Effect of Sensex on direct tax collection: an empirical study from India

Sushanta Kumar Mahapatra*

Department of Economics,
ICFAI Business School (IBS) Hyderabad,
The ICFAI Foundation for Higher Education (IFHE)
Deemed University,
Dontanapally Campus,
Shankerpally Road, Hyderabad, 501203, India
Email: sushanta.mahapatra@gmail.com
*Corresponding author

Pitresh Kaushik

Doon Business School,
Mi-122, Behind Pharma City, Selaqui,
Dehradun Uttarakhand, 248011, India
Email: pitresh@gmail.com

Abstract: Direct tax collection is one of the most important sources of revenue for the Government of India, as it accounts for half of the gross tax revenue according to the financial statements of the Government of India. This study attempts to analyse the trend of direct tax collection over the years and the changes in the three main components of corporate tax, personal tax, and other direct tax. It was found that the corporate tax collection was higher than the personal tax collection. The data was collected from the Income Tax Department of India and the Bombay Stock Exchange (BSE). An analysis of direct tax collection and its pattern was conducted. The paper also tries to establish a relationship between direct tax collections and how it is affected by market index namely Sensex. The study analyse the trend of change in direct tax collection in India and relative variation in Sensex. There are studies pertaining to various macro and microeconomic factors though a study linking mentioned two factors is less likely to be seen in India. It is found that there is a moderately positive correlation between direct tax collection and Sensex although the same is not significant.

Keywords: direct tax; taxation; Sensex; market return; tax collection.

JEL codes: H2, G3, E6.

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Biographical notes: Sushanta Kumar Mahapatra's research areas are applied development and environmental economics, international economics, water governance, institutions and policies, climate change and sustainable development, microfinance and livelihood. He has collaborated in research projects supported by organisations like ILO Geneva, Harvard School of Public Health, Sir Ratan Tata Trust, Ministry of Rural Development, Human Resource Development of Government of India, ICSSR, SBI and NABARD. He has worked as a consultant to World Bank, Japan International Cooperation Agency (JICA). He has published his research ideas in books, Scopus, Web of Science, ABDC, ABS, UGC-CARE indexed journals and acted as reviewer for several journals. He is a recipient of Malcolm Elizabeth Adiseshiah Doctoral Merit Fellowship from Madras Institute of Development Studies (MIDS), Chennai, India and European Commission Erasmus Mundus Post-Doctoral Fellowship (PDF), from University of Bologna, Italy. ORCID ID: http://orcid.org/0000-0002-0831-3621.

Pitresh Kaushik is currently working as Assistant Professor in Department of Accounting and Finance at Doon Business School, Dehradun, India. He has a distinguished academic experience of more than two years where he had also served Lovely Professional University, Punjab, India in the capacity of Assistant Professor. He possesses professional degrees such as Company Secretary (CS) from The Institute of Company Secretaries of India (ICSI) and CA-IPC from The Institute of Chartered Accountants of India (ICAI) coupled with six years' experience in industry at various positions having exposure in the areas of accounting, auditing, taxation and finance. ORCID ID: https://orcid.org/0000-0002-9168-2494.

1 Context

The word 'tax' was for the first time derived from Latin word 'taxare' which means to estimate or evaluate. Tax is considered as a compulsory monetary charge, imposed upon the payer, this charge in turn is used by the government for various public expenditures and spending. Indian taxation system majorly comprise of two components i.e., direct and indirect tax. direct taxes are levied on the income of the individual or an entity, the indirect tax on the other hand, as the name suggests, is collected indirectly in India, which comes from components like value added tax (VAT) or goods and services tax (GST). In India, direct tax was firstly introduced in 1860 to overcome the financial crisis of 1857, the fact itself reflect its very importance. At present it is governed by Income Tax Act, 1961 where the direct tax is collected by Central Government under article 366 and entry 82 and 85 of Seventh Schedule of the Constitution of India.

