

# A Simple Demand Supply Model of Alcohol Consumption in India

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## Abstract

*Alcohol consumption has seen sharp rise in India in last some time. In addition to the health risks it involves heavy socio-economic costs for the person consuming alcohol as well people around him. In this paper an attempt is made to examine the current pattern of consumption of alcohol, determinants of its demand and supply, price elasticity of demand for alcohol and its policy implications in order to assist the decisions of government from demand and supply perspective.*

**Keywords**— *Alcohol, demand, supply, consumption pattern, illicit production, elasticity, government.*

## I. INTRODUCTION

According to the estimates of Global Information System on Alcohol and Health (GISAH) harmful use of alcohol results in death of 2.5 million people annually worldwide. In 2012 alone about 3.3 million deaths in India were attributed to alcohol consumption. This amounts to some 5.9 percent of the global deaths that year. There are 60 different types of diseases where alcohol has a significant casual role. It also causes harm to the well-being and health of people around the drinker. Drinking is a prime cause of many social evils like domestic violence, increase in crimes, road accidents and rape cases to name a few. 3.8% of total deaths were attributable to alcohol in 2004. On an average 4.4% of family budget is spent on alcohol in a household which has active alcohol user. Expenditure on alcohol has high opportunity cost, especially in poor households which leads to welfare loss.

Supply and demand are the two forces that make market economies work. Production of every good is determined by the equilibrium of its demand and supply. Demand refers to how much quantity of a product or service is desired by buyers at a certain price and given point of time. The relationship between the price and quantity demanded is known as demand relationship. Supply, on the other hand, represents how much the market can offer. Equilibrium is the price quantity pair where the quantity demanded at a given price equals the quantity supplied at that price.

The law of supply and demand is the theory explaining the interaction between the supply of a resource and the demand for that resource. It defines the effect the availability of a particular product and the desire for that product has on price. The demand and supply of a good are multivariate variables which determined by many factors. Some of the most important determinants of the market demand for a particular product are its own price, consumer's income, price of other related commodities, consumer's tastes, income distribution, total population and government policy. Similarly, supply of a good is influenced by the price of the good, cost of production, transport condition, factor prices and availability and government policies.

## II. PATTERNS OF ALCOHOL CONSUMPTION IN INDIA

In India, the data availability of alcohol use, its effects and patterns have been poor. In the total spectrum of alcohol consumption in the country only about 50% is documented and the rest is undocumented. The availability of arrack, desisharab and tari makes it difficult to keep track of the production and consumption as most of the activity takes place behind the curtains. In some areas alcohol is even prepared at home through fermentation and distillation. This unorganized and informal production remains out of the purview of official documentation thus a holistic estimate of alcohol consumption and production is unavailable. However, a collective review reveals that 30% of adult men consume alcohol and among women, the estimated prevalence is less than 3%. India ranks as one of the largest alcoholic beverage markets across the globe. More than one fifth of total alcohol produced worldwide is consumed in India. The liquor industry is growing at a rate of 30% per year. The total value of alcoholic drinks consumed in India is projected to be Rs. 1.5 lakh crore in 2015. Almost 45 percent of 12th graders in metropolitan cities in India excessively consume alcohol and teenage drinking has increased by 100 percent during the last 10 years.

