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An Examination of Interrelationship between Central and States Taxes in India Before and After Implementation of GST: A Johansen Cointegration Approach

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ABSTRACT

GST in India has been introduced with effect from 1st July 2017 as an integrated nation wise tax under the notion of 'one tax, one country'. Its taxing mechanism is based on a dual model where both the Centre and the States levy taxes on the same transaction, at the same rate and on the same tax base. It has brought a complete shift from origin based taxation to destination based taxation. This paper seeks to examine the interrelationship of the Central taxes with the States taxes in both pre-GST and post-GST period in India. For study purposes, data for 38 years from 1980-81 to year 2018-19 has been selected and analysed by applying Johansen-Juselius cointegration model. The results indicate a weak association between the Central and the States taxes in India in pre-GST period, which was thus providing room for tax evasion practices. However, after implementation of GST, the scattered Central and States taxes have been converted into one unified whole and an efficient taxing system has emerged which is curbing evasion practices not only in indirect taxes but also in direct taxes domain.

Keywords: *Origin based tax; Destination based tax; Dual GST; CGST; SGST; IGST; Input tax credit.*

1.0 Introduction

Before Goods and Services Tax (GST) came into operation, indirect taxes in India were suffering from many limitations. Non-linkages of taxes were creating cascading effects. Additionally there were other inefficiencies like tax evasion practices, complex procedures and multiplicity of taxes which were acting as obstacles in economic growth (Bagchi, 1994).

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Many Central taxes, States taxes and local levies were in existence. In the Central taxes domain, the important ones were Customs duty, Central excise duty, Services tax and Central Sales tax. On the States taxes front, the important ones were Value added tax (VAT), Entry tax, Entertainment tax, Electricity tax, excise on alcoholic liquor. Now GST has been implemented in India with effect from 1st July, 2017. It has brought many taxes into one unified whole.

GST is grounded upon value added approach where the prime focus is on removing cascading effects. The history of value added tax is very old in India. Initially it was introduced in Central Excise in the form of Modified value added tax (MODVAT) in 1986, then in Services tax in 1994 and finally in State level sales tax commonly known as VAT in 2006. India has adopted dual model of GST based on the philosophy of cooperative federalism where each transaction will be taxed by both State Government and Central Government at the same tax rate and on the same tax base (Thirteenth Finance Commission Report, GOI, 2009).

At the global level, the history of GST is very old. France was the first country have introduced Goods and Services tax (GST) in year 1954 in the form of Value Added Tax. Madagascar became the second country in this regard, followed by Honduras in year 1964, then Denmark in year 1967, Germany in year 1968, Luxembourg, Sweden and Netherland in year 1969, Norway in year 1970, Belgium in year 1971 and Ireland in year 1972 and so on. Till now 160 countries in the world have adopted GST.

Among the countries which adopted VAT/GST in last five years are Bahamas in year 2015, Egypt in year 2016, India in year 2017, Armenia and Dubai in year 2018. As a common feature, every country has adopted two types of rates for taxing goods and services, standard rate and reduced rate to overcome the problem of regressive nature of consumption taxes. Every country has adopted the model of VAT/GST that suites its own requirement. However, the core issues behind implementing VAT/GST is the same across the Globe-removing cascading effect, simplifying the procedures and removing tax evasion practices and more particularly raising sufficient revenue to the Government to meet its expenditure (Graetz, 2008). Brazil and Canada have adopted a dual model of GST.

2.0 Literature Review

Indirect taxes regime in India has witnessed a gradual improvement for the last three decades. Bagchi (1994) may be regarded as the first one who proposed a country level VAT for removing economic distortions and bringing harmony between the Centre and the State. Among others, the problem of double taxation was one of most burning

issues which had the effect of rising the overall level of cost of goods and services in the economy. Murthy (1995) pointed out the need for a Central and States level VAT to cope with the problem of cascading effect for all-round growth. Chelliah (2006) viewed existing indirect tax laws as irrational and leading to cascading effects.

