# Value Added Tax and Household Consumption in India

Abstract

This study aims to investigate the impact of the Value Added Tax (VAT) on the consumption quantity and expenditure of several necessary food and fuel items at the household level in India. We use household level survey data from the National Sample Survey Organization (NSSO) for the 61st (2004-05) and the 68th (2011-12) rounds and tax data from the INSTAVAT Data bank; we employ censored regression analysis and also control for a rich set of demographic characteristics and fixed effects at the household and state level. We document that the introduction of VAT led to a significant decline in the consumption quantity of items such as wheat, pulses and petrol but not items such as rice, kerosene, diesel and Liquefied Petroleum Gas (LPG). However, consumption expenditure of these items has either increased or remained unchanged. These results are robust to disaggregating the sample into rural and urban and different income groups. The findings in this study have important implications for understanding the likely effect of Goods and Service Taxes (GST), recently implemented by the Indian government.

Keywords: Value Added Tax, Consumption Quantity, Consumption Expenditure

Introduction

Consumption taxes like Sales Tax and Value Added Tax (VAT) are among the most favoured instruments of the government for generating revenue. Redistribution of income and consumption, besides raising resources for funding developmental and non-developmental expenditure is one of the paramount responsibilities of the government of any country. Apart from direct taxes like income tax, which can downright alter the allocation of resources in an economy, indirect taxes like consumption taxes, if levied judiciously, can also play a key role in this regard. In fact, in a developing country like India, income taxes cover only about 3.5% of the population. On the other hand, consumption taxes like the sales tax or the Value Added Tax (VAT) influence the consumption basket of almost the entire population, thus reiterating itself as a better instrument for redressing consumption distribution.

Literature on VAT and consumption unanimously says that an increase in the effective tax rate is inversely related to the level of consumption. In fact, one of the primary reasons why consumption taxes like VAT are favored over income taxes is that consumption taxes, by restricting spending, encourages people to save which helps in inducing economic growth of an economy (Alm and Ganainy, 2013). The degree of decline in consumption as a result of tax, however, might vary depending upon the nature of the good, availability of substitutes and consumption habits of people among other factors. Some studies also showed that an increase in VAT can generate different kinds of trends for different types of households (Cashin and Takashi, 2012).

VAT was introduced in India as a replacement to the existing sales tax system. The VAT Act came into effect on 1st April, 2005 and the first state to implement it was Haryana. The other states that enacted it in the same year were Andhra Pradesh, Jammu and Kashmir, Maharashtra, Delhi, Uttarakhand, West Bengal, Himachal Pradesh, Bihar, Punjab, Orissa, Karnataka and Kerala. Some states like Jharkhand, Chattisgarh, Madhya Pradesh, Rajasthan and Gujarat enforced it in 2006. States like Tamil Nadu and Uttar Pradesh were the last ones to implement the VAT Act in 2007 and 2008 respectively. Much later, owing to some of the pitfalls of VAT like the cascading effect associated with the implementation of the tax and different rates and regulations of VAT across the different states, India has now shifted to a comprehensive Goods and Services Tax (GST) system of taxation from 1st July, 2017. GST is an improvement over VAT as it subdues the cascading effects of service taxes by integrating it with the tax on goods. It is more efficient than VAT and has also reduced the tax payer's burden by taxing goods and

services in different tiers in a particular way. However, this does in no way belittle our purpose of research. There is a dearth of research on the consumption implications of indirect taxes especially in the Indian context. Prior to designing any tax policy, the government primarily takes into account its revenue generating potential. The distributional aspect of an indirect tax like VAT is a secondary consideration. This is one of the reasons why VAT or even GST for that matter is criticized for being regressive. Since the poor have a higher propensity to consume, they spend a sizeable portion of their earnings on food. Moreover, for these consumption taxes (Sales Tax, VAT, GST), each person pays the same amount of tax for buying a particular good, regardless of their position in the income distribution of the economy. So, in order to make these taxes less regressive, it is necessary to make a proper analysis of their distribution effects and then draw a blueprint of how to model them in such a way that the people below the poverty line do not end up paying a large amount of their income as taxes. In order to understand the distributional consequences of GST, analyzing the impact of VAT on consumption is of vital importance.

We estimate empirically the effects that a VAT system of taxation had on the quantity and expenditure of household consumption of some necessary food and fuel items in the Indian economy.

Prevalent studies on VAT, acclaimed by the policy makers to be a better and more efficient tax system than the prevalent sales tax system in terms of revenue generation, do not emphasize much on its linkage with consumption. So, we depart from the existing literature on VAT and its effect on consumption in two aspects. First and foremost, there has been no study till date to the best of our knowledge that has empirically carried out this study with respect to India. Further, we check the repercussion of VAT on both consumption quantity and consumption expenditure of goods across various states, rural-urban regions and income quantiles. We use a household level pooled cross section data and Tobit regression analysis to examine the state and rural-urban level variations in consumption of food and fuel items in the period 2004-05 to 2011-12 in India, after the shift to a more transparent and efficient system of taxation. In this study, we have used the statutory VAT rates of the various items under consideration as the predictor variable.

The estimates in this study show that while a unit rise in VAT rate leads to a significant decrease in the quantity of consumption of selected items like wheat, pulses in the rural regions and petrol in the overall economy, it does not have any serious impact on the consumption of other necessary items like rice, kerosene, LPG and diesel. The consumption expenditure, on the other hand, has significantly increased for rice and diesel in the urban areas and petrol in both rural

and urban areas of the states. A hike in VAT rate however, has led to a small but significant decline in the consumption expenditure on *Gram* (a variety of pulse) in the rural areas as well as the economy as a whole. Nevertheless, these results do not differ much when we compare them to the estimates across the top and bottom quantile[1] of the population. For some cereals and pulses, a unit rise in VAT shows a greater fall in the quantity of consumption in the bottom quantile in contrast to the top quantile of the population. There are a few variations in the responsiveness of consumption expenditure too, across the two income quantiles in the rural-urban and all-India estimates.

The paper is organized as follows: Section 2 deals with a review of literature. In Section 3, we have described the data and the descriptive statistics. Section 4 explains the econometric specification, the empirical results and our analysis. The last part i.e. Section 5 concludes the study.

2. Review of Literature

We now provide a brief review of related literature to better position this paper among the existing studies.

In a study on the repercussions of VAT on household consumption especially on poor households in Botswana (Sekwati and Malema, 2011), using income and expenditure figures from the Botswana Household Income and Expenditure Survey (2002/03), results showed that irrespective of the elasticity of demand and supply of goods and services, an increase in tax rate would raise their prices. Due to this shift of tax burden on the consumers, people with low incomes, who have a higher propensity to consume will be affected more than the others because the others have greater capability to adapt their consumption patterns following a change in the price of a good. This implies that an increase in VAT will have the most detrimental effects on the consumption of the poor.

