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Abstract

Taxation affects the prices of commodities and influences consumer behaviour. Increasing taxes on intoxicants are expected to discourage consumption. However, the price elasticity of demand for intoxicants is often low compared to standard (normal) goods. Since the distortionary impacts of taxation on intoxicants are low (in terms of deadweight losses) compared to standard goods, higher taxes are applied to intoxicants. The effect of taxes on intoxicants in terms of price changes also depends on the shifting of the tax burden to consumers. Taxation as a tool to alter prices and, consequently, consumer behaviour becomes less effective when informal supplies of intoxicants (e.g., spurious, untaxed, contraband, smuggled, locally made alternatives) exist in the market. Assessing the price elasticity of demand for alcoholic beverages is the first step in understanding the effectiveness of alcohol taxation policies in India. In this paper, we estimate the own price, cross-price, and income elasticities of demand for foreign liquor (also known as Indian-made foreign liquor) and beer. We examine substitutions across beverage types and consider informal and unregulated supply channels. This study also differentiates between the price sensitivity of poorer households and more affluent ones. Using nationally representative household data for 2022–23 and 2023–24, we find that the own-price elasticity of demand for beer and foreign liquor ranges from –0.27 to –0.17, indicating moderate responsiveness to price changes. Elasticity estimates based on total MPCE range from 0.42 to 0.80, suggesting that increased household expenditure correlates with higher consumption. Substitution effects with country liquor were significant in 2022–23 but diminished in 2023–24. These findings provide timely evidence to inform alcohol taxation policies in India and highlight the need for targeted strategies that consider income groups, price sensitivity, and changing substitution patterns. The implications are substantial, raising questions about the effectiveness of current alcohol taxation measures and encouraging discussion on potential improvements.

Key Words: Price elasticity, cross-price elasticity, income elasticity, alcoholic beverages, consumption expenditure, India.

JEL Codes: H21, H22, H31, I18, P36.

1. Introduction

According to optimal taxation theory, the tax rate on a commodity should ideally be set in proportion to the inverse of its price elasticity of demand. Most normal goods are price elastic, so demand generally declines as prices increase. However, demand for intoxicants such as tobacco, tobacco products, and alcoholic beverages tends to be relatively price inelastic. As habitual goods, when prices rise, consumers often do not reduce their consumption of intoxicants as much as they do for standard goods. Consequently, intoxicants are subject to high tax rates to minimise the distortionary effects of taxation and to raise public revenue. It is believed that, at the margin, higher prices will discourage consumption, which benefits society through positive externalities, namely marginal social benefits, and enhances consumer health, producing positive internalities. Besides price elasticity and cross-price elasticity—reflecting the prices of substitutes—the income elasticity of demand for intoxicants is also a key factor in designing an effective tax system for these products. The availability of alternatives to taxed intoxicants, such as supplies from informal, unregulated sources or locally produced substitutes, diminishes the effectiveness of taxation as a means to deter consumption. Therefore, alongside taxation, regulations governing the manufacturing and distribution of intoxicants are vital to control their supply to consumers.

Alcohol consumption patterns in India have gradually but significantly evolved over time (Das et al., 2006). Over the past decade, the consumption of alcoholic beverages has risen notably. According to the National Sample Survey Office's (NSSO) Household Consumption Expenditure Survey (HCES), a comprehensive and nationally representative survey on household consumption patterns and expenditure, the average annual per capita consumption of alcoholic beverages increased from 2.6 litres in 2011–12 to 3.9 litres in 2022–23 in rural areas, and from 1.2 litres in 2011–12 to 2.7 litres in 2022–23 in urban areas (Badola & Mukherjee, 2025). This has important implications for public health, as alcohol consumption can negatively impact individuals' health (Lim et al., 2012; Whiteford et al., 2013; Baan et al., 2007) and socioeconomic conditions (Gururaj et al., 2021). The World Health Organisation (WHO) estimates that around 30 per cent of the Indian population consumes alcohol, with a significant proportion exhibiting harmful or hazardous drinking patterns (WHO, 2024). This increasing trend in alcohol consumption is accompanied by a rise in alcohol-related health issues, including liver cirrhosis, cancers, and injury-related events (Gururaj et al., 2021; WHO, 2024). These diseases add to the burden on the healthcare system and worsen existing public health challenges. Concurrently, alcohol consumption also has broader economic consequences. For many families, particularly those with limited income sources, expenditure on alcohol often displaces spending on essentials such as food and vital services like healthcare and education. This situation not only heightens existing vulnerabilities but can also drive families further into poverty when higher out-of-pocket healthcare costs are factored in.

