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The Revenue Impact of VAT in Madhya Pradesh: Empirical Evidence from India

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Abstract

Taxation is an important tool of fiscal policy which fills the revenue needs of the government. The introduction of different forms of tax worldwide has rekindled the research in the domain of public finance. The introduction of Value Added Tax has attracted a lot of research in the recent past. The comprehensive review of indirect taxation particularly VAT reveals that Value Added Tax had been mostly studied at national level. While the Value Added Tax has been implemented at both national and sub national level, worldwide research on sub national level is limited. This paper fills this void and tries to examine the revenue impact of Value Added Tax in Indian context particularly for the state of Madhya Pradesh. Using regression technique on data collected for Madhya Pradesh public finances, we try to examine the revenue performance of Value Added Tax in Madhya Pradesh. Madhya Pradesh implemented Value Added Tax in April 2006. Our analysis shows that not only Value Added Tax has performed better than the sales tax which it replaced, but also it has been successful in contributing to MP's own revenue performance.

Keywords: taxation, value added tax, Madhya Pradesh, revenue impact, sales tax

1. Introduction

Value Added Tax is a kind of indirect tax which is predominantly a consumption based tax. While direct taxes like Income tax are directly paid to the government indirect taxes are the ones in which burden of the tax can be shifted by an individual or group to another individual or group. Indirect taxes like Sales Tax or VAT by influencing the rate of production and consumption in an economy play an essential and imperative role in the economic development of a nation. In case of VAT value added at each stage of production and distribution is taxed. Value Added Tax replaced the existing Sales Tax which was the turnover tax levied on gross sale value of the goods. VAT on the other hand is levied on the total value of the commodity. Though a multi point tax VAT was implemented because of the cascading burden of sales tax it replaced. The burden of the tax lies ultimately on the final user of the good or the commodity.

Computation of VAT involves either the use of subtraction method or addition method. In case of subtraction method tax is calculated as tax rate times the difference between value of output and cost of inputs where as in addition method tax is calculated by applying tax rate on the value added. An important feature of VAT is the availability of input tax credit where by a seller of a commodity can collect a tax on the complete value of the output and retain the amount of the tax that he has already paid for the purchases. Zero Rating especially in case of exports to maintain the global competitiveness is another important characteristic of VAT.

The base for Value Added Tax can be gross income, net income or consumption. VAT on consumption is preferred on the ground of stability and also because VAT on income provides distortion for investment decisions. VAT removes the cascading effect of Sales tax and provides an unwavering source of revenue. VAT is also preferred on the administrative grounds as it is easier to administer as compared to sales tax. Though some criticisms have been put worth against VAT that it is a regressive tax that can lead to inflationary pressures still the application of VAT replacing sales tax has lot of merits to it as discussed.

Though the current scenario in India talks about introducing a Goods and Services Tax above VAT it has not yet been implemented. The implementation of GST will provide a solid framework for tax system in India though it

is being opposed by some of the states on the ground that they will incur a huge revenue loss because of GST. This is not a subjective matter of this paper and so with the above background of VAT this paper seeks to examine the revenue impact of VAT in Madhya Pradesh. Currently based on data approximately 140 nations across the world has adopted the system of Value Added Tax. While predominantly VAT is administered at national level in India VAT is administered at both national and sub-national level. While literature shows that some attempts have been made to examine the impact of VAT administered at the national level very few numbers of limited studies examine the revenue impact of VAT at the sub-national or the state level. Though some studies have tried to examine the revenue impact of VAT in developed nations the studies on developing nations are very limited to form a comprehensive insight about the impact of VAT. This paper therefore tries to examine the revenue impact of VAT in India particularly focusing on the revenue performance of VAT in Madhya Pradesh. It should be noted that apart from revenue there are other considerations that can be looked at like administrative efficiency, equity, welfare, cost efficiency etc. We restrict ourselves to revenue performance of VAT in Madhya Pradesh trying to answer two broad questions through our research. Firstly has the State -VAT performed better than the sales tax it replaced in Madhya Pradesh?. Secondly has the VAT contributed to own revenue performance in Madhya Pradesh?. Our research answers the following two questions in a systematic manner by using a small statistical exercise of data analysis which will be discussed in the subsequent data section of the paper. Before moving towards the data analysis it is important for us to look at the existing literature on Vat and its revenue performance worldwide.

