FORENSIC ACCOUNTING ANALYSIS USING BENFORD'S LAW ON GST COLLECTIONS OF WEST BENGAL

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Abstract: As a new evolving profession Forensic Accounting has gained a lot of faith and belief in the eyes of court of law in the recent years to investigate, detect frauds, misstatements and malpractices. Forensic Accounting investigations are conducted by professionals and they use various techniques and methods to collect evidences for their investigations. One of such commonly used method is Benford's Law analysis. The present study focusses on detection of irregularities, potential anomalies in GST collections from West Bengal using Benford's Law and to assess the conformity of GST data (CGST, SGST, IGST, and CESS) to expected patterns or distributions. Dataset used comprises of GST collections of West Bengal state from July 2017 to June 2024. The results of the analysis indicated certain anomalies or deviation in case of CESS. The CGST data showed the highest level of conformity. It shows that data published by the government in the official GST website in certain months may be little under reported or over reported.

Keywords: Anomalies, datasets, frauds, GST, leading digits

Introduction

India is on the verge of becoming a prosperous, inclusive, and globally competitive nation by 2047 according to the vision of Viksit Bharat initiatives. Whenever development occurs it brings in the risks of fraudulent practices and corruption always occurs when public expenditures are involved according to (Ravidasan N.S and Vijay Kumar Singh, 2020). There will be various corporates which will receive various contracts for developmental works from time to time and only source of financial economic information of these corporates are Financial Statements. Financial Statement is the single most important weapon in the field of finance and its users are plentiful, thus it needs to be faultless and

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audit of Financial Statements crafts it as faultless. Even if a fault exists in these Financial Statements then such faults must be mentioned in audit reports so that stakeholders may take informed decisions.

Stakeholders of any entity use Financial Statements for various purposes i.e. to take economic and financial decisions. So, any wrong statement or misleading information in Financial Statements can cause serious problems and trust of users on these financial statements may reduce. This loss of trust is creating audit expectation gap and regular discovery of frauds or financial scams post publication of audited financial statement is the root cause of it.

According to (Shearer T., 2002), frauds are the root cause of unethical practices and causes genuine identity to be forgone and lost in the crowds of malpractices. This is where Forensic Accounting Profession comes in as a savior. It's a cause and effect relationship where rise in frauds and financial scams are the cause and Forensic Accounting Profession is the effect or the savior as per (Al, E., & Khaled., 2022). As per (Shashi Kashyap & Harish Kashyap, 2024), with increasing coverage of internet and technology digital frauds, cyber frauds and financial frauds are also increasing as shown in the following graph:

Figure:1 No. of Cyber Crimes Reported in India

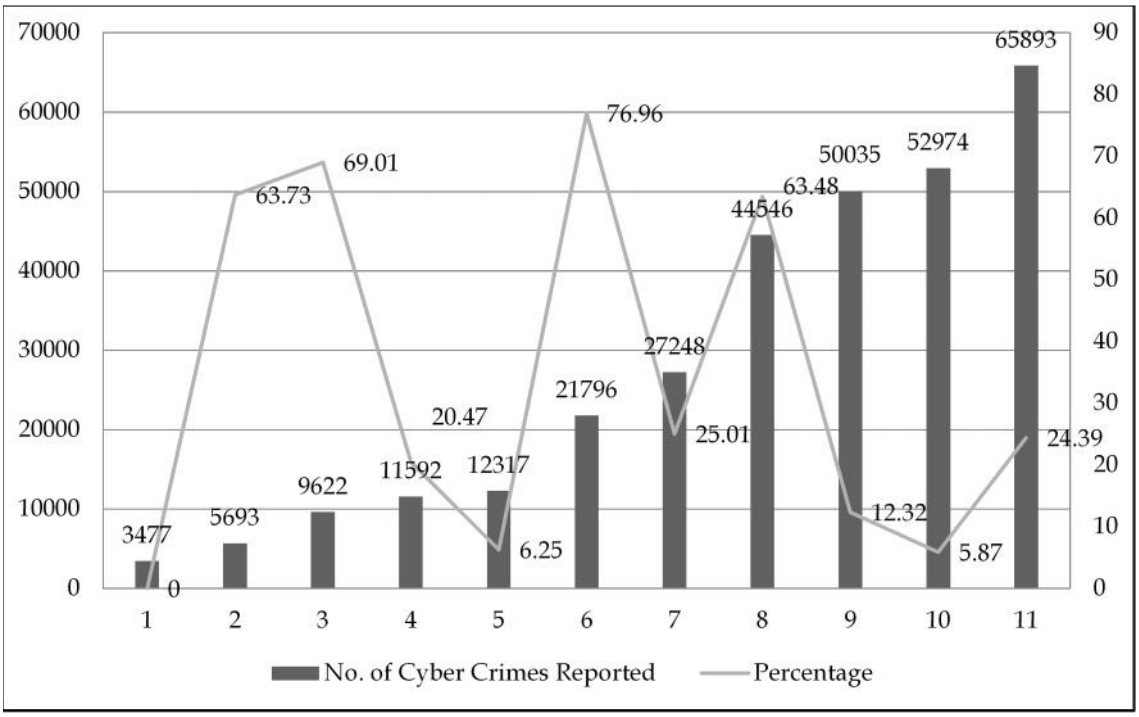


Table: 1 No. of Cyber Crimes Reported in India

Years	No. of Cyber Crimes Reported	Percentage
2012	3477	0
2013	5693	63.73
2014	9622	69.01
2015	11592	20.47
2016	12317	6.25
2017	21796	76.96
2018	27248	25.01
2019	44546	63.48
2020	50035	12.32
2021	52974	5.87
2022	65893	24.39

