



## ASSESSMENT OF TREND, PATTERN, AND GROWTH OF REVENUE AND EXPENDITURE OF BHUBANESWAR MUNICIPAL CORPORATION

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### RESEARCH ARTICLE



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#### Abstract

This chapter examines the trend, pattern, and growth of revenue and expenditure of the Bhubaneswar Municipal Corporation (BMC) over the period 1999-2024, in the context of its transition towards a smart city. Using Secondary data from BMC annual reports, the study analyzes the composition and volatility of major revenue and expenditure heads through descriptive statistics, correlation, and time series techniques, including ADF & Phillips-Perron tests.

The results reveal a highly unstable structure characterised by the collapse of Rate & Tax collections after 2001. Econometric findings indicate a near one-to-one long-run relationship between revenue and expenditure, strong cointegration, and the absence of serious autocorrelation or omitted bias, implying that BMC generally maintains a de facto balanced budget.

Overall, the study concludes that while BMC's income and expenditure are closely aligned over time, the corporation remains fiscally vulnerable due to its reliance on volatile grants and non-recurring revenues.

**Keywords:** *Bhubaneswar Municipal Corporation, Revenue, Expenditure, Growth, Trend*

#### Introduction

To form a smart city, Bhubaneswar has initiated a Smart City Limited branch and introduced a citizens' charter to improve the transparency and effectiveness of the local body administration in 2016. It is like a public grievance where the citizen can rank the services of the Bhubaneswar, and it is easy, hassle-free, and efficient, and also ensures accountability and transparency. It is the concepts used in terms of trust between the service provider and its users.

The citizen charter aims to fulfill the needs of the citizens of this city. To move towards a more livable city, the plan focuses on creating a model of sustainable urbanization based on New Urbanism principles. Bhubaneswar's Strategic plan is built on 5 strategic pillars-Responsive Governance, Transit-Oriented Development (TOD) Based Planning & Design, Fiscal Sustainability, Infrastructure, and Socio-economic Development. By this, Bhubaneswar entered into a smart city challenge program where Bhubaneswar positioned 1<sup>st</sup> out of 98 shortlisted cities in the GOI's Smart Cities challenge.

Bhubaneswar Smart city proposal consists of 57 projects where the main theme focuses on Infrastructure Improvement, Integrated city operations and Management system, utility operation, and others related to housing, etc. The total proposal estimates Total Project Cost at Rs 4537cr, including 4095cr for area-based development-Bhubaneswar Town Centre District (BTCDD) and Rs 442 cr for pan city solution -intelligent city operation and Management center.

#### Review of Literature

Budget revenue fell due to external shocks like a decline in export duties and mineral extraction taxes. The authors aim to highlight how budget adjustments in the context of economic slowdown, oil price collapse, and increased protected expenditure items could undermine Russia's strategic development priorities. The paper analyzes the execution of Russia's federal budget in 2015 and the emerging fiscal challenges for 2016 and subsequent years. It focuses on the rise in fiscal deficit, the decline in oil and gas revenues, and the risk that short-term expenditure cuts could further deteriorate the quality of long-term public spending, especially in human capital and infrastructure. The federal budget deficit shows that 2.7% of GDP, sharply higher than 0.5% of GDP in 2014. Total government spending increased by 0.2 p.p of GDP. However, protected expenditure categories like social obligation, defense, wages of public employees which is restricted the government's flexibility. This creates a risk that the expenditure pattern will shift toward short-term mandatory spending, reducing long-term growth potential. The findings of the paper shows that redesign budget rules to stabilize long-term development spending even in crisis periods. There is an improvement in budget forecasting accuracy, which shows the volatility of commodity prices. The paper effectively shows that

Russia's federal budget in 2015 entered a period of acute stress due to external shocks and structural rigidity (Mamedov & Fomina, 2017). Municipal finance tools directly shape urban development patterns, especially in the context of increasing urbanization in Canada. The key aim is to show that revenue-raising tools should complement planning objectives, not undermine them. Rapid population growth in Canadian cities has intensified demands on Water, sewage, and roads. Citizens simultaneously want to protect farmland, open spaces, and ecological areas, which creates tension between growth and environmental preservation. Municipalities' revenue mainly depends primarily on Property taxes, User fees, and Provincial grants. Property tax as a share of municipal revenue has increased, while grants have decreased. Development charges can theoretically support cost recovery for growth-related infrastructure. There is an efficient allocation of land by internalizing development costs. There is a major policy implication in relation to the Reform of Property Tax Systems, user fee design, and redesign of development charges. These policy reforms would help municipalities advance smart growth, sustainability, and balanced regional development (Slack, 2002). Urbanization has increased municipal responsibilities' require substantial financial resources to deliver key civic services such as housing, water supply, sanitation, and infrastructure. The primary objective of the study is to assess the financial condition, revenue structure, and expenditure patterns of the Jaipur Municipal Corporation (JMC), using the 2018-2019 annual budget as the basis for analysis. The paper observes that ULB finances, including those of Jaipur, have a weak and unstable foundation, which is characterized by Low revenue generation policy, High dependence on grants-in-aid, and inadequate fiscal autonomy. The paper provides limited quantitative analysis beyond descriptive assessment (Jha & Sodhi, 2021). Infrastructure financing reforms, decentralization policies, and changing institutional arrangements influence the patterns of urbanization in India. It critically evaluates the shift from Budgetary support to institutional borrowing, public sector delivery of services to the private sector and NGO participation, and centralized governance to decentralized urban local bodies (ULBs) after the 74<sup>th</sup> Constitutional Amendment. The author highlights increasing Urban service demand, Infrastructure deficit, and Pressure on ULBs due to fiscal constraints. Kundu concludes that India's shift toward market-oriented infrastructure financing and decentralization, without adequate attention to inequality, risks deepening regional and intra-city disparities (Kundu, 1988). India's rapidly growing urbanization, the massive investment requirements for urban infrastructure, and the financial strategies needed to meet these challenges. It also outlines existing urban finance mechanisms, evaluates their limitations, and proposes ways to strengthen urban infrastructure financing systems. The paper aims to sensitize policymakers, urban administrators, and financial institutions regarding the urgent need for sustainable and innovative financing models for Indian cities. As of 2011, 31% of India's population (377 million people) lives in urban areas. The urban population is growing faster than the rural population, and by 2030, several states will be more than 50% urbanized. Urbanization is described as irreversible and a key driver of economic growth, requiring commensurate infrastructure investment. The analysis remains conceptual, with limited financial data or quantitative estimates. It does not deeply address equity concerns, such as infrastructure access for the urban poor (Khan, 2013). Revenue and Expenditure patterns is essential to understand ULB sustainability and fiscal health. ULBs play a crucial role in delivering local public services, implementing development plans, and ensuring accountability in urban governance. The paper aims to examine the revenue and expenditure patterns of Urban Local Bodies (ULBs) in Maharashtra, contextualized within the 74<sup>th</sup> Constitutional Amendment, devolution patterns recommended by the State and Central Finance Commission, and ongoing financial constraints facing Indian municipalities. The authors emphasize that transferring functions without adequate financial resources renders decentralization ineffective. The paper concludes that Urban Local Bodies in Maharashtra have weak revenue bases, rising expenditure burdens, and insufficient devolution, creating a structural imbalance that threatens effective urban governance. Without significant reforms in revenue systems, financial autonomy, and administrative capacity, decentralization will remain incomplete (Deichert, 1988). Small cities manage budget retrenchment, focusing specifically on Marion, Indiana, during a financially difficult period. The authors analyze the causes of fiscal crises, retrenchment strategies adopted, administrative and political considerations, long long-term impacts of budget cuts. This case provides broader insights into cutback management within small local governments, which face unique constraints compared to larger cities. Small cities like Marion experience declining revenue bases, rising service demands, limited economic diversification, and dependence on state/federal transfers. The Marion, Indiana case provides important lessons for small municipalities dealing with fiscal crisis (Weinberg, 1984). Urban Local Body is the prime one for the development of the city. In this regard, one study takes place in Medan City to analyse the performance of the Local government budget for the period 2011-2015. where we can see the variance of income and its growth, the ratio of spending variance, and growth in expenditure. This is useful to find out how much the government can achieve the budget realization that has been set at the beginning of the budget year and how much the growth is. The results showed that the Medan city government budget was quite good, this could be evidenced by an analysis of regional income, which absorbed more than 60% of the planned income budget, corrected negative urban income growth of -017%, direct expenditure ratio of 82.02% and the rest of the indirect shopping sector, while the average level of decentralization in the last 5 years was 34.49% which leads to the growth of the urban sector by the local government and which may reflect among the growth in citizens (Idris et al., 2019). One of the research paper examines the effect of income over expenditures in local municipalities of Sindh. The major income sources are provincial grants and local revenue generated through local taxes and bills. The relationship between income and expenditure is analyzed through Ordinary Least Square (OLS) and Fixed Effect Method (FEM) using time series data (for years 2014-2023) and panel data including time and entities. The results reveal a significant positive effect of income on expenditure. The relationship shows that expenditure increases more than income both individually and collectively. Surprisingly, these local municipalities do not default despite higher expenditure than income as per the relationship. However, the income estimate of both the time series and panel data estimation method is larger than the unity value. This could be because expenditures on municipal services are investments that return in the form of income.