2. Literature Review

While most of the studies have focused on the impact of a national VAT in an economy some studies also talk of VAT at the state level. The most comprehensive research analysis of revenue performance of VAT at sub national level can be seen in this study which tries to examine the revenue assessment of VAT at state level in India. It uses Revenue and Gross State Domestic data for 29 states in India to assess the revenue impact of Value Added Tax at the state level. The direct as well as indirect impact of VAT introduction was examined. The direct impact was examined by seeing whether the introduction of VAT across states increased the VAT or State Own Revenue to Gross State Domestic Product ratio. The indirect impact of introducing VAT on VAT base was also examined. The secondary data was collected from Reserve Bank of India and Ministry of Statistics and Programme Implementation (MOSPI) database for the period of 1993-1994 to 2009-2010 for 29 states. The regression results showed that direct impact of VAT was observed in $2/3^{rd}$ of the sample. The positive impact of VAT in terms of State's Own Revenue Receipts was observed in case of Orissa and Haryana while negative impact was observed in case of Goa and Gujarat. The paper acknowledges the poor revenue performance to the administration problems identified by Comptroller and Auditor General audit in 2009 (Dasgupta, 2012).

The study on VAT and its causes and consequences talks about the revenue performance of VAT at the national level. The causes of rise in VAT use across the world have also been discussed. Using a panel of 143 countries for 25 years they find out that the adoption of VAT led to a long run increase in the Tax to GDP ratio by around 4.5 percent. The paper reveals that the adoption of VAT has led to revenue increase in most of the countries thus proving to be effective tax instrument (Keen & Lockwood, 2010).

The paper on VAT and its impact on economic and human development of a nation also reveal some interesting findings. Their analysis for the state of Adamawa in Nigeria reveals several interesting results for VAT and its impact on human and economic development. With the use of Discriminant analysis, Regression and Anova for the period of 2001-2009 (Unegu & Irefin, 2011) find out that VAT accounts for around 90% of the expenditure for the state of Adamawa. The secondary data used in their analysis suggest minimum impact on economic and human development of the state whereas primary data on the hand suggest minimal impact of VAT on economic and human development of Adamawa. Further research is required to make a more robust comment on this relationship.

The paper on revenue impact of VAT in Nigeria shows similar findings. Nigerian government took a major step and replaced retail sales tax with a consumption based VAT. The paper uses secondary data on Total Federal Revenue, VAT etc collected from Central Bank of Nigeria. The time period of analysis is from 2001-2010. The results reveal that VAT has a positive significant effect on the revenue generation of the Nigerian economy. The positive impact of VAT on revenue generation suggests that VAT is beneficial for the Nigerian economy (Onaolapo, Aworemi, & Ajala, 2013).

(Khan & Shadab, 2013) show that the revenue performance of states implementing VAT has been satisfactory and encouraging. Using regression analysis for the period of 2000-2001 to 2009-2010 their analysis shows that VAT implementation has raised revenue in six states under consideration which has implemented VAT in 1^{st} April

2005.

3. VAT in India

Having seen the brief overview of VAT and the literature on its research it is imperative for us to now have brief insights about VAT in India. VAT at state level in India was implemented in a phased manner starting with Haryana in 2003 and ending with Uttar Pradesh in 2008. As of now all 29 states and seven union territories have implemented VAT which has successfully replaced the existing sales tax. Majority of the states implemented VAT in 1st April 2005. The comprehensive account of VAT implementation by Indian states is shown below starting from Haryana in 2003 to Uttar Pradesh in 2008.

Haryana	1st Apr 2003
Andhra Pradesh, Bihar, Haryana, Karnataka, Kerala, Maharashtra, Orissa, Punjab, West Bengal, Arunachal Pradesh, Assam, Himachal Pradesh, Goa, Jammu and Kashmir, Manipur, Meghalaya, Mizoram, Nagaland ,NCT New Delhi, Sikkim, Tripura	1st Apr 2005
Uttarkhand	1st Oct 2005
Chhattisgarh, Madhya Pradesh, Gujarat, Rajasthan, Jharkhand	1st Apr 2006
Tamil Nadu	1st Jan 2007
Uttar Pradesh	1st Jan 2008

Source: Halakhandi (2007) except Tamil Nadu: Government of Tamil Nadu (no date), and Uttar Pradesh.

Some of the important characteristics of VAT in India are as following:

There is no VAT on imports in India and exports are also zero rated.

Interstate sales are still subjected to central sales tax in India.

Thresholds for registration of VAT dealers differs across different states.

Some essential items like basic necessities are excluded.

