Impact of alcohol tax on externalities associated with it

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ABSTRACT

Alcohol industry in India stands third largest in the world with value of $35 billion, making it a significant contributor to the Indian economy.1 Kerala tops the charts in the level of consumption of liquor as it has the highest per capita consumption of alcohol in the country. Alcohol is a demerit good as its consumption results in socially undesirable outcomes in the form of externalities in terms of increased prevalence of road accidents, health care costs and accounting for about 69% of all crimes in Kerala. However, the liquor industry makes significant contributions to the Keralan economy in the form of tax revenue and employment. In order to limit the economic costs of alcohol consumption, the Keralan government proposed an upsurge in the indirect taxation of alcohol. However, this affects the street price by a little margin as other taxes such as the sales tax have been removed. Regardless of the prohibitive cess on liquor and introduction of dry days and the continuous increase in the taxes have interestingly enough, showcased an upward spiral trend in the sale of liquor. Indirect taxation not only serves as a catalyst to generate revenue to aid government's macroeconomic objectives but to also curb the negative consumption externalities. Therefore, the research question that stems from the aforementioned topic is: "To what extent has the increase in liquor tax in Kerala impacted the externalities associated with it since 2018?"

*Keywords***:** *Kerala, IMFL, Beer, Tax, Alcohol, Externalities, Negative Consumption Externalities, Positive Externalities, Price Elasticity of Demand, RMTR, Costs, Revenue, Health Care, Floods, Tax Revenue*

1. INTRODUCTION

Alcohol industry in India stands third largest in the world with value of $35 billion, making it a significant contributor to the Indian economy. [1] Kerala tops the charts in the level of consumption of liquor as it has the highest per capita consumption of alcohol in the country. [2] Alcohol is a demerit good as its consumption results in socially undesirable outcomes in the form of externalities in terms of increased prevalence of road accidents, health care costs and accounting for about 69% of all crimes in Kerala.[3] However, the liquor industry makes significant contributions to the Keralan economy in the form of tax revenue and employment. In order to limit the economic costs of alcohol consumption, the Keralan government proposed an upsurge in the indirect taxation of alcohol. However, this affects the street price by a little margin as other taxes such as the sales tax have been removed. Regardless of the prohibitive cess on liquor and introduction of dry days and the continuous increase in the taxes have interestingly enough, showcased an upward spiral trend in the sale of liquor. [4]

The economic theories that intertwine with the research range from compare to inefficiency that leads to market failure due to initiation of external costs involved with the consumption of alcohol. These include economic costs of road accidents, healthcare expenditure, domestic violence etc. Indirect taxation as an interventionist market-based policy is utilized by the Indian government to discourage consumption and correct the externality in order to bring out pareto efficiency in the market. However, conditions such as the equivalence of the taxes with the external costs, price elasticity of demand, effectiveness of ad-valorem taxation are involved to determine the potency and optimality of taxes in curbing the externality. Indirect taxation not only serves as a catalyst to generate revenue to aid government's macroeconomic objectives but to also curb the negative consumption externalities. Therefore, the research question that stems from the aforementioned topic is: "**To** *what extent has the increase in liquor tax in Kerala impacted the externalities associated with it since 2018?"*

2. BACKGROUND INFORMATION

Thomas Isaac, Keralan Minister of Finance for the Kerala Budget 2018-19 proposed to increase the sale tax slab to 200% for Indian Made Foreign Liquor (IMFL) for the ones pegged at Rs. 400.[5] [5] For IMFL priced above Rs. 400 would be taxed at 210%. Likewise, the tax on beer has escalated to 100% from 70%. [6] This, however, would not impact the market prices much as the government plans on avoiding Social Welfare, Medical and Rehabilitation cess [7]. Despite these increases, the total quantity of IMFL and Beer (in lakh cases) rose from 208.51 and 115.42, to 216.34 and 121.12 respectively. [8] This translated into an all-time high revenue from Indian- Made Foreign Liquor (IMFL) and beer sales that stood at Rs.14,504.67 crores in the 2018-19 FY. This was an increase of 1567.58 crores from the 2017-18 FY.[9]

