

Is the Value Added Tax Reform in India Poverty Improving? An Analysis of Data from Two Major States¹

Ajitava Raychaudhuri²
Sudip Kumar Sinha³
Poulomi Roy⁴

Abstract

Value Added Tax (VAT) has been introduced in India in place of Sales Tax with effect from April 1, 2005. These taxes are in the domain of different state governments within the federal set up in India. Although VAT is widely acclaimed to be a better system than the sales tax on grounds of efficiency and tax collection, there is no study undertaken which has addressed the direction of this tax reform from the angle of its possible impact on social equity. This paper analyses this question with the help of concentration curves and consumption dominance curves of various orders. The conclusions reached from two major states in India, namely Maharashtra and West Bengal, using National Sample Survey Unit Level data for the 55th round, is that the reform is largely pro-poor, although there are scopes to improve it with respect to some items predominantly consumed by the relatively poorer groups (150 words).

Key Words:

Value Added Tax, Marginal Tax Reform, Public Distribution System, Concentration curve, Lorenz ratio, Marginal Efficiency Cost of Funds, Consumption Dominance

JEL Codes:

D12, D63, H21, H22, H71, I32

¹ We thank Jean-Yves Duclos, Abdelkrim Araar, Sami Bibi and an anonymous reviewer for their suggestions and technical advise in completing the paper. Also, comments from Pramila Krishnan improved the quality of the paper.

² Department of Economics, Jadavpur University, Kolkata 700032, INDIA

³ Assistant Commissioner, Commercial Taxes, Bureau of Investigation, Department of Finance (Revenue), Ministry of Finance, Government of West Bengal, Kolkata 700072, INDIA,

⁴ Junior Research Fellow, Department of Economics, Jadavpur University, Kolkata 700032, INDIA

1. Introduction

India witnessed a switchover to the Value Added Tax (VAT) system from Sales Tax regime starting fiscal 2005. The change is widely anticipated to be not only welfare enhancing for the consumers due to less cascading but also revenue neutral through rate differentials on different commodities. The question that remains more or less unanswered is whether this tax reform is poverty improving or not (Duclos and Wodon, 2004).

Economists strongly advocate pro-poor policies in developing countries so that gains from such policy changes are distributed across households according to their initial incomes or expenditures. However, evaluation of the impact of such change in tax policies on poverty and social welfare is particularly important in developing countries, as it affects the welfare of the poor people. Such evaluation can be done in a number of ways. One important component of such PSIA (Poverty & Social Impact Analysis) analyses of effect of any commodity tax reform is to consider the empirical applicability of a “social improvement” approach. Using this approach, we may be interested in identifying marginal price changes which is socially desirable from both the classical welfare-dominance and the poverty-dominance approaches. Since actual changes in the tax system are mostly “slow and piecemeal” (Feldstein (1975)), and that it would be unwise to ignore the role of the actual tax system as a departure point for the identification of desirable tax reforms, policy analysts may be interested only in the marginal tax reforms (Duclos, Makdissi and Wodon (2004)). One immediate advantage of evaluating the distributive impact of marginal commodity tax reforms is that it can be assessed directly from the already available household consumer expenditure data, since the post tax reform data can only be generated some years later.

The basic question that will be addressed in the current paper is how far the switchover to VAT in India can be regarded as pro-poor. The tools to be used are Concentration Curves, Lorenz Curve and Consumption Dominance curves. Since VAT is implemented in individual states, two major states are taken into account- namely Maharashtra and West Bengal. The assumption is that the tax reform is marginal since the rates are not changed drastically, but its composition has changed. Thus the consumption pattern also is assumed to be quite stable so that we could use the last

large scale unit level data survey of household consumer expenditure available for India.

2. Background of the Reform

2.1. Defects of the Sales Tax system of India:

As per the Constitutional provisions of the federal fiscal structure of India, Sales Tax was the main source of revenue of the State Governments (Kurian and Dasgupta (2003)). However, the State Sales Tax systems were inefficient, highly complex and low revenue yielding due to the following reasons.

In most of the States the Sales Tax was levied on most of the commodities at the first point of sale, for administrative convenience. It not only increases the risk of revenue because the entire tax is concentrated at one stage of sale, it is also inefficient as the most efficient commodity (indirect) tax should be collected from the final consumer, such as in the case of a retail sales tax. The system was also not transparent, as the amount of tax which the goods have suffered at first point of sale is not known at the subsequent stages of sale. In some commodities, the Sales Tax was levied on multistage, without any rebate of taxes paid previously, particularly on inputs and capital goods, thereby inducing the cascading (tax on tax) effect. Such a system also made the export prices non-competitive by increasing the export prices.

The Sales Tax Laws were highly complex, with too many rates of tax (even with multiple rates on same commodities) and too many exemptions and concessions. Also as per the Constitution of India, the States are not entitled to levy tax on services, which are often an integral part of manufacturing and trade. Since, the tax base was narrow with many exemptions and concessions, to raise revenue the States resorted to levy of additional levies like Turnover Tax, Additional Sales Tax, and Surcharges etc. which only rendered the tax system more in-efficient. This also provides incentives for evasion and avoidance of tax. Complex Sales Tax laws also led to very high cost of compliance and enforcement.

Under the Sales Tax system, Central Sales Tax (CST) levied on the inter-State sale (an 'origin' based tax) constituted a serious impediment to the free flow of trade within the country and was inimical to competition and efficiency. 'Tax war' due to lack of harmony in the Sales Tax rate structure and policies, often led to undercutting of tax

rates and ad-hoc tax concessions to attract trade and industry, thereby resulting in gross misallocation of resources.

2.2. Rationale behind implementation of VAT:

As part of the broader fiscal restructuring plan of the Central and State Governments in India, reforms have been initiated to raise revenue and cut deficits. Particular emphasis has been placed on radical reforms in direct and indirect taxes both in terms of Tax Policy Reforms (base broadening, elimination of tax concessions and reduction in the number of tax rates and rationalization of tax structures) as well as Tax Administration Reforms (modernization of tax administration and extensive use of Information and Communication Technologies (ICT) etc.).

At the State level, introduction of an efficient, uniform Value Added Tax (VAT) in place of the in-efficient Sales Tax system remained the main issue of indirect tax reforms since 1999, when the idea was first placed by the Union Finance Minister before the Chief Ministers of the States.

After repeated interactions and discussions, most of the States have finally agreed and implemented VAT in India with effect from April 1, 2005. The following features of the new VAT system sought to remove the inherent defects of the previous Sales Tax system:

1. Converting the first point Sales Tax system into a multi-stage VAT system with rebate for tax on all purchases with minimal exceptions.
2. Extending the tax base to include all goods sold or leased with minimum exemptions.
3. Allowing input tax credit for all raw materials, consumables, goods for resale and production machinery equipments.
4. Replacing the existing structure of too many tax rates with two or three rates applicable throughout the economy.
5. Removing the exemptions except for a basic threshold limit and withdrawing other concessions such as tax holiday etc.
6. Zero-rating the exports out of the country. The Central Sales Tax also will be phased out.

7. Modernising tax administration, computerizing operations and information systems and simplifying forms and procedures.

The policy makers expected the following benefits from the introduction of VAT in India, as enumerated in Government of India's "A White Paper On State –Level Value Added Tax" (2005), published by the Empowered Committee of Finance Ministers of India :

- a set-off will be given for input tax as well as tax paid on previous purchases (which will remove cascading tax burden)
- other taxes, such as turnover tax, surcharge, additional surcharge, etc will be abolished (which will simplify the tax system)
- overall tax burden will be rationalized (this will increase efficiency)
- prices will in general fall (due to removal of cascading tax burden)
- transparency will increase
- there will be self-assessment by dealers (which will increase voluntary compliance)
- There will be higher revenue growth.

"The VAT will therefore help common people, traders, industrialists and also the Government. It is needed for a move towards more efficiency, equal competition and fairness in the tax system", the White Paper observed.

The new VAT system was expected to be revenue neutral, which was to be achieved by selecting the tax rates in the following way. During the innumerable deliberations held by the Empowered Committee of Finance Ministers in India, it was decided that there will be five groups of commodities under VAT, namely,

1. Exempted goods
2. Zero-rated exports.
3. Gold/Silver (VAT @1%)
4. Inputs (VAT @ 4%)
5. Rest of the Commodities (VAT @12.5%) – Revenue Neutral Rate (RNR)

VAT for the general goods covered under serial 5 above has been calculated as a revenue neutral rate, after estimating expected tax revenue from the reduced rates covering commodities under serial numbers 1-4 above.

Hence, the policy reformers expected the move towards VAT to be REVENUE NEUTRAL. VAT Revenue Collection till now of the major States in India suggests that the States have so far registered a growth of 7 to 17% over previous year, indicating that yields from the new VAT regime is more or less REVENUE NEUTRAL , considering the growth rate of the previous Sales Tax regime.

During 2005-06, the total revenue for VAT implementing states has shown an increase of about 13.8 per cent, which is higher than the compound annual growth rate (CAGR) for last 5 years for these states (given in the Ministry of Finance of India website www.finmin.nic.in). This means the newly introduced VAT has been revenue neutral in India as assumed in most of the theoretical literature.

2.3 Review of literature mentioning results of other related study and their Methodologies

Various studies have suggested different tools to measure whether economic growth is pro-poor, although studies on India are notably absent. In case of India, poverty impact of switchover to a VAT regime is not specifically studied by anyone, although optimality of VAT as well as the previous sales tax regime have been discussed by Sinha (2002), Sinha and Raychaudhuri (1998) and Raychaudhuri and Sinha (2004). Notable among the poverty related studies in general are “poverty growth curve” proposed by Hyun Hwa Son (2003) for empirical studies on Thailand, “growth incidence curve” based on the rate of change in the Watts index of poverty normalized by the headcount ratio, used by Ravallion and Chen (2003) for China, “poverty equivalent growth rate” used by Kakwani and Khandkar (2004) for Korea, Thailand and Vietnam, “growth elasticity of poverty” used by Son and Kakwani (2004) for some Asian countries. Duclos and Wodon (2004) have suggested the use of “ income growth curves” to test whether distributional changes are “robustly” pro-poor, in the sense of whether broad classes of ethical judgments would declare a distributional change to be pro-poor.

Some incidence studies have tried to estimate the progressivity /regressivity of consumption taxes and distributional effects of marginal tax reform in some countries. Notable among them are studies by Sahn and Younger (1999) for Africa; Sahn, Younger and Dorosh (1999) for Madagascar; Younger (1996) for Ghana; Yitzhaki and Lewis (1996) for Indonesia; Yitzhaki (1994) for Israel; Jantti (2005) for Finland; Pahan Prasada (2005) for Sri Lanka and Munoz and Cho (2003) for Ethiopia. However, there is no empirical study on pro-poor implications of the indirect tax reform by switching over to VAT in India. Our study will be the first major attempt to measure empirically the pro-poor implications of the reform process in terms of poverty and inequality.

