

Tax Structure and Economic Growth: A Case Study of India

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Abstract

The paper has examined the impact of tax structures on economic growth in India. Data regarding Personal Income Taxes, Corporate Taxes, and Gross Domestic Product have been collected from the website of Reserve Bank of India from 1973-74 to 2018-19. The study applies Johansen Cointegration, Vector Error Correction Model followed by Wald Test to analyze the long-run and short-run relation between the variables. The results indicate that Corporate Taxes and Indirect Taxes have a positive impact while Personal Income Tax negative impact on the economic growth of India in the long run. Thus, the findings of this study do not support the decision taken by the Government of India regarding Corporate Tax rate cuts.

Key words: Personal Income Tax, Corporate Tax, Indirect Tax, Gross Domestic Product, Tax Buoyancy, Goods and Services Tax

JEL classification: H25, H21, E21, E23

Introduction

“Taxes are indeed very heavy, and if those laid on by the Government were the only Ones we had to pay, we might more easily discharge them; but we have many others, and much more grievous to some of us. We are taxed twice as much by our Idleness, three times as much by our Pride, and four times as much by our Folly” (Benjamin Franklin, 1733)

The above quote by Benjamin Franklin rightly describes the burden of taxes. Everyone pays multiple taxes due to binding obligation of law however the return they get for payment of taxes always remains in dark. Tax is one of the most important sources for the Government's revenue in any country. Taxes act as a source for financing public expenditure. Taxes thus reduces the borrowing requirements of the Government and helps to discharge several responsibilities for social welfare. Even after seventy-two years of independence, tax culture has not been properly established in India. Still, a general tendency to avoid tax is predominant in the Indian economy. This is more because people are more concerned about fairness and justice in treatments (Ashraf, Camerer & Loewenstein, 2005).

Every country has a unique tax structure. Tax structure includes the combinations of direct and indirect taxes levied to pursue revenue goals of the Government of a country. The tax policy decides the tax structure. It is not simply the tax but the proper tax structure that may flourish long term growth. Proper tax structure should be conducive to growth and at the same time, it should encompass the required features like equity, fairness, and simplicity. The aim of taxes should be to uplift economic growth without sacrificing human welfare. Tax policy extends beyond the country's borders and hence requires serious deliberations before setting up a tax policy.

Many economic works of literature discuss the effect of taxes on economic growth. The endogenous growth model emphasizes that taxation affects both the short-run and long-run growth of any economy. Whereas Direct Taxes reduce disposable income, Indirect Taxes reduce the efficiency of disposable income. India has a blend of progressive and proportionate taxation. Progressive taxation is levied to reduce the income inequality gap. However, it also reduces encouragement to generate more income and many times individuals start misrepresenting their income and taxes (Slemrod, 1990). The Indian tax structure is shifting from Direct Taxes to Indirect Taxes for reducing the fiscal deficit gap. Recently, personal income taxes have been exempted up to Rupees five lakhs vide budget 2019-20 (MOF, GOI, 2019) and corporate taxes have been brought down to twenty-two percent only for domestic companies.

Savings and investments are two pillars for the economic growth of any nation. Taxes directly affect savings and investments. Policymakers while devising any tax policy should fix up the desired savings and investment goals both short term and long run (Harrod, 1939). Reduction in tax rates and providing more avenues for investments may speed up economic growth. Bringing down the tax rates will have the effect of pushing encouragement towards working, investing and saving (Gale & Samwick, 2014). Further, the importance of labour and capital as predominating factors of production cannot be ignored. Taxes directly impact both labour and capital which are used in the production process. Neo-classical economists viewed ease of substitution between labour and capital through technological advancement to ensure a steady growth rate (Solow, 1956). However, every factor substitution has unique tax implications and different growth impacts.

The main objective of this paper is to analyze the impact of the existing tax structure on Indian economic growth. For measuring economic growth, the growth rate of Gross Domestic Product (GDP) is a widely accepted criterion among the researchers. GDP is affected by many factors however taxes have a long-lasting impact on GDP. The tax-GDP ratio shows a percentage increase in taxes due to a one percent increase in GDP. The tax-GDP ratio in India is quite inconsistent ranging between 7 percent to 8 percent in the last forty-five years (Figure-1). However, Tax buoyancy which shows the growth rate of taxes to the growth rate of GDP is depicting a falling trend for the same period (Figure-2).