Source: Author's Compilation using data of (Shashi Kashyap & Harish Kashyap, 2024)

Forensic accountants are the codebreakers, meticulously combing through these financial documents like a detective sifting through clues at a crime scene according to (Desai & Jangid, 2023). It's a detective story played out not on the gritty streets but within the sterile confines of spreadsheets and bank statements. The forensic accountant is the financial Sherlock Holmes, meticulously piecing together the financial puzzle, their sharp mind and keen eye uncovering the truth hidden beneath the surface. Gone are the days when forensic investigations relied solely on painstaking manual analysis. Today's forensic accountants have an ace up their sleeve – cutting-edge technology like algorithms. These sophisticated tools act as powerful microscopes, amplifying the accountant's ability to identify hidden patterns in the financial data.

Forensic Accounting can be considered as an evolving profession to investigate occurrence of frauds and malpractices which is very different from regular statutory audits and internal control or checks of entities. Forensic Accounting is an investigative, analytical robust mechanism for detection, investigation and prevention of errors, frauds, irregularities and anomalies in financial records. According to *Shearer T. (2002),* frauds are the root cause of unethical practices and causes genuine identity to be forgone and lost in the crowds of malpractices. Thus, if frauds are not detected timely can hamper growth, reputation of any entity and on long term can derail the growth of the economy as well. Where general statutory or other audits comes under question or fails, there courts orders for Forensic Accounting

investigations. There are various Forensic Accounting methods and techniques and one of such technique which is very popular as well as frequently used is called Benford's Law analysis as per *Desai & Jangid, (2023)*. According to the study of *Nigrini, M. J. (1996)* who was one of the first to make Benford's Law analysis popular, showcased that Benford's Law can be used effectively to detect anomalies in tax data and accounting records. Further, to identify irregularities and potential fraud in various financial statements, studies of *Durtschi, C., Hillison, W., & Pacini, C. (2004)* validated the use of Benford's Law analysis as an effective technique.

Benford's Law is the law of anomalous numbers, or the first digit law is about studying the first digits of any significant numbers or figures of any financial dataset. *Benford, F. (1938)* observed that in many datasets, the first digit is more likely to be small (e.g., 1, 2) rather than large (e.g., 8, 9). According to the law the chances of occurrence or probability of first digits in a naturally occurring collection of numbers in a dataset will be as follows:

Table:2 Probability of First Digits as per Benford's Law

First Digit	Probability
1	30.1%
2	17.6%
3	12.5%
4	9.7%
5	7.9%
6	6.7%
7	5.8%
8	5.1%
9	4.6%

If the data of any dataset e.g. data of financial statements, deviate from the above-mentioned expected distribution then it will infer that anomalies exists, the data is manipulated or fraudulent activities might have occurred in preparation of the data. In order to test this Forensic Accounting technique i.e. Benford's Law we have selected Goods and Service Tax (GST) collection data of West Bengal as the data is easily available and the numbers are naturally occurring dataset.

Review of Literatures

There are many research done in the area of Forensic Accounting. Our focus in this research is on one of the most widely used

Forensic Accounting method which is used in investigation process i.e. Benford's Law. Some of the core literatures which discusses about Benford's Law and are related to this research paper are presented as follows:

Author(s) & Year	Area of Study	Major Findings
1) Devi, Seema & Saini, Prof. (2023)	The objective of this study was to assess auditors' awareness of forensic accounting, use of various tools, techniques and their perception of fraud. Data was collected from both internal and external auditors, and SPSS 21 software was employed for data analysis, including the application of the chi-square test.	The study's findings indicate that auditors have a moderate level of awareness regarding forensic accounting. It discusses on various Forensic Accounting methods including Benford's Law. Private companies are also more likely to engage in financial statement fraud compared to corruption or asset misappropriation. Based on the study's results, it is recommended that organizations embrace and implement forensic accounting practices to effectively prevent and detect fraud at an early stage.
2) Al Enazi, Khaled. (2022)	The objective of this study is to investigate the practice of forensic accounting in Saudi Arabia. It aims to examine the role of forensic accounting in detecting financial fraud and identify the factors that enhance its effectiveness in this area.	It is suggested that forensic accounting techniques should be integrated into the financial reporting functions of business organizations.The adoption of forensic accounting investigation techniques in corruption investigations can aid corruption prosecutors in building robust cases against corrupt officials. Utilizing forensic accounting investigation reports in the preparation of corruption charges can enhance the interpretation and communication of charges in court. Furthermore, the use of forensic accounting-based investigations can expedite the successful prosecution of corruption charges and contribute to securing convictions in law courts.