3. Objective of the study

As can be seen from the White Paper on VAT in India, the main reason behind the introduction of VAT was to enhance the efficiency and transparency of the commodity tax system and increase buoyancy of such tax revenue. The policy makers did not consider poverty alleviation or income redistribution as a critical component of such a reform process.

This is not an unusual experience. “Poverty and or inequality considerations have received little if any attention in LDC tax reforms. Partly this is because of the belief that few taxes are paid by the poor, and partly because of the belief that the tax system does not provide the best instruments to target the poor”(Gemmel and Morrissey, 2002). There is a strong belief that public social expenditures provide a better means to target the poor and reduce poverty (taxes are not viewed as instruments for reducing poverty) (Gemmel and Morrissey(2002), Bird and Zolt(2003)).

However, these beliefs are not always well supported by actual facts. It is true that in developing countries very few taxes are directly incident on the poor. In India for example, only 3.5% of the population are covered under the Income Tax (a direct tax). But certain consumption (indirect) taxes, particularly Sales Tax affect the prices of goods that the poor (as well as the rich) consume.

Indirect taxes dominate the tax system of the developing countries in general and the sub-national governments in particular. In India, Sales Tax is the single largest source of revenue (constitutes 29% of the revenue receipts) for the State (sub-national)

governments (Kurian and Dasgupta, 2003). Since rich and poor often purchase broadly similar consumption bundles, it may appear that it is difficult to make these taxes strongly progressive (i.e. to ensure that those on higher incomes pay relatively more tax). However, recent evidence (Sahn and Younger, 1999; Gemmel and Morrissey, 2002) suggests that some indirect taxes, particularly taxes such as Sales Tax or VAT, can be quite strongly progressive or regressive and can potentially affect poverty or inequality in developing countries.

In India, after almost a decade long (1996-2005) discussion among the State and Central governments, Value Added Tax has been implemented with effect from April 1, 2005, replacing the earlier Sales Tax regime. The tax structure has been radically restructured. In view of the discussion enumerated above, the motivation of the current study is to explore whether the new tax system (that is, VAT) is more progressive or regressive than the earlier Sales Tax system in India by measuring the distributional impact of such tax reforms (introduction of VAT).

In our current study, we will use Lorenz Curve and Concentration Curves and Consumption Dominance Curves to measure impact of this tax reform on the poorer income groups. The empirical exercise will be carried out on selected major commodities for two major States in India, namely Maharashtra and West Bengal. We intend to empirically carry out the following exercises to judge the pro-poor character of tax regime change in the above mentioned two states in India:

1. Calculate the trend of shares of expenditure on a particular commodity. The tools to be used are Engel curve and normalised Engel curve.
2. Calculate the progressivity of previous sales taxes on some important commodities for the major states in India. The tools to be used are the concentration curves and Lorenz ratios. One may calculate the concentration ratios in this context.
3. Calculate the direction of tax reform from the perspective of poorer groups through the consumption dominance analysis of various orders.

4. Methodology

The following tools have been used in our current study for poverty measures

4.1 Engel Curve and Normalised Engel Curve:

Engel curve shows the how the shares of expenditure on a particular commodity change as the income of the household increases. The normalised Engel curves depict the trend in share of expenditure on a particular commodity relative to the average share of expenditure as the income of the household increases. This will give some idea about the type of commodities the poor consumes more.

4.2 The FGT poverty index:

Measuring the impact of different taxes on poverty has been much less prevalent than assessing inequality impacts. Studies that have been undertaken demonstrate the importance of the particular poverty measure chosen for the conclusions reached. The most commonly used measures in tax analyses are the head count (the numbers, or proportion, below a specified poverty line); poverty gap (the average income of those in poverty relative to the poverty line); and ‘severity of poverty’ (the dispersion of incomes within the poor group).

Among the above, the simplest and most popular measure of poverty index is the Foster-Greer-Thorbecke (FGT) poverty index. This uses the concept of poverty gap, where income of a group is measured from a pre-determined poverty level, say z . Assuming $F(y)$ denotes the cumulative distribution of income y , FGT index is defined as

$$FGT^\alpha(z) = \int_0^z \left(\frac{z-y}{z} \right)^\alpha dF(y) \quad (1)$$

$FGT^0(z)$ gives the poverty headcount ratio, while $FGT^1(z)$ gives the normalized (by poverty line) poverty gap. Similarly, $FGT^2(z)$ gives the weighted normalized poverty gap.

The following tools have been used in tax incidence analyses in the current study to measure inequality:

4.3 Concentration Curve

The concentration curve is an important normative and descriptive tool, used in evaluating the impact of tax and transfer policies. It can capture the horizontal and vertical equity concepts related to tax impacts on social welfare.

The concentration curve is defined as,

$$C_{T(p)} = \frac{1}{\mu_T} \int_0^p \bar{T}(q) d(q) \quad (2)$$

Where $\mu_T = \int_0^1 Q_T(p) d(p) = \mu_X - \mu_N$ is average ‘taxes’ across the population, noting

that $Q_T(p)$ is the p -quantile function of net taxes and $\bar{T}(q)$ is expected net tax for q th quantile. Since population size is normalized to 1, $C_{T(p)}$ shows the proportion of total taxes paid by the p bottom proportion of the population, and X and N signify the gross and net incomes respectively.

In general use, concentration curves are usually estimated by ordering a finite number of n sample observations $(X_1; N_1), \dots, (X_n; N_n)$ in increasing values of gross incomes, such that $X_1 \leq X_2 \dots \leq X_n$, with percentiles $p_i = i/n$; where $i=1, \dots, n$. Then, the sample (or “empirical”) concentration curve for taxes ($T_i = X_i - N_i$) is then defined as

$$C_T(p = i/n) = \frac{1}{n\mu_T} \sum_{j=1}^i T_j \quad (3)$$

In our empirical study we will use the concentration curves to analyze the progressivity / regressivity of Sales Tax/VAT on different commodities in India. The concentration curves typically plot post-tax income, expenditure or tax payments against the proportion of the population ranked by pre-tax income. The concentration curve, like the Lorenz curve, passes through the origin. But unlike the Lorenz curve, it need not always be increasing, and its curvature depends on the income elasticity of the commodity for expenditure concentration curves.

For an indirect tax, these concentration curves can be compared to the concentration curve for total expenditures, the relevant tax base (the equivalent, in the indirect tax case, to the pre-tax Lorenz curve). If an indirect tax is unambiguously progressive, its

concentration curve will lie wholly outside the concentration curve for expenditures (the Lorenz curve). This implies that the poor pay proportionately less tax than their share of expenditure.

One can also use conditional second order stochastic dominance rules for ranking taxes on different commodities, expenditure on which is a component of total income (Yitzhaki and Slemrod, 1987). This is done by comparing concentration curves. If the concentration curve of one commodity is above the concentration curve of another commodity, then the first commodity dominates the second. However, if the concentration curves intersect, then it is impossible to show dominance.

Although conclusions about the welfare dominance typically relate to the whole income distribution, if we are more interested in the welfare of the poorest, we will focus on the impact on the poorest (for example, x%) of the population, simply by examining the behaviour of Lorenz or concentration curves in the region to the left of the designated poverty ratio. For example, where concentration curves for different taxes cross but that crossing point occurs relatively high up in the population ranking, one tax may still be judged to be unambiguously preferred if it is clearly superior for the poorest 20%, say, of the population.

4.4 Lorenz Curve

The Lorenz curve is one of the most popular graphical tools for illustrating and comparing income inequality. It provides complete information on the whole distribution of income relative to the mean, and therefore gives a more comprehensive description of the relative standards of living than any of the traditional summary statistics of dispersion pertaining to income distribution. The Lorenz curve has the advantage of being able to establish orderings of distributions in terms of inequality.

The Lorenz curve is defined as follows:

$$L_{(p)} = \frac{\int_0^p Q(q)d(q)}{\int_0^1 Q(q)d(q)}$$

$$= \frac{1}{\mu_0} \int_0^p Q(q)d(q) \quad (4)$$

Where $Q(q)$ is the net income function of those with net income rank equaling q . Thus, The numerator $\int_0^p Q(q) dq$ sums the incomes of the bottom p proportion (the poorest 100p%) of the population. The denominator sums the incomes of all. Since population size is normalized to 1, the denominator gives average income μ . $L(p)$ thus indicates the cumulative percentage of total income held by a cumulative proportion p of the population, when individuals are ordered in increasing values of their income. For instance, if $L(0.5) = 0.3$, then we know that the 50% poorest individuals hold 30% of the total income in a population.

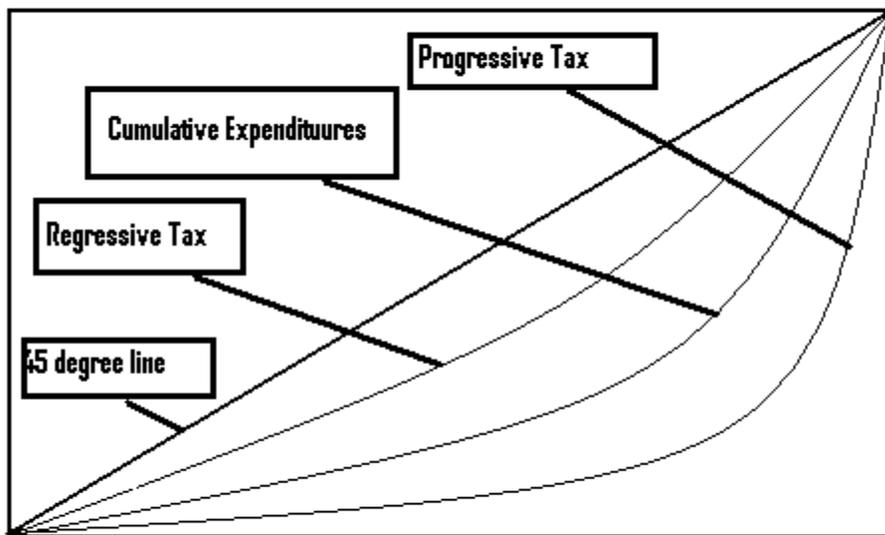


FIGURE - 1

Figure 1 provides a guideline for interpretation of the graphical results of the concentration curve analysis. The 45 degree line is the line of perfect equality. Any disparity in the distribution of income/expenditure would result in the cumulative income/distribution curve caving downwards from the 45-degree line. The curve titled “cumulative expenditure” represents the cumulative expenditure curve as in the case in this particular study. This serves as the benchmark for comparing different

concentration curves and determining the level of regressivity or progressivity of the tax. The cumulative expenditure curve is represented by the Lorenz curve for the total expenditures in this study.

