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Personal Income Tax and Indian Economy - A Correlation and Regression Analysis with GDP

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This research article studies the influence of revenue generated from personal income taxes on economic growth in India. Starting with a brief discussion of personal income tax as a source of revenue in India, this study has used correlation and regression analysis to determine the impact of personal income tax revenues on GDP. It is found that there is a strong positive correlation between personal income tax revenue. The PIT as a percentage of GDP is higher than low-income economies reported by IMF. This percentage is expected to reach 4.8 by 2030, as predicted by regression analysis. Further, they are positively correlated implying an increase in PIT leads to an increase in GDP.

Keywords: *personal income tax, economy, gdp, regression, correlation, covid-19.*

INTRODUCTION

Personal Income Tax (PIT) is a progressive direct tax levied on an individual or household income. It is a recognized fiscal tool to address equity concerns through income redistribution.[1] Several IMF reports establish that PIT is one of the key sources of revenue in advanced

[1] *Elel Hotels & Investments Ltd. v Union of India* AIR 1990 SC 1664

economies. However, it plays a limited role in emerging market economies like India where the economy is characterized by a larger share of the agricultural sector, self-employment, and a smaller share of labor income. PIT contribute little to overall tax revenue as the number of individuals subject to this tax is small. The majority earn incomes that fall below the base rate. Moreover, the number of deduction possibilities is more, especially in higher slabs. However, during the years 2000 to 2019, the average PIT revenue of emerging market economies increased from 2.1 % to 3.1% of GDP. PIT can be a catalyst in the economic growth of low-income developing countries as it has the potential to significantly contribute to the GDP and average revenue. Therefore, India, with its huge population has the potential and must aim to generate more revenue through personal income taxes. This study focuses on the relationship between PIT and the GDP of India for the years 2009-2022.

SCOPE AND IMPORTANCE

The total PIT revenue as a percentage of GDP indicates the share of the country's output collected by the government through personal income taxes. During the Budget Speech in 2015, Finance Minister Arun Jaitley highlighted that only 2% of India's GDP comes from PIT which is abysmally low for the second most populated country in the world. Further, the PIT payments did not match the consumption profile. Thus, it is a challenge to harness this potential source of revenue unless more people come forward and file true details of their income. In 2022, the Co-Head of Equity Strategy, Asia Pacific and India, Neelkanth Mishra stated that the removal of some exemptions on PIT can have a positive impact on the revenue generated and consequently on the economy. However, the need for this study is heightened by the budget for FY 2022-23 which announced no important changes in the personal income tax policies. Thus, in order to determine the reason for no action toward PIT in the budget, we need to see the trend of PIT contribution to GDP over the last decade. We also need to incorporate the disruptions that may have occurred in this trend due to COVID-19-induced economic shocks.

RELATION BETWEEN PERSONAL INCOME TAX AND TOTAL REVENUE

Panda, P. & Das, K.K., (2020) conducts research on the impact of direct tax policy reforms, administrative reforms, and economic policy reforms on the direct tax revenue and total revenue

using Anova and regression analysis. It concluded that economic policy reforms in 1991 had a significant impact on total tax revenue. **Bholane, K.P., (2020)** in his research paper measures the contribution of direct and indirect taxes in the total tax revenue collected for the period 2013-14 to 2017-18 and further examines the total tax to GDP Ratio. It was concluded that tax collection in India is dependent on indirect taxes. Corporate tax is the major contributor to direct tax revenue. The contribution of indirect tax to GDP is more than that of direct taxes. **Devasia & N. K. (2020)** analyzes the trend, pattern, and composition of revenue of the central government and examines the impact of public revenue on macroeconomic indicators like GDP and GNI for the period 1990-91 to 2016-17. They concluded that public revenue and macroeconomic indicators are significantly interlinked and correlated. Further, the gross tax buoyancy coefficient remained fluctuating. **Geetanjali, J.V.R., & Venugopal, P.R., (2017)** studies the impact of direct taxes on the growth of GDP. The study revealed that there is a significant impact of the Net Collection of Direct Taxes on GDP. India raises about 50% of its GDP in the form of Direct Taxes. **Dahal, A. K., (2020)** undertakes to explore the relationship of tax revenue with Nepal's GDP. The study revealed a high degree of a positive relationship between tax revenue and the GDP of Nepal. The tax to GDP ratio of Nepal lies in the high rank among various developing countries.