3. RESEARCH METHODOLOGY

Sources and Rationale	Limitations and Measures taken to offset them
Quantitative Data for Sales for both IMFL and Beer was obtained Before and After Tax through an article from TOI.	TOI is a credible source, however the data received was cross-examined from a variety of sources such as the ET, livemint etc.
Quantitative data for revenue generated by the government from alcohol tax was gathered from articles ranging from livemint to India-today.	Since these articles were domestically published, chances of manipulation exist. Data was compared with Keralan Government's website.
Research Papers were utilized to understand the external costs of alcohol consumption	A range of academic journals were used to find the common ground each of these agreed upon.
Academic Journals from JSTOR were used to consolidate the understanding of theories that blend well with negative externality of alcohol.	Online podcasts were relied upon to aid comprehension of advanced theories.
Background Information in terms of the prevalence of alcohol was gathered by referring to a range of source from TOI to Money Control.	To combat controversial claims, the idea supported by the majority was utilized to come up with genuine economic evaluation of Kerala.
The statistical data of alcohol consumption was found from paper by The Kerala State Beverages Corporation Limited.	The paper used was a domestic publication. These figures were cross examined using TOI and ET because manipulation could exist.
Case studies that aid the application of economic theories were acquired from an expert from University of Toronto.	N/A because the source stems from an expert from a credible institution.
Quantitative data for the structure of tax system for alcohol in Kerala was obtained from national publications to compare the upsurge in the tax-rate.	N/A
Economic theories were understood using IBDP textbooks for Economics such as Pearson, Cambridge, Ellie Tragakes, IBID-Press Etc.	N/A

4. ANALYSIS OF ECONOMIC THEORIES

4.1 Negative Consumption Externality of Alcohol in Kerala

The costs incurred by the third party whose interests and actions are not taken into account whilst the consumption of a demerit good (alcohol in this case), are termed as the external costs. A demerit good is a good which when consumed generates costs beyond those borne by the consumer [10]. The imposition of external costs on consumers kindle the divergence between the marginal private and social benefits. In other words, consumption pattern of alcohol doesn't reflect socially optimum consumption patterns as social costs of consumption considers effects on the those too who were not directly involved in consumption. This results in Negative Consumption Externality.

Economic efficiency is referred to as a state in which all the resources available in a society are allocated in terms of the best interest of society which results in Pareto efficiency [11]. Pareto efficiency is a state in which no one can be made better off without making someone else worse off [12]. Existence of perfect competition amongst economic agents when prices represent marginal social costs and benefits, showcases Pareto efficiency in the market. However, when such conditions don't occur due to presence of externalities of a demerit good like Alcohol, market failure exists.

Externalities are present in the form of external costs that are spilt over the society in the form of costs of liquor consumption which ignite the divergence between Marginal Private and Social Benefit curves. Because the externality only consists of consumption, both marginal private and social costs curves are reflected by the supply curve. For example, in Kerala the external costs of Alcohol account for quarter of its hospital beds full due to its consumption and domestic violence [13].

Allocative inefficiency is showcased above by the intersection of P_m and Q_m as quantity of alcohol produced is greater than the socially optimum as highlighted by $Q_m > Q_{opt.}$ This suggests an overallocation of resources into the production of Alcohol in Kerala, resulting in market failure due to loss of social benefits for the society shown by the triangle.

Government interventionist policies such as the alcohol taxes in Kerala, theoretically in terms of ceteris paribus, drives an economy towards the achievement of a Pareto-efficient state to correct the market failure. However, these market based policies in the real world affect some stakeholders unfavorably. An indirect tax is a tax levied on goods and services [14]. An indirect tax on alcohol doesn't account for a Pareto-efficient strategy to correct the externality as factors such as income gets redistributed, unemployment is created due to higher costs of production of firms etc. However, government intervention becomes imperative when market failures of alcohol affect social welfare considerably in terms of incorrect risk perception of consumption [15], externalities and effectiveness of ad-valorem tax. Thus, external costs ranging from health care expenses to domestic violence stem from alcohol consumption in Kerala resulting in negative consumption externality which does not allow for pareto efficiency and leading to market failure. Although indirect taxation doesn't ensure pareto efficiency, its utilisation becomes crucial to help the Keralan government correct the negative consumption externality of alcohol.