Revenue collection is vital for the development and growth of every country as it provides the government with funds that may be allocated for various developmental activities and for the welfare of the citizens of the country such as health, education and infrastructure. According to Amoh and Adom (2017), taxes form a greater chunk of total revenues of the emerging economies in Africa. This revenue collection is often done in

the form of tax and hence tax has been recognised as a keystone in political framework (Brennan and Buchanan, 1980; Levi, 1988). Direct tax is one of the most important sources of revenue for the Government of India as it accounts for half of the gross tax revenue according to the financial statements of Government of India. This fact is evident enough to prove the importance of direct tax collection in India and its impact on the economic and social development of the country. Trend analysis of direct tax collection in India may be helpful in unleashing the loopholes in current tax policy resulting investments by Indian corporates in tax havens for tax avoidance. Such analysis will be helpful for government in taking preventive steps to plug such loopholes in the tax policy thereby making it more effective (Mukundhan et al., 2019). The trend studies the figures for 18 years, which starts from the year 2000 to 2018. The other component for the study remains Sensex. Sensex is also known as Bombay Stock Exchange (BSE) or sensitivity index. Sensex is a market index, it currently has 30 financially strong companies of India listed in it, with a health that holds the potential to reflect the industrial sector of Indian economy. This component has been studied previously in relation to various factors as well. The Sensex has been studied with factor like gold price by Narang and Singh (2012). Another study by Bhunia and Pakira (2014) reflected the relationship of Sensex with gold price and exchange rates that gave an additional factor to have been considered.

With a similar idea in mind this study attempts to not just read the direct tax collection pattern in India, but also tries to relate it with Sensex which is a prominent market index. Hardly any such direct relationship has been drawn so far between the two factors mentioned in picture and the current study tries to do so.

2 Literature review

History has witnessed the various tax reforms as per the requirement of the states and the economies to attain transition; this too gave rise to a varied pattern in tax scales. The study by Rao (2000) highlights various approaches, primarily three, that have different impact on tax collection pattern. The first model being the optimal tax (OT) model had the limitation of impracticality in the application (Rao, 2000). The Harberger Tax (HT) model, the objective of the particular system suggests to be optimal, the distortion induced in tax is also minimised in the particular model and it also satisfy the element of applicability and feasibility which was missing in the former (Rao, 2000). The third model supply side tax (SST) model, the model emphasised the need to reduce the role of the state. Public expenditure has to be reduced and facilitation of tax rate cutting was promoted, especially in the direct tax rates to not affect or minimise the incentives of work, investments or savings (Rao, 2000). The recent and latest model combines all the three models. These transitions were the result of getting a better taxation system and hence to boost tax paying process. With the introduction of the reforms, the revenue coming from tax, particularly direct tax was seen to have been improved and increasing at a faster rate. The increase was seen through both corporate income and personal income, that both falls under the category of direct taxation (Rao, 2000). Implying how promoting tax payers and providing them incentives to become a fair tax payer has worked over the period through various reforms (Rao, 2000). Hence tax saving has never been hidden for a long time now. An interesting study carried out in the year 2011 that entertains the understating of income by some group, this in turn brings into the mind of the income bearer as to how they are saving taxes (Sharma et al., 2011). Special

assessment units have been formed to deal with the cases in which taxpayers are voluntarily disclosing higher incomes but in order to avoid this, such income taxpayers usually understate their incomes (Sharma et al., 2011). Voluntary disclosure by taxpayers plays a significant role in tax collection (Sharma et al., 2011).

Entertaining all these shying away from tax elements, there are studies that reflect how it can be encouraged, as incentives can play a major role in human behaviour, the incentive theory, suggesting how people are pulled towards actions that are reward-based and pushed away from those with negative consequences. The research conducted in 2004 had a similar approach. It suggests how there is a need for incentives to both the staff officers as well as the taxpayers. Taxpayers need to be encouraged, so that they disclose their income voluntarily (Das-Gupta et al., 2004).

The reforms that need to be incorporated include rigorous procedure being followed in selection and conduct of audits. Along with it more support staff and accessing officers need to be appointed (Das-Gupta et al., 2004). Assessing officers need to have better access to information. With this, to ensure greater compliance, penalty and prosecution efforts can be imposed (Das-Gupta et al., 2004). The competition among the staff officers should also be increased. The study also suggests there should be closer supervision of audit and centralised audit selection procedures but achieving these objectives becomes very difficult due to the opposition from the tax administration employees (Das-Gupta et al., 1995). Reforms related to taxation policy are also required to keep a check on country's corporate investments in tax havens to avoid tax. If we look by the Indian perspective, after 2010, a declining trend has been observed in Indian investments in tax haven particularly because of agreements between India and the countries considered as tax havens (Mukundhan et al., 2019).

