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Research Article

EFFICACY DYNAMICS OF TEA AND COFFEE CONSUMPTION PATTERNIN INDIA AND ITS DETERMINANTS AT HOUSEHOLD LEVEL

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Abstract- A perceptible change in the quantity consumption and expenditure pattern on tea and coffee was evident across income groups and location of households in India. Low-income households consumed less quantity of these beverages as compared to middle and high-income households. Relatively, the proportion of expenditure on tea and coffee of low-income households was lower than the middle and high-income households in 2004-05, which decreased in all income groups in 2011-12. Similarly, rural households consumed lower levels of coffee and tea than the urban households, which decreased considerably over a period of time. Whereas, compared to tea, per capita consumption expenditure on coffee is very low and has shown a sharp decline across income groups over a period of time. The Heckman Sample Selection Model indicated house hold characters such as per capita income, education and urbanization as the major factors affecting both the preference for and expenditure on tea and coffee in India. These results are useful for developing the policy design and marketing strategies for the promotion of these two beverages in India.

Keywords- Coffee, Tea, Consumption, Heckman, Maximum Likelihood

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Introduction

Increase in household disposal income, changes in consumption preferences and growing urban areas have resulted in significant changes in the dietary pattern of households away from cereals to high value food commodities such as livestock products, fruits, vegetables and beverages [1, 3, 18 & 22]. Tea and Coffee are the most popular beverages in the world. Tea is the cheapest and most widely consumed beverage in the world, next to water [24]. Every day, world over 1.4 billion cups of coffee are consumed by consumers [14]. The tea and coffee sector plays a significant role in the country's economy. Tea exports constitute a significant part in country's total agricultural exports earnings. The Exports of tea from India during 2013-14 stood at 225.76 million Kg valued at US$ 760.58 million [19]. Coffee is the next important beverage in India contributing contributes about 4% towards the world coffee production and 4.67% of global coffee exports valued at US$ 765.80 [19].

The domestic demand for tea accounts for 76.18 per cent of total production while in coffee it forms 38.46 per cent of the total production (TE 2013-14). A strong domestic demand insulates the domestic producers and consumers against international price fluctuations. The consumption pattern of tea and coffee is changing and is identified as part of overall change in the diets of consumers. In this context, understanding the household characters that influence demand for tea and coffee in India assumes great importance. Several factors influence the demand for tea and coffee; their prices, tastes and preferences of the consumers, income of the consumers, change in the price of related goods, advertisement efforts and demographics factors including gender, literacy level, age, cultural background and occupation. Thus far, the research studies in India have primarily focussed on the magnitude of changes in the consumption pattern of food commodities[1 & 17]and analysing the impact of price and per capita income by estimating demand elasticities [16, 18, 20 & 21]. There is hardly any attempt in analysing the nature of demand and consumer preferences for tea and coffee in the Indian context. In fact, the influence of household level characteristics on consumption of tea and coffee is insufficiently understood in India. Therefore, the main objective of this study is to estimate the determinants of household demand for tea and coffee in the Indian context, which is crucial for arriving at marketing strategists for targeting and promotion of these beverages.

The paper is structured into four sections. The first section provides brief introduction along with research gap, in section two, methodology of the study including database, specific feature of the data and econometric tools employed in the analysis of the data. The section three comprises empirical results of the study and critical discussion of results. The final section is the conclusion that also provides some policy suggestions.

MaterialsandMethods

Data

The household data on dietary pattern and consumer expenditures collected by the National Sample Survey Organization (NSSO), Government of India at national level, particularly pertaining to the periods, 2004-05 and 2011-12 were used for this study to capture the temporal and spatial variation in the consumption of coffee and tea at household level. These comprehensive National Sample Survey (NSS) data with a sample size of over 100,000 households covering both rural and urban areas has a high acquiescent in research and drawing policy inferences. The detailed sampling procedure adopted are given in the reports on Household Consumption of Various Goods and Services in India for 2004-05 and 2011-12, released by the planning commission, Government of India. We used state wise poverty line to classify the entire sample size as low, middle

and high-income class. For this, poverty estimates, released by the planning commission, Government of India for 2004-05 and 2011-12 were used for each individual state. Accordingly, the 'low income' class comprised of households who have an income level below the poverty line (BPL), between BPL and up to 150 per cent of BPL was grouped as 'middle income' and households having per capita income above 150 per cent of BPL were categorized as 'high income' group.

