

## AN ANALYTICAL STUDY OF DIRECT & INDIRECT TAX AND GDP OF INDIA

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### ABSTRACT

*This paper makes an attempt to assess the trends of direct and indirect tax collection and their impact on the GDP of India for a period of 10 years (i.e., from 2012-13 to 2021-22). An attempt has been made to observe the trend values of direct and indirect tax collection in India and to study the correlation between total revenue (direct and indirect tax) and GDP. The study is based on secondary data collected from published data by the RBI, NSO, and magazines. The available data have been analysed by using some important managerial and statistical tools, viz., tax-to-GDP ratio regression, correlation, and ANOVA, in order to test the significance of the results obtained. On the basis of an overall analysis, it is therefore important to state that there is a significant relationship between direct and indirect taxes and the country's GDP. It is also clear that a major portion of the tax revenue comes from indirect taxes.*

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**Keywords:** Direct Tax, Indirect Tax, GDP, Regression Analysis, Correlation, ANOVA.

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### Introduction

GDP and tax revenue are strongly related. But before we begin, we ought to be aware of what GDP (gross domestic product) is. Gross Domestic Product (GDP) is an indicator of a country's financial health. GDP measures additionally exhibit how large the economy is. GDP is calculated by including complete consumption, investment, government spending, and net exports. When we see the GDP formula, a large element of a country's GDP comes from government spending. Generally, government spending is carried out to make the financial system more productive. In order to meet the goal of government spending, the government has to first accumulate ample revenues. The major element of the government's income collection is tax revenue. Tax revenue is the earnings that are collected by governments through taxation. Total tax revenue as a share of GDP indicates the share of the country's output gathered by the government via taxes. The taxes collected from each direct tax and indirect tax are the government's tax revenue. Direct tax is the tax that is paid immediately to the government by the individual or organisation on whom it is levied. Some examples of direct tax are income tax, wealth tax, corporation tax, and property tax. Indirect taxes are those that are collected with the aid of intermediaries from individuals and firms that endure the burden of the tax and pass it on to the government. The example of indirect tax is Goods and Services Tax (GST) . The present study covers the relation between tax revenue and GDP. Tax revenue is the aggregation of direct and indirect taxes. The paper tries to study the assumption that there is a significant relationship between tax revenue and GDP. The tax-to-GDP ratio, regression, correlation, and ANOVA are conducted to evaluate the contention of the researcher.

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### Objectives of the Study

- To determine how well the economic resources are directed by the government.
- To study the direction of direct tax, indirect tax, and GDP.
- To study and analyse the relationship between tax revenue and GDP.
- Ascertaining growth in tax revenue has an impact on the GDP.

### Review of literature

- Deepak Kumar Behera and Umakant Dash, in their paper "Impact of GDP and tax revenue on health care financing: An empirical investigation from Indian states," concluded that "improved alternative tax revenue in Indian states has policy implications for universal health coverage."
- HieuHuu Nguyen concluded in his paper, "Impact of direct tax and indirect tax on economic growth in Vietnam," that "tax has a positive impact on Vietnam's economic growth." Reveals that "the effects of direct tax and indirect tax are different."
- Ms Apurva Shukla, Mr Ravindra Tripathi, and Mr Mano Ashish Tripathi, in their paper "Nexus between Taxation and Macro-Economic Variables: A Study with Reference to Direct Tax in the Indian Economy," concluded that "the fiscal deficit has an inverse relationship and the personal tax has a strong positive correlation with GDP."
- MUDASIR AHMAD GANAI and P. Nalawraj, in their paper "Tax System in India and its Impact on the Indian Economy and the Indian Union Budget," concluded that "the tax system in India is very important to improve the economy of the country and increase the public revenue in the Indian Union Budget."
- Dr.Paritosh Dube, in his paper "A Study of Trends of Gross Domestic Product of Selected Countries From 2012 to 2021," concluded that "out of the 6 countries selected, the performance of China followed by India is commendable."
- Okafor, Regina, in their paper, "Tax Revenue Generation and Nigerian Economic Development," concluded that "The positive and significant relation between the GDP and the tax explanatory variables indicates that policy measures to expand tax revenue through more effective tax administration will impact positively on growing the economy."
- Aditya Harit and his colleagues, in their paper "The Impact of Tax Revenue, Money Supply, and Exchange Rate on GDP in the Indian Economy: An Empirical Study," collectively studied the impact of exchange rate, broad money (as a percentage of GDP), and tax revenue (as a percentage of GDP) on GDP by using a simple multiple regression model and found that all three independent variables have a positive relation with GDP and are significant in the Indian Economy.

