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ABOUT THE COLLEGE

Hansraj College is one of the largest constituent colleges of the University of Delhi. The college was founded by the D.A.V. College Managing Committee on 26th July, 1948 in the sacred memories of Maharshi Dayanand Saraswati and Mahatma Hansraj who spent their magnificent lives emphasizing the importance of knowledge. It is one of the leading lights in the D.A.V. family of over 700 institutions.

Hansraj College is a premier institution dedicated to teaching and research. It has highly qualified academicians who impart education in Science, Commerce, and Arts at undergraduate and graduate levels to more than 5000 students. The college has consistently demonstrated outstanding performance in academics, sports, and extracurricular activities.

The college has completed 76 years in the realm of imparting higher education. It has made significant and unparalleled contributions in terms of producing scholars, bureaucrats, intellectuals, and sportsperson serving in different domains not only in our own country but even at international levels.

Hansraj College stands at the cusp between the past and the future today. While it retains inspiring facets of its proud history, with an equally sharp gaze it looks ahead, assimilating the exciting world of new knowledge as it unfolds in front of it, holding the promise of an experience seeped with exhilarating learning and holistic growth for all those who enter its portals.

About the Journal

The ***HRC Journal of Economics and Finance*** is a **double-blind peer–reviewed academic journal** for students, researchers, and faculty to showcase their research pertaining to the discipline of economics and business. It is an international journal. Our mission is to provide a platform through which scholars can publish their scholarly findings to showcase them with the research community at large. We invite research papers and articles on topics related to the field of economics, business and management for its quarterly journal publication.

Message from the Principal

The launch of the *HRC Journal of Economics and Finance* is a milestone that marks our dedication towards providing a platform to young researchers in the field of economics and finance. It is even more fortuitous that the launch has been manifested in the Platinum jubilee year of the college, the Centenary year of the University of Delhi and the 75th year of India's independence.

The New Education Policy, 2020 has launched a paradigm shift that encourages research both at the faculty and student level. Accordingly there is a growing need to provide credible platforms to present research outputs at all levels. This journal fills a significant gap and will contribute to fostering a research ecosystem thereby advancing the objectives of the NEP 2020. This journal will provide an opportunity to students, teachers and scholars, around the world to come together and showcase the links between classroom teaching and their practical training.

I congratulate the authors whose papers/articles have been published in the journal and encourage others to contribute to future issues. Appreciation is due to the Editor In-Chief of this journal, Dr. Apoorva Gupta who has worked tirelessly for the successful launch of this issue of the journal. My best wishes for the success of this venture.

Prof. (Dr.) Rama
Principal
Hansraj College

From the Editor's Desk

Dear Readers,

It is my great pleasure and privilege to present the next issue of the Journal of Hansraj College, the *HRC Journal of Economics and Finance*. The journal provides a platform to young researchers in the field of economics, business, social sciences, finance and management to publish their scholarly articles. Our inclusive nature ensures that we cover the wide range of issues in the field. This issue features a diverse range of articles that provide insightful analyses and innovative perspectives on various contemporary economic topics.

We have received around thirty papers relevant to the field of development economics, political economy, macroeconomic policy, financial markets, international trade, and behavioral economics. All the papers went through three rounds of review process, first by the editors and then by the review board. All the papers have gone through double blind peer review process. The authors were communicated with the revisions. The papers were accepted only after the satisfactory revisions were being made. We strictly follow the research ethics and do not tolerate plagiarism. All the selected papers were tested for plagiarism before publication. We have worked tirelessly to bring out the fourth issue of the journal with high quality research work.

Writing quality research papers takes a lot of time and effort, and the authors must be congratulated for writing their research papers for the journal, which is launched in the Platinum Jubilee year of the college, the Centenary year of the University of Delhi and the 75th year of India's independence. We also take this opportunity to congratulate the review board of this issue for their constant academic support for the timely release of the journal. We also thank the support received from the Principal of the college, Prof. (Dr.) Rama, the Advisory Board and the Editorial Board.

We hope that readers find the articles interesting, informative and engaging, and enjoy reading it. We believe that this effort of ours will stimulate further research and discussion in the field of economics and finance, and encourage readers to write for further issues of the journal. We look forward to receiving your feedback and suggestions for future issues.

Disclaimer: The opinions expressed in this journal belong to the contributors and do not necessarily reflect the viewpoints of the college, the editors, the Advisory Board, the Editorial Board, and the Review Board of the *HRC Journal of Economics and Finance*.

Dr. Apoorva Gupta
Editor In-Chief

Email: editor.jef@hrc.du.ac.in
Website: Hansraj College, University of Delhi

Members of the Team

Publisher

Dr. Apoorva Gupta
Assistant Professor
Department of Economics
Hansraj College
Email: editor.jef@hrc.du.ac.in

Issuing Body

Hansraj College
University of Delhi
Mahatma Hansraj Marg
Malka Ganj
New Delhi - 110007

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Unsecured Savings: Retiring population in Africa

Clever Dhewa[1], Commerce Division, Harare Polytechnic and Faculty of Business Management Sciences and Economics, Department of Finance and Accounting, University of Zimbabwe

Wellington Garikai Bonga, Department of Law, University of Nicosia Africa, Lusaka, Zambia

Nombeko Gumbo, Graduate School of Business, National University of Science and Technology, Zimbabwe

Shepard Makurumidze, Faculty of Business Management Sciences and Economics, Department of Finance and Accounting, University of Zimbabwe

Abstract

The issue of unsecured savings among Africa's retiring population is a pressing concern, given the continent's unique socio-economic challenges. With a predominantly informal labour market, a low savings culture, and diminishing social protection, many Africans face financial insecurity in retirement. Statistical evidence shows that the majority of employees in Africa do not make savings for post-retirement phase, and only very few of the working-age population contribute to pensions. Financial literacy remains low, exacerbating the risks associated with inadequate retirement planning. Investment avenues in many African nations are limited and often unstable, further complicating the financial landscape for retirees. The study sought to establish the critical reasons contributing to low retirement savings rate among Africa's aging population. The study employed an explanatory approach, backed by empirical literature and theories to explore unsecured savings concerning retiring population in Africa. Four critical theories related to financial behaviour are explored - the lifecycle hypothesis, the permanent income

[1] Corresponding Author, Email: cleverdhewa@gmail.com. ORCiD: 0009-0006-4166-2934

hypothesis, the financial planning theory, and behavioural economics theory - to have understood the causes of low savings behaviour in Africa. The study found that the challenges surrounding unsecured savings among Africa's retiring population are significant and multifaceted. The labour market in many African nations is largely informal, financial literacy is low for the retirees, nations have shrinking social protection, and there exist limited investment avenues, of which the few existing are not stable especially for the longer term. The observed issues confirm that many individuals face an uncertain financial future in retirement. The study recommends enhancing financial literacy, expanding access to secure savings options, fostering a savings culture, promoting investment in diverse avenues, and reforming social protection mechanisms to ensure a more secure financial future for Africa’s retirees.

Keywords: Africa, Financial insecurity, Financial literacy, Informal Labour Market, Investment avenues, Pension, Savings culture, Social protection, Unsecured savings, Retirement.

JEL Codes: D14, D91, G11, I38, J26, O55

1. Introduction

Retirement planning is critical for post-retirement financial stability of the old age population, yet a significant portion of Africa's population is unprepared for this transition. Retirement insecurity in Africa poses a major challenge, arising not only from the current absence of social protection for the elderly but also from the anticipated rapid increase in their population in the years ahead (Keith, 2024).Statistical evidence shows that 91% of employees in Africa do not plan for retirement (Nyang'oro, 2023), and only 9.6% of the working-age population contributes to pensions (Parmar, 2025). Observing adult poverty levels in the continent points that there are challenges in generating wealth for retirees. There is poverty observed for the old-aged African population where adult poverty levels in Africa remain alarmingly high, with approximately 40% of the adult population living far below the acceptable international poverty datum line as defined by the World Bank (World Bank, 2023). The continent faces a unique set of challenges that hinder effective savings for retirement. With a labour market characterized by

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informality, insufficient social safety nets, and low financial literacy, many individuals find themselves in precarious situations as they approach retirement age. The necessity for secure savings options cannot be overstated, especially as the demographic shifts towards an aging population. The continent is witnessing a significant demographic shift, with an increase in old projected to double by 2050 (Duhon et al., 2023). The projected rapid increase presents unique socio-economic constraints, particularly in a region characterized by a predominantly informal labour market, a low savings culture, and inadequate social protection systems.

Unsecured savings refer to funds that lack adequate protection and stability, making them vulnerable to loss or depreciation. This term is often used interchangeably with "insecure savings", but it emphasizes the uncertainty and potential dangers associated with those savings. This type of savings often arises from informal saving behaviours or relying on unregulated savings groups, which do not offer the same security as formal banking systems. Additionally, insecure savings may be subject to inflation, leading to a decline in purchasing power over time, and can be tied to volatile investments that are prone to significant fluctuations. The financial landscape in regions like Africa highlights the precariousness faced by individuals who lack proper financial literacy and access to secure savings options, leading to increased economic vulnerability (Beck et al., 2023; Dhewa et al., 2024; Alphonce et al., 2024). Overall, unsecured savings can pose substantial risks, particularly for individuals without stable incomes or those approaching retirement, as they may struggle to meet financial obligations in times of crisis.

The study sought to ascertain the critical reasons contributing to the low retirement savings rate among Africa's aging population. Specific objectives include analysing the effects of a predominantly informal labour market on savings behaviour, assessing the influence of financial literacy on retirement, and identifying barriers to accessing pension schemes. The research further sought to explore the influence played by socio-economic constraints, low employment and economic instability, on individuals' ability to save for retirement. Through applying theoretical frameworks, the research gives information on factors influencing saving behaviours. Ultimately, the study aims to recommend actionable strategies for enhancing financial literacy, expanding secure savings options, and reforming social protection mechanisms to improve the financial security of retirees across the continent.

The study contributes significantly to the discourse on financial security for retirees by addressing the critical issue of low savings rates in the context of Africa's socio-economic landscape. It provides a broad analysis on barriers which prevent retirement preparedness, particularly in informal labour markets where the majority of workers operate without adequate financial safety nets. Integrating theoretical frameworks, the study offers nuanced insights into the psychological and economic factors affecting savings decisions. Furthermore, the research highlights the urgent need for policy reforms aimed at improving financial literacy and expanding access to secure savings options, thereby fostering a culture of saving. This contribution is essential not only for academic discussions but also for guiding policymakers in developing sustainable retirement solutions that can enhance the financial future of Africa's aging population.

This explanatory study is arranged in six sections namely introduction, presentation and discussion of challenges that hinder effective savings for retirement, theoretical review, presentation and justification, the research methodology for this study, presentation of policy recommendations, and conclusion of the paper.

2. Challenges that hinder effective savings for retirement.

With a labour market marked by informality, and inadequate social safety net, many individuals in Africa face precarious circumstances as they near retirement age (Alphonce et al., 2024).The savings rate in Africa remains notably low compared to other regions. However, is that certain Pentecostal movements in Africa are promoting a structured approach to saving, investing, and building wealth (Mahuni, Taru & Bonga, 2020). According to the World Bank, the average gross savings rate in Sub Saharan Africa (SSA) was approximately 15% of GDP in 2021, significantly lower than the global average of about 25% (World Bank, 2023a). Furthermore, a report by the International Monetary Fund (IMF) highlights that many countries in Africa experience challenges in mobilizing domestic savings. For example, 10% of retirees in many African nations have access to formal savings accounts (IMF, 2022). Additionally, the Sanlam Financial Confidence Index (2024) indicates that 54% of South Africans earn less than R8,000 per month, contributing to a culture of low savings and financial insecurity, particularly among the retiring population (Sanlam, 2024). The challenges that hinder effective savings for retirement are as explained below.

- **The Informal Labour Market:** The informal labour market institutes a substantial part of the African economy. The International Labour Organization asserts that more than 80% of the workforce in SSA is employed informally (World Bank, 2012). This informal employment often lacks the benefits associated with formal jobs, such as retirement plans, health insurance, and job security. As a result, workers in the informal sector are particularly vulnerable to financial instability during retirement. In support, Keith (2024) echoed that the predominantly informal nature of the labour market in many African nations leaves many individuals without access to formal pension systems. The lack of formal employment benefits translates into a low savings rate. Nyang'oro (2023) emphasizes that 91% of SSA workers do not save for old age, illustrating the severity of the issue. Without employer-sponsored retirement plans or access to formal savings vehicles, these individuals often rely on familial support or government assistance, which can be unreliable. Nowadays, the strength of social capital to arrest old age poverty has declined significantly due to an increase in youth unemployment and unmatching industrial growth in the continent.
- **Diminishing Social Protection:** Social protection is a vital social right acknowledged in various frameworks, and the majority of nations worldwide. In Africa, the growing population of elderly individuals in many countries underscores the urgent need to implement social security through administration of pension to the old population (Thovoethin & Ewalefoh, 2018). In general, Africa's social protection framework plays a significant role in the prevailing poverty levels, leaving many individuals susceptible to economic shocks (African Union, 2024). Several African nations are striving to broaden their social protection coverage. Notable examples include Egypt's Takaful and Karama Programme, Botswana's extensive social safety nets, and Morocco's initiatives aimed at universalizing social protection, including health insurance and family allowances. The diminishing landscape of social protection in Africa exacerbates the financial insecurity of the retiring population. Many governments have struggled to maintain robust pension systems due to economic constraints and

political instability. As noted by Thovoethin & Ewalefoh (2018), the challenges in implementing universal old-age pensions highlight the systemic issues within the continent's social protection frameworks.

An insignificant percentage of the employees are actively contributing to retirement pension schemes. According to FSD Africa (2025), pension coverage remains low with only 9.6% of active contributors from the working-age population. This lack of coverage leaves many individuals without a financial safety net during retirement, pushing them into poverty. Accordingly, Nyang'oro (2023) echoed that pension schemes in Sub Saharan Africa are marked by low uptake stemming from poor salaries, and unfavourable socio-economic challenges bedevilling many countries in the continent.

Government policies in many African nations are hindering the potential to fully utilize the well-established social protection programs for enhancing financial inclusion. For instance, South African Social Security Agency (SASSA) oversees a social protection program that serves approximately 11 million individuals. Although government policies facilitate direct transfers to recipients' accounts with Post-bank (the default option) and other banks selected by recipients, they limit Postbank's services to merely crediting benefits and allowing the full withdrawal of the transferred amount (Natarajan, Randall & Reddy, 2022).

Official Development Assistance (ODA) is vital for supporting poverty reduction initiatives in Africa. While ODA to the continent has increased in absolute terms over the years, it still falls significantly short of Africa's financing requirements (African Union, 2024).

- **Low Financial Literacy:** Retirement should be seen as a lifelong financial journey that demands ongoing planning and adjustment (Business Live, 2024). Financial literacy is a vital component of effective retirement planning, yet it remains alarmingly low in Africa. A survey by Dhewa et al. (2024) indicates that several employees have low levels of financial skills to make informed decisions regarding their retirement savings. This deficiency is particularly evident among low-income households, where financial education is often limited.

  The consequences of low financial literacy are profound. Many individuals lack consciousness of the significance of savings, leading to inadequate preparation for old age. Zeka & Kinsman (2025) highlight that the reliance on short-term financial solutions often overshadows the need for long-term savings strategies. This results in a cycle of debt and financial insecurity.

- **Investment Avenues and Cost of Living:** The investment landscape in Africa is limited, with few stable avenues for individuals to grow their savings. The lack of diversified investment options hampers the ability of individuals to secure their financial futures. As per the STANLIB Savings Report (2020), the high cost of living further compounds the challenges faced by retirees, as many individuals find it difficult to save when a significant portion of their income is consumed by everyday expenses.

  As a result, many individuals resort to debt to maintain their living standards, which can lead to severe financial distress in retirement. The combination of high living costs and limited investment opportunities creates an environment where saving for retirement becomes increasingly difficult.

  Due to lack of investment avenues, many people in Africa have resorted to stokvels. Stokvels are informal savings clubs, where groups of individuals come together to contribute a fixed amount of money regularly. The pooled funds are then collectively distributed among members at designated intervals. Some researchers have proposed incorporating retirement planning into stokvels to enhance their contribution to financial growth (Business Live, 2024). They opined that participating in stokvels, can improve savings rates and offer solutions that are culturally appropriate.

  The increasing cost of living has a significant effect on people's finances in Africa, impacting their financial well-being in various ways. With a substantial part of salaries devoted to essential expenses, individuals remain with low disposable income hindering retirement planning (FinMark Trust, 2024). The financial constraints hinder their ability to plan for the future and reach their financial objectives.

- **Pension Schemes:** The challenges that hinder effective savings for retirement in Africa are also closely linked to the predominant classification of pension schemes into defined benefit and defined contribution plans. Defined benefit schemes, which promise a specific payout at retirement, often place financial strain on employers and can lead to underfunding, reducing their effectiveness (Nyang'oro & Njenga, 2022). Conversely, defined contribution plans rely heavily on individual contributions, which can be inadequate due to low income levels and limited financial literacy among workers (Hartley & Abels, 2025). This dual structure can exacerbate the difficulties employees face in accumulating sufficient retirement savings.

- **Previous colonies:** The historical context of colonization in many African countries significantly impacts the current challenges hindering effective retirement savings among citizens. Colonial legacies often resulted in economic structures that favoured extraction over sustainable development, leaving many nations with weak financial systems and limited access to financial education (Nyang'oro & Njenga, 2022). This has created a landscape where low income levels and high unemployment rates prevail, and make it hard for individuals to save adequately. Additionally, the lack of trust in financial institutions, stemming from historical exploitation, contributes to a reluctance to engage with formal savings mechanisms.
- **Unfavourable socio-economic conditions:** The adverse socio-economic conditions in numerous African countries impede the working population's ability to save, which in turn affects their financial well-being after retirement (Dhlembeu, Kekana & Mpinda, 2023). These socio-economic challenges include high family expenditures, large family sizes, and low levels of financial education, elevated interest rates, hyperinflation, fluctuating exchange rates, and low income levels. As supported by Karakara, Sebu & Dasmani (2022), all these factors have a negative influence on workers` ability to make savings.