The idea behind tax collection is to deploy those funds in the economic development and to attain the financial harmony in the country and hence it's equally important to observe how the tax collection process can minimise the cost that it involves. A study back by Ahmed (1968) tried to investigate as to how tax collection cost can be minimised. In comparison to indirect cost, the cost of collection of direct taxes is very high (Ahmed, 1968). In India, the cost of tax collection has been very high when compared with the tax yield over the years. In recent years, the trend that has been observed is that the tax yield is decreasing but the cost of tax collection is still the same, it is due to the presence of fixed costs (Ahmed, 1968). Tax collection is something done to provide for the expenses government requires to run an economy, when its collection itself gets expensive, the purpose gets defeat. It was found by the author that, when we compare the cost of collection of direct taxes with indirect taxes, the cost of collection of direct taxes is the highest (Ahmed, 1968).

Speaking of the cost reduction previously as discussed in Ahmed (1968), in the era when there was no digital medium. The digital age too has its way for cost reduction that made it simpler and also added to the studies like the one that will be discussed now. Virtual platform by now have affected almost every sector and economic factors too, tax was no different. It was found that, e-filing of return has made the process of tax filing very convenient. It has also helped in reducing time and cost, as through online mode, it takes only 20–30 minutes to file the return (Sharma et al., 2011). It saves the hassle of a taxpayer who otherwise has to stand in a long queue and wait for hours. It ultimately leads to saving resources of the society but the problem in our country is lack of familiarity with online platforms as people are hesitant and sceptical to use online

methods. This is one of the reasons that is acting as a hurdle in the process of e-filing of returns (Sharma et al., 2011).

According to a Sharma et al.(2011), if people are given training related to computer and made aware about the ease of online filing of return, then it would be easier for the government to achieve this objective, such initiatives can be taken by the tax authorities also (Sharma et al., 2011). They can sensitise people by organising workshops and showing them presentations regarding filing of e-returns. Furthermore, if the credibility is enhanced, then the trust of taxpayers can also be established. If the government overcomes, the barriers of e-filing of return then, it might increase the tax yield along with a reduction in the cost collection (Sharma et al., 2011). Two new modes of generating electronic verification code for e-filing of return have been added by the government. Currently EVC can be generated by only using digital signature but now the other two modes include, bank account and demat account (Sharma et al., 2011).

Income tax policies and reforms in India have covered a long distance since independence of the country in year 1947. The maximum combined marginal rate of tax was once as high as 97.5% of one's income in India which resulted in widespread tax evasion and avoidance (Acharya, 2005). Singh is considered as the first finance minister of India to have restructured the tax system of India transforming it into a modern one in 1985 by reducing the top marginal income tax rate from 62 to 50% and reducing the number of slabs from eight to four (Acharya, 2005). The reforms in Indian taxation system continued in the decade of 90's where Manmohan Singh as finance minister of India reduced the maximum tax rates to 40% and reduced the slab rates from four to three (Acharya, 2005).

In the next two decades, P. Chidambaram and Pranab Mukherjee as finance ministers of India improved the Indian tax system by exempting income of individuals up to Rs. 1.6 Lakhs and reducing the maximum tax rates to only 30%. The tax structure was also simplified by abolition of distinction between widely-held and closely-held company and reduction in corporate tax rates (Acharya, 2005). Currently, the individuals with annual income of less than 5 lakhs are exempt from tax which is a big tax relief for middle class and a surcharge is levied on higher earning individuals which tries to bridge the gap between rich and poor. Income tax rates and policies significantly influences the direct tax collection of a country. Various developing nations are using their taxation policy to attract more investment by reducing their tax rates. On the contrary, developed countries in order to protect their national economy are imposing higher tax rates (Oana et al., 2017)

As income tax in India is a self-assessment tax, government has to emphasise on voluntary tax compliance but Adeyeye et al. (2016) examined that people try to avoid tax due to perception of government's dishonesty and less responsiveness. It was established in the study by Adeyeye et al. (2016) that 'honest and tax fairness' and 'government's responsiveness' is having a strong relationship with voluntary tax compliance. So the government policies play a very vital role in bringing transparency, and improving government's perception to improve voluntary tax compliance and tax collection. Published in 2000, the study 'The Savers-Spenders theory of fiscal policy' added yet another feather of proposal to the study of macroeconomics. The study critically examines the two important canonical models that are actually literatures which show macroeconomic effects of government debt and of fiscal policy as whole (Mankiw, 2000). How these factors affect the macro economy was being studied in two literatures already, namely Barro-Ramsey model of infinitely lived family by Robert Barro in 1974

and Diamond Simuelson model of over lapping generation by Peter Diamond in the year 1965 (Mankiw, 2000).

