On Efficiency of VAT in India

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Abstract

Only in the last decade the Value Added Tax (VAT) system had been rolled out in Indian states. Theoretically availability of an efficient tax instrument should have raised the revenue collection choice of the states. We test this hypothesis using a panel data set comprising of 33 years data for 11 major Indian states. Since Indian federalism has significantly persistent difference in per capita Gross State Domestic Product (GSDP) among its states, we also check if the drivers of efficiency are different in the groups of low and high GSDP states. Along with usual explanatory factors, we also consider role of fiscal transfers from the central government to state governments in our analysis. The results indicate that the introduction of VAT had been efficient neither for all states taken together nor for individual state groups. In the high GSDP states it appears that the loss occurred due to misreporting of exports and slackened revenue effort of the states on receipt of compensating transfer from the central government towards possible revenue loss on introduction of the VAT. But, in the low GSDP states it appears that it occurred on the rapid growth of the service sector as a share of GSDP of these sates, a sector the states constitutionally are unable to tax. The results derive important policy implications on design of tax and transfer policies in federal economies like India.

Keywords: Value Added Tax, Tax reform, Indian states, Revenue Efficiency

JEL Classifications: H20, H21

1. Introduction

The adoption of VAT is quite a recent phenomenon in Indian states. India is a federal democracy with 29 constituent states. The Constitution of India through its statute divides the tax and expenditure responsibilities between the central and state governments. Accordingly the state governments have responsibility of both designing and collecting sale tax on goods. However service tax, excise and customs duty, direct taxes are designed and collected by the central government. There exist mechanisms through which the central revenue is shared with the states[1]. Haryana was the first Indian state to unilaterally shift to a Value Added Tax (VAT) system on sale tax in 2003-04. Afterwards coordination was achieved among other states and the Central government towards the implementation of VAT from the financial year 2005-06. While most of the states shifted to VAT from the conventional sale tax system in 2005-06, some states lagged behind e.g. Uttar Pradesh introduced VAT as late as 1st January, 2008. In India, the VAT system adopts the input tax credit method, i.e. a firm while paying their own tax revenue to the authority, on production of relevant vouchers receives refund of the tax revenue already paid by it during the purchase of intermediate inputs.

There is a view among the economists that since VAT makes the production more efficient by avoiding taxation of intermediate inputs and associated cascading of taxes in supply chain, it is a more efficient system of commodity taxation compared to the conventional one. It is also expected to fetch higher revenue: (i) by providing incentive to firms in declaring their transaction record and thereby creating an audit trail it helps to check tax evasion; (ii) by dividing the VAT liability across supply chain so that even if revenue is lost at one part of the supply chain due to evasion, it helps collection of the rest of the due revenue on the value of the product. But, it is not that there is unanimity among economists in support of efficiency of VAT relative to alternative systems of commodity taxation (like tariff, conventional sale tax, retail sale tax) especially in presence of imperfect markets (Das-Gupta (2005)) and informal sectors of production (Piggott and Whalley (2001), Emran and Stiglitz (2005))[2]. Also the possibility of evasion may not be completely avoided even in a VAT system mainly because: (i) administering match of every purchase-voucher of intermediate inputs with the corresponding sales-vouchers may turn out to be so costly that the detection of the cases where fake vouchers are produced for claiming input tax credit may be

[1] See Rangarajan and Srivastava (2011) for details.

[2] In presence of imperfect markets and informal sector it is often argued that turnover tax is a better instrument for checking tax evasion (Emran and Stiglitz (2005), Gordon and Li (2009)). See Best, Brockmeyer, Kleven, Spinnweijn and Waseem (2013) for a recent empirical evidence.

detected with low probability, especially if the number of transactions are very large; (ii) the scope of zero rating may induce firms to show their products zero-rated in order to avoid payment of tax revenue. The latter is commonly observed in the case of zero-rated exports, while for claiming undue input-tax credit either the exported amount is over-reported by the sellers or a quantity is shown to be exported while it has been actually sold at the domestic market[3]. In many countries for maintaining administrative efficiency smaller firms with turnover below a threshold are exempted from VAT registration[4]. Nevertheless VAT has been adopted rapidly in last fifty years not only in developed countries but also in developing countries around the World. Till date, over 130 countries have adopted the VAT system of commodity taxation[5].

In Indian federal structure VAT was first adopted by the Central government in 1986 over its jurisdiction which consists of customs duty, excise tax (except on liquors) and service tax. Later on the Central government persuaded the state governments to adopt VAT over their own jurisdiction which consists mainly of taxation of goods. Since the aim was to introduce an inter-state VAT on goods in India, a certain degree of harmonization of VAT structure adopted in different states was required which would also eliminate the possibility of tax competition among states. An empowered committee of state finance ministers was formed to serve this purpose. The committee agreed on imposition of four different floor rates of VAT for different categories of goods. They also agreed to keep the list of exempted commodities short and similar. However above the floor the states were free to choose the structure of goods tax in their own states[6]. The threshold turnover value for VAT registration was also independently decided. But it should be noted that India still does not have a fully integrated system of VAT among the states; and between the states and the centre. Therefore even if VAT indeed were an efficient system of taxation, it might not have achieved its full potential in Indian case. Beside this India is known for its large informal sector of production and imperfect markets, the extent of which varies from one state to another. The governments, their ideology and the administrative efficiency also differ across states. So the adoption of VAT may not have the same efficiency impact in all Indian states. This sets the backdrop of the present paper. The question we

[3]See Keen and Smith (2006), Hashimzade, Huang and Myles (2010) and Mirrlees Review (2011) for a discussion.

[4] See Crawford, Keen and Smith (2010) for calculation of optimum threshold: it is positive function of administrative and compliance cost and negative function of marginal cost of public fund, the rate of VAT and the ratio of value added to turnover.

[5] See Keen and Lockwood (2010) for an empirical analysis of the causes of adoption. They find that the lower revenue countries and the countries with non-crisis IMF loan are more likely to adopt VAT.

[6] Note, the design of VAT in Indian states to a large extent disapproves the apprehension of Keen and Lockwood (2010) that in fiscal federalisms the revenue uptake at the local government level would dissipate on horizontal tax competition and the effect of introduction of VAT would be less significant.

address in this paper is whether the adoption of VAT in India has been efficient. We explore this by analyzing a panel data set of 11 major Indian states spanning over 33 years from 1980-81 to 2012-13.