This paper differs in the sense that it studied the impact of tax revenue on GDP by using the tax-to-GDP ratio, a simple regression model, correlation, and tested hypotheses on the basis of ANOVA and found that tax revenues have a positive relationship with GDP and are significant in the Indian economy.

### Methodology

Direct and indirect taxes are very important sources of income for the economy, and for measuring the direction of direct and indirect taxes combined, actual revenue is calculated. Actual revenue and GDP are analysed by the least squares method of regression analysis, and then a trend is calculated. The tax-to-GDP ratio is used to determine how well economic resources are directed by the government. To study and analyse the relation between tax revenue and GDP, various statistical measures like mean, standard deviation, coefficient of variation, correlation, and probable error are calculated. The analysis of variance is an important statistical tool for testing the significance of linearity in regression and correlation. So in the present study to ascertain whether growth in tax revenue has an impact on the GDP, the following hypotheses are tested:

- H<sub>0</sub>:** There is no significant linear relationship between the independent variable, which is tax revenue, and the dependent variable, GDP
- H<sub>1</sub>:** There is a significant linear relationship between the independent variable, which is tax revenue, and the dependent variable, GDP.

**Data Analysis****Table 1**

Year	Indirect Tax	Direct Tax	Tax Revenue	GDP	Actual Revenue to GDP Ratio
2012-13	4.73	5.59	10.32	99.44	10.38%
2013-14	4.95	6.39	11.34	112.34	10.09%
2014-15	5.43	6.69	12.12	124.68	9.72%
2015-16	7.12	7.42	14.54	137.72	10.56%
2016-17	8.62	8.50	17.12	153.92	11.12%
2017-18	9.15	10.02	19.17	170.9	11.22%
2018-19	9.39	11.38	20.77	189.00	10.99%
2019-20	9.54	10.50	20.04	200.75	9.98%
2020-21	10.77	9.45	20.22	198.00	10.21%
2021-22	12.94	14.1	27.04	232.15	11.65%

Table 1 presents the idea of descriptive statistics of tax revenue and GDP derived from actual data. The GDP ranges from 99.44 to 232.15 lakh crore rupees, but the tax revenue ranges from 10.32 to 27.04 lakh crore rupees, and the GDP to tax ratio ranges from 9.72% to 11.65% during the study period.

**Statistical Measures of tax revenue to GDP ratio****Table 2**

	Tax Revenue	GDP	Tax to GDP Ratio
<b>Mean</b>	17.27	161.89	10.59
<b>Standard deviation</b>	5.22	43.40	0.63
<b>Coefficient of variation</b>	30.22%	26.81%	5.91%
<b>Correlation coefficient (r)</b>		0.9807	
<b>Coefficient of determination (r<sup>2</sup>)</b>		0.9608	
<b>Probable Error ( P.E.)</b>		.0083	
<b>6xP.E.</b>		0.05	

Note: Author's estimation results using Microsoft Office Excel 2010

The above table shows the mean, standard deviation, coefficient of variation, correlation, and probable error of tax revenue and GDP. The standard deviation of tax revenue is smaller than GDP, so the mean tax revenue is more representative than GDP. The value of the correlation coefficient (r) is 0.9807, which means there is a strong positive correlation between tax revenue and GDP. Since r = 0.9807 is greater than 6P.E. So the correlation is highly significant.