Methodology

It is a common problem in the expenditure survey data on food commodities that large number of respondents may report non-participation or zero consumption of some of the food commodities due to taste and preference on specific food, socioeconomic and cultural limits confronted by the respondents [4]. In case of such a censored data, the use of ordinary least squares regression analysis yields biased, inconsistent and inefficient regression parameters since limiting the range of the dependent variable leads to a non-zero mean on the error term [12]. The single equation censored Tobit [25] model is used to deal with such censored data; it should be stressed that the model is unduly restrictive as it implicitly assumes that the independent variables have the same impact on the probability of preference and the consumption of food commodities. In our study, Heckman sample selection function is employed to accommodate such a kind of zero consumption or non-participation problem encountered in consumer expenditure survey data on tea and coffee. Following the notations from Yen and Rosinski (2008) [26], the Heckman sample selection model can be written as follows:

$$\begin{aligned} \log y &= x'\beta + v \quad if \quad z'\alpha + u > 0 , \\ y &= 0 \qquad\quad if \quad z'\alpha + u \le 0 , \end{aligned} \tag{1}$$

Where, y denotes the dependent variable of the model; x and z represent the vectors of independent variables, which explain the dependent variable; β and α denote conformable vectors of parameters; u and v are the error terms which are distributed as bi-variate normal with zero means and a finite covariance matrix:

$$\begin{bmatrix} u \\ v \end{bmatrix} \sim N\left\{\begin{matrix} 0 \\ 0 \end{matrix}\right\}, \begin{bmatrix} 1 & \sigma\rho \\ \sigma\rho & \sigma^2 \end{bmatrix} \tag{2}$$

where, σ denotes the standard deviation of v, and the correlation between u and v is represented by ρ. The standard deviation of u is not known, thus, it is a set at unity, given that the selection outcomes are observed as binary, which means that the value is either 1 or 0. The sample likelihood function is:

$$L = \prod_{y=0}[1-\Phi(z'\alpha)] \prod_{y>0}\Phi\left[\frac{z'\alpha+\rho(\log y - x'\beta/\sigma}{(1-\rho^2)^{1/2}}\right] y^{-1}\frac{1}{\sigma}\phi\left(\frac{\log - x'\beta}{\sigma}\right) \tag{3}$$

where y-1 is the Jacobian transformation from log y to y, and ϕ (·) and Φ(·) are the standard normal probability density function (pdf) and cumulative distribution function(cdf), respectively. When the errors are independent ($\rho = 0$), [Eq-3] reduces to that of a two-part model, in which case the log-likelihood function is separable in parameters α and $[\beta, \sigma]$, and therefore estimation can be broken down to a probit model (to estimate α) using the whole sample and a linear regression of log y on x (to estimate β and σ) using only the on-limit observations.

There is continued interest in the marginal effect calculation in the sample selection model. Based on the procedure given by Yen and Rosinski (2008), the conditional mean of the dependent variable y is:

$$E(y|y>0) = \exp(x'\beta + \sigma^2/2)\,\Phi(z'\alpha+\sigma\rho)/\Phi(z'\alpha) \tag{4}$$

Since the marginal probability of a positive observation is:

$$\Pr(y>0) = \Phi(z'\alpha) \tag{5}$$

the unconditional mean of y is:

$$E(y) = \exp(x'\beta + \sigma^2/2)\,\Phi(z'\alpha+\sigma\rho) \tag{6}$$

Differentiating [Eq-4, 5 and 6] gives the marginal effects on probability, conditional mean and unconditional mean of a common element of x and z (say $x_j = z_j$):

$$\partial \Pr(y>0)/\partial x_j = \phi(z'\alpha)\,\alpha_j \tag{7}$$

$$\begin{aligned} \partial E(y|y>0)/\partial x_j = [\Phi(z'\alpha)]^{-2} \exp(x'\beta+\sigma^2/2)\{[\Phi(z'\alpha)\,\phi(z'\alpha+\sigma\rho) \\ -\phi(z'\alpha)\,\Phi(z'\alpha+\sigma\rho)]\,\alpha_j + \Phi(z'\alpha+\sigma\rho)\,\beta_j\} \end{aligned} \tag{8}$$

$$\partial E(y)/\partial x_j = \exp(x'\beta+\sigma^2/2)[\phi(z'\alpha+\sigma\rho)\,\alpha_j + \Phi(z'\alpha+\sigma\rho)\,\beta_j \tag{9}$$

These marginal effects can be evaluated at data points of interest, such as the sample means of explanatory variables.