Author(s) & Year	Area of Study	Major Findings
3) Agu & Okoye, (2019)	Application of Forensic Accounting: A Bridge to Audit Expectation Gap in Nigerian Deposit Money Banks in Enugu State. The researcher wanted to ascertain how forensic accounting can be applied to bridging the audit expectation gap in Nigerian Deposit Money Banks.	Litigation support service can be considered for reduction and control of the audit expectation gap.The researcher also observed that knowledge and education level relating to finance is lacking among the stakeholders which need to be changed in the years to come. So there is a clear need for stakeholder's education for the successful implementation of the forensic audit to reduce the audit expectation gap.The researcher has observed that forensic audits must be conducted before for all transactions and pieces of evidence must be collected apart from normal statutory audits.
4) Rai, (2017)	A Study on the Importance of Integrating Forensic Accounting with Regular Financial Accounting. The study focuses on the detection and prevention of fraud at the initial stage only so that the impact of such a menace can be minimized.	There are various Forensic Accounting methods and Information Technology plays an important role in Forensic Accounting. Methods like Benford's Law, Beniesh Model must be applied with Information Technology enabled software to get superior results. The existing way of accounting and auditing practices are not sufficient and traditional ways must be reinforced with modern software-driven forensic accounting tools to face the new upcoming challenges of frauds and scams.
5) Fatah & Naser, (2017)	An Investigation of Expectation Gap between Independent Auditors and Users from Auditing Services Based on Their Role and Professional Features in Auditing Process.	The study was on factors which causes audit expectation gap based on survey conducted in Iran.The research results portrayed that the audit expectation gap was not affected by the professional experience of the providers of audit services. The major conclusion from their research was

Author(s) & Year	Area of Study	Major Findings
		audit expectations gap occurs because of the size and quality of audit firms.
6) Sharma,(2017)	Forensic accounting and its application in selected industries of Mumbai. The objective of this research focused on forensic accounting and auditing differences and how it assists in the detection and prevention of fraud and understanding the techniques of forensic accounting.	The major findings were accounting skill, investigative and analytical skills of Forensic Accountant are superior, they have more control on fraud management and the fraud detection capabilities are also more, Transactions, balances, calculations should be redone again and again to minimize chances of frauds; further financial ratios should be analyzed to examine frauds.Data mining techniques should be adopted for the sole purpose of compilation of large volumes of facts and figures for new-fangled, concealed, or unexpected information.
7) SALEH, (2016)	Based on Application of International Standards of Internal Audit In Yemen It aimed to investigate the degree to which internal auditors in Yemeni private sector organizations, particularly open and closed joint stock corporations, applied internal audit standards.	The survey discovered that businesses in the private sector are using the internal audit standards (IIA). The study also discovered that there are significant differences in how the IA standards are applied depending on the type of business, with the banking sector coming in first with a percentage of application of 77 percent, which is considered good, the telecommunications sector coming in second with 67 percent, which is above average, insurance companies coming in third.
8) Bhadra & Sekhar, (2010)	The role of auditing and assurance standards in improving audit quality Indian perspectives.	The researcher commented on the role of auditors which was not satisfactory and because of their connivance in these scams their role are further challenged by stakeholders.

Author(s) & Year	Area of Study	Major Findings
	The study involves whether all standards of auditing and assurance are standardized in nature, understanding the relationship between professional ethics and standards of auditing and assurance and whether there exists proper harmonization between Indian and International standards.	The researcher commented on the role of auditors which was not satisfactory and because of their connivance in these scams their role are further challenged by stakeholders. Peer review was considered an effective way to monitor whether audit firms are applying the standards in a proper manner or not. It was observed that since auditor's work is time bound and many times due to competition from other audit firms, many auditors compromise on independence and does not comply with standards or professional ethics.

In all the above literatures Benford's Law was discussed and its usefulness was focussed upon as a superior forensic accounting investigation tool. However, in these papers how to apply Benford's Law to detect irregularities and potential anomalies are not mentioned. Thus, the practical aspect of the technique is not showcased in the previous researches.

Objectives of Study

The following are the objectives of this research:

1) To detect irregularities and potential anomalies in GST collections from West Bengal using Benford's Law.

2) To assess the conformity of GST data (CGST, SGST, IGST, and CESS) to expected patterns and distributions.