If the concentration curve is above the Lorenz curve and below the 45-degree curve, the tax instrument is classified as regressive, that is, the impact of taxed consumption of the particular item concerned is concentrated more on the lower income classes. Similarly, for the progressive tax. If the concentration curve crosses the Lorenz curve, the share of the tax burden borne by both rich and poor groups is either higher than their share of income or lower.

4.5 Consumption Dominance Curve:

The concept of the Consumption Dominance Curve or CD-Curve of order- s is really useful to understand socially improving tax reform (Makdissi & Wodon, 2002). CD-curves display cumulative consumption shares when these are weighted by powers of poverty gaps. Conditions for which a tax reform is socially improving can be checked from the stochastic dominance curves (Duclos, Makdissi and Wodon, 2004). The dominance curves of order $s=1, 2, 3, \dots$ are defined as

$$D^s(z) = \frac{1}{(s-1)!} \int_0^z [z-y]^{(s-1)} dF(y) \quad (5)$$

where, z : poverty line, s : order of dominance, y : income

The dominance curves are therefore sums of powers of poverty gaps. Dominance curves can be interpreted as the ethically weighted cost of taxing k . As value of s increases it means that more weights are attached to the largest poverty.

Consumption dominance curves are defined as the change in dominance for changes in prices. Assuming full shifting of taxes, we have:

$$CD_k^s(z) = \frac{\partial D^s(z)}{\partial t_k}, s = 1, 2, 3, \dots \quad (6)$$

CD curves describe the ethically weighted cost of taxing k . Thus the vertical axis of the CD curves measure the ethically weighted cost of taxing k . The normalized CD curves are defined as

$$\overline{CD}_k^s(z) = \frac{CD_k^s(z)}{X_k(m)} \text{ where, } X_k(m) \text{ is the average consumption of good } k \text{ at the}$$

post tax price vector m , which is also interpreted as the ethically weighted cost of taxing k as a proportion of the average welfare cost (Duclos, Makdissi and Wodon, 2004).

These curves thus can be interpreted as the ethically weighted (or social) cost of taxing k as a proportion to the average welfare cost. Thus in drawing the normalized CD curves we also consider the revenue neutrality condition.

Let us define the concept of MECF which is the marginal efficiency cost of funds. In other words, this is the cost in terms of social welfare for raising one unit of revenue through rise in tax of the corresponding good. Thus it is defined for commodity k as:

$$MECF_k = \frac{X_k(m)}{\frac{\partial R(t)}{\partial t_k}}, \text{ where, } X_k(m) \text{ is the per capita consumption of commodity } k \text{ at post}$$

tax price vector m , and $R(t)$ is the government revenue.

A necessary and sufficient condition for a revenue neutral tax reform to be s-order poverty improving (condition 7) and social welfare improving (condition 8) can be represented by

$$\overline{CD}_l^s(y) - \gamma \overline{CD}_j^s(y) \geq 0 \quad \forall y[0, z] \quad (7)$$

$$\overline{CD}_l^s(y) - \gamma \overline{CD}_j^s(y) \geq 0 \quad \forall y[0, \infty) \quad (8)$$

The social welfare test extends over the entire space $\forall y[0, \infty)$ while the poverty test is limited to the range of potential poverty line $\forall y[0, z^1]$. Here γ is the ratio of MECF of commodity l to MECF of commodity j .

Suppose tax on commodity l is reduced and that on commodity j is increased, all marginally, assuming the consumption pattern of households does not undergo any drastic change. Such a marginal tax reform will reduce poverty if \overline{CD}_l multiplied by its MECF lies above the \overline{CD}_j multiplied by its MECF for every poverty line under z^1 . The multiplied \overline{CD}_j values are really poverty cost per marginal dollar of tax raised from

increasing tax on commodity j (Bibi and Duclos, 2004). When the range is unbounded and the normalized CD curves adjusted by its own MECF lies above that of another commodity then the poverty improvement extends to global welfare improvement.

At any $z=z^*$ the height of the normalized CD curve for commodity l measures how much poverty falls per rupee of welfare benefit if tax on l is reduced. Similarly height of the normalized CD curve of commodity j measures the increase in poverty due to increase in tax on j . The difference between the two measures the net fall in poverty per rupee of welfare benefit.

Thus the normalized CD curves give the distributional impact of tax reform along with the objective of revenue neutrality whereas the CD curves measure the distributional impact of tax reform. Given the definition of γ above, ordinary CD curves here do not take into account whether revenue neutrality is maintained or not, although it might be different for alternative definitions of γ (Makdissi and Wodon, 2007 forthcoming).

A poverty decreasing and revenue neutral marginal tax reform is described as the one for which $\overline{CD}_i^s(y) - \gamma \overline{CD}_j^s(y) \geq 0$ where γ is the ratio of marginal economic efficiency cost (MECF) of taxing j to MECF of taxing l . That is $\gamma = \frac{\lambda_j}{\lambda_l}$.

MECF from taxing good j is defined as

$$\lambda_j = \frac{X_j}{\partial R(t)/\partial t_j} = \frac{1}{1 + \frac{t_j}{1+t_j} e_{jj} + \sum_{j \neq k} \frac{t_k}{1+t_k} e_{kj}} \quad (A1)$$

To calculate λ_j one has to estimate the elasticities. The estimation of own-price and cross price elasticities is done by using the *Quadratic Almost Ideal Demand System (QAIDS)*. We have estimated the following demand system where budget shares are linear in β_{jk}, γ_j and θ_j . The estimation strategy follows Bibi and Duclos (2005). We have used the 1999-2000 household survey data published by NSSO for different

commodities. We have commodity wise data on expenditures and quantities, as well as data on many other demographic characteristics such as education, region of residence, age, sex, number of child, household size and income.

4.6 Quadratic Almost Ideal Demand System Method

We estimate the following demand system

$$w_j = \alpha_j + \sum_{k=1}^K \beta_{jk} \ln m_k + \gamma_j \ln(y/z) + \theta_j [\ln(y/z)]^2 + v_j \quad (\text{A2})$$

$$\text{subject to } \sum_{k=1}^K \alpha_k = 1 \quad \beta_{jk} = \beta_{kj}, \quad \sum_{j=1}^j \beta_{jk} = \sum_{k=1}^K \gamma_k = \sum_{k=1}^K \theta_k = 0$$

and where w_j : the budget share of commodity j at y,

m_k = post tax price of good k

y : the monthly per capita consumption expenditure (proxy of income),

z : the poverty line, v_j : a residual term

The model described by equation (A2) was used to estimate a demand system of six goods. The six goods that we have considered are rice (non-PDS), spice, milk (liquid), tea, sandal and other commodities. The other commodity includes all the marketed commodities except these five commodities. In our study we have calculated MECF of others as the MECF of LPG and biscuits. Here we should also mention that from the expenditure figure we have excluded the expenditure on four PDS commodities such as rice, wheat, kerosene, sugar. The expenditure shares of ‘other commodities’ is obtained by subtracting expenditure share of five selected commodities from one. It should be mentioned here that to avoid the problem of identification we have excluded one equation that is equation for ‘others commodities’.

We have employed the three stage least square (3SLS) method to estimate the elasticities. In our calculation we have specified additional exogenous variables such as log of household size, sex, sector, log of age, square of log of age, literate upto primary level, literate upto middle level, literate upto secondary level, literate upto higher secondary level, graduate and above in agriculture, graduate and above in medicine and engineering and graduate and above in other subjects. These exogenous variables are not included in any of the system equations. These implicit exogenous variables are used as instruments for endogenous variables ($\ln(y/z)$ and $\ln(y/z)^2$) in the “first stage”. In the second stage we replace the matrix of observations on explanatory endogenous variables by its estimate derived from stage one and apply OLS to the reformulated equation. In the third stage the residuals of regression of all the structural equations are obtained using two-stage least square estimators of the coefficients. Using these residuals we estimate the elements in the variance covariance matrix of all structural disturbances. Then transform the structural equations in the model by the prime of matrix of observation of per-determined variables and applying least square to the reformulated system using the estimated error variance covariance matrix. This gives us the three stage least square estimator of the coefficients in the model. Coefficients of the equation of ‘other commodities’ are estimated using the estimated coefficients obtained from the first stage.

Having estimated β_{ij} 's we have estimated the own and cross price elasticities using the following formula:

$$e_{ii} = \frac{\beta_{ii}}{\bar{w}_i} - 1 \text{ and } e_{ij} = \frac{\beta_{ij}}{\bar{w}_i}$$

Table 1 and Table2 presented below lists the own and cross price elasticities of nine goods. Table 5 below shows the calculated MECF values. Since we do not have data on income and we have used monthly per capita expenditure as a proxy of income. The MECF of a commodity is calculated using equation 9 above. MECF of others is used as the MECF of LPG and biscuits. The MECF calculated for the rice and Kerosene through PDS are likely to be biased since the commodities purchased through PDS are submitted to rations. In reality, the MECF for a rationed good is equal to 1 as long as the demand of this rationed good is unaffected by the price change

$$\left(\frac{\partial X_k(m)}{\partial t_k} = 0 \Rightarrow MECF_k = \frac{X_k(m)}{\frac{\partial R(m)}{\partial t_k}} = \frac{X_k(m)}{\frac{\partial X_k(m)}{\partial t_k} + X_k(m)} = 1 \right).$$

Table 1: Estimated Own and Cross Price Elasticity (West Bengal)

	Rice (non-PDS)	Spice	Sugar (non-PDS)	Milk (Liquid)	Sandal	Others
Rice (non-PDS)	-0.3927	0.0017	-0.0129	-0.0625	-0.1914	-0.3422
Spice	0.0948	-0.6196	-0.0670	-0.1948	0.4597	-0.6732
Sugar (non-PDS)	-0.2855	-0.0260	-0.5428	0.2948	1.4758	-1.9163
Milk (Liquid)	-0.6088	-0.0332	0.1296	-0.3910	-0.1819	0.0853
Sandal	-0.8461	0.0355	0.2943	-0.0825	-1.5463	1.1451
Others	-0.1312	-0.0045	-0.0331	0.0034	0.0993	-0.9338

e_{ij} : Elasticity of demand for i^{th} commodity (row) with respect to price of j^{th} column

Table 2: Estimated Own and Cross Price Elasticity (Maharashtra)

	Rice (non-PDS)	Tea	Spice	Milk (Liquid)	Sandal	Others
Rice (non-PDS)	-3.4414	-0.0144	-0.2387	0.1859	-0.0097	2.5182
Tea	-0.0593	-0.6261	-0.1408	0.0953	-0.1051	-0.1640
Spice	-0.6371	-0.0910	-0.9236	-0.0308	-0.0423	0.7249
Milk (Liquid)	0.2317	0.0288	-0.0144	-0.2596	0.0230	-1.0095
Sandal	-0.1399	-0.3674	-0.2288	0.2663	-0.6134	0.0831
Others	0.2698	-0.0043	0.0291	-0.0868	0.0006	-1.2085

e_{ij} : Elasticity of demand for i^{th} commodity (row) with respect to price of j^{th} column

Table 3: Official Poverty Line (in Rupees) in 1999-2000

	West Bengal	Maharashtra
Rural	350.17	318.63
Urban	409.22	593.71

Source: <http://www.nic.fi/~otammile/povindia.htm>

4.6 Data set

Commodities were chosen based on three criteria (details are given below in the descriptive statistics section) -

First, The weight of the commodity in the basket of consumption in the aggregate across income groups gives an idea about the importance of the commodity in the consumption in a particular region. The rice (non-PDS), spice and milk (liquid) are the major food items across states in India.