There are some country studies concerning the effect of VAT on revenue. In a recent paper Keen and Lockwood (2010) uses a cross country panel dataset to empirically test the hypothesis that VAT had been an efficient system of taxation for the countries that shifted to it. They call a tax system more efficient, if it causes lower income loss in collection of targeted amount of revenue. In a stylized theoretical model where a government chooses the size of public expenditure, they show that revenue ratio (the ratio of revenue from all sources to Gross Domestic Product (GDP)) increases (falls) if and only if the tax instrument is more efficient (inefficient). They also show that this argument is valid even if the government is not benevolent. From the data it appears that while VAT had been efficient in some countries, it had also been inefficient in some other countries. The net effect had been positive in all the regions of the world except Sub-Saharan Africa. Generally it was found to be successful in relatively richer countries. In Indian case Das-Gupta (2012) exploits sale tax revenue and Gross State Domestic Product (GSDP) data of 29 states separately for 16 years (1993-94 to 2008-09) to assess the impact of introduction of VAT on revenue buoyancy which he has found to be limited. He also constructs a panel with this data to assess the impact of VAT introduction on the VAT base proxied by GSDP and reports no impact. Although Das-Gupta (2012) makes an important contribution in studying incidence of VAT in India, however the focus was not the evaluation of the efficiency impact of VAT-introduction in India. He also does not control for explanatory factors like share of informal and service sector in GSDP.

In this paper we follow the methodology of assessing the efficiency impact of VAT-introduction proposed by Keen and Lockwood (2010) more closely to answer the questions raised above. While Keen and Lockwood (2010) undertake a cross country study with panel data, fiscal federalism features are not included in their study. But, the contribution of this paper lies in adapting their framework for a particular country like India and studying Indian federalism with its typical characteristic features. First, informal production sector plays a key role in Indian economy and existence of large informal sector is detrimental to the success of VAT; unlike Keen and Lockwood (2010) we incorporate this feature in our analysis. As a proxy of the size of informal sector in a state along with the share of agricultural sector in state gross domestic product (GSDP), we also include the share of unregistered manufacturing. Second, since some taxes are outside the purview of states, the transfer from Centre to State becomes an important factor in the revenue target and collection

in a state. Therefore, the share of transfer from the central government in GSDP has also been included as one of explanatory factors of revenue performance of the states. Since the states cannot tax service sector in Indian federalism, the size of service sector in a state appears as an explanatory factor too. Apart from these, we also use a larger panel data set of Indian states than Das-Gupta (2012) for the present study. Compared to short panel used by Keen and Lockwood (2010) we use a long panel. In the regression analysis this puts a different restriction on the error structure. Moreover, the impact of introduction of VAT on the groups of high and low income Indian states has been studied separately to check whether they have reacted differently to introduction of VAT. These are the issues not addressed before in any study involving India. The results have specific policy implications depending on the identity of the state groups.

We find that in general the introduction of VAT has not been efficient for Indian states irrespective of per capita GSDP level of the states. Interestingly, the explanation for the observed inefficiency is different for the high and low per capita GSDP states. For the high income states it appears that the leakages from exports and higher central transfer on introduction of VAT have been responsible for the inefficiency, while for low income states it appears that the expansion of the service sector, which falls outside the base of the state VAT, matters.

The next section of the paper describes the methodology and the data. Section 3 describes the results. The section following concludes the paper.

2. Methodology and Data

Since there is no obvious way to test directly the efficiency gains from VAT, Keen and Lockwood (2010) develops an indirect methodology for the same which has also been adopted in this paper. They call a tax system more efficient, if it causes lower income loss in collection of targeted amount of revenue. In a stylized model where a government chooses the size of public expenditure, they show that revenue ratio (the ratio of revenue from all sources to Gross Domestic Product (GDP)) increases (falls) if and only if the tax instrument is more efficient (inefficient). They also show that this argument is valid even if the government is not benevolent. Therefore a revenue equation of following form is estimated:

$$r = \beta_0 + \beta_1 V + \beta_2 Y + \beta_3 VY \quad (1)$$

where r is the revenue ratio and Y is the per capita GDP of the state. The variable V represents the introduction-of-VAT dummy, which takes value of 1 if VAT is introduced and 0 otherwise. As discussed above if it is observed from the regression analysis that $\frac{\partial r}{\partial V}$ is positive and significant, it is concluded

that the introduction of VAT had been efficient. The other variables which are thought to have effects on the revenue ratio are also included in the regression equation. These include the share of agriculture and unregistered manufacturing in the state GDP (GSDP), share of service sector in GSDP, trade openness index (share of import and export in Indian GDP), share of exports in GDP and the share of Central government transfer in GSDP.

In India agricultural commodities and the commodities produced by the unregistered manufacturing units are largely traded in the informal markets and no tax is collected from these transactions. Therefore the share of agriculture and unregistered manufacturing in GSDP can be taken as proxy for the size of informal sector in the state's economy. Even if these products are sold in the formal sector markets as intermediate inputs, no tax is paid by the sellers having their turnover below a threshold and therefore no input tax credit is claimed by the buyers of these inputs either. So the informal sector acts as an exempted sector in the supply chain. An increased share of exempted transactions shrinks the tax base and inefficiency is created in the tax system: the choice of$r$gets adversely affected. The introduction of VAT is not expected to bring any significant change in the way the informal sector affects the revenue collection unless either the registration threshold changes or the introduction of VAT provides an incentive to the informal sector firms to get registered for VAT.

In India service tax is collected by the central government. So a state loses the revenue on final and intermediate transactions of services which is part of its GSDP. Therefore as the share of service sector rises in GSDP,r is expected to be adversely affected. However since the tax collected from the formal sector purchase of intermediate goods made by the service sector firms is retained by the state, on introduction of VAT a positive effect on r is also expected. Therefore the net effect of rise in the share of service sector in GSDP on r may either be positive or negative, depending on the strengths of the two effects discussed above. The positive effect would be weaker, more labour intensive the service sector is and more purchases of intermediate goods are made from the informal sectors of production.

In Indian federalism states receive a part of their revenue as transfer from the Central government. The higher the share of central transfer in a state's GSDP, the higher the value of r the state should be in a position to choose. When the VAT was adopted by the states, the central government increased their transfer to the state to make adoption of VAT revenue neutral. But the state may also choose to free-ride on the central transfer by reducing its own revenue effort: in that case r may fall as well.