Despite continual amendments in indirect tax laws, non-linkage between the Centre and the States taxes were creating rooms for tax evasion. Acharya (2005) emphasized the need for a substantial reform for creating proper harmonization between Centre and State. Further, all taxes prior to GST came into force were isolated and complex.

On the tax base side, Rao (2009) regarded existing indirect tax structure as having narrow tax base with significant cascading effects. Purohit and Purohit (2010) worked on rates for maintaining fiscal autonomy of the States. They emphasized a blend of standard and preferential rates for taxing both goods and services.

Again, Rao (2010) viewed GST as the need of time, however he emphasized that the States should be given autonomy in deciding the tax rate. It was also emphasized that GST was in favour of both Centre and State (Rao, 2011). Sharma and Bhaskar (2012) regarded GST is a weapon to fight against market distortions. Mukherjee and Rao (2014) concluded that both petroleum and electricity should be brought within the purview of GST to avoid cascading effects.

Nayar (2014) held that continuous reforms on indirect taxes is necessary to bring globalization in real terms. Mukherjee (2015) pointed out the need for taking into confidence all the stakeholders of GST for its effective implementation. Viswanathan (2015) regarded performance of VAT as excellent and he also emphasized the need for GST for Indian economy as a whole.

Kumar (2016) opined that GST has the effect of transferring fiscal powers from States to the Centre. Gupta (2016) argued that GST has removed the procedural barriers. Bhattarai (2017) viewed GST as a remarkable step and necessary step for growth of the Indian economy. Dash (2017) regarded GST as a reform having long term effect. Yadav and Shankar (2018) regarded GST as having many unique features as compared to the rest of the world.

3.0 Interrelationship of the Central taxes with the States Taxes in Pre-GST Period

Before GST came into force, the Indian indirect tax system was suffering from many limitations. Cascading effects, multiple taxation, complex procedures and most important non-linkages between various taxes were leading to huge tax evasion

practices. Bagchi, (1994) characterized Indian trade taxes as archaic, irrational and complex requiring urgent reforms. Most of the taxes were origin based and thus tax revenue was not growing. Different taxes bearing different rates were creating confusions and acting as an obstacle in the Indian Government initiative of ease of doing business. The taxes were scattered and not acting as a tax system.

One of the accepted models for testing long run and short run association has been provided by Johansen cointegration model (Johansen and Juselius, 1990). Thus, for testing the inter-linkages between taxes in pre-GST period, the study proceeds with application of Johansen cointegration model as adopted by Hondroyiannis and Papapetrou (1996). They used Cointegration as pre-test for Granger causality for studying the relationship between Government spending and revenue. 38 year's data from year 1980-81 to 2018-19 of Central taxes, States taxes and GDP at constant prices has been collected from website of Reserve Bank of India. The data from 1980-81 to 2016-17 has been used for studying the inter-relationship between taxes in pre-GST period. The data from 2017-18 to 2018-19 has been used to analyse post-GST period scenarios. Further, all data has been transformed into natural log (LN). For data analysis purposes, the study has used E Views 7. For analysing the data in a pre-GST period, total Central taxes have been subdivided into two broad categories; Central Indirect Taxes and Central Direct Taxes and at the same time States taxes have also been subdivided into States Direct Taxes and States Indirect Taxes. For analysing the interrelationship between taxes, and more particularly how other taxes were affecting Central Indirect Taxes in pre-GST period, the following functional equation is framed:

$$CIT = f(SIT + CDT + SDT) \quad \text{.....(1)}$$

The above equation after converting into natural log (LN) and expressed in linear form may be reproduced as:

$$LNCIT = \beta_0 + \beta_1 LNSIT_t + \beta_2 LNCDT_t + \beta_3 LNSDT_t + \varepsilon_t \quad \text{.....(2)}$$

where CIT stands for Central Indirect Taxes, SIT for States Indirect Taxes, CDT for Central Direct Taxes and SDT for States Direct Taxes. β_0, β_1, β_2 *and* β_3 represents parameters to be tested, t is the time trend and ε reflects error term.