Second, those commodities were chosen for which we can compare a rise in tax on commodity j along with a fall in tax on commodity k . This helps us to stay close to the theoretical hypotheses in the consumption dominance literature which always assumes poverty reduction with revenue neutrality.

Third, we have also taken at least one exempt commodity for which data of consumption and tax are clearly available, namely Public Distribution System (PDS) rice.

Regarding choice of states, we have somewhat arbitrarily chosen one state in the East coast of India, namely, West Bengal and the other on the West coast, namely, Maharashtra. Some stylized facts are presented, again in the descriptive statistics section.

All the consumption data are taken from Unit level dataset obtained from the National Sample Survey Organisation (NSSO) of India. The household-wise data available in India from the National Sample Survey (NSS) on consumption expenditure for the 55th round (1999-2000) is used here for the study. The data have all the details about household size, monthly per capita expenditure, details about per head consumption of goods both in value and if available, in physical units terms. Note that the latest household level consumer expenditure data is available for different states in India only for the year 1999-2000 (NSS - 55th Round Data), although Data for aggregative All-India level is available for 2003-04. However, for measuring the poverty and social impact analysis (PSIA) of transition to VAT we are considering the Sales Tax rates as applicable up to 31st March 2005 and current VAT rates effective from April 1, 2005. All Tax data are taken from INSTAVAT Data bank.

We are assuming that the consumption pattern remained more or less the same over the period 1999-2000 and 2004-2005 during the Sales Tax regime in India. Thus it is truly an analysis of Marginal Tax Reform.

5. Descriptive statistics, Results and its interpretations

5.1 Descriptive Statistics

Our analysis is based on ten selected commodities, two of which are Public Distribution System or PDS commodities. We concentrate on two major states in India, namely, Maharashtra and West Bengal. The two states stand as follows in terms of tax collection and Net State Domestic Product (NSDP) –

Comparative figures for West Bengal and Maharashtra

	<i>West Bengal</i>	<i>Maharashtra</i>
Net State Domestic Product (NSDP) (at current price), 2002-03	<i>Rs. 89,792 crore</i>	<i>Rs. 1,53,429 crore</i>
<i>Population</i>	<i>80 million</i>	<i>96 million</i>
<i>Per Capita NSDP (at current price)</i>	<i>Rs.11,224 crore</i>	<i>Rs. 15,982 crore</i>
<i>Total Tax Revenue (2002-03)</i>	<i>Rs. 8399.60 Crore</i>	<i>Rs. 28576.30 Crore</i>
<i>Tax to NSDP Ratio (2002-03)</i>	<i>9.35</i>	<i>18.63</i>

Note: 1 crore = 10 million

Source: Indian Public Finance Statistics, Reserve Bank of India, 2004

Thus the above picture clearly shows that Maharashtra is a richer state than West Bengal and also, West Bengal's Tax collection, heavily dependent on Sales tax, did not perform that well as Maharashtra.

The average share of expenditure on a particular good in total expenditure of the household is an important indicator of the importance of the commodity. Following table shows the average commodity wise expenditure shares for both the states along with the rate of taxes in the pre and the post reform period.

Table 4 : Share of Expenditure on Good and Tax Rates

Sl. No	Commodity	Share of Expenditure on Good*		Sales Tax Rate (%)		VAT Rate (%)	
		MAH	WB	MAH	WB	MAH	WB
1	Rice (non-PDS)	0.0476	0.2086	0	2	0	0
2	Rice (PDS)	0.0035	0.0028	0	0	0	0
3	Kerosene (PDS)	0.0038	0.0048	4.4	4.55	4	4
4	LPG	0.0125	0.0078	8.8	17	4	4
5	Spice	0.0215	0.0206	4.4	8.05	4	4
6	Sandal	0.0036	0.0026	0	3.45	4	4
7	Milk (liquid)	0.0633	0.0311	0	0	0	0

8	Biscuits	0.0039	0.0068	8.8	10.0	12.5	12.5
9	Tea	0.0152		8.8		4	
10	Sugar (non-PDS)		0.0085		0	4	

Note: WB=West Bengal, MAH =Maharashtra

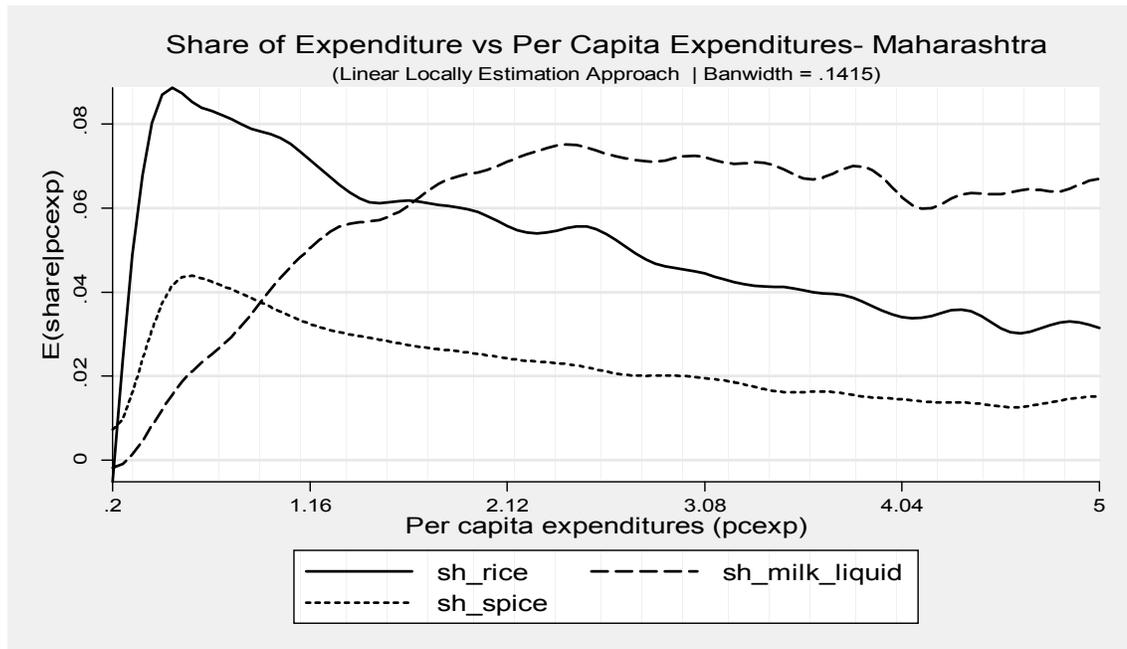
Source: NSSO unit level data and INSTAVAT data set

From the above table, one can see that only taxes on two commodities biscuits and sandal in both the states and tax on sugar (non-PDS) also have increased under the new VAT regime, while all other commodities chosen have reduction in taxes under VAT. Two commodities Rice (PDS and non-PDS) and Milk (liquid) have become exempt commodities. So for revenue neutrality, some other commodities must have higher rates under VAT which are not consumer goods but are intermediate goods.

5.2 Engel Curves

Engel curves plot the shares of expenditure on a particular item as the income of the household increases. From Fig (2)-Fig (5) it is observed that poorer households spend more on rice (non-PDS), spice, sandal (plastic footwear or hawai chappal) compared to the richer households. On the other hand, shares of expenditure on liquefied petroleum gas (LPG), biscuits, tea, sugar (non-PDS) and milk (Liquid) increase as the income of the household increases, indicating any increase in tax on rice (non-PDS), spice and sandal are likely to fall more on the poor than the rich. Similarly increase in tax on LPG, biscuits, tea and milk (liquid) is expected to affect richer households more than the poorer households. The Engel curve of rice (PDS) though not plotted here shows a falling trend.

Maharashtra



Fig(2)

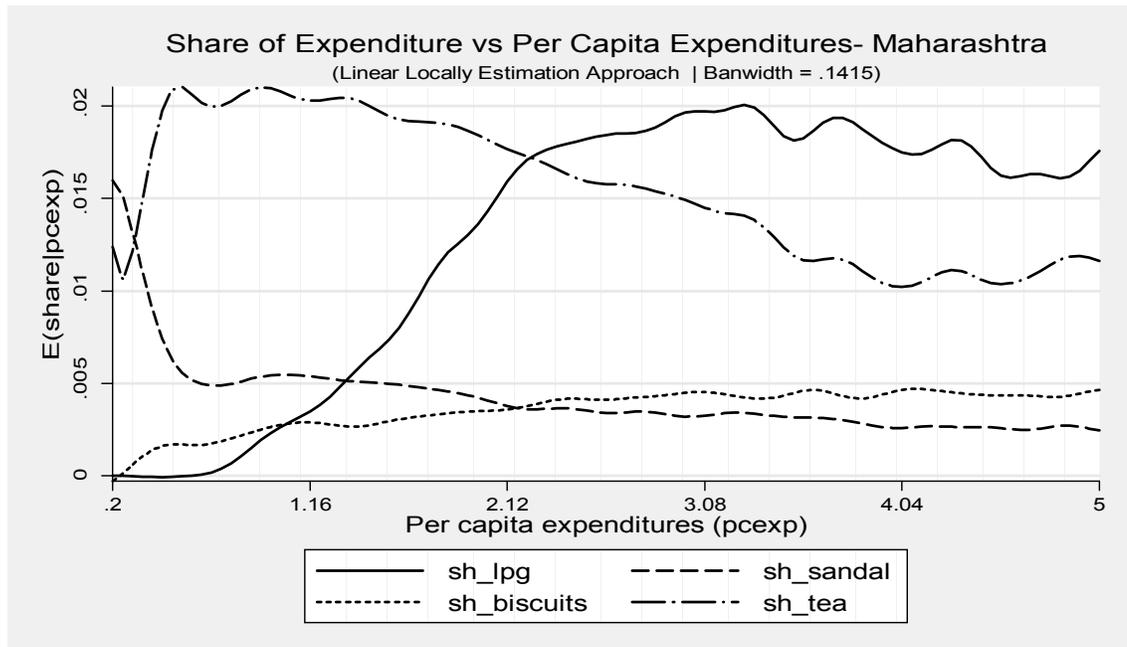


Fig (3)