Terfa et al. (2017) using both primary and secondary data of the Nekemte town households, analyzed the effect of VAT on consumption behavior. They used statistical measures like mean, standard deviation, correlation and regression analysis to conclude that in order to ensure that the enactment of VAT is favorable to the consumers, it has to be complemented with some

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[1] Top expenditure quantile comprises 50% of the total households with the higher total household expenditure.
Bottom quantile consists of the other 50% of the total households in the lower range of household expenditure.

mandatory schemes like the lowering of income tax rates which will help in increasing the purchasing power of households by raising their disposable incomes. Additionally, since there might be people who were not paying income taxes in the first place, the government should safeguard their interests by zero rating the necessary goods used by the poor and also extend to them other types of assistance initiatives to be certain that VAT is not detrimental to anyone.

Using data from the North Wales area (United Kingdom), Ahmed et al. (2015) examined the effect of an increment in VAT rate on spending habits. By conducting reliability tests, they collected primary data from 120 respondents (66% of them responded) and investigated it using correlation and t-tests to estimate the link between the variables. Their findings suggested that a VAT rise from 17.5 percent to 20 percent led to a significant change in the consumers' purchasing power. This relation was demonstrated by an association between VAT changes and a change in the life style of the consumers, their age and their buying behavior and their annual earnings and their buying behavior.

An analysis on the incidence and distributional effects of a sudden revision in the VAT taxes on food prevalent in Norway (Gaarder,2018), using regression discontinuity on survey data on consumption spending has shown that VAT does not affect the price of any other item except food prices, the burden of which is completely borne by consumers. Producers do not bear any substantial amount of the tax burden of the VAT on food items. The study highlights that reducing the VAT rate on food helps in reducing inequality among consumers partly because it is the poor who have a greater expenditure share on food items and they calibrate their spending in accordance with the changes in price. Andrikopoulos et al. (1993) used Deaton and Muellbauer's (1980) static almost ideal demand system (AIDS) in Greece to estimate the transitory effects of VAT on prices, expenditure shares and demand for thirteen commodity groups during the time period 1958-86. According to them, VAT led to a rise in commodity prices and the extent of the price rise depended upon the nature of the commodity i.e. whether it is a necessary good or a luxury. They grouped food, beverages, housing and education as necessary items and all other commodity groups were considered as luxury items. The estimates showed that VAT lowered the prices of food, heating and lighting, health and transportation and increased the prices of all the other groups of commodities. Overall, it brought about a rise in the consumer price index by 4.7 percent above the prevailing rate. VAT also had an effect on the consumption patterns and the structure of the consumers' expenditure through own and cross price elasticities. Again, the magnitude of the cross price effects of the rise in VAT on expenditure shares was determined by the nature of the commodity.

Vire ́n (2009), using annual panel data from 15 EU countries for the years 1970-2004 and data on Finnish excise taxes for the early 2000s, estimated how increased VAT rates were shifted to consumer prices. He used mark-up equations, Phillips curve and inflation forecast error equations to conclude that approximately two-thirds of the increase in VAT shifts to the consumer rather than the producer prices.

In a pioneer study by Alm and Ganainy (2012) which estimates the repercussions of VAT on the level of real per capita total household consumption of fifteen European Union countries during 1961-2005, results show that a one percent rise in the VAT rate leads to a one percent fall in consumption approximately in the short run and an even greater fall in the long run, across different estimators, time periods and other independent variables. The paper has used various econometric techniques like the basic pooled OLS, difference-in-difference estimator, two-way error component model and finally the generalized method of moments (GMM) estimators pertaining to dynamic panel models to establish its results, which are compatible with the view that taxing consumption creates more savings and growth than income.

Kolahi et al. (2016) also examined the effects of VAT rate on the consumption possibilities of 19 developing countries for the time period 1995-2010, both theoretically and with an econometric model. By applying the model developed by Ando and Modigliani (1963), they proposed an aggregate consumption function in life cycle hypothesis that performs as an intertemporal optimization problem for a typical consumer. On the empirical side, they also use a GMM estimator to a dynamic panel to analyze the impact of VAT on the level of per head private consumption. According to the results, VAT rate with a lag had a significantly negative effect on per capita consumption in all the year except the first where the effect is positive. This was because, in consonance with Duesenberry's theory, a consumer is more concerned about his relative rather than his absolute consumption and also the fact that current consumption is not only a function of current income but also of past consumption.

Miki (2011), using panel data on a sample of 14 developed countries in the time period covering 1980-2010, made an attempt to empirically validate the relation between the change in VAT rate and aggregate consumption. The analysis uses quarterly data from Quarter 2 of 1980 and Quarter 3 of 2010 of 14 developed countries and 53 instances of the change in VAT rates to display the different trends of aggregate consumption as a result of the change in the VAT

policy. The regression estimates show that initially, consumption rises just before the rise in VAT as people stock their goods before the rise in tax takes place. However, this positive effect is only momentary and depends on the time when the tax rate change announcement is done. Then, as the rise takes place, aggregate consumption falls as people prefer to use their built up stocks rather than buying new ones. Finally, when people exhaust their stock, consumption again rises.

Tochukwu, Jerry and Titus (2015), in their study covering the time period 1994-2014, used an ex-facto research design on Nigerian data and multiple regression analysis to analyze the aftermath of variation in VAT rates on household consumption spending on durable and non-durable goods and on consumer price index along with their lagged value variants. Empirically, the paper established that for non-durable goods, consumption expenditure rose with an increase in VAT rates. This result has led to the deduction that the non-durable goods under consideration are necessities and hence the price change due to VAT let consumption expenditure remain persistent. The results stipulated that VAT, its other variants and the lagged consumption expenditure levels had no effect whatsoever on the consumer price index.

A study by Alderman and Ninno (1999) using the LSDS survey in South Africa discussed the effect of VAT exemptions on certain commodities on the consumption expenditure and calorie intake of the poor. Applying the efficiency condition by Deaton (1997), the paper justifies tax exemption on maize on grounds of fairness, increase in calorie consumption by the poor and tax efficiency, exemption on milk and bread although has same impact on revenue, is not as favourable as maize as far as equity is concerned. On the other hand, tax exemption on meat is not reasonable neither in terms of nutrition nor equity perspective. Rather, it would have a detrimental effect on the calorie intake of the poor rural households while benefitting the non-poor urban people.

Caspersen and Metcalf (1995), using two approaches to measure lifetime income namely, consumption data from the Consumption Expenditure Survey and income data from the Panel Study of Income Dynamics tried to estimate the lifetime incidence of a VAT in the United States They conducted an absolute incidence analysis of a five percent VAT and arrived at a conclusion that VAT is more regressive when annual income is used as a proxy for wellbeing rather than lifetime income. Also, excluding food, housing and medical expenditure from the VAT tax base improves its progressivity.

3. Data Description and Sources:

The study is based primarily on household level data from the household consumer expenditure surveys conducted by the National Sample Survey Office (NSSO), a part of the Ministry of Statistics and Programme Implementation (MOSPI). The NSSO conducts all-India surveys quinquennially on consumer expenditure and employment and the results of these surveys are released under various reports. For the purpose of our research, we have used data from the 61st (July, 2004-June, 2005) and the 68th (July, 2011-June, 2012) NSS rounds.