Figure-1. Tax-GDP ratio in India

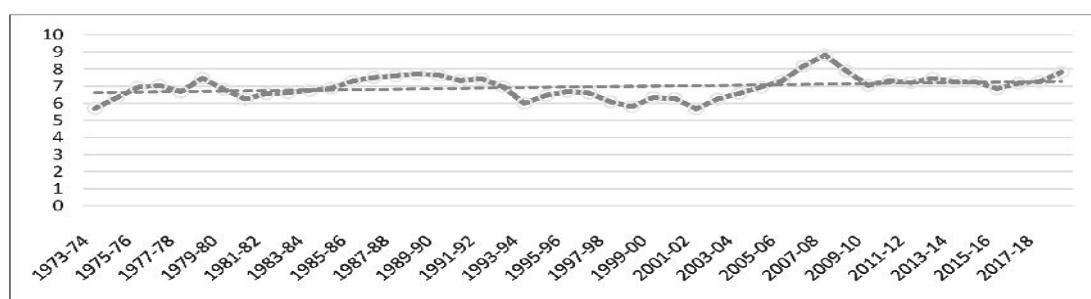
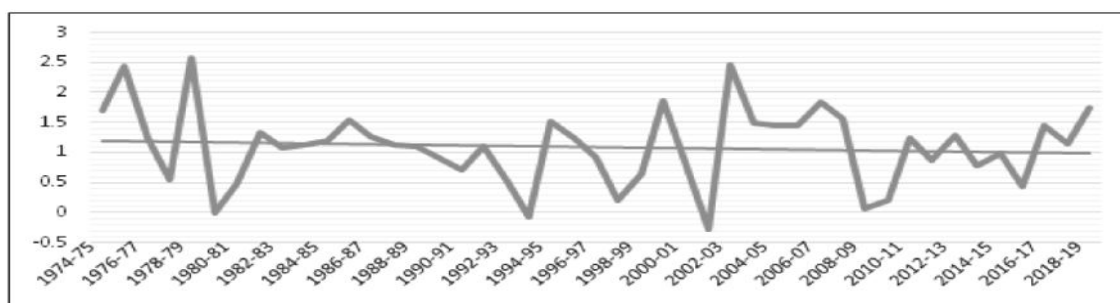


Figure-2. Tax buoyancy in India



Hence, this paper has been organized as follows. The next section reviews empirical evidence of the impact of tax on GDP. The third section conducts the multivariate analysis to assess the impact of taxes on the Indian GDP. The fourth section incorporates discussions highlighting the problem areas in the Indian tax structure which are acting as hurdles in the economic growth of the country. Finally, the paper ends in the fifth section with concluding remarks to assist policymakers to draw an appropriate tax structure that may boost the growth of the Indian economy.

Theoretical and empirical evidences

The effect of taxes on the economic growth of a country has been a long-lasting debate. Many research studies have been conducted on the topic. Among researchers, there is a wider acceptance of the view that taxation influences economic growth (Slemrod, 1990, Engen & Skinner, 1996, Myles, 2000, Scully, 2003)

However, their opinions vary regarding the impact of direct and indirect taxes. The majority of authors have found the positive influence of indirect taxes while the negative influence of direct taxes on economic growth in the long run (Matallah&Matallah, 2017, Vazquez et al 2009, Dackehag& Hansson, 2012, Ferde&Dahlby, 2012, McBride, 2012). Two major components of direct taxes are corporate income taxes and personal income. Many studies suggest the negative impact of corporate taxes as having more harmful than personal income taxes (McBride, 2012, Johansson et al 2008, Veronika&Lenka, 2012). Studies also suggest Tax structure based on selective consumption taxes, taxes on personal income and property is more conducive to Economic growth (Stoilova, 2017). Ahmad, Sial& Ahmad (2018) found that Indirect taxes bring negative effects in the long run as compared to the short run.

There was a multiplicity of taxes in indirect taxes domain before the Goods and Services Tax came into practice with effect from 1st July 2017. Venkataraman, &Urmi, 2017 found that Economic growth is more affected by Customs duty as compared to Excise duty. It is also argued that Shift in tax structure from trade to domestic consumption taxes is having positive effects for economies classified as lower-middle-income (McNabb, 2016). India follows a progressive taxation mechanism where the tax rate increases with an increase in income. This many times frustrates the high earner group and induce them towards misrepresenting their income and taxes. Slemrod, J., 1990 argued towards bringing a flat rate of personal taxes as a safeguard to minimize tax misrepresentations. Further, Tax rate cuts have been found to create inducement towards working, saving and investing (Ogbonna, George

&Odoemelam, Ndubuisi. (2015). Attitude, behavior, and norm also play an important role in deciding tax compliance (Engen & Skinner, 1996). Ullmann, Robert & Watrin, Christoph. (2008) found different reactions of individuals towards different taxes. Subject to certain assumptions any behavioral reactions towards taxes in the form of evasion or avoidance are symptoms of inefficiency (Slemrod, 2018). There is always a growth maximizing rate (Scully. 2003). Below the maximum rate positive impact of taxes on economic growth may be seen, however, once the threshold limit crossed the negative impact of taxes starts (Huňady&Orviská, 2015). Further, the higher tax rate may have the effect of curtailing consumptions and may also induce leakages (Caulkins, et al 2015).