3.1 Descriptive statistics

The descriptive statistics of the variables have been presented in Table 1. The results showed that there were significant differences between the minimum and maximum values of LNCDT and LNSDT as compared to LNCIT and LNSIT in pre-GST period.

For testing normality, Jarque-Bera test is estimated at 5% confidence level. The null hypothesis has been set that error terms are normally distributed against an

alternative hypothesis of error terms not being normally distributed. The results of Jarque-Bera revealed that all the variables are normally distributed.

Table 1: Descriptive Statistics

	LNCDT	LNCIT	LNSDT	LNSIT
Mean	6.226817	6.863568	4.612693	6.624662
Median	6.179478	6.879325	4.668427	6.627115
Maximum	9.047484	9.066596	6.981898	8.991598
Minimum	3.369707	4.629082	1.924249	4.082441
Std. Dev.	1.826372	1.216662	1.589948	1.470346
Skewness	0.024851	-0.064441	-0.072305	-0.011041
Kurtosis	1.674240	2.060704	1.758390	1.859073
Jarque-Bera	2.713501	1.385786	2.408864	2.007560
Probability	0.257496	0.500127	0.299862	0.366491
Sum	230.3922	253.9520	170.6696	245.1125
Sum Sq. Dev.	120.0828	53.28957	91.00561	77.82902
Observations	37	37	37	37

3.2 Unit root testing

Unit root testing has been estimated using Augmented Dickey-Fuller test through the Schwarz information criterion (SC). Testing down has been done from 9 lags as selected by the system. Since variables have reflected a trend, the trend and intercept is included in the test equation of ADF test. The results of ADF test as reflected in Table 2 show that all the variables are non-stationary at level but stationary at first differences and thus the study proceeds to apply Johansen cointegration to study long run association between the variables. One of the most important conditions for applying Johansen cointegration is that the variables should be integrated of the same order.

Table 2: Results of Augmented Dickey Fuller Test

	Level		First difference	
Variables	T-Statistics	Probability	T-Statistics	Probability
LNCIT	-2.644099	0.2645	-4.520173	0.0000
LNSIT	-2.762087	0.2197	-6.305110	0.0000
LNCDT	-3.363841	0.0738	-5.538747	0.0003
LNSDT	-3.307967	0.0811	-7509585	0.0000

3.3 Johansen Cointegration

Since all the variables under study have been found to have the same order of integration, the study proceeds to find long run link between variables by applying Johansen cointegration. The first step in Johansen cointegration is determining the best lag length. Results of optimal lag length selection are presented in Table 3. All three important criteria namely Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) indicated 1 as optimal lag length.

Table 3: Optimal Lag Length Selection

Lag	Log Likelihood	LR	FPE	AIC	SC	HQ
0	25.49728	NA	3.07e-06	-1.343580	-1.160363	-1.282848
1	164.8041	235.0802*	1.39e-09*	-9.050255*	-8.134170*	-8.746598*
2	179.4413	21.04106	1.60e-09	-8.965084	-7.316131	-8.418502
3	190.0803	12.63378	2.56e-09	-8.630019	-6.248199	-7.840513
4	206.2750	15.18251	3.37e-09	-8.642187	-5.527498	-7.609756
5	224.8987	12.80379	4.98e-09	-8.806167	-4.958611	-7.530811

** Indicates lag order selected by the criterion*

Johansen cointegration, test is estimated at lag 1 and the results are presented in Table 4 and Table 5. Both trace and maximum Eigenvalue tests suggested the existence of one cointegrating vector at 5% level of significance. Therefore, it can be concluded that there was long run association between Central Indirect Taxes, States indirect taxes, Central Direct Taxes and States direct taxes in the pre-GST period in India.