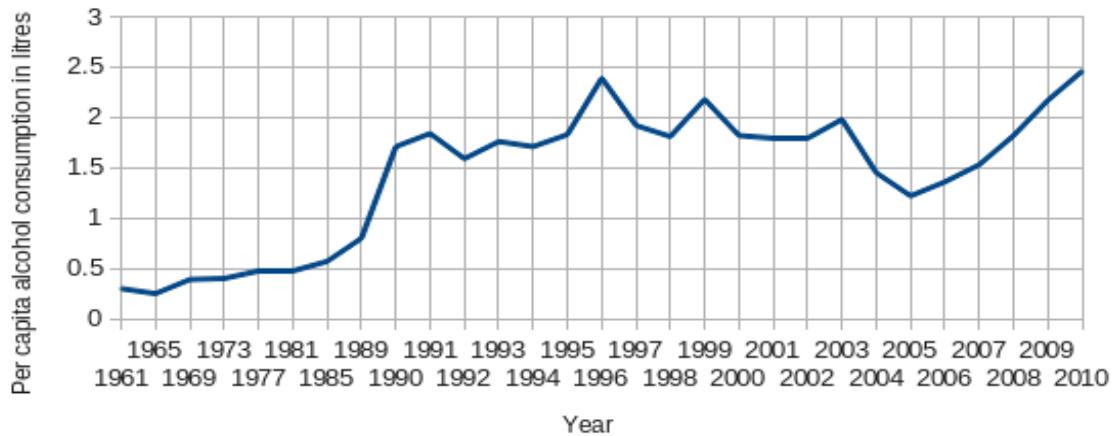
There are three noticeable features in alcohol consumption tendency in India. First is the persistent rise in the number of alcohol consumer instead of continuous efforts from the governmental side to keep

the alcohol consumption under check. According to OECD (Organisation for Economic Co-operation and Development), consumption of alcohol has risen by 55% in India during the period 1992-2012.

Second tendency is that of increase in average intake of alcohol by alcohol consumers. While an

individual's average consumption of alcohol is 6.2 liters per year worldwide, it is 4.3 liters per year for an average Indian consumer but the figure is 11.4 liters per year for an average rural consumer. The persistent rise in average intake of alcohol in India is evident from the below figure.

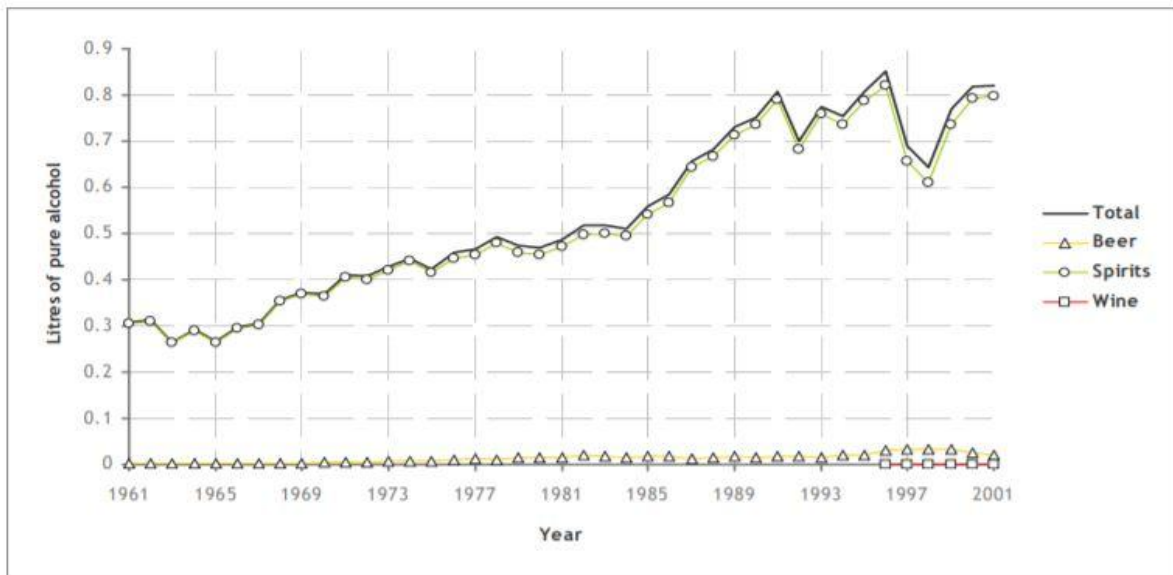
**Figure I**  
Alcohol consumption trend in India  
Historical data



Source: FAO (Food and Agriculture Organisation of the United Nations), WHO, World Drink Trends 2012

**Figure II**

Recorded adult per capita consumption (age 15+)



Source: FAO (Food and Agriculture Organisation of the United Nations), WHO, World Drink Trends 2003

Third feature of alcohol consumption is high ratio of spirits in the total consumption of alcohol against beer and wine like options. Spirits are easily available, difficult to be accounted for and governed by the government, cheap and involving high health hazards. The part of beer and wine are increasing but at a very low pace. While alcohol of all kinds is injurious to health, high prevalence of insecure means is even alarming.