This relationship may be exploited and upscaled to increase the local income of municipalities(Hirani et al., 2024).Rapid urbanization is driven by quality living aspirations, yet it has posed many challenges to creating a sustainable built environment. One of the significant challenges is managing the enormous amount of waste created in the urban environment. The problem becomes more critical for cities like Patna (India), where infrastructure growth has not occurred due to the growing population density. This paper is about exploring lean Thinking in Municipal Solid waste management to provide an efficient model that could manage the increasing quantity without scaling up the system. The study explores the applicability of Lean Principles in Municipal Solid Waste Management by identifying the Value Chain and creating flow within the system in Indian and Global contexts. Furthermore, it analyses the present condition of Municipal Solid Waste Management in the region of Patna Municipal Corporation and identifies its Value Stream and revenue generation potential. The study suggests suitable Lean suggestions for improving the present condition and revenue generation opportunities of Municipal Solid Waste Management in the area under the jurisdiction of Patna Municipal Corporation. This guides the path for introducing Lean management in the Municipal Solid Waste Management sector and improving the management capacity of ULBs with the optimum utilization of available resources and move towards the growth of the ULBs(Anand et al., 2023).

**Methodology**

The objective of the Study was carried out by using the Secondary Data of the Bhubaneswar Municipality Corporation from 1999 to 2024. The data consists of the Income & Expenditure of the Bhubaneswar Municipality Corporation under Different Heads. The Data has been collected from April 2024 to October 2024 with the help of the Housing & Urban Development Department. The variables under study for the first objective are: Trend, Pattern, and Growth of Income & Expenditure of BMC. BMC’s Income & Expenditure structure has been chosen only because of the Smart City intervention. Being a Smart City of Odisha, there is an analysis taking place between the income & Expenditure. How the Income & Expenditure has been utilised under different heads of the Bhubaneswar Municipality Corporation.

**Table 1: Trend of Revenue of BMC Under Different Heads (In Percentage)**

Year	Rate & Tax	fee & User Charges	Revenue Derived From Municipal Property	Grant & Contribution for General Purposes	Advances	Sale & Hire Charges	Assigned Revenues & Compensations	Income From Investment	Interest Earned	Loans	Other Income	Grants For Other Purposes
1999	76.46	1.24	4.92	12.67	1.78	0.00	0.00	0.00	0.00	0.86	0.00	2.07
2000	66.58	1.69	7.10	18.52	2.55	0.00	0.00	0.00	0.00	1.28	0.00	2.30
2001	8.96	1.76	5.55	83.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55
2002	11.35	2.40	6.08	76.90	0.56	0.00	0.00	0.00	0.00	1.53	0.00	1.18
2003	16.18	1.73	7.07	72.20	0.52	0.00	0.00	0.00	0.00	1.44	0.00	0.86
2004	13.53	0.57	1.02	0.00	0.23	0.56	35.20	0.84	0.00	42.22	1.55	4.26
2005	15.48	0.63	1.16	0.00	1.01	0.50	34.63	0.80	0.02	37.10	2.46	6.20
2006	15.34	1.26	2.68	0.00	0.78	1.18	25.90	0.59	0.13	0.00	3.20	48.95
2007	12.72	1.66	1.64	1.27	0.60	0.70	20.29	0.44	0.19	0.00	2.16	58.33
2008	10.22	3.83	1.34	0.00	1.16	0.60	18.88	0.36	0.25	10.20	2.49	50.68
2009	9.20	7.74	1.61	52.13	0.42	0.28	13.79	0.31	0.25	6.13	5.61	2.53
2010	5.81	2.94	0.47	0.56	0.26	0.24	12.29	0.44	0.25	0.00	4.47	72.26
2011	12.51	10.41	0.54	1.30	0.00	1.31	13.03	0.52	0.08	0.00	4.71	55.60
2012	9.34	8.86	0.49	59.72	0.00	1.39	12.85	0.70	0.33	0.00	4.46	1.87
2013	10.12	4.19	0.54	45.07	0.00	22.70	12.37	0.67	0.22	0.00	3.52	0.58
2014	9.60	2.90	0.41	0.00	0.00	43.76	17.39	0.70	0.00	2.32	21.37	1.56
2015	11.42	2.00	1.45	64.53	0.00	0.18	16.66	2.67	0.00	0.43	0.66	0.00
2016	18.20	9.76	0.58	26.27	0.00	0.44	24.63	3.90	0.00	11.22	0.75	4.25
2017	17.72	13.22	2.92	17.15	0.00	0.40	20.98	2.77	1.87	2.40	0.16	20.41
2018	17.79	12.92	0.87	35.80	0.00	0.44	20.37	2.48	1.75	1.92	0.72	4.92
2019	14.43	7.83	1.26	36.39	0.00	0.10	21.08	2.92	1.66	1.39	0.30	12.63
2020	22.67	6.53	0.80	19.24	0.00	0.26	13.11	1.79	1.07	1.08	0.20	33.24
2021	20.49	6.45	0.84	13.87	0.00	0.25	13.57	1.66	1.75	0.39	0.21	40.50

2022	15.00	10.06	0.81	42.29	0.00	0.53	12.78	1.06	1.64	0.78	0.29	14.76
2023	14.94	15.10	1.05	34.91	0.00	0.64	12.00	2.41	1.67	0.71	0.47	16.10
2024	11.67	10.37	0.90	32.92	0.00	0.66	10.51	1.73	1.00	1.13	0.07	29.04

Source: Secondary Data (Bhubaneswar Municipality Corporation, Annual Report)

Table 1 shows significant volatility in BMC’s revenue structure. Rate & Tax income peaked in 1999-20000, which varies from 76.46% to 66.58% but collapsed sharply in 2001 by 8.96% and never recovered, which is stabilizing only between 11-22% after 2015. Fees & User Charged remained below 4% until 2008, then grew steadily after 2009, peaking in 2023 (15.10%). Grants & Contributions showed extreme fluctuations, with very high shares in 2001-03, which varied from 72-83%, zero income in several years, and new peaks in 2012(59.72%) and in 2015 it was (64.53%). Sales & Hire Charges have sporadic spikes in 2013 (22.70%) and in 2014 (43.76%), but remained negligible otherwise. Municipal property income started modestly but declined to below 2% after 2006, with no recovery.

Assigned Revenues, Investments, Loans, and Other Income rose sharply in 2004, which is 35.20% and stayed strong until 2008, then stabilized at 12-24%. Investment income stayed below 4%, peaking in 2016 (3.90%). Loan receipts were high in the mid-2000s, especially in 2004-05. Grants also saw major peaks in 2006,2007,2010, and 2021.

Overall, BMC’s revenue mix is highly unstable, with heavy dependence on grants and periodic borrowing, while tax revenues remain weak and have never recovered after the 2001 decline.