Table 4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.678004	57.63415	47.85613	0.0046
At most 1	0.267867	17.97163	29.79707	0.5682
At most 2	0.171108	7.058895	15.49471	0.5708
At most 3	0.013920	0.490624	3.841466	0.4836

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.678004	39.66252	27.58434	0.0009
At most 1	0.267867	10.91274	21.13162	0.6560
At most 2	0.171108	6.568272	14.26460	0.5414
At most 3	0.013920	0.490624	3.841466	0.4836

3.4 Vector error correction model (VECM)

Since Johansen cointegration has indicated one cointegrating vector, most suitable method to study long run and short run association between taxes is Vector Error Correction Model (VECM). Results of the Vector Error Correction Model (VECM) are presented in Table 6. First part of the output of VECM deals with cointegrating vectors and second part deals with a short term link between variables and error correction term. The long run link as represented by cointegrating vectors may be given with the help of following equation:

$LNCIT_t = 3.18 - 2.68\ LNSIT_t - 0.21\ LNCDT_t + 1.96\ LNSDT_t + \varepsilon_t$ …..(3)

The equation (3) shows positive long run relation of LNCIT with LNSIT and LNCDT however negative relation with LNSDT. Thus, 1% increase in States indirect taxes (LNSIT) might increase Central Indirect Taxes (LNCIT) by 2.68% and 1% increase in Central Direct Taxes (LNCDT) might increase Central Indirect Taxes (LNCIT) by 0.21% in long run. However, 1% increase in States direct taxes (LNSDT) might decrease Central Indirect Taxes (LNCIT) by 1.96% in the long run in pre-GST period. The negative long run relation with States direct taxes (LNSDT) give rise to two probable reasons; one may be subsidy by States Governments and the other tax evasion. The short run equation of VECM may be reproduced as under:

$\Delta LNCIT_t = -0.22\ ECT_{t-1} + 0.16\ \Delta LNCIT_{t-1} - 0.74\ \Delta LNSIT_{t-1} - 0.01\ \Delta LNCDT_{t-1} + 0.37\ \Delta LNSDT_{t-1} + 0.15$ …..(4)

Table 6: Vector Error Correction Estimates

Vector Error Correction Estimates				
Date: 07/01/19 Time: 11:37				
Sample (adjusted): 3 37				
Included observations: 35 after adjustments				
Standard errors in ( ) and t-statistics in [ ]				
Cointegrating Eq:	CointEq1			
LNCIT(-1)	1.000000			
LNSIT(-1)	-2.680978			
	(0.29616)			
	[-9.05259]			
LNCDT(-1)	-0.213488			
	(0.16578)			
	[-1.28780]			