Variables Selection

Heckman sample selection model was estimated for tea and coffee consumption separately. Consumption expenditure on tea and coffee (₹) were considered as dependent variables. Based on the [Eq-1], the dependent variable refers to the natural logarithm of the total expenditure on tea and coffee incurred by a consumer in a year. Independent variables considered are: prices of tea leaf, number of tea cups, coffee powder and number of coffee cups, liquid milk and sugar (in ₹), per capita income (in ₹), household size (in numbers), age of household head (in years), education level, gender of household head (1 for female headed households and 0 for male headed households), a dummy variable for rural and urban households and a dummy variable for the presence of regular salary earners in the households. Choosing independent variables is one of the empirical issues in the estimation of the Heckman regression model. As in the other sample selection model, we used exclusion conditions to identify the model parameters. Although there are no a priori exclusion conditions for the current samples, we excluded the age variable in the consumption equation, which was used in the selection equation. Use of such different sets of variables in the two equations ensures that the model is identified. Stata version 13.0 was used to estimate the log likelihood function of the Heckman sample selection model and its marginal effects at different levels.

Price response was obtained on the basis of unit values. Unit price for tea, coffee, liquid milk, powdered milk and sugar was derived by dividing the value of these food items by respective quantity consumed by a particular respondent in a region. Price for these food items, which is not consumed by any respondent in a region, was given the average price of the corresponding region. The use of the unit value as a price for a food item have been applied by Deaton (1990; 1996) [7 & 8], Crawford et al. (2003) [5] and Kedir (2005) [15]. The prices of the tea, coffee, liquid milk and sugar were deflated with consumer prices index (CPI) of respective years to convert them into real values. We considered total per capita expenditure on food and non-food commodities as a proxy for per capita income, and therefore is used interchangeably in the present study.

Results and Discussion

Trend in production, export and consumption of tea and coffee in India

India is the second largest producer of tea in the world (23.71% of global production in 2013-14). The production of tea in India increased from 823 million Kilo gram (Kg)in TE 2001-02 to 1146 million kg in TE 2013-14 with an average annual compound growth rate of 2.04 per cent [Table-1]. During the same period, coffee production is also increased from 298 million kg to 312 million kg and registered a compound annual growth rate of 2.50 per cent. The pace of coffee exports has been higher (4.02 per cent) as compared to stagnated growth in export of Tea (0.01 per cent). Over the years, import of tea has been decreasing and became zero in TE 2013-14. Whereas, coffee import has been increasing mainly for re-exports in the form of instant coffee. The result indicates that domestic production of tea meets the total demand in terms of domestic consumption and exports while in the case of coffee, imports are on the increase mainly to meet the export demand [Table-1].

India is the second largest (20.68% of global consumption) consumer of tea in the

world. Of the total production of tea, 76.18 per cent is consumed within India. The per capita tea consumption in India increased from 646 grams during 1995-96 to 911 grams in 2013-14 with an annual compound growth rate of 2.31 per cent per annum. In spite of increased consumption, the per capita tea consumption in India is quite low as compared to per capita consumption in countries like Turkey (7.54 kg/annum), Ireland (3.22 kg/annum) and United Kingdom (2.74 kg/annum) (FAO Inter Governmental Group Secretariat, 2015). India has all the potential to increase its domestic demand in terms of premium tea as well as organic tea, where a growing number of consumers are prepared to pay a higher price for these products.