There are three main objectives for taxing alcoholic beverages: mobilising revenue, discouraging consumption for health and social benefits, and recovering the social costs associated with consumption. Apart from mobilising revenue and discouraging consumption, the goal of internalising social costs through taxation is often overlooked. Besides levying cesses and surcharges on alcoholic beverages to fund specific social sector expenditures, such as education, health, and de-addiction centres, tax policy can also help recover social costs. The

social costs or most of the adverse effects of consuming alcoholic beverages are attributable not to consumption per se but to excessive consumption (Government of Karnataka, 2001). Therefore, existing tax policies, as well as regulatory systems, aim to restrict the consumption of alcoholic beverages in terms of quantity and manner, including prohibiting drinking in public places, near schools, hospitals, religious institutions, and among individuals below a certain age. Both policies—taxes and regulations—intervene to restrict the supply and demand of alcoholic beverages.

This paper aims to estimate the price elasticity of alcohol consumption in India. Using the NSSO's HCES of 2022–23 and 2023–24, it provides estimates of the demand elasticity (in quantity) for various alcoholic beverages. The findings could inform the development of alcohol tax policies in states to minimise harmful consumption, while considering household-level substitution and trade-off behaviours.

2. Literature Review

Existing research highlights both the public health burden and the complex economic and social implications of alcohol consumption in India and around the world. While the harmful effects of alcohol on health, such as liver cirrhosis, cancers, and injury-related morbidity, are well-established (Lim et al., 2012; Whiteford et al., 2013; Baan et al., 2007), evidence also points to broader patterns of vulnerability. Households with limited resources often face complex trade-offs when alcohol expenditure displaces spending on essential goods and services, such as food, healthcare, or education, thereby reinforcing cycles of deprivation and vulnerability (Benegal, 2005; Bonu et al., 2005). Similarly, alcohol use has been shown to contribute to increased risks of domestic violence and psychological trauma within families (Nayak et al., 2009; da Silva Maia et al., 2022; Sontate et al., 2022), emphasising the need for policy approaches that are sensitive to both health and social dimensions.

From a policy perspective, taxation has long been seen as a key tool to reduce excessive consumption and raise public funds. However, its effectiveness depends on how much consumers change their consumption behaviour in response to price shifts. The literature analysing this relationship shows mixed results across different settings. Global meta-analyses in high-income countries suggest that alcohol demand tends to be moderately sensitive to price changes, with estimated elasticities generally around −0.5, meaning that a 10 per cent increase in price is linked to a 5 per cent decrease in consumption (Gallet, 2007; Wagenaar et al., 2009; Fogarty, 2010). Importantly, this sensitivity varies between beverage types, with beer generally being less responsive to price changes than wine and spirits, as well as among different socioeconomic groups.

In the Indian context, however, empirical evidence remains relatively limited and outdated. Early contributions by Musgrave and Stern (1988) used data from Karnataka during the 1970s to estimate the price elasticity of arrack between –0.47 and –0.62, indicating moderate responsiveness. Reddy et al. (1999) reported even higher elasticity among arrack consumers in Andhra Pradesh, with estimates ranging from –1.23 to –1.36, although their sample size was limited, warranting cautious interpretation. Mahal (2000), adopting a simulation approach, highlighted that younger individuals aged 15 to 25 years may be more responsive to price

changes, with an elasticity of -1.0. These findings collectively suggest that price interventions can influence consumption patterns, but their magnitude and distribution remain uncertain.

The NSSO's Household Consumption Expenditure Surveys also document shifts in the composition of alcohol consumption over time, with the share of foreign/refined liquor or wine and beer increasing in urban settings relative to country liquor (Dsouza et al., 2025). This evolution in preferences and market structure suggests that elasticity estimates derived from earlier studies may no longer accurately reflect current behaviours or substitution dynamics. Furthermore, recent analysis has highlighted the need for a more nuanced understanding of how evolving pricing strategies and expanded market access influence household decisions (Schess et al., 2023).

Although existing studies have established an important foundation, significant gaps still exist in the literature. Much of the evidence does not systematically evaluate substitution across different beverage types or consider informal and unregulated supply channels. Additionally, many estimates rely on regional data or simulation techniques rather than comprehensive national datasets. In this context, updated and reliable elasticity estimates derived from recent, nationally representative surveys are crucial for guiding taxation strategies that align with current consumption patterns.

By providing new empirical estimates of price elasticity, this study seeks to enhance the evidence base that policymakers can rely on when designing tax policies and assessing their likely impacts. This analysis aims to offer reliable benchmarks for understanding how price variations affect overall alcohol demand in India's rapidly changing consumption landscape.

3. Methodology

This study utilises the NSSO's HCES of 2022-23 and 2023-24, which provide detailed information on monthly household consumption (in value and quantity) of various types of alcoholic beverages (such as toddy, country liquor, beer, foreign/refined liquor or wine, and other intoxicants). Table 1 shows the number of sample households reporting the consumption of different alcoholic beverage types. It is evident that three main types of liquor are consumed: country liquor, foreign liquor, and beer. In this study, foreign liquor and beer are combined as a single category, with country liquor regarded as a substitute. The reason for this is that foreign liquor and beer are subject to higher taxes than country liquor across Indian states. When treating country liquor as a substitute, the interaction with the source from which country liquor is procured is included to account for non-market purchases and their effect on prices.