The study by Mankiw (2000) proved the deficiency of both these models and urged a requirement of third new model. Author largely highlights three reasons as to why he tends to reject the existing two models (Mankiw, 2000). The first reason being, the two studies using the assumption of how 'to smooth the consumption over time, households use financial markets (Mankiw, 2000). Author has given evidences with the help of other studies to be skeptical about this assumption. Second fact highlighting the non-applicability of the two models was through claim as to how, "Many households or group segment have net worth near to zero" (Mankiw, 2000). After examining the data on wealth holdings, it was found that savings are not as normal an activity as it seems to do the consumption smoothing, which was again assumed by the two models (Mankiw, 2000). The third and the last claim highlights that the bequests are important in wealth accumulation. And any model studying fiscal policy must consider this factor (Mankiw, 2000). All the three facts have finally given rise to a new model studying fiscal policy, one of the propositions to framing such a model was that how the large demand of goods and services are been affected by the temporary changes in tax (Mankiw, 2000).

Back in 1989, when the work by Summers and Summers was first published, it tried to gauge the impact of tax on securities transactions on the revenue. Being an industrialised nation, US Securities Transfer Excise Tax was not practiced, as done by other industrialising nations (Summers and Summers, 1989). The piece of work then examines what are the feasibility and the desirability to implementing the US Securities Transfer excise tax, the argument has been supported by the example of other nations like United Kingdom and Japan that suggests how STET is feasible, administration wise and shall pose no impact on the financial market of the US or its competitiveness (Summers and Summers, 1989). The research highlights how the financial market in the US have become more effective over the span of time and how there is a vivid increase in the stock market size, the study reflects how tax levied on security transaction abroad like for the country Japan and the other European nations have been remarkably high, as close as $12 billion for Japan in the year 1987 (Summers and Summers, 1989). This figure reflects how US can have an advantage from such a tax, being the country with stock market way huge than the countries in picture. It proposes how liquidity shall not be affected by any such move (Summers and Summers, 1989). Another study by Campbell and Froot (1994) largely focused on securities transaction taxes (STT), only after STT were considered relevant in the policies. The international experience which is related to STT is considered and a proper framework has been tried to be framed in this relation, the behavioural changes that are related to transaction taxes were focused on (Campbell and Froot, 1994). The finding shows how the behavioural changes which are affected by the security transaction taxes can be huge and much more, so much so that effecting the trading due to migration to offshores (Campbell and Froot, 1994).

Though published in 2006, the empirical study started to collect information from the year 1997 in China, the work investigated the effects that occurred on Chines Stock Market due to the variation in transaction tax (Baltagi et al., 2006). The study reflected how news for tax change doesn't cause a fluctuation in the market but the change in the rate itself does, the study showed the effect of the implementation of tax rate change on the market (Baltagi et al., 2006). The changes in market volatility, trading volume and market efficiency that is related to the tax change was studies in this empirical work, the

data was gathered from the Shanghai A share market and Shenzhen A share market. Both the markets are an important one in the Chinese Economic System (Baltagi et al., 2006).

Now when the world is developing easiness to tax collection system similar to – considering incentives, cost cutting approaches, time and money saving approaches for the tax payer. It becomes an enticing thought for how and why this segment (taxation) becomes so crucial, especially for a third world nation like India. Many lights have been thrown on the relationship between macro-economic factors and the country's functioning, maybe reflected by indices like Sensex and Nifty. The study from the authors read stock markets like BSE and NSE (Hassan and Sangmi, 2013). This became the area of study, it involved various parameters like broad money supply, exchange rates, gold price, interest rates, index of production and other economic factors that were affecting the stock exchange and the market as a whole (Hassan and Sangmi, 2013). It had studied the three major Indian market indices like BSE, NSE and Sensex (Hassan and Sangmi, 2013). Speaking internationally, there are studies that highlighted the relation between the macroeconomic factors and the stock market. The similar approach was chosen in the study for Singapore Stock Index (Maysami and Koh, 2000). Independent macroeconomics variables like money supply, short term and long term interest and exchange rates and price levels were studied, the dependent variable being Stock Return was taken in picture (Maysami and Koh, 2000). A data for seven years was considered from 1988 to 1995, it was found that there was a positive relationship between the money supply and stock return while on the other hand other factors like exchange rates, price levels showed a negative relationship with stock return (Maysami and Koh, 2000). There are many macroeconomic factors that have been studied in relation to the market indices of a country, around the globe. Studying taxation and its relatedness with the market can be a promising subject matter. Another study talks about the tax collection, primarily in the informal sector and the productivity, productivity of various sectors of an economy is one of the most important factors in reflecting the progress of the nation through various market indices and other indicators (Ordonez, 2014). The study tried to quantify to what an extent the distortion, which is associated with the way firms avoid taxes can affect the efficiency and productivity (Ordonez, 2014). The informal sector data for a developing country was connected with a general equilibrium model, by which the results of incomplete enforcement of taxes were studied (Ordonez, 2014).