The 61st round of survey covered around 79,298 rural and 45,346 urban households and the 68th round of survey was canvassed in 119,378 rural and 83,935 urban households. The information reported under these surveys are collected under different reference periods according to which the reports are divided under two schedules. Schedule I has information on certain categories of relatively infrequently purchased items (consumption during the last 30 days and the last 365 days) and the rest of the frequently purchased items like food and fuel(30-day reference period). Also, the 68th round of survey is canvassed under Type I and Type II information.[2] In this study, we have used the Type 1 information on quantity and value of household consumption of food and fuel items. The estimates in our dataset are given commodity-wise, separately for rural and urban areas for each of the states. Our study deals with data on 20 major states of India.[3]

The data also has all the details about household size, household type and various other household characteristics which we utilize in our research. To get the results from sample to population, sampling weights have been calculated on the basis of multiplier provided by the NSSO.[4]

VAT rates operative from 1st April, 2005 are taken from the INSTAVAT Data Bank, a source of all indirect tax rates across India.

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[2] Type I: Reference period of last 30 and last 365 days for durables, education and medical (institutional) and last 30 days for food, fuel and other consumer services. Type II: Reference period of last 365 days for the infrequently purchased items, last 7 days for some food items, pan, tobacco and other intoxicants and last 30 days for all other food items, fuel and the rest.
[3] States included: Jammu and Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Delhi, Rajasthan, Uttar Pradesh, Bihar, West Bengal, Jharkhand, Orissa, Chattisgarh, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu
[4] Sampling weight= MLT/100 if NSS=NSC and weight= MLT/200 if NSS and NSC are not equal.

The data on official poverty rates across various states spanning the period of our study has been drawn from the Planning Commission Reports on estimates of poverty released by the Government of India (GOI), calculated using the Tendulkar methodology of poverty estimation. The Planning Commission periodically estimates poverty ratios for the respective years in which the NSSO conducts their large sample surveys.

The data on the population of each state, the sectoral Gross State Domestic Product (GSDP) at factor cost (constant prices) and the state-wise production of food grains (rice, wheat and pulses) has been accumulated from the Handbook of Statistics on Indian States, published by the Reserve Bank of India (RBI). The population data is expressed in terms of thousands of units, the GSDP data is given in terms of Rupees lakh with a base year of 2004-05 and the data on food-grain produced by each state in the years 2004-05 and 2011-12 is specified in terms of thousand of tonnes. Data on the developmental capital expenditure for each state is also amassed from the module of State finances, a Study of Budgets, circulated by the RBI, in units of Rupees lakhs.

3.1. Descriptive Statistics

Table 1 shows the demographic characteristics of the households covered in the survey. The average number of members in a household is approximately 5 on an average in both the urban and rural areas. While the percentage of Hindus and Muslims in the total population is greater in the rural and urban regions respectively, the proportion of Scheduled Caste (SCs) and Scheduled Tribes (STs) in the rural population exceeds that in the urban sector. The real annual household expenditure in the urban areas is higher than even the all-India average but the percentage of it spent on food items (around 49-50%) is almost the same in rural, urban and the all-India estimates.

[Insert Table 1 here]

Commodity-wise, the average consumption quantity of all cereals except *Arhar* is higher in the rural regions vis-à-vis the urban areas. For *Arhar*, the mean value of consumption quantity is 0.82 kg per household in the urban areas, higher than the rural and the all-India average. The real consumption expenditure of a household, for both wheat and *Arhar*, is larger for the urban

households. Amongst the fuels covered in the study, except petrol, the mean value of consumption quantity of the rest of them are greater in the urban regions. For petrol, the average consumption quantity of households in the urban areas is slightly lower (4.1litres) than the all-India or rural estimates but the mean value of real consumption expenditure is still higher in the urban areas. In fact, the total consumption expenditure on all fuels is universally higher in the urban areas, for all households covered in the survey.

[Insert Tables 2(a) and 2(b) here]

## 4. Econometric Model and findings

### 4.1 Econometric Specification

We use Tobit model to analyze the effect of VAT rates on total consumption quantity and expenditure of several food and fuel items.

In our dataset, we observe the tax rates for all goods under consideration. However, there are many zero values in the total consumption quantity and expenditure variables. So, it is effectively a case of left censoring in the dataset. Here, we have censored the dataset at 1 and then applied Tobit regression on it. A Tobit regression produces unbiased and consistent estimates unlike an OLS estimator when the dataset has significant censoring (Greene,1997). Since our data is censored at a threshold, OLS estimation on the whole uncensored sample will give us inconsistent estimates.

The standard Tobit model used in this exercise is:

$$log y_{ijt} = \alpha_i + s_j + \delta w_{jt} + \beta VAT_{jt} + \gamma x_{ijt} + \epsilon_{ijt}$$

where $y_{ijt}^*$ denotes the latent dependent variable i.e. the total consumption quantity (Case 1) and the total real consumption expenditure (Case 2) of each item, for each household (i), state (j) and year (t) separately and $VAT_{jt}$ stands for the respective VAT rates of each item in each state in the respective years. $\beta$, our main variable of interest, represents the responsiveness of the consumption quantity or consumption expenditure to a change in the VAT rates for a particular commodity. $\alpha_i$ stands for the household fixed effect and $s_j$ is the state fixed effects

that also account for the the pre-VAT sales tax on commodities and the consumption habits and patterns of each state. $w_{jt}$ indicates the state level variables and $x_{ijt}$ denotes the various household demographic characteristics.

Two separate sets of regressions (quantity and expenditure) have been carried out for each item consumed by the households covered in our study, independently for the rural and urban regions of each state and also for the state as a whole. We also performed the same set of regressions for the top and bottom 50 percent of expenditure quantiles[5] of the population across the various states.

Just to reiterate, our dependent variable in this study is the log of the total consumption quantity and the log of the total consumption expenditure of a particular item. The items covered in this analysis can be split into two categories: food and fuels. Specifically, the food items are cereals like rice (non-PDS), wheat (non-PDS) and pulses like *Arhar/Tur* and *Gram.* The non-food items include fuels like kerosene (non-PDS), LPG, petrol and diesel used for household purposes only.

One point to be noted here is that prior to the VAT regime, India followed a system of sales taxation. Unlike the VAT system of taxation, sales tax was enforced on the total value of goods and services purchased and not on the value added at every stage of production. It was inefficient, had a cascading effect and also encouraged tax evasions due to the lack of the built-in-check structure of VAT. Under the sales tax system, most of the exemptions were for the necessary items of consumption including cereals. Seven states exempted rice from sales tax and the rest of the states taxed it at a rate of 1.25 to 4 percent. Sales tax rates on non-PDS kerosene had an average of about 5.5 percent per state, with some states having rates as high as 10 and 20 and only a couple of them exempting it from the taxes. In the pre-VAT era, the sales tax rate on LPG had a range of around 1 to 20, with an average rate of approximately 10 for every state in India.