Madhya Pradesh implemented VAT in 1st April 2006. VAT in Madhya Pradesh is governed under MP VAT Act, 2002. Madhya Pradesh levies VAT on petroleum and has recently proposed to increase the amount of VAT on petroleum and diesel. The amount of VAT rate has been slashed for several other commodities like baby diapers, school bags, calculators, aluminum panels. Overall the aim has been to increase the revenue and to reduce the tax based distortions. The tax is said to be optimal or efficient when it minimizes the excess burden. VAT which replaced the retail sales tax was set to reduce the cascading effect of the previous sales tax. Whether VAT served its desired objectives is something worth examining. This paper fills this void and attempts to find out the revenue impact of VAT in Madhya Pradesh. The answer is sought using statistical analysis of VAT and its revenue performance in India. The subsequent sections throw light on this aspect.

4. Objectives of the Study

This study seeks to answer the two main research questions mentioned as following:

Has the Value Added Tax done better than the Sales Tax it replaced in Madhya Pradesh

Has the Value Added Tax contributed to the improvement of State Own Revenue Receipts in Madhya Pradesh

We form a statistical model and use regression analysis to provide answers to these questions in a systematic and precise manner.

5. Sources of Data

The data for ST (Revenue) and State Own Revenue Receipts are taken from Reserve Bank of India database on public finances whereas the data for Gross State Domestic Product for Madhya Pradesh is taken from MOSPI (Ministry of Statistics and Programme Implementation) database and Indiastat.

6. Methodology

The secondary data collected is on ST (Revenue), State Own Revenue Receipts and Gross State Domestic Product for Madhya Pradesh from 1999-2013. The data in total covers fourteen years for empirical assessment. The ratio of ST to GSDP and ST to SORR are calculated for the above time frame to examine the revenue impact of Value Added Tax in Madhya Pradesh. Statistical models for buoyancy and revenue assessment has been formed where we have used regression technique to answer the research questions for our study based on

revenue assessment of VAT in Madhya Pradesh. Madhya Pradesh implemented VAT in 2006 so 1999-2000 to 2005-2006 is the pre VAT period and 2006-2007 to 2012-2013 is the post VAT period in our analysis. The analysis has been conducted using Microsoft Excel and SPSS.

7. Statistical Model

This study tries to address two main questions: First has the VAT performed better than the sales tax it replaced in Madhya Pradesh and second has the VAT contributed to State Own Revenue Performance. Madhya Pradesh implemented the VAT in 1st April 2006. To examine and analyze the revenue performance of VAT in Madhya Pradesh, Revenue (ST) and Revenue to GSDP ratio pre and post VAT implementation are taken into consideration. GSDP is the Gross State Domestic Product which gives us the final value of output in a particular state over a given period of time usually one year. The variable ST also reflects the GSDP buoyancy of sales tax.

The first question of whether the VAT has performed better than Sales tax the following two equations are used where revenue ST pre and post VAT implementation in Madhya Pradesh are compared:

$$\log ST = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP) \quad (1)$$

$$\frac{ST}{GSDP} = \beta_0 + \beta_1 V_t \quad (2)$$

The time period for our analysis is from 1999-2000 to 2012-2013. ST is the revenue or GSDP buoyancy of sales tax. Since the values obtained are very large we have taken natural log of ST for our analysis. β_0 is the intercept coefficient and β_1 is the slope coefficient of Gross State Domestic Product. The variable V_t is the dummy in the equation 1 which gives the value of 1 in the years in which VAT was there otherwise it takes zero. $V_t . \log GSDP$ is the slope dummy in equation (1). The dependent variable in equation two is the Revenue (Sales Tax) to GSDP ratio which depends on the dummy variable V_t defined above with values between 0 and 1.

The second question whether the implementation of VAT contributed to State's Own Revenue Performance is examined through following through following two equations.

$$\log SORR = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP) \quad (3)$$

$$\frac{SORR}{GSDP} = \beta_0 + \beta_1 V_t \quad (4)$$

The only difference between the previous two equations and these equations is that here the dependent variable is the State own revenue receipt (SORR) instead of variable ST in the previous case. State own revenue receipt depends on the Gross State Domestic Product and the slope dummy of $(V_t . \log GSDP)$.

The main question is to examine the revenue performance of VAT in Madhya Pradesh. Another equation for robustness check was formed to see that VAT contributed to larger share of MP revenue even though there was no revenue increase observed. The equation is given as the ratio of ST to SORR as following:-

$$\frac{ST}{SORR} = \beta_0 + \beta_1 V_t \quad (5)$$

The dependent variable is the revenue to state own revenue receipt whereas the independent variable is the dummy variable V_t. The equation (5) shows the impact on ST to SORR ratio when the variable V_t changes by one unit.