4.2 Incorrect Risk Perception
Rationality and possession of adequate knowledge in terms of decision making to maximize long term welfare, are the constituents of a perfect market where economic agents are assumed to possess these characteristics. Knowledge not adequate enough/ imperfect-knowledge with regards to the discernment of costs and benefits involved in consumption of alcohol can lead to market failure showcases incorrect risk perception. Prevalence of *asymmetric information* in the market of alcohol and the ignorance of drinkers about the health risks and internal costs of drinking leads to incorrect perception. This leads to consumption of alcohol beyond the Pareto-efficient quantity. Government intervenes to bridge the information gap owing to incorrect risk perception by implementing its market-based or legislative policies. A tax on alcohol helps signaling the costs of drinking to alcoholics (in terms of higher prices) and to an extent brings consumption closer to the Pareto-efficient level. However, whether or not the government would be able to achieve the optimal level depends on the PED (discussed later) and the level of taxation. On the other hand, negative advertising and strict regulations on the consumption of alcohol can have a similar effect of reducing consumption to the levels consumed under perfect knowledge conditions.

Therefore, incorrect risk perception fuels market failure due to asymmetric information and ignorance amongst consumers about the social costs associated with alcohol consumption, facilitating consumption in excess of the pareto-efficienct level. Effectiveness of government intervention in Kerala to signal higher prices of alcohol through increase in indirect taxation by approximately 205% on both IMFL and Beer, is determined by the PED and the level of consumption, discussed later in the essay. Notwithstanding, combining this market-based approach with legislation and regulation could render the approach more effective. However, this has its own drawbacks in the form of monitoring and maintenance costs.

4.3 Indirect Taxation as a Market Based Solution to Negative Consumption Externality
The Keralan government imposes indirect tax on alcohol to reduce its consumption and hence curb negative consumption externality associated. The introduction of indirect taxation results a decrease in the supply of alcohol since the cost of production increases, kindling a leftward shift in the supply curve from (S=MPC=MSC) to (MPC+Tax). In order for indirect taxation to curb the externality, it must be equivalent to the external costs created due to consumption of alcohol. Since technical difficulties exist in the measurement of external costs created, taxes may not equal the external costs and hence not correct the negative consumption externality entirely. However, if we assume taxes imposed to equal the external costs created, then (MPC + Tax) curve intersects with (MPB) at Q_{opt} where market prices increase to P_c (price paid by the consumers) from P_m. This results in allocative efficiency. Furthermore, the shaded area represents the tax revenue collected by the government of Kerala which is approximately Rs. 14,504.67 crores which is 1,567.58 crores greater than that of last year [16]. This reflects that the upsurge in the revenue was in tandem with the rise in indirect taxation, proving that alcohol has an inelastic demand [17]. Inelastic demand means that the demand is proportionately less responsive to the changes in price.

Consumption of alcohol brings both benefits (employment and investment by government in other sectors by tax revenue generated through it) and costs to the society in the form of road accidents, health care costs etc. The utilitarian objective of the Keralan society is to maximize the net benefits. An example of positive externality of consumption of alcohol; The tax revenue garnered by the government from alcohol was used to fund the relief programs of floods in Kerala in 2018. The victims (third party in this case) were benefitted from the consumption as the drinkers had to pay additional taxes, therefore, consumption of alcohol led to positive consumption externality. [18]

Alcohol consumption acts as a social lubricant that facilitates recreation for individuals when consumed in limited quantities. However, according to many medical and public health researchers, alcohol can trigger anti-social and threatening behaviors which include domestic violence, drunk-driving.

The increase in the indirect taxation by approximately 205% on alcohol and 75% on Beer, has been done to essentially curb the external costs involved. However, the trend of accidents due to alcohol consumption has shown an upward trend despite an increase in tax. Accidents in 2017 attributable to alcohol consumption as its cause was 23 whereas, in 2018 the figures soar to 157 regardless of the increase in tax. [19] The increase in accidents brings the effectiveness of the tax in question as it fails to reduce externalities induced by accidents. This also sheds light on the ineffectiveness of alcohol tax to bring the consumption to social optimum quantity where externalities such as these are corrected. Therefore, rise in externalities induced by alcohol consumption despite the increase in tax showcases that tax has failed the utilitarian objective of the government to achieve social optimum where external costs are eradicated.

Nonetheless, externalities such as accidents induced by drunk-driving, cannot be taken care of with sole imposition of tax as it is an amalgamation of drinking and driving. Since tax is imposed on alcohol consumption solely, the tax cannot necessarily have an influence the level of road accidents as driving and drinking are two separate activities. Because not all drinkers drive, and since influence on driving due to drinking varies between individuals, effectiveness of alcohol tax might not be evaluated. According to the National Institute of Aging probabilities of accidents with a certain level of consumption of alcohol, falls with age. [20] Therefore, it makes more sense to regulate rigid restrictions on alcohol consumption by young drivers than to impose taxes on consumption to curb externality.