Table-1 *Trend in production, export and consumption of tea and coffee in India (Million Kg)*

Particulars	Production		Export		Consumption		Import	
	Tea	Coffee	Tea	Coffee	Tea	Coffee	Tea	Coffee
TE 2001-02	823	298	187	235	653	60	17	0
TE 2005-06	912	273	195	215	735	75	18	17
TE 2010-11	977	285	206	231	819	101	48	47
TE 2013-14	1146	312	219	310	873	120	0	118
Annual compound Growth rate (%)	2.04	2.50	0.01	4.02	2.90	4.37		

The trend in consumption of tea in four major consuming countries depicted in the [Fig-1] shows an increasing trend during 2009-10 to 2013-14 period except for Turkey. Growth in tea consumption was particularly higher in China with the growth rate exceeding 8 percent annually on a year to year basis and reached 1610 million Kg in 2013-14. In India, consumption expanded by 2.4 percent in 2009 to 6.6 percent in 2013 to reach 100 million Kg.

India produced 312 million Kg of coffee in the TE 2013-14 and consumed 120 million Kg (38.46 percent). The domestic coffee consumption in India witnessed a significant growth (4.37 per cent) during the period 2001-02 to 2013-14 [Table-1]. However, the annual per capita consumption at 60 grams (GAIN report, 2014) is much lower than the other exporting countries like Brazil (4.8 kg).USA is the largest consumer (143 million Kg) of coffee in the world followed by Brazil (122 million Kg) and Japan (42 million Kg) [Fig-2].

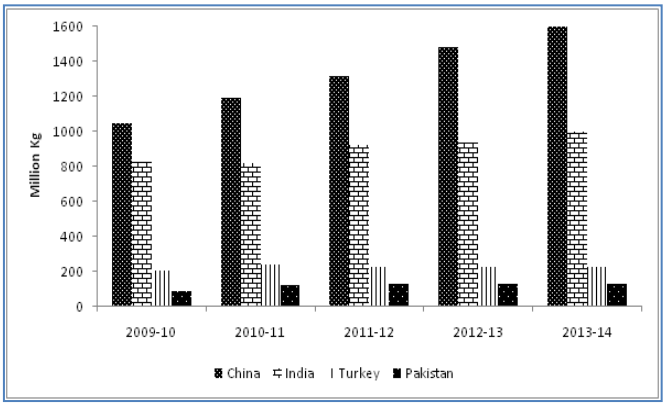

Fig-1 Trend in consumption of tea in major consuming countries

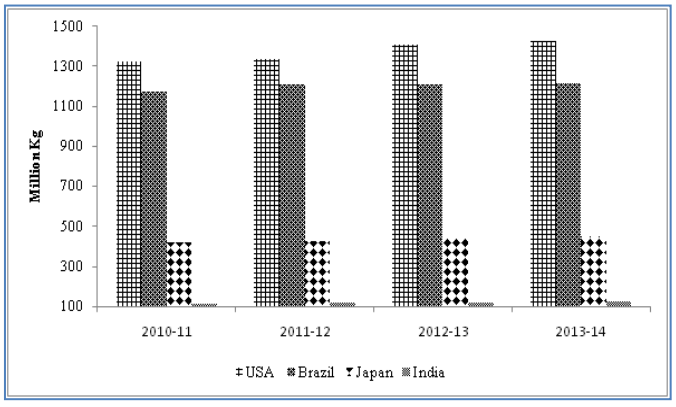

Fig-2 Trends in consumption of coffee in major consuming countries

According to CARE report (2014), domestic coffee consumption is expected to grow in India, which is attributed to the shift in perception of coffee from a traditional beverage that is consumed mainly in South India, to a youthful and trendy beverage consumed throughout the nation in several forms and retail formats. It is observed that, large number of consumers, particularly middle and higher income groups are switching from tea to coffee in India. Another major trend among younger consumers in India in the past few years has been the increasing attraction for a variety of coffee drinks such as espresso, cappuccino, latte and instant coffee promoted aggressively by private players. Consequently, the share of domestic coffee consumption in total production has increased from 19 per cent during 2000-01 to 41 per cent in 2014-15[14].