3. Theoretical framework

Understanding the factors influencing savings behaviour in Africa can be enhanced through various economic theories. This section discusses four critical theories namely; Life Cycle Hypothesis, Permanent Income Hypothesis, Theory of Planned Behaviour, and Behavioural Economics theory.

- **Lifecycle Hypothesis:** The lifecycle hypothesis (Modigliani & Brumberg, 1954) postulates that people plan for consumption and save over time. The theory asserts that workers save during period of work life to meet future post-retirement consumption. In the context of Africa, the high prevalence of informal employment and low income growth disrupts this lifecycle planning. Many individuals lack the means to save adequately during their working years, resulting in insufficient funds upon retirement.

- **Permanent Income Hypothesis:** The theory was propounded by Friedman in 1957. It suggests that people derive their consumption patterns on projected future income levels than present income level. In Africa, low and fluctuating incomes, especially in the informal sector, hinder individuals' ability to form accurate expectations about future income. This uncertainty leads to a reliance on instantaneous consumption than saving, further exacerbating the financial challenges faced during retirement.
- **Theory of Planned Behaviour:** The theory was postulated by Ajzen in 1991. It examines the relationship between attitude, norms, and personality on financial behaviour. In the context of savings, individuals' beliefs about saving and the social pressures they face can significantly impact their willingness to save for retirement. The low financial literacy prevalent in Africa can negatively influence attitudes towards saving, while cultural norms may prioritize immediate family support over personal savings.
- **Behavioural Economics:** The theory examines the influence of psychological factors on financial planning. This field highlights the tendency for individuals to favour immediate gratification over long-term benefits, often referred to as present bias. In Africa, the culture of consumerism and reliance on credit can lead to a neglect of savings. As noted by Zeka & Kinsman (2025), this behaviour can create a cycle of debt that further undermines retirement security.

In conclusion, the examination of savings behaviour among Africa's retiring population through the lens of various economic theories illuminates the complex interplay of factors at play. The Life Cycle theory and Permanent Income Hypothesis underscore the challenges posed by irregular income streams and inadequate planning due to informal employment. Meanwhile, the Planned Financial Behaviour theory highlights the effects of social norms on financial capability, which can either motivate or hinder savings efforts. Lastly, insights from Behavioural Economics reveal the psychological barriers to long-term savings, exacerbated by cultural tendencies toward immediate consumption. Collectively, the theories provide a framework for understanding the multifaceted issues surrounding unsecured savings in Africa. Addressing these challenges requires a concerted effort to enhance financial literacy, improve access to secure savings options, and reform social protection systems, ultimately fostering a savings culture that can safeguard the financial future of retirees across the continent.

4. Policy Recommendations

Addressing the challenges of unsecure savings among Africa's retiring population requires a multifaceted approach. The need for multifaceted approach to address the challenges has been emphasized from the reviewed theories (Life Cycle Hypothesis, Permanent Income Hypothesis, Theory of Planned Behaviour, and Behavioural Economics theory) and various reviewed previous studies. The current study best blends the solutions to ensure improved and more informed interference for a better Africa. The following policy recommendations aim to enhance financial security for retirees:

- **Enhance financial literacy programs:** There is need to prioritise financial education by the Government and financial intermediaries aimed at educating individuals about retirement planning and savings. Programs should focus on providing practical information and tools to help individuals understand the significance of retirement planning and how to effectively manage their finances. Alphonce et al (2024) insist on expanding lifelong learning programs to enhance financial literacy among the aging. The authors indicated that this can be achieved through social work and government intervention programmes. A higher degree of financial confidence empowers individuals to overcome financial constraints, diligently track their financial objectives, and attain financial stability.
- **Expand access to formal savings vehicles:** Efforts should be made to improve access to formal savings channels, particularly for individuals in the informal sector. This can include the development of low-cost savings accounts and retirement plans that cater to the unique needs of low-income earners.

- **Strengthen social protection systems:** Governments must work towards strengthening social protection systems to ensure that all citizens have access to adequate retirement benefits. This may involve implementing universal pension schemes and increasing contributions from both employers and employees. With strong political commitment and effective administration, social security can transform lives and shape societies across all regions of the globe (International Social Security Association, 2016).
- **Promote investment in diverse avenues:** Encouraging investment in an array of financial products can help individuals grow their savings. There is need for collaborations by the governments and financial intermediaries to create a more stable investment environment that provides diversified options, including low-risk investment funds and community investment initiatives.
- **Foster a savings culture:** Public campaigns promoting the benefits of saving and responsible financial behaviour can help shift societal attitudes towards savings. Engaging community leaders and influencers can enhance the effectiveness of these campaigns. Utilize innovations in digitalisation to boost retirement saving. The implementation of digital solutions can enhance coverage, particularly in the informal sector, by simplifying the enrolment process and facilitating contributions to pension funds (Nyang'oro, 2023).
- **Pension scheme model:** Creating a pension scheme model that caters to Africa's largely non-payrolled workforce is essential. This will not just help mobilizing savings, but also for preventing widespread poverty among the elderly due to rapid urbanization and the corresponding decline of traditional kinship-based systems of old-age security (Mo Ibrahim Foundation, 2024). Also, as indicated by Nyang'oro (2023) enhancing pension membership and exposure by incorporating everyone is a key. There is need for Africa to adopt a combination of world-wide retirement systems alongside those that involve payroll deductions and employer contributions. Encouraging higher contributions through employer matches, and exploring hybrid models that combine the stability of defined benefits with the flexibility of defined contributions (Pillay & Fedderke, 2022).
- **Development of a suitable framework for financial well-being:** Creating a framework for financial well-being for retirees would be a suitable solution to

address the challenges faced by retirees. This would cater for all the needs of retirees in their post-retirement living.

- **Encouraging private sector in enhancing financial literacy:** Through engagement, policy makers can seek private sector support to enhance financial literacy. The private sector can play a crucial role in helping employees save for retirement by enhancing their financial literacy. Employers can conduct training sessions focused on retirement planning, investment strategies, and budgeting skills. Through providing employees with the knowledge and tools necessary to manage their finances effectively, companies capacitate people on effective retirement planning. Additionally, employers can offer workshops on understanding retirement accounts and the benefits of consistent contributions. This proactive approach not only prepares workers for their financial future but also fosters a culture of financial awareness within the companies, ultimately leading to a more secure retirement for employees.

In summary, addressing the challenges of unsecured savings among Africa's retiring population necessitates a multifaceted approach that draws from the insights provided by established economic theories. Key policy recommendations include enhancing financial education programs to capacitate people with financial knowledge needed in the effective retirement planning process, expanding access to formal savings vehicles tailored to low-income earners, and strengthening social protection systems to ensure adequate retirement benefits for all. Additionally, promoting diverse investment opportunities and fostering a savings culture through public campaigns can significantly shift societal attitudes towards saving. Through implementing these strategies, policymakers can create a more secure financial future for retirees in Africa, ultimately reducing financial insecurity and enhancing overall well-being.

5. Conclusion

The challenges surrounding unsecured savings among Africa's retiring population are significant and multifaceted. The research reveals that the predominantly informal labour market, low levels of financial literacy, diminishing social protection, and limited investment avenues contribute to an uncertain financial future for many individuals in retirement. Employing a comprehensive methodological approach, this study utilized extensive literature reviews and an explanatory research design to investigate these issues. Through integrating established economic theories (Life Cycle theory, Permanent Income Hypothesis, Planned Financial Behaviour theory, and Behavioural Economics) the study offered a nuanced understanding of the factors influencing savings behaviour in the African context. Through this analytical framework, targeted policy recommendations were developed, including enhancing financial literacy programs, expanding access to formal savings vehicles, and strengthening social protection systems. These strategies aim to empower people with the financial knowledge and resources for use in the post-retirement phase. Furthermore, fostering a culture of savings through public campaigns and promoting diverse investment opportunities can help shift societal attitudes towards saving.

Addressing these issues is not only crucial for individual well-being but also vital for the continent's broader economic development and social stability. A secure financial future for retirees can lead to reduced poverty rates among the elderly, increased consumer confidence, and overall economic resilience. Therefore, it is imperative for governments, financial institutions, and communities to collaborate in creating an environment that supports and encourages saving behaviour. Ultimately, a collective effort will significantly enhance sustainable development of Africa, fostering resilience and prosperity for future generations. In conclusion, the research effectively achieved its objectives of investigating the critical factors contributing to low retirement savings among Africa's aging population. It reviewed the impact of the informal labour market, revealing how irregular income and lack of formal employment hinder savings. The assessment of financial literacy underscored its vital role in retirement planning, showing that low awareness of financial products impedes savings efforts. Additionally, the study identified barriers to accessing pension schemes and explored socio-economic constraints, like low employment and economic instability, that exacerbate financial insecurity. Relying on theoretical frameworks, the research provided insights into the motivations affecting savings decisions and formulated actionable strategies to enhance financial literacy, expand secure savings options, and reform social protection mechanisms.

Recommendations aim to improve retirees' financial security, emphasising the necessity of ways to foster a sustainable financial future for Africa's aging population.

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A Social, Religious, Rural-Urban and Regional Analysis of Average Monthly Expenditure & Earnings of Households of Uttar Pradesh, India

Rakesh Kumar[1], Assistant Professor, Motilal Nehru College, University of Delhi

Ajad Singh, Professor, Motilal Nehru College, University of Delhi

Amulya Kr. Sahoo, Assistant Professor, Shyama Prasad Mukherjee College, University of Delhi

Abstract

This paper discusses the inequality in average monthly expenditure and earnings across households in Uttar Pradesh. The study is based on the Periodic Labour Force Survey (PLFS) 2023–24 unit-level data for Uttar Pradesh, covering a sample of 9,086 households. PLFS collects data on various aspect of the population like social groups, regional variations, Inequality across different categories are found to be significant and within the groups of various categories, inequality was found to be right loaded. Except religion all other bases of differentiation were found to have an impact on the average monthly expenditure. To measure inequality, tools like Gini Co-efficient, KD curve and Generalised index were calculated. Regression analysis also proved the point that all factors except religion were very significant in determining monthly expenditure of the households**.**

Keywords: Social, Religious, Regional, Rural, Urban, Consumption-expenditure GE (Index), Gini Coefficient, K-D curve

JEL Classification: D31, D63, C14, C21, C51, R23, R 58, O15

[1] Email: agahrakesh@mln.du.ac.in

1. Introduction

Household consumption expenditure is a key indicator of the economic behaviour and financial capacity of households. Amount of money households spend on goods and services, housing costs, rent and utilities—as well as spending on public services including education and healthcare forms the total consumption expenditure. This paper explores the possibility of resource generating and expenditure capacity being related to some caste-based criterion in addition to religious, regional and place of residence identities. This study uses data from Periodic Labour Force Survey (PLFS) Data of 2023-24. PLFS data combines population into 04 social groups; General, OBC, SC, and ST. Religion, region and place of residence are other criteria upon which earning and expenditure data is collected and considered for the study of average monthly expenditure and earnings. PLFS survey divides Uttar Pradesh into five major regions i.e.; western plain, eastern plain, central plain, central high lands and Bundel-Khand region. Hindu, Muslim and others are three religious groups considered by survey.

To understand economic trends and behaviour of the individuals, consumption expenditure is one of the most important factors. It provides an insight into consumer confidence and living standards but also plays a central role in assessing economic growth, inflation dynamics, and overall economic health (Madudova & Corejova, 2024). Since household spending constitutes a significant portion of a country's gross domestic product (GDP), changes in this expenditure can signal shifts in economic activity, prompting adjustments in fiscal and monetary policies. Therefore, analysing household consumption is essential for policymakers, economists, and financial institutions to gauge economic stability and forecast future economic performance. Consumption expenditure is one of the important factors in determining aggregate expenditure in the economy and overall GDP growth. Differences in consumption expenditure across social groups in India are largely driven by disparities in household characteristics, particularly education and employment status. This point to underlying structural issues that contributes to persistent social group-based inequality in consumption. From the point of view of government policies, household consumption expenditure serves as a key metric for evaluating the overall financial well-being of citizens. These spending patterns allow governments to make informed decisions that aim to maintain economic stability, support growth, and improve public welfare. Consumption expenditure, calorie intake and level of poverty are considered to be related to each other (Kapoor, 2020). Average earnings can differ across regions, indicating the presence of "between-group" inequality. Additionally, earnings variations within each region contribute to the "within-group" component of overall inequality. For effective policymaking, it is important to distinguish and analyse these sources of inequality. If a significant portion of inequality stems from regional disparities, policy efforts may need to prioritize regional economic development, particularly targeting less affluent areas. Decomposing inequality helps in identifying its key drivers and supports more informed and targeted policy decisions. The education level of the head of household emerges as the most significant contributor to inequality, followed by household size, social group, and the source of energy for lighting in Uttar Pradesh during the years 2005, 2006, and 2007 (Pandey, 2013).

India is a vast and diverse country, comprising 28 states and 8 union territories. It exhibits significant regional, social, and religious diversity. With ongoing development, a rapidly widening rural-urban gap is also becoming increasingly evident. India's regional, religious and caste diversity significantly impacts borrowing and spending behaviour (Rana et al., 2023). Population wise Uttar Pradesh is largest state of India. In 2023-24, the average Monthly Per Capita Expenditure (MPCE) in India was estimated at Rs. 4,122 for rural areas and Rs. 6,996 for urban areas. The gap between urban and rural MPCE at the national level has been shrinking. It dropped from 84% in 2011-12 to 71% in 2022-23, and further reduced to 70% in 2023-24. All 18 major states saw an increase in average MPCE for both rural and urban areas during this period (Government of India, Ministry of Statistics & Programme Implementation, 2025).

Recent national estimates of the Multidimensional Poverty Index (MPI) reflect notable progress since 2015–16, including in Uttar Pradesh, yet the state still accounts for a large absolute share of deprived households. This underscores the magnitude of the policy agenda (NITI Aayog, 2023, 2024). Its demographic scale, low degree of urban concentration, and modest per-capita income growth make Uttar Pradesh a critical and distinctive case for studying inequality patterns in present-day India.

An examination of disparities in both household income and expenditure in Uttar Pradesh is particularly relevant for two reasons. First, in economies characterized by low average earnings and widespread informality, household consumption provides a more stable indicator of welfare compared to reported income, which is often volatile and subject to measurement challenges. Second, analyzing income alongside expenditure yields insights into labour-market outcomes, exposure to risk, and the ways in which families mitigate shocks through transfers, migration, or asset liquidation. The availability of the 2023–24 PLFS survey round makes it possible to construct state-representative estimates of per-capita monthly income (PCI) and per-capita monthly consumption expenditure (PCE).

Because Uttar Pradesh accounts for a very large share of India's population, even incremental improvements in distribution translate into significant gains in absolute welfare. On the other hand, persistent inequalities directly affect millions of people. With its predominantly rural economy, limited urban base, and fiscal constraints, the state provides a demanding test of whether recent public investments in infrastructure and welfare delivery are effectively reaching disadvantaged sections to reduce gaps in consumption and enhance income-generating capacity. By presenting carefully disaggregated estimates for both PCE and PCI, and clearly outlining the scope and limitations of PLFS data, the study contributes evidence that is academically rigorous while being directly applicable to state-level policymaking. The discussion moves from descriptive statistics to formal inequality indices and finally to econometric analysis of how expenditure patterns vary with income and socio-economic characteristics in Uttar Pradesh.

2. Literature review

Kumar et al. (2024) conducted a comprehensive study on income and wealth inequalities in India spanning the period 1922–2023. Their findings suggest that inequality declined until the early 1980s but began to rise with the onset of economic reforms, with India's regressive tax structure identified as a key driver of this resurgence. Kapoor (2022) complements this view by arguing that the adoption of socialist policies in the post-independence period contributed significantly to reducing inequality up to the 1970s. He further emphasizes the need to shift analytical attention from wealth inequality to income inequality for a more accurate assessment of disparities. In contrast, Anand and Kumar (2023), examining wealth inequality between 2012 and 2018, challenged the official narrative of a decline. They argued that survey data underestimates the wealth held by the richest households by about 54%, concluding that wealth concentration has in fact intensified during this period.

Adding to this body of work, Asher et al. (2022) explored intergenerational mobility in India. To overcome data limitations common in developing economies, they introduced a new methodological approach and revealed that intergenerational mobility has been persistently low, especially for daughters across social groups, when compared to sons. Earlier, Haughton (2009), in the seminal *Handbook on Poverty and Inequality*, provided foundational insights into the concepts and measurement of poverty and inequality, employing tools such as the Lorenz curve, the Kakwani method, and the Reynolds–Smolensky approach to assess how taxation affects distributive outcomes. In a related study, Borooah et al. (2014) analyzed rural households using monthly per capita consumption expenditure (MPCE). They highlighted the persistent trade-off between poverty reduction and inequality, noting that caste-based disparities remain deeply entrenched, with Scheduled Castes being most severely affected. These findings are supplemented by Pathak (2011) and he finds that poverty decreased but inequality increased in Uttar Pradesh between 1993-94 and 2004-05, primarily driven by income growth with regional variations. The methodology involved decomposition analysis using Foster-Greer-Thorbecke (FGT) poverty measures, Theil's inequality index, and Datt-Ravallion growth-inequality decomposition on NSS data This is corroborated by Sahoo et al. (2024) found poverty changes varied across Uttar Pradesh regions (2004-2005 to 2011-2012). The central region experienced increased poverty, while other regions saw differential reductions. This was explained by growth elasticity and structural factors such as occupational shifts and landholding patterns, with low poverty elasticity contributing to slower reductions in some areas despite growth.

Expanding the methodological frontier, Azpitarte and Alonso-Villar (2011) introduced Lorenz dominance criteria based on Ray invariance, offering an intermediate tool for comparing income distributions that improves upon absolute and relative inequality measures. Along similar lines, Kumar and Gopika (2018) examined consumption inequality across social groups in India between the years 1993–94 and 2009–10 using Theil’s index and the overlapping index. Drawing on NSSO Consumption Expenditure Surveys (50th, 61st, and 66th rounds), they found a rising trend in inequality both within and between groups. Reddy (2020) further reinforced this view, emphasizing that inequality has deepened despite periods of rapid economic growth.