During the study period India had opened up to international trade through a series of reforms and the trade openness index rose monotonically from 0.14in 1980-81 to 0.43 in 2012-13. Since the trade revenue is collected entirely by the central government it does not have direct impact on r. However if the trading firms purchase the intermediate goods from domestic market or sells the final good at the domestic market the state earns revenue and$r$ may rise or fall depending on the production and the consumption pattern of a state.

Since zero-rating of exports is argued as a major source of evasion under VAT, the undue demand for input tax credit on exported items may result in drain in state's revenue. So the rise in export as a share of GDP may lower the choice of r by the states if they are adversely affected by the evasion. In India share of exports in GDP has increased monotonically from 4.6% in 1980-81to 17% in 2012-13.Therefore if export related evasion adversely affects a state it is expected that the rise in export as a share of GDP would lower r.

So the regression equation that we estimate corresponding to revenue equation presented in (1) takes the following form:

$$r_{it} = \beta_1 V + \beta_2 Y + \beta_3 VY + \gamma X_{it} + \mu_i + \varepsilon_{it}. \quad (2)$$

In equation (2) above i andt are state and time indicators, respectively, and X_{it} are the explanatory variables other than the VAT dummy and per capita GSDP as explained above. The termμ_i are state-specific time-invariant effects;$\gamma$is the vector of coefficients corresponding to X_{it};ε_{it} are the error associated with each observation. The cross-section invariant but time-variant specific effects are included in X_{it}.

We collect the data on the variables described above from official sources, viz. Ministry of Statistics and Programnme Implementation (MOSPI), Ministry of Finance, Government of India and Reserve Bank of India Reports like Handbook of Statistics for Indian Economy and State Finances: A Study of Budgets. The data on date of implementation of VAT in individual states have been taken from Das-Gupta (2012). We collect data on 11 major Indian States, viz. Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Orissa, Punjab, Rajasthan, West Bengal and Tamil Nadu. We exclude the other major states like Bihar, Madhya Pradesh and Uttar Pradesh from our analysis as they were bi-furcated during the study period to create new states. The period covered in the study is from 1980-81 to 2012-13. We could not include 2013-14 as data on GSDP for some states were still not available. The data on own tax and non-tax revenue as a share of GSDP which has been taken as value of r, per capita GSDP, share of agriculture and unregistered manufacturing in GSDP, share of service sector in

GSDP and the central transfer as a proportion of GSDP for all the states are displayed in the Figures 1, 2 and 3.

Figures 1, 2, 3

From Figure 1, it is observed that the own tax and non-tax revenue as a share of GSDP has shown rising trend over the study period for all states. But dependence on the central government transfer has remained substantial. While own tax and non-tax revenue form a major portion of the total revenue of some states, for states like Orissa, West Bengal and Rajasthan, the central transfer to states constitutes a significant portion of the total revenue, sometimes even higher than the own tax and non-tax revenue of the states, especially in the recent past[7]. The share of central transfer in the state's total revenue over the sample period had been 31% on an average, with a minimum of 9%, a maximum of 65% and standard deviation of 0.12.

From Figure 2, it is evident that the share of agriculture and unregistered manufacturing and share of service sector in GSDP have shown completely opposing trends over the sample period, viz. the fall in the former is coupled with a rising trend of the latter (mostly of the same amount).Figure 3 reveals that over the years, India's trade openness has improved and export to GDP ratio also has shown a rising trend.

We run regression specification (2) on three different sets of data: first, on the panel of 11 major states; second, on the panel of the high per capita GSDP states; third, on the panel of the low per capita GSDP states. All of them are balanced panel over 33 years from 1980-81 to 2012-13. We have divided the 11 states into two groups according to the median of the median per capita GSDP across states. The High GSDP group of states consists of Gujarat, Haryana, Kerala, Maharashtra, Punjab and Tamil Nadu[8] and the low GSDP states group consists of Andhra Pradesh, Karnataka, Orissa, Rajasthan and West Bengal. In order to check whether the position of a particular state has changed substantially over time, we assign ranks for each state year wise and then find out the rank correlation of each year (Table 1). It is evident that the rank correlations are very high, the mode of the correlations being 0.96. While the correlation with distant past may have fallen to some extent, it has never been lower than 0.76. Therefore, it may be concluded that since the position of a state vis-à-vis other states has not changed much over time, clubbing the states in the above two groups is justified.

Table 1

[7] The central transfer to total revenue for these states are on an average 56.8%, 44.9% and 41.5%, respectively, with the ratio ranging between 50.6% to 65.3%, 37.6% to 55.3% and34.6% to 47.7% for the three states.

[8] Tamil Nadu is the median state, but since its mean per capita GSDP is higher than the all India mean per capita GSDP, it falls in high GSDP state.

Table 2 provides the descriptive statistics of the variables for all 11 states, while Table 3 presents the summary statistics of high and low GSDP states, respectively. Across all the tables, it is noted that in all the variables the variation over time within the states is greater than the variation between the states. There is significant difference in mean per capita income between the high and low GSDP states. But, it is observed that the difference of mean share of agriculture and unregistered manufacturing in GSDP is significant between the two groups of states only at 10% level (the share is between 22 to 47 per cent for high GSDP states and between 30 to 38 per cent in low GSDP states).The same is true for the service-GSDP ratio. The high GSDP states have share of service sector in GSDP varying between 39 to 54 per cent, compared to that of the low GSDP states, for which it varies between 41 to 49 per cent. Interestingly, the mean of central transfer to GSDP ratio for high GSDP states (varying between 0.04 to 5 percent across states and years in the group)is markedly lower than the mean of central transfer to GSDP at low GSDP states (varying between 1 to 17 per cent across states in the group over years). The wide variation in per capita GSDP is controlled by taking it in log form.