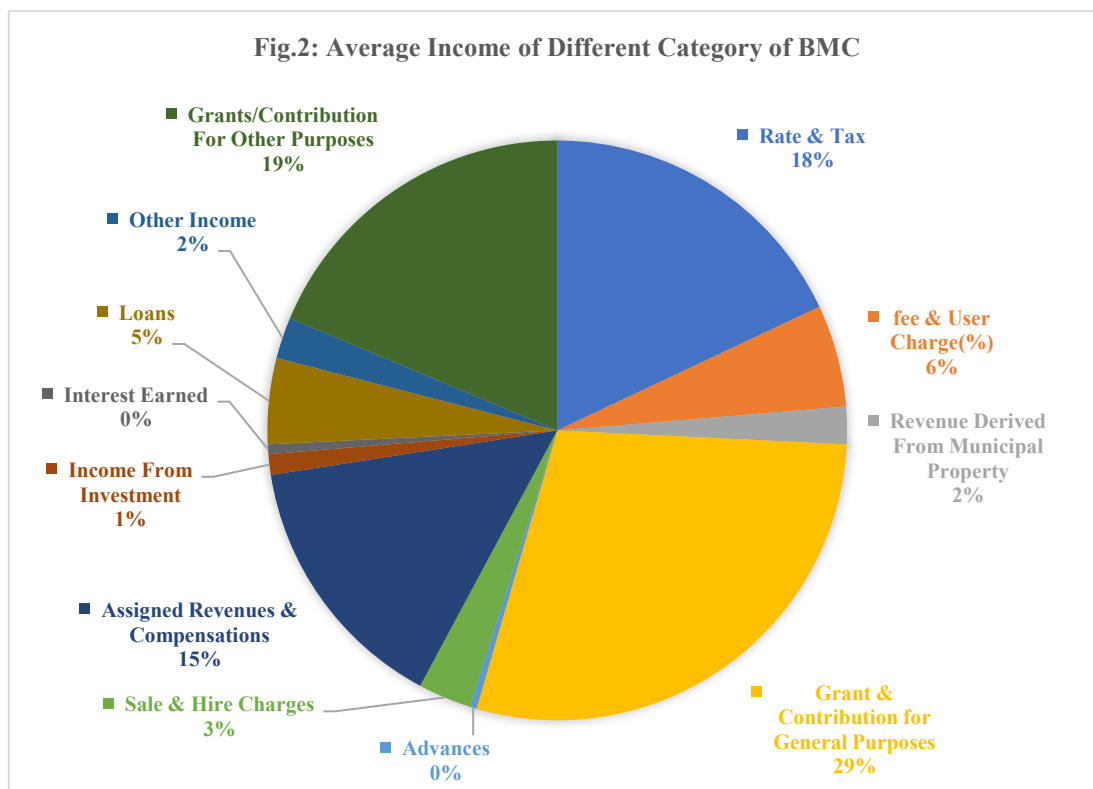
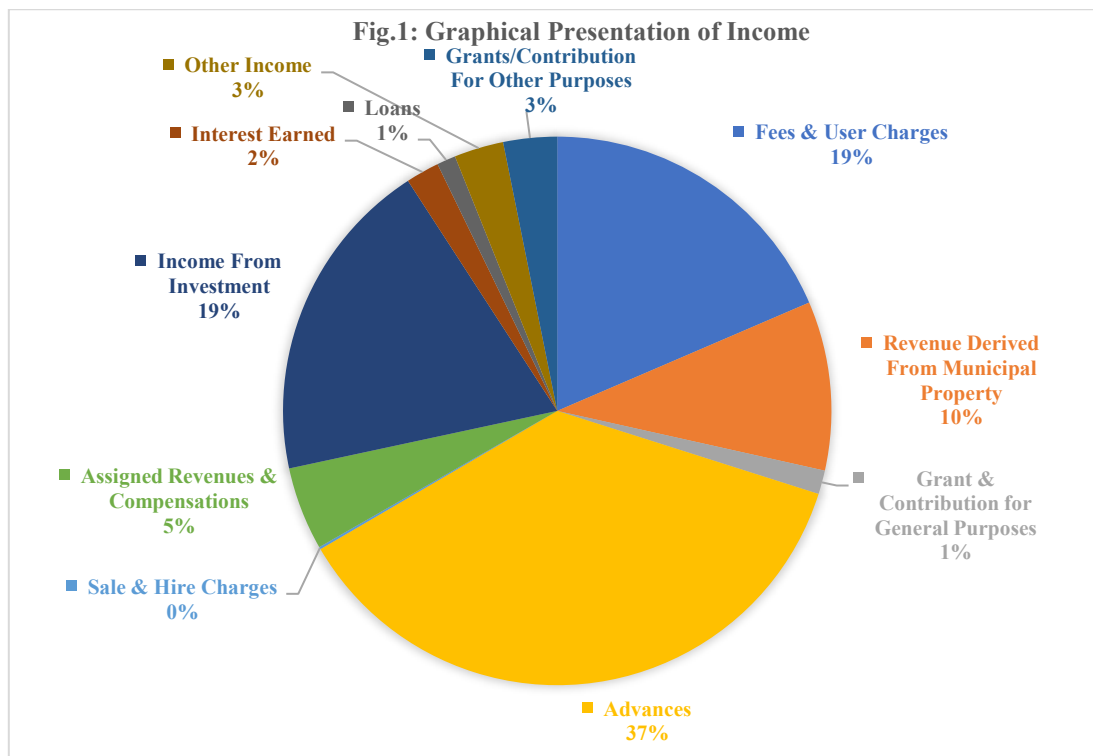
**Table 2: Trend of Expenditure of BMC (In Percentage)**

Year	Administrative Expenses	Refund of Deposits	Public Convenience	Miscellaneous	Loans	Operation & Maintenance	Purchase of Fixed Assets	Remittance of Taxes Recovered	Interest & Finance Charges	Revenue Grants, Contributions, and Subsidies	Programme Expenses
1999	37.56	7.86	0.00	4.95	6.20	2.33	0.00	27.60	0.00	8.90	0.00
2000	33.00	12.39	0.00	12.90	8.41	4.00	0.20	19.48	0.00	6.46	0.00
2001	42.55	12.22	0.22	6.90	1.62	0.78	0.00	14.66	0.00	4.00	0.00
2002	33.56	7.90	0.09	5.54	6.31	1.30	0.75	16.48	0.00	1.29	0.00
2003	47.36	11.94	0.08	4.55	4.77	0.70	2.64	23.39	0.00	1.37	0.00
2004	13.06	5.74	0.46	0.00	0.00	1.06	32.43	14.70	0.14	0.19	0.60
2005	14.00	7.34	0.37	0.00	1.78	1.54	32.24	14.16	0.63	0.21	0.40
2006	8.06	4.07	0.34	0.00	0.38	2.48	15.93	14.94	1.34	0.13	0.27
2007	8.38	3.38	0.31	0.00	0.56	0.81	22.93	16.74	1.24	0.11	0.24
2008	13.55	3.81	0.25	0.00	0.23	2.24	17.88	27.82	0.00	0.04	0.21
2009	14.66	1.67	1.48	0.00	0.16	1.08	19.92	46.86	2.02	0.03	0.19
2010	9.35	1.07	1.26	0.00	0.07	0.26	10.92	53.62	1.99	0.00	0.07
2011	8.54	1.04	1.25	0.00	0.14	0.24	10.66	41.88	1.96	22.74	1.30
2012	8.64	0.97	1.57	0.00	0.15	0.34	10.79	37.63	1.78	0.00	0.71
2013	12.39	2.16	1.51	0.00	0.03	0.32	12.67	34.85	1.69	0.00	0.88
2014	12.12	1.53	0.45	0.00	0.11	0.35	14.77	35.48	0.00	0.02	17.35
2015	11.68	4.50	1.32	0.00	0.20	0.51	14.72	14.75	0.00	0.08	20.47
2016	18.14	7.64	0.00	0.00	0.02	0.00	21.21	27.06	0.00	0.01	10.52
2017	17.32	1.82	0.00	0.00	0.46	0.00	25.70	34.79	0.00	0.25	2.82
2018	18.10	1.68	0.00	0.00	0.15	0.00	25.34	30.48	0.00	0.22	4.88
2019	18.22	1.68	0.00	0.00	0.29	0.00	24.62	33.20	0.00	0.28	3.69
2020	10.20	1.33	0.00	0.00	0.90	0.00	20.60	55.56	0.00	0.19	2.26
2021	8.47	0.83	0.00	0.00	0.78	0.00	16.76	26.42	0.00	0.14	15.23
2022	8.40	0.96	0.00	0.00	2.87	0.00	14.74	21.85	0.00	0.15	5.90
2023	7.79	1.24	0.00	0.00	1.76	0.00	16.68	23.74	0.00	0.30	4.61
2024	7.00	1.27	0.00	0.00	0.34	0.00	16.41	29.52	0.00	0.09	12.97

Like table no 1, there is a trend of expenditure of Bhubaneswar Municipal Corporation shows top-down circumstances in each and every category, which is year-wise.