Besides, the utilization of indirect taxation to curb excess demand and negative consumption externality of alcohol can lead to construction of incentives to move towards harmful substitutions. For example; Sniffed petrol was a widespread intoxicant in Aboriginal communities when alcohol became more expensive due to increase in indirect taxation. [21] Therefore, this reflects a possibility of negative externality of alcohol not being curbed and hence a case of market failure.

Thus, increases in the selling price of IMFL and Beer as an endeavour to ignite a leftward shift in the supply to to curb the divergence between marginal social and private benefits and bring consumption to optimal levels. However, correction of externality demands the equivalence of the tax rate with external costs created by consumption. Furthermore, Inelastic Demand of alcohol is reflected as tax revenue increased by 1,567.58 crores regardless of the increase in the tax. Additionally, positive externality is created through consumption as seen by reliefs by flood victims in Kerala in 2018. While limited consumption of alcohol facilitates recreation, it can lead to anti-social and domestic violence, showing how the harm of alcohol consumption outweighs the benefits. Upsurge in the accidents despite the increase in indirect tax rates questions the optimality of taxes in curbing the negative externalities such as accidents due to drunk driving, depicting how tax failed to achieve the utilitarian objective of Keralan Government. Nevertheless, because drinking and driving are two separate activities and they can't be controlled with sole imposition of taxes, showing how it does not do justice to the evaluation of indirect tax in terms of its effectiveness. Also, indirect taxation itself can forge negative externality through constructions of incentives to harmful substitutions as mentioned above.

In order to discern the potency of the indirect tax policy employed by the Keralan government to curb market failure due to excess consumption of alcohol beyond the social optimum, it is of utmost importance to assess the price elasticity of demand (PED) for the two major categories of alcohol consumed; IMFL and Beer. The value of the PED would determine whether the demands is elastic or inelastic as a response to the increase in indirect taxation by the government of Kerala.

4.4 Analysis of PED
Secondary sales data for 2017-18 and 2018-19 have been utilized to calculate the PED of the alcohol. Due to the lack of availability of data in isolation for IMFL and Beer, the quantity demanded and average prices for both have been clubbed together.

5. SALES AND REVENUE GENERATED IN THE PAST 5 YEARS [22]
Since PED<1, the demand is shown to be inelastic. Meaning, the percentage change in quantity demanded is less than proportionate with respect to the percentage change in price. In other words, the demand for IMFL and Beer is revealed to be less responsive to the increase in price due to indirect taxation. This implies that increase in indirect tax has only served to increase the tax revenue generated by the government by 1,567.58 crores [22] and has not been able to reduce the demand. Furthermore, since IMFL and Beer are habit forming goods, the PED stands in sync with the inelastic demand and low degree of substitutability of these. Also, the upsurge in the tax rate is not sufficient to decrease the demand and therefore, chances are that negative consumption externality of alcohol is not intact rather, has been increased with consumption.

5.1 Ad-Valorem Tax
Since indirect taxation on alcohol deals with percentage of the price of alcohol, it is considered Ad-Valorem Tax. The tax rate for IMFL worth up to Rs. 400 is 200% whereas for prices above Rs. 400, the tax rate is set at 210% [23]. However, for Beer it is set at 100% [24]. This suggests that ad valorem taxes work in the favor of cheaper units of alcohol, which from a social point of view is undesirable. Justification for this stems from the fact that lower prices stand for lower quality and greater health or other risks. Therefore, it results in incentivization of consumers in Kerala to incline towards cheaper segments of alcohol and hence, adds on to the adversity of negative health impacts. In addition, ad-valorem tax brings to light the exponential effect in the prices of alcohol. This implies that for a producer to increase the price of a unit of alcohol case by a certain figure, the price charged to the consumers' needs to be increased by more than the increase in price, in order to break even. This highlights the disincentivizing effect forged by the tax for the producers to improve upon the quality of alcohol. Notwithstanding, there exists possibilities that producers of IMFL and Beer rather than keeping the prices intact, decrease them to remain competitive and maintain demand.