Cain et al. (2010), analyzing data from the 38th (1983), 50th (1993–94), and 61st (2004–05) rounds of the NSSO using 30-day recall consumption expenditure for rural and urban households across 16 states, identified a sharp increase in inequality during the 1993–2004 period. Although the rise was more pronounced in urban areas; rural inequality also increased, with education emerging as a key factor behind these disparities. Subramanian and Jayaraj (2015) also found widening inequality between 1983 and 2009. They adopted the Krtscha centrist measure of inequality and NSSO data. At a more localized level, Rana et al. (2023) examined borrowing and spending behaviours among rural households in West Bengal across social and religious lines. Using the Fairlie decomposition method, they found that unreserved Hindus are more likely to save and borrow from formal institutions compared to other Hindu castes and the Muslim population, highlighting structural divides in financial access.

Internationally, Madudová and Corejová (2024) investigated the relationship between household size and consumption expenditure in Slovakia. Applying ANOVA and regression techniques, they demonstrated a significant link between household sizes—particularly the number of children—and spending patterns, underscoring variations in consumption across family structures. Within the Indian context, Kapoor (2020) studied MPCE and nutrition intake across social and religious groups in Punjab. His findings revealed that while Sikhs had higher calorie, protein, and fat intake, MPCE differences among religious groups were not statistically significant. However, Scheduled Castes, Scheduled Tribes, and Other Backward Classes showed much lower MPCE and nutrition levels compared to unreserved groups, pointing to persistent deprivation. Finally, extending beyond India, Oria (2020) analyzed rural–urban household consumption patterns in Afghanistan using CSO, ALCS, and SFSA 2017 data. The study identified stark rural–urban income disparities, with rural areas showing some advantages in unemployment and crime rates but also facing serious internal inequities and structural disadvantages.

3. Research Gap

The reviewed studies collectively reveal several research gaps that require further investigations. The studies on inequality in India particularly on Uttar Pradesh, exhibit a recurring limitation of insufficient focus on intersectional inequality. Most studies consider broad categories such as region or income group but fail to disaggregate data by caste, religion, sector, or their intersections. Most studies focus on consumption inequalities data at national-level or state-level, often without incorporating critical social stratifiers like social groups, religion, and region. Therefore, the intersectional nature of inequality remains underexplored. Temporal limitations are also visible, with most of the studies limit to pre-2014 period and ignore significant policy and economic developments of the past decade after 2014. These studies lack dynamic modelling of comparison. While some studies use advanced decomposition methods, they often do not simulate the potential impact of targeted policies. They ignore the multilevel disadvantages faced by marginalized subpopulations, particularly in states with entrenched social hierarchies like Uttar Pradesh. There is also limited research engagement on cause effect relationship for Uttar Pradesh even when inequality is decomposed. However, while some works use decomposition techniques to identify sources of inequality, they do not extend to evaluating or modelling the effect of various factors. Addressing these gaps would require integrating disaggregated, multidimensional data, adopting intersectional frameworks, and extending to structural causes of inequality. There is clear dearth of literature on the inequalities of income and expenditure for the households of Uttar Pradesh after 2014.

These shortcomings underline the importance of a fresh Uttar Pradesh-focused analysis. This study places consumption at the center, with income serving as a complementary dimension, while applying survey weights and measures of statistical precision. By employing kernel density estimation along with generalized entropy indices GE(0), GE(1), and GE(2), it becomes possible to pinpoint whether inequality is driven by deficits at the lower end, concentration at the top, or both.

Given this background, the primary objective of this paper is threefold. First, it seeks to measure the inequality in average monthly household expenditure and earnings across different categories of households. Second, it aims to analyze the extent of disparity within each group, thereby highlighting variations that exist even among households belonging to the same category. Third, the paper intends to examine how a range of social, religious, regional, and rural–urban factors influence household consumption expenditure, with the goal of understanding the broader determinants that shape inequality patterns.

4. Data and Research Methodology

Keeping in mind the limitations of the studies done so far, this study draws upon the post 2014 Periodic Labour Force Survey (PLFS) 2023–24 unit-level data for Uttar Pradesh, covering a sample of 9,086 households. The dataset provides detailed information on household monthly expenditure and earnings, collected using well-defined guidelines issued by the National Statistical Office (NSO). Household expenditure data include usual monthly consumer spending, the imputed value of goods consumed from home production, wages in kind, and free collections. Additionally, durable goods purchased over the past year are annualized and added proportionately. The total monthly expenditure thus reflects both cash and non-cash components of household consumption. Earnings data were collected for all employed individuals, classified as regular wage/salaried workers, casual labourers, and self-employed. For regular and casual workers, gross earnings include cash and in-kind payments, leave salary, and apportioned bonuses, but exclude employer contributions and severance pay.

For the self-employed, earnings were estimated as the difference between gross output valued at basic prices and total business expenses. The output includes goods or services produced for sale, own use, or free distribution, while expenses cover raw materials, utilities, taxes, and wage payments. All values were reported at current prices, and standard procedures were followed to impute and apportion non-cash income and partnership profits. The dataset thus offers a comprehensive measure of both consumption and income inequality.

Average per capita monthly expenditure is computed for each group of different categories. This helps in understanding the consumption pattern and living standards of different groups. For side-by-side comparison and visualisation of a variable between two or more groups, K-density curve (kernel density curve) which is a non-parametric method is used. K-density curve helps us to understand the distribution of households in different expenditure and income groups. This would fill up the research gap for the households of Uttar Pradesh

To understand dynamic inequality of different categories and within category, we have employed Generalised entropy index and Ginni coefficient method. These two are widely used methods of measuring inequality. Generalised entropy index (GE index) measures the sensitivity to inequality within a group while Ginni Coefficient is a measure of overall inequality of a group and used to compare different group for inequality.

5. Regression analysis

To fill up the research gap of modelling of inequality and look at the impact of various factors on per capita expenditure, we have used linear regression analysis. The theoretical model has the following form:

$$pce = \beta_0 + \beta_1 pci + \beta_2 Durban + \beta_3 Dobc + \beta_4 Dsc + \beta_5 Dst + \beta_6 Dbndl + \beta_7 Dwp + \beta_8 Dcp + \beta_9 Dch + \beta_{10} Dhindu + \beta_{11} Dother + u_i \quad (1)$$

Where:

pce: Per Capita Monthly expenditure

pci: Per capita Monthly earnings

Durban: Dummy for urban household

Dobc: Dummy for OBC household

Dsc: Dummy for SC household

Dst: Dummy for ST household

Dwp: Dummy for household in western plain

Dbndl: Dummy for household in Bundel-Khand region

Dch: Dummy for household in central highland

Dcp: Dummy for household in central plain

Dhindu: Dummy for Hindu households

Dother: Dummy for household following other religion

6. Results and analysis

Table 1 presents summary statistics of average per capita earnings, monthly expenditure, and household size across sector, caste, religion, and region. Urban households fare significantly better than rural ones. Urban residents have more than double the average per capita earnings (₹5763) compared to rural households (₹2708). Correspondingly, average per capita monthly expenditure in urban areas (₹3624) far exceeds that in rural areas (₹2144). This disparity may be due to differences in employment types, wage structures, education levels, and access to financial services and different levels of development.

The General category exhibits the highest economic well-being among the social group categories with average per capita income at ₹5333 and average per capita monthly expenditure at ₹3646 followed by OBCs, SCs and STs. STs is the most disadvantaged Group. STs have the lowest average per capita income (₹2591) and expenditure (₹2064), and both SC and ST households' size are larger compared to other two social groups. These groups had been historically marginalized groups and still continue to face economic disadvantages and restricted access opportunities. Followers of Other religions report the highest average per capita earnings (₹6905) and spending (₹3678) and smallest household sizes (4.35). Hindus report moderate average per capita earnings (₹3864) and expenditure (₹2720), while Muslims have the lowest average per capita earnings (₹3451) and largest household size (5.20).The Central Plain is the most prosperous region, followed by the Western and Central Highland regions. The Eastern Plain is the most disadvantaged, with average per capita income at ₹2780 and spending at ₹2061. This group-wise analysis highlights the need for targeted, inclusive policies to bridge these socio-economic divides.

Table 1: Summary Statistics for Monthly Expenditure and Earnings for Various Groups

Categories	Average per capita earnings (in Rs)	Average Per capita monthly expenditure (in Rs)	Average Household Size
Rural	2708.1	2144.72	4.87
Urban	5763.41	3624.13	4.41
Gen	5333.2	3646.99	4.43
OBS	3538.77	2515.21	4.77
ST	3027.16	2157.03	4.8
SC	2591.87	2064.55	4.81
Hindu	3864.14	2720.38	4.6
Islam	3451.98	2445.39	5.2
Others Religion	6905.33	3678.2	4.35
Bundelkhand	3795.55	2508.69	4.78
Central Highland	3812.51	2898.51	4.36
Central Plain	5323.53	3686.76	4.48
Eastern Plain	2780.51	2061.5	4.73
Western Plain	3836.08	2754.16	5.14

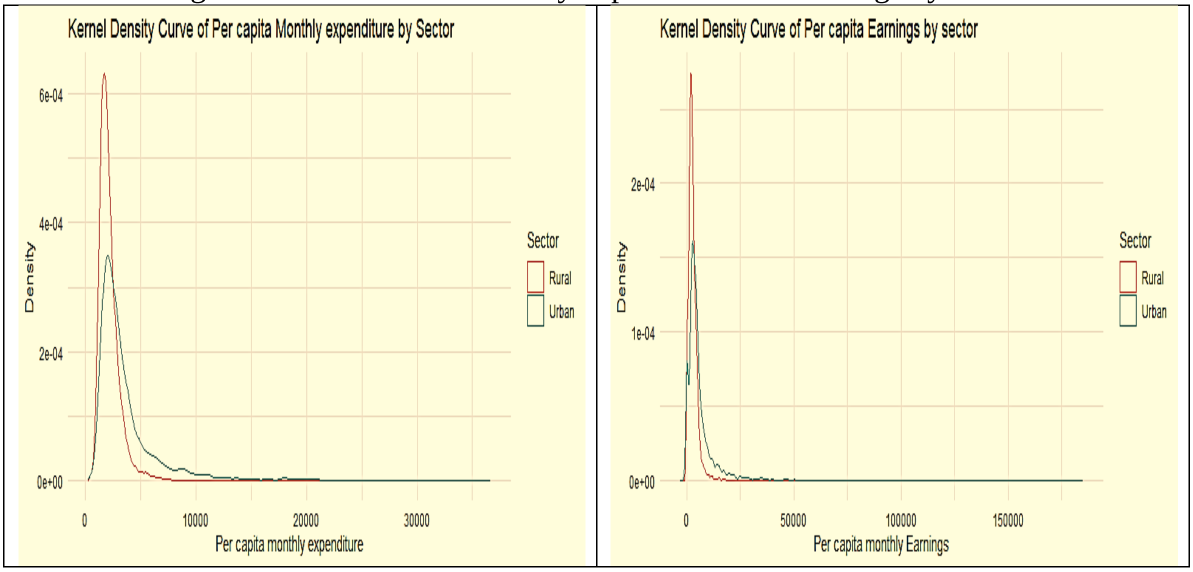
Source: Authors' Calculation

7. Inequality Analysis

Combined K-D curve of Rural-Urban areas for per capita monthly expenditure and Income is right skewed indicating that less number of households is in higher monthly expenditure and earnings group. In rural areas concentration of households around mean expenditure is more pronounced compared to urban areas. Compared to rural areas, percentage households in higher earnings group in urban areas is more than that of rural areas. Similar trend for Rural- Urban is visible for earnings from the K-D curve of earnings. The General category enjoys the highest earnings and savings ability, while ST and SC groups remain economically disadvantaged, with lower earnings and higher consumption ratios.

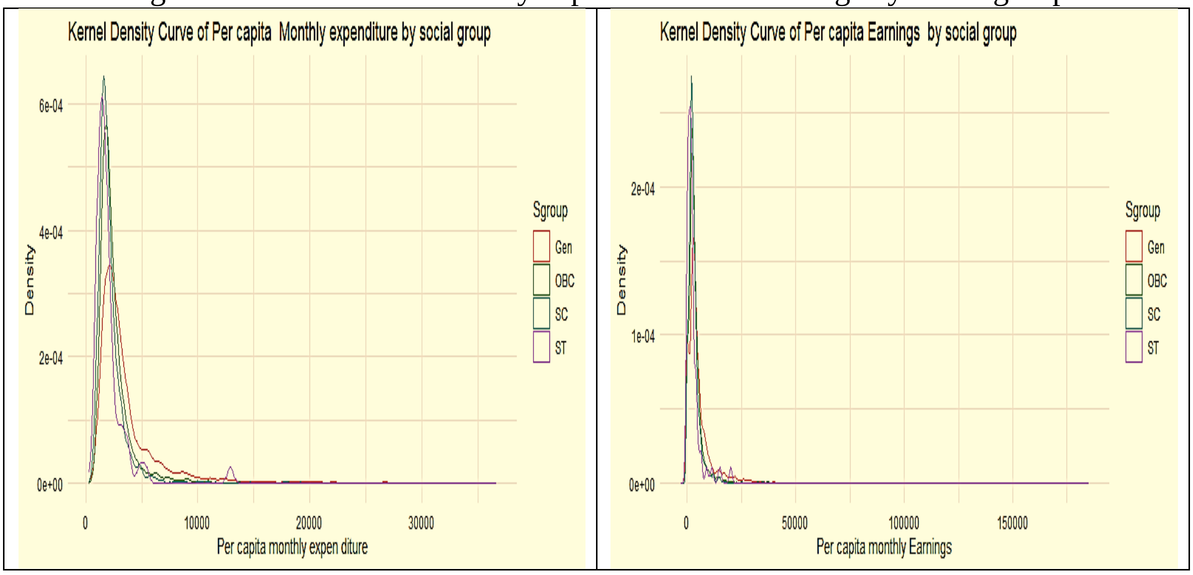
K-D curve of average monthly expenditure for social groups in graph 2shows that mean monthly expenditure and earnings distribution across social groups is right skewed. Maximum concentration of households around the average is highest for the SC category. OBC and ST have almost same level of concentration of households around mean value. Percentage of households in higher expenditure group is largest for General category. K-D curve for average earning also exhibits similar pattern for various social groups. The only exception is that in higher earnings groups, all other social categories have approximately same level of representation.

Figure 1: K-D curve of monthly expenditure and earnings by sector



Source: Authors' compilation

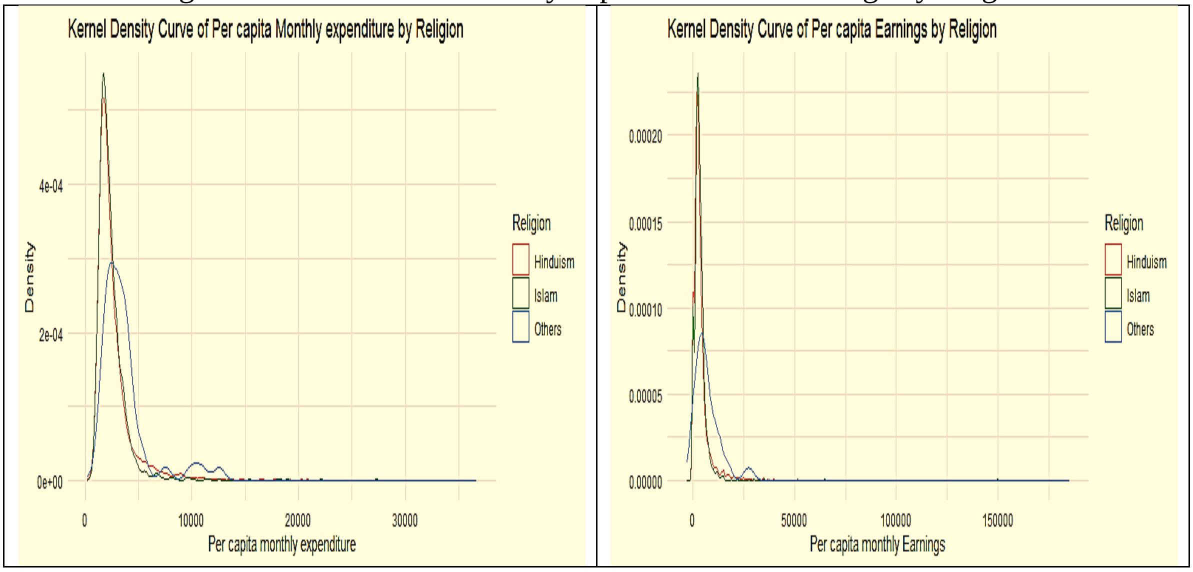
Figure 2: K-D curve of monthly expenditure and earnings by social group



Source: Authors' compilation

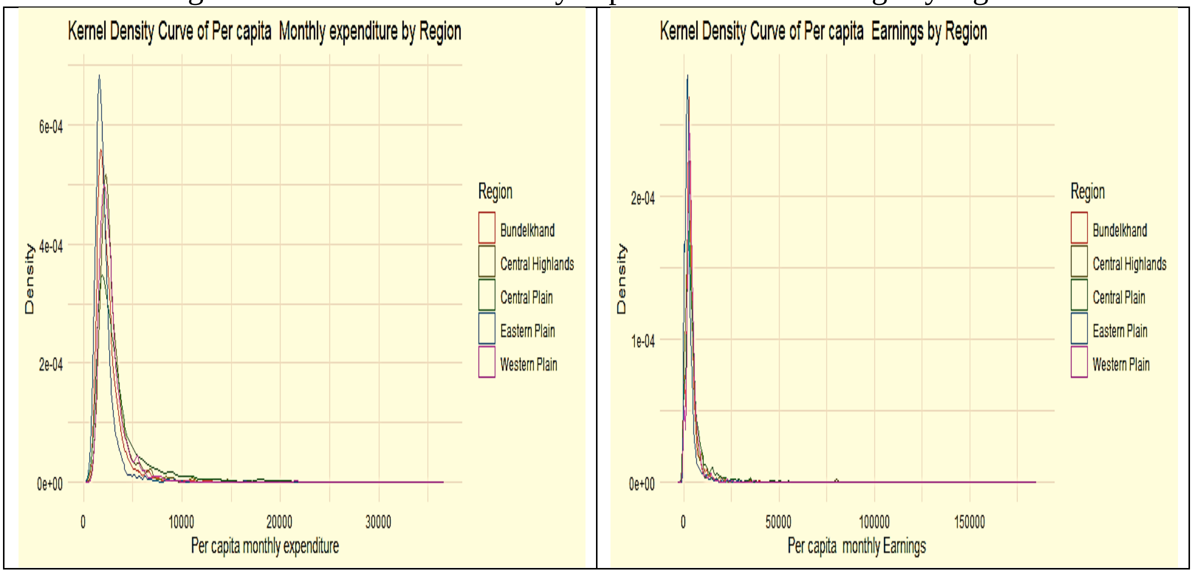
K-D curve for religious groups indicates that least concentration of the households around mean is for the category "Others". Highest level of concentration is found for the Hindu households, followed by Muslim households. All K-D curves are right skewed indicating that fewer households are in high expenditure and earnings group but this is highest for "others" category.