**Graphical Presentation of Revenue & Average Revenue of the Bhubaneswar Municipality Corporation**

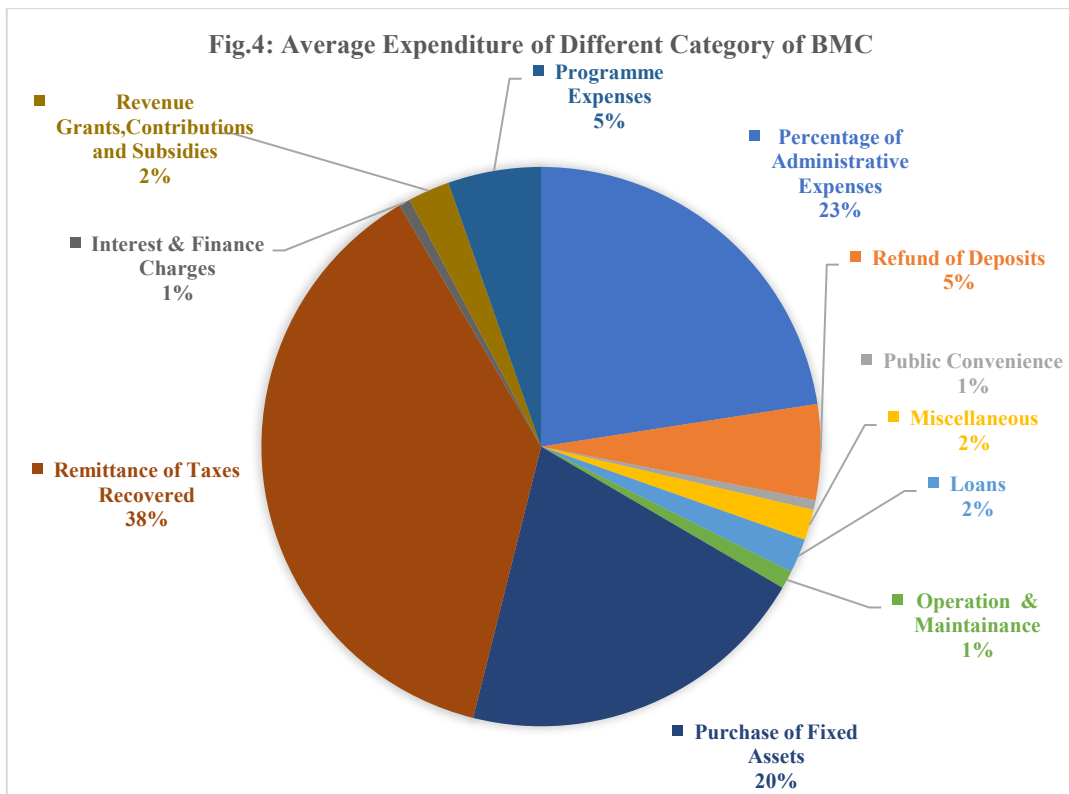
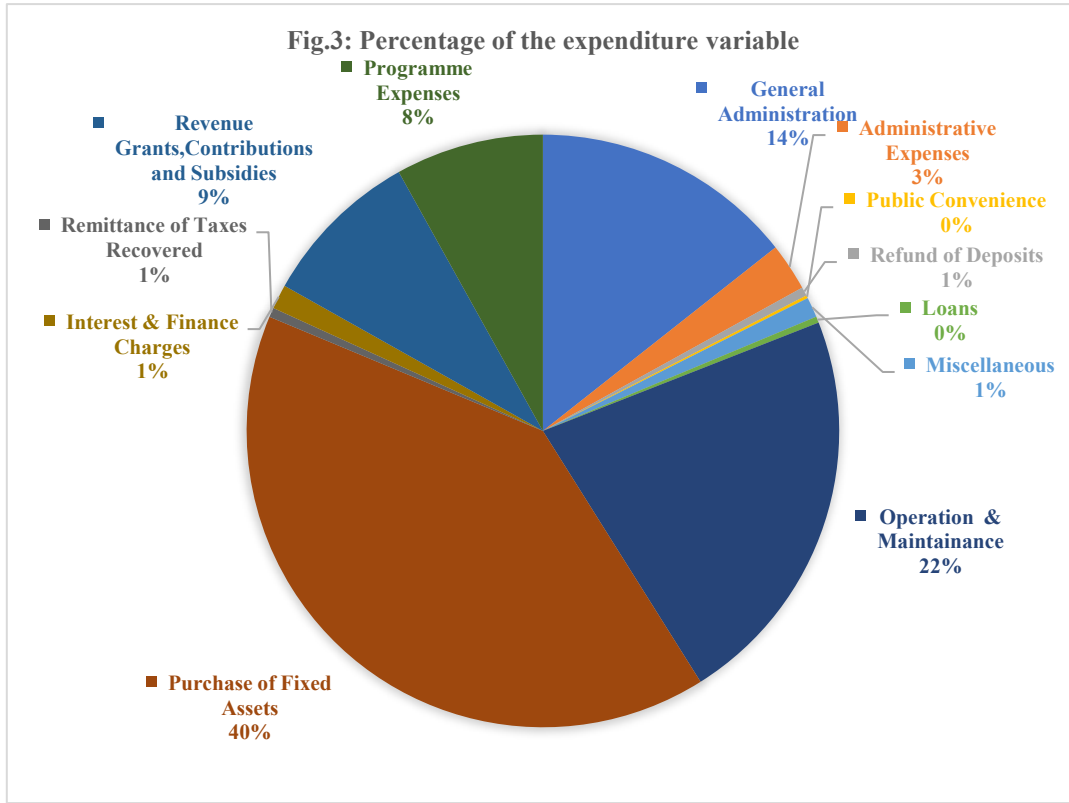
There is a Graphical Representation of income under different heads of Income of Bhubaneswar Municipality Corporation during the period from 1999 to 2024. The Percentage of Average income & Mean income is shown graphically under different heads.



The above Figures 1 & 2 show that There is a comparison analysis has been made of the income composition of the Two Groups as in Percentage of Income and the average Income.

**Graphical Presentation of Expenditure & Average Expenditure of the Bhubaneswar Municipality Corporation**

There is a Graphical Representation of Expenditure under different heads of Expenditure of Bhubaneswar Municipality Corporation during the period from 1999 to 2024. The Percentage of Average income and Mean income is shown graphically under different heads.



The above Graphs 9 & 10 show the Comparison diagram of the Percentage average of Expenditure and the Mean Average of Expenditure. It has been shown that in some cases the percentage average is greater than the mean average, and in some cases the mean average is greater than the percentage average.