In this particular analysis, respective VAT rates of the items is the primary independent variable. Since VAT rates came into effect from 2005 for the first time, all the rates corresponding to the year 2004 in our dataset are considered to be 0. The identification strategy used in this paper is the time variation of the implementation of VAT by the different states between April, 2005 to early 2008. The rates for food items ranges from 0 to 5 and the rates for the fuels spans across from 0 to 50.

On the basis of extensive literature survey on the issue, our study makes use of three different

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[5] Bottom quantile: Quantile 1 and Top Quantile: Quantile 2 as referred to in Table 4(a), 4(b) and 4(c)

sets of control variables that are related to consumption of a household: some demographic characteristics of households, few state level variables and some fixed effects.

Demographic characteristics include the age of the household members, the sex composition of the household[6] and the marital status of the household members. The dataset enlists the marital status into four categories.[7] It also includes the level of education attained by the members of the household. Education affects the amount of deliberation an individual engages in before making a purchase. In addition, an educated member of a household will always take into account all his options (substitutes in this case) before making a consumption decision. The NSSO Socio-Economic survey has classified the level of education into various codes.[8] Two of the most important demographic controls in the context of this study are household size and the real annual household expenditure. The household size determines the total consumption of a family which is imperative to our study and the log of the yearly real expenditure of a household on all items, both durable and non-durable is a good proxy of a household's income position. Households with a lower disposable income will spend more on consumption of food items and less on durables.

Household fixed effect controls for the unobserved heterogeneity between households belonging to different religions and castes. Religion impacts consumption behavior through few aspects like beliefs and rituals (Mathras et al.,2015). This needs to be considered before determining the effect of VAT on the consumption basket of households. NSSO categorizes all the religions practiced in Indian households into eight groups.[9] Also, certain social groups are associated with some typical consumption habits. A region which has a dominant population of a certain community would be expected to have a certain pattern of demand and supply for any good, especially food items. Social groups are broadly classified into four types in the

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[6] Gender denoted by codes 1 (male) and 2 (female) in the dataset.

[7] 1: never married 2: currently married 3: widowed 4: divorced or separated

[8] 01: not literate 02: literate by attending Non-Formal Education Courses (NFEC), Adult Education Centres (AEC) or primary schools built under the Education Guarantee Scheme (EGS) 03: literate through attaining the Total Literacy Campaign (TLC) 04: other literates without formal education 05: literates below primary school 06: literates who have passed primary education 07: literates who have passed middle education 08: literates who have passed secondary education 10: literates who have achieved higher secondary education 11: people who have completed some diploma/certificate course 12: graduates 13: postgraduates and above

[9] 1: Hinduism 2: Islam 3: Christianity 4: Sikhism 5: Jainism 6: Buddhism 7: Zoroastrianism 9: others

data.[10]

State level variables controls for some state specific factors that can be correlated to household consumption as consumption pattern might differ in different states. One of them is the sectoral gross state domestic product. In a diverse country like India, some states are richer than the others. Gross domestic product of a state, sector-wise (agriculture and industry), at factor cost and at constant prices (base year: 2004-05) takes into account some of the state-level variability over the period of study. The amount of expenditure that the government of a state incurs in developmental activities like education, social security, rural development, transport and communication among others is another source of asymmetry between the various states. The regression analysis in this paper uses the log value of the real developmental capital expenditure to avoid the high degree of skewness in the data. The official estimates of poverty rate or incidence of poverty of each state (rural and urban) in the respective years is an approximate measure of the level of destitution in each state and can be an important element of variance in household consumption. Finally, we also control for the state-wise per capita estimate of production of food grains. Production of a particular cereal in a state depends on the demand of that particular item in that region. This state level heterogeneity in production of foodgrains is derived from the difference in food preferences.

Apart from this, we also include state dummies to allow for the state fixed effects. Along with controlling for the pre-VAT sales tax rates on commodities, these state dummies also take into consideration the difference in the food habits of people belonging to different states according to the local culture and cuisine.

4.2. Results and Analysis

Based on separate regressions for all goods under review, we have presented and analyzed the results below.

All-India: Table 3(a) shows the all-India estimates of the effect of an increase in VAT rate on the total consumption quantity and expenditure on the various food and fuel items. For rice, regressing the total consumption quantity on a unit increase in VAT rate does not show any

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[10] 1: Scheduled Tribes (STs) 2: Scheduled Castes (SCs) 3. Other Backward Classes (OBCs) 9. Other

significant change. Rice being a necessary item of consumption for majority of the households, the estimates show that people are not willing to substitute it with alternative cereals irrespective of the change in price. The total household consumption expenditure on rice also remains unaffected. Unlike rice, the quantity consumed for wheat falls by almost 25 percent although the consumption expenditure remains unchanged with a unit increase in VAT rates. This might be because households cut consumption quantity to keep the expenditure fixed. Although the consumption of *Tur* remains unaffected, both quantity and expenditure register a significant fall in the case of *Gram* as a consequence of increase in VAT rates. It is to be noted here that this variety of pulse has many substitutes which explains the large fall in quantity of consumption if VAT rises by one percent. However, the fall in total consumption expenditure is much lesser than the fall in consumption quantity. This implies that even though the price of the product rises due to VAT, the drop in consumption by the households ensures that the overall expenditure does not rise. Infact, the huge magnitude of the fall in quantity ensures that the household expenditure on consumption of *Gram* actually falls. The consumption of all the fuels except petrol remains unaffected in response to a unit rise in VAT rates. Petrol shows an 11 percent fall in consumption quantity and a significant rise of 3 percent in consumption expenditure. The estimates for Liquefied Petroleum Gas (LPG), which is one of the most commonly used cooking fuels in a developing country like India, especially in the urban areas, shows no responsiveness to a unit rise in VAT. The effects are similar for diesel too. A rise in the VAT rate does not lead to any significant change in the quantity or expenditure incurred on diesel. It implies that the quantity consumed of diesel is inelastic to a minor rise in the price of diesel due to VAT alone. Consumers do not change their diesel use in this case as that would require some drastic changes like driving less, incurring costs in purchasing a more fuel efficient car or even travelling by public transport.