Figure 3: K-D curve of monthly expenditure and earnings by religion



Source: Authors' compilation

Figure 4: K-D curve of monthly expenditure and earnings by region



Source: Authors' compilation

K-D curve analysis for regions throws some important light on the distribution of households in different expenditure groups. All K-D curves are bell shaped and skewed to the right indicating that across regions concentration of households in higher expenditure group is less. Though for different region it is different. Eastern plain have lowest concentration in higher expenditure group. Western plain followed by central plain and central highlands have highest concentration in higher expenditure group. Similar trends from K-D curve are visible for the average earning across regions.

8. Monthly Per capita expenditure and Earnings inequality within different groups

Inequality measurement is an important aspect to capture the well-being of the households across different categories. Gini coefficient is used to measure relative inequality for average per capita monthly expenditure and earnings across different categories. To look at the distribution of inequality within a category Generalised Entropy (GE) Index is also calculated. GE(0) capture the inequality in the lower quantiles and GE(1) also known as Theil's index measures overall inequality and GE(2) is a measure of inequality in upper quantiles of a group.

A detailed analysis of income inequality, based on the Gini coefficient and Generalized Entropy (GE) indices (GE(0), GE(1), GE(2)), exhibits significant disparities across caste, sector, religion, and region. These variations highlight pronounced inequalities among different groups and within groups. Scheduled Tribes (STs) exhibit the highest income inequality, with a Gini coefficient of 0.511 and a GE(0) value of 0.4646. Though the most economically disadvantaged, the presence of relatively affluent individuals within the group contributes to higher level inequality, as reflected in the higher GE(2) score of 0.7512. In contrast, the General category also shows a high Gini of 0.4796, and the highest GE(2) value (1.0515), suggesting a wide gap between the average and the richest members. Other Backward Classes (OBCs) and Scheduled Castes (SCs) demonstrate comparatively lower inequality levels. SCs, in particular, have the lowest GE(0) and GE(2) scores, indicating not just lower incomes overall, but also a more uniform income distribution, potentially because a majority are clustered around similarly low-income levels.

Sector-wise, inequality is more pronounced in urban areas (Gini: 0.4561) compared to rural areas (Gini: 0.3426). The GE(1) and GE(2) values in urban areas (0.4113 and 0.8019) far exceed rural figures (0.2119 and 0.3005), suggesting that urban centres are marked by significant income differences. Rural areas, while economically weaker overall, exhibit less internal disparity.

Table 2: Inequality Measure of Per Capita Monthly Earnings across groups

Categories	**Gini**	**GE(0)**	**GE(1)**	**GE(2)**
General	0.4796	0.3929	0.4715	1.0515
OBC	0.4117	0.2962	0.3413	0.6133
SC	0.3823	0.2507	0.2823	0.4764
ST	0.511	0.4646	0.4867	0.7512
Rural	0.3426	0.2079	0.2119	0.3005
Urban	0.4561	0.3471	0.4113	0.8019
Hinduism	0.4537	0.3554	0.419	0.8559
Islam	0.3511	0.2182	0.2865	0.8708
Others	0.3773	0.2363	0.237	0.2868
Bundelkhand	0.3731	0.2344	0.3002	0.6086
Central Highlands	0.4138	0.2954	0.3648	0.8157
Central Plain	0.4629	0.3601	0.4235	0.8389
Eastern Plain	0.4493	0.3526	0.4317	1.0789
Western Plain	0.3073	0.1591	0.175	0.2471

Source: Authors' Calculation

Hindus reflect moderate inequality levels (Gini: 0.4537), while Muslims show a lower Gini (0.3511) but a relatively high GE(2) of 0.8708. This indicates that while most Muslim households may be concentrated around low-income levels, a few high-income earners cause income polarization. Other religions show the most equal income distribution, with a Gini of 0.3773 and very low GE values, suggesting relative economic homogeneity within this group.

Regional differences are also significant. The Eastern Plain shows the highest inequality in terms of GE(2) (1.0789), indicating income concentration among a few rich households. The Central Plain and Central Highlands follow closely. In contrast, the Western Plain has the lowest inequality (Gini: 0.3073; GE(2): 0.2471), indicating a more balanced income distribution across households in the region.

The data highlights deep-rooted economic disparities based on location, caste, religion, and region. Urban populations, the General category, and “other religions” earn the highest incomes and save more. In contrast, rural populations, SC, ST, and economically weaker regions like the Eastern Plain have lower earnings and limited savings potential. The high earnings gap between groups further indicates economic inequality, with lower earnings communities relying more on spending and having minimal financial security. Addressing these disparities requires targeted economic policies, better financial inclusion, and improved opportunities for lower earnings communities.

9. ANCOVA Analysis

This regression analysis is based on an ANCOVA model, where per capita monthly expenditure is the dependent variable. The independent variables include both quantitative and qualitative factors. The quantitative variable is per capita earnings. while the qualitative variables include sector (urban vs. rural), social group (General, OBC, SC, ST), religion (Hindu, Islam, Others), and region (Eastern Plain, Central Plain, Central Highland, Western Plain, Bundel-Khand). Dummy variables are used to represent the categorical variables, with the reference categories being rural (Drural), ST (Dgen), Bundel-Khand (Dep), and Islam (Dislam).

This ANCOVA regression model provides valuable insights into how demographic and economic factors influence monthly expenditure. The results show that earnings have a strong and statistically significant impact, with higher earnings leading to higher spending. The results exhibit strong evidence of structural disparities influencing economic outcomes across various social groups and geographies.

The intercept with value rupee 1572.3 represents the average value of per capita monthly expenditure of the dependent variable for the reference categories; Rural, General caste, Islam religion, and the Eastern region. All other coefficient in the model is interpreted relative to these baseline groups. Urban residents spend more than rural residents, highlighting the cost-of-living differences. Social group disparities are evident, with General category households spending the most, while OBC, SC and ST groups spend less. Regional differences are also significant, with the Western plain, central highland

and Central Plains exhibiting higher spending levels than Bundel-Khand and the Eastern Plain.

Table 3: Regression Results Heteroskedasticity-robust standard errors, variant HC1

Variables	Coefficient	Std. Error	t-ratio	p-value	
Constant	1572.42	74.3191	21.16	<0.0001	***
pci	0.189171	0.0198571	9.527	<0.0001	***
Durban	683.088	58.5947	11.66	<0.0001	***
Dobc	−611.787	60.7828	−10.07	<0.0001	***
Dsc	−921.587	66.0276	−13.96	<0.0001	***
Dst	−687.336	170.655	−4.028	<0.0001	***
Dhindu	491.518	46.5833	10.55	<0.0001	***
Dother	55.7341	296.485	0.188	0.8509	
Dbndl	57.4864	32.7304	1.756	0.0791	*
Dcp	863.793	56.012	15.42	<0.0001	***
Dch	469.945	65.3913	7.187	<0.0001	***
Dwp	410.601	46.3551	8.858	<0.0001	***

Mean dependent var	2675.85		S.D. dependent var	2118.869
Sum squared resid	2.38E+10		S.E. of regression	1618.897
R-squared	0.416952		Adjusted R-squared	0.416246
F(11, 9074)	143.8718		P-value(F)	1.70E-306
Log-likelihood	−80027.47		Akaike criterion	160078.9
Schwarz criterion	160164.3		Hannan-Quinn	160108

Source: Authors' Calculation. Note: Rural, General, Islam, and eastern plain are reference category dummy variable

Hindu households show a significant advantage over the reference group, with a coefficient of ₹491.52. This indicates a meaningful economic disparity between religious communities. The dummy for "Other" religions is not statistically significant, suggesting their economic outcomes are similar to those of the reference category.

In conclusion, the regression model highlights the substantial influence of income, caste, religion, sector, and region on economic well-being. It reinforces the reality that marginalized caste groups, rural populations, and certain regions continue to face systemic disadvantages, while urban, upper-caste, and central plain households enjoy economic advantages. These findings stress the need for inclusive, equity-driven policies.

Overall, this ANCOVA model provides valuable insights into how income, social identity, location, and other factors shape consumption patterns in Uttar Pradesh, offering a strong basis for policy interventions aimed at promoting equitable economic growth.

10. Conclusion

The data presents the average monthly expenditure across different demographic groups, focusing on rural and urban populations, caste categories, and regional divisions. .From the analysis, a clear pattern emerges. Urban households tend to have higher average monthly expenditures than rural households. The highest recorded expenditures are found in urban areas, where the general category population spends significantly more on average compared to other caste groups. Similarly, within rural areas, the general category also shows relatively higher expenditures, followed by Other Backward Classes (OBCs), Scheduled Castes (SCs), and Scheduled Tribes (STs), who tend to have the lowest expenditures. This disparity reflects socio-economic inequalities, with historically disadvantaged communities facing financial constraints.

Regionally, expenditure patterns vary. The Western Plain and Central Plain regions exhibit higher expenditures, particularly among urban populations. In contrast, Bundel-Khand and the Eastern Plain regions, especially in rural areas, show lower expenditure levels. The Central Highland region displays a more balanced expenditure pattern but remains lower than the Western and Central Plains. These differences may be attributed to economic opportunities, agricultural productivity, industrial presence, and infrastructure development in different regions.

These findings have several policy implications. First, targeted economic programs for lower social groups (ST, SC, and OBC) should be strengthened to improve their financial conditions and increase expenditure capacity. Second, urban-rural disparities should be addressed through infrastructure and employment-generation initiatives in rural areas. Lastly, regional economic imbalances must be tackled through focused development efforts in economically weaker regions like the Eastern Plain and Bundel-Khand to improve their standard of living. The paper does not analyse the policy initiatives to solve the inequalities across groups. This can be studied in future work.

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Labour Market Dynamics in Odisha: Trends in Participation, Employment Type, and Earnings (2017-18 to 2023-24)

Ravindra Kumar[1], Research Scholar, Department of Economics, Pondicherry University, Puducherry

Md. Moniruzzaman Muzib, Research Scholar, Department of Economics, Pondicherry University, Puducherry

Rita Rani Majhi, Research Scholar, Department of Economics, Pondicherry University, Puducherry

Sivasankar.V, Professor, Department of Economics, Pondicherry University, Puducherry

Abstract

This study analyzes employment trends in Odisha using data from the Periodic Labour Force Survey (PLFS) covering 2017–18 to 2023–24. It examines changes in the Labour Force Participation Rate, Worker Population Ratio, Unemployment Rates, Employment Types, and Earnings across rural and urban regions. The findings reveal a substantial rise in Female Labour Force Participation Rate, particularly in rural areas, alongside a gradual shift from casual labour to self-employment among women. Male employment patterns, by contrast, remained relatively stable. Rural female workers emerged as a key driver of Odisha's overall gains in WPR and LFPR. Although the segment of women in self-employment fluctuated, there was a notable increase in their participation as helpers in household enterprises. Regular wage employment expanded for males but declined for females, while casual labour fell for both genders in rural areas. In Town areas, women's self-employment initially increased but showed a marginal decline in recent years. The study contributes to understanding gendered employment dynamics and offers evidence

[1] Email: ravindran.kumar2013@gmail.com

for designing inclusive, region-specific policy interventions to improve job quality and strengthen economic resilience.

Keywords: Employment type, Unemployment rate, Labour Force Participation rate, Worker Population Ratio

1. Introduction

India is currently one of the rapidly expanding economies in the world, ranked as the fifth-largest according to the International Monetary Fund (IMF, 2024). Provisional estimates suggest that the country achieved a growth rate of 8.2 percent in 2023–24, supported by robust sectoral performance across states and Union Territories. Odisha has shown a strong recovery from the COVID-19-induced downturn and has demonstrated notable sectoral growth, as highlighted by (Odisha Economic Survey, 2023–24).[2] In 2022–23, Maharashtra's Gross State Domestic Product (GSDP) was ₹36.46 lakh crore, Odisha's was ₹7.53 lakh crore, and Jharkhand's was ₹3.94 lakh crore, placing them first, thirteenth, and seventeenth among all Indian states. In 2023–24, Odisha's sectoral contribution to Gross State Value Added (GSVA) comprised 21 percent from agriculture and allied sectors, 36 percent from services, and 43 percent from industry. The state's GDP growth rate of 8.5 percent slightly outpaced the national average, highlighting Odisha's above-average economic performance during the period 2018–19 to 2022–23 (Odisha Economic Survey, 2023–24).[3]

Labour force indicators further underscore Odisha's favourable position. The labour force participation rate for individuals aged 15 and above was 61.3 percent in Odisha, higher than the national average of 57.9 percent, according to PLFS 2022–23. The state also reported a lower unemployment rate (3.2 percent) compared to the national figure (3.9 percent). However, disparities remain in income levels: regular wage earners in Odisha

[2] National Accounts Division, MoSPI, & Government of Maharashtra, 2023, as cited in *Odisha Economic Survey 2023-24*

[3] Directorate of Economics and Statistics & MOSPI, 2023, as cited in *Odisha Economic Survey 2023-24*

earned 5.3 percent less than the national average, while earnings gaps for self-employed and casual labourers were 24.1 percent and 13.3 percent, respectively (Odisha Economic Survey, 2023–24).

This study investigates evolving employment trends in Odisha between 2017–18 and 2023–24, with a focus on gender dynamics, sectoral shifts, employment types, and earnings. It examines labour force participation, the distribution of employment types—including self-employment, regular wage work, and casual labour—and the corresponding earnings across these categories. The paper is organized into five sections. Section 1 gives an overview of Odisha's socio-economic profile. Section 2 reviews the existing literature. Section 3 explains the research methodology. Section 4 presents the results and analysis, and Section 5 concludes with key findings and policy suggestions.

2. Literature Review

While many studies have analyzed labour force participation and unemployment trends at the national level, there is relatively limited research that focuses specifically on Odisha. The present study will be an addition to the existing literature focusing on labour force participation and unemployment, earning of different type of workers across different types of employment.

Sahoo (2019) highlights a faster decline in the primary sector's income share relative to its proportion of employment, while the Services Economy has shown rapid growth in both income and its contribution to the overall economy. He emphasizes the complex and uneven nature of Odisha's economic transformation, underscoring the salience of targeted policy interventions to reduce inequalities in employment and sectoral growth. Mohanty & Padhi (1995) find that the tribal population in Odisha exhibits higher workforce participation than the general population, with similar unemployment rates and moderate underemployment. However, tribal communities face limited rural non-agricultural job opportunities, pointing to the need for productivity-linked employment, improved access to resources for marginalized cultivators, and targeted support for rural non-farm activities. Himanshu (2011) re-examines employment and unemployment trends since the

1970s based on successive National Sample Surveys. Findings suggest that transformation in employment trends and labour structure has been sluggish. The 66th round of the NSS (2009–10) shows lethargic employment growth, an increase in casual work, a decline in self-employment since 2004–05, and a significant drop in female labour force participation. Samantaraya et al. (2014) identify large differences in Odisha's economic performance between the periods 1991–2004 and 2004–2012. During the first period, agricultural distress led to slow poverty reduction. In the post-2004 period, the state experienced vigorous agricultural growth, declining poverty, and a shift in labour mobility within the agricultural sector. Advancements in irrigation, road infrastructure, and the presence of economic activities such as mining and industry supported higher wages and better living conditions. Overall, the literature highlights persistent structural challenges in Odisha's employment landscape alongside emerging opportunities from sectoral shifts.

Collectively, these studies underscore the need for inclusive growth strategies that balance agricultural productivity with non-farm job creation. Policies addressing marginalized groups and regional disparities are essential for achieving sustainable economic transformation.

3. Data sources and Methodology

The data for this study are drawn from the Periodic Labour Force Survey (PLFS) for Odisha, covering the period 2017–18 to 2023–24. Descriptive statistics are used to inspect trends in (1) the Labour Force Participation Rate, (2) the Worker Population Ratio, (3) the Unemployment Rate, (4) the distribution of employment types, and (5) workers' earnings. Since PLFS data are only available from 2017–18 onwards, the study is restricted to this period. The analysis relies on descriptive methods, with bar charts, line graphs and tables used to present trends, while the Compound Annual Growth Rate (CAGR) is applied to measure the growth of key variables.

4. Data Analysis and trends

The data on LFPR, WPR, unemployment rate, types of employment, and earnings of the population in Odisha are presented through tables, histograms, and trend lines in the below sections.

4.1. Labour Force Participation Rate

The Labour Force Participation Rate (LFPR) refers to the share of the working-age population (15 years and above) that is either employed or actively looking for work (Ministry of Statistics and Programme Implementation [MoSPI], 2023). Table 1 presents LFPR trends in Odisha from 2017–18 to 2023–24, disaggregated by region (rural and urban) and gender. The male Labour Force Participation Rate exhibited little variation across rural and urban areas during this timeframe, suggesting that men's engagement in the labour market is already at a saturation point, leaving limited scope for further expansion. By comparison, the female LFPR recorded a significant upward trend, particularly in agrarian regions, where it rose from 20 percent in 2017–18 to 52.6 percent in 2023–24. Urban female LFPR also increased, though at a more modest rate, climbing from 16.9 percent to 30.8 percent. Consequently, the overall LFPR (male and female combined) in Odisha rose from 48.3 percent to 64.9 percent, a shift largely driven by the surge in women's participation.