Changes in consumption pattern of tea and coffee in India at household level

The changes in consumption patterns of tea and coffee at the household level have been estimated using per capita consumption level during 2004-05 (61st round) and 2011-12 (68th round). Overall, there has been an increase in per capita consumption of tea in rural households from 713.59 gm in 2004-05 to 1003.13 gm in 2011-12 [Table-2]. Similarly, in urban areas, it increased from 810.61 gm to 1041.08 gm. Thus, the per capita increase in the consumption of tea was higher (40.58 percent) in rural households as compared to urban households (28.43 percent). During the same periods, the number of cups of tea consumed have declined in both rural (46.19 to 43.40) and urban (71.52 to 62.68) areas. Compared to tea, the coffee consumption was at a much lower level. In fact, a perceptible decline in consumption of coffee is witnessed in 2011-12 as compared to 2004-05 in both rural and urban areas. The per capita consumption of coffee powder decreased from 52.49 gm to 39.16 gm (25.40 percent) in rural areas and from 90.31 gm to 57.79 gm in urban area (36.01 per cent). Unlike tea, Coffee consumption was higher across urban households than rural households, which are attributed to the existence of cafe and restaurants in urban areas. Consumption of tea and coffee in cups is practiced outside the home and was higher among the urban households as compared to rural households. The increasing trend in tea leaf consumption across all income groups in both rural and urban areas has contributed to higher growth in its consumption, while coffee consumption witnessed a decrease across income groups in both rural and urban households.

The annual per capita expenditure on tea increased from Rs. 330.93 to Rs. 375.45 in rural areas and Rs. 477.07 to Rs. 514.19 in urban areas in 2011-12 as compared to 2004-05 [Table-3]. Increased expenditure on these two beverages is witnessed across all income groups. However, among the rural households, the share of consumption expenditure on tea to the total food expenditure decreased to 3.75 per cent in 2011-12 from 6.73 per cent during 2004-05. Similarly, the share decreased from 8.05 to 4.24 per cent among urban households. Compared to tea, per capita consumption expenditure on coffee is very low. The total consumption expenditure on coffee decreased marginally during 2011-12 as compared to 2004-05. Further, a decreasing trend is witnessed in the share of expenditure on coffee across all income groups in 2011-12 in relation to 2004-05 [Table-3]. This analysis clearly indicates tea as a dominant choice drink of households in India.

Determinants of demand for tea and coffee in India

In this section, we employed Heckman sample selection model to analyse the economic and demographic drivers of household demand for tea and coffee in

India. The results of ML estimation for tea shows that the estimated error correlation coefficient (ρ) between selection and consumption equations and its corresponding covariance term (λ) being significant. Besides, Likelihood Ratio (LR) test rejected independence of the error terms of the selection and consumption equations. However, in the case of coffee, LR test did not reject independence of the error terms of the selection and consumption equations [Table-4]. The results suggest the importance of selectivity correction in the present analysis of tea consumption. Most of the estimated coefficients in both the selection and consumption equations of tea and coffee were statistically significant.

Table-2 *Income group-wise, per capita consumption of tea and coffee in rural and urban India (Cups in number and leaf and powder in Kg)*

Income groups	Kind of Consumption	Rural			Urban		
		2004-05	2011-12	%change	2004-05	2011-12	%change
Tea							
Low	Cup	22.22	17.22	-22.53	38.88	29.20	-24.89
	Leaf	316.27	484.61	53.23	473.92	651.23	37.42
Middle	Cup	47.69	37.81	-20.72	65.98	55.24	-16.27
	Leaf	675.85	954.18	41.18	817.85	1064.24	30.13
High	Cup	68.68	75.19	9.48	109.69	103.59	-5.56
	Leaf	1148.64	1570.59	36.74	1140.06	1407.78	23.48
Aggregate	Cup	46.19	43.40	-6.04	71.52	62.68	-12.36
	Leaf	713.59	1003.13	40.58	810.61	1041.08	28.43
Coffee							
Low	Cup	0.65	0.09	-86.52	1.50	0.01	-99.16
	Powder	13.25	3.56	-73.11	19.22	8.30	-56.79
Middle	Cup	0.75	0.32	-56.83	2.13	0.51	-76.12
	Powder	33.17	23.30	-29.75	65.54	42.13	-35.72
High	Cup	3.77	2.05	-45.70	5.73	5.58	-2.57
	Powder	111.05	90.61	-18.41	186.17	122.93	-33.97
Aggregate	Cup	1.72	0.82	-52.49	3.12	2.03	-34.84
	Powder	52.49	39.16	-25.40	90.31	57.79	-36.01

Source: Extracted from unit level data of 61st and 68th rounds of consumer expenditure survey of the NSSO.