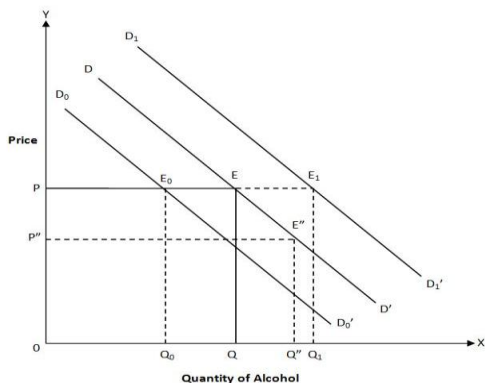
### III. DETERMINANTS OF DEMAND AND SUPPLY OF ALCOHOL

The factors that determine the demand and supply of other goods apply for alcohol as well.

Demand of alcohol is determined by its price, price of related goods, income of the consumer, tastes and expectations and to some extent affected by Bandwagon (Bandwagon effect is a psychological phenomenon in which people do something primarily because other people are doing it). While the relation of demand and price of alcohol determines the slope of the demand curve, other factors determine its position on the demand map.

Change in price of alcohol results in movement along the demand curve while changes in other determining factors causes the demand curve to shift either towards the center or away from centre depending upon the relation between the variable and demand of alcohol. If the variable is positively correlated to the demand, demand curve will shift outwards and vice versa. Every point on the demand curve is itself an equilibrium point of what that good costs and how much utility it entails. A person would be ready to pay that much for a good which equals the utility reaped from that good. Utility in economics is an ethics free phenomenon; it represents merely the satisfaction derived from consuming a good or service.

Figure III : Demand Curve of Alcohol Consumption

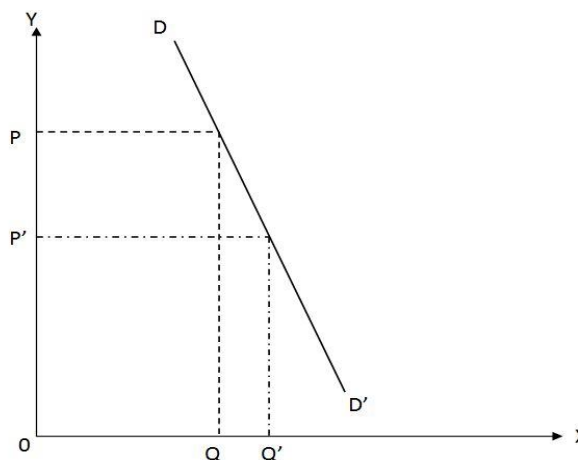


In the above diagram, if the price is P and demand curve is DD' then quantity demanded will be Q. A change in price (reduction) increases the demand of alcohol but the movement is along the demand curve. On the other hand, if there is a change in other factors such as income of consumer tastes or price of related goods the demand curve shifts altogether. If the variable is positively related with alcohol consumption, like income, increase in the variable will shift the demand curve away from the origin, i.e., quantity demanded will increase at the same price and vice versa. Opposite will happen if the variable is negatively associated, like price of substitute goods.

One more factor worth mentioning is elasticity of demand of alcohol. Alcohol comes under the category of addictive goods; once someone is addicted to it few factors can influence its demand. If a good is more sensitive to price variations, it is said to have high price elasticity. If it is less sensitive to price variations, the price elasticity is low. It is easy to influence the demand of a good of highly elastic nature. Less elastic a good is, more difficult it becomes to control its demand through price regulations.