Tables2, 3

3. Results

In the panel regression, the dependent variable is own tax and non-tax revenue as share of GSDP (defined as revenue ratio) taken in log form. Along with the independent variables described above, we also incorporate interaction terms of each of these independent variables with introduction-of-VAT dummy in the regression as the introduction of VAT itself may have an impact on the way the independent variables influence the dependent variable. For example, VAT regime itself may have differential impact on a state's revenue collection depending on whether it is a high or low GSDP state; introduction of VAT may also affect the responsiveness of revenue collection with respect to share of agriculture and unregistered manufacturing and the share of service sector in GSDP as the sectoral composition of GSDP of respective states are not necessarily similar. Moreover the incidence of trade openness, with introduction of VAT, may differentially affect the states, as discussed in Section 2. Lastly, since the states received special transfers from the centre as compensation for possible revenue shortfall at the introduction of VAT which may have an impact on the revenue effort of the states, the interaction dummy with share of central transfer in GSDP has also been

incorporated. The per capita GSDP and share of central transfer in GSDP data has been taken with one period lag for avoiding possible endogeneity.

With the number of states being significantly less than the number of years in all three data sets being used, the datasets are long panels where the within-state variation of most of the variables is more than the between-state variation. Therefore we estimate the fixed effect regression with AR(1) disturbance term (Cameron and Trivedi (2009)).For r_{it} and Y_{it} we use log values. Different specifications of the regression equation (2) are estimated, e.g. since export-GDP ratio and trade openness index are likely to have a high correlation with each other they are not included in the same regression. Similarly, the share of agriculture and the share of services having a high negative correlation among them have been included in separate regressions. The results for all 11 states are reported in Table 4 and those of high and low GSDP state groups are reported in respective Tables 5 and 6.In each table, regression 1 estimates the basic revenue equation given in (1). Regressions 2, 3, 4 and 5 introduce other explanatory variables in it. However the coefficients of VAT-dummy, log of per capita GSDP and their interaction term have been estimated in each regression. Based on estimated regression co-efficients we calculate the mean marginal effect of introduction-of-VAT on revenue ratio by differentiating r with respect to V for each regression, e.g.$\frac{\partial r}{\partial V} = \hat{\beta}_1 + \hat{\beta}_3 \bar{Y}$ for regression (1) where $\hat{\beta}_1$ and $\hat{\beta}_3$ are estimates of β_1 and β_3 respectively and $\bar{Y}$ is the mean value of log of per capita GSDP over 1980-81 to 2012-13. It should be noted that when mean effect is calculated, only those co-efficients are considered which are significant at 5% or 1% level[9].

Table 4

From Table 4 it is evident that if all states are considered together the explanatory variables like lagged per capita GSDP, the share of agriculture and unregistered manufacturing in GSDP, share of services in GSDP, the trade openness index and the share of exports in GDP all shows their expected sign, all being significant at least at 5% level. Except the share of informal sector, which negatively affects r, the other variables affect $r$positively, as expected. The previous year's share of central transfer in GSDP also has a positive significant effect on r. But how does introduction of VAT affect r? Table 4 shows that it does not have any direct effect on r. But it works indirectly through evasion related to

[9]Obviously, the estimate of mean marginal effect varies from one regression to the other.

exports as reflected in the negatively significant interaction term of trade openness and export-to-GDP ratio, and reduces efficiency. We estimate all states taken together the introduction-of-VAT reduces the revenue ratio by about 24% to 28%.

Comparing the results of India across states with those of Keen and Lockwood (2010) across countries, it is observed that while in India we fail to see any direct impact of introduction of VAT dummy, in most of the cases, they find a positive direct impact. Moreover, in the cross-country case the per capita income has a negative impact on r. But for the Indian states we find a positively significant impact, as expected. The significance and the direction of the effect of the share of informal sector and that of the trade openness are also the same for both the papers. However, as far as the trade openness interaction term is concerned, while trade openness contributes to higher revenue collection with VAT introduction in the cross country study, it dampens the positive effect of trade openness in the case of Indian states. This points to the possible leakage in tax collection from exports.

Now, the question is whether effect of VAT is different in the high and low per capita GSDP states. We try to find an answer from Table 5 and 6 below.

Tables 5 and 6

The results for the high and the low GSDP states broadly conform to the ones depicted in Table 4, with certain important differences. The effect of lagged per capita GSDP is consistently positive and significant in both the groups. The effects of share of service, export to GDP ratio and trade openness are also same as in Table 4. But if the other variables are compared, some interesting differences emerge. *First*, while the same negative significant effect of share of informal sector is observed in low GSDP states, it is not at all significant in high GSDP states. *Second*, the interaction term of share of service is negatively significant for only low GSDP states implying that it weakens the revenue collection with the introduction of VAT. *Third*, the interaction term of trade openness is negatively significant only in regression 4 of low GSDP states, but it is not significant with high GSDP states. But, interestingly the high GSDP states experience a negatively significant interaction term of exports-GDP ratio, but the low GSDP states do not. *Fourth*, though previous year's central transfer to GSDP ratio is positively significant for both the groups, its interaction term is not significant in low GSDP states, but negatively significant for all regressions for high GSDP states. The mean effect of introduction-of-VAT for the high GSDP states ranges between -0.19 and -0.50 and that of the low GSDP states lies between-0.34 to -0.81 implying reduction of efficiency in both the groups. Therefore though in both the high income and low income states there has been significant loss in efficiency

due to introduction of VAT, the channel of influences are different in the two groups of states. It appears that in the high income states the leakages from exports and the higher central transfer on introduction of VAT have been responsible for the inefficiency; for low income states it is the expansion of the service sector which falls outside the jurisdiction of the state VAT.

4. Conclusions

The paper tests the theoretical hypothesis derived by Keen and Lockwood (2010) that the availability of an efficient tax instrument should raise the revenue collection choice of the states in the case of introduction of VAT in Indian states using a panel data set comprising of 33 years data for its 11 major states. Since Indian federalism has significantly persistent difference in per capita Gross State Domestic Product (GSDP) among the states, it also checks if the drivers of efficiency are different in the groups of low and high GSDP states. So it compares the effect of VAT separately for the high per capita GSDP and the low per capita GSDP state groups.

The results indicate that the introduction of VAT had not been efficient in India. It has reduced the revenue-collection efficiency for both the high and the low GSDP state groups. In the high GSDP states it appears that the loss occurs due to misreporting of exports and slackened revenue effort of the states on receipt of transfers from the centre as compensation to possible revenue loss on introduction of VAT. In low GSDP states the same occurs as service sector expands its share in GSDP. Since in India by Constitution the service sector falls outside the jurisdiction of state VAT this happens. Therefore the policy implications for high and low GSDP states are also different. The contribution of the paper is significant not only due to the assessment of revenue efficiency of VAT in India for the first time, but also because it incorporates the characteristics of fiscal federalism characteristics of Indian federal structure in the analysis, finds out the channels through which the effect of VAT works in the high and the low income states.