**Table 3: Statistical Overview of BMC’s Revenue Sources**

Components	Rate & Tax	Fees & User Charge	Revenue Derived From Municipal	Grant & Contribution (General)	Advances	Sale & Hire Charges	Assigned Revenues & Compensations	Income From Investment	Interest Earned	Loans	Other Income	Grants/Contributions (Other)
Mean	17.99	5.69	2.08	28.73	0.38	2.97	14.7	1.15	0.54	4.79	2.3	18.68
Standard Error	3.19	0.87	0.42	5.24	0.12	1.84	1.9	0.22	0.14	2.1	0.84	4.36
Median	13.98	4.01	1.11	22.76	0	0.44	13.34	0.7	0.21	1.11	0.69	5.56
Standard Deviation	16.29	4.46	2.14	26.7	0.64	9.4	9.69	1.1	0.71	10.69	4.27	22.25
Kurtosis	9.11	-0.95	0.87	-0.79	4.91	15.63	0.07	-0.11	-0.84	8.53	16.86	-0.11
Skewness	3.09	0.59	1.51	0.59	2.17	3.92	0.18	0.94	0.99	3.02	3.82	1.1
Range	70.66	14.52	6.7	83.17	2.55	43.76	35.2	3.9	1.87	42.22	21.37	72.26
Minimum	5.81	0.57	0.41	0	0	0	0	0	0	0	0	0
Maximum	76.46	15.1	7.1	83.17	2.55	43.76	35.2	3.9	1.87	42.22	21.37	72.26

The Above table 3 shows the Main Revenue Components of Bhubaneswar Municipality Corporation as its sources & General Grants from. In the Rate & Tax Category, the mean value is 17.99, which hides very high variability (SD=16.29). As it is very positively skewed and has high Kurtosis (9.11) as there are occasional extreme peaks like 1999 (76.46), which pull the average up. In the Fees & User Charges section, the mean is 5.69 with a moderate spread (SD=4.46). Skewness value is 0.59 as it is slightly right-skewed, and there is low kurtosis (-0.95), which indicates this is more stable and closer to a normal distribution than taxes. There is high dependency on volatile components, as Rate & Tax and Grants both show wide Fluctuations, and user charges are relatively stable, but it could be expanded as a reliable revenue source. There is an underutilization of some assets, like the income from municipal property is negligible, and sale & Hire Charges are one-off windfalls, not a steady source of income.

It has been clear from the result that Assigned Revenue is more consistent than Grants & Loans. Investment and Interest Income are small but steady, as they could be improved with better asset management. Loans and Other income are highly episodic and not sustainable revenue sources. Other grant sources mirror the volatility mode as it suggests over-reliance on higher-tier government support.

**Table 4: Correlation Matrix of BMC’s Revenue Sources**

Variable	Rate & Tax	Fees & User Charges	Revenue Derived From Municipal Property	Grant & Contribution for General Purposes	Advances	Sale & Hire Charges	Assigned Revenues & Compensations	Income From Investment	Interest Earned	Loans	Other Income	Grants/Contributions for Other Purposes
Rate & Tax	1											
Fees & User Charges	0.78	1										
Revenue Derived From Municipal Property	0.65	0.68	1									
Grant & Contribution for General Purposes	0.57	0.68	0.61	1								
Advances	-0.43	-0.41	-0.24	-0.41	1							
Sale & Hire Charges	-0.01	-0.07	-0.18	-0.04	-0.19	1						
Assigned Revenues & Compensations	0.82	0.75	0.63	0.65	-0.41	0.19	1					
Income From Investment	0.82	0.8	0.75	0.67	-0.51	-0.09	0.85	1				
Interest Earned	0.89	0.86	0.77	0.67	-0.48	-0.07	0.85	0.92	1			
Loans	-0.07	-0.04	-0.14	-0.12	0.22	-0.03	0.1	0.05	-0.06	1		
Other Income	-0.07	-0.07	-0.21	-0.11	-0.06	0.89	0.18	-0.16	-0.27	0	1	

Grants/Contributions for Other Purposes	0.62	0.5	0.35	0.1	-0.02	-0.18	0.48	0.4	0.5	-0.18	-0.08	1
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The Above table shows the correlation Matrix of the Income Sources of the Bhubaneswar Municipality Corporation. It shows that there is a strong positive correlation between the variables. Rate & Tax shows a very high correlation with Interest Earned, which is (0.89), Income From Investment is (0.82), Assigned Revenue & Compensation is (0.82), and in fees & User Charges it is (0.78). This indicates that when tax collections rise, there is an increase in other income source variables, as it suggests they share similar economic or policy drivers.

In some other variable case, there is also a Moderate Positive Correlation between the variables. Grants and Contributions are moderately correlated with Rate & Tax (0.62), Interest earned (0.50), Assigned Revenue & Compensation (0.48) & income from Investment (0.40), which suggests years with higher internal revenue also tend to get more external project grants, possibly due to co co-funding requirement of the local government.

**Table 5: Statistical Overview of BMC’s Expenditure Sources**

Components of Statistical Overview	Percentage of Administrative Expenses	Refund of Deposits	Public Convenience	Miscellaneous	Loans	Operation & Maintenance	Purchase of Fixed Assets	Remittance of Taxes Recovered	Interest & Finance Charges	Revenue Grants, Contributions, and Subsidies	Programme Expenses
Mean	17.00	4.16	0.42	1.34	1.49	0.78	15.44	28.37	0.49	1.82	4.06
Standard Error	2.28	0.74	0.11	0.61	0.45	0.20	1.83	2.33	0.15	0.94	1.18
Median	12.72	1.99	0.15	0.00	0.36	0.34	16.17	27.33	0.00	0.17	0.79
Standard Deviation	11.63	3.78	0.57	3.12	2.31	1.01	9.31	11.91	0.78	4.78	6.04
Kurtosis	1.20	0.11	-0.29	7.06	2.82	2.93	-0.43	0.00	-0.46	15.51	1.58
Skewness	1.52	1.14	1.17	2.60	1.93	1.71	-0.17	0.75	1.16	3.77	1.64
Range	40.36	11.57	1.57	12.90	8.41	4.00	32.43	41.40	2.02	22.74	20.47
Minimum	7.00	0.83	0.00	0.00	0.00	0.00	0.00	14.16	0.00	0.00	0.00
Maximum	47.36	12.39	1.57	12.90	8.41	4.00	32.43	55.56	2.02	22.74	20.47

The Above table 5 shows the summary statistics of the Variables that come under the Expenditure of the Bhubaneswar Municipality Corporation. The mean value of Administrative expenses is 17% which is relatively high compared to others. The Standard Deviation is 11.63, which means spending varies widely across the periods. The variable is right-skewed as some periods have unusually high values, which is 1.52, and the range varies from 7% to 47.36% showing large fluctuations.

**Table 6: Correlation Matrix of BMC’s Expenditure Sources**

Variable	General Administration	Administrative Expenses	Refund of Deposits	Public Convenience	Miscellaneous	Loans	Operation & Maintenance	Purchase of Fixed Assets	Remittance of Taxes Recovered	Interest & Finance Charges	Revenue Grants, Contributions, and Subsidies	Programme Expenses
General Administration	1.00											
Administrative Expenses	0.56	1.00										
Refund of Deposits	0.02	0.07	1.00									
Public Convenience	-0.47	-0.32	-0.28	1.00								
Miscellaneous	0.51	0.20	-0.27	-0.07	1.00							
Loans	-0.40	-0.07	0.36	-0.09	-0.34	1.00						
Operation & Maintenance	0.93	0.53	-0.11	-0.49	0.57	-0.38	1.00					
Purchase of Fixed Assets	0.83	0.35	0.18	-0.45	0.42	-0.30	0.88	1.00				
Remittance of Taxes Recovered	-0.09	-0.25	0.83	-0.26	-0.25	0.27	-0.16	0.22	1.00			

Interest & Finance Charges	-0.07	-0.15	0.25	-0.07	-0.06	-0.05	-0.07	0.07	0.39	1.00		
Revenue Grants, Contributions, and Subsidies	0.66	0.59	0.01	-0.26	0.31	-0.20	0.74	0.60	-0.31	-0.09	1.00	
Programme Expenses	-0.14	0.10	0.77	-0.32	-0.26	0.53	-0.19	-0.08	0.52	-0.18	-0.06	1.00

The above table shows the correlation matrix of the Expenditure of Bhubaneswar Municipality Corporation under different heads during the period from 1999 to 2024. The correlation between the variables is strong and positive, as the value is  $>0.70$  in some of the variables. Under General Administration & Operation Maintenance, the value is 0.93, which shows that there is a very strong link between the variables, as when general administration costs rise, others tend to rise.