LNSDT(-1)	1.958703			
	(0.31964)			
	[6.12785]			
C	3.183747			
Error Correction:	D(LNCIT)	D(LNSIT)	D(LNCDT)	D(LNSDT)
CointEq1	-0.224167	0.069118	0.235167	-0.328850
	(0.10092)	(0.05674)	(0.09621)	(0.15008)
	[-2.22126]	[1.21812]	[2.44431]	[-2.19113]
D(LNCIT(-1))	0.160854	-0.087010	-0.112384	-0.484440
	(0.20459)	(0.11503)	(0.19505)	(0.30426)
	[0.78622]	[-0.75640]	[-0.57619]	[-1.59218]
D(LNSIT(-1))	-0.743022	0.145714	0.555867	0.326346
	(0.44652)	(0.25105)	(0.42569)	(0.66405)
	[-1.66402]	[0.58041]	[1.30582]	[0.49145]
D(LNCDT(-1))	-0.014789	-0.189418	-0.294559	0.319683
	(0.21911)	(0.12319)	(0.20888)	(0.32584)
	[-0.06750]	[-1.53759]	[-1.41017]	[0.98109]
D(LNSDT(-1))	0.372411	-0.001326	-0.018210	0.148516
	(0.16239)	(0.09130)	(0.15481)	(0.24150)
	[2.29334]	[-0.01452]	[-0.11763]	[0.61498]
C	0.155831	0.154526	0.142208	0.079399
	(0.04734)	(0.02661)	(0.04513)	(0.07040)
	[3.29207]	[5.80618]	[3.15131]	[1.12790]
R-squared	0.252552	0.147086	0.303455	0.295970
Adj. R-squared	0.123682	0.000031	0.183361	0.174586
Sum sq. resids	0.211543	0.066873	0.192260	0.467856
S.E. equation	0.085408	0.048020	0.081423	0.127016
F-statistic	1.959741	1.000214	2.526811	2.438287
Log likelihood	39.73898	59.89260	41.41157	25.84865
Akaike AIC	-1.927942	-3.079577	-2.023518	-1.134209
Schwarz SC	-1.661311	-2.812946	-1.756887	-0.867578
Mean dependent	0.121638	0.134018	0.156497	0.137244
S.D. dependent	0.091237	0.048021	0.090101	0.139804
Determinant resid covariance (dof adj.)		5.43E-10		
Determinant resid covariance		2.56E-10		
Log likelihood		187.8525		
Akaike information criterion		-9.134427		
Schwarz criterion		-7.890148		

Error correction (ECT) measures the speed of adjustment in dependent variable due to a change in any of the independent variables. However, the error correction coefficient should be negative and significant. Table 7 reports coefficients of error correction having value -0.22 with the prospect of 0.0343. Hence, it can be concluded that 22% deviations were corrected annually and there was long run causality running from States indirect taxes, Central Direct Taxes and States direct taxes to Central Indirect Taxes in pre-GST period.

Table 7: Probabilities of Coefficients of VECM

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	-0.224167	0.100919	-2.221255	0.0343
C(2)	0.160854	0.204593	0.786215	0.4381
C(3)	-0.743022	0.446522	-1.664019	0.1069
C(4)	-0.014789	0.219106	-0.067497	0.9466
C(5)	0.372411	0.162388	2.293343	0.0293
C(6)	0.155831	0.047335	3.292069	0.0026
R-squared	0.252552	Mean dependent var		0.121638
Adjusted R-squared	0.123682	S.D. dependent var		0.091237
S.E. of regression	0.085408	Akaike info criterion		-1.927942
Sum squared resid	0.211543	Schwarz criterion		-1.661311
Log likelihood	39.73898	Hannan-Quinn criter.		-1.835901
F-statistic	1.959741	Durbin-Watson stat		2.186757
Prob(F-statistic)	0.114808			

However, there was no short run causality running from States direct taxes to Central Indirect Taxes because the coefficient of C (5) is positive. Again, there was no short run causality running from Central Indirect Taxes and States indirect to Central Indirect Taxes because coefficients of C (3) and C (4) are negative but insignificant. Furthermore joint Wald test under null hypothesis of C (3) = C (4) = 0 also proves the same assertion (Table 8).

Table 8: Wald Test results

Test Statistic	**Value**	**Df**	**Probability**
F-statistic	1.856418	(2, 29)	0.1743
Chi-square	3.712836	2	0.1562
Null Hypothesis: C(3)=C(4)=0 Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(3)		-0.743022	0.446522
C(4)		-0.014789	0.219106

LM test is estimated for serial correlation under null hypothesis of no serial correlation. LM test shows that test statistic is 11.70051 with p-value of 0.7643 and thus null hypothesis is not rejected and it can be safely concluded that there is no serial correlation in the VEC model.