Methodology

a) Type of Data: Secondary Data study.

b) Dataset: The dataset used in this research comprises of GST collections of West Bengal state from July 2017 to June 2024, i.e. 7 years segmented into CGST, SGST, IGST, and CESS.

c) Source: The date has been collected from the official website of GST department of Government of India i.e. www.gst.gov.in

d) Tools and Techniques: SPSS and MS-Excel are used for analysing the data. From the 7 years monthly GST collection dataset first leading digits of CGST, SGST, IGST, and CESS collections are obtained. Secondly, we obtained the observed frequency for each type of GST segments and compared with expected Benford's Law Distribution which predicts the probability of each digit. Once observed and expected frequencies are obtained Chi-Square statistic test, Mean Absolute Deviation (MAD), Distortion Factor DF

and Anomaly detection graphs are made for further analysis. Further, ARIMA model test conducted on SPSS to find anomaly and check if GST collection data fits well with Benford's Law Distribution.

Data Analysis and Findings

The dataset used in this research comprises of GST collections of West Bengal state from July 2017 to June 2024, i.e. 7 years segmented into CGST, SGST, IGST, and CESS. The first leading digits of CGST, SGST, IGST, and CESS collections are obtained and accordingly observed as well as expected frequency as per Benford's Law Distribution were obtained.

Chi-Square

Using the frequencies Chi-Square statistic test were conducted to find out whether irregularities or anomalies in the dataset exists or not.

Mean Absolute Deviation (MAD)

MAD can be considered as a critical measure in Benford's analysis. It quantifies the average deviation of the observed digit frequencies from the expected frequencies under Benford's Law. So after Chi-Square statistic test we conducted MAD. The interpretation of the MAD value generally are as follows:

Close conformity: MAD < 0.004

Acceptable conformity:

0.004 < MAD < 0.008

Marginal conformity:

0.008 < MAD < 0.012

Non-conformity: MAD > 0.012

The Mean Absolute Deviation (MAD) is a simple yet effective way to quantify how closely your data follows Benford's Law. It provides a single measure to assess whether the data behaves as expected or if there might be potential anomalies. A small MAD value indicates closer conformity, while larger values suggest the need for further investigation.

Distortion Factor

Next analysis after MAD is Distortion Factor (DF) which provides clear indication of how closely or data conforms to Benford's Law. Higher values suggest greater deviation from Benford's Law.

DF = Calculated MAD/ Benchmark MAD

Benchmark MAD for DF is usually 0.0012 or 0.0015. We have considered 0.0012 for our calculation.

The following thresholds are used as decision criteria for Distortion Factor (DF):

DF < 1.5: Acceptable; the data closely follows Benford's Law.

DF between 1.5 and 2: Moderate distortion; the data shows some deviation from Benford's Law.

DF > 2: Significant distortion; the data likely contains anomalies or has been manipulated

ARIMA (Auto Regressive Integrated Moving Average)

Lastly ARIMA test conducted to identify whether there are any deviations from Benford's expected distribution with focus

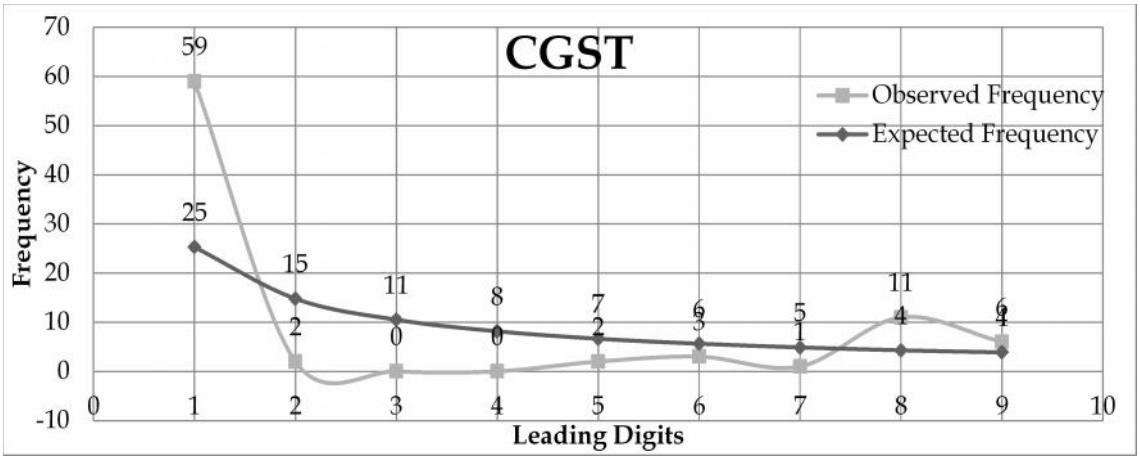
on time series aspect, testing for stationarity, autoregressive, and moving average components. It provides insights whether there exists anomalies, irregularities or trends in GST collection data.