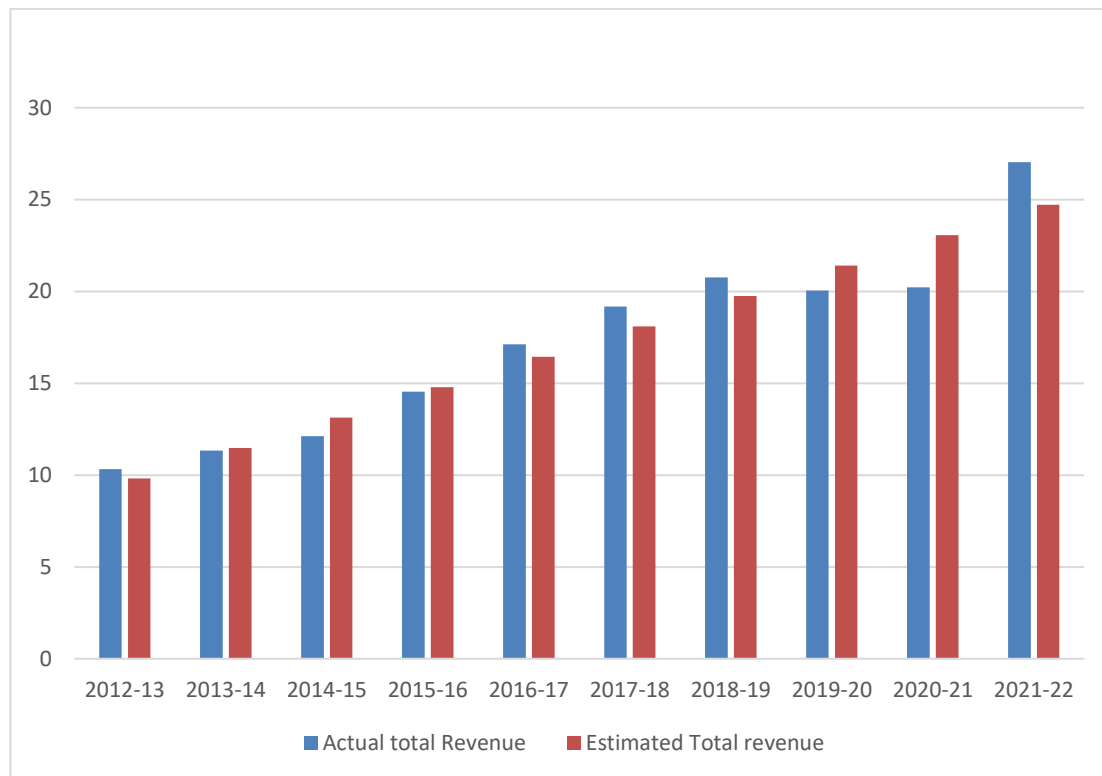
**Analysis of Trend of Actual Revenue**

Trend analysis is a technique that is used to examine and predict movements in actual revenue based on current and historical data. This makes us unable to compare data and identify trends in financial performance.

**Table 3**

Year	Actual Revenue(Y)	Estimated Revenue(Y <sub>c</sub> )	Y-Y <sub>c</sub>
2012-13	10.32	9.82	0.5
2013-14	11.34	11.48	-0.14
2014-15	12.12	13.13	-1.01
2015-16	14.54	14.79	-0.25
2016-17	17.12	16.44	0.68
2017-18	19.17	18.09	1.08
2018-19	20.77	19.75	1.02
2019-20	20.04	21.40	-1.36
2020-21	20.22	23.06	-2.84
2021-22	27.04	24.71	2.33

Note: y<sub>c</sub> indicates the estimated value of actual revenue by using the least squares method to fit the trend line equation in the form of Y<sub>c</sub> = bX + a, where the equation so fitted is y<sub>c</sub> = 1.65X + 8.17 (taking 2012-2013 as the origin and 1 unit of X = 1 year).



The above table shows the tax revenue, estimated revenue calculated on the basis of the regression equation, and the difference between estimated and actual tax revenue. The above table depicts that actual revenue registered a rising trend with a positive balance throughout the study period except for the year 2019–20, in which there is a negative growth. From the regression equation, it is seen that the tax revenue is increased by 1.65 lakh crore rupees per year. Therefore, the estimated value of tax revenue is positive with an upward trend during the whole of the study period. The difference between actual and estimated revenue was negative from 2013–14 to 2015–16 and 2019–20 to 2020–21, while it was positive in the remaining years.