Table 1: LFPR (Percent) usual status (ps+ss) of Odisha, 15 year and above

	Rural			Urban			Rural + Urban		
Year	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**
2017-18	79.4	20	49	74.6	16.9	44.8	78.6	19.5	48.3
2018-19	79.8	25.2	52.1	75	20.3	47	79	24.4	51.2
2019-20	79	34.8	56.4	74.6	23.5	49.2	78.3	33.1	55.3
2020-21	79.5	34.7	56.9	75.2	22.2	49.1	78.9	32.9	55.8
2021-22	79.5	34.7	56.9	75.2	22.2	49.1	78.9	32.9	55.8
2022-23	79.1	47.5	63	73.2	27.8	51.5	78.1	44.7	61.3
2023-24	82.9	52.6	67.1	75	30.8	53.2	81.7	49.4	64.9
CAGR	0.72	17.49	5.38	0.09	10.52	2.91	0.65	16.76	5.05

Source: PLFS (2017-18 to 2023-24). Note: The CAGR is calculated by authors

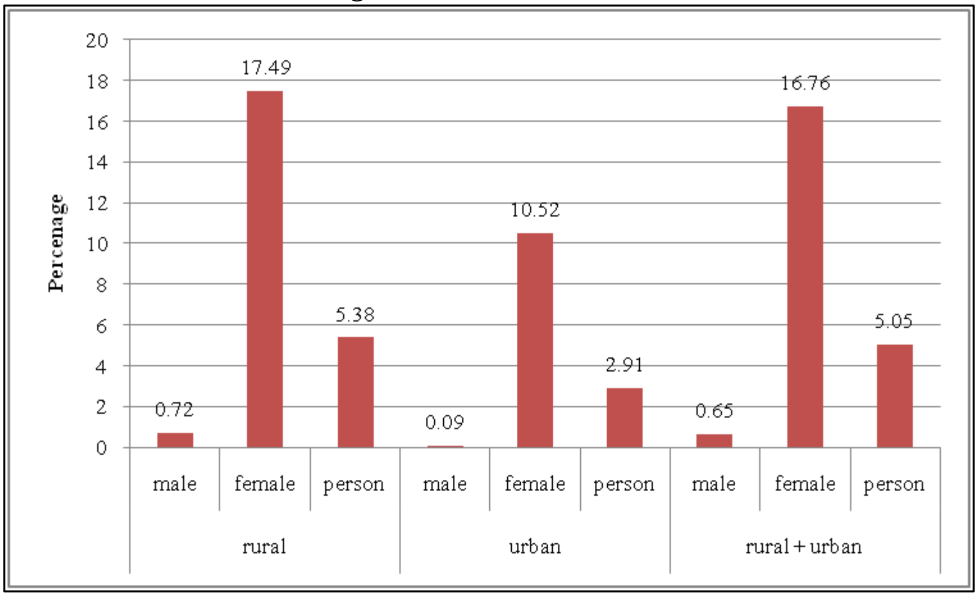
Several structural and policy-related factors account for these patterns. The historically low female LFPR in India has been associated with increased educational enrolment, the burden of unpaid care responsibilities, increasing household earnings, and the mechanization of agriculture (Mehrotra & Sinha, 2017). In recent years, however, targeted government initiatives — including programs promoting girls' education, skill development, entrepreneurship, and workplace safety (Ministry of Women and Child Development, 2023) — These factors appear to have encouraged greater female participation in the labour force. Moreover, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) has offered a safety net of paid employment, disproportionately benefiting women in rural areas (Ghosh, 2002). The COVID-19 pandemic and the accompanying wave of reverse migration may also have raised rural female LFPR, as women increasingly took up economic roles to supplement household incomes during the crisis (Chand, 2022).

This rising LFPR coincided with a decline in unemployment rates, suggesting that Odisha's labour market has been relatively effective in absorbing the expanding labour force. As shown in Table 3, unemployment rates fell across all categories between 2017–18 and 2023–24, even amid the surge in female participation. For instance, rural female unemployment declined from 5.3 percent to 2 percent while rural female LFPR more than doubled. Likewise, unemployment rates declined for both men and women across rural and urban areas. The simultaneous increase in LFPR (greater participation) and decrease in unemployment (higher absorption) indicates that the labour market expanded its capacity to generate employment, particularly for women.

This pattern suggests that the rise in female LFPR was not merely distress-driven—a scenario typically marked by rising participation alongside stagnant or rising unemployment—but instead reflects a mix of improved opportunities, policy support, and structural change. National programmes such as *BetiBachaoBetiPadhao*, MGNREGA, Skill India Mission, Working Women Hostels, and recent labour law reforms have contributed to higher female participation by creating safer and more inclusive workplaces. As a result, female labour force participation has increased markedly, especially in rural Odisha (GoI Report, 2023, pp. 31–35).[4]

However, the nature and quality of employment remain critical. While more women are participating and finding jobs, much of this work is concentrated in informal, low-paid, or unpaid activities, particularly as helpers in household enterprises. Thus, although rising LFPR and falling unemployment indicate improved labour market absorption, they also highlight the need for policies that enhance the quality and security of jobs. The CAGR shows a strong rise in labour force participation in Odisha between 2017–18 and 2023–24, especially among women. Rural female participation grew at 17.49 percent yearly, while urban females saw a 10.52 percent increase, narrowing gender gaps. Male participation rose only slightly 0.72 percent annually in rural areas and 0.09 percent in urban areas—reflecting already high male rates. Overall, LFPR grew by about 5 percent annually, driven largely by women entering the workforce.

Figure 1: CAGR of LFPR



Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

[4]Directorate General of Employment (GoI), 2023, *Female Labour Utilization in India*, Ministry of Labour & Employment

4.2. Worker Population Ratio

As it is evident from the table, female WPR grew much faster than male WPR, especially in rural areas, where it rose by 18.18 percent annually compared to just 1.50 percent for rural males. Urban female WPR also increased significantly at 11.08 percent per year, while urban male growth was minimal at 0.41 percent. Overall, the total WPR in Odisha improved by about 5.78 percent annually, indicating rising labour force participation. This shows that women's employment, predominantly in rural Odisha, has grown steadily and substantially during this period. Ghosh (2002) notes that married women in rural areas are more than twice as likely to engage in economic activities as their urban counterparts, which align with the observed trends.

Several factors help explain the rise in rural female WPR. Initiatives such as the Jal Jeevan Mission, which reduced time spent on household chores by improving water access, likely freed up time for women to participate in paid work (Goldar & Aggarwal, 2024).

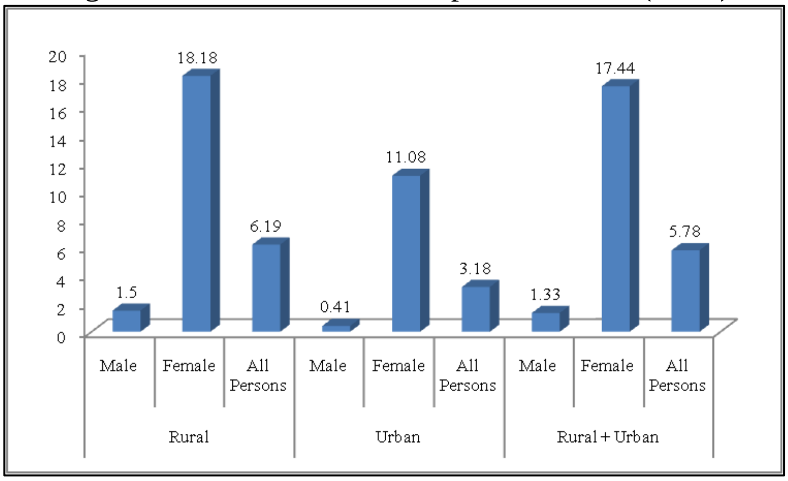
Table 2: WPR (Percent) usual status (ps+ss) of Odisha, 15 year and above

	Rural			Urban			Rural + Urban		
Year	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**
2017-18	73.6	18.9	45.6	69.1	14.8	41.1	72.9	18.3	44.9
2018-19	74.6	24.2	48.9	67.4	15.8	41	73.4	22.8	47.6
2019-20	73.4	33.6	53	68.9	21.6	45.4	72.7	31.8	51.9
2020-21	74.5	33.6	53.9	68.7	18.4	43.9	73.6	31.4	52.4
2021-22	74.5	33.6	53.9	68.7	18.4	43.9	73.6	31.4	52.4
2022-23	75.5	46.5	60.7	68.8	25.9	48.3	74.4	43.6	58.9
2023-24	80.5	51.5	65.4	70.8	27.8	49.6	78.9	48	62.9
CAGR	1.5	18.18	6.19	0.41	11.08	3.18	1.33	17.44	5.78

Source: PLFS (2017-18 to 2023-24). Note: CAGR is calculated by authors

Likewise, having better access to mobile phones and the internet has helped women learn about more job opportunities. Structural shifts also contributed: as rural men moved into non-agricultural activities or exited agriculture altogether, more women filled the resulting labour gaps in agriculture and allied sectors. In addition, opportunities for women have expanded in manufacturing and services, with participation among women from wealthier households rising faster than that of poorer women. Importantly, this rise in women's WPR does not appear to be distress-driven, since wage rates have not declined—an outcome that would normally accompany distress-led participation (Goldar & Aggarwal, 2024).

Figure 2: CAGR of Worker Population Ratio (WPR)



Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

4.3. Unemployment Rates

The observed rise in WPR is complemented by a decline in unemployment rates over the same period (Table 2). From 2017–18 to 2023–24, unemployment went down for both men and women in rural as well as urban areas, with some ups and downs, especially among urban women. In rural areas, male unemployment dropped from 7.3 percent to 2.9 percent, and female unemployment fell from 5.3 percent to 2.0 percent. Urban female unemployment, though initially high and volatile, also fell significantly by 2023-24. This inverse relationship, with rising WPR alongside declining unemployment, suggests that more people are not only entering the labour force but also securing employment, indicating improved labour absorption in Odisha's economy. The fact that WPR increased without a corresponding rise in unemployment indicates that the labour market has been able to generate sufficient jobs to accommodate the growing workforce, predominantly women. However, as highlighted earlier, the quality of these jobs, especially those concentrated in self-employment and helper roles, remains a concern.

The Compound Annual Growth Rate (CAGR) further confirms these improvements, showing a steady decline in unemployment rates in Odisha from 2017–18 to 2023–24.

Rural unemployment fell sharply, with an average annual decline of about 15 percent for females and 14.26 percent for males, reflecting better employment opportunities in rural areas. Urban unemployment also declined, though more modestly, at around 4 percent annually for both males and females. Odisha’s unemployment rate decreased by nearly 12.90 percent per year. This signals significant improvement in labour market conditions.

Table 3: Unemployment Rate (%) usual status (ps+ss) of Odisha, 15 year and above

	Rural			Urban			Rural + Urban		
Year	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**	**Male**	**Female**	**All Persons**
2017-18	7.3	5.3	6.9	7.3	12.7	8.4	7.3	6.3	7.1
2018-19	6.6	4.2	6	10.1	21.9	12.7	7.1	6.6	7
2019-20	7	3.6	6	7.6	8	7.7	7.1	4.1	6.2
2020-21	6.4	3	5.4	8.6	17.2	10.5	6.7	4.4	6
2021-22	6.4	3	5.4	8.6	17.2	10.5	6.7	4.4	6
2022-23	4.5	2	3.6	6	6.8	6.2	4.7	2.4	3.9
2023-24	2.9	2	2.6	5.6	9.7	6.8	3.3	2.7	3.1
CAGR	-14.26	-14.99	-15.01	-4.32	-4.39	-3.46	-12.39	-13.17	-12.9

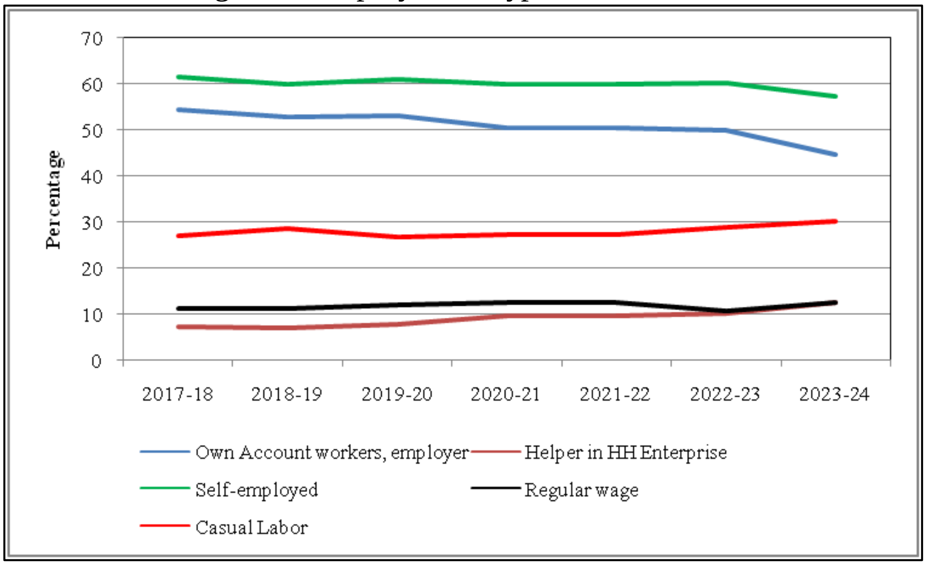
Source: PLFS (2017-18 to 2023-24). Note: CAGR value is calculated by authors

4.4. Types of Employment and their trend Rural Odisha

The rising Labour Force Participation Rate (LFPR), particularly among rural women, between 2017–18 and 2023–24, is reflected in the changing distribution of workers across employment types. While LFPR shows how many working-age people are engaged in or seeking work, employment status data indicate whether they are self-employed, regular wage workers, or casual labourers. For rural males, LFPR remained fairly constant, with modest shifts in employment. The proportion of male own-account workers and firm owners declined slightly (54.5 percent to 44.7 percent), suggesting movement away from agriculture or small businesses. The proportion working as helpers in household enterprises rose moderately, and casual labour increased 27.1 percent to 30.2 percent. Regular wage employment slightly increased from 11.3 percent to 12.5 percent during 2017-18 to 2023-24, showing that stable salaried jobs remained limited.

The CAGR figures from 2017–18 to 2023–24 highlight shifts in rural Odisha. Among rural males, self-employment declined (-3.25 percent), helpers in household enterprises grew strongly (9.78 percent), casual labour fell (-1.17 percent), and regular wage employment grew slightly (1.70 percent), indicating slow formalization. For rural females, self-employment rose sharply (11.31 percent) and helpers increased (4.09 percent), while casual labour declined (-10.99 percent) and regular wage work also fell (-9.27 percent), pointing to withdrawal from casual work and movement into family-based activities.

Figure 3: Employment Type of Rural Male



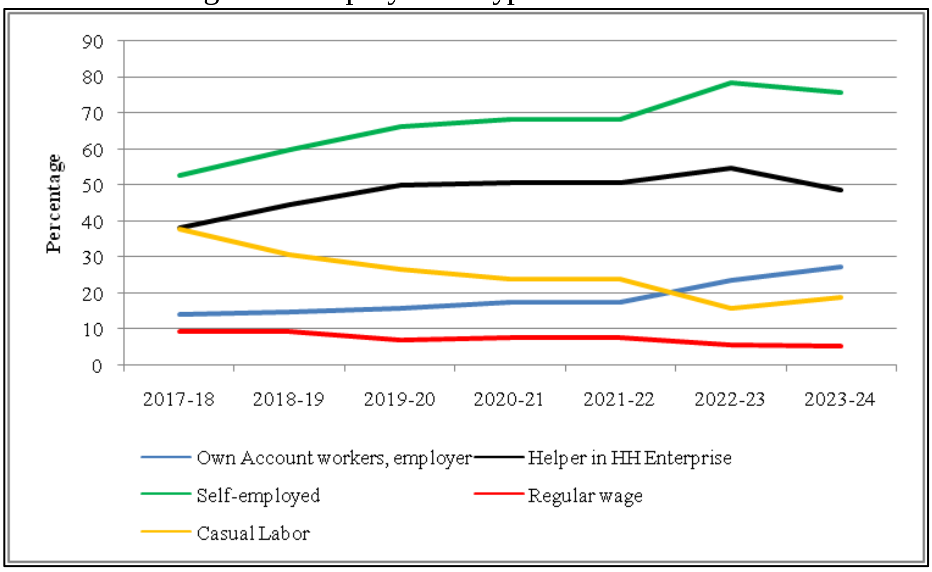
Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

Overall, self-employment declined (-3.31 percent), helpers rose by 12.25 percent, casual labour fell (-2.34 percent), and regular wage work stagnated (-2.27 percent). These trends indicate rising family-based work and a decline in casual labour, with limited progress in formal jobs.

The sharp rise in rural female LFPR from 20 percent in 2017-18 to 52.6 percent in 2023-24, is visible in the shift in employment status. The share of women as helpers in household enterprises rose from 38.2 percent to 48.6 percent, absorbing much of the additional labour. Regular wage employment fell (9.5 percent to 5.3 percent) and casual labour dropped steeply (38 percent to 18.9 percent). This suggests that as more rural women entered the labour force, many engaged in family-based enterprises rather than formal or casual work. The decline in casual labour, particularly among women, suggests a shift away from the least secure and lowest-paid work. However, the rise in helpers in household enterprises, often unpaid or low-paid, raises concerns about employment quality. Thus, higher LFPR reflects increased participation but also restructuring of employment, with women concentrated in family-based self-employment and fewer in casual or regular wage jobs. For men, steady participation was matched by minor changes, with continued dominance of self-employment and casual work.