5.2 Revenue Maximizing Tax Rate (RMTR)
In order to determine the extent to which the sin tax on alcohol has been able to generate revenue and reduce health care expenses, it is imperative to consider its effective rate. Escalation in the rates to a certain extent would increase not only tax revenue but also health and other social benefits associated with drinking such as tax paid by the drinker amongst other things. Therefore, there are two tax rates that need to be considered to evaluate the effectiveness of taxation on alcohol for different purposes: a. Revenue Maximizing Tax Rate (RMTR) and b. Socially Optimal Tax Rate (SOTR). RMTR is the tax rate when imposed on alcohol that yields maximum tax revenue whereas, SOTR is the tax rate that brings society towards optimum quantity and price for alcohol. However, these two rates are rarely equivalent and thus signifying that a sin tax can barely achieve both objectives of tax revenue maximization and achieving social optimum.

Quantification of external costs and determining the social optimum quantity to maximize net benefits is difficult to measure, and hence technical difficulties are involved into the calculation of SOTR in the real world. Therefore, RMTR is usually calculated to evaluate the ad-valorem tax rate in terms of its effectiveness in generating tax revenue which is one of major driving force behind the implementation of the tax.

Although RMTR is beyond the scope of the syllabus of IBDP economics, it has been used to evaluate the effectiveness of alcohol tax in Kerala in compensating for negative consumption externality by generating tax revenue for the government. Tax revenue generated from imposition could be used in multiple ways by the government to bring about welfare in society by investing in its macroeconomic policies. However, equivalence or proximity of the current alcohol tax rate to RMTR doesn't necessarily mean that negative externality created by alcohol consumption has been reduced. As there exists no guarantee that revenue garnered by the government would lead to welfare of the society which would reimburse for the welfare losses created by consumption of

alcohol. Nevertheless, it has been assumed that the tax revenue generated would be utilized in the best interest of the Keralan society.

RMTR is calculated by taking into account the PED of alcohol as it is the elasticity of demand for a good that determines the level of upsurge that can be made to prices in order to proliferate revenue. The proximity to RMTR is determined by comparing the current tax rate to the value of RMTR.

Therefore, the RMTR for alcohol in Kerala equals - 0.275. This however, doesn't match the current tax rate pegged at 0.205 (average of both tax rates). This means the indirect tax is not the RMTR and doesn't yield maximum revenue for the government. Hence, according to the RMTR discussed above, the Keralan government can raise taxes to the level of RMTR in order to maximize its tax revenue to meet its macroeconomic objectives and undertake measures for the welfare of the society. Despite that, increasing the current tax to RMTR could also bring about potential problems to the society such as creation of deadweight loss due to tax incidence on consumers with moderate or minimal consumption as discussed earlier.

6. CONCLUSION
Despite the rise in the indirect taxation of both IMFL and Beer, the consumption has escalated tremendously owing to its inelastic demand (0.55). Currently, with the given tax rate of 205% (on average) for IMFL and 100% for Beer, holding an assumption that negative externality is directly proportional to demand, the government has not been able to reduce the negative externalities, rather it has been increased by rise in accident rates and domestic violence (since it rises with consumption). However, the government has been able to engender positive externality considering the example such as the August 2018 floods in Kerala, where tax revenue from alcohol consumption was utilized to fund the relief camps. Also, the government with tax revenues of approximately Rs 14,500 crores could use it for social welfare. However, the current tax rate is not close RMTR and therefore, there lies greater scope for the creation of positive externality. This means that revenues can still be increased by increasing the tax rate. Nevertheless, because the tax has been imposed since the start of the fiscal year 2018-19, and considering PED takes time to increase, the PED calculated using secondary data could be questionable as the PED after some years may vary.

Notwithstanding, earmarking revenues from alcohol tax raises questions against the budgetary rigidity and political accountability. There is no guarantee that earmarked revenue is tied with government expenditure on welfare for the society. Therefore, these assumptions might not hold true in real life. Nonetheless, it can also be argued that the government revenue generated compensates for the external costs created by consumption of alcohol which is also responsible for the divergence between social and private benefits. But again, since there are technical difficulties associated with computation of these external costs, it is difficult to make out whether or not such statements hold true.

Considering the PED and the habit-forming characteristic of alcohol, the government of Kerala could escalate the rate of indirect tax to greater lengths and could switch towards specific taxation. By doing this, the government would be able to simply their administration procedures and be able to predict the revenue it could generate. This would also help government overcome the limitations of ad-valorem tax, wherein the consumer switch to cheaper segments of IMFL and bear greater health costs due to poorer quality.

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