West Bengal

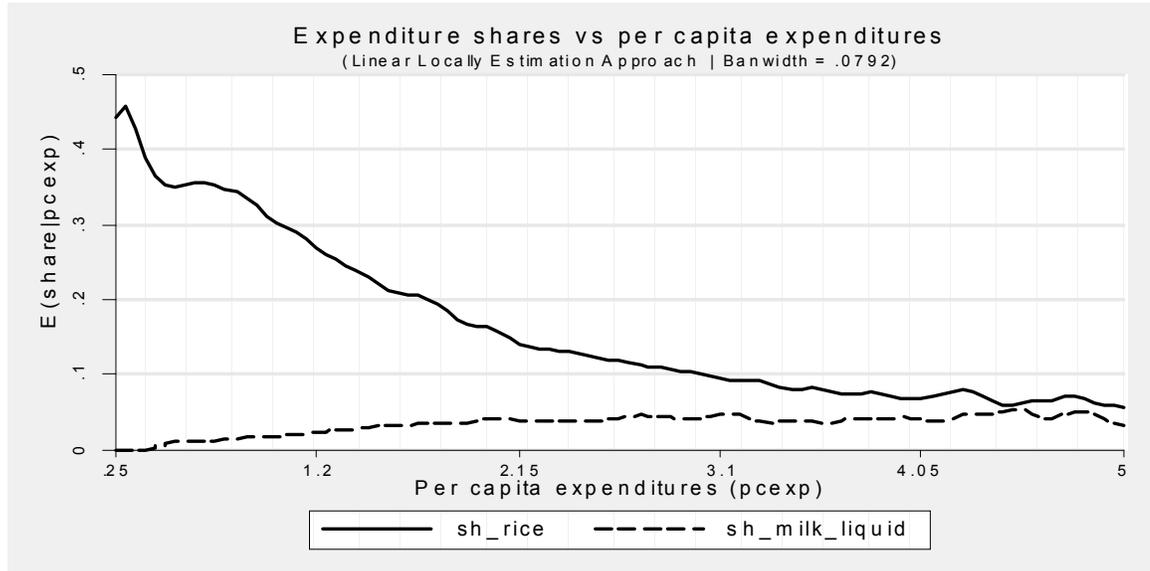


Fig (4)

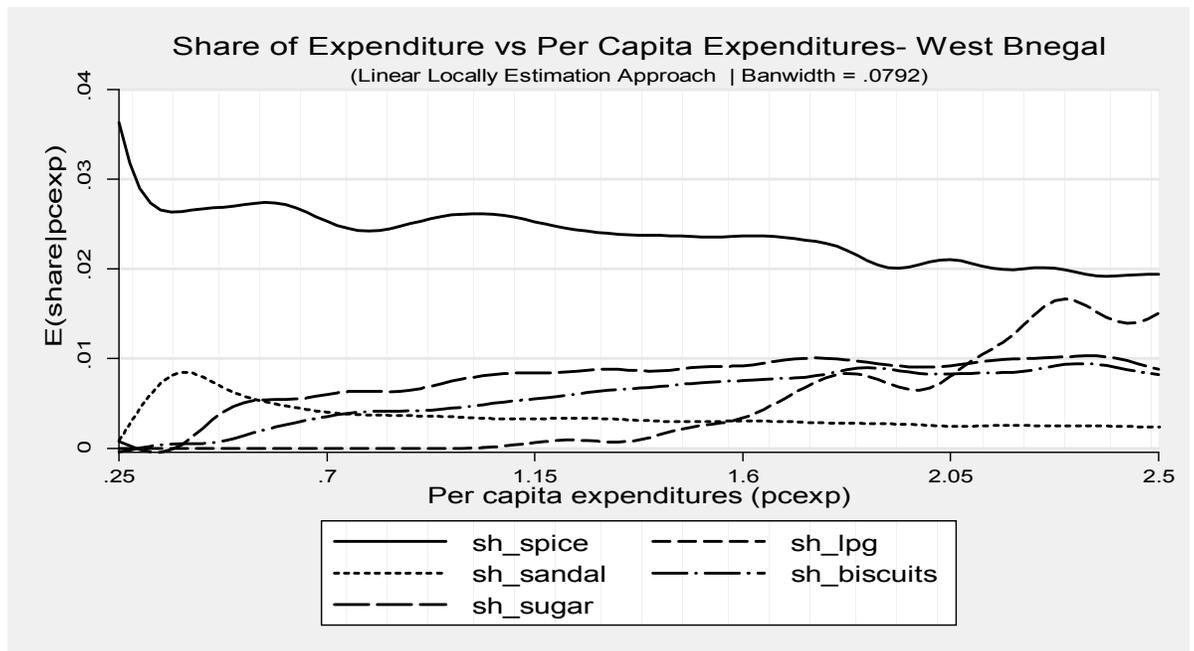


Fig (6)

5. 2. Progressiveness of Tax or Expenditure

In this section we will check whether the increase in tax on a particular commodity makes the tax system progressive or not. For this we will use the expenditure concentration curve and the Lorenz curve.

Maharashtra

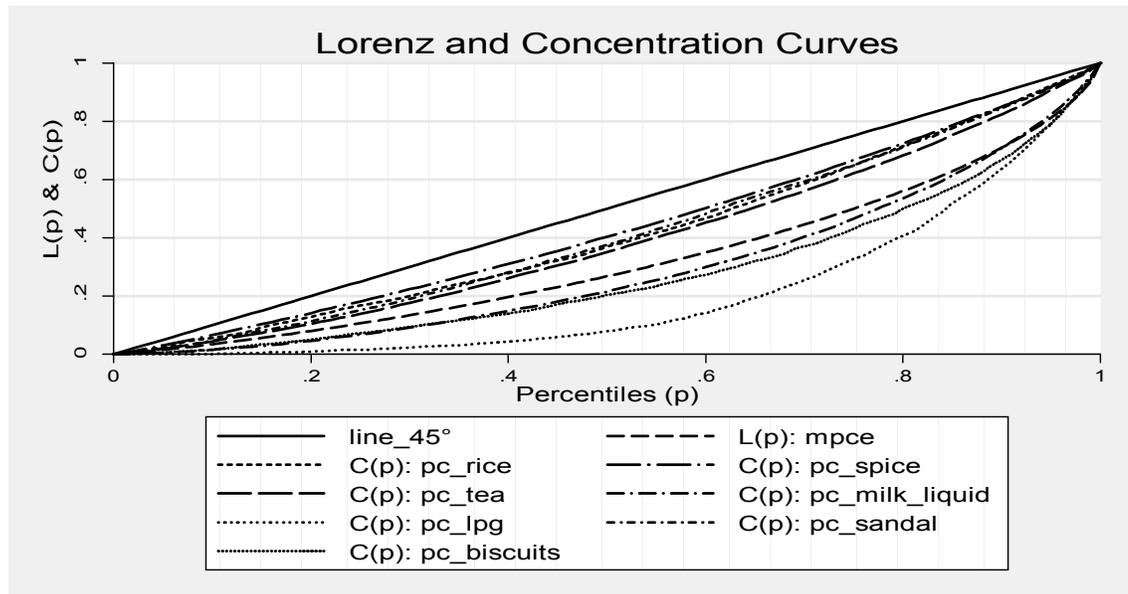


Fig (6)

The Lorenz curve and expenditure concentration curves are used to check whether the marginal change in tax rate makes the tax system progressive or regressive. In both Maharashtra and West Bengal the expenditure concentration curve for rice (non-PDS), spice and sandal lie above the Lorenz curve. Thus any increase in tax on these commodities will make the tax system regressive. Except for sandal (plastic) we find that tax on all the above-mentioned goods falls under VAT compared to the sales tax rate. For sandal there is an increase in tax rate from 3.45 percent to 4 percent in West Bengal and in Maharashtra it was under exempted commodity list but now tax has increased to 4 percent. ***This increase in tax rate on sandal will fall more on the poorer households than on the relatively richer households in both the states.***

The expenditure concentration curve of tea lies above the Lorenz curve in Maharashtra. Thus fall in tax on tea in Maharashtra will make the tax system progressive. Again expenditure concentration curve of sugar (non-PDS) in West Bengal cuts the Lorenz

curve from below at around 0.85 percentile point indicating there should be increase in tax on sugar (non-PDS).

The expenditure concentration curve of LPG lies below the Lorenz curve in both the states. The expenditure concentration curves of milk (liquid) and biscuits cut the Lorenz curve from below at around 0.95 percentile point in both the states. Thus any increase in tax on LPG, milk (liquid) and biscuits will make the tax reform progressive.

In reality we find that though there is an increase in tax on biscuits there is a fall in tax on LPG and tea. Milk (liquid) was in the exempted commodity list before reform and continues to be in the exempted commodity list after reform.