Table 1: Number of Households Reported to have Liquor in Samples

Liquor types	2022-23	2023-24
Toddy	4,322	5,841
Country liquor	33,543	36,089
Beer	19,587	22,428
Foreign/refined liquor or wine	26,633	32,984
Total Number of Households Reporting Consumption of Alcoholic Beverages	84,085	97,342
	(32.12)	(37.16)
Total Number of Households Surveyed	**2,61,746**	**2,61,953**

Note: Figures in the parentheses show the percentage of the Total Number of Households Surveyed. It is worth noting that, as this study focuses specifically on liquor consumption, other intoxicants are not included in the analysis.

Source: Compiled from the NSSO's HCES

To estimate price elasticity, we adopt the methodology developed by Deaton in the late 1980s, which has been successfully applied in subsequent studies, including Gjika et al. (2020). This methodology leverages household survey data alongside regional price variations to model consumer behaviour. In the context of Indian household surveys, which often lack detailed price data, unit values defined by Deaton (1980) as the expenditure on a good divided by its quantity are used as a proxy for actual prices.

Despite potential inaccuracies in household-level price data, unit values are preferred for their relative accuracy.

Focusing specifically on households that report liquor consumption, this study applies Deaton's approach to model conditional demand, effectively isolating consumers' behaviour. This contrasts with broader models that may also consider the decision to start consuming liquor.

The modified Deaton model is articulated through the following equations:

$$\ln(q_{hc}) = \beta_0 + \theta_0 \ln(x_{hc}) + \gamma_0 z_{hc} + \delta \ln(p_c) + \tau_1 \ln(ps_c) + v_1 \text{PurchaseBF}_{hc} + d_1 \text{PurchaseCL}_{hc} + d_2 \text{PurchaseCL}_{hc} \times \ln(ps_c) + u_{0hc} \quad (1)$$

Where,

$\ln(q_{hc})$ denotes the quantity of beer and foreign liquor consumption of household h in region c.
x_{hc} signifies the total expenditure of household h in region c.
p_c indicates the average price of beer and foreign liquor in region c.
ps_c indicates the price of country liquor (substitute for foreign liquor and beer) in region c.
PurchaseBF_{hc} is a dummy variable where it is one when beer/foreign liquor is purchased and zero otherwise for household h in region c1.
PurchaseCL_{hc} is a dummy variable where it is one when country liquor is purchased and zero otherwise for household h in region c.
u_{0hc} is the error term used in the econometric analysis.
z_{hc} are control variables encompassing various other characteristics of household h in region c.

1 'Not purchasing' includes consumption from home-grown stock, free collection, exchange of goods and services, gifts or charity, and other unspecified sources.

In equation 1, δ denotes the price elasticity of quantity demanded for beer and foreign liquor. τ_1 shows the cross-price elasticity of demand for beer and foreign liquor when country liquor is not purchased, whereas $\tau_1 + d_2$ represents the cross-price elasticity of demand for beer and foreign liquor when country liquor is purchased from a market.

Table 2: List of Control Variables

Categories of Control Variables	Variables
Sector	Rural*
	Urban
Occupation	Self-Employment in Agriculture
	Self-Employment in Non-Agriculture*
	Regular wage/salary earning in Agriculture
	Regular wage/salary earning in Non-Agriculture
	Casual labour in Agriculture
	Casual labour in Non-Agriculture
	Households with no engagement in Economic Activity
Caste	SC*
	ST
	OBC
	Others
Religion	Hindu*
	Islam
	Christianity
	Sikhism
	Jainism
	Buddhism
	Others
Household Composition	Share of Children in the Total Number of Households
	Share of Young Adults in the Total Number of Households
	ln(Household size)
Education	Number of family members who completed graduation and above

Note: *-Represents the base (benchmark) for the respective category.
Source: Computed by authors based on the NSSO's HCES.

The decision to focus on the actual quantity of beer and foreign liquor consumed is guided by the complex ways consumers respond to price changes. However, when beer prices increase, overall spending on these beverages may still go up, even if the amount consumed stays the same or drops. This variation in consumer behaviour is seen in different households, where some report higher expenditure on alcoholic drinks despite higher prices, while others seem to choose cheaper options or consume less. Therefore, analysing total consumption value can help understand how price changes influence consumption patterns of beer and foreign liquor, offering a clearer picture of consumer responses. This approach effectively isolates the direct effects of price shifts on alcohol consumption from their broader impact on household spending.

$$\ln(value_{hc}) = \beta_0 + \theta_0 \ln(x_{hc}) + \gamma_0 z_{hc} + \delta \ln(p_c) + \tau_1 \ln(ps_c) + v_1 PurchaseBF_{hc} + d_1 PurchaseCL_{hc} + d_2 PurchaseCL_{hc} \times \ln(ps_c) + u_{0hc} \quad (2)$$