After all the relevant studies on such dealings, it was observed that the relationship of various macroeconomic factors, events, models, literatures and their transitions over the period, impact and relatedness were studied in context of various types of taxes, tax components and market indices. Some studies also highlighted the relation between a particular type of tax like security transaction tax or securities transfer excise tax with the markets. Other studies that dug into the various models and tried to establish a relation between specific points in taxation policies and tax collection with economic developments, which were often measured by market indices, it becomes relatively important to have a study like this one, as no study has tried to directly fetch the relationship between tax collection (here direct tax collection) with that of the market indices such as Sensex, as in the case of India stock market, where Sensex act as the mirror of the country's economy and hold the potential to reflect its position and image.

3 Research methodology

The research is based on collection of data from various reliable secondary sources which primarily include government sources such as Income Tax Department and official websites of Stock Exchanges. The data of 'collection of direct tax' and 'components of direct tax' is collected from Official Website of Income Tax of India and the data related to 'returns of Sensex' is collected from official website of BSE. From the collected data, a study and analysis of direct tax collection from corporates, individuals and other sources is conducted. Along with this, the paper also tries to establish a relationship between the direct tax collection in India and how it is effected by Sensex. For the purpose of study, direct tax collection is bifurcated into three major parts:

1 corporate tax

2 personal income tax

3 other direct tax

'Percentage analysis' is done to analyse the proportion of the above-mentioned components in Total direct tax. On the other hand, to analyse the trend of 'direct tax collection' over years, a line chart is prepared so that the trend (rising or declining) can be ascertained.

To analyse the relationship between 'direct tax collection' and 'Sensex returns', correlation between them is calculated. The correlation is calculated after dividing the time series into three phases i.e., phase 1, phase 2 and phase 3. Phase 1 starts from financial year 2001–2002 and continues till 2006–2007 which may be considered as pre-recession phase, the overall prospects of the Indian market were good during this phase due to which the economic activities were at peak. Phase 2 starts from financial year 2007–2008 and continues till 2012–2013 which comprises of recession of 2008–2009 and recovery whereas phase 2 starts from financial year 2013–2014 and ends with 2018–2019 which may be considered as post-recession and post-recovery phase. The correlation between the components of direct tax i.e., corporate tax, personal income tax and other tax is calculated with Sensex returns. To ascertain the overall relationship between direct tax and Sensex returns, the correlation of aggregate direct tax is also calculated with annual return of Sensex. Also, Stata 13.0 was used to derive the results in form of descriptive statistics where p-value, R-square and other statistics were analysed to find the relationship.

4 Results and discussion

4.1 Proportion of corporate tax, personal income tax and other direct taxes in total direct tax

As bifurcated by Income Tax Department, direct tax has three components i.e., corporate tax, personal income tax and other direct tax where 'corporate tax' refers to the tax collected from corporates, 'personal income tax' refers to income tax collected from individuals and the remaining collections is categorised under 'other direct tax'. Over the years, there had been nominal fluctuation in the proportion of corporate tax, personal income tax and other direct tax. The proportion of corporate tax had always remained

highest amongst the three components from 2001–2002 to 2018–2019. On the other hand, the proportion of other direct tax had always remained nominal which recorded its highest proportion in 2016–2017 with 1.80% of total direct tax. A reduction in proportion of personal income tax can be seen after 2001–2002 and it continued to contribute less than 40% of total direct tax till 2015–2016 due to continuous relief given to individual tax payers by Government of India. Table 1 shows the proportion of all three components and their proportion of direct tax over past 18 years.