West Bengal

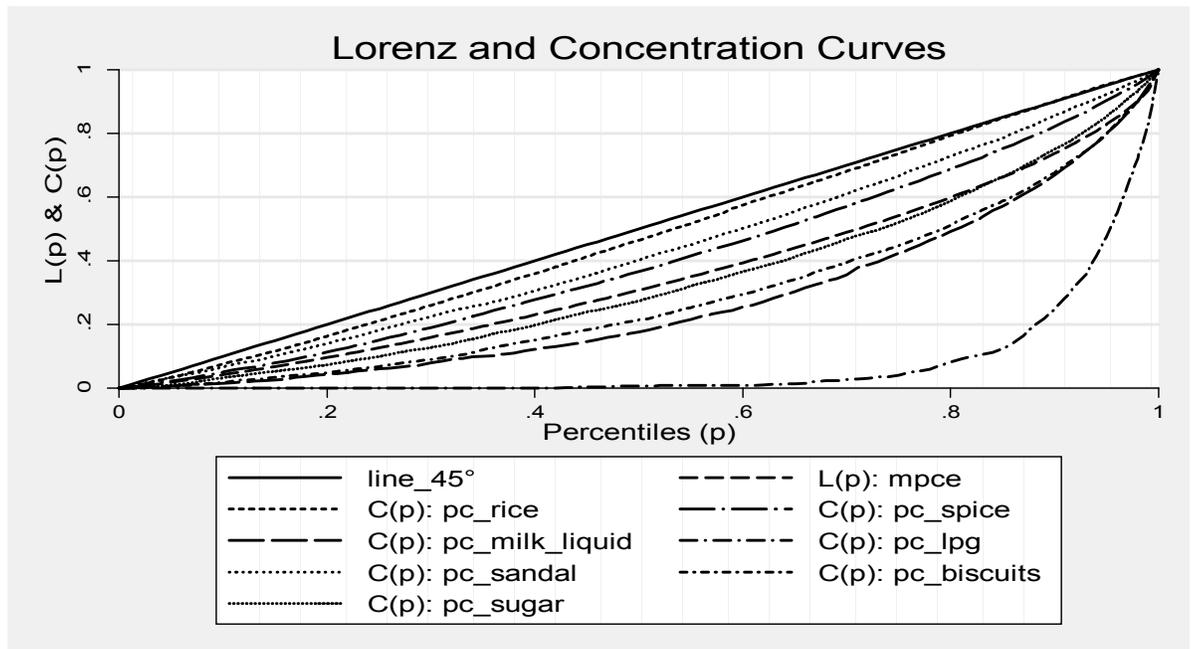


Fig (7)

6. Distributive and Efficiency Cost of Reform

6.1 Taxed and Non-taxed Goods

To find the revenue neutral impact of reform on poverty we have considered seven commodities: rice (non-PDS), spice, milk (liquid), tea or sugar (non-PDS), biscuits, LPG and Sandal. The consumption dominance curves normalized by mean and adjusted by marginal efficiency cost of public fund (MECF) are used as tools of analysis. The normalized CD curve for good j is drawn dividing the CD curves by the average consumption of that good. When we multiply the normalized CD curve of good j by the MECF⁵ of good j we not only consider the impact of reform on equity but also how efficient are the reform in maintaining the revenue neutrality. The ultimate impact of tax reform on poverty and welfare depends on the trade off between equity and efficiency. Throughout the analysis in the following section we have maintained the assumption of revenue neutrality of the government budget. Table 5 reports the marginal efficiency cost of raising public funds and Table 6 shows the tax structure in both the states.

Table 5: State-wise Calculated Marginal Efficiency Cost of Public Fund (MECF)

	Maharashtra	West Bengal
Rice (non-PDS)	0.7670	1.0500
Sandal	1.0298	1.0894
Tea	1.0838	
Sugar (non-PDS)		1.2214
Spice	0.9575	1.0333
Milk (Liquid)	1.1423	0.9129
Biscuits*	1.1769	1.1094

⁵ λ_j indicates the MECF of taxing j .

LPG*	1.1769	1.1094
------	--------	--------

Note: * MPCE of others commodity is taken as MPCE of LPG and Biscuits

Table 6: Tax Structure in the Pre and Post Reform Period

State	Maharashtra		West Bengal	
	Pre-Reform	Post- Reform	Pre-Reform	Post- Reform
Rice (non-PDS)	Exempted	Exempted	Taxed	Exempted (Tax Decrease)
Milk (liquid)	Exempted	Exempted	Exempted	Exempted
Spice	Taxed	Tax Decrease	Taxed	Tax Decrease
LPG	Taxed	Tax Decrease	Taxed	Tax Decrease
Tea	Taxed	Tax Decrease		
Biscuits	Taxed	Tax Increase	Taxed	Tax Increase
Sandal	Exempted	Tax Increase	Taxed	Tax Increase
Sugar(non-PDS)			Exempted	Tax Increase

In the next section first we will evaluate the tax policy of the government of West Bengal in terms of poverty alleviation and then we will consider the case of Maharashtra.

6.2 West Bengal

First we consider two goods, rice (non-PDS) and milk (liquid) that are exempted from taxation in VAT regime. Comparing rice (non-PDS) and milk (liquid) in West Bengal we find that any increase in tax on milk (liquid) and decrease in tax on rice (non-PDS) with revenue neutrality of the budget will be first order poverty improving for those whose income is below 1.6865, which is higher than the official poverty line which is drawn at the value 1 (MPCE divided by either rural or urban poverty lines). Considering second and third order of dominance it is observed that the marginal increase in tax on milk (liquid) for a decrease in tax on rice (non-PDS) will be poverty improving for a larger range of poverty lines.

In the pre reform period sandal was taxed and milk (liquid) was on the exempted commodity list. In the post reform period though tax on sandal has increased slightly from 3.45 percent to 4 percent but milk (liquid) is still in the exempted commodity list. We find that it will be first order poverty improving to increase the tax on milk (liquid) in order to reduce the tax on sandal so that budget deficit of the government remains unchanged for all poverty lines below 1.8527. It would be second and third order poverty improving for a wide range of poverty lines.

Thus we observe that with revenue neutrality though the decrease in tax on rice (non-PDS) is pro-poor, the increase in tax on sandal and keeping milk (liquid) in the exempted commodity list are not pro-poor.

The adjusted normalised CD curve of LPG lies below the adjusted normalised CD curve of all other commodities (see Fig (8) below) at least upto a certain range of poverty line. This clearly indicates that there should have been an increase in tax on LPG and that more fund should have been allotted to give subsidy to spice and it will reduce poverty at order one all poverty lines below 2.0675.

Table 2: Critical Poverty Line –West Bengal

	S=1	S=2	S=3
Rice(non-PDS)-Milk (Liquid)	1.6865	-	-
Sandal-Milk (Liquid)	1.8527	-	-
Spice –LPG	2.0675	-	-
Spice- Sugar (non-PDS)	1.1470	1.8027	2.5759
Sandal - Biscuits	1.7214	-	-

Note: Only poverty lines higher than 0.25 and upto 5.0 are considered. Sample size is 7982 observations and there is no household with income below 0.25.

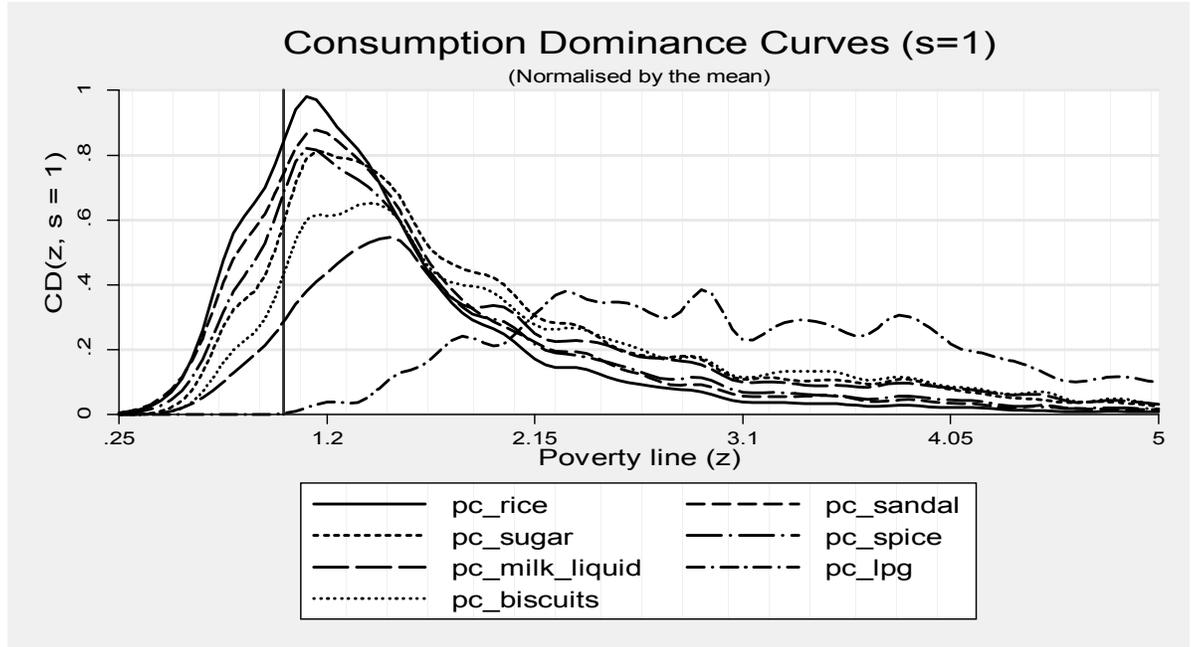


Fig (8)

In the post reform period we have observed that tax on spice has reduced to 4.4 percent from 4 percent and tax on sugar (non-PDS) has increased from 0 percent to 4 percent. Such a change in tax rates found to poverty reducing keeping budget deficit of the government unchanged. It is observed that any marginal reduction in tax on spice combined with marginal increase in tax on sugar (non-PDS) will be first order poverty reducing for all poverty lines below 1.1470 and second and third order poverty reducing for a wide range of poverty lines. Thus reduction in tax on sugar (non-PDS) is justifiable from the pro-poor angle if we consider the spice and sugar (non-PDS) combination.

Again it is found that tax on both sandal and biscuits have increased in the post reform period but with revenue neutrality of the government budget any increase in tax on biscuits by reduction in tax on sandal will be first order poverty reducing for all poverty lines below 1.7214 and second and third order poverty declining for all levels of poverty lines.

Thus the increase in tax on biscuits, sugar (non-PDS) is in the right direction but the decrease in tax on LPG is not a pro-poor revenue neutral reform.

6.3. Maharashtra

Two non-taxed goods both in the pre and post reform period, namely, rice (non-PDS) and milk (liquid) are considered for Maharashtra also and we find that it would be first order revenue neutral poverty improving reform to increase tax on milk (liquid) in order to give subsidy to rice (non-PDS) for the poverty lines until 1.2405 (Figure (9) below), which again is higher than the official poverty line drawn at 1 (as in West Bengal, dividing MPCE by rural or urban poverty lines). We find that such a change in tax rates will be second order poverty improving for poverty lines at 2.1233 and third order poverty improving for income levels until 3.0472.

In Maharashtra though both sandal and milk (liquid) were on the exempted commodity list, in the post reform period sandal's tax is increased to 4 percent but tax on milk is not increased. If we consider the sandal –milk (liquid) combination we observe that the decrease in tax on sandal combined with the increase in tax on milk (liquid) with budget deficit remaining constant will be first order poverty reducing for those whose income is below 1.9964. It would be second and third order poverty reducing for a larger range of poverty lines.

Again for the spice – LPG combination it is found that it would be first order poverty reducing if there is an increase in tax on milk (liquid) and decrease in tax on spice when budget deficit remains unchanged for all poverty lines upto 1.8716. It would be second order poverty reducing for all poverty lines below 4.4410.