In equation two, $value_{hc}$ denotes the value (expenditure on) of beer and foreign liquor consumed by the household h in region c. The coefficient δ measures the responsiveness of value consumed to price changes, capturing the essence of price elasticity. τ_1 shows the cross-price elasticity with reference to country liquor when it is not purchased. It should be noted that the interaction term between the country liquor price (i.e., $\ln(ps_c)$) and the dummy variable $PurchaseCL_{hc}$ represents the cross-price elasticity of foreign liquor and beer with reference to country liquor. The results for equation two are presented in the appendix.

This approach differs from the Almost Ideal Demand System (AIDS) by prioritising value and quantity instead of modelling consumer preferences for goods. The methodology ensures robustness by applying sampling weights to correct potential biases caused by unequal selection probabilities across the population. This improved method allows for a more accurate representation of the population, supported by controlling for various demographic and socioeconomic factors.

Additionally, the analysis includes a detailed examination of how price elasticity varies among households with different economic backgrounds, using the detailed categories from the NSSO survey, such as ration (Public Distribution System) card types, which reflect economic status. This study highlights the differing price sensitivities between poorer households and more affluent ones.

This methodology not only follows established economic modelling techniques but also adapts them to the specific context of liquor consumption in India, offering a comprehensive framework for understanding demand dynamics in response to price changes.

4. Results

Tables 3 and 4 together offer a comprehensive view of the changing patterns of alcohol consumption in India, differentiating between macro-level per capita estimates and household-level characteristics used for econometric analysis. Table 3 shows the average monthly per capita expenditure and quantity consumed by households that reported drinking alcohol, calculated at the macro population level by dividing total consumption expenditure and quantity by the number of households consuming in both rural and urban areas. Table 4 presents the household-level details used in the analysis, including changes in quantity consumed, prices, and overall spending.

Table 3 indicates that in rural areas, expenditure on country liquor stayed roughly constant between 2022–23 and 2023–24 (Rs 132.47 to Rs 133.93), accompanied by a slight reduction in the quantity consumed (0.81 litres to 0.64 litres). This implies that while overall spending level remained stable, households may have shifted towards cheaper options or slightly decreased their consumption volumes. For beer and foreign/refined liquor, both expenditure and quantities consumed declined. In rural areas, annual spending on beer fell from Rs 214.16 to Rs 201.21, and on foreign/refined liquor from Rs 338.06 to Rs 274.03, with corresponding decreases in

quantities consumed. These patterns probably reflect price pressures or substitution towards country liquor, aligning with expected income and price elasticity effects.

Urban areas displayed a somewhat different pattern. Annual expenditure on country liquor rose modestly (Rs 176.79 to Rs 185.36), despite a slight decline in quantity (from 0.77 litres to 0.69 litres). This indicates the possibility of price increases or a shift towards higher-priced brands. For beer, annual expenditure decreased (from Rs 283.20 to Rs 261.21), but the quantity remained steady at 1.20 litres, suggesting relative stability in consumption despite the lower expenditure. This may reflect lower unit values. Foreign/refined liquor in urban areas showed apparent declines in both expenditure and quantity, further confirming reduced demand for premium beverages during this period.

Table 3: Average Monthly Per Capita Expenditure on Alcoholic Beverages (Rs), with Quantity Consumed in Litres (in Parentheses)

	2022-23	2023-24
Rural		
Country Liquor	132.47	133.93
	(0.81)	(0.64)
Beer	214.16	201.21
	(0.99)	(0.90)
Foreign/refined liquor or wine	338.06	274.03
	(0.47)	(0.39)
Urban		
Country Liquor	176.79	185.36
	(0.77)	(0.69)
Beer	283.20	261.21
	(1.20)	(1.20)
Foreign/refined liquor or wine	443.31	301.41
	(0.51)	(0.47)

Notes: Figures in parentheses indicate average monthly per capita consumption in litres. It is important to note that Table 3 presents average monthly per capita expenditure and quantity based only on households that reported alcohol consumption. Appendix Table A1 provides population-level averages that include both consumers and non-consumers. As a result, the figures in Table A1 are lower. However, the overall trend across the two years remains broadly similar in both tables.
Source: Computed by authors based on the NSSO database

Table 4 complements Table 3 by offering household-level summary statistics for the variables used in the regression models. Notably, the mean of ln(q), the natural logarithm of the quantity consumed, decreased from 0.24 in 2022–23 to 0.15 in 2023–24. This aligns with the per capita declines noted in Table 3. The mean of ln(p), the natural logarithm of unit value prices, rose from 3.45 to 3.54 over the same period, indicating upward pressure on prices. This is further supported by the increase in ln(ps), the price of substitutes (country liquor), from 2.85 to 3.13.