[Insert Table 3(a) here]

Rural: The rural estimates of the effect of a unit rise in VAT on consumption quantity and expenditure are presented in Table 3(b). The unchanged consumption expenditure of rice in the rural areas can be attributed to two factors. First, in the rural regions especially in states where rice is an important part of the diet, majority of people consume it out of their home produce. Second, there is a huge informal market in India. In this market, consumers do not pay any tax on any purchase. So, it is not very unusual to state that any change in tax policy does not affect the consumption. All these factors together contribute to the unchanged consumption quantity

and expenditure of rice post a rise in VAT in the rural areas. The quantity of wheat, on the other hand, shows a high and significant fall of 49 percent as a consequence of a single unit increase in VAT. This might be because in the rural areas, substitutes like Ragi are very popular and available at a much cheaper price. Also, it is possible that the rural population do not mind changing their consumption habits drastically in order to accommodate the change in prices. The expenditure regressions, on the other hand, show that the consumption expenditure of wheat remains unchanged after a percent increase in VAT rates. Among fuels, kerosene is a cooking and lighting fuel, mostly purchased by the rural poor. A percent rise in VAT does not have any significant impact on the consumption quantity or the total expenditure. This might be because in the majority of the rural areas, the poor still depend on kerosene, both subsidized and non-subsidized as the supply of electricity is irregular and the other alternative of cooking gas is unaffordable. Even though the government which controls the price of kerosene, in order to encourage the use of a cleaner fuel had cut down the allocation of subsidized kerosene to states and increased the subsidy on cooking gas, the poor substitutability of kerosene, especially in the rural regions is the main factor behind this unresponsiveness. However, the consumption expenditure co-efficient of petrol exhibits a positive and significant change.

[Insert Table 3(b) here]

Urban: The results of the same analysis for the urban areas are shown in Table 3(c) below. Unlike the rural estimates, a unit increase in VAT leads to a significant rise in the consumption expenditure on rice by 3 percent. Wheat, in contrast to the all-India and rural estimates, shows no change in either quantity or expenditure of household consumption. Amidst the fuels, both petrol and diesel show a significant rise in consumption expenditure although their quantities consumed by the households remain unvarying due to rise in VAT.

[Insert Table 3(c) here]

Quantile Estimates:

All-India: The all-India quantile estimates are given in Table 4(a). The quantity consumed of wheat significantly falls by a higher magnitude (almost 44 percent) in the bottom quantile of the population. Similar results are observed for *gram* as well where the fall in consumption quantity for a unit increase in VAT is 65 percent in the bottom and 17 percent in the top

quantile.

[Insert Table 4(a) here]

Rural: The results for the quantile estimates in the all-India regressions are almost replicated in the rural areas (Table 4(b)), especially for wheat and *gram* among the food items. Kerosene shows a minor (about 1 percent) but significant rise in the consumption expenditure, quantity remaining unchanged for a unit rise in tax rate.

[Insert Table 4(b) here]

Urban: Among the two quantiles (Table 4(c)), in a sharp contradiction to all the earlier estimates, the top quantile of the households do not alter their quantity of consumption of wheat for any change in VAT rate. The effects are alike for all the goods under review. The bottom quantile of the households, on the other hand, significantly decrease their consumption quantity for wheat, *gram* and diesel in response to a hike in VAT rates.

[Insert Table 4(c) here]

5. Concluding Remarks

One very crucial aspect of the effect of VAT which has been left relatively unexplored till date is the repercussions of the VAT reform on the necessary food and fuel consumption especially in the context of a developing country like India.This study is an attempt to provide empirical evidence of the precise effect of a unit rise in VAT on the consumption quantity and expenditure of various necessary food and fuel items in different households, surveyed across rural and urban regions and across different expenditure quantiles in 20 major states of India during the time period 2004 to 2011. In contrast to studies that say that a shift in the VAT policy reflects in a change in the spending pattern of households and has severe distributional effects with regards to food consumption and welfare of consumers, we find that on accounting for a rich set of controls, for the majority of the goods, the effects of a rise in VAT rate seem to be quite similar. Apart from wheat and the pulses in the food category, which record a fall in consumption quantity in the rural sector and petrol in the fuel group, which witnesses a similar outcome in the all-India estimates, none of the other goods show any major change in

consumption as a repercussion to a rise in VAT. This observation specifically holds for the urban regions in our study, where a unit increase in VAT does not bring about much change in the quantity consumed of the food and fuel items. On the other hand, total consumption expenditure does show a positive and significant change for some of the items. One explanation for this outcome is the underlying fact that all these items especially rice, wheat, kerosene and LPG are all necessary items of consumption for specific groups of consumers. Consequently, these particular groups of consumers, especially the ones who are far above the poverty line in the economy do not change their diet or consumption patterns and habits for slight changes in prices. This does not undermine the credibility of consumption taxes like VAT to encourage savings in the economy by curbing spending. There still exists a majority of the population who restrict their consumption when consumer prices increase and look for substitutes. Even among the commodities, there are many other commodities like other food items which are not necessities and also durable goods which respond in a different way to consumption taxes as compared to these necessities. Among the two quantiles of household expenditure, the households in the bottom quantile are more responsive in terms of higher fall in consumption quantity of some cereals and pulses to a change in the VAT on items. Besides, for some items, a percentage increase in VAT leads to a significant rise in the consumption expenditure for the relatively richer households unlike the other group whose consumption expenditure either remains unaffected or falls altogether.

The imposition of any consumption tax has some distributional consequences on the economy. Since it affects the prices of goods consumed by the rich, middle-income and poor households, there is a need to evaluate its implications, particularly on food consumption. If the VAT rates imposed on certain food items increases its price such that it is no longer affordable to the poor, it will adversely affect their food intake and hence nutritional intake. It is quite possible that it leads to a sharp plunge in their health and well-being as the body needs a minimum amount of calorie intake in order to function adequately. So, the devising of a tax policy needs very careful consideration as a change in these taxes can have implications on the consumption distribution among the population of different income groups. There have been numerous studies on the repercussions of the VAT system of taxation from the point of view of efficiency, increased revenue generation and uniformity among others. However, the focus on the consumption aspect of VAT is very limited.

An indirect tax can achieve greater success in generating increasing amounts of government revenue if it is constituted in a manner that the rich people pay higher taxes on the goods predominantly consumed by them while the poor are either exempted from those taxes or they

purchase goods, which are an essential part of their commodity bundle, at a much lower tax rate.  If a government aims to attain anything close to a perfect distribution system along with generating a considerable amount of revenue and eliminating the regressiveness of consumption taxes, it must make a sequential study of all its taxes and their effects. Apart from providing subsidized goods and cash transfers, an economy should have a sound system of taxes in place. Designing a better indirect tax policy which takes into account every aspect of an economy requires scrutinizing the equity and social justice implications of the old tax arrangements, like VAT in this case.