8. Empirical Analysis and Results

To examine the revenue impact of Value Added Tax in Madhya Pradesh we have divided our period of study into pre VAT period and post VAT period. Our period of study is from 1999-2000 to 2012-2013. The period from 1999-2000 to 2005-2006 is the pre VAT period and the period from 2006-2007 to 2012-2013 is the post VAT period. For the problem of multicollinearity we have considered looking at the variance inflating factor (VIF). The rule of thumb is if the VIF is greater than 10 we suspect multicollinearity. To be on the safe side we take the VIF less than five as no multicollinearity situation. For autocorrelation we have considered Durbin Watson test statistic. DW value of two gives no autocorrelation. If it's close to two we consider our model as free from autocorrelation problem. We find no evidence of multicollinearity and autocorrelation as VIF is less than five and DW statistic for no autocorrelation is 2.3 is close to 2.

Our first research question that has VAT performed better than sales tax it replaced in Madhya Pradesh is answered by regression equation 1 and 2. The buoyancy equation 1 which gives us the sales tax revenue is compared pre and post VAT implementation. A detailed insight of the regression result for the entire time period

points out that for equation 1 the model fits the data very well with high R square of around 98 percent. F value is significant and adjusted R square adjusted with degrees of freedom is around 98 percent. Since regression points out to the average impact of independent variables on dependent variable a closer look at the coefficient values for GSDP and slope dummy shows that ST (Revenue) increases with the increase in Gross State Domestic Product of MP and the slope dummy. The coefficient of the slope dummy is not significant as t value is less than 2 and p value is greater than level of significance of 5 percent. Though only GSDP variable is significant in buoyancy equation with t value of 12.5 (t>2) and p value less than level of significance alpha it cannot be ignored that the years in which VAT is implemented after 2006 the revenue increases with the increase in the slope dummy variable by the amount of the slope coefficient. The years in which VAT didn't exist in Madhya Pradesh the value of slope dummy coefficient is zero. From the above equation we can see that on an average the years in which VAT exist in M.P the revenue increases although marginally by a small amount.

Equation 1- $\log ST = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP)$

Table 1. Regression results for equation 1

Equation 1	Coefficients	t value	p value	VIF
Constant	-5.999	-4.047	0.002	NA
log GSDP	1.159	12.578	0.000**	4.204
V_MP.log GSDP	0.002	0.359	0.726	4.204
	R Square	AdjR Square	Sig F	DW value
Value	0.985	0.982	0.000**	2.378

**At 5% level of significance.

Equation 2 which gives the ratio of Revenue to GSDP for Madhya Pradesh shows the similar findings. The regression analysis for equation 2 shows that the ratio of Revenue to GSDP increases with the VAT dummy. The value of slope dummy coefficient is zero in years when there was no VAT in M.P. The analysis shows that Revenue as a proportion of MP's Gross State Domestic Product increases with the increase in VAT dummy as reflected in the positive value of the coefficient(0.02). The coefficient is significant as p value is less than 0.05 and t value(5) is greater than 2. R square is 68% showing that large amount of variation in Revenue to GSDP ratio for Madhya Pradesh is being explained by the model.

Equation 2-$\frac{ST}{GSDP} = \beta_0 + \beta_1 V_t$

Table 2. Regression results for equation 2

Equation 2	Coefficients	t value	p value	VIF
Constant	0.786	278.502	0.000	NA
V_MP	0.02	5.096	0.000**	1
	R Square	AdjR Square	Sig F	DW value
Value	0.684	0.658	0.000**	1.44

**At 5% level of significance.

Thus with regression analysis for equation no 1 and 2 we effectively address our first question that Has VAT done better than sales tax it replaced in Madhya Pradesh. Our results show that VAT has done better than sales tax it replaced for Madhya Pradesh.

The answer to our second research question that has VAT contributed to improvement of State Own Revenue performance for Madhya Pradesh is answered by considering equations 3 and 4. The model fits the data very well with significant F value and high adjusted R square of 96 percent. Beta one is significant with t value of 8.9 and p value less than 0.05. The dependent variable State Own Revenue Receipts increases with the increase in Gross State Domestic Product of Madhya Pradesh. An interesting result is observed when we look at the coefficient of slope dummy. The value is zero in the years in which Madhya Pradesh didn't have any Value Added Tax. The regression result for equation 3 shows that the value of coefficient is - 0.003 which means that an increase in slope dummy decreases the State Own Revenue Receipts by - 0.003. The t value of the coefficient beta two is also not significant and p value of 0.744 is greater than 0.05 (level of significance).