3.5 Granger causality

If cointegration exists, there must be granger causality in at least one direction. Results of Granger Causality test are presented in table-9. The results show that States indirect taxes' granger caused Central Indirect Taxes however, reverse was not true. States indirect taxes' granger caused States direct taxes and again reverse was not true. States direct taxes and Central Direct Taxes granger caused each other. No Granger causality could be noted between Central Direct Taxes and Central Indirect Taxes, between Central Direct Taxes and States direct taxes, between States indirect taxes and Central Direct Taxes in pre-GST period.

Table 9: Results of Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
SIT does not Granger Cause CIT	36	5.85342	0.0212
CIT does not Granger Cause SIT		2.16247	0.1509
CDT does not Granger Cause CIT	36	0.96474	0.3331
CIT does not Granger Cause CDT		0.99087	0.3268
SDT does not Granger Cause CIT	36	1.92923	0.1741
CIT does not Granger Cause SDT		0.51003	0.4801
CDT does not Granger Cause SIT	36	2.81483	0.1028
SIT does not Granger Cause CDT		0.93170	0.3414
SDT does not Granger Cause SIT	36	3.26399	0.0799
SIT does not Granger Cause SDT		6.39151	0.0164
SDT does not Granger Cause CDT	36	11.6323	0.0017
CDT does not Granger Cause SDT		4.25378	0.0471

4.0 Interrelationship of the Central Taxes with the States Taxes in Post-GST Period

GST has brought many scattered taxes into a unified whole by subsuming most of the Central and States taxes. Central taxes that were subsumed include Central Excise

duty, Additional duties of excise, Excise duty levied under Medicinal & Toilet Preparation Act, Additional duties of customs (CVD & SAD), Service Tax, Central Sales tax Surcharges & Cesses and State taxes that were subsumed include State VAT / Sales Tax, Purchase Tax, Entertainment Tax (other than those levied by local bodies), Luxury Tax, Entry Tax (all forms), Taxes on lottery, betting & gambling, Surcharges & Cesses. Alcoholic liquor for human consumption has been kept out of purview of GST (Section 9.1, Central Goods and Services Tax Act, 2017). On five petroleum products GST shall be levied from a later date as may be notified (Section 9.2, CGST Act, 2017).

GST has been implemented in India as dual GST model. Under GST system, each transaction is to be at once taxed by both Centre and State Government on the same tax base and on the same rate. In case of intra-State transaction, Central Goods and Services Tax (CGST) plus State Goods and Services Tax (SGST) is to be levied and in case of inter-State transaction, Integrated Goods and Services Tax (IGST) is to be levied. Intra State transaction has been defined to mean where both location of supplier and place of supply falls within one State or one Union territory. However, if location of supplier and place of supply falls between two States, between two Union territories or between one State and Union territory, the supply is said to be said inter State supply. Registration is required in every State from where taxable supplies are made if aggregate turnover exceeds specified amount (22.1, CGST Act, 2017).