Notably, ln(x), representing household total expenditure, rose slightly from 9.76 to 9.85, indicating rising consumption expenditure of households. However, this increase did not translate into higher average quantities of beer and foreign liquor consumed. This reinforces

the interpretation that the price effect and the substitution effect toward cheaper options outweighed any positive income effect.

The purchase indicators further reveal consistent buying patterns among reporting households. The observed changes in both expenditure and quantity, along with rising unit values, emphasise the significance of price elasticity and substitution effects in shaping alcohol consumption dynamics.

Table 4: Descriptive Statistics

	2022-23	**2023-24**
Variable	Obs. Mean Std. dev.	Obs. Mean Std. dev.
Value		
ln(value)	43,862 4.99 1.11	51,663 4.99 1.08
q		
ln(q)	43,862 0.24 0.85	51,663 0.15 0.81
p		
ln(p)	2,39,116 3.45 1.38	2,44,284 3.54 1.54
ps		
ln(ps)	2,30,626 2.85 1.56	2,25,265 3.13 1.68
ln(x)	2,61,746 9.76 0.59	2,61,953 9.85 0.58
PurchaseBF		
Others	43,862 0.01 0.10	51,663 0.01 0.08
Purchase	43,862 0.99 0.10	51,663 0.99 0.08
PurchaseCL		
Others	33,543 0.02 0.14	36,089 0.01 0.12
Purchase	33,543 0.98 0.14	36,089 0.99 0.12

Source: Computed by authors based on the NSSO database.

Table 3 shows the average monthly per capita consumption estimates at the national level, calculated by dividing the total consumption by the total population. In contrast, Table 4 presents descriptive statistics at the household level, which are used in the regression analysis.

The regression results shown in Tables 5 and 6 offer a detailed analysis of the factors influencing the total quantity of beer and foreign liquor consumed, estimated separately for 2022–23 and 2023–24. The models utilise Deaton's unit value method to identify the effects of price, income, and substitution patterns, while controlling for household socioeconomic characteristics.

In 2022–23 (Table 5), the coefficient of ln(p), which represents the own-price elasticity of quantity consumed, is negative and statistically significant across all specifications, with point estimates of –0.25 and –0.27. This shows that a 10 per cent increase in the combined price of beer and foreign liquor was associated with, on average, a 2.6 per cent decrease in quantity consumed. The size of this elasticity indicates that consumption is moderately responsive to price changes, aligning with the expectation that higher-taxed beverages are more sensitive to price fluctuations.

The cross-price elasticity concerning the price of country liquor (ln(ps)) is also negative and significant in most models, with coefficients ranging from –0.20 to –0.23. This suggests that, on average, increases in the price of country liquor are linked to decreased consumption of beer and foreign liquor, implying that for many households, country liquor is not merely a substitute but part of a broader consumption portfolio. However, the positive and significant interaction term (PurchaseCL × ln(ps)) indicates substitution among households that buy country liquor. The coefficients of this interaction range from 0.17 to 0.21, showing that when country liquor is purchased, a rise in its price leads to a partial shift towards beer and foreign liquor. This aligns with the modelling approach that differentiates households based on their actual purchasing behaviours.

The coefficient on ln(x), which measures income elasticity, is positive and significant in all specifications, ranging from 0.42 to 0.63. This indicates that a 10 per cent increase in household total expenditure is associated with a rise in the quantity of beer and foreign liquor consumed by approximately 4.2 to 6.3 per cent. This elasticity highlights the continued status of these beverages as aspirational goods among households with higher purchasing power.

The PurchaseBF variable shows positive and significant coefficients (0.17 to 0.30), confirming that among households reporting purchases, there is a consistently higher level of consumption. In contrast, PurchaseCL is associated with negative and significant coefficients, ranging from –0.82 to –0.94, indicating that households purchasing country liquor tend to consume smaller quantities of beer and foreign liquor, consistent with partial substitution in practice.

Table 5: Regression Results for Quantity Consumption (Equation 1): 2022-23

	lnq		lnq		lnq		lnq	
ln(p)	-0.25	***	-0.27	***	-0.25	***	-0.27	***
	(0.02)		(0.02)		(0.02)		(0.02)	
ln(ps)	-0.22	**	-0.23	**	-0.20	**	-0.22	**
	(0.09)		(0.10)		(0.09)		(0.09)	
PurchaseBF	0.30	***	0.18	**	0.24	***	0.17	**
	(0.08)		(0.08)		(0.08)		(0.08)	
PurchaseCL	-0.94	**	-0.85	**	-0.82	**	-0.83	**
	(0.41)		(0.41)		(0.40)		(0.41)	
PurchaseCL× ln(ps)	0.18	*	0.21	**	0.17	*	0.20	**
	(0.10)		(0.10)		(0.09)		(0.10)	
ln(x)	0.63	***	0.42	***	0.58	***	0.43	***
	(0.04)		(0.04)		(0.04)		(0.05)	
Constant	-3.71	***	-2.92	***	-3.21	***	-3.08	***
	(0.59)		(0.61)		(0.55)		(0.57)	
Sector	Yes		Yes		Yes		Yes	
Occupation	Yes		Yes		Yes		Yes	
Caste	Yes		Yes		No		No	
Religion	No		No		Yes		Yes	
Household Composition	Yes		Yes		Yes		Yes	
Education	Yes		Yes		Yes		Yes	
Observations	2,494		2,494		2,494		2,494	
R-squared	0.23		0.36		0.25		0.36	
State Fixed Effect	No		Yes		No		Yes	