Equation 4 reveals interesting findings. The low Adjusted R square value of 39 percent shows us that model didn't fit the data very well. The dependent variable State Own Receipts as a proportion of GSDP of MP increases with the increase in VAT dummy. The slope coefficient of VAT dummy is significant with t value of 3(t>2) and p value of 0.01 which is less than 0.05. Thus State Own Revenue Receipts (SORR) as a proportion of GSDP of M.P increases by 0.014 when VAT dummy increases by one unit.

Equation 3- $\log SORR = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP)$

Table 3. Regression results for equation 3

Equation 3	Coefficients	t value	p value	VIF
Constant	-5.466	-2.562	0.026	NA
log GSDP	1.189	8.964	0.000**	4.204
V_MP.log GSDP	-0.003	-0.335	0.744	4.204
	R Square	AdjR Square	Sig F	DW value
Value	0.966	0.96	0.000**	2.209

**At 5% level of significance.

Equation 4- $\frac{SORR}{GSDP} = \beta_0 + \beta_1 V_t$

Table 4. Regression results for equation 4

Equation 4	Coefficients	t value	p value	VIF
Constant	0.849	258.548	0.000	NA
V_MP	0.014	3.049	0.010**	1
	R Square	AdjR Square	Sig F	DW value
Value	0.437	0.39	0.010**	1.519

**At 5% level of significance.

With analysis of equation 3 and 4 we are indefinite about the impact of VAT on Madhya Pradesh own revenue receipt so we conduct a Post VAT analysis of equation 3 to get a better insight. We observe that when VAT is implemented in Madhya Pradesh the slope coefficient with a value of (1.22) becomes significant with p value less than 0.05 and t value of 21.16 greater than 2. The period for which VAT is implemented State Own Revenue Receipt increases by 1.22 times as slope dummy increases by 1 unit. We therefore conclude that VAT has contributed to State Own Revenue performance in Madhya Pradesh.

$$\log ST = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP) \quad (5)$$

Table 5. Regression results for equation 5

Equation 5	Coefficients	t value	p value	VIF
Constant	-5.602	-4.872	0.005	NA
V_MP. Log GSDP	1.138	16.749	0.000**	1
	R Square	AdjR Square	Sig F	DW value
Value	0.982	0.979	0.000**	1.778

**At 5% level of significance.

$$\log SORR = \beta_0 + \beta_1 \log GSDP + \beta 2(V_t . \log GSDP) \quad (6)$$

Table 6. Regression results for equation 6

Equation 6	Coefficients	t value	p value	VIF
Constant	-6.055	-6.2	0.002	NA
V_MP. Log GSDP	1.221	21.169	0.000**	1
	R Square	AdjR Square	Sig F	DW value
Value	0.989	0.987	0.010**	2.574

**At 5% level of significance.

Equation 7 shows that Sales Tax Revenue as a proportion of State Own Revenue Receipts increases only marginally with the increase in VAT dummy. Though the coefficient of slope dummy is significant with p value less than 0.05 the average impact of VAT on Sales Tax Revenue as a proportion of State Own Revenue Receipts is marginal.

Equation 7- $\frac{ST}{SORR} = \beta_0 + \beta_1 V_t$

Table 7. Regression results for equation 7

Equation 7	Coefficients	t value	p value	VIF
Constant	0.926	396.754	0.000	NA
V_MP	0.008	2.53	0.026	1
	R Square	AdjR Square	Sig F	DW value
Value	0.348	0.293	0.010**	2.221

**At 5% level of significance.

The movement of ST/SORR over the years is captured in the first graph in the appendix. We can clearly see that after the implementation of VAT in Madhya Pradesh the ratio of ST/SORR has not taken a definite way. The graph shows a zigzag movement of this ratio reflecting that there was no definite pattern observed over the years. The graph for Revenue to Gross State Domestic Ratio shows an uptrend after the VAT implementation except for the crisis years 2008-2010 where the whole world suffered the slowdown in their economy.