In India full potential of introduction of VAT has still not been realized in absence of common Goods and Service Tax (GST) across the states the introduction of which is pending for more than two years now. The paper shows that the part implementation of VAT has not been efficient in Indian states. Once GST is introduced the service sector will enter the state VAT system. The results suggest that this may improve the efficiency of revenue collection in low GSDP states. But for overall efficiency of VAT in Indian states it is very important the policies are implemented such that evasion

of VAT through exports is stopped. This will improve the efficiency of VAT in high per capita GSDP states as well. It remains to be seen if VAT becomes an efficient instrument of taxation after the GST is rolled out in India. If not possibly abandoning the VAT system is a better policy in India.

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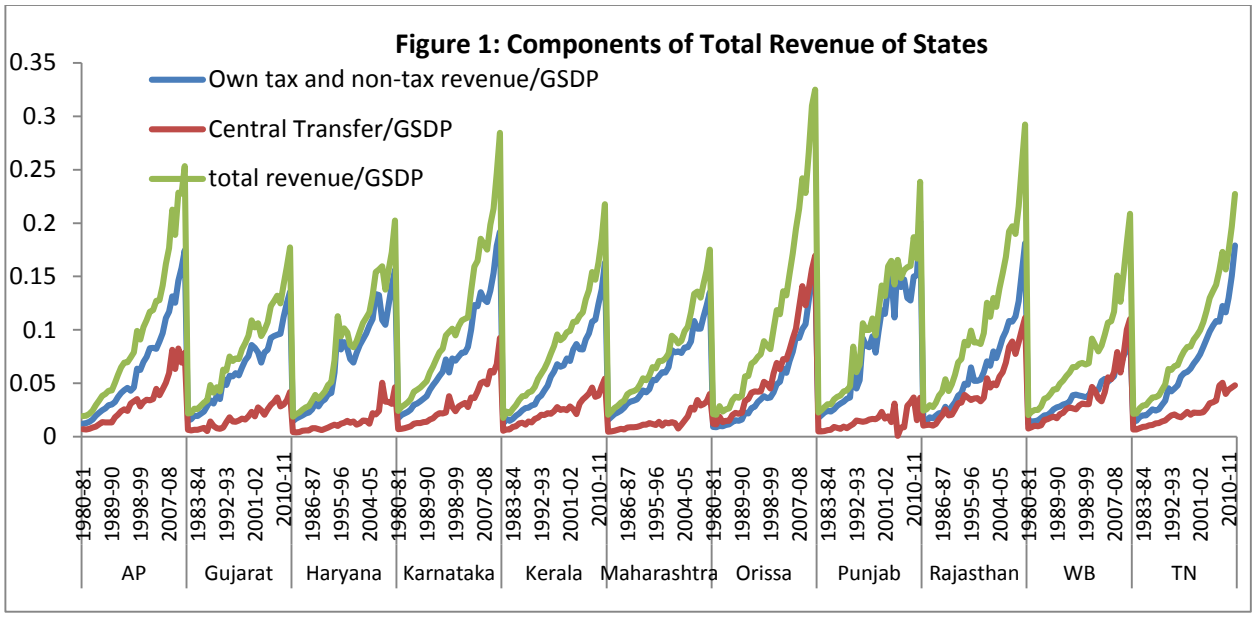
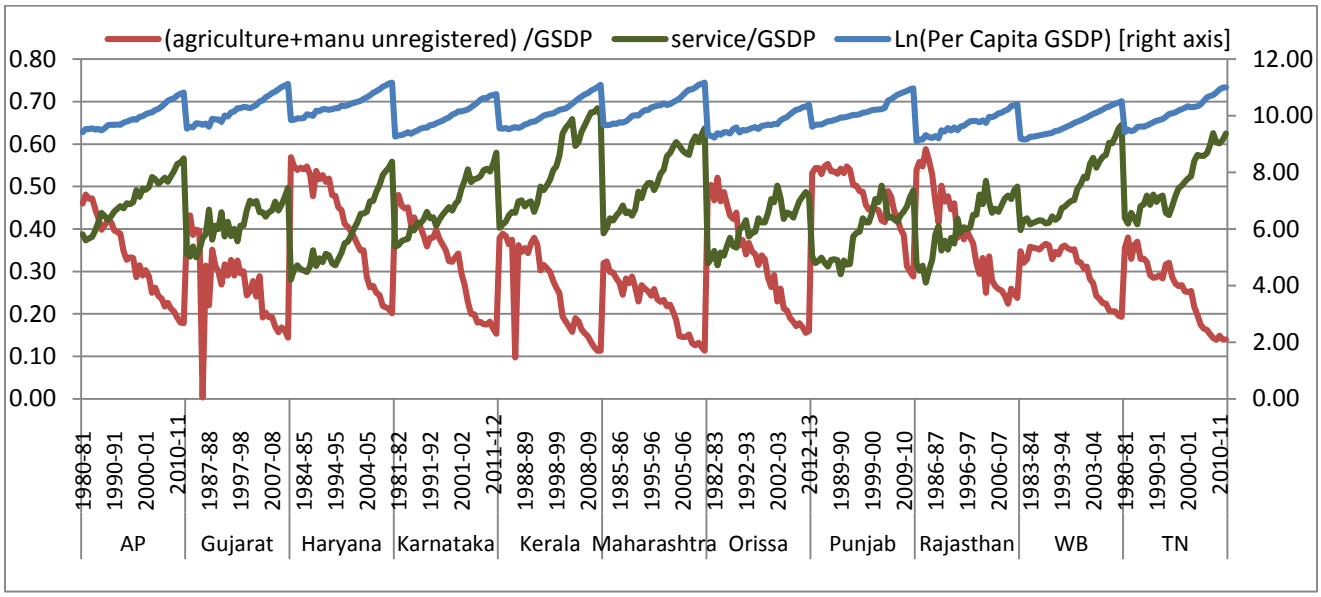