Notes: Figures in the parentheses show the standard error
*** implies p<0.01, ** implies p<0.05, and *implies p<0.1
Source: Estimated by authors.

In 2023–24 (Table 6), the own-price elasticity of demand remains negative and significant but with smaller magnitudes compared to the previous year. The coefficients on ln(p) range from –0.17 to –0.18, indicating that the sensitivity of quantity demanded to price increases has decreased. This could reflect adaptation to higher prices or stabilisation of consumption preferences among existing consumers.

The cross-price elasticity to ln(ps) becomes weaker and mostly insignificant in 2023–24. The interaction term (PurchaseCL × ln(ps)) loses significance in most specifications, indicating that the substitution effect observed earlier has become less noticeable. This suggests that as prices rose and households adjusted their purchasing behaviour, the potential for substitution between country liquor and higher-taxed alcoholic beverages decreased.

The income elasticity of demand rises in 2023–24, with the coefficients of ln(x) ranging from 0.55 to 0.80. This shows that the responsiveness of the quantity consumed to income growth has strengthened over this period. This trend matches expectations that among households continuing to consume beer and foreign liquor, consumption still closely relates to increases in household resources.

The PurchaseBF coefficient stays positive and statistically significant across all models (0.30 to 0.38), confirming the link between declared purchase and higher consumption levels. The negative coefficients of PurchaseCL in 2023–24 are smaller in magnitude and not significant compared to those in 2022–23, indicating some erosion of clear segmentation between households that mainly consume country liquor and those that consume higher-taxed beverages.

Overall, these results highlight several key trends. First, the own-price elasticity of demand for beer and foreign liquor remained significant but weakened in the latest period (2023-24), indicating that households became less responsive to price increases. Second, the substitution effect between country liquor and higher-taxed beverages was evident in 2022–23 but became less clear in 2023–24. Third, the income elasticity of demand increased in the later period, suggesting that among households consuming alcohol, rising resources were linked to proportionally larger increases in consumption. These findings emphasise the importance of modelling consumption as conditional on purchase behaviour and accounting for the diverse responses to price and income changes, as implemented through the Deaton-based estimation approach.

Table 6: Regression Results for Quantity Consumption (Equation 1): 2023-24

	lnq		lnq		lnq		lnq	
ln(p)	-0.17	***	-0.17	***	-0.18	***	-0.17	***
	(0.01)		(0.01)		(0.01)		(0.01)	
ln(ps)	-0.08		-0.10		-0.14	*	-0.11	*
	(0.07)		(0.07)		(0.07)		(0.07)	
PurchaseBF	0.36	***	0.30	***	0.38	***	0.30	***
	(0.11)		(0.10)		(0.11)		(0.10)	
PurchaseCL	-0.14		-0.51	*	-0.33		-0.55	*
	(0.33)		(0.29)		(0.31)		(0.29)	
PurchaseCL× ln(ps)	-0.01		0.11		0.06		0.12	*
	(0.08)		(0.07)		(0.07)		(0.07)	
ln(x)	0.80	***	0.56	***	0.77	***	0.55	***
	(0.03)		(0.04)		(0.03)		(0.04)	
Constant	-6.40	***	-4.48	***	-5.81	***	-4.38	***
	(0.45)		(0.50)		(0.41)		(0.48)	
Sector	Yes		Yes		Yes		Yes	
Occupation	Yes		Yes		Yes		Yes	
Caste	Yes		Yes		No		No	
Religion	No		No		Yes		Yes	
Household Composition	Yes		Yes		Yes		Yes	
Education	Yes		Yes		Yes		Yes	
Observations	3,847		3,847		3,847		3,847	
R-squared	0.23		0.35		0.25		0.35	
State Fixed Effect	No		Yes		No		Yes	

Notes: Figures in the parentheses show the standard error
*** implies p<0.01, ** implies p<0.05, and *implies p<0.1
Source: Estimated by authors.