Table 8: Critical Poverty Line –Maharashtra

	S=1	S=2	S=3
Rice(non-PDS)-Milk (Liquid)	1.2405	2.1233	3.0472
Sandal-Milk (Liquid)	1.9964	-	-
Spice-LPG	1.8716	4.4410	-
Tea-Biscuits	2.1595	-	-

Note: Only poverty lines higher than 0.15 and upto 5.0 are considered. Sample size is 9355 observations and there is no household with income below 0.15.

S – Denotes the order of dominance.

There is a fall in tax on tea and rise in tax on biscuits under VAT reform and we find that any marginal reduction in tax on tea and increase in tax on biscuits with budget deficit of the government remaining unchanged will be first order poverty reducing for all whose income below 2.1595 and second and third order poverty reducing for a wide range of poverty lines.

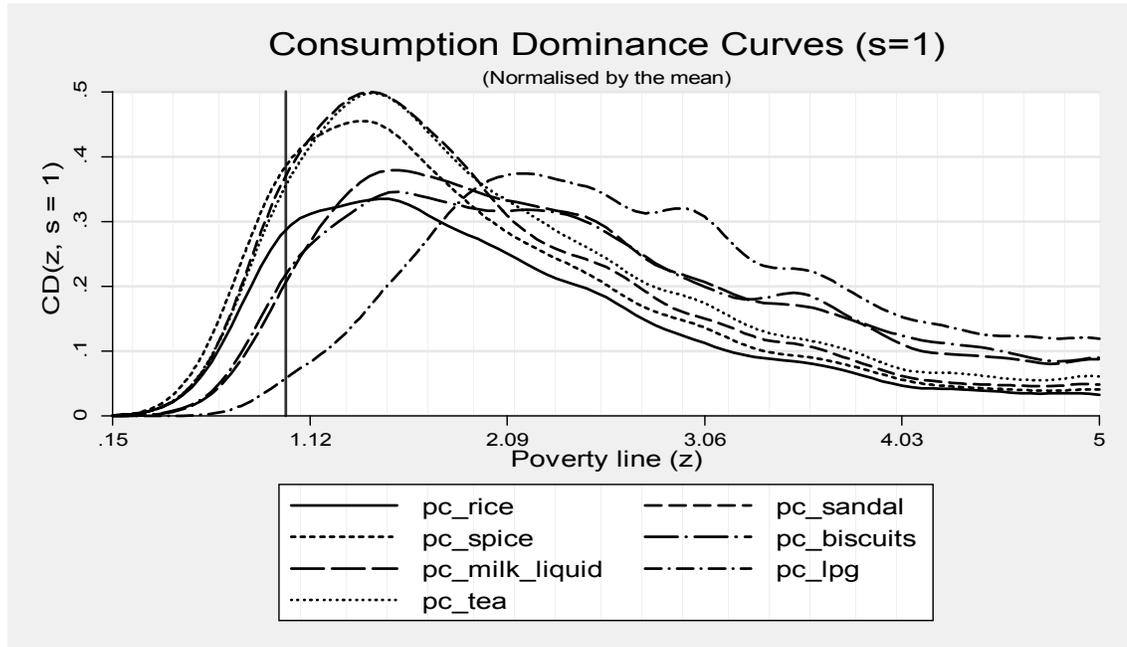


Fig (9)

Thus, by decreasing tax on spice and tea and keeping rice (non-PDS) in the exempted commodity list, the government of Maharashtra has done the right thing in terms of revenue neutral pro-poor reform. But the increase in tax on sandal is not pro-poor. The tax on milk (liquid) could have been increased in order to give subsidy to rice (non-PDS) or sandal. The rise in tax on biscuits is also a right kind of reform.

6.2. PDS Commodities and Non-taxed Good

In this paper we have considered two Public Distribution System (PDS) commodities: rice (PDS) and kerosene (PDS) and compared them with the exempted commodity milk (liquid). The rate of subsidy on rice (PDS) and kerosene (PDS) are shown below.

Table 9: The Rate of Subsidy on PDS Commodities (1999-00)

	West Bengal	Maharashtra
Rice (PDS)	55.79	53.43
Kerosene (PDS)	64.26	45.74

It is observed that the rate of subsidy on kerosene (PDS) is higher than that on rice (PDS) in West Bengal whereas the subsidy rate of rice (PDS) is much higher in Maharashtra. One of the important objectives of the supply of PDS commodities at a subsidized rate is to help the poor. In this section we will discuss whether the subsidy rate on PDS commodities can be increased by increasing tax on one of the exempted commodities. As milk (liquid) is in the exempted commodity list in the both pre and post reform period we have compared PDS commodities with milk (liquid).

These PDS goods are rationed commodities. The calculation of elasticities using the Quadratic Almost Identical Demand System (QAIDS) for the PDS commodities is not possible. Thus the estimated marginal efficiency cost of public funds (MECF) is likely to be biased. In reality, the MECF for a rationed good is equal one⁶ as long as the demand of this rationed good is unaffected by the price change. Table 10 and Table 11 report the critical poverty lines upto which any increase in subsidy on PDS commodities compensated by increasing tax on milk (liquid) (the non-taxed commodity) with budget deficit remaining constant is poverty decreasing.

$${}^6 \frac{\partial X_k(p)}{\partial s_k} = 0 \Rightarrow MECF_k = \frac{X_k(p)}{\frac{\partial R(t)}{\partial s_k}} = \frac{X_k(p)}{\frac{\partial X_k(p)}{\partial s_k} + X_k(p)} = 1$$

Table 10: Critical Poverty line –West Bengal

	S=1	S=2	S=3
Rice(PDS)-Milk (Liquid)	1.4138	-	-
Kerosene (PDS)-Milk (Liquid)	-	-	-

Note : Range of poverty line $(z)=[0.25,1.5]$,
S- denotes order of dominance

In West Bengal we find that it is first order poverty reducing to increase subsidy on rice (PDS) by increasing tax on milk (liquid) with revenue neutrality of the budget for those whose income is below 1.4138, which again is higher than the official poverty line. For second and third orders of dominance we find it is poverty reducing to increase tax on milk (liquid) and decrease tax on rice (PDS) for all poverty lines upto 1.5 with budget deficit remaining unaltered.

For all poverty lines below 1.5 it is seen that in West Bengal increase in tax on milk (liquid) and increase in subsidy on kerosene (PDS) can decrease poverty at order one, two or three when revenue of the government remains constant.

West Bengal

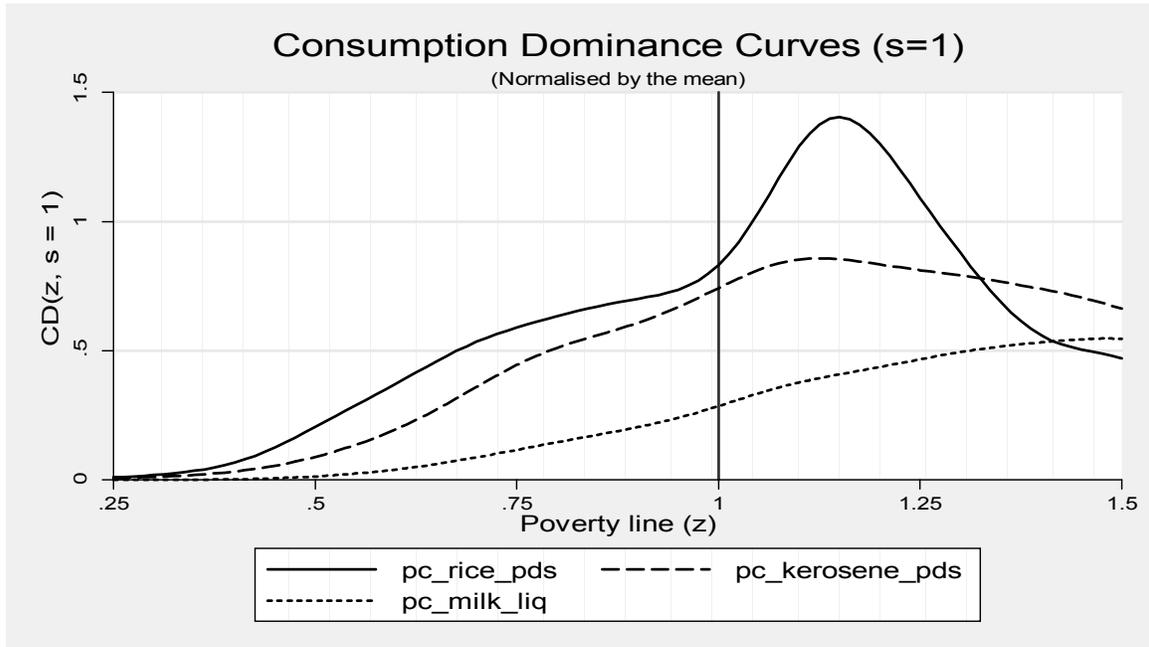


Fig (10)

In Maharashtra we find that any increase in tax on milk (liquid) in order to increase subsidy on kerosene (PDS) or rice (PDS) is poverty improving at order one, two and three for all poverty lines ranging upto 1.5 in Maharashtra.