Figure 2: Per Capita Income and Sectoral Shares in GSDP across States in India



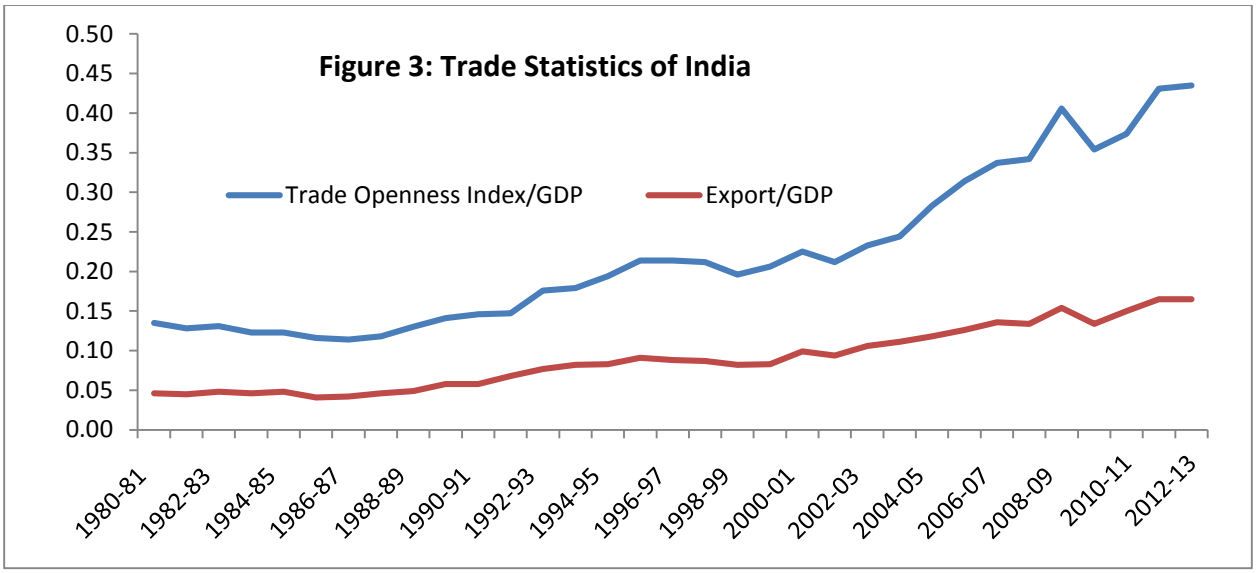


Figure 3: Trade Statistics of India
Trade Openness Index/GDP
Export/GDP
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1980-81
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
2008-09
2010-11
2012-13

TABLE 1: Rank Correlation of ranks based on per capita GSDP of 11 states																																
	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1980-81	1.00																																
1981-82	0.95	1.00																															
1982-83	0.96	0.99	1.00																														
1983-84	0.90	0.95	0.94	1.00																													
1984-85	0.93	0.95	0.96	0.92	1.00																												
1985-86	0.96	0.95	0.96	0.92	0.98	1.00																											
1986-87	0.95	0.96	0.97	0.91	0.99	0.99	1.00																										
1987-88	0.95	0.94	0.95	0.86	0.97	0.98	0.99	1.00																									
1988-89	0.90	0.95	0.94	0.95	0.98	0.95	0.96	0.94	1.00																								
1989-90	0.96	0.95	0.95	0.94	0.95	0.98	0.97	0.96	0.95	1.00																							
1990-91	0.93	0.95	0.94	0.91	0.95	0.95	0.96	0.95	0.95	0.97	1.00																						
1991-92	0.95	0.93	0.92	0.85	0.92	0.95	0.95	0.97	0.90	0.96	0.96	1.00																					
1992-93	0.89	0.92	0.90	0.89	0.93	0.91	0.94	0.92	0.95	0.95	0.98	0.93	1.00																				
1993-94	0.95	0.94	0.95	0.89	0.96	0.96	0.98	0.97	0.94	0.95	0.96	0.95	0.95	1.00																			
1994-95	0.86	0.87	0.86	0.87	0.90	0.88	0.91	0.90	0.93	0.92	0.96	0.91	0.97	0.95	1.00																		
1995-96	0.85	0.85	0.85	0.85	0.87	0.86	0.89	0.88	0.90	0.91	0.95	0.90	0.96	0.94	0.99	1.00																	
1996-97	0.85	0.85	0.85	0.84	0.89	0.86	0.90	0.89	0.92	0.90	0.95	0.90	0.98	0.94	0.99	0.98	1.00																
1997-98	0.84	0.84	0.83	0.82	0.86	0.85	0.88	0.87	0.89	0.89	0.95	0.89	0.97	0.93	0.98	0.99	0.99	1.00															
1998-99	0.85	0.85	0.85	0.84	0.89	0.86	0.90	0.89	0.92	0.90	0.95	0.90	0.98	0.94	0.99	0.98	1.00	0.99	1.00														
1999-00	0.84	0.80	0.81	0.79	0.84	0.82	0.85	0.85	0.85	0.85	0.90	0.86	0.94	0.92	0.96	0.97	0.97	0.98	0.97	1.00													
2000-01	0.84	0.79	0.80	0.76	0.85	0.83	0.86	0.87	0.85	0.85	0.90	0.89	0.93	0.92	0.96	0.95	0.97	0.96	0.97	0.98	1.00												
2001-02	0.85	0.82	0.83	0.81	0.86	0.84	0.87	0.86	0.88	0.86	0.91	0.87	0.95	0.93	0.97	0.96	0.98	0.97	0.98	0.99	0.99	1.00											
2002-03	0.86	0.84	0.85	0.82	0.85	0.83	0.86	0.85	0.87	0.85	0.90	0.86	0.94	0.92	0.95	0.95	0.96	0.95	0.96	0.98	0.97	0.99	1.00										
2003-04	0.86	0.84	0.85	0.82	0.85	0.83	0.86	0.85	0.87	0.85	0.90	0.86	0.94	0.92	0.95	0.95	0.96	0.95	0.96	0.98	0.97	0.99	1.00	1.00									
2004-05	0.92	0.93	0.94	0.85	0.93	0.91	0.95	0.93	0.91	0.91	0.95	0.92	0.95	0.97	0.94	0.93	0.95	0.94	0.95	0.93	0.92	0.94	0.95	0.95	1.00								
2005-06	0.89	0.88	0.89	0.85	0.88	0.85	0.89	0.86	0.89	0.87	0.92	0.87	0.95	0.94	0.95	0.94	0.95	0.95	0.95	0.96	0.95	0.97	0.99	0.99	0.97	1.00							
2006-07	0.88	0.86	0.87	0.83	0.85	0.84	0.87	0.85	0.86	0.86	0.91	0.86	0.94	0.93	0.94	0.95	0.95	0.95	0.95	0.97	0.94	0.96	0.98	0.98	0.96	0.99	1.00						
2007-08	0.91	0.87	0.89	0.85	0.87	0.86	0.89	0.86	0.87	0.88	0.90	0.87	0.93	0.94	0.92	0.93	0.93	0.94	0.93	0.96	0.93	0.95	0.97	0.97	0.95	0.98	0.99	1.00					
2008-09	0.92	0.89	0.91	0.86	0.90	0.88	0.91	0.88	0.90	0.89	0.91	0.88	0.94	0.95	0.93	0.92	0.94	0.93	0.94	0.95	0.94	0.96	0.98	0.98	0.96	0.99	0.98	0.99	1.00				
2009-10	0.92	0.89	0.91	0.86	0.90	0.88	0.91	0.88	0.90	0.89	0.91	0.88	0.94	0.95	0.93	0.92	0.94	0.93	0.94	0.95	0.94	0.96	0.98	0.98	0.96	0.99	0.98	0.99	1.00	1.00			
2010-11	0.87	0.84	0.85	0.84	0.84	0.83	0.85	0.84	0.85	0.86	0.90	0.86	0.92	0.92	0.95	0.96	0.95	0.95	0.95	0.98	0.95	0.97	0.98	0.98	0.93	0.97	0.98	0.97	0.96	0.96	1.00		
2011-12	0.88	0.85	0.86	0.85	0.86	0.85	0.87	0.85	0.88	0.87	0.91	0.87	0.93	0.93	0.96	0.95	0.95	0.95	0.95	0.97	0.96	0.98	0.99	0.99	0.94	0.98	0.97	0.96	0.97	0.97	0.99	1.00	
2012-13	0.87	0.84	0.85	0.84	0.84	0.83	0.85	0.84	0.85	0.86	0.90	0.86	0.92	0.92	0.95	0.96	0.95	0.95	0.95	0.98	0.95	0.97	0.98	0.98	0.93	0.97	0.98	0.97	0.96	0.96	1.00	0.99	1.00