Besides the main regressions on quantity consumed, the appendix tables (Table A2 and Table A3) present estimates where the dependent variable is the log of the combined value of beer and foreign liquor consumed. These results indicate that the own-price elasticity of value is positive and highly significant in both years, showing that as unit values increase, expenditure rises even if quantities decline or stay steady. This pattern aligns with the conceptual framework that higher prices can cause households to keep their spending levels consistent despite buying smaller amounts. The cross-price elasticity estimates and interaction terms mostly mirror the findings from the quantity regressions, with substitution effects visible in 2022–23 but weaker in 2023–24. Overall, these models strengthen the interpretation that rising prices have nuanced effects on household expenditure, influenced by both price sensitivity and the habitual nature of liquor among households that consume it.

6. Conclusions

The results of this analysis show how household alcohol consumption in India remains influenced by a combination of price sensitivity, substitution behaviour, and ongoing income effects. While the decline in the quantity consumed of beer and foreign liquor, along with rising unit values, indicates some success of price mechanisms in moderating demand, the continued resilience in expenditure highlights the limitations of relying solely on price-based measures to reduce alcohol consumption in India.

These patterns highlight the complex role of liquor as both a discretionary and habitual good in Indian households. For policy design, this suggests that taxation and pricing policies should be complemented by measures that address the structural factors sustaining demand, including social norms surrounding alcohol use, the accessibility of cheaper substitutes like country liquor, and the role of informal or non-market procurement.

Furthermore, the diminishing substitution effects over time suggest that as households adapt to sustained price increases, the potential to shift consumption from higher-taxed to lower-taxed categories decreases. This has practical implications: while initial price increases can encourage substitution away from premium products, over time, consumers may modify their budgets to sustain their established preferences. Policymakers seeking to reduce harmful consumption patterns must therefore take into account time dynamics and the persistence of consumption habits.

Finally, the strong and rising income elasticity observed across models highlights that improvements in household purchasing capacity are likely to lead to increased expenditure on alcohol unless preventive measures are strengthened. Public health strategies that combine price measures with awareness campaigns, targeted support for vulnerable groups, and stricter enforcement of regulations around the sale and distribution of alcohol will be essential to achieve sustained reductions in consumption.

This study has certain limitations that need to be acknowledged. First, the reliance on unit values as proxies for prices, although methodologically sound under Deaton's framework, may not fully account for variations in quality or unobserved transaction characteristics. Second, the analysis is based on self-reported expenditure and quantity data, which may be subject to underreporting or recall bias, particularly for goods like alcohol that can be stigmatised. Third,

while the regressions control for a wide range of household characteristics, potential unobserved heterogeneity across states and over time may still affect the estimated elasticities.

Future research could expand on this study by connecting these consumption patterns to health outcomes and exploring how differences in state-level policies influence household responses. Gaining a deeper understanding of the relationship between income growth, social factors, and market structures will be essential for creating interventions that are both effective and equitable.

References

Anderson, P., Chisholm, D., & Fuhr, D. C., 2009. Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *The Lancet*, 373(9682): 2234–2246.

Badola, S., & Mukherjee, S., 2025. Beyond Necessities: A Closer Look at Per Capita Consumption Expenditure on Tobacco and Alcoholic Beverages during the last Decade. NIPFP Working Paper No. 432 (30 July 2025), New Delhi: NIPFP (forthcoming).

Benegal, V., 2005. India: alcohol and public health. *Addiction*, 100(8): 1051–1056.

Bonu, S., Rani, M., Peters, D. H., Jha, P., & Nguyen, S. N., 2005. Does use of tobacco or alcohol contribute to impoverishment from hospitalization costs in India? *Health Policy and Planning*, 20(1): 41–49.

Das, S. K., Balakrishnan, V., & Vasudevan, D. M., 2006. Alcohol: Its Health and Social Impact in India. *National Medical Journal of India*, 19(2): 94.

Deaton, A., 1988. Quality, quantity, and spatial variation of price. *American Economic Review*, 78(3):418–430.

Dsouza, S. L., Chopra, R. R., & Nayak, R., 2025. The macroeconomic overview of the alcohol industry: a perspective from the emerging market of Asia. *International Journal of Wine Business Research*, *37*(2): 277-292.

Gjika, A., Zhllima, E., Rama, K., & Imami, D., 2020. Analysis of tobacco price elasticity in Albania using household level data. *International Journal of Environmental Research and Public Health*, 17(2): 432.

Government of Karnataka, 2001. First Report of the Tax Reforms Commission. Finance Department, Government of Karnataka, 12 February 2001.

Gururaj, G., Gautham, M. S., & Arvind, B. A., 2021. Alcohol consumption in India: A rising burden and a fractured response. *Drug and Alcohol Review*, 40(3): 368-384.

Lim, S. S., Vos, T., Flaxman, A. D., *et al.*, 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors in 21 regions, 1990–2010. *The Lancet*, 380(9859): 2224–2260.

Schess, J., Bennett-Li, L., Velleman, R., Bhatia, U., Catalano, A., Jambhale, A., & Nadkarni, A., 2023. Alcohol policies in India: a scoping review. *PloS one*, 18(11): e0294392.

