachal Pradesh	18	18	CL
12	Jammu & Kashmir	21	21	Jammu & Kashmir Liquor License & Sale Rules, 1984 (Rules made under J&K Excise Act, 1958) https://www.newslaundry.com/2015/09/30/indias-prudish-alcohol-laws-that-preach-victorian-morality-and-insult-intelligence/
13	Jharkhand	21	21	CL
14	Karnataka*	21/18	21/18	https://www.thehindu.com/news/cities/bangalore/Is-legal-age-to-drink-in-Karnataka-18-or-21/article13982569.ece
15	Kerala**	18	18	CL
16	Madhya Pradesh	21	21	CL
17	Maharashtra***	21	21	CL
18	Orissa	21	21	CL
19	Pondicherry	18	18	CL
20	Punjab	25	25	CL
21	Rajasthan	18	18	CL
22	Tamil Nadu****	21	21	CL
23	Uttar Pradesh	21	21	CL
24	Uttarakhand	21	21	CL
25	West Bengal	21	21	CL

Notes: CL stands for "Chakraborty, T., Lohawala, N. (2021). Women, Violence and Work: Threat of Sexual Violence and Women's Decision to Work (No. 14372). Institute of Labor Economics (IZA)."; P stands for Prohibition.

Our study excludes the following north eastern states and Union territories (UT) : Nagaland, Manipur, Tripura, Meghalaya, Daman Diu, Lakshadweep , Andaman Nicobar islands.

*Karnataka MLDA suffers from a contradiction within the excise dept. The legal drinking age is 21 as per Karnataka Excise Department (1967) and 18 as per the Karnataka Excise Act (1965). We choose 21 as MLDA for Karnataka in our study and include the results for MLDA as 18 in Table A2 and Table A3.

**Kerala changed its MLDA from 18 to 21 years in mid 2012. IHDS 2 field survey lasted from Nov 2011 - Oct 2012. Thus, we use 18 as the MLDA for Kerala.

***Maharashtra changed its MLDA for hard liquor from 21 to 25 years in 2011. We use 21 as the MLDA for Maharashtra.

****Tamil Nadu changed its MLDA from 18 to 21 years in 2004. We use 21 as the MLDA for Tamil Nadu.

The MLDA of Jammu and Kashmir, Goa and Dadra Nagar Haveli relies on online sources.