Table 2: Summary Statistics of 11 Major Indian States					
Observations: N=363, n=11, T= 33					
Variable		**Mean**	**Std. Dev.**	**Min**	**Max**
Own Tax and Non Tax Revenue/GSDP	overall	0.064	0.04	0.01	0.20
	between		0.01	0.04	0.08
	within		0.04	0.00	0.18
Ln(Per Capita GSDP)	overall	10.042	0.49	9.10	11.18
	between		0.25	9.70	10.40
	within		0.43	9.33	11.00
Share of Agriculture & Unregistered Manufacturing in GSDP	overall	0.323	0.12	0.10	0.59
	between		0.07	0.22	0.47
	within		0.09	0.06	0.53
Share of Service in GSDP	overall	0.454	0.09	0.27	0.68
	between		0.05	0.39	0.54
	within		0.07	0.31	0.63
Trade Openness Index	overall	0.222	0.10	0.11	0.44
	between		0.00	0.22	0.22
	within		0.10	0.11	0.44
Share of Export in GDP	overall	0.090	.038	0.04	0.17
	between		0.00	0.09	0.09
	within		.038	0.04	0.17
Central Transfer/ GSDP	overall	0.029	0.03	0.004	0.17
	between		0.01	0.01	0.06
	within		0.02	-0.02	0.14

Table 3: Summary of High and Low Per Capita GSDP States										
		High Per Capita GSDP States				Low Per Capita GSDP States				
		Observations: N=198, n=6, T= 33				Observations: N=165, n=5, T= 33				Equality of Means Test[§]
Variable		**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**	**z-statisitc**
Own Tax and Non Tax Revenue/GSDP	overall	0.068	0.04	0.01	0.20	0.059	0.04	0.01	0.19	-2.05**
	between		0.01	0.06	0.08		0.01	0.04	0.08	
	within		0.04	0.00	0.19		0.04	0.00	0.18	
Ln(Per Capita GSDP)	overall	10.232	0.46	9.42	11.18	9.813	0.43	9.10	10.82	--
	between		0.11	10.13	10.40		0.14	9.70	9.97	
	within		0.45	9.52	11.19		0.41	9.14	10.66	
Share of Agriculture & Unregistered Manufacturing in GSDP	overall	0.315	0.13	0.10	0.57	0.333	0.10	0.15	0.59	1.46*
	between		0.10	0.22	0.47		0.03	0.30	0.38	
	within		0.09	0.05	0.48		0.10	0.16	0.54	
Share of Service in GSDP	overall	0.460	0.10	0.28	0.68	0.447	0.07	0.27	0.65	-1.39*
	between		0.07	0.39	0.54		0.04	0.41	0.49	
	within		0.07	0.32	0.63		0.06	0.31	0.61	
Trade Openness Index	overall	0.222	0.10	0.11	0.44	0.222	0.10	0.11	0.44	--
	between		0.00	0.22	0.22		0.00	0.22	0.22	
	within		0.10	0.11	0.44		0.10	0.11	0.44	
Share of Export in GDP	overall	0.090	0.04	0.04	0.17	0.090	0.04	0.04	0.17	--
	between		0.00	0.09	0.09		0.00	0.09	0.09	
	within		0.04	0.04	0.17		0.04	0.04	0.17	
Central Transfer/ GSDP	overall	0.019	0.01	0.004	0.05	0.041	0.03	0.01	0.17	8.51***
	between		0.00	0.01	0.02		0.01	0.03	0.06	
	within		0.01	0.00	0.05		0.03	-0.01	0.15	
[§] μ_1 corresponds to Low GSDP states and μ_2 corresponds to high GSDP states										
*10% los, **5% los, ***1% los										