The substantial rise in female LFPR and Worker Population Ratio (WPR) between 2017-18 and 2023–24 has drawn policy attention. PLFS 2023–24 data show women's workforce participation increased from 18.9 percent to 51.5 percent, largely in rural areas. While positive at first glance, this rise may partly reflect changes in survey methodology, distress-driven employment, and an expansion of informal work rather than growth in decent jobs (Thakur & Chaudhary, 2025; Afridi, 2025; Deshpande, 2025). Enumerator guidelines in PLFS 2023–24 instructed that household-based activities—such as collection of firewood, kitchen gardening, and poultry—be classified as self-employment rather than domestic duties (Thakur & Chaudhary, 2025; Mohanan & Kar, 2025).

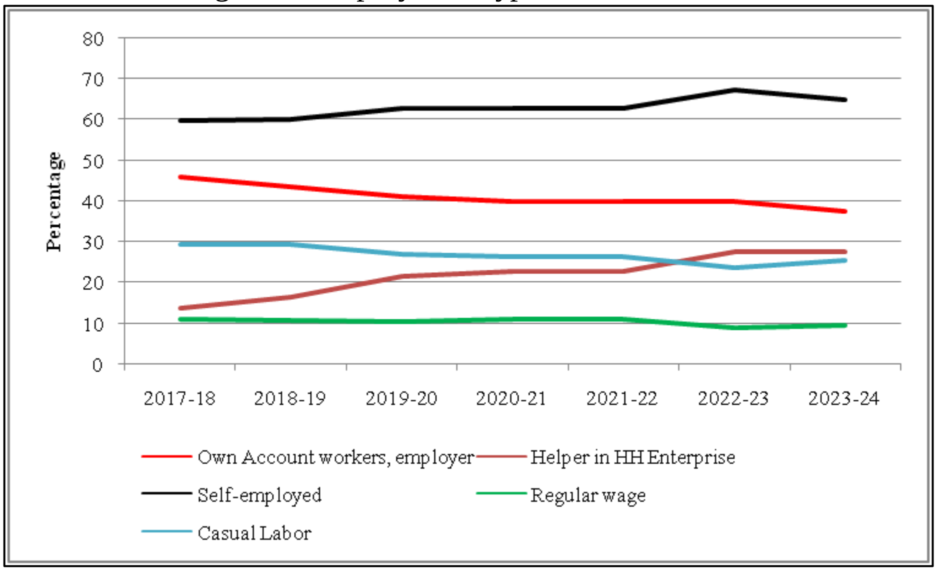
Figure 4: Employment Type of Rural Female



Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author.

Economic distress after COVID-19 also contributed, as women turned to self-employment to support household incomes amidst shrinking salaried jobs (Afridi, 2024; Dewan, 2024; ILO, 2024). The increase in self-employment, often unpaid or minimally paid, appears to reflect necessity-driven participation rather than improved opportunities (Deshpande, 2025; Ghosh, 2025).

Figure 5: Employment type of Rural Person



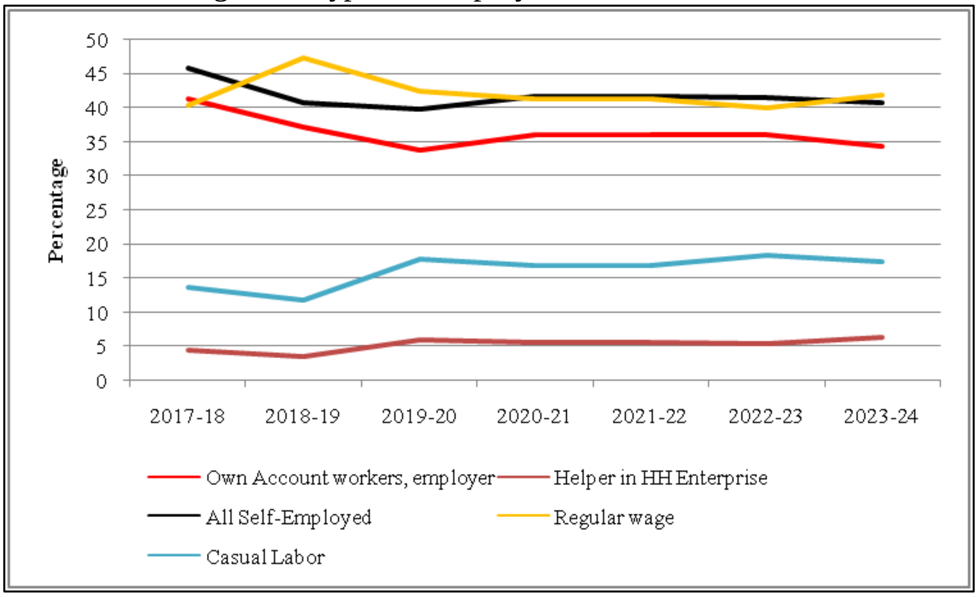
Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

In sum, while rising LFPR indicates greater economic engagement, much of this is concentrated in informal, insecure work. The findings stress the need to expand regular wage opportunities and improve conditions in self-employment to enhance not just the quantity but also the quality of women’s work.

4.5. Types of Employment and their trend in Urban Odisha

The trends in urban Odisha’s employment structure between 2017–18 and 2023–24, as reflected in Figures 6, 7 and 8, complement the earlier findings on mounting LFPR, WPR, and declining unemployment rate, but they also reveal important differences from rural patterns, particularly regarding women’s employment. Earlier, we noted that Odisha experienced a significant rise in LFPR and WPR, especially among women, with rural areas contributing most to this increase. In urban areas too, female LFPR rose from 16.9 percent in 2017-18 to 30.8 percent in 2023-24, but the growth was more modest compared to rural areas. Unemployment rates in urban areas also declined over this period.

Figure 6: Types of Employment of Urban Male

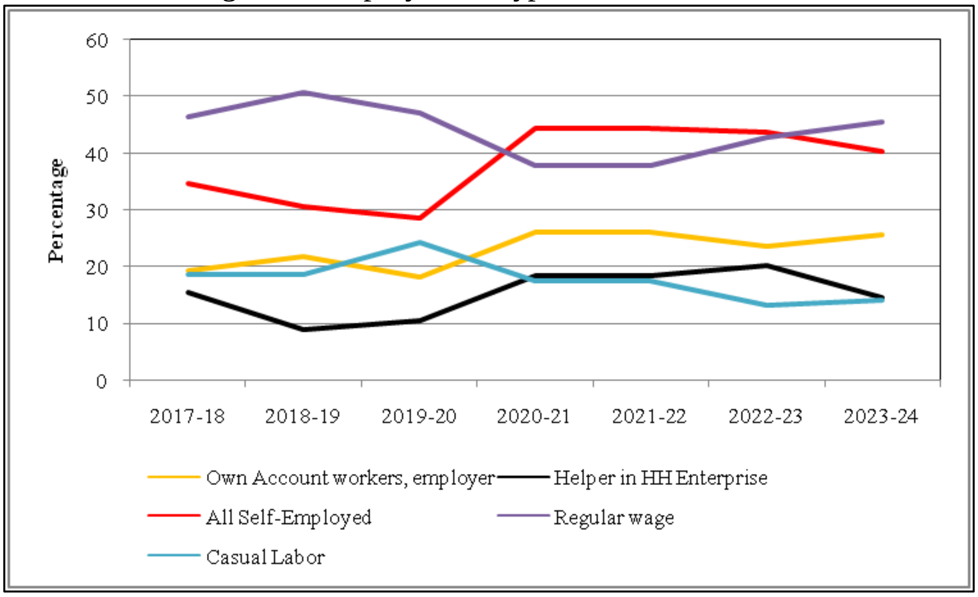


Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

For urban males, employment patterns shifted toward more precarious forms of work. The proportion of self-employment declined from 45.9 percent to 40.8 percent, whereas regular wage employment remained largely unchanged, rising slightly from 40.5 percent to 41.9 percent. At the same time, casual labour rose sharply from 13.6 percent to 17.3 percent, suggesting greater vulnerability, possibly linked to economic shocks such as COVID-19. Urban women experienced more positive changes. Their share in self-employment rose initially, peaking at 44.5 percent in 2020–21, before settling at 40.4 percent in 2023–24. More notably, regular wage employment decreased overall, reaching 45.5 percent by 2023–24. At the same time, casual labour declined steeply, from 24.3 percent in 2019–20 to 14.1 percent in 2023–24. This shift indicates improved access to relatively stable jobs for women in urban Odisha.

The CAGR values for 2017–18 to 2023–24 (Table 4) confirm these dynamics. Among urban males, self-employment contracted at –3.00 percent, helpers in household enterprises grew moderately at 5.66 percent, casual labour declined slightly at –1.94 percent, and regular wage jobs grew slowly at 0.57 percent. This highlights stagnation in formal opportunities alongside a modest rise in family-based work. For urban females, self-employment grew by 4.89 percent yearly, helpers declined by 0.88 percent annually, casual labour rose by 2.52 percent each year, and regular wage work fell marginally by 0.36 percent annually. For the urban workforce as a whole, self-employment declined by 2.48 percent yearly, helpers rose by 4.71 percent yearly, casual labour contracted by 1.22 percent yearly, and regular wage jobs grew only by 0.51 percent yearly. These trends reflect persistent informality and limited formalization, though with gendered variations.

Figure 7: Employment Type of Urban Female

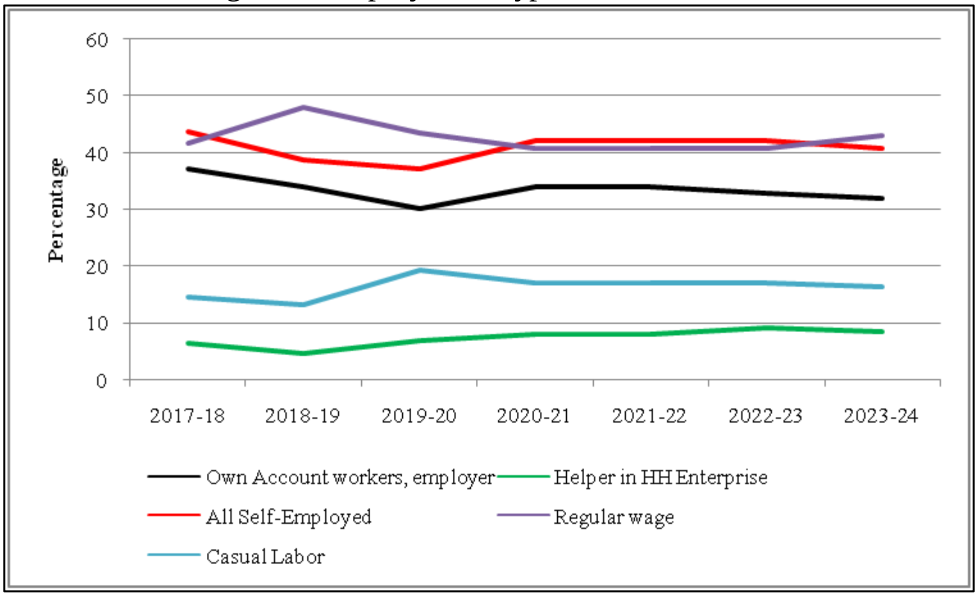


Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

The comparison of urban with rural patterns highlights important contrasts. Rising rural female LFPR was largely absorbed into household enterprises and informal, low-paid work. In urban areas, however, women gained better access to regular wage jobs and moved away from casual labour, reflecting relatively higher job quality. For men, the story was less positive: while rural men remained concentrated in self-employment and casual work, urban men saw declining self-employment and rising casual labour, indicating deteriorating job quality and reduced access to formal jobs.

Largely, Odisha's urban labour market shows both opportunities and challenges. Women have achieved better access to regular wage employment and reduced dependence on casual labour, pointing to improved job quality compared to their rural counterparts. For men, however, a shift toward casual labour raises concerns about vulnerability and stagnation in formal job creation. Self-employment remains important for both genders but is steadily declining, consistent with the broader structural transformation of Odisha's economy. These findings illustrate that while Odisha's labour market has successfully absorbed rising participation, particularly of women, urban-rural and gender differences persist.

Figure 8: Employment Type of Urban Person



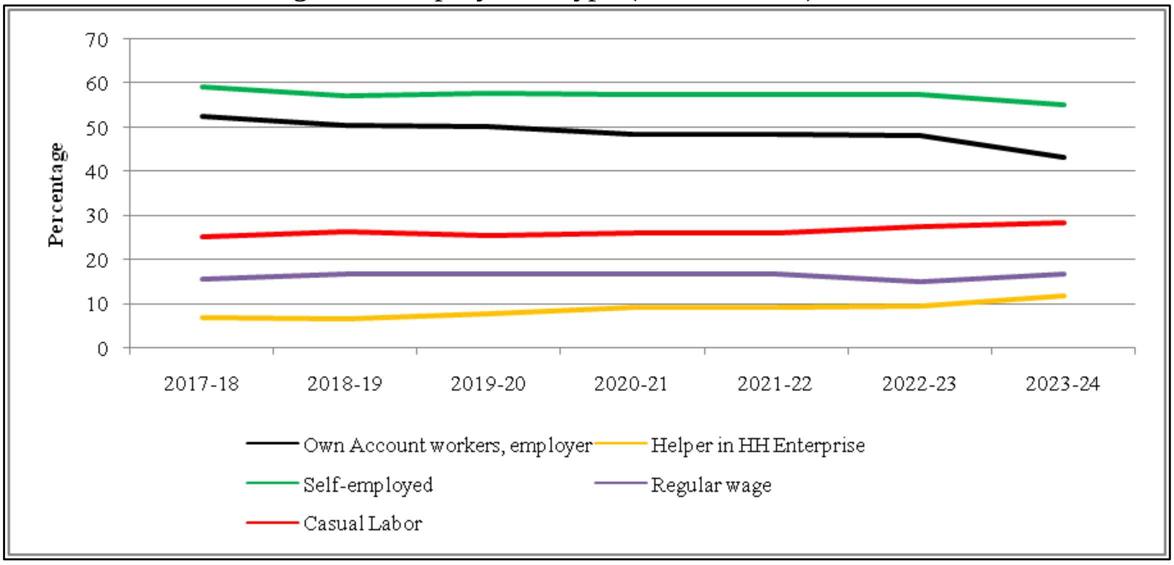
Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

4.6. Types of Employment and their trend in (Rural+ Urban) Odisha

The combined rural and urban data presented in Figures 9, 10 and 11 reveal how Odisha's workforce adapted to rising participation rates and economic disruptions between 2017–18 and 2023-24. As seen earlier, Odisha experienced a sharp increase in female LFPR and WPR during this period, while unemployment rates fell—indicating that the labour market was able to absorb the growing workforce. However, the structure of employment shifted markedly, particularly for women, and these shifts are reflected in the combined rural–urban employment patterns. For males, self-employment remained the dominant form of work, declining slightly from 59.3 percent to 55 percent, while regular wage jobs declined marginally and casual labour rose from 25.1 percent to 28.3 percent during

2017-18 to 2023-24. This suggests that for men, the rising workforce was largely absorbed into informal, low-security casual jobs rather than into more stable regular wage work. Notably, most male self-employed workers continued to work as own-account workers, indicating limited expansion of family-based enterprises or hiring additional help.

Figure 9: Employment type (Rural+Urban) Male



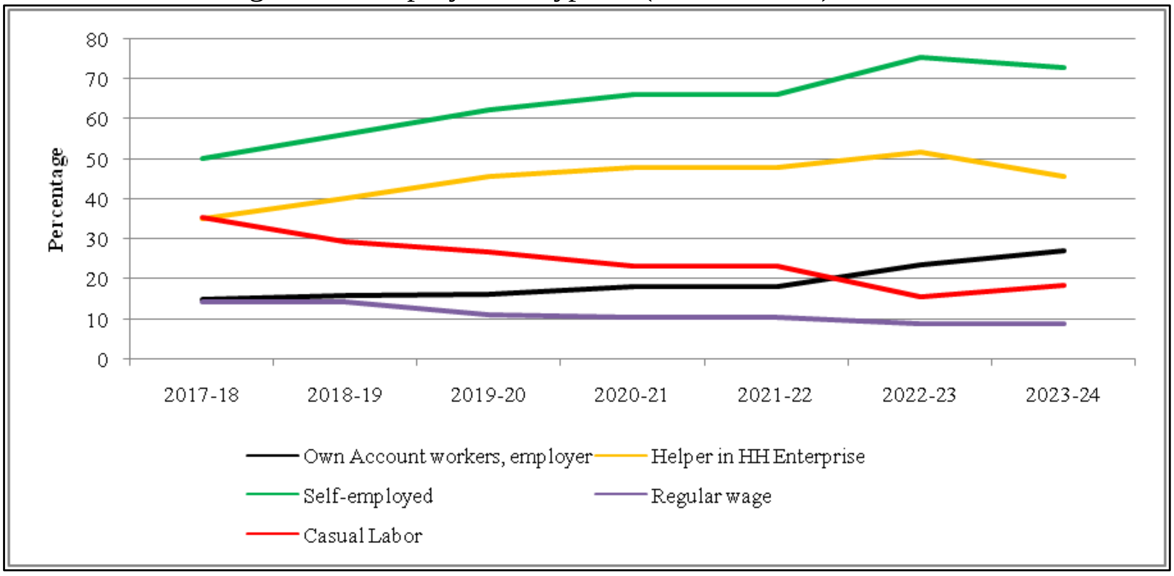
Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

For females, the trends were more striking. The proportion of women in self-employment rose dramatically, from 50.3 percent in 2017–18 to 72.8 percent in 2023-24, with the bulk of this increase occurring in the helper in household enterprises category. Simultaneously, the proportion of women in regular wage and casual employment fell sharply. This reflects both greater participation of women and the limited availability of formal jobs, which pushed many into family-based, informal activities. In total, self-employment for both men and women grew from 57.4 percent to 62 percent, while regular wage and casual jobs decreased, showing the rising role of self-employment in Odisha's labour market.

These structural shifts can be linked to both demographic and economic factors. As noted earlier, policies like *Jal Jeevan Mission*, MGNREGA, and women's empowerment initiatives likely encouraged women's participation—but in the absence of sufficient regular jobs, much of this participation was absorbed through family enterprises or informal self-employment. Social norms and the flexibility of working at home also played a role in shaping these choices for women.