Table 1 Proportion of components of direct tax from 2001–2002 to 2018–2019

Financial year	*Corporate tax % of total*	*Personal income tax % of total*	*Other direct tax % of total*
2001–2002	52.90%	46.25%	0.85%
2002–2003	55.57%	44.37%	0.06%
2003–2004	60.48%	39.38%	0.13%
2004–2005	62.27%	37.11%	0.62%
2005–2006	61.30%	38.55%	0.15%
2006–2007	62.70%	37.20%	0.10%
2007–2008	61.58%	38.31%	0.11%
2008–2009	63.93%	35.96%	0.12%
2009–2010	64.73%	35.14%	0.13%
2010–2011	66.97%	32.79%	0.24%
2011–2012	65.35%	34.45%	0.20%
2012–2013	63.74%	36.11%	0.15%
2013–2014	61.80%	38.03%	0.16%
2014–2015	61.65%	38.20%	0.16%
2015–2016	61.09%	38.77%	0.15%
2016–2017	57.07%	41.13%	1.80%
2017–2018	57.00%	41.90%	1.09%
2018–2019*	58.33%	41.59%	0.09%

Note: *Provisional figures/unaudited figures by Income Tax Department of India

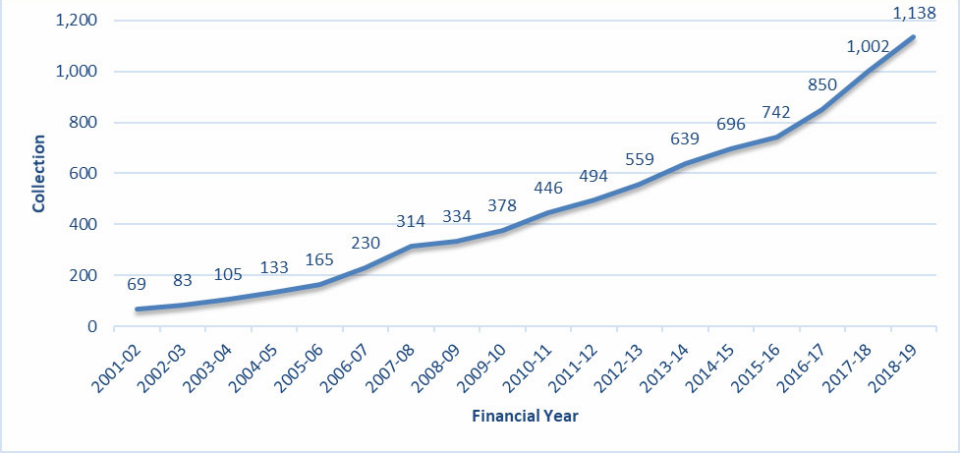
Source: Government of India (2020)

4.2 Trends in collection of direct tax over the years

Analysing the trends of tax collection can be helpful in finding the reasons of a particular change in trend and ultimately will help in formulation of effective tax collection policy. The same was evident when Indian Government implemented general-anti avoidance rule (GAAR) and tax information and exchange agreements (TIEA) to curb tax evasion and avoid diversion of investments to tax havens (Mukundhan et al., 2019). Analysis of the data of tax collection of financial year 2001–2002 displays that from the total collection

of Rs. 69,198 Crore in 2001–2002, the amount of tax collection has surpassed the mark of Rs. 10,00,000 Crore and the total collection in 2017–2018 amounted Rs. 10,02,037 Crore whereas the same has been estimated to be 11,37,685 Crore in 2018–2019. As evident in Figure 1, there is a rising trend throughout from year 2001–2002 to 2018–2019 where the total tax collection kept rising without any exception.

Figure 1 Trend of total direct tax collection (Rs. In '000 Crore) from 2001–2002 to 2018–2019 (see online version for colours)



Source: Government of India (2020)

Tax policy reforms, reduced tax rates and better tax administration helped India in improving tax compliance and ultimately has resulted in improving direct tax collection in India (Acharya, 2005). Continuous tax reforms and simplification of taxation system in India facilitated the continuous growth of tax collection in the country.

4.3 Percentage change in collection of revenue from components of direct tax

After observing the percentage change in various components of direct tax it was found that except some cases, there was a consistent increase in the collection of direct tax and its components (Table 2). The minimum increase in percentage of corporate tax was 2.56% increase in year 2001–2002 whereas the highest percentage increase was after four years of the same i.e., 2006–2007 where the tax collection increased by 42.50% as compared to previous year. On the other hand, in case of personal income tax, a decline of 0.33% was recorded in year 2008–2009 and interestingly, the highest increase of 40.65% which took place in just preceeding year i.e., 2007–2008 as perceived from Table 2. Because of small amount and proportion of collection, there were greater fluctuations in case of other direct taxes which were not significant as compared to total direct taxes. The data mentioned in Table 2 is segregated into three phases i.e., phase 1, phase 2 and phase 3 the basis of same has been mentioned in research methodology.