Table-3 *Income group-wise annual per capita expenditure on tea and coffee in rural and urban India [in Rs (₹)]*

Income groups	Tea		Coffee	
	2004-05	2011-12	2004-05	2011-12
Rural				
Low	139.37 (5.38)	142.15 (2.94)	4.19 (0.16)	0.98 (0.04)
Middle	290.78 (6.68)	324.51 (3.76)	9.47 (0.22)	7.14 (0.08)
High	562.66 (7.21)	659.69 (3.99)	46.18 (0.59)	34.13 (0.21)
Aggregate	330.93 (6.73)	375.45 (3.75)	19.95 (0.41)	14.08 (0.14)
Urban				
Low	231.01 (7.43)	225.94 (3.92)	6.07 (0.20)	2.36 (0.04)
Middle	443.34 (8.38)	470.89 (4.50)	21.58 (0.41)	17.34 (0.17)
High	756.87 (8.08)	845.75 (4.20)	92.15 (0.98)	98.49 (0.49)
Aggregate	477.07 (8.05)	514.19 (4.24)	39.93 (0.67)	39.39 (0.32)

Source: Extracted from unit level data of 61st and 68th rounds of consumer expenditure survey of the NSSO.
Note: Figures in the parentheses are percentage to total food expenditure

With the separate equations to accommodate sample selection and level, and with the logarithmic transformation in the dependent variables, the effects of explanatory variables on the probability and the level of consumption are non-trivial. Further, as discussed in the methodology section, marginal effects on probability, conditional and unconditional levels [Eq-7, 8 and 9] were estimated to explore the impacts of household characters on the probability of participation in the market and the consumption of tea and coffee, separately. The effects on the conditional level explain what makes those consuming these beverages consume either more or less i.e., the conditional marginal effects measure how the consumption of these beverages change due to a specific independent variable for current consumers. The effects on probability explain the binary decision on consumption, *viz.*, to consume or not to consume, i.e., the marginal effects of probability measure as how those consumers who are at zero consumption start consuming these beverages due to the influence of independent variables. The effects of unconditional level provide an overall assessment of what contributes to a consumption level by increasing (or decreasing) either the probability or conditional level.

Impact of changes in tea and coffee prices on household consumption

To assess the impact of independent variables on tea and coffee consumption, marginal effect is calculated using the ML results obtained from the Heckman sample selection model. The respective estimated marginal effects on probability, conditional and unconditional levels for tea and coffee are presented in [Table-5]. Increased price per gram of coffee powder and per cup coffee reduced the choice probability (0.42 and 1.95 per cent, respectively) of expenditure on coffee consumption. The average consumers (unconditional level) reduced their expenditure on coffee as its price increased. In contrast, prices of tea leaf and tea cup have a positive relationship with preference for and expenditure on tea consumption both at conditional and unconditional level. Rise in price per cup of coffee by one rupee increased the expenditure on tea consumption by Rs. 14.28 at conditional level and Rs. 15.46 at unconditional level. Similarly, one rupee increase in price per cup of tea increased the coffee expenditure by Rs. 3.01 at

conditional level and Rs. 2.06 at unconditional level.

Is coffee and tea a complement or a substitute for sugar and milk?

Our analysis indicates that, increased sugar price has negative impact on the consumption of tea and coffee at both conditional and unconditional levels. This means, a rise in the price of sugar leads to decline in expenditure on tea and coffee. Though coffee and sugar are complements, increased sugar price has negative impact on coffee consumption only at unconditional level. From the results; tea and sugar; coffee and sugar emerged as complements. On the contrary, the price of the milk has a positive impact on the consumption of tea (Rs. 0.59/- at conditional and Rs. 0.90/- at unconditional level) [Table-5]. The increased price of liquid milk resulted in an increased probability of preference and tea consumption. This may be attributed to growing demand for green tea and black tea, which is usually consumed without milk. While, milk price exhibited an inverse relationship with the preference and consumption of coffee, indicating coffee and milk as complements.