Economic shocks during this period also influenced these trends, like Demonetization (2016), GST implementation (2017), and especially the COVID-19 pandemic disrupted formal employment opportunities. During the first phase of the pandemic, job losses in urban salaried jobs led to reverse migration to rural areas, increasing rural employment, particularly among women—while urban employment numbers temporarily fell. The pandemic also pushed many people into informal self-employment to survive, as salaried positions declined and family labour became a buffer (Chand, 2022; Goel, 2024).

Figure 10: Employment Type of (Rural+Urban) Female



Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

While the rise in self-employment reflects the resilience of households and their ability to absorb shocks, it also highlights the precarious nature of employment in Odisha. As Joshi & Mitra (2020) argue, shortages of suitable and productive employment have forced many—especially women—into low-productivity, informal self-employment or underemployment. In the PLFS 2017–18, the percentage share of male self-employed, regular wage, and casual labour workers were 59.3 percent, 15.7 percent, and 25.1 percent, respectively. Proportion of self-employed workers without employees and helpers in small household businesses in the total labour force were 52.5 percent and 6.8

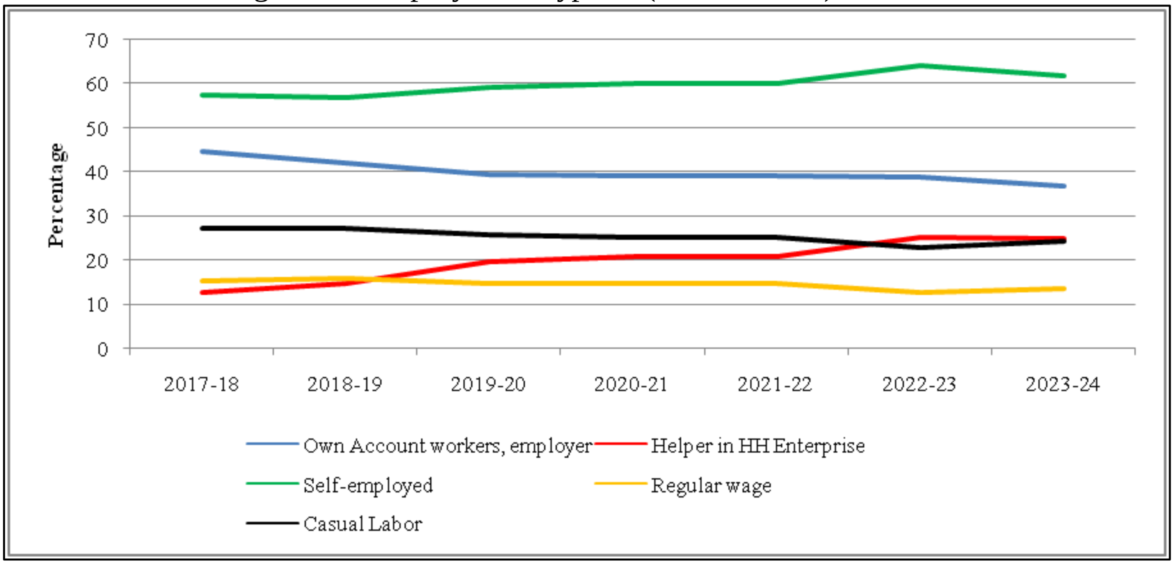
percent, respectively. The proportion of self-employed workers decreased from 59.3 percent to 55 percent, while the share of regular wage workers increased from 15.7 percent to 16.7 percent, and the proportion of casual labourenlarged from 25.1 percent to 28.3 percent. Although male workers in urban areas showed a shift from regular salaried work and self-employment to casual work, the change was minimal. The majority of workers, including males, females, and persons from both urban and rural areas, were working as self-employed. Combined rural and urban males were mostly engaged as self-employed workers without employees compared to females, while the majority of females were engaged as helpers in household enterprises compared to males.

In the PLFS 2017–18, the proportion of female Independent workers, regular wage, and casual labour workers in combined rural and urban areas was 50.3 percent, 14.2 percent, and 35.5 percent, respectively. The proportion of Independent workers and helpers in family businesses in the total labour force was 15 percent and 35.3 percent, respectively. A significant portion of females were self-employed in 2017–18, and this percentage increased to 72.8 percent in 2023-24. However, the share of regular wage and casual labour workers decreased in the same timeframe. Female workers in combined areas showed a preference for self-employment over regular salaried work and casual labour. In the PLFS 2017–18, the proportion of persons who were independent workers, in Steady paid employment, and in Contingent labour were 57.4 percent, 15.4 percent, and 27.2 percent, respectively. The share of self-employed workers increased from 57.4 percent to 62 percent, while the share of regular wage workers decreased from 15.4 percent to 13.6 percent, and the proportion of contingent labour dropped from 27.2 percent to 24.4 percent during the given time period. Generally, it can be inferred that individuals in both rural and urban areas of Odisha were inclined to work as independent workers rather than in regular wage and casual labour. Males were mostly engaged as own-account workers compared to females, while a major percentage of females were engaged as helpers in household enterprises compared to males.

In general, it can be said that in the case of rural and urban combined areas, self-employment witnessed growth among females as helpers in household enterprises, but salaried employment wage and contingent workers dropped. Males were usually working as own-account workers while females were engaged in self-employment over regular and casual work. The CAGR analysis of employment patterns in Odisha (rural and urban combined) from 2017–18 to 2023–24 shows distinct gendered and structural shifts. For males, the proportion of independent workers declined significantly by 3.20 percent annually, while helpers in household enterprises grew notably at 9.47 percent. Casual labour contracted slightly by 1.25 percent, whereas regular wage work grew modestly at 1.03 percent, suggesting some improvement in formal employment but persistent informality. Among females, self-employment increased sharply by 10.36 percent, and helpers rose by 4.40 percent, reflecting growing participation in family-based and independent work. Casual labour among females rose by 6.36 percent, while regular wage work declined steeply by 7.67 percent, indicating a withdrawal from formal jobs and rising precarity. Overall, for the total workforce, self-employment declined moderately by 3.15 percent, while helpers increased significantly by 12.02 percent; casual labour rose slightly by 1.29 percent. Regular wage work declined by 2.05 percent, underscoring a continuing reliance on informal and insecure employment despite some diversification. These trends highlight the persistence of informality, the rise of household-based work, and limited progress in expanding secure wage employment across Odisha.

It has been seen that job creation was higher in urban regions during 2018-19 than in rural. Hence, an increase in workers was witnessed in the first phase of COVID-19. The devastating effect of COVID-19 led to continuous lockdowns, which forced poor urban dwellers to move to rural areas for survival during 2020–21. As a result, Urban employed population decreased. The workforce increased during 2017–18 and 2020–21, with the growth more pronounced for women, particularly in agrarian regions. The COVID-19 pandemic had a devastating effect on employment because many salaried workers not only lost employment but also faced deterioration in the quality of self-employment. In order to survive, numerous people started their own businesses with the help of unpaid family labour. This pandemic shifted employment from salaried work to self-employment (Chand, 2022). Demonetization on November 8, 2016, and GST implementation on July 1, 2017, slowed down India’s economic expansion. The outbreak of the COVID-19 pandemic also affected economic structure of India negatively. The increase in the female LFPR was due to distress in the economy during 2017–18 to 2019–20. The proportions of self-employed women increased across all sectors of the economy (Goel, 2024). The shortage of suitable employment and engagement in underemployment and low-productive jobs forced people, especially females, to choose self-employment (Joshi & Mitra, 2020).

Figure 11: Employment Type of (Rural+Urban) Person



Source: PLFS (2017-18 to 2023-24). Note: The trend line diagram is creation of author

Table 4: CAGR of Employment types of Rural, Urban and (Rural+ Urban) Areas for Odisha

	Rural			Urban			(Rural + Urban)		
Types of Employment	**Male**	**Female**	**Person**	**Male**	**Female**	**Person**	**Male**	**Female**	**Person**
Own Account workers, employer	-3.25	11.31	-3.31	-3	4.89	-2.48	-3.2	10.36	-3.15
Helper in HH Enterprise	9.78	4.09	12.25	5.66	-0.88	4.71	9.47	4.4	12.02
All Self-employed	-1.17	6.28	1.43	-1.94	2.52	-1.22	-1.25	6.36	1.29
Regular wage	1.7	-9.27	-2.27	0.57	-0.36	0.51	1.03	-7.67	-2.05
Casual Labour	1.82	-10.99	-2.34	4.09	-4.6	2.07	2.02	-10.29	-1.79

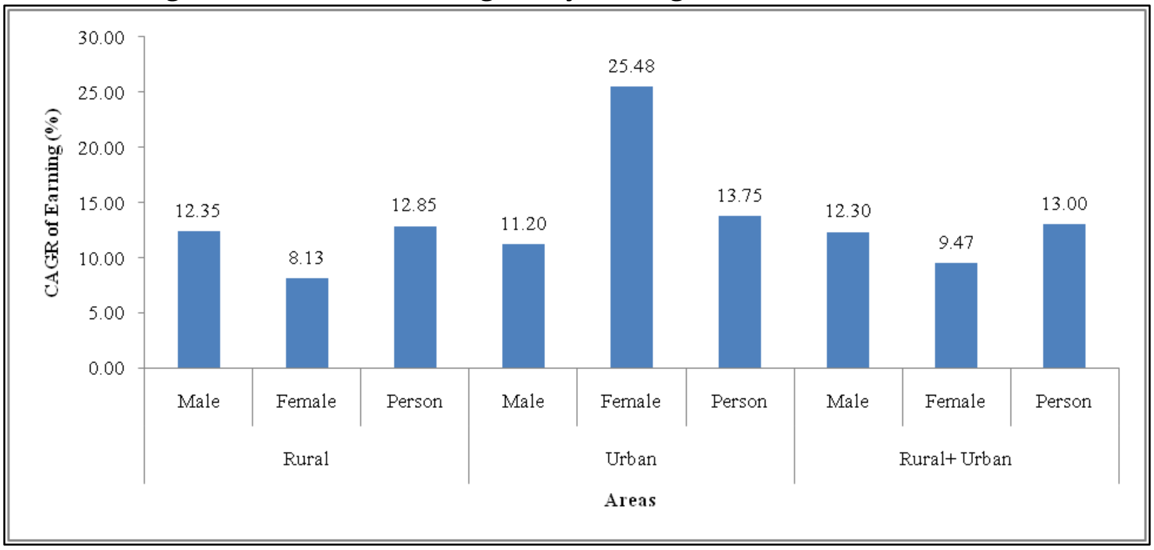
Source: PLFS (2017-18 to 2023-24. Note: The CAGR is calculated by author

4.7. Growth of Average Monthly Earning of casual labour

The Compound Annual Growth Rate (CAGR) can be defined as a mathematical tool used to appraise the average annual growth of an investment over a long period of time (Organization for Economic Co-operation and Development, 2020). The CAGR has been calculated for the period 2017–18 to 2023–24. As visible in Figure 12, the CAGR value of average daily earnings of casual labour in Odisha is positive in rural, urban, and combined areas. The CAGR for rural men and women is 12.35 percent and 8.13 percent, respectively, whereas for city males and females, it stands at 11.20 percent and 25.48

percent, respectively. This represents the yearly growth rate of average daily earnings of agrarian males is greater than agrarian females, while in Town, the annual growth rate of females is 2.2 times that of males.

Figure 12: CAGR of average daily earning of casual labor of Odisha



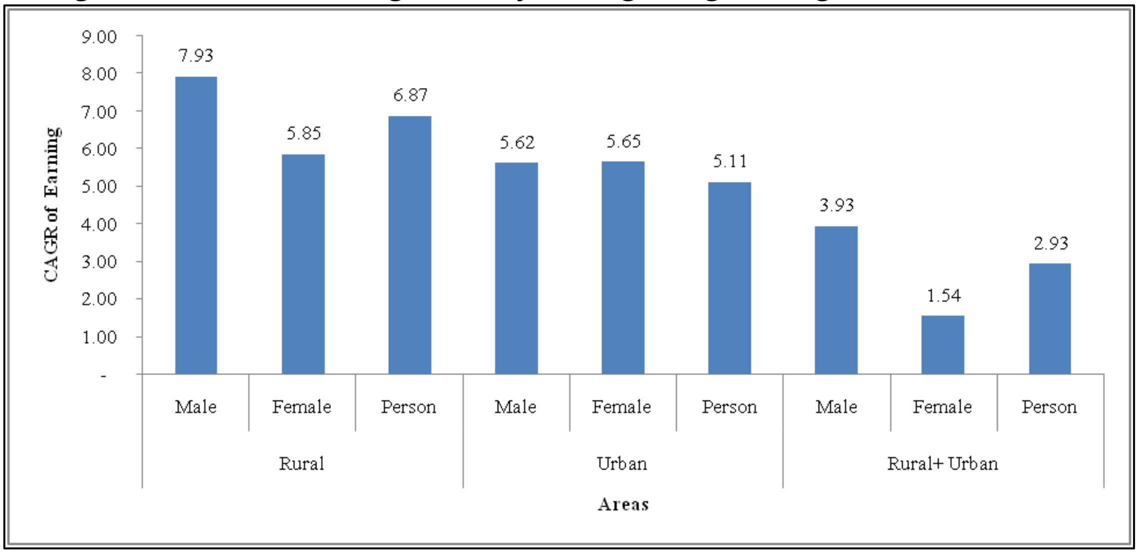
Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

The annual growth rates of males, females, and persons in combined areas are 12.30 percent, 9.47 percent, and 13.0 percent, respectively, with persons showing better growth compared to males and females. Overall, it can be inferred that there is growth in the average monthly earnings of casual labour during 2017–18 to 2023–24, with urban female earnings showing an annual growth rate of about 26 percent.

4.8. Growth of average monthly Earning of regular wage workers

The CAGR has been calculated for the period 2017–18 to 2023–24. As visible in the bar diagram, the CAGR value of average monthly earnings of Salaried workers of Odisha is positive in rural, urban, and combined areas. The CAGR values of agrarian male and metropolitan regions females are 7.93 percent and 5.85 percent, respectively, while the same values for men and women in metropolitan regions are 5.62 percent and 5.65 percent.

Figure 13: CAGR of average monthly earning of regular wage workers of Odisha



Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

This means the annual growth rate of average earnings of male regular wage workers is greater than females in rural areas, while in urban areas the annual growth rates of males and females are almost equal. The annual growth rates of males, females, and persons in combined areas are 3.93 percent, 1.54 percent, and 2.93 percent, respectively, with males showing better growth compared to females and persons.

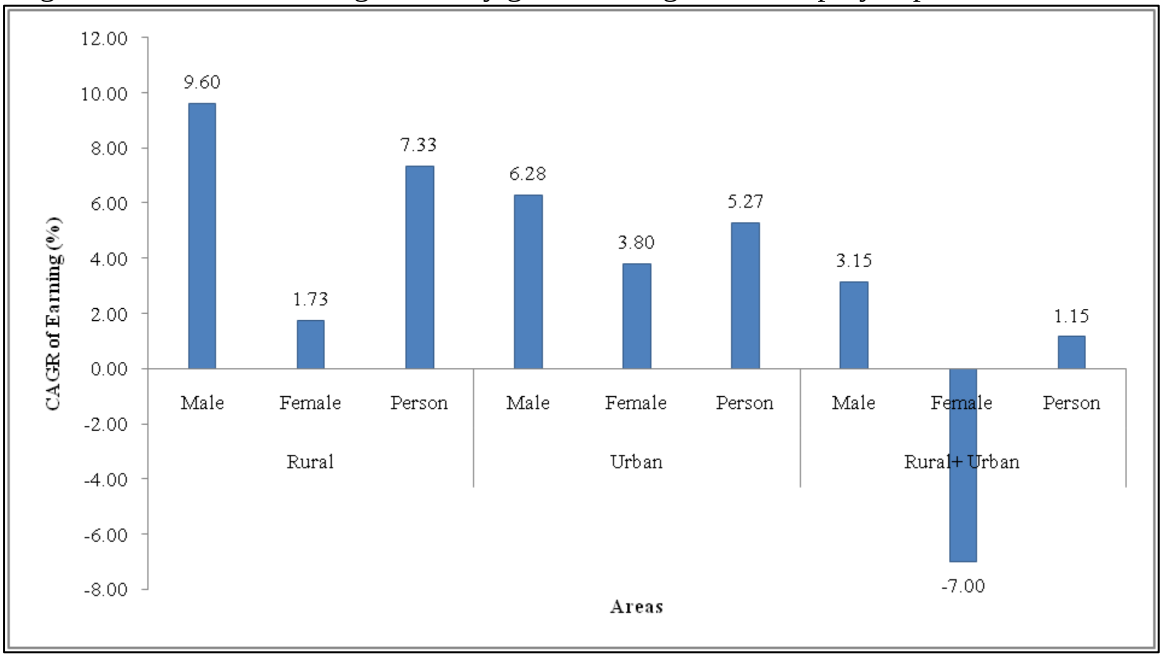
Overall, it can be said that the yearly growth rate of average monthly earnings of regular wage workers in agrarian regions and town areas is more than 5 percent, but in the combined areas it is below 5 percent.

4.9. Growth of average monthly Earning of self-employed workers

The CAGR has been calculated for the period 2017–18 to 2023–24. As visible in the bar diagram, the CAGR value of average monthly gross earnings of self-employed persons in Odisha is positive in rural, urban, and combined areas, except for females in combined areas. The CAGR values of rural males and females are 9.60 percent and 1.73 percent, respectively, while the same values for men and women in town areas are 6.28 percent and 3.80 percent. The CAGR values of male population and female population in combined areas are 3.15 percent and (–7.0) percent. This means the yearly progression rate of average earnings of male population is greater than female population in each area. The annual growth rates of persons in rural, urban, and combined areas are 7.33 percent, 5.27 percent, and 1.15 percent respectively. Here, the growth rate of earnings of rural persons is greater than urban and combined areas.

Overall, it can be said that the average annual earnings of independent male workers are growing faster than those of females and persons in each area. It means males engaged in self-employment in Odisha are experiencing a higher annual growth rate of earnings.