Thornton, M., 1991. The economics of prohibition. Salt Lake City, UT: University of Utah Press.

Wagenaar, A. C., Salois, M. J., & Komro, K. A., 2009. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. *Addiction*, 104(2): 179–190.

Whiteford, H. A., Degenhardt, L., Rehm, J., *et al.* 2013. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904): 1575–1586.

World Health Organization, 2014. *Global status report on alcohol and health 2014*. Geneva: WHO Press.

World Health Organization. 2024. *Global status report on alcohol and health and treatment of substance use disorders*. World Health Organization. https://iris.who.int/handle/10665/376251

Appendix

Table A1: Population-Level Average Monthly Per Capita Expenditure on Alcoholic Beverages (Rs), with Quantity Consumed in Litres (in Parentheses)

	2022-23	2023-24
Rural		
Country Liquor	21.54	25.21
	(0.130)	(0.123)
Beer	11.31	13.11
	(0.052)	(0.058)
Foreign/refined liquor or wine	29.17	30.21
	(0.039)	(0.042)
Urban		
Country Liquor	12.33	14.03
	(0.055)	(0.053)
Beer	23.67	25.81
	(0.100)	(0.119)
Foreign/refined liquor or wine	23.67	25.81
	(0.100)	(0.119)

Note: Figures in the parentheses show the average monthly per capita consumption of alcoholic beverages in litres.

Table A2: Regression for lnvalue (2023-24)

	lnvalue		lnvalue		lnvalue		lnvalue	
ln(p)	0.83	***	0.83	***	0.82	***	0.83	***
	(0.01)		(0.01)		(0.01)		(0.01)	
ln(ps)	-0.08		-0.10		-0.14	*	-0.11	*
	(0.07)		(0.07)		(0.07)		(0.07)	
PurchaseBF	0.36	***	0.30	***	0.38	***	0.30	***
	(0.11)		(0.10)		(0.11)		(0.10)	
PurchaseCL	-0.14		-0.51	*	-0.33		-0.55	*
	(0.33)		(0.29)		(0.31)		(0.29)	
PurchaseCL× ln(ps)	-0.01		0.11		0.06		0.12	*
	(0.08)		(0.07)		(0.07)		(0.07)	
ln(x)	0.80	***	0.56	***	0.77	***	0.55	***
	(0.03)		(0.04)		(0.03)		(0.04)	
Constant	-6.40	***	-4.48	***	-5.81	***	-4.38	***
	(0.45)		(0.50)		(0.41)		(0.48)	
Sector	Yes		Yes		Yes		Yes	
Occupation	Yes		Yes		Yes		Yes	
Caste	Yes		Yes		No		No	
Religion	No		No		Yes		Yes	
Household Composition	Yes		Yes		Yes		Yes	
Education	Yes		Yes		Yes		Yes	
Observations	3,847		3,847		3,847		3,847	
R-squared	0.65		0.70		0.66		0.70	

Notes: Figures in the parentheses show the standard error
*** implies p<0.01, ** implies p<0.05, and *implies p<0.1
Source: Estimated by authors.

Table A3: Regression for lnvalue (2022-23)

	lnvalue		lnvalue		lnvalue		lnvalue	
ln(p)	0.75	***	0.73	***	0.75	***	0.73	***
	(0.02)		(0.02)		(0.02)		(0.02)	
ln(ps)	-0.22	**	-0.23	**	-0.20	**	-0.22	**
	(0.09)		(0.10)		(0.09)		(0.09)	
PurchaseBF	0.30	***	0.18	**	0.24	***	0.17	**
	(0.08)		(0.08)		(0.08)		(0.08)	
PurchaseCL	-0.94	**	-0.85	**	-0.82	**	-0.83	**
	(0.41)		(0.41)		(0.40)		(0.41)	
PurchaseCL× ln(ps)	0.18	*	0.21	**	0.17	*	0.20	**
	(0.10)		(0.10)		(0.09)		(0.10)	
ln(x)	0.63	***	0.42	***	0.58	***	0.43	***
	(0.04)		(0.04)		(0.04)		(0.05)	
Constant	-3.71	***	-2.92	***	-3.21	***	-3.08	***
	(0.59)		(0.61)		(0.55)		(0.57)	
Sector	Yes		Yes		Yes		Yes	
Occupation	Yes		Yes		Yes		Yes	
Caste	Yes		Yes		No		No	
Religion	No		No		Yes		Yes	
Household Composition	Yes		Yes		Yes		Yes	
Education	Yes		Yes		Yes		Yes	
Observations	2,494		2,494		2,494		2,494	
R-squared	0.56		0.63		0.58		0.64	

Notes: Figures in the parentheses show the standard error
*** implies p<0.01, ** implies p<0.05, and *implies p<0.1
Source: Estimated by authors.

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