Table-4 *Results of maximum likelihoods (ML) estimates of Heckman sample selection model for tea and coffee*

Variables	Tea		Coffee	
	Selection equation	Demand equation	Selection Equation	Demand equation
Price of tea leaf	0.000 ns (0.001)	0.003** (0.000)	0.002 ns (0.001)	-0.011 ns (0.015)
Price of tea cup	0.094** (0.01)	0.083** (0.007)	0.058** (0.008)	0.022 ns (0.015)
Price of coffee powder	-0.002* (0.001)	-0.013** (0.001)	-0.14 ns (0.084)	-0.019 ns (0.047)
Price of coffee cup	0.047** (0.004)	0.026** (0.002)	-0.03** (0.003)	0.049** (0.01)
Price of sugar	0.002** (0.001)	-0.004** (0.000)	-0.026** (0.002)	-0.004 ns (0.006)
Price of liquid milk	0.009** (0.003)	0.000 ns (0.000)	-0.011** (0.002)	-0.003 ns (0.003)
Per capita income x 10^{-3}	0.067** (0.02)	0.098** (0.011)	0.056** (0.011)	0.073** (0.015)
Household size	0.051** (0.005)	-0.072 ns (0.002)	-0.039** (0.005)	-0.102** (0.009)
Education	0.035** (0.008)	0.033** (0.004)	0.107** (0.007)	0.056** (0.021)
Age in years	0.01** (0.001)	-	0.01** (0.001)	-
Gender of household head	-0.354** (0.028)	0.034* (0.014)	0.132** (0.027)	0.079 ns (0.054)
Regular salary earner	-0.053 ns (0.033)	0.155** (0.013)	-0.139** (0.024)	0.26** (0.044)
Urbanization	0.066 ns (0.021)	0.164** (0.01)	0.135** (0.023)	0.047 ns (0.041)
Constant	0.248 ns (0.08)	5.362** (0.035)	-1.175** (0.099)	4.611** (0.351)
Rho (ρ)	-0.726** (0.021)		0.207 ns (0.293)	
Sigma(σ)	0.825** (0.005)		0.847** (0.049)	
Lambda (λ	-0.599** (0.02)		0.175 ns (0.258)	
Wald test of independent of equations (rho=0) chi^2	421.39**		0.47ns	

Source: Extracted from unit level data of 61st and 68th rounds of consumer expenditure survey of the NSSO.
Note: ns indicates non-significant; ** and* indicate significant at one and five per cent level, respectively.

Changes in income and household consumption of tea and coffee

Tea and coffee consumption is influenced by income of the households. An increase in the monthly income of the households by Rs. 1000/- resulted in the additional tea expenditure of Rs. 46.27 at conditional level and Rs. 46.90 at unconditional level [Table-5]. Similarly, coffee expenditure increased by Rs. 14.68 at conditional level and Rs. 2.86 at unconditional level. Also, the probability of preference for the consumption of these beverages showed a positive relationship with income of the consumers. It indicates that, increase in the per capita income of the households will lead to increase in the consumption expenditure on both tea and coffee in India.

Demographic determinants of tea and coffee consumption

Tea and coffee consumption is further hypothesised to be determined by household level characters. Household size was inversely associated with the probability of preference and expenditure on coffee consumption. Whereas, in case of tea, household size exerted a positive impact on the probability of preference. Thus, an increase in household size increased the preference for tea, but decreased the preference for coffee. Age influenced positively the tea consumption. The education level of household head positively influenced the preference for and consumption expenditure on both beverages. Household heads with higher education levels were more likely to consume these beverages. The women headed households were found to consume more coffee in relation to tea. The households with regular salary earners influenced positively the consumption of both coffee and tea. Households in the urban areas are more likely to consume both tea and coffee being attracted to the modern cafe culture trends. This indicates the trend towards higher demand for these beverages in urban India. Overall, the consumption of tea and coffee was found to be influenced by variables like household size, income, gender, education, and location of consumers.