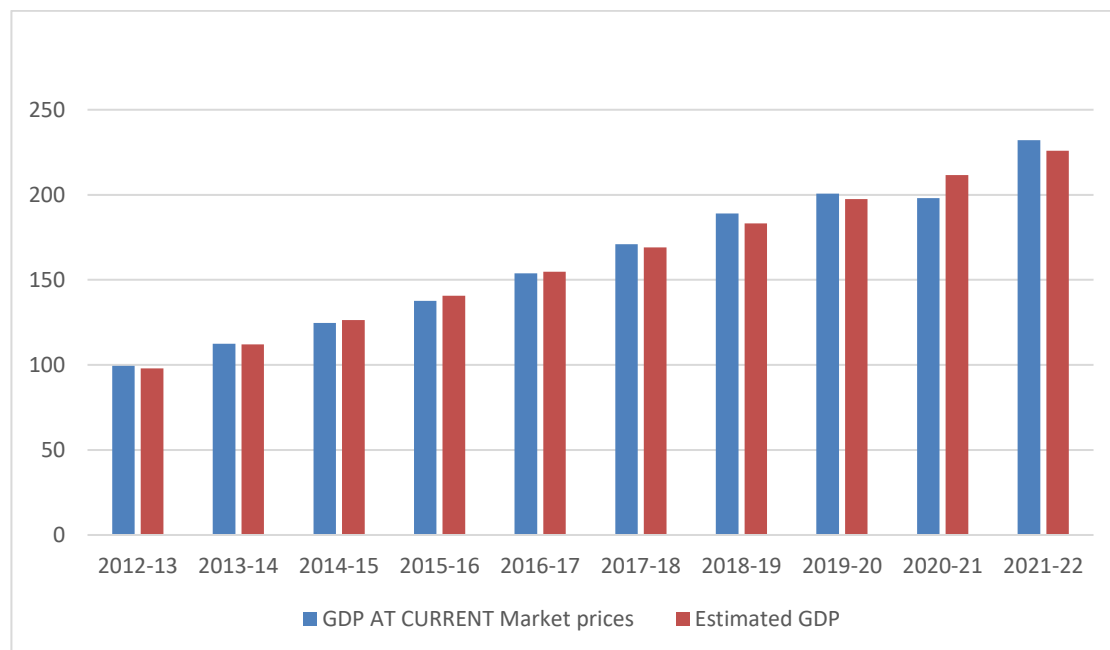
#### Analysis of Trend of GDP

Trend analysis is a technique that is used to examine and predict movements in the GDP based on current and historical data. This makes us unable to compare data and identify trends in financial performance.

**Table 4**

Year	GDP at Current Market Price	Estimated GDP	Y-Yc
2012-13	99.44	97.93	1.51
2013-14	112.34	112.14	0.2
2014-15	124.68	126.36	-1.68
2015-16	137.72	140.57	-2.85
2016-17	153.92	154.78	-.86
2017-18	170.9	169	1.9
2018-19	189.00	183.21	5.79
2019-20	200.75	197.42	3.33
2020-21	198.00	211.64	-13.64
2021-22	232.15	225.85	6.3

Note: yc indicates the estimated value of actual revenue by using least square method to fit trend line equation in form of  $Y_c = bX + a$ , where the equation so fitted is  $yc = 14.21X + 83.72$  (taking 2012-13 as the origin and 1 unit of X = 1 year)



The above table shows the GDP at current prices, estimated GDP calculated on the basis of the regression equation, and the difference between estimated and actual GDP. The above table depicts that actual GDP registered a rising trend with a positive balance throughout the study period except in the years 2020–21. From the regression equation, it is seen that the tax revenue is increased by 14.21 lakh crore rupees in each year. Therefore, the estimated value of GDP is positive with an upward trend during the whole of the study period. The difference between actual and estimated GDP was negative from 2014–15 to 2016–17 and 2020–21, while it was positive in the remaining years.

### Hypothesis Testing

For proving the linear relationship between tax revenue and GDP, the following hypothesis is formulated: Hypothesis: There is assumed to be a linear relationship between tax revenue and GDP.

The H<sub>0</sub> and H<sub>1</sub>, i.e., the null and alternative hypotheses, are as follows:

- H<sub>0</sub>:** There is no significant linear relationship between the independent variable, which is tax revenue, and the dependent variable, GDP.
- H<sub>1</sub>:** There is a significant linear relationship between the independent variable, which is tax revenue, and the dependent variable, GDP.

The ANOVA table depicts how well the regression equation fits the data. In other words, the table reveals that the regression model predicts the dependent variable significantly well. The p-value is less than 0.000 and is thus less than 0.05, which indicates that, overall, the regression model statistically significantly predicts the outcome variable and is a good fit for the data.