Tables

Descriptive Statistics

Table 1: Demographic characteristics of sample households

*denoted by (Mean) {Median} [S.D.]

|  | **Rural** | **Urban** | **All-India** |
|---|---|---|---|
| Age of head (in years) | (26.5) {20} [21.33] | (27.43) {22} [20.19] | (26.88) {21} [20.88] |
| Household Size | (5.09) {5} [2.53] | (4.53) {4} [2.31] | (4.87) {5} [2.46] |
| Real Annual Household Expenditure (in Rupees) | (11936.51){6541.76} [22920.41] | (15710.18) {9585.21} [28418.4] | (13471.8) {7806.87} [25369.62] |
| Real Annual Household Food Expenditure (in Rupees) | (6551.96) {3010.17} [8296.8] | (8159.97) {6064.72} [10722.47] | (7206.02) {4474.58} [9729.51] |
| % of Males | 41.58 | 44.3 | 42.69 |
| % of Hindus | 82.57 | 78.47 | 80.9 |
| % of Muslims | 11.36 | 14.98 | 12.83 |
| % of STs | 8.88 | 3.38 | 6.64 |
| % of SCs | 18.63 | 14.07 | 16.77 |
| % of food expenditure | 48.96 | 49.66 | 49.24 |
| Number of Households | 115,386 | 73,962 | 189,348 |
| Number of Observations | 12,762,349 | 8,753,630 | 21,515,979 |

Source: NSSO Survey (2004, 2011)

Table 2 (a): Total Consumption Quantity (in unit kgs/litres)

*denoted by (Mean) {Median} [S.D.]

| **Items** | **Rural** | **Urban** | **All-India** |
|---|---|---|---|
| Rice (non-PDS) | (10.21) {0.07} [17.93] | (8.32) {0.06} [13.63] | (9.46) {0.06} [16.37] |
| Wheat (non-PDS) | (10.89) {0.07} [19.86] | (9.66) {0.06} [16.38] | (10.37) {0.07} [18.48] |
| *Arhar /Tur* | (0.78) {0.004} [1.45] | (0.82) {0.005} [1.24] | (0.79) {0.004} [1.37] |
| *Gram* | (0.45) {0.002} [0.76] | (0.4) {0.1} [0.69] | (0.43) {0.003} [0.74] |
| Kerosene (non-PDS) | (0.87) {0.004} [1.57] | (1.44) {0.01} [3.37] | (1.08) {0.004} [2.4] |
| LPG | (4.96) {3.55} [5.57] | (6.12) {4.73} [6.6] | (5.68) {4}[6.26] |
| Petrol | (4.3) {0.5} [7.94] | (4.1) {0.16} [7.8] | (4.22) {0.22} [7.85] |
| Diesel | (6.56 ){2} [9.24] | (6.61) {5} [8.96] | (6.58) {3} [9.12] |

Source: NSSO Survey (2004, 2011)

Table 2(b): Total Real Consumption Expenditure (in unit Rupees)

*denoted by (Mean) {Median} [S.D.]

| Items | Rural | Urban | All-India |
|---|---|---|---|
| Rice (non-PDS) | (30.52) {1.67} [52.18] | (30.29) {1.9} [48.11] | (30.42) {1.72} [50.59] |
| Wheat (non-PDS) | (21.62) {1.29}[36.78] | (23.03) {1.43} [36.07] | (22.22) {1.32} [36.49] |
| *Arhar /Tur* | (7.41) {0.29} [13.52] | (8.12) {0.4} [12.28] | (7.71) {0.32} [13] |
| *Gram* | (3.16) {0.14} [5.42] | (2.97) {0.62} [5.11] | (3.08){0.16} [5.29] |
| Kerosene (non-PDS) | (3.79) {0.16} [0.97] | (7.18) {0.32} [18.07] | (5.04) {0.19} [12.39] |
| LPG | (23.09) {17.41} [25.65] | (28.13) {23.11} [29.96] | (26.22) {20.18} [28.51] |
| Petrol | (0.32) {0.13} [4.71] | (0.75) {0.11} [10.92] | (0.38) {0.13} [5.97] |
| Diesel | (41.54) {13.87} [57.83] | (42.45) {30.82} [56.23] | (41.84) {16.94} [57.13] |

Source: NSSO Survey (2004, 2011)

**Estimation Results**

Table 3(a): Effect of VAT on the Total Consumption Quantity and Expenditure (all-India)

| Commodity | Variables | Quantity | | Expenditure | |
|---|---|---|---|---|---|
| | | (1) | (2) | (1) | (2) |
| Rice (non-PDS) | VAT rate | 0.15** | 0.06 | 0.16*** | -0.01 |
| | | (3.59) | (0.42) | (3.86) | (-0.81) |
| | Obs. | 164,356 | 163,462 | 164,356 | 163,462 |
| | Controls | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.50*** | -0.25** | -0.40*** | 0.01 |
| | | (-11.10) | (-3.04) | (--11.40) | (0.48) |
| | Obs. | 136,234 | 128,407 | 136,234 | 128,407 |
| | Controls | No | Yes | No | Yes |
| Pulse 1 (*Tur)* | VAT rate | -0.01 | -0.01 | -0.03 | -0.004 |
| | | (-0.37) | (-0.19) | (-1.02) | (-0.34) |
| | Obs. | 120,117 | 114,114 | 120,117 | 114,114 |
| | Controls | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.17** | -0.21** | -0.09** | -0.007** |
| | | (-3.389) | (-4.69) | (-3.23) | (-2.73) |
| | Obs. | 82,512 | 80,085 | 82,512 | 80,085 |
| | Controls | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | 0.01** | -0.001 | 0.02*** | -0.02 |
| | | (4.49) | (-0.08) | (8.49) | (-0.75) |
| | Obs. | 41,736 | 41,643 | 41,736 | 41,643 |
| | Controls | No | Yes | No | Yes |
| LPG | VAT rate | -0.04 | -0.03 | -0.04 | -0.002 |
| | | (-1.53) | (-0.75) | (-1.44) | (-0.12) |
| | Obs. | 75,022 | 74,966 | 75,022 | 74,966 |
| | Controls | No | Yes | No | Yes |
| Petrol | VAT rate | 0.03 | -0.11* | 0.03 | 0.03** |
| | | (1.43) | (-7.03) | (1.00) | (2.54) |
| | Obs. | 148 | 148 | 33,964 | 33,858 |
| | Controls | No | Yes | No | Yes |
| Diesel | VAT rate | -0.02** | 0.01 | -0.01** | 0.01 |
| | | (-5.94) | (0.65) | (-4.0) | (1.43) |
| | Obs. | 154 | 154 | 154 | 154 |
| | Controls | No | Yes | No | Yes |