From the above literature review, it is evident that the authors have conducted research to study the contribution of the direct and indirect tax on GDP, and the impact of public revenue on GDP, and GNI. However, little attention has been diverted to measuring the influence exerted exclusively by 'personal income tax' on GDP. This study undertakes to trace out the gap along with taking into consideration the pandemic-induced economic shock waves that resulted in the loss of income of individuals on a large scale.

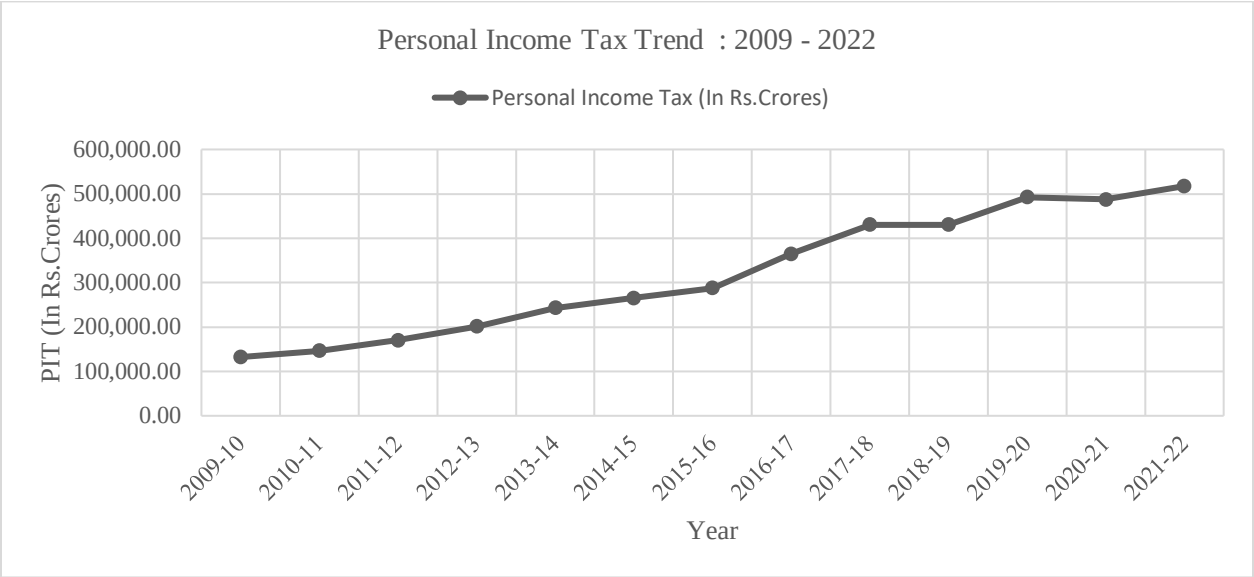
This article is largely based on secondary sources of data such as legislation (Income Tax Act 1961), case laws, publications, the official website of CBDT (Central Board of Direct Taxes), Union Budgets, IMF, and RBI Reports. The impact is found by using Correlation and Regression analysis of time series data. Excel Software has been used to analyze the data.

ANALYSIS

Table 1: Personal Income Tax

Year	Tax on Income (In Rs. Crores)	GDP
2009-10	132314.77	7,651,078.00
2010-11	146586.54	8,301,235.00
2011-12	170342.63	8,736,329.00
2012-13	201486.45	9,213,017.00
2013-14	242856.96	9,801,370.00
2014-15	265732.91	10,527,674.00
2015-16	287637.12	11,369,493.00
2016-17	364604.38	12,308,193.00
2017-18	430772.03	13,144,582.00
2018-19	430772.03	14,003,316.00
2019-20	492653.71	14,569,268.00
2020-21	487143.71	13,512,740.00
2021-22	517,460.09*	13,821,274.76*
Source: https://www.indiabudget.gov.in/		Source: RBI
*Predicted using regression analysis		

Figure 1: Trend in Personal Income Tax Collection



Source: Based on Table 1

The existence of a Correlation between two variables is determined using the Durbin-Watson test which is applicable for small samples and is valid only for First-Oder Regressive Models. Therefore, prior to testing for autocorrelation, we need to find out whether R (1) is appropriate by running OLS (Ordinary Least Square Method).