Table 2 Percentage change in components of direct tax and Sensex

Phase	*Financial year*	*Corporate tax*	*Personal income tax*	*Other tax*	*Total direct tax*	*Sensex returns*
Phase 1	2001–2002	2.56%	0.76%	–30.77%	1.31%	–0.26%
	2002–2003	26.12%	15.19%	–91.45%	20.07%	–12.78%
	2003–2004	37.66%	12.26%	180.00%	26.48%	84.36%
	2004–2005	30.08%	19.05%	487.86%	26.34%	16.21%
	2005–2006	22.49%	29.27%	–69.62%	24.44%	74.33%
	2006–2007	42.50%	34.44%	–4.00%	39.32%	12.95%
Phase 2	2007–2008	34.12%	40.65%	41.67%	36.56%	23.10%
	2008–2009	10.25%	–0.33%	14.41%	6.20%	–38.21%
	2009–2010	14.68%	10.66%	29.82%	13.25%	80.13%
	2010–2011	22.05%	10.11%	107.72%	17.97%	10.87%
	2011–2012	8.08%	16.36%	–5.62%	10.76%	–10.45%
	2012–2013	10.38%	18.60%	–16.87%	13.16%	8.38%
Phase 3	2013–2014	10.76%	20.34%	25.15%	14.24%	18.87%
	2014–2015	8.68%	9.42%	6.31%	8.96%	24.49%
	2015–2016	5.67%	8.23%	–1.46%	6.63%	–9.49%
	2016–2017	6.99%	21.51%	1,316.68%	14.53%	17.53%
	2017–2018	17.79%	20.14%	–28.36%	17.93%	11.07%
	2018–2019	16.17%	12.68%	–90.93%	13.54%	17.64%

Source: Government of India (2020)

4.4 Effect of Sensex annual return on tax collection

Percentage change in components of direct tax and Sensex returns were plotted on Figure 2 and Figure 3. When Sensex returns increased to record 84.36% in 2003–2004, corporate tax collection also increased to significant rate of 37.66%. In the same year, personal tax collection also increased at a fair rate of 12.26% whereas other taxes grew at an insane rate of 180%. In the years of slump, when Sensex shredded to record negative return of 38.21% in 2008–2009, personal tax collection also recorded an erosion of 0.33% in collection for the first time. Besides this, corporate tax collection and other tax collection also showed growth at a lazier pace of 10.25% and 14.41% respectively. In the years when share market was booming (2006–2008), corporate tax collection and personal tax collection increased at their highest rates i.e., 42.5% and 40.65% respectively (Table 2).

Since the proportion of 'other direct tax' was nominal and fluctuations are high, it is plotted on Figure 3 separately from other two components in Figure 2. It may be seen with the help of the Figure 2 that when Annual return of Sensex increases, tax collection also increases but at a lower rate than that of Sensex (2003–2004, 2005–2006, 2009–2010). When Sensex returns decreases, tax collection also decreases but at a lower rate than that of Sensex which was evident in year 2008–2009, 2011–2012, 2015–2016.

Figure 2 Graphical comparison of Sensex annual returns and change in direct tax collection components (except 'other tax') (see online version for colours)

Source: Government of India (2020)

Figure 3 Graphical comparison of Sensex annual returns and change in direct tax collection from 'other tax' (see online version for colours)

Source: Government of India (2020)

Table 3 Correlation between total direct tax collection and Sensex taking direct tax collection as dependent variable and Sensex returns as independent variable

Variable	*Total direct tax*	*Sensex returns*
Total direct tax	1.000	-
Sensex returns	0.3620	1.000

Source: Authors calculations

After considering 'total direct tax collection' as dependent variable and 'Sensex returns' as independent variable, the correlation between both is calculated. A correlation between +0.10 to +0.29 is considered as moderately weak but positive correlation, correlation between +0.30 to +0.49 is considered as moderate and correlation greater than +0.50 is

considered as high correlation according to Cohen's convention of interpreting correlation. As shown in Table 3, the correlation between both variables is +0.3620. A positive correlation of +0.3620 shows that there is a moderate correlation between 'total direct tax collection' and 'Sensex returns'.