The role of foreign capital cannot be ignored for economic growth. Tax structures built up to give concessions to foreign investors may invite more foreign capital. Sinevicienea&Railienb (2015) suggested that the Taxation structure is an important driving force for private investment. Further, the higher the corporate income tax, the lower will be private investment and slower will be economic growth (Ferde&Dahlby, 2012). On the capital taxation side it has been argued that where growth is driven by domestic innovation activity, positive rates of capital taxation can increase the long-run growth rate (Kate & Milionis, 2019). It goes without saying that for designing an optimal tax system, the use of both direct and indirect taxes are required. Taxes have the effect of bringing inequality. A buffet rule for individuals and companies with wealth tax will have the effect of making the system more equitable (Passant, 2017). There is evidence of molding tax systems to bridge the gap of gender inequality. Economic policies should focus to incorporate social justice and gender equality (Hodgson & Sadiq 2017). For a tax policy to be effective, it should be well planned and efficiently implemented. The policies which are poorly implemented may be deficient in uplifting the economic development (Kransdorff, 2010). Studies also suggest taxing land at higher than the building for developments (Junge& Levinson 2012). Taxes may also be seen as a means of bringing welfare. Kiss (2009) suggested that any tax rate above the Nash equilibrium rate may reduce welfare. The empirical studies may be summarized as under

S/N	Authors	Data and period	Method	Results
1	Skinner, (1987).	31 sub-Saharan African countries during 1965-73 and 1974-82.	Regression Analysis	Output growth will be affected when countries are not on a steady growth path.
2	Barro, (1991).	98 countries 1960-1985	Regression Analysis	There is a negative relation of per capita growth and the ratio of private investment to GDP with the ratio of government consumption expenditure to GDP.
3	Poulson& Kaplan, (2008)	United States ,1964 -2004	Ordinary least squares regression analysis	Economic growth is negatively impacted due to higher marginal rates of taxes.
4	Padda&Akram (2009)	Pakistan, India and Sri Lanka, 1973–2008	GLS transformed Dickey-Fuller, Impulse response	The tax rate changes have a negative impact on the economic growth of the selected three countries in the short run.
5	Dackehag&Hansson (2012).	25 OECD member countries, 1970-2010	Regression model	There is a negative impact of taxation of corporate income on economic growth.
6	Ferede&Dahlby, (2012).	Canada, 1977–2006	Regression model	Higher the corporate income tax, lower will be private investment and slower will be economic growth
7	McBride,(2012)	twenty-six such studies going back to 1983	Review Article	Taxes have a negative effect on growth. Corporate income taxes are most harmful followed by personal income taxes.

8	Veronika&Lenka, (2012).	27 EU member countries , 1998 – 2010	Regression model	If the tax burden is reduced, there will be a greater impact on EU15 countries as compared to EU12 new member countries.
9	Stoilova&Patonov (2013)	EU countries, 1995-2010	Regression model	The tax structure based on direct taxes plays a crucial role in the economic growth of EU countries.
10	Gale &Samwick, (2014).	Past 50 years, U.S.	simulation analyses	Different taxes have a different impact on economic growth. Reforms should focus on improving incentives, curtailing existing subsidies, removing windfall gains and minimizing deficit financing to have long term growth of the economy
11	Macek, (2014).	OECD Countries 2000-2011	Regression model	There is a negative impact of corporate taxes and income taxes on economic growth, however, the negative impact of value - added tax was not confirmed.
12	Huňady&Orviská (2015).	EU countries (1999-2011)	panel data regressions	There is a maximum tax rate below which the positive impact of taxes on economic growth may be seen, however, once the threshold limit crossed the negative impact of taxes start.

13	Sinevicienea&Railieneb, (2015)	European Union (EU) countries, 2003 – 2012	Spearman's correlations	The taxation structure is an important driving force for private investment.
14	Clausing, (2016).	U.S. multinational corporations, 1983 – 2012	Regression Analysis	For the countries having without low tax rates, tax base erosion is a large problem.
15	Iriqat, &Anabtawi, (2016).	Palestine, 1999-2014	Ordinary Least Square	There is no Granger Causality flowing from tax revenue to GDP, Government spending, Consumption, Investment and Balance of trade
16	McNabb, (2016).	100 developing and developed countries. the past 30 years	Error correction model	A shift in tax structure from trade to domestic consumption taxes are having positive effects for economies classified as lower-middle-income.
17	Ojong, Anthony &Arikpo, (2016)	Nigeria, 1986 to 2010.	Regressions model	No significant relationship was found between Company Income Tax and GDP and growth of the Nigeria economy
18	Kalaš, Mirović, &Andrašić, (2017).	United States, 1996-2016	Regression model	There is no significant impact of personal income taxes and corporate income tax over growth of GDP.
19	Matallah&Matallah (2017)	Algeria 1970-2015	Johansen Cointegration test and Vector Error Correction Model (VECM)	While direct taxes have a significant negative effect, the indirect tax has a significant positive effect on real GDP in the long run.