Table 4: Linear Fixed Effects with AR (1) Disturbances Model Results for Major 11 States of India					
Dependent Variable: Ln (Own Tax and Non- Tax Revenue/GSDP)					
	Regression 1	**Regression 2**	**Regression 3**	**Regression 4**	**Regression 5**
V	0.409	2.626*	1.930	1.808	1.489
	(1.102)	(-1.407)	(1.348)	(1.312)	(1.269)
Lag (Ln GSDP per capita)	1.012***	0.796***	0.683***	0.597***	0.584***
	(0.083)	(-0.106)	(0.102)	(0.109)	(0.102)
V*Lag (Ln GSDP per capita)	-0.042	-0.218	-0.147	-0.111	-0.087
	(0.106)	(0.136)	(0.130)	(0.133)	(0.129)
(Agriculture+ Unregistered Manufacture)/ GSDP		-0.348**	-0.381**		
		(0.153)	(0.149)		
V* (Agriculture+ Unregistered Manufacture)/GSDP		-0.278	-0.200		
		(0.344)	(0.333)		
Services/ GSDP				1.680***	1.423***
				(0.308)	(0.304)
V* Services/ GSDP				0.647	-0.572
				(0.423)	(0.412)
Trade Openness Index		1.805***		1.983***	
		(0.473)		(0.457)	
V*Trade Openness Index		-0.960*		-1.097**	
		(0.574)		(0.556)	
Exports/ GDP			6.213***		5.593***
			(1.078)		(1.059)
V* Exports/ GDP			-3.133**		-2.50*
			(1.422)		(1.396)
Lag(Central transfer /GSDP)		3.655**	2.825*	3.474**	3.099*
		(1.685)	(1.649)	(1.620)	(1.610)
V* Lag(Central transfer /GSDP)		-2.229	-1.021	-1.775	-1.084
		(1.808)	(1.747)	(1.703)	(1.663)
Constant	-12.878***	-11.155***	-10.175***	-10.080***	-9.911***
	(0.131)	(0.212)	(0.214)	(0.199)	(0.197)
Mean Effect of V	-	-	-0.281	-0.244	-
F-Statistic	73.30***	49.57***	60.34***	53.15***	60.65***
* 10% los, ** 5% los, *** 1% los					

Table 5: Linear Fixed Effects with AR (1) Disturbances Model Results for High GSDP States					
Dependent Variable: Ln (Own Tax and Non- Tax Revenue/GSDP)					
	Regression 1	**Regression 2**	**Regression 3**	**Regression 4**	**Regression 5**
V	-0.844	0.120	-0.716	-0.786	-1.208
	(2.707)	(3.263)	(3.115)	(2.939)	(2.825)
Lag (Ln GSDP per capita)	1.058***	0.9278***	0.720***	0.683***	0.567***
	(0.130)	(0.165)	(0.162)	(0.171)	(0.161)
V*Lag (Ln GSDP per capita)	0.073	0.0410	0.148	0.124	0.182
	(0.256)	(0.316)	(0.305)	(0.292)	(0.284)
(Agriculture+ Unregistered Manufacture)/ GSDP		-0.122	-0.156		
		(0.191)	(0.187)		
V* (Agriculture+ Unregistered Manufacture)/GSDP		-0.393	-0.325		
		(0.428)			
Services/ GSDP				1.656***	1.432***
				(0.446)	(0.437)
V* Services/ GSDP				0.046	0.077
				(0.548)	(0.529)
Trade Openness Index		1.201*		1.416**	
		(0.717)		(0.697)	
V*Trade Openness Index		-1.107		-1.349	
		(0.898)		(0.881)	
Exports/ GDP			6.378***		5.903***
			(1.659)		(1.628)
V* Exports/ GDP			-5.605**		-5.224**
			(2.333)		(2.3)
Lag(Central transfer /GSDP)		7.80*	5.285	8.501**	6.469
		(4.218)	(4.121)	(4.084)	(4.035)
V*Lag(Central transfer /GSDP)		-10.554**	-7.827*	-10.918***	-8.8**
		(4.607)	(4.489)	(4.458)	(4.387)
Constant	-13.529***	-12.553***	-10.705***	-10.932***	-9.838***
	(0.278)	(0.387)	(0.403)	(0.407)	(0.405)
Mean Effect of V	-	-0.189	-0.503	-0.196	-0.469
F-Statistic	52.23***	24.84***	31.49***	32.42***	38.12***
* 10% los, ** 5% los, *** 1% los					

Table 6: Linear Fixed Effects with AR (1) Disturbances Model Results for Low GSDP States					
Dependent Variable: Ln (Own Tax and Non- Tax Revenue/GSDP)					
	Regression 1	**Regression 2**	**Regression 3**	**Regression 4**	**Regression 5**
V	-1.536	0.259	-0.023	-0.893	-0.739
	(1.803)	(1.991)	(1.913)	(1.924)	(1.915)
Lag (Ln GSDP per capita)	0.877***	0.401***	0.378***	0.449***	0.558***
	(0.111)	(0.125)	(0.121)	(0.123)	(0.119)
V*Lag (Ln GSDP per capita)	0.152	-0.002	0.012	0.240	0.182
	(0.178)	(0.189)	(0.181)	(0212)	(0.212)
(Agriculture+ Unregistered Manufacture)/ GSDP		-1.747***	-1.806***		
		(0.303)	(0.292)		
V* (Agriculture+ Unregistered Manufacture)/GSDP		0.075	-0.006		
		(1.002)	(0.973)		
Services/ GSDP				2.011***	1.685***
				(0.382)	(0.391)
V* Services/ GSDP				-2.010**	-1.821**
				(0.802)	(0.812)
Trade Openness Index		2.022***		2.710***	
		(0.544)		(0.534)	
V*Trade Openness Index		-0.821		-1.549**	
		(0.659)		(0.651)	
Exports/ GDP			5.006***		5.18***
			(1.207)		(1.258)
V* Exports/ GDP			-0.898		-1.343
			(1.577)		(1.639)
Lag(Central transfer /GSDP)		2.585*	2.474*	2.557*	2.896*
		(1.472)	(1.448)	(1.532)	(1.582)
V* Lag(Central transfer /GSDP)		-0.748	-0.264	-1.570	-1.391
		(1.63)	(1.583)	(1.695)	(1.728)
Constant	-11.309***	-6.811***	-6.595***	-8.859***	-9.703***
	(0.125)	(0.229)	(0.229)	(0.173)	(0.180)
Mean Effect of V	-	-	-	-0.344	-0.815
F-Statistic	32.82***	44.37***	50.65***	33.00***	35.09***
* 10% los, ** 5% los, *** 1% los					