**ANOVA Table 5**

Model	Sum of squares	df	F Ratio
Regression	104577.64	1	109.45
Residual	17199.28	18	
Total	121776.92	19	

It can be observed that the P value is 0.000, which indicates that the H<sub>0</sub> is rejected and the H<sub>1</sub> is accepted.

- H<sub>1</sub>:** There is a significant linear relationship between the independent variable, which is tax revenue, and the dependent variable, GDP.

Thus, the hypothesis that there is a linear relationship between tax revenue and GDP stands proved. This also suggests that as tax revenue rises or increases, the GDP also rises or increases.

## Findings

The tax-to-GDP ratio shows a fluctuating trend, which means tax revenues are increasing as well as decreasing, but during the whole of the study, they were low. This can be because the unorganised sector makes it vulnerable, causing greater tax evasion. Another factor that contributes to the low tax to GDP ratio is low per capita income, high poverty, or the agriculture sector's dominance. To know the significant impact of tax revenue on GDP, further statistical analysis has been done. The standard deviation of tax revenue is smaller than GDP, so the mean tax revenue is more representative than GDP. Correlation analysis shows that there is a correlation between the GDP and tax revenue; the value of the correlation coefficient ( $r$ ) is 0.9807, showing that the degree of correlation is high. The  $r^2$  is high, as it is 96%; the higher the  $r^2$  value, the more of the total variation in the dependent variable, which is GDP, can be explained by the independent variable, tax revenue. The ANOVA table proves the hypothesis that there is a linear relationship between GDP and tax revenue.

## Conclusion

It can be concluded from the above discussion that the impact of tax revenue on GDP can be measured using the tax-to-GDP ratio, a simple regression model, correlation, and tested hypotheses on the basis of ANOVA, which found that tax revenues have a positive relationship with GDP and are significant in the Indian economy. Direct and indirect taxes are very important for the economic development and growth of the country. The tax system is one of the main sources of income for the country. Higher tax revenues mean a country is able to spend further on improving infrastructure, health, and education—keys to the long-term prospects for a country's economy and people. It is necessary that in order to increase the tax-to-GDP ratio, India's informal zone is added to the formal fold, and there must be progressive earnings taxes, complemented by indirect taxation, property taxes, capital taxes, etc. Thus, the focal point needs to be on widening the tax base as an alternative to really deepening it, and the government should try to improve the tax collection instruments and decrease tax evasion. Taxes should also be levied on products that are used by high-income groups.

## Limitations

- Sample size is a limiting factor, which is 10 years from 2012–13 to 2020–21.
- The analysis is based on secondary data.
- Other factors can also affect the GDP.

## References

1. NGUYEN, H. H. (2019). Impact of direct tax and indirect tax on economic growth in Vietnam. *The Journal of Asian Finance, Economics and Business*, 6(4), 129-137.
2. Shukla, M. A., Tripathi, R., & Tripathi, M. M. A. (2022). Nexus between Taxation and Macro-Economic Variables: Study with reference to Direct Tax in Indian Economy. *Journal of Positive School Psychology*, 1612-1623.
3. GANAI, M. A., & NALRAJ, P. Tax System in India and its impact on Indian Economy and Indian Union Budget.
4. Okafor, R. G. (2012). Tax revenue generation and Nigerian economic development. *European journal of business and management*, 4(19), 49-56.
5. Behera, D. K., & Dash, U. (2017). Impact of GDP and tax revenue on health care financing: An empirical investigation from Indian states. *Theoretical & Applied Economics*, 2(611), 249-266.
6. Harit, A. THE IMPACT OF TAX REVENUE, MONEY SUPPLY AND EXCHANGE RATE ON GDP IN INDIAN ECONOMY: AN EMPIRICAL STUDY.
7. Shukla, M. A., Tripathi, R., & Tripathi, M. M. A. (2022). Nexus between Taxation and Macro-Economic Variables: Study with reference to Direct Tax in Indian Economy. *Journal of Positive School Psychology*, 1612-1623.
8. GANAI, M. A., & NALRAJ, P. Tax System in India and its impact on Indian Economy and Indian Union Budget.
9. Mukherjee, S. (2022). *Trends and Patterns of Tax Expenditures on Union Taxes in India* (No. 22/380).
10. Mpofu, F. Y. (2022). Taxation of the Digital Economy and Direct Digital Service Taxes: Opportunities, Challenges, and Implications for African Countries. *Economies*, 10(9), 219.