**Augmented Dicky Fuller Test (ADF)**

For the Unit Root test of the Time Series Data, there is a test that takes place, which is the Augmented Dicky Fuller Test. For this Test, there should be a place for the Null & Alternative Hypothesis. This model has been used for the Stationarity Test of the Data.

$H_0$  Null Hypothesis: The Time Series Data has a unit root, it is non-stationary

$H_1$  Alt: The time Series Data is Stationary

**Table 7: Test Result of Augmented Dicky Fuller Test**

Augmented Dickey–Fuller Test				
Test Type	Test Statistic	1%	5%	10%
Z(t)	2.21	-3.75	-3	-2.63
MacKinnon's approximate p-value for Z(t) = 0.99				

The test result shows that the P value is 0.99, which is insignificant, so we fail to reject the null hypothesis, which is non-stationary, and fail to accept the alternative hypothesis, which states that the time series is non-stationary. So that the next test takes place, which is the 1<sup>st</sup> Difference test of the Augmented Dicky Fuller Test.

**1<sup>st</sup> Difference**

**Table 8: Test Result of Augmented Dicky Fuller Test (1<sup>st</sup> Difference)**

Augmented Dickey–Fuller Test				
Test Type	Test Statistic	1%	5%	10%
Z(t)	-3.48	-4.38	-3.60	-3.24
MacKinnon's approximate p-value for Z(t) = 0.04				

The Above table result shows that the p-value is 0.04, which is again insignificant. So again, we fail to reject the null hypothesis, which is non-stationary, and fail to accept the alternative hypothesis.

For that, we will take the test of the Autoregressive Distributed Lag (ARDL) Model.

**Phillips–Perron test for unit root**

**Table 9: Test Result of Philips Peron Test**

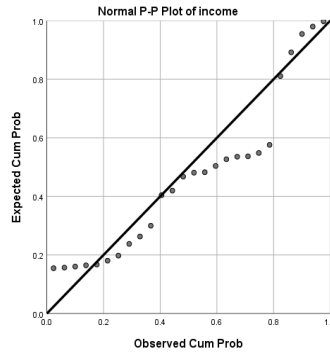
Number of obs = 25				
Variable: Expenditure				
H0: Random walk without drift, d = 0				
	Dickey-Fuller			
	Test Statistic	1%	5%	10%
Z(rho)	3.98	-17.2	-12.5	-10.2
Z(t)	2.77	-3.75	-3	-2.63
MacKinnon approximate p-value for Z(t) = 1.0000				

The purpose of this test is to determine whether the series is stationary or whether it contains a unit root, indicating non-stationarity.

Null Hypothesis (H0): The Expenditure series has a unit root, meaning it follows a random walk and is non-stationary.

Alternative Hypothesis (H1): The series is stationary in nature with a stable mean and variance over the period of time.

$Z(\rho)=3.98$ . The statistic measures the persistence of shocks in the series. The corresponding critical values are -17.2 at (1%) Test Statistic, -12.5 (5%), and -10.2(10%). For stationarity,  $Z(\rho)$  must be more negative than the critical values. However, the observed value (3.98) is positive and far above all critical thresholds. This strongly indicates that the series does not exhibit mean-reverting behaviour.



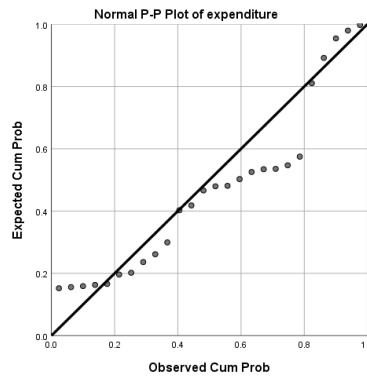
**Fig.3: Normal P-P Plot of Revenue of BMC**

The MacKinnon approximate p-value is 1.00, which is extremely high. A p-value this large provides no evidence to reject the null hypothesis. This confirms that the Expenditure series behaves like a random walk.

The Expenditure series is clearly non-stationary and exhibits characteristics of a unit root process. The series should not be used directly in regression or forecasting models without transformation.

**P-P Plot of Revenue & Expenditure (Normality Test)**

Revenue data is not normally distributed. If the data is normally distributed, the points should lie close to the diagonal reference line (the 45° line). It likely exhibits skewness (probably right-skewed, which is common for income data). This suggests that normality assumptions for parametric tests may not hold.



**Fig.4: Normal P-P Plot of Expenditure of BMC**

Expenditure is not normally distributed. The skewness pattern is very similar to what is often observed in Revenue and spending data, where most people spend modest amounts while a few have very high expenditures.

**T Test of the Income and Expenditure**

**Table 10: T-test of Two Samples**

t-Test: Two-Sample Assuming Unequal Variances		
	Income	Expenditure
Mean	4264009138.42	4276297085.23
Observations	26.00	26.00
Hypothesised Mean Difference	0.00	
df	50.00	
t Stat	-0.01	
P(T<=t) one-tail	0.50	
t Critical one-tailed	1.68	
P(T<=t) two-tail	0.99	
t Critical two-tailed	2.01	

The above table shows the two-sample t-test with unequal variance, which compares the means of Income & Expenditure to see whether they are statistically significant or not.

The p-value in a tailed test is 0.99 as there is evidence to reject the null hypothesis, and on one tail, the value is 0.50 as there is also no evidence to reject the null hypothesis.

Statistically, there is no significant difference between the average income and Expenditure of BMC over 26 Years, as the two variables are almost equal on average as indicating a balanced budget situation across the local government era. Suggested: It is always necessary to meet the Surplus and economic hardship for the future. Saving must be needed.

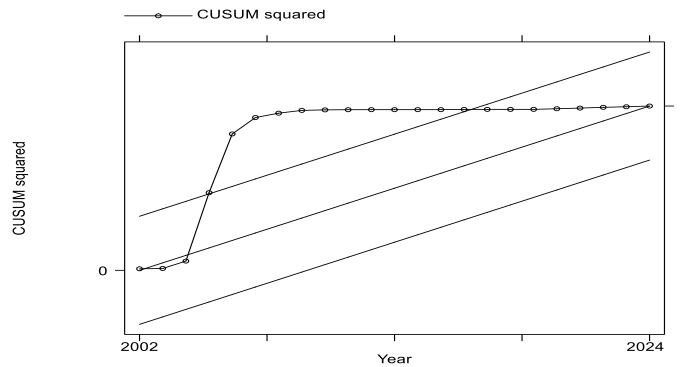


Fig.5: Cusum Test Between Income & Expenditure

**Cusum Test:**

The Cusum Squared test of Fig.5 shows that from the period of 1999 to 2024 to see the structural break in the dataset. It has been seen from the graph that from the period 2004 to 2006, there is a breakdown period arises in the Data of BMC, which is shown in the Graph between the Income & Expenditure of Bhubaneswar Municipality Corporation.

The Breakdown occurred because of the implementation of the FRBM Act on Expenditure & Income. There is Fiscal Responsibility & Budget Management, so that there is a breakdown occurred between those periods, and after that, the situation is normal.

It has been seen from the graph that from the period 2004 to 2006, there is a breakdown period arises in the Data of BMC, which is shown in the Graph between the Income & Expenditure of Bhubaneswar Municipality Corporation.

The Breakdown occurred because of the implementation of the FRBM Act on Expenditure & Income. There is Fiscal Responsibility & Budget Management, so that there is a breakdown occurred between those periods, and after that, the situation is normal.

Table 11: Result of the ARDL Model

ARDL (1,0) Regression Results						
ARDL Coefficients						
Variable	Coefficient	Std. Err.	t	P> t	[95% Conf. Interval] Lower	[95% Conf. Interval] Upper
Expenditure (L1)	-1.00838	0.02067	-48.79	0	-1.05124	-0.96551
Income	0.995733	0.005102	195.18	0	0.985153	1.006314
cons	25400000	21500000	1.18	0.25	-1.9E+07	7.01E+07

The above test result signifies the Auto Regressive Distributed Lag Model with 01 1-period lag, where Expenditure is the Dependent Variable, and Income is the Independent Variable. The Model has been used to analyse the Long-run relationship between the variables like Expenditure & Income. The Model Describes the Value of R Square, which is 0.995, and Adjusted R Square is 0.9951, indicating that he model explains about 99.5% of the Variation in Expenditure. There is a very strong Fit, though this could suggest a possible risk of overfitting of the given sample size.