Conclusions and Policy Implications

Tea and coffee are the important traditional export earning crops of India. Tea production meets domestic and export demand while in coffee imports are on the increase mainly to meet the export demand. The growth rate of production, consumption and export of coffee was higher than the tea. Low income household not only consumed lesser quantity of tea and coffee but also spent relatively a smaller proportion of their total food expenditure on these beverages compared to higher income households. In recent years, the preference for healthier tea drinks

Table-5 *Determinants (marginal effect) of household characters on tea and coffee consumption*

Variables	Tea			Coffee		
	Probability (x 100)	Conditional level	Unconditional level	Probability (x 100)	Conditional level	Unconditional level
Price of tea leaf	0.00 (0.000)	1.446** (0.189)	1.387** (0.206)	0.03 (0.00)	-2.60 (3.572)	-0.121 (0.265)
Price of tea cup	0.84** (0.001)	41.297** (2.587)	43.164** (2.381)	0.80** (0.001)	3.006 (2.114)	2.055** (0.395)
Price of coffee powder	0.41** (0.00)	-5.838** (0.223)	-5.689** (0.21)	-0.42** (0.001)	0.357 (2.928)	-4.42* (2.336)
Price of coffee cup	-0.02* (0.00)	14.276** (0.898)	15.456** (0.857)	-1.95* (0.01)	12.226** (1.653)	-0.068 (0.176)
Price of sugar	0.01* (0.00)	-1.713** (0.18)	-1.578** (0.169)	-0.36** (0.001)	0.025 (0.348)	-0.817** (0.14)
Price of liquid milk	0.08** (0.00)	0.59** (0.183)	0.899** (0.279)	-0.15** (0.00)	-0.411* (0.206)	-0.369** (0.082)
Per capita income x 10^{-3}	0.60** (0.002)	46.266** (4.593)	46.902** (4.463)	0.78** (0.002)	14.68** (1.743)	2.864** (0.522)
Household size	0.45** (0.00)	-27.572** (0.907)	-24.512** (0.898)	-0.54** (0.001)	-21.921** (2.157)	-2.845** (0.504)
Education	0.31** (0.001)	16.331** (1.564)	16.967** (1.513)	1.49** (0.002)	9.149** (2.126)	4.083** (0.5)
Age in years	0.09** (0.00)	0.624** (0.053)	0.972** (0.078)	0.14 (0.00)	-0.347 (0.493)	0.304 (0.079)
Gender of household head	-14.02** (0.011)	-18.936** (2.679)	-34.146** (3.33)	2.85** (0.006)	11.781 (8.10)	7.17** (2.018)
Regular salary earner	-2.05 (0.013)	26.13** (3.582)	11.361 (4.427)	-2.56** (0.005)	61.428** (12.602)	0.915** (1.48)
Urbanization	2.52** (0.008)	37.844** (2.745)	28.173** (3.374)	2.91** (0.007)	5.407 (5.232)	6.355** (2.196)

Note: ns indicates non-significant; ** and* indicate significant at one and five per cent level, respectively.

such as green tea, black tea and organic tea is driving tea consumption in India, which offers opportunities for expanding the business. However, strong brand building with innovative and effective marketing strategies are key. On the contrary, though there is a high growth in domestic consumption of coffee, our analysis indicated that the per capita quantity consumption of coffee is abysmally low at household level and has decreased over the years across all income group households as compared to tea. The high growth at macro level is due to the low base value in domestic consumption of coffee and increased consumption in the recent years. Tea is clearly the choice drink in India irrespective of income levels in India. Domestic tea consumption accounted for over 3/4th of its total production, while domestic consumption of coffee forms about 38 per cent of its production. Promotion of coffee consumption in India has to be systematically undertaken so that over dependence on exports can be reduced to mitigate the fluctuations in international market prices as India is a minor player in the international market. The emerging coffee cafe culture in the recent years in the cities has contributed to higher coffee consumption in urban areas as compared to rural households. Per capita income, education and urbanization were the major drivers affecting both preference for and the consumption expenditure on tea and coffee in India. An increase in the price of tea did not influence significantly the expenditure on tea consumption, whereas, coffee prices affected inversely the preference for coffee consumption. Besides, household size, gender, education, and location of consumers acted as other drivers.

Conflict of Interest: None declared

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