20	Stoilova, D. (2017).	EU-28 member states, 1996–2013	regression model	Tax structure based on selective consumption taxes, taxes on personal income and property is more conducive to the economic growth
21	Tapş ı	OECD countries, 2008-2014	panel regression method	The tax burden is more positively affected by direct taxes and economic growth
22	Venkataraman, &Urmi, (2017).	India 1977-2015	ARDL Bounds test	Economic growth is more affected by Customs duty as compared to Excise duty
23	Ahmad, Sial& Ahmad, (2018).	Pakistan, 1974 – 2010	Auto Regressive Distributed Lag (ARDL) bounds testing approach	Indirect taxes bring negative effect in the long run as compared to short-run
24	BĂZGAN, (2018).	Romania, 2009-2017	Vector Autoregressive Model	Indirect taxes have a positive influence on economic growth as compared to direct taxes.
25	Kate, F. & Millionis, P (2019).	77 OECD Member countries (1965-2014)	Ordinary Least Square	Where growth is driven by domestic innovation activity, positive rates of capital taxation can increase the long-run growth rate.
26	Vatavu, Lobont, Stefea, &Olariu, (2019).	the Central and Eastern Europe (CEE) countries, 1995–2015	Granger non-causality tests, Cointegration techniques with error correction models	There is a significant influence of taxation on economic growth and citizen wellbeing.

Data and model specification

This study is based on secondary data collected from the website of Reserve Bank of India. This study has collected 45 year's data from 1973-74 to 2018-19. The data relates to Direct Taxes, Indirect Taxes (IDT) and Gross Domestic Product (GDP). Direct taxes have been segmented into Corporate Taxes (CT) and Personal Income Taxes (PIT) for understanding the individual effects. All the data have been converted into a natural log (LN) to maintain consistency. Data have been analyzed using E Views 7.1.

$$\ln \text{GDP} = \beta_0 + \beta_1 \ln \text{CT}_t + \beta_2 \ln \text{PIT}_t + \beta_3 \ln \text{IDT}_t + \varepsilon_t(2)$$

Here, $\beta_0, \beta_1, \beta_2$ and β_3 are defined parameters to be tested under the study, t shows the time trend and ε reflects error term. For testing unit root, the Augmented Dickey-Fuller (ADF) test is to be applied. The selection of an appropriate model will depend on unit root analysis. If the variables are stationary at level, Ordinary Least Square Method (OLS) may yield good results.

However, if variables are found to have stationary at first difference, the application of Ordinary

Least Square Method (OLS) may produce spurious regressions and the most appropriate model in such a case would be Johansen Cointegration which studies whether a combination of variables move together or not. If Cointegration is detected between variables, Vector Error Correction Model (VECM) followed by Wald Test shall be applied to establish the long run and short-run relation between the variables. The study seeks to test the hypothesis at 5% ($\alpha = 0.05$) level.

The study applies the model of Matallah and Matallah (2017). However, the study excludes the impact of expenditure on GDP because the paper confines itself to examine the only impact of taxes on the GDP of the Indian economy. Following functional relationship is developed.

$$\text{GDP} = f(\text{PIT}, \text{CT}, \text{IDT}) (1)$$

Where GDP refers to Gross Domestic Products, PIT refers to Personal Income Taxes and IDT refers to Indirect Taxes. Above functional relation after converting into a natural log (ln) may be written in equation form as follows:

Data Analysis

Descriptive Statistics

The descriptive statistics of the variables are listed in table-2. The results show larger deviations in values for the Personal Income Taxes (LN PIT) and Corporate Taxes (LN CT) as compared to Indirect Taxes (LN IDT). Further, the results of the JarqueBera test reflect that all the variables under study are normally distributed

Table-2: Descriptive Statistics

	LNGDP	LNCT	LNIDT	LN PIT
Mean	13.96587	9.712420	10.86743	8.756885
Median	14.09276	9.769734	11.06416	8.278088
Maximum	16.76048	12.97050	13.48912	12.71687
Minimum	11.13342	6.368187	8.023552	5.361292
Std. Dev.	1.720226	2.069154	1.552884	2.400541
Skewness	-0.030205	0.069775	-0.129742	0.229521
Kurtosis	1.764404	1.664383	1.951479	1.489098
Jarque-Bera	2.933167	3.456416	2.236228	4.779294
Probability	0.230712	0.177602	0.326896	0.091662
Sum	642.4298	446.7713	499.9016	402.8167
Sum Sq. Dev.	133.1630	192.6630	108.5152	259.3168
Observations	46	46	46	46

Source: Author's computation

Testing Unit Root

test by applying the following equation

Unit root is tested using Augmented Dickey-Fuller (ADF)

$$\Delta Y_t = \alpha_0 + b_1 t + \beta_{Y_{t-1}} + \sum_{i=1}^P \gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (3)$$

In above equation Δ represents first difference, Y denotes dependent variable, t reflects time trend and ε_t shows the error term. Further, P is the optimal lag length and α, β and γ denote the parameters under considerations to be tested. $b_1 t$ is included for the trend which may be eliminated in case variables do not reflect a time trend. However, as precautionary measure, unit root has been tested using both only intercept and intercept with trend. The results of ADF test (table-3) shows that all the variables are stationary at the first difference.