The data analysis are as follows:

Table 3: Benford Analysis for CGST

Leading Digits	Observed Frequency	Observed %	Expected Frequency as per Benford	Expected Benford %	(Observed - Expected)² / Expected	Absolute Difference in %
1	59	70%	25	30.10%	44.96	40.14%
2	2	2%	15	17.60%	11.05	15.22%
3	0	0%	11	12.50%	10.50	12.50%
4	0	0%	8	9.70%	8.15	9.70%
5	2	2%	7	7.90%	3.24	5.52%
6	3	4%	6	6.70%	1.23	3.13%
7	1	1%	5	5.80%	3.08	4.61%
8	11	13%	4	5.10%	10.53	8.00%
9	6	7%	4	4.60%	1.18	2.54%
Total 84	100%	84	100.00%	93.92	101.35%	

Figure2: Expected and Observed Frequency of Leading Digits of CGST Collections as per Benford's Law



Source: Author's Computation

Interpretation: From the above Figure 1 we tried to find out how Benford's Law distribution fits with the leading digits of CGST and we can see major deviation in Leading digit 1 and 2 rest are in close conformity. Using the data of Table 1 we have conducted Chi-Square statistic test to find out whether irregularities or anomalies in the dataset exists or not.

Degrees of freedom (df) = 9 digits (1-9) i.e. 9-1 = 8

p-value for Chi-Square statistic = 0.00

Since p value is less than 0.05 reject the null hypothesis indicating that observed frequencies significantly differ from the expected frequencies. A significant deviation from Benford's Law could indicate potential irregularities or anomalies in the dataset.

MAD = 0.1126 % or 0.001126. MAD conformity achieved.

As MAD<0.006(0.6%)→Close conformity (good)

The result shows close conformity i.e. the data behaves as expected follows Benford's Law.

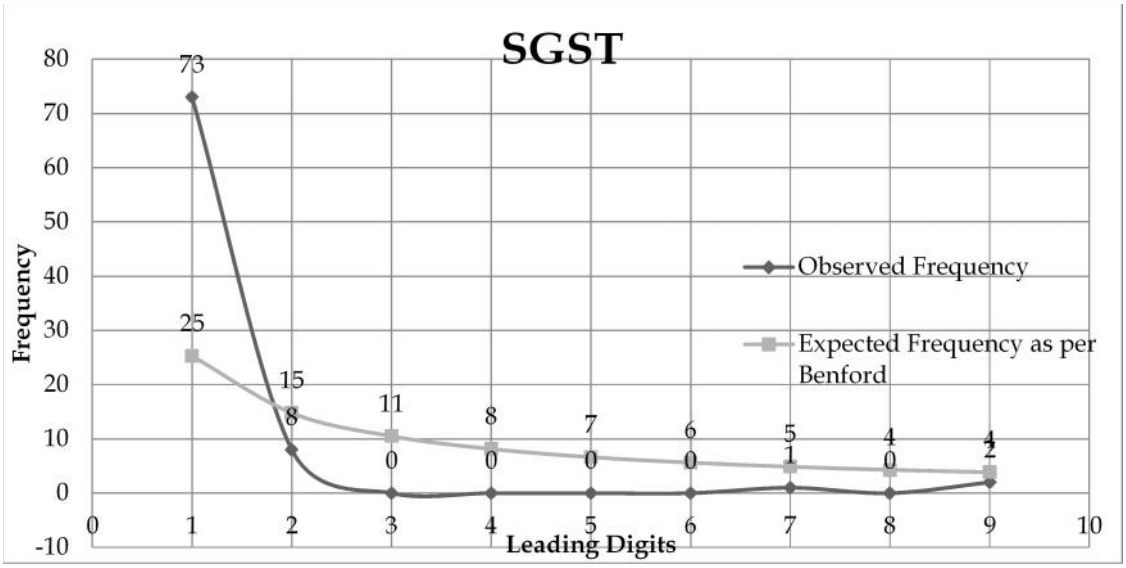
Distortion Factor (DF) = 0.001126/0.0012 = 0.94

DF < 1.5: Acceptable; the data closely follows Benford's Law.

Table 4: Benford Analysis for SGST

Leading Digits	Observed Frequency	Observed %	Expected Frequency as per Benford	Expected Benford %	(Observed - Expected)² / Expected	Absolute Difference in %
1	73	87%	25	30.10%	90.05	56.80%
2	8	10%	15	17.60%	3.11	8.08%
3	0	0%	11	12.50%	10.50	12.50%
4	0	0%	8	9.70%	8.15	9.70%
5	0	0%	7	7.90%	6.64	7.90%
6	0	0%	6	6.70%	5.63	6.70%
7	1	1%	5	5.80%	3.08	4.61%
8	0	0%	4	5.10%	4.28	5.10%
9	2	2%	4	4.60%	0.90	2.22%
Total	84	100%	84	100.00%	132.34	113.61%

Figure3: Expected and Observed Frequency of Leading Digits of SGST Collections as per Benford's Law



Source: Author's Computation

Interpretation: From the above Figure 2 we tried to find out how Benford's Law distribution fits with the leading digits of SGST and we can see major deviation in Leading digit 1 rest are in close conformity. Using the data of Table 2 we have conducted Chi-Square statistic test to find out whether irregularities or anomalies in the dataset exists or not.

Degrees of freedom (df) = 9 digits (1-9) i.e. 9-1 = 8

p-value for Chi-Square statistic = 0.00

Since p value is less than 0.05 reject the null hypothesis indicating that observed frequencies significantly differ from the expected frequencies. A significant deviation from Benford's Law could indicate potential irregularities or anomalies in the dataset.