Step 1: Running OLS and determining autoregressive model / obtain Residuals: The null hypothesis would be that the successive values of PIT and GDP are independent i.e., there is no first order correlation. Therefore, the alternative hypothesis would be that the first order correlation exists between the two values.

By running OLS on MS-Excel, *p-value = 0.000033* which is much smaller than the standard value, i.e., Alpha = 0.05. Therefore, we reject the null hypothesis and conclude that R (1) is an appropriate model. DW test can be performed. Now we proceed to test for correlation using DW Test.

Step 2: Durbin-Watson Test: As a rule of thumb, if *d*=2, we may assume that there is no first order correlation. The closer the d is to 0, the greater the evidence of positive autocorrelation. Similarly, the closer *d* is to 4, the greater the evidence of negative serial correlation. By using MS Excel, we obtained *d= 0.00096,* indicating the presence of a positive correlation between PIT and GDP

Step 3: UCL upper critical value is 0.554 and LCL- lower critical value is - 0.554

Step 4: Testing Hypothesis: If d is less than the critical value of d i.e., d crit, then we conclude that a positive correlation is present. We reject the null hypothesis. If d is greater than the critical value of d, we do not reject the null hypothesis. If d lies between d1 and du, it indicates that d might be greater than or less than d crit. In such a situation, one can neither reject nor accept the null hypothesis. The test is inconclusive. Here, d= *0.00096*. Clearly, d is less than the critical value. Thus, there exists a positive correlation between PIT and GDP.

Figure 2*: Correlation function for PIT and GDP*

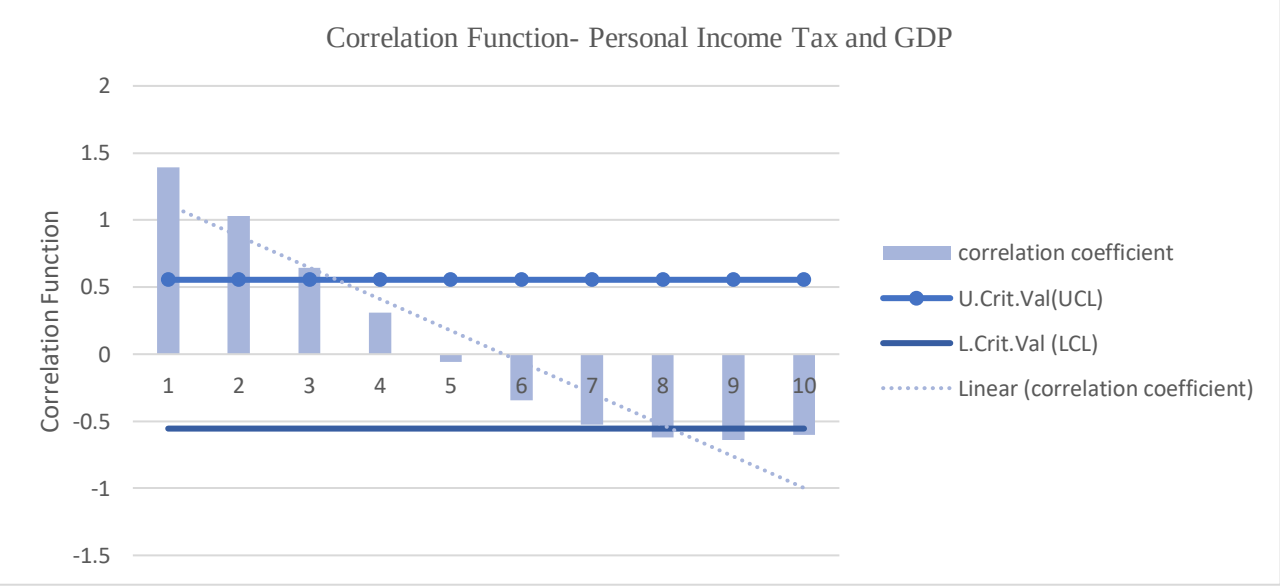
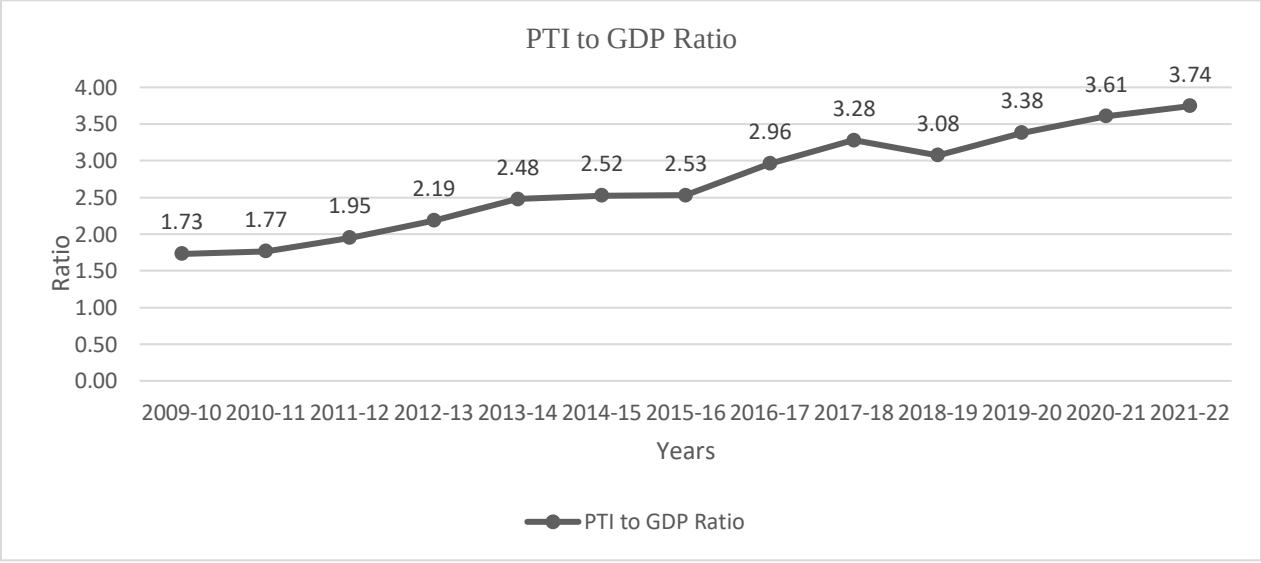