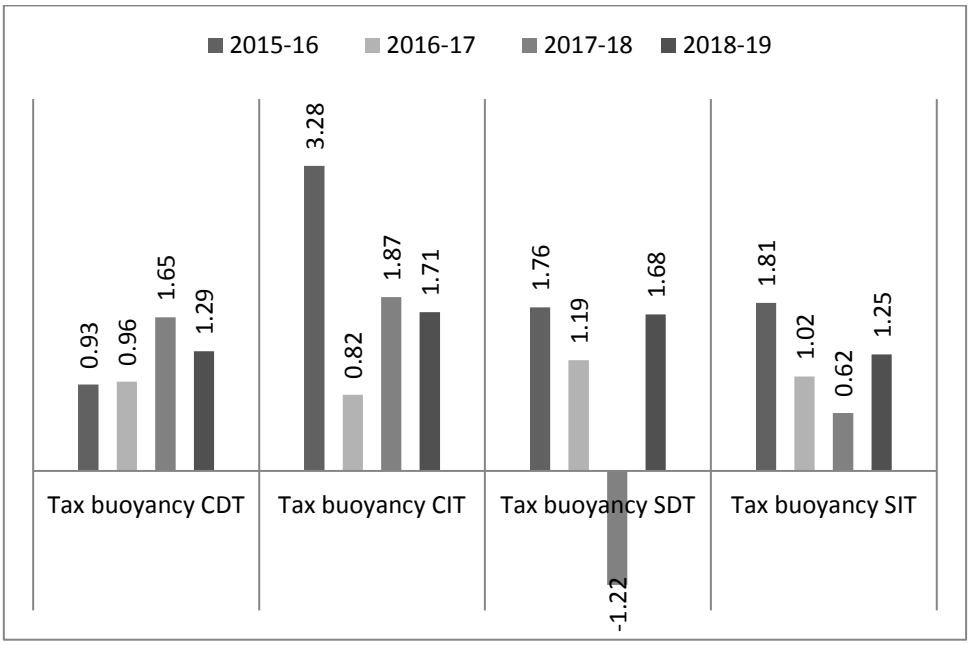
To give effect to destination based tax mechanism, Integrated Goods and Services Tax Act, 2017 incorporates provisions regarding apportionment of tax and settlement of tax between the Centre and the State. By virtue of section 17.1 of IGST Act, 2017, first apportionment out of the integrated tax collected shall be made in favour of Central Government equivalent to Central tax applicable on similar transactions in intra State supply and the balance fund remaining in integrated tax so collected shall be apportioned to that State where supply takes place. Thus, only that State will be benefited where ultimate consumption takes place and GST law provides no incentive to the producing State.

The new tax structure emerged in GST regime is integrated one. Permanent account number (PAN) issued under income tax act, 1961 is a mandatory requirement for grant of registration under GST (25.1.6. CGST act, 2017). This unique feature of GST has led to link the GST number with Permanent account number (PAN). This is a remarkable step to fight against tax evasion practices. GST has directly benefitted the indirect taxes and indirectly the direct taxes due to its unique features.

When actual figures of year 2017-18 and 2018-19 are compared with figures of immediately two preceding years 2015-16 and 2016-17, it can be observed that there has

been phenomenal growth in Central direct taxes (Figure 1). In year 2018-19 as compared to year 2017-18, a good jump may be observed in States direct and indirect taxes buoyancy.

Figure 1: Tax Buoyancy in India in Pre and Post-GST Period



Data source: Handbook of Statistics on Indian Economy, Reserve Bank of India (2018)

5.0 Findings of the Study

The study has found long run association between various taxes in pre-GST period. However, no short run association could be noted in this regard. In the pre-GST period there were multiple taxes which were operating in isolation. Proper linkages between the Central and States taxes were missing. As an effect this was providing sufficient rooms for tax evasion practices in pre-GST period. The introduction of GST has brought integrated tax structure in India. This has improved linkages between Central and States taxes and acting as a check against tax evasion practices. As a result indirect tax collection both Central and States taxes have started boosting up. The requirement of PAN for registrations has also significantly improved direct taxes collection. Thus, GST has impacted directly the indirect taxes and indirectly the direct

taxes. GST being destination based model, the States need to formulate different strategies to increase tax revenue. However, it may require more time and thus five year's limit of GST compensation period as provided in the Goods and Services Tax (Compensation to States) Act, 2017 may need further extension.

6.0 Conclusion

GST was the need of time to create proper linkages between various taxes in India to boost the overall growth of tax revenue while bringing down overall cost level by removing cascading effects. After GST implementation, total tax revenue will increase due to destinations based principle, however, only those States will be benefitted where ultimately consumption takes place. The States should use some of its resources also for increasing consumption within the State and at the same time Centre should transfer some portion of GST revenue to producing States even after transition period of five years to enable the States to increase their overall consumption level. GST has acted as a thread to bring all taxes into one system. However, there are certain limitations under the existing law which should be removed to reap full benefits flowing from GST law in India.

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