Table-3: Result of Unit Root Analysis using ADF

Lags: Testing down from 9 lags				
Criterion: Schwarz Information Criterion (BIC)				
Variables	P-Value at I(0)		P-Value at I(1)	
	With intercept	With intercept and trend	With intercept	With intercept and trend
Gross Domestic Product (LNGDP)	0.9539	0.3259	0.0006	0.0041
Corporate Taxes (LNCT)	0.9052	0.3696	0.0000	0.0001
Indirect Taxes (LNIDT)	0.7709	0.3235	0.0000	0.0000
Personal Income Taxes (LNPIT)	0.9576	0.4762	0.0000	0.0000

Source: Author's computation

Johansen Cointegration

When the variables are found to be stationary at first differences, the application of the Ordinary Least Square (OLS) method may yield spurious regressions. In such cases, the Johansen Cointegration test may be applied

which assumes that a combination of variables may move together. However, for applying Johansen Cointegration, all the variables should be integrated into the same order. Since in this study all the four variables have been found stationary at first differences, Johansen and Juselius (1990) method is applied to identify the number of cointegrating

vectors. As the first step, the VAR lag selection test is applied for selecting the appropriate lag length. The results of the VAR lag selection test (Table-4) show 1 lag as the

most appropriate so the Johansen Cointegration test is conducted at lag 1.

Table-4: Result of VAR lag section test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-52.29078	NA	0.000171	2.680513	2.846006	2.741173
1	186.2373	420.2638*	4.31e-09*	-7.916062*	-7.088600*	-7.612764*
2	202.1181	24.95554	4.43e-09	-7.910385	-6.420954	-7.364450
3	215.0272	17.82690	5.43e-09	-7.763201	-5.611801	-6.974628
4	233.9826	22.56597	5.28e-09	-7.903935	-5.090566	-6.872724
* indicates lag order selected by the criterion LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion						

Source: Author's computation

For the testing hypothesis, two popular tests under Johansen Cointegration are the "Trace test" and "Max-Eigenvalue test". The number of cointegrating vectors under Johansen Cointegration should be lesser than the number of variables under study. Thus, for proper long term relation, the number of cointegrating vectors should be $n-1$. Since, in the present study, the number of variables is four, the number of cointegrating vectors should at most be three. Thus, the following hypothesizes are set for deciding the number of cointegrating vectors among the variables:

Ho: There is no cointegrating vector among the variables

H1: There is at most one cointegrating vector among the variables

H2: There are at most two cointegrating vectors among the variables

H3: There are at most three cointegrating vectors among the variables

Results of both the Trace test and the Maximum Eigenvalue test have identified one cointegrating vector at 0.05 level (Table-5 and Table-6)

Table-5: Results of Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.569959	59.86292	47.85613	0.0025
At most 1	0.323816	22.73244	29.79707	0.2594
At most 2	0.114467	5.515657	15.49471	0.7519
At most 3	0.003783	0.166774	3.841466	0.6830
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's computation

Table-6: Results of Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.569959	37.13047	27.58434	0.0022
At most 1	0.323816	17.21679	21.13162	0.1620
At most 2	0.114467	5.348883	14.26460	0.6973
At most 3	0.003783	0.166774	3.841466	0.6830
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's computation

Vector Error Correction Model (VECM)

Vector Error Correction Model (VECM) may be applied to study the long run and short-run relationship among the variables and also the speed at which equilibrium is restored after a given shock in any of the variables. However, for the applicability of this model Johansen test must identify one or more cointegrating vectors.

Firstly the basic equation of VAR model is given as under:

$$Y_t = \alpha_t + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \dots + \beta_p Y_{t-p} + \varepsilon_t \quad (4)$$

After this, the VECM representation of VAR model may be given as under

$$\Delta Y_t = \alpha_t + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (5)$$

The equation (5) shows a Vector Error Correction Model (VECM) having order p-1 where Π commonly denoted as $\alpha\beta'$ represents long term relation between the variables.

Since, the results of Johansen Cointegration has identified one cointegrating vector, the study proceeds to apply VECM to evaluate relation between the variables.

The Results of the VECM are shown in table-6. As per results, following long run equation may be given

$$\ln GDP_t = -0.606039 \ln CT_t + 0.150670 \ln PIT_t - 0.537524 \ln IDT_t - 3.552687 + \varepsilon_{1t} \quad (6)$$

The above equation (7) shows positive long run relation of GDP with Corporate Taxes and Indirect Taxes and negative long run relationship with Personal Income Taxes. Thus, 1% increase in Corporate Taxes may increase GDP by 0.60% and 1% increase in Indirect Taxes may increase GDP by 0.53%. While 1% increase in Personal Income Taxes may decrease GDP by 0.15%.