Table 4 Correlation of various components of direct tax with annual return of Sensex in various phases

Phase	*Corporate tax with Sensex*	*Personal income tax with Sensex*	*Other tax with Sensex*	*Total direct tax with Sensex*
Phase 1	0.301	0.220	0.118	0.283
Phase 2	0.301	0.265	0.203	0.314
Phase 3	0.285	0.356	0.166	0.425
Overall	0.364	0.270	0.058	0.362

Source: Authors calculations

Table 5 Descriptive statistics of direct tax and Sensex returns

Variable	*Observation*	*Mean*	*Standard Deviation*	*Min*	*Max*
Total direct tax	18	.1731546	.1014926	.130737	.3932125
Sensex returns	18	.1826456	.3229489	–.3820731	.8436352

Source: Authors calculations

Table 4 depicts the correlation in different phases and different components of direct tax with Sensex returns. After referring Table 5, it can be concluded that in phase 1, there was moderately low correlation of +0.283 where corporate tax had highest correlation of +0.301 amongst the three components of direct tax whereas personal income tax had a correlation of +0.220 and other tax had lowest correlation at +0.118 with Sensex returns. As far as phase 2 is concerned, the overall correlation of +0.314 is better than phase 1 whereas there is no significant difference in the correlation between corporate tax and Sensex returns and it remains same at +0.301. Improvement in correlation can be seen in both personal income tax and other tax which stand at +0.265 and +0.203 respectively.

In phase 3, there is further improvement in the overall correlation and it stands highest in all three phases at+0.425 which can be considered as moderately high correlation. Although the correlation between corporate tax and Sensex returns had declined to +0.285 in phase 3 but there is a significant improvement in the correlation between personal income tax and Sensex returns which stands at +0.356 which can be considered as moderate correlation. There is a fall in the correlation of other tax and Sensex returns in phase 3 and the same has fell from +0.203 to +0.166 which can be considered as a weak correlation.

As far as overall correlation is concerned, corporate tax and Sensex returns have a correlation of +0.364 which can be considered as moderate correlation. On the other hand personal income tax have a moderately low correlation of +0.270 and other tax have a weak correlation of +0.058. All the components take the overall correlation to +0.362 which can be considered as moderately positive correlation.

Table 6 Regression of direct tax and Sensex returns

Total direct tax	*Coefficient*	*Standard error*	*T*	*P>|t|*	*[95% conf. interval]*	
SensexReturns	.1137523	.0732398	1.55	0.140	–.0415091	.2690137
Constant	.1523782	.0265953	5.73	0.000	.0959986	.2087578
Source		*Sum of squares*		*Degree of freedom*		*Mean square*
Model		0.22942293		1		0.22942293
Residual		.152170557		16		.00951066
Total		.17511285		17		.010300756

Notes: Number observations =8, F(1,16)= 2.41, Prob > F = 0.1399,
R-Squared = 0.1310, Adj-R squared = 0.767, root MSE = 0.9753.

Source: Authors calculations

Stata 13.0 is used to derive the results in Table 3, Table 5 and Table 6. Table 6 shows the calculation of regression which is calculated by considering Sensex returns as independent variable and total direct tax as dependent variable. From Table 6, we can see that the p value is greater than 0.05 which indicates that the variables are not significantly correlated. On the other hand, the R-squared is only 0.1310 which means that the variation of only 13% variables can be explained. By applying the above two tests i.e., correlation and regression, we concluded that there is a moderately positive correlation between total direct tax collected and Sensex returns. But at the same time, the findings are not significant, which means that the variables are not significantly correlated to each other. There are various other variables that affect the direct tax collection and Sensex return is one of them but it does not significantly affect the direct tax collection.

5 Conclusions and policy implications

It may be concluded that irrespective of economic and market conditions, the collection of direct taxes had always increased. The observed increase can be seen as a result of continuous reforms in taxation policy of India. There was a variation in the percentage increase in the collection, but it had not been able to effect the continuously rising trend of increase in direct tax collection. Along with total tax collection, its components viz. corporate tax and personal income tax had also shown a continuous rising trend apart from one instance. It can be observed that Sensex soared before 2008 as the economy was booming. The overall prospects of the Indian market were good due to which the economic activities were at peak. So because of this the tax collection also increased considerably but after the 2008 global crisis, as there was recession in the economy, it affected the entire Indian economy. Businesses had downfall, many employees lost their job due to which ultimately the collection of direct taxes was also affected. Thus after 2008, direct tax collection increased at a decreasing rate and after a certain period of time it decreased.

This study of trends in tax collection can be helpful for the government in future tax policy formulation. This study also established that Sensex returns moderately affects direct tax collection of the country which is a unique contribution to knowledge. As

direct tax is a very significant source of revenue for the government, this distinctive study which has correlated the Sensex returns and direct tax collection will provide government with a new perspective to look at while policy formulation related to personal income tax as well as corporate tax.

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