Table 3(b): Effect of VAT on the Total Consumption Quantity and Expenditure (Rural)

| Commodity | Variables | Quantity | | Expenditure | |
|---|---|---|---|---|---|
| | | (1) | (2) | (1) | (2) |
| Rice (non-PDS) | VAT rate | 0.12** | 0.01 | 0.13** | -0.03 |
| | | (2.64) | (0.06) | (2.97) | (-1.38) |
| | Obs. | 98,666 | 98,560 | 98,666 | 98,560 |
| | Controls | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.57** | -0.49** | -0.45** | 0.03 |
| | | (-11.17) | (-7.44) | (-11.85) | (1.39) |
| | Obs. | 78,646 | 74,500 | 78,646 | 74,500 |
| | Controls | No | Yes | No | Yes |
| Pulse 1 (*Tur)* | VAT rate | -0.02 | -0.06* | -0.04 | -0.02 |
| | | (-0.58) | (-1.84) | (-1.08) | (-1.05) |
| | Obs. | 68,271 | 64,894 | 68,271 | 64,894 |
| | Controls | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.19** | -0.28** | -0.11** | -0.09** |
| | | (-3.45) | (-8.55) | (-3.47) | (-3.11) |
| | Obs. | 48,337 | 46,731 | 48,337 | 46,731 |
| | Controls | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | 0.02** | 0.006 | 0.02** | -0.002 |
| | | (11.2) | (1.22) | (11.72) | (-1.26) |
| | Obs. | 26,372 | 26,314 | 26,372 | 26,314 |
| | Controls | No | Yes | No | Yes |
| LPG | VAT rate | -0.03** | -0.02 | -0.04* | -0.01 |
| | | (-1.84) | (-1.24) | (-1.82) | (-0.63) |
| | Obs. | 28,433 | 28,417 | 28,433 | 28,417 |
| | Controls | No | Yes | No | Yes |
| Petrol | VAT rate | 0.06** | 0.01 | 0.07** | 0.05** |
| | | (5.95) | (0.27) | (7.41) | (5.09) |
| | Obs. | 85 | 85 | 29,244 | 29,155 |
| | Controls | No | Yes | No | Yes |
| Diesel | VAT rate | -0.03** | 0.004 | -0.02** | 0.01 |
| | | (-7.24) | | (-6.17) | (1.08) |
| | Obs. | 104 | 104 | 104 | 104 |
| | Controls | No | Yes | No | Yes |

Table 3(c): Effect of VAT on the Total Consumption Quantity and Expenditure (Urban)

| Commodity | Variables | Quantity | | Expenditure | |
|---|---|---|---|---|---|
| | | (1) | (2) | (1) | (2) |
| Rice (non-PDS) | VAT rate | 0.21** | 0.24 | 0.21** | 0.03** |
| | | (6.16) | (1.73) | (5.76) | (2.53) |
| | Obs. | 65,692 | 65,690 | 65,690 | 64,902 |
| | Controls | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.43** | -0.02 | -0.34** | -0.002 |
| | | (-10.98) | (-0.45) | (-11.24) | (-0.07) |
| | Obs. | 57,588 | 53,907 | 57,588 | 53,907 |
| | Controls | No | Yes | No | Yes |
| Pulse 1 (*Tur)* | VAT rate | 0.002 | 0.03 | -0.03 | 0.01 |
| | | (0.10) | (0.29) | (-0.80) | (0.61) |
| | Obs. | 51,846 | 49,520 | 51,846 | 49,520 |
| | Controls | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.13** | -0.07 | -0.06** | -0.03 |
| | | (-2.88) | (-1.5) | (-2.54) | (-0.61) |
| | Obs. | 34,175 | 33,354 | 34,175 | 33,354 |
| | Controls | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | -0.002 | -0.01 | 0.01* | 0.006 |
| | | (-0.62) | (-0.94) | (1.92) | (-1.37) |
| | Obs. | 15,364 | 15,329 | 15,364 | 15,329 |
| | Controls | No | Yes | No | Yes |
| LPG | VAT rate | -0.03 | -0.03 | -0.03 | 0.01 |
| | | (-1.25) | (-0.19) | (-1.14) | (0.29) |
| | Obs. | 46,589 | 46,549 | 46,589 | 46,549 |
| | Controls | No | Yes | No | Yes |
| Petrol | VAT rate | 0.02 | 0.01 | 0.01 | 0.03** |
| | | (0.77) | (1.07) | (0.40) | (2.15) |
| | Obs. | 63 | 63 | 4720 | 4703 |
| | Controls | No | Yes | No | Yes |
| Diesel | VAT rate | -0.01 | 0.01 | -0.001 | 0.02* |
| | | (-1.23) | (1.17) | (-0.23) | (1.89) |
| | Obs. | 50 | 50 | 50 | 50 |
| | Controls | No | Yes | No | Yes |

Quantile Estimates

## Table 4(a): Effect of VAT on the Total Consumption Quantity and Expenditure (all-India)

| Commodity | Variables | Quantile 1 | | | | Quantile 2 | | | |
| | | Quantity | | Expenditure | | Quantity | | Expenditure | |
| | | (1) | (2) | (1) | (2) | (1) | (2) | (1) | (2) |
|---|---|---|---|---|---|---|---|---|---|
| Rice (non-PDS) | VAT rate | -0.01 (-0.70) | 0.003 (0.07) | -0.03** (-2.39) | -0.06** (-2.43) | 0.15** (3.71) | 0.13 (0.77) | 0.05** (3.46) | 0.04 (1.3) |
| | Obs. | 82,178 | 82,131 | 82,178 | 82,131 | 82,178 | 81,331 | 82,178 | 81,331 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.49** (-6.52) | -0.44** (-2.98) | -0.02 (-0.77) | -0.04 (-1.15) | -0.59** (-24.13) | -0.24** (-3.29) | -0.08** (-2.91) | -0.06** (-2.19) |
| | Obs. | 68,117 | 63,570 | 68,117 | 63,570 | 68,117 | 64,837 | 68,117 | 64,837 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 1 (*Tur*) | VAT rate | -0.09* (-1.74) | -0.09 (-0.8) | 0.01 (0.38) | -0.06** (-2.89) | -0.02 (-0.76) | 0.04 (0.46) | 0.02 (1.02) | 0.02** (2.32) |
| | Obs. | 60,059 | 55,497 | 60,059 | 55,497 | 60,058 | 58,917 | 60,058 | 58,917 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.38** (-5.41) | -0.65** (-5.78) | -0.07** (-2.22) | -0.1** (-3.46) | -0.13** (-2.36) | -0.17** (-3.87) | -0.05 (-1.21) | -0.07** (-1.71) |
| | Obs. | 41,256 | 39,865 | 41,256 | 39,865 | 41,256 | 40,220 | 41,256 | 40,220 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | | | | | 0.01** (4.49) | 0.001 (0.16) | 0.02** (8.49) | 0.005** (1.97) |
| | Obs. | | | | | 20,868 | 20,843 | 20,868 | 20,843 |
| | Controls | | | | | No | Yes | No | Yes |
| LPG | VAT rate | -0.001 (-0.14) | -0.04 (-0.94) | -0.001 (-0.05) | 0.006 (0.24) | -0.02 (-0.61) | -0.06 (-1.48) | -0.01 (-0.63) | -0.01 (-0.55) |
| | Obs. | 37,511 | 37,462 | 37,511 | 37,462 | 37,511 | 37,504 | 37,511 | 37,504 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Petrol | VAT rate | | | | | -0.01 (-0.38) | -0.07** (-3.37) | 0.09** (7.19) | 0.03** (2.03) |
| | Obs. | | | | | 107 | 107 | 16,982 | 16,919 |
| | Controls | | | | | No | Yes | No | Yes |
| Diesel | VAT rate | -0.02*** (-4.96) | -0.01 (-1.45) | -0.01** (-3.56) | -0.01 (-1.23) | -0.003 (-0.77) | -0.04** (-2.99) | -0.003 (-0.71) | -0.04** (-3.87) |
| | Obs. | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 77 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |