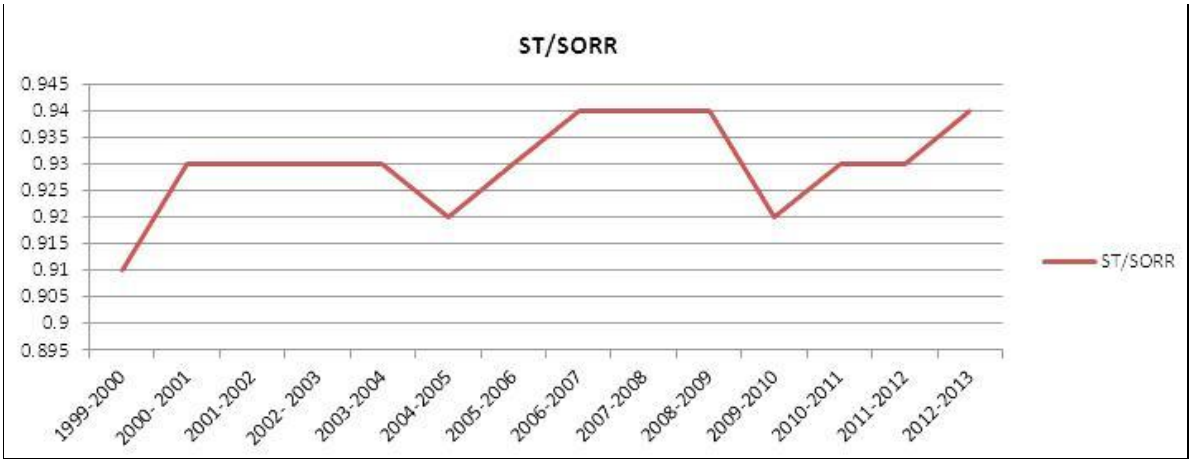

Figure 1. Shows the graph for the movement of ST/SORR for the sample period

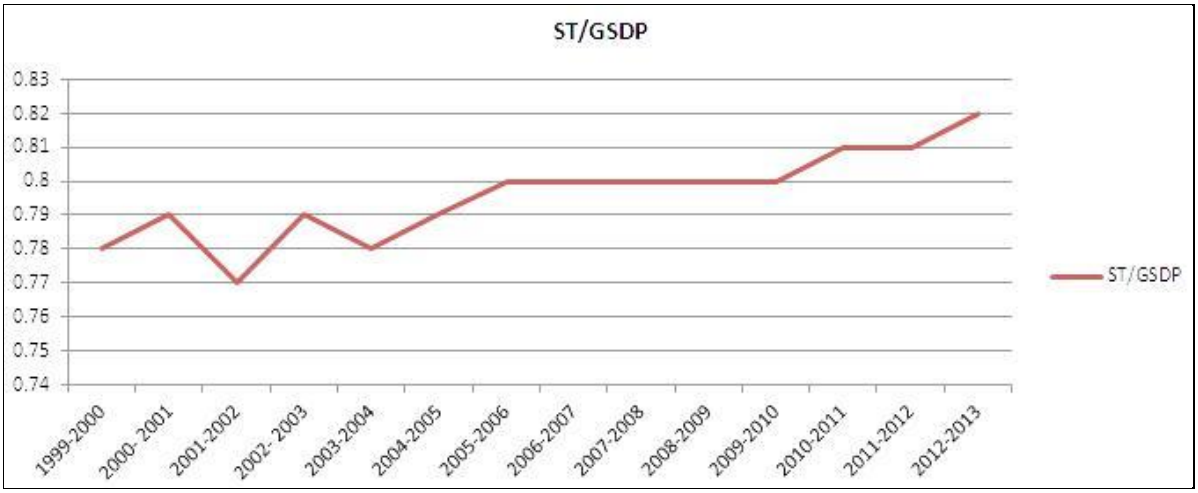

Figure 2. Shows the graph for the movement of ST/GSDP for the sample period

9. Conclusion

The main focus of this paper was to examine the revenue impact of Value Added Tax in Madhya Pradesh. To assess the revenue impact of VAT we collected data for Sales Tax Revenue, State Own Revenue Receipts from Reserve Bank of India database and data on Gross Domestic Product of Madhya Pradesh from MOSPI database. We conducted an empirical exercise on the above data which was collected from 1999-2013 to answer two main research questions of our study which are: a) Has the VAT done better than the sales tax it replaced in Madhya Pradesh b) Has the VAT contributed to improvement in State's Own Revenue Performance. The results show that implementation of Value Added Tax by M.P in 2006 turned out to be a boon for Madhya Pradesh tax system as the VAT performance has been better than the sales tax it replaced. At the same time State Own Revenue Performance also shows an increase with the VAT implementation which is evident in the model.

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