Table-7: Results of Vector Error Correction Model (VECM)

Vector Error Correction Estimates	
Date: 10/13/19 Time: 08:36	
Sample (adjusted): 3 46	
Included observations: 44 after adjustments	
Standard errors in () & t-statistics in []	
CointegratingEq:	CointEq1
LNGDP(-1)	1.000000
LNCT(-1)	-0.606039 (0.08316) [-7.28805]
LNPIT(-1)	0.150670 (0.04307) [3.49839]

LNIDT(-1)	-0.537524 (0.06583) [-8.16514]			
C	-3.552687			
Error Correction:				
	D(LNGDP)	D(LNCT)	D(LNPIT)	D(LNIDT)
CointEq1	-0.097395 (0.03772) [-2.58210]	0.514175 (0.18235) [2.81976]	0.053540 (0.47829) [0.11194]	0.244523 (0.12504) [1.95555]
D(LNGDP(-1))	0.323337 (0.15117) [2.13884]	1.569191 (0.73083) [2.14715]	0.769730 (1.91693) [0.40154]	0.937412 (0.50115) [1.87052]
D(LNCT(-1))	-0.012390 (0.03337) [-0.37130]	0.216613 (0.16132) [1.34277]	0.212830 (0.42313) [0.50299]	0.056300 (0.11062) [0.50895]
D(LNPIT(-1))	-0.006621 (0.01304) [-0.50773]	-0.116302 (0.06304) [-1.84477]	-0.252520 (0.16536) [-1.52707]	-0.080184 (0.04323) [-1.85477]
D(LNIDT(-1))	-0.134785 (0.04759) [-2.83227]	-0.161597 (0.23006) [-0.70240]	0.083418 (0.60344) [0.13824]	0.009104 (0.15776) [0.05771]
C	0.102772 (0.01812) [5.67172]	-0.044369 (0.08760) [-0.50651]	0.058255 (0.22977) [0.25354]	0.004359 (0.06007) [0.07256]
R-squared				
	0.400915	0.233801	0.070169	0.160171
Adj. R-squared				
	0.322088	0.132986	-0.052177	0.049667
Sum sq. resids				
	0.021366	0.499331	3.435352	0.234798
S.E. equation				
	0.023712	0.114631	0.300673	0.078606
F-statistic				
	5.086009	2.319099	0.573529	1.449464
Log likelihood				
	105.4303	36.09757	-6.331748	52.69752
Akaike AIC				
	-4.519561	-1.368072	0.560534	-2.122615
Schwarz SC				
	-4.276262	-1.124773	0.803833	-1.879316
Mean dependent				
	0.124116	0.145606	0.155119	0.118321
S.D. dependent				
	0.028799	0.123109	0.293123	0.080634
Determinant resid covariance (dof adj.)			2.30E-09	
Determinant resid covariance			1.28E-09	
Log likelihood			200.8016	
Akaike information criterion			-7.854617	
Schwarz criterion			-6.719224	

Source: Author's computation

Short run equation may be reproduced as below

$$\Delta \text{LNGDP}_t = -0.097 \text{ECT}_{t-1} + 0.323 \Delta \text{LNGDP}_{t-1} - 0.012 \Delta \text{LNCT}_{t-1} - 0.006 \Delta \text{LNPIT}_{t-1} - 0.134 \Delta \text{LNIDT}_{t-1} + 0.102 \quad (9)$$

The speed at which equilibrium restored due to a shock in one variable is measured by the Error Correction Coefficient. However, the Error Correction Coefficient needs to be negative as well as significant. Table-8 shows that the value of the error correction coefficient is -0.097395 with a probability of 0.0138. Thus, the error correction coefficient is negative and significant in the present study. Further, the coefficient of Indirect Taxes also negative and significant and hence it can be emphasized that in the short run also Indirect Taxes have a positive influence on the GDP. Further, since coefficients of Personal Income Taxes and Corporate Taxes are negative but not significant, Wald Test is estimated to evaluate short-run relation between Personal Income Taxes and Corporate Taxes to GDP.

Table-8: Probabilities of coefficients of VECM

Dependent Variable: D(LNGDP)				
Method: Least Squares				
Date: 10/13/19 Time: 09:34				
Sample (adjusted): 3 46				
Included observations: 44 after adjustments				
D(LNGDP) = C(1)*(LNGDP(-1) - 0.606039159171*LNCT(-1) + 0.150670152967*LNPIT(-1) - 0.537523745633*LNIDT(-1) - 3.55268722392) + C(2)*D(LNGDP(-1)) + C(3)*D(LNCT(-1)) + C(4) *D(LNPIT(-1)) + C(5)*D(LNIDT(-1)) + C(6)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.097395	0.037719	-2.582103	0.0138
C(2)	0.323337	0.151174	2.138841	0.0389
C(3)	-0.012390	0.033369	-0.371298	0.7125
C(4)	-0.006621	0.013041	-0.507729	0.6146
C(5)	-0.134785	0.047589	-2.832267	0.0074
C(6)	0.102772	0.018120	5.671721	0.0000
R-squared	0.400915	Mean dependent var 0.124116		
Adjusted R-squared	0.322088	S.D. dependent var 0.028799		
S.E. of regression	0.023712	Akaike info criterion -4.519561		
Sum squared resid	0.021366	Schwarz criterion -4.276262		
Log likelihood	105.4303	Hannan-Quinn criter. -4.429334		
F-statistic	5.086009	Durbin-Watson stat 1.782546		
Prob (F-statistic)	0.001149			

Source: Author's computation

For estimating Wald test following hypothesis are set

$$H_0: C(3)=C(4)=0$$

$$H_1: C(3)=C(4) \neq 0$$

Wald test results accepts the null hypothesis that there is no short run causality flowing from Corporate Taxes and Personal Income Taxes to GDP (Table-9)

Table-9: Wald Test

Test Statistic	Value	df	Probability
F-statistic	0.242539	(2, 38)	0.7858
Chi-square	0.485077	2	0.7846
Null Hypothesis: C(3)=C(4)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(3)	-0.006621	0.013041	
C(4)	-0.012390	0.033369	
Restrictions are linear in coefficients.			