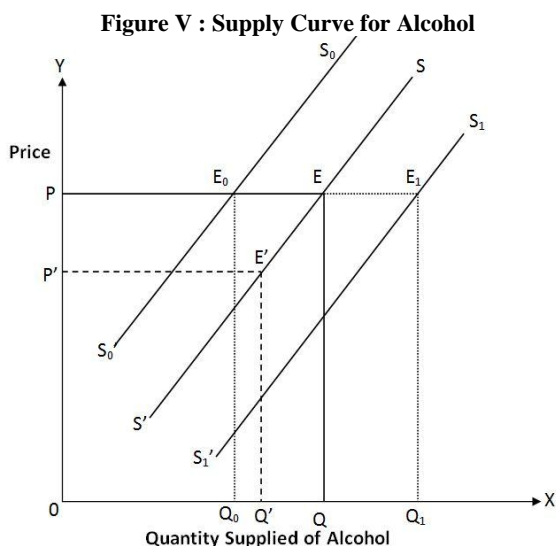
Empirical evidences suggest a price elasticity of demand ranging from -0.14 to -0.46 for county liquor. These figures themselves suggest that the demand of alcohol is rigid and have a low sensitivity for price variations. However, these figures are for county liquor only. Alcohol industry being a highly competitive one, have a lot of available substitutes. If the price of one variety rises, loss in its demand is compensated by increase in the demand of other variant, total demand remaining more or less the same. So the demand curve for alcohol tends to be steeper, having less sensitivity to price variations.

Figure IV : Low Elasticity of Demand for Alcohol



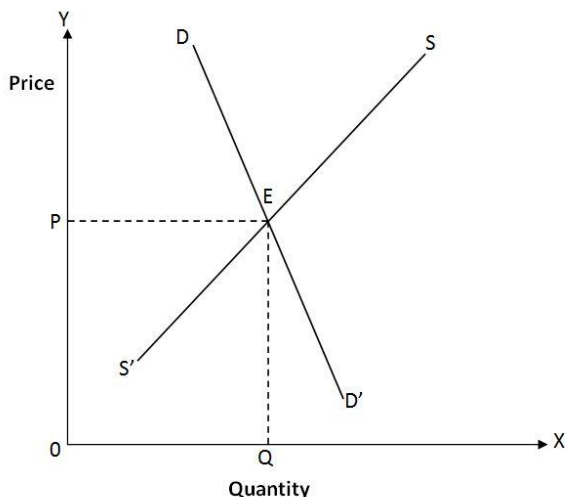
As shown in the above figure demand curve for alcohol tends to be steep. An increase in price from  $P'$  to  $P$  reduces the demand by a much lesser amount from  $Q'$  to  $Q$ .

On the other hand, supply curve of alcohol is influenced by the price of alcohol, cost of production, price of inputs and factors of production. As in demand curve, price variation leads to movement along the supply curve and changes in other factors shifts the supply curve. This can be seen in the figure below, figure being self explanatory.



The market equilibrium for price and quantity is determined at a place where demand and supply equates.

**Figure VI : Market Equilibrium for Alcohol Demand and Supply**



Through the interaction of demand and supply forces, market equilibrium is established at point E with  $P$  price and  $Q$  quantity.

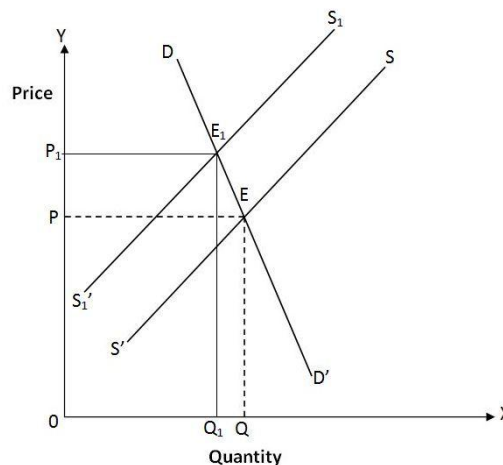
#### IV. REDUCING THE ALCOHOL CONSUMPTION IN INDIA

In spite of persistent efforts from the government, the consumption of alcohol has not reduced in India. Alcohol consumption is a cause of many socio economic problems in the society. Social cost of consuming alcohol remains very high, let alone private economic opportunity cost for the concerned individual who spends his income on alcohol instead of other productive goods.