MAD = 0.1262 % or 0.001262, MAD conformity achieved.

MAD < 0.006 (0.6%) → Close conformity (good)

The result shows close conformity i.e. the data behaves as expected follows Benford's Law.

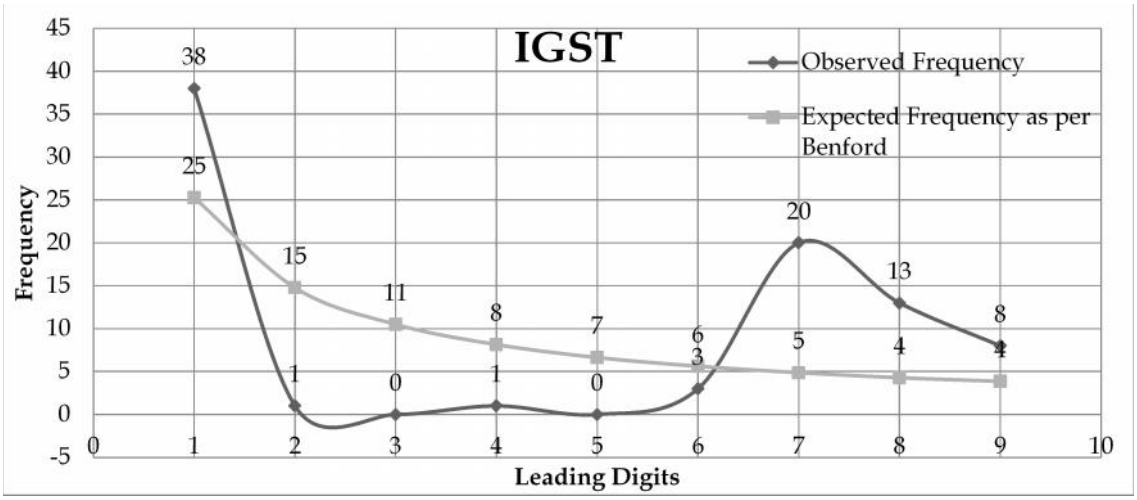
Distortion Factor (DF) = 0.001262/0.0012 = 1.05

DF < 1.5: Acceptable; the data closely follows Benford's Law.

Table 5: Benford Analysis for IGST

Leading Digits	Observed Frequency	Observed %	Expected Frequency as per Benford	Expected Benford %	(Observed - Expected)² / Expected	Absolute Difference in %
1	38	45%	25	30.10%	6.40	15.14%
2	1	1%	15	17.60%	12.85	16.41%
3	0	0%	11	12.50%	10.50	12.50%
4	1	1%	8	9.70%	6.27	8.51%
5	0	0%	7	7.90%	6.64	7.90%
6	3	4%	6	6.70%	1.23	3.13%
7	20	24%	5	5.80%	46.97	18.01%
8	13	15%	4	5.10%	17.73	10.38%
9	8	10%	4	4.60%	4.43	4.92%
Total	84	100%	84	100.00%	113.01	96.90%

Figure4: Expected and Observed Frequency of Leading Digits of IGST Collections as per Benford's Law



Source: Author's Computation

Interpretation: From the above Figure 3 we tried to find out how Benford's Law distribution fits with the leading digits of IGST and we can see major deviation in Leading digit 1, 2 and 7, rest are in close conformity. Using the data of Table 3 we have conducted Chi-Square statistic test to find out whether irregularities or anomalies in the dataset exists or not.

Degrees of freedom (df) = 9 digits (1-9) i.e. 9-1 = 8

p-value for Chi-Square statistic = 0.00

Since p value is less than 0.05 reject the null hypothesis indicating that observed frequencies significantly differ from the expected frequencies. A significant deviation from Benford's Law could indicate potential irregularities or anomalies in the dataset.

MAD = 0.1077 % or 0.001076, MAD conformity achieved.

MAD < 0.006 (0.6%) → Close conformity (good)

The result shows close conformity i.e. the data behaves as expected follows Benford's Law.