Table 2: PTI to GDP Ratio

Year	PTI to GDP Ratio
2009-10	1.729361144
2010-11	1.765840143
2011-12	1.949819312
2012-13	2.186975776

2013-14	2.477785861
2014-15	2.524136956
2015-16	2.529902785
2016-17	2.962290078
2017-18	3.277183177
2018-19	3.076214448
2019-20	3.381458217
2020-21	3.605069808
2021-22	3.743938956
Source: Based on Table 1	

Figure 3: PTI-GDP Ratio



IMF reports revealed an average PIT-GDP to be 3.1% in 2019. In 2021-22, India's PIT-GDP is higher than this average.

Table 4: Predicted Values PIT to GDP Ratio (obtained using Regression analysis)

Year	Predicted PIT	Predicted GDP	Predicted PIT to GDP Ratio
2021-22	517,460.09	13,821,274.76	3.743938967
2022-23	547,481.32	14,103,567.68	3.881864025
2023-24	577,210.27	14,361,850.73	4.019052147
2024-25	606,649.79	14,598,166.01	4.155657541
2025-26	635,802.69	14,814,381.94	4.291793541
2026-27	664,671.76	15,012,208.05	4.427541643
2027-28	693,259.78	15,193,208.44	4.562958375
2028-29	721,569.47	15,358,814.19	4.69808057
2020-30	749,603.54	15,510,334.66	4.832929489

SUGGESTIONS AND CONCLUSION

The Covid-19 brought down the revenue raised through PIT; however, the impact seems negligible as the numbers are predicted to climb back in no time. Further, the analysis reveals that there is a high degree of positive correlation between PIT and GDP. Thus, PIT is directly linked to the economic growth of India. However, the PIT-GDP ratio remains critically low at 3.7. If the current policies continue, the ratio is not expected to display impressive growth in the near future. Given the huge working population of India, income tax is a potential source of income for the government. Once the pandemic effect withers, the government must focus on

implementing appropriate tax policy reforms. Only then can India expect a higher contribution of PIT to GDP in the upcoming years.