Table 4(b): Effect of VAT on the Total Consumption Quantity and Expenditure (Rural)

| Commodity | Variables | Quantile 1 | | | | Quantile 2 | | | |
| | | Quantity | | Expenditure | | Quantity | | Expenditure | |
| | | (1) | (2) | (1) | (2) | (1) | (2) | (1) | (2) |
|---|---|---|---|---|---|---|---|---|---|
| Rice (non-PDS) | VAT rate | -0.05** (-1.98) | -0.01 (-0.22) | -0.05** (-2.86) | -0.08** (-3.53) | 0.12** (2.8) | -0.01 (-0.06) | 0.0488 (2.06) | 0.02 (0.57) |
| | Obs. | 51,633 | 51,600 | 51,633 | 51,600 | 47,033 | 46,960 | 47,033 | 46,960 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.47** (-6.37) | -0.58** (-3.60) | -0.01 (-0.31) | -0.02 (-0.87) | -0.56** (-11.08) | -0.56** (-9.83) | -0.08* (-1.75) | 0.002 (0.09) |
| | Obs. | 40,768 | 38,448 | 40,768 | 38,448 | 37,878 | 36,052 | 37,878 | 36,052 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 1 (*Tur*) | VAT rate | -0.08 (-1.54) | -0.1 (-0.90) | 0.005 (0.38) | -0.08** (-3.4) | -0.02 (-0.86) | -0.04 (-1.55) | 0.04** (2.1) | 0.05** (2.26) |
| | Obs. | 35,748 | 33,008 | 35,748 | 33,008 | 32,523 | 31,886 | 32,523 | 31,886 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.44** (-5.84) | -0.74** (-3.24) | -0.07** (-2.19) | -0.11** (-3.47) | -0.15** (-2.66) | -0.27** (-6.3)_ | -0.08* (-1.94) | -0.11** (-2.18) |
| | Obs. | 25,116 | 24,221 | 25,116 | 24,221 | 23,221 | 22,510 | 23,221 | 22,510 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | | | | | 0.01** (11.02) | 0.01 (1.22) | 0.02** (11.72) | 0.01** (4.6) |
| | Obs. | | | | | 13,583 | 13,563 | 13,583 | 13,563 |
| | Controls | | | | | No | Yes | No | Yes |
| LPG | VAT rate | -0.02 (-0.48) | -0.05 (-1.06) | -0.02 (-0.86) | 0.001 (0.06) | -0.03* (-1.66) | -0.03 (-1.2) | -0.04 (-1.63) | 0.01 90.73) |
| | Obs. | 13,375 | 13,361 | 13,375 | 13,361 | 15,058 | 15,056 | 15,058 | 15,056 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Petrol | VAT rate | | | | | 0.06** (5.93) | 0.34** (7.43) | 0.07** (7.41) | 0.05** (4.54) |
| | Obs. | | | | | 63 | 63 | 15,099 | 15,042 |
| | Controls | | | | | No | Yes | No | Yes |
| Diesel | VAT rate | -0.02** (-5.61) | -0.02** (-4.28) | -0.01** (-5.07) | -0.02** (-3.32) | | | | |
| | Obs. | 52 | 52 | 52 | 52 | | | | |
| | Controls | No | Yes | No | Yes | | | | |

## Table 4(c): Effect of VAT on the Total Consumption Quantity and Expenditure (Urban)

| Commodity | Variables | Quantile 1 | | | | Quantile 2 | | | |
| | | Quantity | | Expenditure | | Quantity | | Expenditure | |
| | | (1) | (2) | (1) | (2) | (1) | (2) | (1) | (2) |
|---|---|---|---|---|---|---|---|---|---|
| Rice (non-PDS) | VAT rate | 0.05** | 0.15** | 0.03 | 0.05* | 0.21** | 0.26 | 0.09** | 0.05** |
| | | (2.11) | (2.42) | (1.16) | (1.66) | (6.17) | (1.34) | (5.66) | (2.91) |
| | Obs. | 30,545 | 30,531 | 30,545 | 30,531 | 35,145 | 34,371 | 35,145 | 34,371 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Wheat (non-PDS) | VAT rate | -0.47** | -0.38** | -0.28** | -0.3 | -0.43** | 0.004 | -0.35** | -0.06 |
| | | (-10.06) | (-6.41) | (-6.84) | (-1.53) | (-10.95) | (0.08) | (-11.21) | (-3.04) |
| | Obs. | 27,349 | 25,122 | 27,349 | 25,122 | 30,239 | 28,785 | 30,239 | 28,785 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 1 (*Tur*) | VAT rate | -0.08** | -0.06 | 0.001 | -0.04* | 0.005 | 0.04 | -0.02 | -0.01 |
| | | (-2.29) | (-0.63) | (0.07) | (-1.7) | (0.19) | (0.38) | (-0.72) | (-0.44) |
| | Obs. | 24,311 | 22,489 | 24,311 | 22,489 | 27,535 | 27,031 | 27,535 | 27,031 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Pulse 2 (*Gram*) | VAT rate | -0.33** | -0.58** | -0.08** | -0.09* | -0.11** | -0.03 | 0.11** | 0.17** |
| | | (-3.31) | (-2.75) | (-2.46) | (-1.82) | (-1.97) | (-0.44) | (3.35) | (2.08) |
| | Obs. | 16,140 | 15,644 | 16,140 | 15,644 | 18,035 | 17,710 | 18,035 | 17,710 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Kerosene (non-PDS) | VAT rate | | | | | -0.002 | -0.01 | 0.01* | -0.004 |
| | | | | | | (-0.62) | (-0.65) | (1.92) | (-1.04) |
| | Obs. | | | | | 7285 | 7280 | 7285 | 7280 |
| | Controls | | | | | No | Yes | No | Yes |
| LPG | VAT rate | -0.01 | -0.07 | -0.01 | 0.01 | -0.02 | -0.11 | -0.01 | -0.01 |
| | | (-0.2) | (-1.28) | (-0.56) | (0.29) | (-0.82) | (-0.94) | (-0.34) | (-0.49) |
| | Obs. | 24,136 | 24,101 | 24,136 | 24,101 | 22,453 | 22,448 | 22,453 | 22,448 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Petrol | VAT rate | | | | | 0.02 | | 0.01 | 0.03* |
| | | | | | | (0.76) | | (0.4) | (1.86) |
| | Obs. | | | | | 44 | | 1883 | 1877 |
| | Controls | | | | | No | Yes | No | Yes |
| Diesel | VAT rate | -0.006* | -0.03** | 0.003 | -0.04** | -0.00 | -0.05 | -0.01 | -0.06 |
| | | (-1.94) | (-1.1e+12) | (1.1) | (2.2e+11) | (-0.01) | (-0.89) | (-0.89) | (-1.14) |
| | Obs. | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | Controls | No | Yes | No | Yes | No | Yes | No | Yes |

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