Source: Author's computation

Variance Decomposition and Impulse Response

The results of the estimated variance decomposition have been shown in table-10. Variance Decomposition identifies the effect on one variable due to a shock in other variables. It is evident that in the first year due to its own shock, 100% fluctuations have been caused in GDP. In the second year, a shock in GDP will cause 93% fluctuations in GDP while a shock in Corporate Taxes will cause 1.32% fluctuations in GDP, a shock in Personal Income taxes will result in 3.49% fluctuations in GDP and a shock in Indirect taxes will cause 2.13% variability in GDP. In the fifth year, a shock in GDP will cause 80% fluctuations in GDP while a shock in Corporate Taxes will cause 8.86% fluctuations in GDP, a

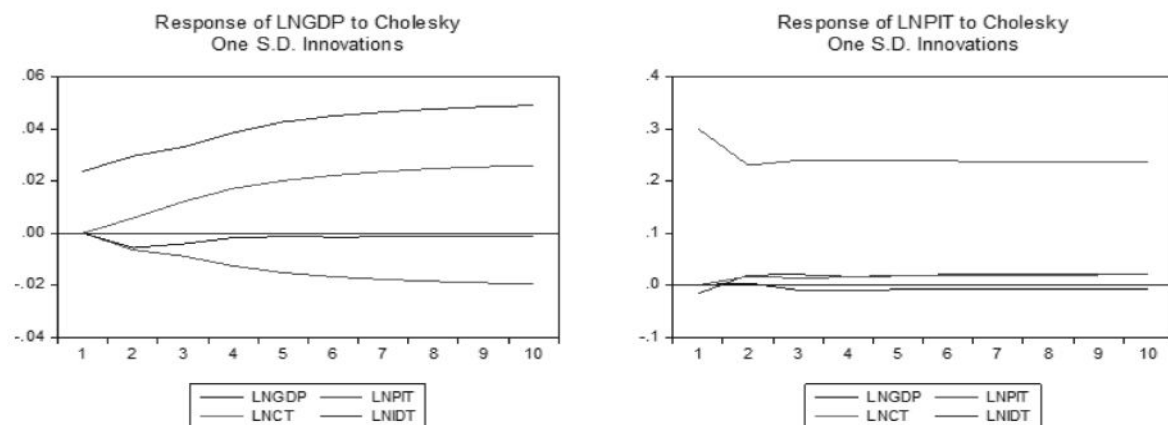
shock in Personal Income taxes will result in 10.24% fluctuations in GDP and a shock in Indirect taxes will cause 0.76% variability in GDP. In the tenth year, a shock in GDP will cause 73% fluctuations in GDP while a shock in Corporate Taxes will cause 12% fluctuations in GDP, a shock in Personal Income taxes will result in 13% fluctuations in GDP and a shock in Indirect taxes will cause 0.27% variability in GDP. In the short run and long run both GDP in India is more affected due to a change in Personal Income Taxes where unfortunately the study has identified higher tax evasions. The same results are also reflected by Impulse Response of the variables as shown in figure-3.

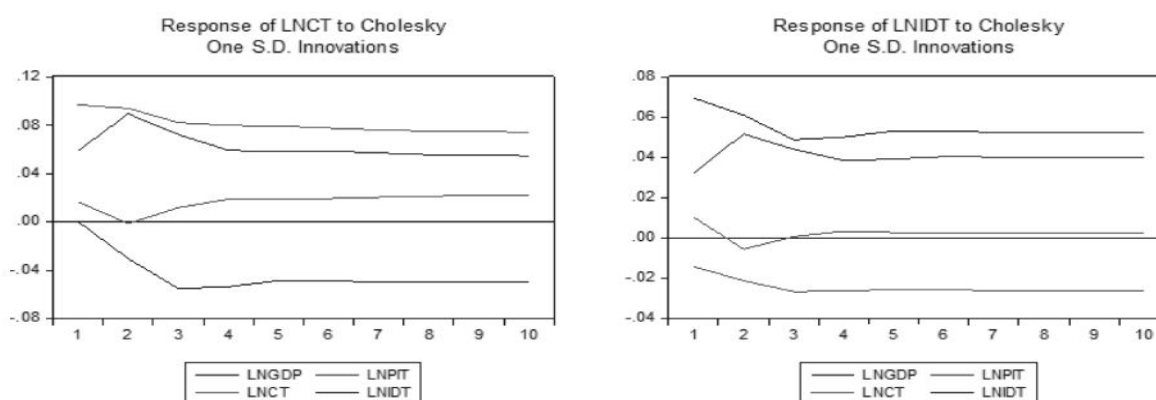
Table-10: Variance Decomposition

Variance Decomposition of LNGDP:					
Period	S.E.	LNGDP	LNCT	LNPIT	LNIDT
1	0.023712	100.0000	0.000000	0.000000	0.000000
2	0.039249	93.05101	1.324825	3.493422	2.130748
3	0.053573	87.86793	4.466828	5.911391	1.753849
4	0.069279	83.29133	7.178602	8.414558	1.115513