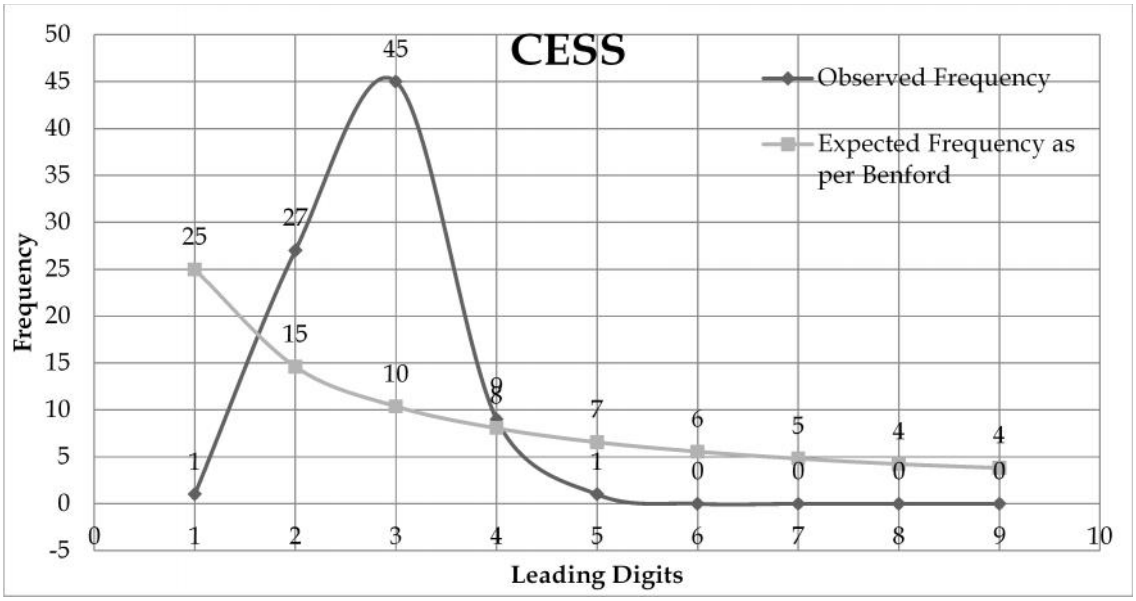
Distortion Factor (DF) = 0.90

DF < 1.5: Acceptable; the data closely follows Benford's Law.

Table 6: Benford Analysis for CESS

Leading Digits	Observed Frequency	Observed %	Expected Frequency as per Benford	Expected Benford %	(Observed - Expected)² / Expected	Absolute Difference in %
1	1	1%	25	30.10%	23.02	28.90%
2	27	33%	15	17.60%	10.51	14.93%
3	45	54%	10	12.50%	115.56	41.72%
4	9	11%	8	9.70%	0.11	1.14%
5	1	1%	7	7.90%	4.71	6.70%
6	0	0%	6	6.70%	5.56	6.70%
7	0	0%	5	5.80%	4.81	5.80%
8	0	0%	4	5.10%	4.23	5.10%
9	0	0%	4	4.60%	3.82	4.60%
Total	83	100%	83	100.00%	172.34	115.58%

Figure 5: Expected and Observed Frequency of Leading Digits of IGST Collections as per Benford's Law



Source: Author's Computation

Interpretation: From the above Figure 4 we tried to find out how Benford's Law distribution fits with the leading digits of CESS and we can see major deviation in Leading digit 1, 2 and 3, rest are in close conformity. Using the data of Table 4 we have conducted Chi-Square statistic test to find out whether irregularities or anomalies in the dataset exists or not.

Degrees of freedom (df) = 9 digits (1-9) i.e. 9-1 = 8

p-value for Chi-Square statistic = 0.00

Since p value is less than 0.05 reject the null hypothesis indicating that observed frequencies significantly differ from the expected frequencies. A significant deviation from Benford's Law could indicate potential irregularities or anomalies in the dataset.

MAD = 0.1284 % or 0.001284; MAD conformity achieved.

MAD < 0.006 (0.6%) → Close conformity (good)

The result shows close conformity i.e. the data behaves as expected follows Benford's Law.

Distortion Factor (DF) = 1.07

DF < 1.5: Acceptable; the data closely follows Benford's Law.

The following are the ARIMA (Auto Regressive Integrated Moving Average) model results in SPSS:

Table7: ARIMA Result Output

Model Fit

					Percentile						
Fit Statistic	**Mean**	**SE**	**Minimum**	**Maximum**	**5**	**10**	**25**	**50**	**75**	**90**	**95**
Stationary R-Squared	.541	.195	.197	.678	.197	.197	.397	.610	.650	.678	.678
R-squared	.541	.195	.197	.678	.197	.197	.397	.610	.650	.678	.678
RMSE	283.425	237.301	73.306	690.363	73.306	73.306	129.013	208.098	475.502	690.363	690.363
MAPE	1605.023	996.333	468.104	3082.022	468.104	468.104	768.123	1396.018	2546.426	3082.022	3082.022
MaxAPE	131533.359	80121.719	37890.885	247737.809	37890.885	37890.885	63158.283	115958.219	207696.005	247737.809	247737.809
MAE	180.048	145.580	51.460	431.550	51.460	51.460	83.600	138.452	297.293	431.550	431.550
MaxAE	1208.226	1054.511	308.423	3020.565	308.423	308.423	525.074	849.824	2070.580	3020.565	3020.565
Normalized BIC	10.893	1.589	8.749	13.180	8.749	8.749	9.635	10.782	12.206	13.180	13.180

Source: Author's Computation

Interpretation of the above SPSS output table are as follows:

Stationary R-squared (0.541)

Interpretation: It measures how nicely the model fits the differenced (stationary) version of the data. A value of 0.541 indicates that 54.1% of the variability in the stationary GST data is explained by the model. A value between 0.5 and 0.7 indicates a moderately good fit. The model explains some patterns in the data which shows GST collections of West Bengal state moderately conforms with Benford's Law.