The equation of the ARDL Model will be

$$Y_t = 25,400,000 + 0.995733 \cdot \text{Income}_t - 1.00838 \cdot \text{Expenditure}_{t-1} + u_t \text{ OR}$$

$$Y_t = 25,400,000 + 0.995733 \cdot X_t - 1.00838 \cdot Y_{t-1} + U_t$$

Where Expenditure (Y<sub>t</sub>)=Current Period Expenditure

Income<sub>t</sub> (X<sub>t</sub>)=Current Period Income

Expenditure<sub>t-1</sub>=Previous Period Expenditure

U<sub>t</sub>=Error Term

It can be concluded that the Current expenditure is strongly driven by current income and negatively influenced by the prior period's Expenditure. The near coefficients imply that any change in income or past expenditure has a proportionally large effect on current expenditure.

**Vector Auto Regression Model (Model Estimation)**

**Table 12: Test Result of VAR Model**

Vector autoregression (04 Period Lag)						
Equation	Parms	RMSE	R-Sq.	Chi2	P>chi2	
Inexpenditure	6	0.03	0.99	4024.76	0	
Inexpenditure	Coefficient	Std. Err	z	P> z	95% conf. interval Lower	95% conf. interval Upper
L1	-0.06	0.09	-0.66	0.51	-0.24	0.12
L2	0.03	0.08	0.46	0.64	-0.12	0.2
L3	-0.16	0.07	-2.21	0.02	-0.31	-0.01
L4	0.11	0.05	1.96	0.05	0	0.23
lnincome	1.03	0.07	13.44	0	0.88	1.18
_cons	0.34	0.15	2.25	0.02	0.04	0.65

The Vector Autoregression Model (VAR)with four lags has been estimated to understand how past values of expenditure (Inexpenditure) and current income (lnincome) influence current expenditure.

The very high R-squared (0.99) indicates that the model explains 99% of the variation in Inexpenditure. The Chi-square test is highly significant (p<0.000, meaning the overall equation is statistically strong. The low RMSE (0.03) indicates small prediction errors. Overall, the VAR model fits the Inexpenditure data extremely well. In L1, the coefficient value is -0.06, p is 0.51, which is not significant. This means last period's expenditure does not meaningfully influence current expenditure. The Lag (L2) coefficient is 0.03, and the p-value is 0.64, which is not significant. In Lag L (3) coefficient is -0.16,0=0.02, which is significant at 5%. Expenditure from three periods earlier has a statistically significant dampening influence on current expenditure.

**Diagnostic Analysis**

For the Diagnostic analysis, a test takes place between the Expenditure and income variables during the period from 1999 to 2024 of BMC. First, there is Breusch-Pagan/Cook-Weisberg test is used for the Heteroscedasticity among the data.

Null Hypothesis: The Error Terms have constant variance (homoscedasticity)

By making an analysis, the result comes out that the value of chi-square is 10.60 and the p-value is 0.011, which is statistically significant as we reject the null hypothesis and accept the Alternative Hypothesis. Heteroscedasticity is present as the variance of the residuals is not constant across fitted values of Expenditure.

**White's Test**

In the White Test, we have to analyse the Heteroscedasticity and Homoscedasticity among the Variables. For this, we have to take the Null & Alternative Hypotheses.

Null: The residuals are Homoscedastic

Alt: The Residuals have Heteroscedasticity

**Representation of the Data**

**Table 13: Test Result of VAR Model**

Source	Chi Square	Df	p-value
Heteroscedasticity	2.06	2	0.356
Homoscedasticity		1	
Kurtosis		1	

The above table shows that the value of chi-square is 2.06 at 02 level of degrees of freedom, and the value is 0.356, which is greater than the 5% level of significance, so we fail to reject the null hypothesis. This suggests no evidence of heteroscedasticity under the White Test.

In the Breusch-Pagan Test, it has been established that there is heteroscedasticity between the variables, while the white test has no heteroscedasticity. In that sense, when there is a conflicting situation arises then we may assume that there is heteroscedasticity may be present, and we should use robust standard errors.

H0: Constant variance

chi2(1) = 21.89

Prob > chi2 = 0.0000

**Robust Standard Error**

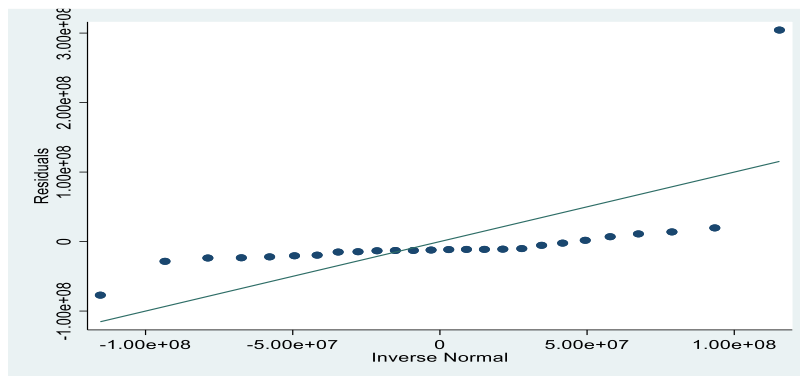
In Robust Standard Error, first, we regress the variables by taking the expenditure as the dependent variable and the income as the independent variable. So the result may be represented as below.

**Robust Result**

**Table 14: Test Result of VAR Model**

Expenditure	Coefficient	Std. err.	t	p> t	95% Conf Interval(lower)	95% Conf Interval (Upper)
Revenue	0.99	0.00	310.71	0.00	0.99	1.00
Cons	24800000	26300000	0.94	0.355	-29500000	79100000

The above table shows that the model consists of 26 observations, and the value of the coefficient on income is 0.99. This indicates a nearly proportional relationship between income and expenditure. In practical terms, for every additional unit increase in income, expenditure increases by approximately 0.99 units, which suggests that spending closely tracks income levels.

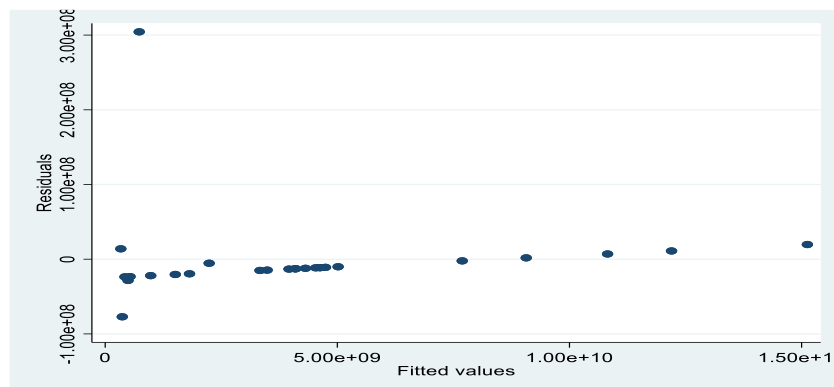


The constant term is positive (2.48) but not statistically significant because the p-value is 0.35, meaning it is not reliably different from zero. The regression results show that expenditure is strongly and almost proportionally driven by income. The near unit coefficient suggests that expenditure increases in nearly the same magnitude as income, indicating a tight linkage between earnings and spending behaviour.

**RVF plot Graph**

The above graph signifies whether the residuals are randomly distributed, as it has a good fit or not. Most residuals are clustered near zero, but there is one extreme point with a value above  $3.00 \times 10^8$  and one below  $-1.00 \times 10^8$ . Residuals are not scattered, so there is a concentration of points for smaller fitted values.

The point at the top left is a clear outlier that disproportionately influences the regression line. The spread of residuals changes across the fitted values as a small variance in the middle and right side, but a big jump on the left side because of the outlier. This suggests a possible heteroscedasticity or model misspecification, or the residual distribution has misspecification.