To discourage the use of alcohol the Indian government spends crores of rupees to reduce the flow of illicit alcohol. From the perspective of demand and supply analysis, to reduce the consumption of alcohol government has two policy options. It can either try to reduce the demand of alcohol or restrict the supply.

As described above, demand curve of alcohol is highly inelastic. Suppose the government increases the vigilance of administrative machinery. Although the purpose of vigilance is to reduce the consumption, it directly influences supply of alcohol instead of demand. The costs associated with the supply of alcohol increases and with the increase in costs the supply curve shifts upwards. Establishment of new equilibrium can be shown as follows

**Figure VIII : Effect of Shift in Curve on Equilibrium**



The shift in supply curve increases the price of alcohol and as per the law of demand an increase in price is accompanied by a reduction in demand (other factors remaining the same). However, as the price elasticity of demand for alcohol is highly inelastic the

quantity demanded is reduced by lesser intensity than the extent of increase in price. Thus in spite of spending crores of rupees on administrative strictness, the consumption of alcohol is not reduced by a desirable amount.

Another alternative policy is that of influencing the consumption of alcohol by directly targeting the demand curve. Public announcements, awareness campaigns, mandatory health warnings on alcoholic drinks and prohibition of alcohol advertisements through any media source are all policies aimed at reducing the quantity of alcohol demanded at any given point. If successful, these policies shift the demand curve for alcohol to the left, thus reducing the quantity demanded. In contrast to the vigilance mechanism, awareness drives tries to attempt the menace through demand side thus making it more effective because is substantially reduces the quantity demanded for consumption.

## V. CONCLUSION

Article 47 of Indian Constitution says: “The state shall regard the raising of the level of nutrition and standard of living of its people as among its primary duties and in particular, the state shall endeavor to bring about prohibition of the use, except for medicinal purposes, of intoxicating drinks and of drugs which are injurious to health”. Economics believes in rationality of individual and grant him freedom to choose whatever he believes to be right. The subjectivity of value judgments has remained primarily outside the purview of economic studies. But a science which is concerned of human wellbeing cannot alienate itself from socio economic problems prevailing in a state. Negative externalities accruing from the consumption of alcohol have long lasting implications for the welfare of the individual consumer as well as people around him/her.

Economically and psychologically influencing the individual choices towards alcoholism is the much needed sustainable solution which targets the problem from demand side. If successfully implemented, these can bring about broad changes in the consumption patterns. However, demand side measures are slower to implement, they take time to show its effect. In the meantime, they have to be complemented by supply side measures as well. These supply side measures include-

A. Increasing the taxation on alcohol thus increasing the price and discouraging the consumption of alcohol. Although alcohol shows limited price sensitivity but the negative relation of increase in price and reduction of demand cannot be rejected altogether. There is much scope to increase the tax on liquor which

will not only reduce the demanded quantity but also will gain some precious pennies for the state treasury which can be spent on the awareness campaigns and educating the youth about the dangers of alcoholism which will in sequence affect the demand side of the phenomenon.

B. The illicit and informal market of desi, unsafe liquor should be brought under government surveillance. If a large part of a sector continues to remain outside the reach of the government, policies are bound to fail. In India the prime source of alcohol for people is spirit and not beer or wine. As these informal producers are not controlled they cannot be taxed. An increase in the tax rate will increase the price of only that portion of supply which is documented, others remaining unaffected. If in a competitive industry half the prices are raised, consumers will have a tendency of switching to those alternatives which are still outside the tax net and thus are cheap. This will have serious health implications as well.

Thus the problem has to be tackled from demand as well as supply side.

## ACKNOWLEDGEMENT

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