Table 11: Critical Poverty line –Maharashtra

	S=1	S=2	S=3
Rice(PDS)-Milk (Liquid)	-	-	-
Kerosene (PDS)-Milk (Liquid)	-	-	-

Note : $z=[0.15,1.5]$, S – order of dominance

Maharashtra

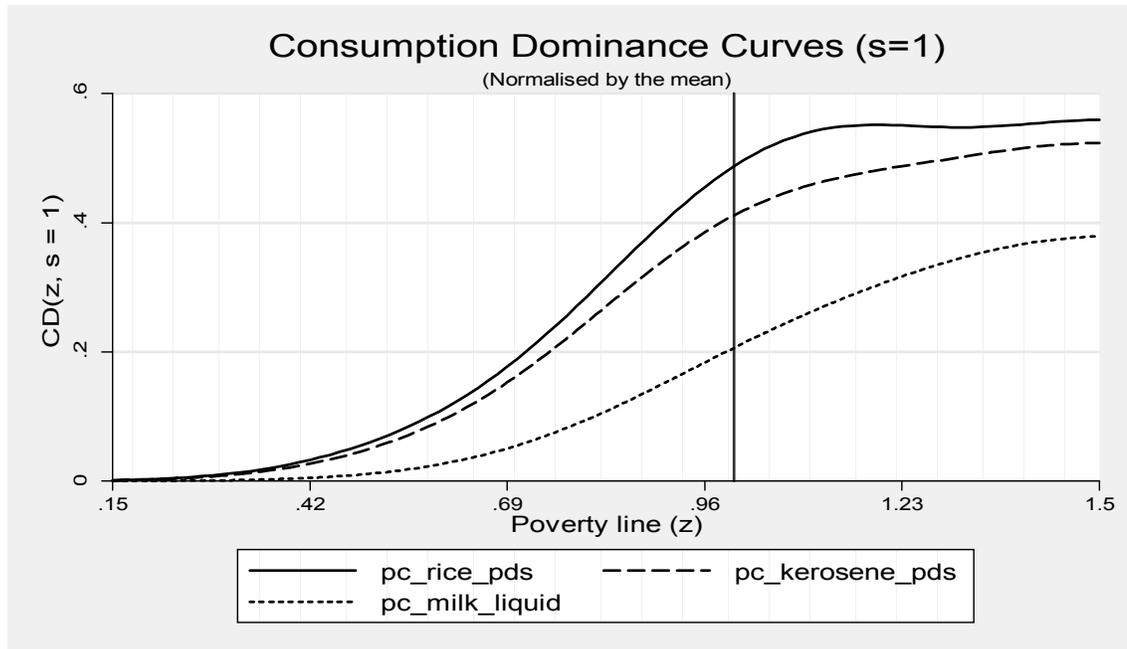


Fig (11)

Conclusion

The present work is an effort to understand the nature of marginal tax reform undertaken by different state governments in India, when they switched over to VAT from sales tax regime. Although VAT is known to be a better tax regime in general since it avoids cascading, does it benefit the poor more than the rich? The present paper has specifically addressed this question for two important states in India, namely, West Bengal and Maharashtra. This study finds that the design of the VAT in these states are generally pro-poor since those commodities are taxed less which are consumed more by people below a wide range of poverty lines, all higher than the official ones. The poverty lines differ from commodity to commodity, but pair-wise comparisons of taxes with the help of normalized consumption dominance curves give an unambiguous answer regarding who benefits from increase or decrease in tax rates if the government wants to maintain its revenue target.

In order to answer the question of progressivity of taxes we have used the Lorenz and expenditure concentration curves. We have identified LPG, milk (liquid) and biscuits as the items on which more tax make the tax system progressive. Though there was an increase in tax on biscuits in both the states, tax on LPG and milk (liquid) has been reduced. This reduction in tax on LPG and milk (liquid) definitely will improve the condition of the richer households than poorer households. The observed rise in tax on sandal on the other hand will make the tax system regressive in nature. The reduction in tax on rice (non-PDS) and spice appeared to be good step as the expenditure on these commodities is more concentrated among the poor than the rich. It is found that any increase in tax on tea will make the tax system progressive in West Bengal and regressive in Maharashtra.

With the consideration of revenue neutrality we have tried to analyse the impact of reform on poverty when there is an increase in tax on one commodity and decrease in tax on another commodity. For this purpose we have considered the different combinations of two commodities and checked whether the direction of reform is poverty improving, by using consumption dominance curves of various orders. There is a rise in tax rate of biscuits and sandal in both the states and increase in tax on sugar (non-PDS) in Maharashtra. There is also a decrease or no change in tax rate of rice (non-PDS), spice, tea, milk (liquid) and LPG. The rise in tax on sandal in both the states contradicts the direction of pro-poor nature of reform. We find that the direction of change in tax on LPG in both the states is also inconsistent with pro-poor reform. Again keeping milk (liquid) under exempted commodity list in West Bengal and Maharashtra is found to be somewhat beneficial to comparatively richer households more. The examination of role of PDS commodities shows that it is pro-poor to give subsidy to rice and kerosene through PDS by increasing tax on milk (liquid). Similarly reduction of tax on tea in Maharashtra appeared to be pro-poor change in tax whereas such a change in tax on tea in West Bengal found to be not pro-poor reform.

The analysis here fulfils a gap in the literature on taxes like VAT in India, but the analysis is in partial equilibrium framework. In many cases revenue neutrality is maintained by increase in taxes on products that are finished products but are used by industries and not consumed. Thus many of the tax reductions are not pair-wise truly

comparable for revenue neutrality. However, the analysis done here gives some indications about the design of VAT in India. The political economy factor clearly shows up in case of petroleum products like LPG. LPG is a rich man's item but its tax is reduced (the argument given is that it is a nationally important good), while kerosene is taxed more despite being consumed more by the relatively poorer groups. In the latter case, the poorest benefit from a higher tax, but not the other in the 'poor' class. Hopefully, more such comparative studies among more states in India, along with additional dimensions like gender, region and castes will throw more information on the pro-poor dimensions in the design of VAT.

Reference:

Bibi, Sami and Jean-Yves Duclos (2004), "Poverty-Decreasing Indirect Tax Reforms: Evidence from Tunisia", CIRPEE working paper 04-03, Department of Economique, Université Laval.

Bird, Richard. M. and Eric M. Zolt (2003), "Introduction to Tax Policy Design and Development", paper presented in the course on Practical Issues of Tax Policy in Developing Countries, World Bank, April 28- May 1, 2003.

Davidson, Russel and Jean-Yves Duclos (1997), "Statistical Inference for the Measurement of the Incidence of Taxes and Transfer", *Econometrica*, 65 (6), 1453-66.

Deaton, Angus and Franque Grimmard (1992), "Demand Analysis and Tax Reform in Pakistan", LSMS Working Paper No. 85, Washington D.C., World Bank.

Duclos, Jean-Yves and Abdelkrim Araar (2005), Poverty and Equity: Measurement, Policy and Estimation with DAD, Mimeo.

Duclos Jean-Yves, Paul Makdissi and Quentin Wodon (referred as Duclos et al also) (2004), "Socially Improving Tax Reforms", CIRPEE working paper 04-01, Department of Economique, Université Laval.

Duclos, Jean-Yves and Quentin Wodon (2004), 'What is "Pro-Poor"?', Cahier de recherché/Working Paper 04-25, CIRPEE, Department of Economique, Université Laval, Quebec, October.

Feldstein, Martin S. (1975), The Income Tax and Charitable Contributions: Part I-Aggregate and Distributional Effects, *National Tax Journal*, 28, 81-100.

Gemmel, N and O.Morrissey (2002), “ The Poverty Impacts of Revenue System in Developing Countries”, A Report prepared for the International Development, U.K.

Government of India (2005), “A White Paper on State-Level Value Added Tax”, Ministry of Finance, Empowered Committee of State Finance Ministers, January.

Hossain, Shahabuddin M. (2003), “Poverty and Social Impact Analysis: A Suggested Framework”, IMF Working Paper, WP/03/195, October.

INSTAVAT (2005), Tax Data Set, published by Instavat Info Private Limited, Mumbai.

Jäntti, Markus (2005), “The distribution of the tax burden in Finland 1985-2001”, Department of Economics and Statistics, Åbo Akademi University, April.

“Key Indicators 2004: Poverty in Asia, Measurement, Estimates and Prospects”, Manila: Asian Development Bank.

Kurian, N.J. and Sushmita Das Gupta (2003), “Rising Revenue Gap of the States: Dimensions of the Problem and Possible Approaches for a Solution”, in “The Dynamics of Fiscal Federalism: Challenges Before the Twelfth Finance Commission”, Ed. By G.C.Srivastava, Taxmann Publications Pvt Ltd, New Delhi.

Makdissi, P. and Q. Wodon (2007), “Poverty-Reducing and Welfare-Improving Marginal Public Price and Price Cap Reforms”, in *Journal of Public Economic Theory* (Forthcoming).

Mayshar, Joram and Shlomo Yitzhaki (1995), "Dalton-Improving Indirect Tax Reform", *The American Economic Review*, 85 (4), 793-807.

Munoz, Sonia and Stanley Sang-Wook Cho [2003], “Social Impact of a Tax Reform: The Case of Ethiopia”, IMF Working Paper, WP/03/232, November.

National Institute of Public Finance & Policy (NIPFP) (1994) – ‘Reform of Domestic Trade Taxes in India: Issues and Options’, April.

Prasada, Pahan (2005), “Incidence of Commodity Taxation on Income Distribution in Sri Lanka”, Paper presented in the PEP meeting in Colombo.

Planning Commission of India website www.planningcommission.nic.in

Raychaudhuri, Ajitava and Sudip Kumar Sinha (2004), “Fiscal reforms Initiatives in India: An Indirect Tax Perspective” in Purusottam Bhattacharya, Tridib Chakraborti and Shibashis Chatterjee (eds) *Anatomy of Fear: Essays on India’s Internal Security*, New Delhi: Lancer’s Books.

Sahn, D.E. and Younger S.D. (1999),” Dominance Testing of Social Sector Expenditures and Taxes in Africa”, IMF Working Paper no. WP/99/172, Washington D.C., IMF, December.

Sinha, Sudip [2002], Models of Optimal Commodity Taxation with special reference to India, Unpublished Ph.D thesis, accepted for the award of doctorate degree by Jadavpur University.

Sinha, Sudip and Ajitava Raychaudhuri (1998), “ Some Extensions of Optimal Commodity Taxation: With Special references to India”, Journal of Economic Development, Vol. 23, No. 2, December.

Son, Hyun H. and Nanak Kakwani (2004), “Economic Growth and Poverty Reduction: Initial Conditions Matter”, Working Paper no. 2, International Poverty Centre, UNDP, August.

Survey of Consumer Expenditure : 55th Round (1999-2000), National Sample Survey Organization, India.

Yitzhaki, Shlomo and Jeffrey Lewis (1996), "Guidelines on Searching for a Dalton-Improving Tax Reform: An Illustration with Data from Indonesia", The World Bank Economic Review, 10 (3), 541-62.

Yitzhaki, Shlomo and Ingram Olkin (1987), “Concentration Curves”, Technical Report 230, Dept of statistics, Stanford University, April.

Yitzhaki, Shlomo and Joel Slemrod (1991), "Welfare Dominance: An Application to Commodity Taxation", American Economic Review, 81 (3), 480-96.

Yitzhaki, Shlomo (1994), “On the Progressivity of Commodity Taxation”, in Wolfgang Eichhom, (ed.) Models and Measurement of Welfare and Inequality”, Springer-Verlag, Heidelberg, 1994, 448-465.

Younger, S.D. (1996),”Estimating tax incidence in Ghana using household data”, in D. Sahn (Ed.) “Economic Reform and the Poor in Africa”, Oxford Clarendon Press.

Younger, Stephen, David Sahn, Steven Haggblade and Paul Dorosh (1999), "Tax Incidence in Madagascar: An Analysis Using Household Data", The World Bank Economic Review, 13 (2), 303-332.