**Graph of Qnom r**

The above graph shows the normal Q-Q plot of regression residuals. There is a clear extreme outlier at the top right corner with a residual above  $3.0 \times 10^8$ . There is a large deviation at the bottom left, and these points are far from the effective line, as indicated non non-normality. For most middle values, residuals are somewhat aligned but still show a slight upward and this suggests mid skewness.

**Multicollinearity check**

**Table 15: Test Result of VIF Test  
Variation Inflation Factor (VIF)**

Variable	VIF	1/VIF
Income	1.00	1.00
Mean VIF	1.00	

The variance inflation factor (VIF) is one of the most widely used statistical measures for detecting multicollinearity in regression models. The above table shows that the VIF for Income is 1.00 and the Mean VIF is 1.00, which means VIF measures the multicollinearity with the predictors. AVIF of 1 indicates that there is no correlation between the dependent & Independent variables. As there is only one predictor (Income), Multicollinearity cannot occur, and the value of VIF will always be 01.

A VIF in this range signals a moderate multicollinearity problem. While the model may still be usable, the coefficients may begin to show signs of instability. When VIF values are below 5, multicollinearity is usually considered low or acceptable. The independent variables are not strongly correlated with each other, and the coefficient estimates can be interpreted with greater confidence.

**Ramsey RESET test for omitted variables**

In this test, we have to test the omitted values, as in the Null Hypothesis, we have to analyze whether the model has no omitted values and is correctly specified.

$F(3,21)=0.22$

$Prob>F=0.881$

From the analysis result, it has been seen that the p-value is greater than 0.005, so in this case, we fail to reject the null hypothesis, and there is no statistical evidence that the model suffers from any omitted variable bias. So the model is appropriate, and any missing patterns in the data are unlikely to be due to the omitted predictors.

**Auto Correlation Test (Durbin Watson Test)**

**Table 16: Test Result of Durbin Watson Test**

Ln expenditure	Coefficient	Std. err.	t	P> t	95% conf. interval (Lower)	95% conf. interval (Upper)
lnrevenue	0.98	0.01	66.97	0	0.95	1.01
_cons	0.1	0.13	0.78	0.44	-0.17	0.39
Durbin-Watson d-statistic (2, 26) = 2.00469						

The Durbin-Watson (DW) statistic assesses the presence of autocorrelation in regression residuals. A close to 2 indicates no autocorrelation. Values below 2 suggest positive autocorrelation. Values above 2 suggest negative autocorrelation. In this model, the DW statistic is 2.00, which is essentially equal to 2. This indicates no evidence of autocorrelation, implying that the residuals behave independently and the regression estimates are statistically reliable.

The estimated coefficient for log revenue is 0.98, and it is highly significant ( $t=66.97, p<0.00$ ). Since both variables are expressed in natural logarithms, the coefficient represents elasticity. This result implies that A 1% increase in revenue is associated with a 0.98% increase in expenditure. The 95% confidence interval (0.95-1.01) is narrow and includes 1, suggesting that expenditure is nearly perfectly elastic with respect to revenue.

The intercept is small and statistically insignificant ( $p=0.44>0.05$ ). This indicates that the model does not provide a meaningful or reliable prediction of expenditure when revenue is zero.

**Double Log Linear Regression Model**

**Table 17: Test Result of Double Log Regression Model**

lnincome	Coefficient	Std. err.	t	P> t	95% confidence interval Lower	95% confidence interval Upper
lnexpenditure	1.005	0.015	66.97	0	0.974	1.03
_cons	-0.05	0.141	-0.42	0.67	0.351	0.23

The coefficient on ln(expenditure) is 1.00, which is positive and highly statistically significant ( $p<0.01$ ). Because the model is specified in log-log form, the coefficient directly represents elasticity. The results suggest that the relationship between expenditure and income is almost perfectly proportional, implying near-unit elasticity.



The Dependent Variable is Expenditure, and the Independent Variable is Income. The data consists of the Period from 1999 to 2024 of the Bhubaneswar Municipality Corporation.

**Table 21: Representation of ANOVA Table**

Expenditure	Coefficient	Std. Error.	t	P> t	95% conf. interval	
Revenue	1	0.00	252.38	0.00	0.99196	1.008356
D	-51200000	35900000	-1.43	0.00	-125000000	23000000
Cons	51000000	26400000	1.93	0.0	-3600000	106000000
Metric	Value					
Number of observations	26					
F(2, 23)	45136.02					
Prob > F	0.00					
R-squared	0.99					
Adjusted R-squared	0.99					
Root MSE	65000000					

The Above table shows that there is variation in the dependent variable, which is explained by the model through the independent variable. There is a very high t value (252.38), and the P value is <0.001, meaning this relationship is highly statistically significant. 95% Confidence interval is tight (0.99 to 1.00), confirming strong precision. The Constant as intercept is 51 million, as it indicates the baseline expenditure when income =0 and D=0. It is marginally significant (p=0.066, close to 0.05). As we saw, there is a breakdown point in the year 2004. From the analysis, it is clear that, during pre- & post-2004, there is no high impact because of the FRBM Act. But in the Metric Model, it has been seen that Prob>F=0.000 as the P value is zero and the model is statistically significant overall and at any conventional level.

**The Regression Equation will be**

$$\text{Expenditure} = 51,000,00 + (1.0000 * \text{Income}) - (51,200,000 * D) + \epsilon$$

High T value for income suggests the relationship is very stable across the data, and the model shows a near-perfect one-to-one relationship between income and Expenditure. The dummy variable has a negative but statistically insignificant effect.

**Slope Dummy**

A slope dummy is used when the relationship (Slope) between the dependent variable and an independent variable changes depending on the category of a dummy variable.

**Table 22: Regress Expenditure Income D DX**

Expenditure	Coefficient	Std. Error.	t	P> t	95% conf. interval	
Revenue	1.79	0.11	15.82	0	1.56	2.03
D	3.16E+08	5.62E+07	5.63	0	2.00E+08	4.33E+08
DX	-0.79	0.11	-7.02	0	-1.03	-0.56
_Cons	-3.15000000	54200000	-5.8	0	-4.27E+08	-2.02E+08
Metric	Value					
Number of observations	26					
F (2, 23)	93262.88					
Prob > F	0.000					
R-squared	0.9999					
Adjusted R-squared	0.99					
Root MSE	3.70E+07					

The Above table shows that the ANOVA Representation, as there is a variation explained by the predictors, as the SS is 3.76E+20, the SS Residual is 2.96E+16, the degree of freedom in the model is 3, Residual is 22. The value of R-squared is 0.999, as there is 99.99% of the variance in Expenditure is explained by the predictors (Income D and DX). The value of p-value is 0.000, as overall the model is significant.

The model is statistically extremely strong as it shows that income is a major driver of expenditure, but DX moderates this effect downward when  $D=1$ .

There is a significant impact of the FRBM Act on the Income & Expenditure of BMC. There is no significant difference between the income & Expenditure of BMC over 26 Years. Suggested: It is always necessary to meet the Surplus and economic hardship for the future. Saving must be needed.

### **Conclusion**

The analysis of Bhubaneswar Municipal Corporation's (BMC) income and expenditure from 1999 to 2024 highlights a highly volatile revenue structure with heavy dependence on grants and sporadic loans, while traditional sources like Rate & Taxes failed to sustain earlier levels. User Charges, though modest, emerged as a more consistent and expandable source of revenue. On the expenditure side, BMC has managed to reduce administrative overheads and shift towards programmatic and capital spending, though with irregular allocations. Econometric modelling strongly confirms that income is the primary driver of expenditure, with both variables moving almost one-to-one over time. Despite volatility, long-term cointegration ensures that income and expenditure remain balanced, leading to a near-equilibrium fiscal situation. However, the over-reliance on unpredictable grants and one-off revenues makes BMC financially vulnerable. Thus, strengthening own-source revenues (taxes, user fees, asset utilisation) and ensuring prudent expenditure management are essential for achieving fiscal stability and reducing dependence on external grants and borrowings.

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