R-squared (0.541)

Interpretation: The value shows that 54.1% of the variability in the original GST data is explained by the model. It shows moderate explanatory power suggesting that the model captures significant trends in the data, but it's not a perfect fit.

RMSE (Root Mean Square Error: 283.425)

Interpretation: RMSE measures the average prediction error, here the model's predictions deviate from the actual values by about 283.4 units. Such lower RMSE values indicate better model fit.

MAPE (Mean Absolute Percentage Error: 1605.023)

Interpretation: It captures the average absolute percentage difference between the predicted and actual values. MAPE of 1605.023% indicates a high prediction error in percentage terms. The high value shows that the model's predictions are quite far off in percentage terms. Thus, the model may need improvement or that the data itself is highly variable.

MaxAPE (Max Absolute Percentage Error: 131533.359)

Interpretation: The very high percentage error value between predicted and actual values. A MaxAPE of 131,533% suggests that there may be outliers or certain periods in the data where the model is failing to capture important dynamics, further analysis of anomalies are needed.

MAE (Mean Absolute Error: 180.048)

Interpretation: MAE measures the average magnitude of the errors in the same units as the dependent variable (GST collections). On average, the model's predictions are off by 180.048 units.

Assessment: Like RMSE, lower values are better. While it's lower than the RMSE, the MAE provides a more intuitive sense of typical errors in prediction.

MaxAE (Max Absolute Error: 1208.226)

Interpretation: Very high MaxAE of 1208.226 means that the largest deviation between predicted and actual values is 1,208 units. This shows that certain months experience large deviations, suggesting presence of anomalies or outliers.

Normalized BIC (10.893)

Interpretation: BIC (Bayesian Information Criterion) is used for model comparison. Here value of 10.893 can be compared with other models. The model has moderate explanatory power.

Table8: ARIMA Result Output

Model Statistics

Model	Number of Predictors	Model Fit statistics Stationary R-squared	Ljung-Box Q(18)			Number of Outliers
			Statistics	DF	Sig.	
CGST-Model_1	1	.678	24.694	18	.134	0
SGST-Model_2	1	.598	20.484	18	.306	0
IGST-Model_3	1	.510	16.795	18	.537	0
CESS-Model_4	1	.197	18.828	18	.402	0
TOTAL-Model_5	1	.622	20.468	18	.307	0

Source: Author's Computation

Interpretation of the above SPSS output table are as follows:

The above result of ARIMA models for CGST, SGST, IGST, CESS, and TOTAL collections explain a moderate portion of the variance (Stationary R-squared values ranging from 0.197 to 0.678). CGST is having highest explanatory power, while CESS has the lowest.

The Ljung-Box Q test displays no substantial autocorrelation in the residuals for all models (p-values > 0.05), suggesting that the models fit well and residuals are independent. No outliers detected in any of the models. These results imply that the models are moderately effective but further study are required for CESS.

Based in all the above tests and studies the dataset was observed very minutely and certain outliers were found which are as follows:

Table 9: Outliers in GST Collection Dataset

(Figures in Rs. Crores)

Months	CGST	SGST	IGST	CESS	TOTAL
Jul-17	1	1	2	0	3
Apr-20	221	261	149	3	633
Apr-24	2,178	2,640	1,894	581	7,293

Source: Author's Computation

Interpretation: Since GST was introduced for the first time July 2017 data amount is very less shows may be there was under reporting of GST collection. April 2020 is the time when Covid-19 hit for the first time that's why again amount of GST collection is less in comparison to preceding and succeeding months. April 2024 data shows highest GST collections exceptionally high values for all taxes, this could indicate error in reporting or unusual transactions which requires further investigations.

Conclusion

Forensic Accounting is a growing profession in India and professionals here use various techniques for their investigations. In order to identify irregularities, anomalies in financial data Benford's Law serves as a fantastic technique in Forensic Accounting. In this study application of such technique identified potential areas of concern in GST collection of West Bengal which are a publicly available information in GST website. Chi-Square statistic results of all the GST segments shows potential irregularities or anomalies exists in the dataset. The MAD results show close conformity and Distortion Factor (DF) results shows that the data closely follows Benford's Law. The ARIMA results shows that CGST is having highest explanatory power, while CESS has the lowest which means CESS has the highest deviation from Benford's Law which shows potential irregularities. All the tests showed that there are some errors and outliers that exist in the monthly West Bengal GST collections. The Government should periodically review and revise the past data as all records may not be available while publication of data in GST website but subsequently such documents or data may have been available. Some

of these irregularities or outliers are detected and summarized at the end of the data analysis and possible reasoning has been assigned, however there may exist other explanations and reasonings which must be further studied in detail. Further, it can be concluded that Benford's Law serves as a fanciful technique in Forensic Accounting which being easy to understand and implement to detect potential irregularities and frauds in financial datasets.

Conflict of Interests

The authors declare that there is no conflict of interests that are directly or indirectly related to this research work.

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