5	0.085179	80.12465	8.862130	10.24774	0.765479
6	0.100242	77.95092	9.989304	11.48169	0.578085
7	0.114363	76.36132	10.82617	12.35160	0.460910
8	0.127667	75.16214	11.45801	13.00010	0.379755
9	0.140218	74.24408	11.93756	13.49665	0.321712
10	0.152057	73.52763	12.31004	13.88330	0.279025
Variance Decomposition of LNCT:					
Period	S.E.	LNGDP	LNCT	LNPIT	LNIDT
1	0.114631	26.59935	73.40065	0.000000	0.000000
2	0.175677	37.22351	58.83994	0.934151	3.002392
3	0.214514	36.32709	54.42123	0.636167	8.615519
4	0.243136	34.17571	53.69798	0.542721	11.58358
5	0.267417	32.95596	53.66769	0.496495	12.87986
6	0.289320	32.24218	53.45725	0.468816	13.83176
7	0.309293	31.61799	53.19823	0.467449	14.71633
8	0.327695	31.04672	53.00826	0.482785	15.46224
9	0.344900	30.56318	52.86837	0.503014	16.06543
10	0.361167	30.15744	52.74741	0.524074	16.57108
Variance Decomposition of LNPIT:					
Period	S.E.	LNGDP	LNCT	LNPIT	LNIDT

Figure 3: Impulse Response





Source: Author's computation

Granger Causality

Granger Causality tests the directional relationship between the variables. The test emphasizes which variable causes the other variable. The directional relationship between the variables either may be one-sided or both

sided. The results of Granger Causality are reflected in table-11. The results show that GDP and Personal Income Taxes Granger cause each other. Corporate Taxes Granger causes Personal Income Taxes however, the reverse is not true.

Table-11: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
LNPIT does not Granger Cause LNGDP	45	4.12882	0.0485
LNGDP does not Granger Cause LNPIT		5.77121	0.0208
LNCT does not Granger Cause LNGDP	45	0.40677	0.5271
LNGDP does not Granger Cause LNCT		2.38837	0.1297
LNIDT does not Granger Cause LNGDP	45	1.15073	0.2895
LNGDP does not Granger Cause LNIDT		3.92745	0.0541
LNCT does not Granger Cause LNPIT	45	5.31901	0.0261
LNPIT does not Granger Cause LNCT		0.31198	0.5794
LNIDT does not Granger Cause LNPIT	45	2.87974	0.0971
LNPIT does not Granger Cause LNIDT		0.14262	0.7076
LNIDT does not Granger Cause LNCT	45	0.93729	0.3385
LNCT does not Granger Cause LNIDT		1.07678	0.3054

Source: Author's computation

Findings of the study

The study has identified a significant long-run positive relation between Indirect Taxes and Corporate Taxes to GDP in India while Personal Income Tax has a negative impact on GDP in the long run. In the short run, only Indirect Taxes has a positive impact on the GDP. Out of the three independent variables selected in the study, Personal Income Tax has a more negative impact on GDP as compared to Corporate Taxes and Indirect Taxes and this impact is bidirectional too.

The findings of this paper are in line with the findings of Venkataraman and Urmi (2017) who showed Personal Income Taxes as having no impact, Corporate Taxes and customs duty as having a significant positive impact on the economic growth of India. Matallah & Matallah (2017) also asserted the negative impact of Direct Taxes and the positive impact of Indirect Taxes in the long run in Algeria. The same findings were also arrived at by Vazquez et al (2009), Dackehag & Hansson (2012) and Geetanjali & Venugopal (2017) regarding the negative impact of Direct Taxes on economic growth in the long run. Unnecessary complicacy into direct tax systems, higher marginal rates of personal taxes and weak enforcement were some of the issues that were resulting in a large number of taxpayers to either escape the tax laws or paying lesser taxes Chelliah, R. (2006). However contrary to Johansson et al (2008), the impact of Corporate Taxes has been found positive in the long run in India

Conclusion

To analyze the impact of tax structures in India on its economic growth, the study has examined the impacts of Personal Income Taxes, Corporate Taxes and Indirect Taxes in India from 1973-74 to 2018-19. The results highlight that Corporate Taxes and Indirect Taxes have positive impact while Personal Income Tax negative impact on economic growth of India in the long run. The results are in line with other studies conducted in different countries across the globe. The important structural changes in taxes domain include Goods and Services Tax which has been implemented since first July, 2017 and Direct Taxes code which is yet to be implemented. The real effects of these structural changes may be evaluated after some years when adequate data will be available for research. As conclusion, it is suggested to reduce slowly Personal Income Taxes by chronologically increasing Corporate Taxes and Indirect Taxes for overall economic growth of India

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