Figure 14: CAGR of average monthly gross earning of self-employed persons of Odisha



Source: PLFS (2017-18 to 2023-24). Note: The CAGR and bar diagram are creation of author

4.10. Discussion

The Government of India released ₹4,638 crore for Odisha, and the rural rate of unemployment declined from 54 per thousand in 2021–22 to 36 per thousand in 2022–23 (DoRD, NSSO Employment & Unemployment Survey Reports; PLFS; NSSO). Employment is closely associated with growth and prosperity. The quantity and quality of employment are key factors that determine how meritoriously economic output translates into improved living standards for the population. With the creation of employment, demand-driven economic growth increases, and the dependence of people on government support for a dignified life decreases. The need of the hour is to provide suitable jobs according to qualifications that meet the needs and aspirations of India's young workforce (Economic Survey 2023–24). Between 2018 and 2022–23, the SDG index shows across states and Union Territories, with Odisha also emerging as a good-performing state (Economic Survey 2023–24).

Between 2017–18 and 2021–22, the female LFPR in India augmented significantly, rising from 23.3 percent to 32.8 percent, with rural areas driving much of this growth (GoI, 2023).[5] In Odisha, a similar trend is evident, particularly in rural areas where FLFPR rose more sharply than in urban areas. Several factors explain this shift. Demographic changes such as declining fertility and rising education levels are vital for freeing up women's time and improving their employability (Andres et al., 2017; GoI, 2023). Government programs such as *BetiBachaoBetiPadhao*, Skill India Mission, and MGNREGA have also provided incentives and opportunities for women to engage in paid work (MoWCD, 2023). Despite these improvements, overall participation remains lower than desired, with significant gender gaps compared to male participation rates. Although women's participation in the labour force has risen, structural barriers continue to shape their employment choices and limit access to quality jobs. A major proportion of women cited unpaid care responsibilities and social norms prioritizing men's employment as reasons for staying out of the workforce (GoI, 2023).[6] Women who do enter the labour market are often concentrated in informal and insecure jobs, reflecting the persistence of the "male breadwinner/female homemaker" norm (Chaudhary & Verick, 2014). About 44.5 percent of women outside the workforce report being occupied with household duties and childcare, a figure that has barely changed despite policy interventions (GoI, 2023).[7]

A notable feature of female LFPR is the concentration of women in self-employment and informal work. In 2021–22, 19.7 percent of women were self-employed, often as helpers in family enterprises, compared to just 5.3 percent in regular wage or salaried

[5] Directorate General of Employment (GoI), 2023, *Female Labour Utilization in India*, Ministry of Labour & Employment
[6] Directorate General of Employment (GoI), 2023, *Female Labour Utilization in India*, Ministry of Labour & Employment
[7] Directorate General of Employment (GoI), 2023, *Female Labour Utilization in India*, Ministry of Labour & Employment

employment (GoI, 2023). In Odisha, the majority of rural women who entered the workforce did so as helpers in household enterprises — a role that often involves unpaid or low-paid labour (Joshi &Mitra, 2020). This shows that although women are willing to contribute economically by entering the labour market, the limited availability of stable, well-paying jobs makes them vulnerable.

The relationship between education and FLFPR is quite peculiar. Women with no schooling or with very high levels of education tend to work, while those with moderate education often remain out of the labour force, reflecting a U-shaped relationship (Andres et al., 2017; GoI, 2023). Even when women enter paid work, they face significant gender wage disparities: both regular and casual women workers earn less than their male counterparts for similar work, and these differences are more pronounced in urban regions than in rural regions (GoI, 2023). Thus, while participation rates have risen, the quality of employment and parity in earnings remain significant challenges.

Economic shocks over the last decade — such as demonetization (2016), GST implementation (2017), and the COVID-19 pandemic (2020) — have also altered employment patterns. During the pandemic, many salaried jobs were lost, pushing both men and women into informal self-employment and unpaid family work (Chand, 2022; Goel, 2024). This shift was particularly pronounced among women, who took up self-employment in family enterprises as a survival strategy, reinforcing the trend towards informal, insecure work (GoI, 2023).

5. Conclusion

The analysis of labour force trends in Odisha between 2017–18 and 2023–24 highlights significant shifts in both participation and employment quality, with strong gendered dimensions. Female participation has risen sharply, particularly in rural areas, driving much of the growth in LFPR and WPR. This reflects the combined influence of policy initiatives, socio-demographic changes, and structural economic shifts. Unemployment has declined across all categories, suggesting better absorption of the labour force. Yet, the composition of jobs reveals concerns. For women, self-employment—often as helpers in household enterprises—has grown, but these roles are largely informal, low-paid, or unpaid. At the same time, regular wage employment for women has declined, limiting access to stable, formal jobs. Male employment patterns show a persistence of casual labour and stagnation in regular wage work. Urban women fared slightly better, with modest improvements in wage employment and reduced casual labour, though informality continues to dominate. Earnings trends reveal growth across worker categories, particularly among urban females. However, gender gaps remain wide: self-employed men have experienced much higher earnings growth than women, reinforcing persistent inequality.

Overall, Odisha's labour market has expanded and absorbed new entrants, particularly women. However, the concentration of female workers in informal, insecure, and low-paying jobs underscores the need for deeper policy action. Future strategies should prioritize decent and remunerative work, with interventions such as skill development, digital literacy, gender-responsive workplace policies, childcare support, enterprise development, and formalization of informal work. Strengthening social protection and safety nets will enhance resilience to economic shocks. These measures are essential to ensure that rising labour force participation translates into sustainable, inclusive, and equitable development, recognizing and rewarding women's economic contributions while addressing structural barriers that reproduce gendered inequalities (GoI, 2023; Joshi & Mitra, 2020; International Labour Organization, 2024; Ghosh, 2025).

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Book Review – Understanding Nature: Ecology for a New Generation

Author: Louise M. Weber

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Annavajhula J C Bose[1], PhD, Department of Economics (Retd.), Shri Ram College of Commerce, University of Delhi

Economics students must read this book because they do not know that "the economy is completely dependent on ecology". To put it differently, it is high time they knew that learning economics is incomplete without learning ecology.

This is a typical non-mainstream viewpoint. It is owed, for example, to Satish Kumar, a most dedicated peace-pilgrim, life-long environmental activist and former Jain monk, influenced by Buddha, Gandhi, Rabindranath Tagore and Schumacher the contrarian economist. He has made the case for replacing the words "liberté, égalité, fraternité" or "life, liberty, happiness" by the words "soil, soul, society". The former words represent the egocentric approach that has "led to the current state of the world - misuse of natural resources, human relationships breaking down, wars and the much other violences". The latter words represent what is imperative for humanity's salvation—the ecocentric approach wherein "soil represents nature in its entirety - land, water, air, animals (including humans as he says we should not separate ourselves from nature) and the endless interactions of all. Soul represents each individual and their contentment with themselves, an inner peace. Society represents how these individuals interact with each

[1] Email: bose.ajc@gmail.com

other as a collective (neighbourhood, town, state, country, continent, [and] world) and how they value and appreciate nature."

Economics curriculum must be integral to an ecological worldview, according to Satish Kumar: "the economy is a subsidiary of ecology. Without ecology there is no economy. Yet around the world, economy is taught as if there is no connection between economy and ecology. Nature, which is another name for ecology, is considered just a resource for the economy which in effect means a resource for the maximisation of profit through ever increasing production and consumption. Similarly, people are reduced to a resource for the economy. Endless production, consumption and the pursuit of profit, in the name of economic growth, progress and development have become the most cherished goals of the modern economy. According to an ecological worldview, if production and consumption, money and economic growth damage nature and exploit people then such economic activities must be stopped or pursued with restraint and within natural limits. In the economy of nature there is no waste. Whatever we take from nature must go back to nature. What cannot be absorbed by nature should not be produced. An industrial economy is a linear economy. We take from nature, use it and then throw it with the consequence that it ends up in landfills, in rivers and oceans and in the atmosphere. We need to replace this linear economy with a cyclical economy. All goods and products must be recycled and returned to nature, without waste. In the economy of nature there is no pollution either…whatever we make or use should be beautiful. Beauty is food for the soul. Our senses and spirits are nourished by beauty. Beauty ignites creativity and inspires the imagination…the beautiful should also be useful…what is beautiful and useful should also be durable. This BUD formula — beautiful, useful and durable — should be incorporated in the study of economics."

I have found these wisdom-words of Satish Kumar as the best way of inviting the reader to open this book and study its wonderful knowledge unknown to economics students as well as their teachers.

Apart from the exciting and soothing Introduction and Epilogue chapters respectively, there are 31 well-crafted hard-scientific chapters in the book, which is a unique ecological textbook in that it has a historic framework. The author is a greatest professor of biology and environmental science in the world. Each chapter is followed by many thinking questions which test the reader's internalisation of the subject matter. The book is invaluable for students doing the compulsory course of environmental studies like in Delhi University in particular and in general to anybody seeking to become an informed citizen.

The book takes us through discussions on definitions of ecology, natural history; biomes, life forms and ecoregions; individual species; evolution; microevolution; autobiography of the Earth; statistics; basics and profound questions of population ecology; basics and theory of community ecology; predation; succession; ecosystem ecology basics; energy; matter; ecosystem regulation; landscape ecology; wildlife management and habitat ecology; wildlife management for temperate farms and ranches and in temperate forests; conservation biology; restoration ecology; aquatic ecology; biogeography, and wicked problems.

The reader should not lose heart as many sections of the book are difficult to readily grasp. For example, the section on wicked and super wicked problems is one of the most difficult to read. As the author points out, "Wicked problems are without precedent, difficult even to formulate, with consequences difficult to imagine and considerable uncertainty and ambiguity." Climate change is super wicked as it has "the additional characteristics of time running out, no central authority, and the people trying to solve the problem are also causing it. Climate change is particularly complex because its effects are varied. It can increase or decrease rainfall and crop yields. It can affect human health positively or negatively. It can cause changes to forests and other ecosystems and impact our energy supply. Access to energy and disruptions caused by human migration have been at the heart of all the world's wars for the last 20 years…for a wicked problem, we cannot wait for outside entities to take leadership in finding solutions. Individuals working creatively and adroitly with other community members can find ways to adapt within the circumstances of an uncertain and changing situation."

Thus, putting oneself in a hopeful and positive frame of mind is not easy in reading this book. The point is that problem-solving solutions "require that many people adjust their mindsets and behaviour. Power structures and economic systems may need change. Stakeholders may have radically different views. The problems may change over time. Every problem may interact with other problems. Solutions may be contradictory.

Arguments from the participants may be illogical, replaced by value-based thinking. The problem may not be understood or named until after the formulation of solutions."

However, like Satish Kumar, the author—Louise Weber—helps readers "build a personal relationship with the Earth, under the premise that those who love nature will walk more softly and work to heal Her. For students who intend to raise children, own property, travel to distant places, take visits to wilderness areas, or be leaders when environmental problems arise, this book can lead to a deeper relationship with the Earth. Whether the readers are health pre-professionals who may eventually prescribe outdoor time for patients or those seeking a nature-related occupation, this book can provide a source of therapy for Earth and self. Joy is essential. Ecopsychologists have observed that in the magnitude of the environmental crisis, people withdraw with a sense of helplessness. The environmental movement has been so successful that it has invented a problem too large to solve, in many people's mind. The response can be regression to what feels good, creating further epidemics such as shopping, gambling, substance abuse, and screen addictions. The answer is not to scold people for their addictions and lack of concern, as environmentalists sometimes do, but to reconnect humans with nature in an expression of love rather than guilt and fear. The key remedy is to have people engage in reciprocity—healing self by healing Earth."

This book is capable of effectively offering this remedy by examining the entire ideas specific to ecology at global, regional and local scales. In doing so, the author remains humble and cautious to conclude thus: "Ecology at best has been a body of knowledge, methods, and vocabulary. The body of practices for solving some of humanity's most serious problems and to restore the more spiritual relationship with the land has been outside its parameters. We need a change. Our fate is not yet sealed on climate change and biodiversity loss, but the window is closing. Immediate action is vital in a way that many in the human population are terrified to embrace. For enlightenment we must realize the ways of thinking about nature that are less mechanistic. It is time to embrace natural history, traditional ecological knowledge, and ecopsychology as portals that are not as scary. It could work."

The message is irresistible. Unless we understand what ecology is, we cannot understand the meaningful purpose of economics. The author is grateful to Mother Earth for inspiring her to write this book: “It is still a beautiful world, even though She doesn’t deserve how we, her most intelligent species, have treated Her.”

So, let us learn from her to understand ecology--the connection between soil, soul and society, as Satish Kumar puts it. Let us drop ego in favour of eco and thereby become responsible residents of this planet. Moreover, given that the youth in the world are desperately seeking decent livelihoods along with emotional wellness, a book like this enables them to think about such possibilities within the ontology and metaphysics of losing their rapid “disconnection from nature”.

The book is very expensive, though. I can share its pdf copy as a gift if the reader wants to take it as a soulmate for actualising a regenerative present and future. One thing is crystal clear. The book is surely not airy; it is seriously grounded by meeting with the guidelines set forth in the Four-Dimensional Ecology Education framework outlined by the Ecological Society of America.

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Trend Analysis of Frauds in India's Banking Sector: A Comparative Study across fraud categories and banks

Esther Ngaihte[1], Associate Professor, Shri Ram College of Commerce, Delhi

Saesha Banga, Student, MBA (IB), IIFT, Delhi

Megha Goenka, Former Student, SRCC, DU

Abstract

This paper provides a comprehensive trend analysis of banking frauds in India from 2017 to 2024, focusing on the impact of technological advancements and the rise of digital banking. The study examines the increasing frequency and evolving nature of fraud across public, private, foreign, small finance, and payment banks, categorizing fraudulent activities into off-balance sheet, cash, internet, and forex-related transactions. Using secondary data from the Reserve Bank of India (RBI) and individual banks, the research identifies significant trends, including a notable decline in fraud cases within public sector banks post-2019, likely due to regulatory interventions by the RBI. In contrast, private sector banks have experienced a marked rise in fraud, particularly in digital transactions, revealing greater vulnerability to cyber-related risks. By evaluating the effectiveness of regulatory frameworks and advancements in fraud detection systems, this paper assesses their role in curbing fraud across the banking sector. The findings underscore the urgent need for stronger cybersecurity protocols and a more robust fraud prevention ecosystem to address the rising incidence of digital fraud in private sector banks and mitigate the financial impact of fraud on public sector banks.

Keywords: Banking frauds, digital transactions, public and private banks, fraud detection systems, RBI regulations, cybersecurity.

JEL Classification: G2, G21, G32, G38

[1]Email: esther.ngaihte@srcc.du.ac.in

1. Introduction

In recent years, banking frauds have emerged as a critical concern in the Indian financial ecosystem, driven largely by the rapid digitalization of banking services and an increasing reliance on technology. As banks adopt advanced digital platforms to enhance customer experiences and operational efficiency, they simultaneously expose themselves to new and complex risks. The last seven years have witnessed significant fluctuations in both the volume and value of fraud cases within the banking sector. Notably, there is a growing concentration of frauds in digital transactions and technology-driven scams, raising alarm bells among regulators, stakeholders, and consumers alike.

Public sector banks, which have historically been more vulnerable to large-scale frauds, particularly in advances and loans, have demonstrated a remarkable turnaround since 2019. This positive trend is largely attributed to stricter regulatory oversight implemented by the Reserve Bank of India (RBI), which has aimed to bolster the integrity and stability of the banking system. The RBI's proactive measures include enhanced compliance frameworks, increased scrutiny of transactions, and the introduction of advanced monitoring technologies. As a result, public sector banks have seen a sharp reduction in both the number and amount of fraud cases, highlighting the effectiveness of these interventions.

In stark contrast, private sector banks, with their strong emphasis on digital banking, have experienced a notable rise in fraud cases, particularly following the COVID-19 pandemic. The pandemic accelerated the shift to digital services, resulting in a surge of online transactions, which, while beneficial for customer convenience, also created fertile ground for fraudsters. Techniques such as phishing, identity theft, and other cybercrimes have proliferated, leading to significant financial losses and eroding customer trust in the banking system.

This paper aims to explore the trends in banking fraud across different types of banks—public, private, foreign, small finance, and payment banks—while also delving into various operational areas. By analysing detailed data from 2017 to 2024, this study seeks to uncover the underlying causes of these trends, emphasizing the impact of evolving fraud techniques, regulatory interventions, and shifts in banking practices. Furthermore, the paper will evaluate the effectiveness of RBI’s regulatory frameworks in addressing these challenges and the critical role of technological advancements in enhancing fraud detection capabilities.

The implications of these findings are far-reaching, particularly concerning the need for robust fraud mitigation strategies tailored to the evolving digital landscape. As banks continue to innovate and expand their digital offerings, it is imperative that they also prioritize strengthened cybersecurity measures to protect their assets and maintain consumer confidence. By understanding the complexities of banking fraud in the current era, stakeholders can better formulate strategies to safeguard the financial ecosystem and ensure its resilience against future threats.

Section 2 of the paper gives a review of the literature on the issues of financial frauds in the banking sector. Section 3 highlights the research methodology including the research design, the research objectives and the research questions. The next section covers the analysis of the data on financial frauds in the banking sector. The paper concludes with a discussion and policy recommendation.

2. Literature Review

The issue of financial fraud in the banking sector has garnered increasing attention in recent years, as it represents a complex challenge shaped by various factors, including technological advancements, weak governance, and systemic inefficiencies. As the banking landscape evolves, it becomes essential to understand the vulnerabilities that render the system susceptible to fraud. The existing literature sheds light on these vulnerabilities, offering valuable insights into the underlying causes and potential solutions for mitigating banking fraud.

Verma (2021) provides a foundational perspective by tracing the roots of banking fraud in India back to the post-liberalization era. During this period, the rapid expansion of the banking system created opportunities for fraudulent activities, particularly within public sector banks (PSBs). High-profile cases, such as the Punjab National Bank-Nirav Modi scandal, exemplify the significant losses these banks have endured. Verma's analysis highlights that, despite the introduction of regulatory measures like the Central Fraud Registry and Early Warning Signals, PSBs continue to grapple with governance challenges, including poor compensation structures and inadequate training for fraud prevention. These shortcomings, coupled with delays in fraud reporting, complicate recovery efforts and underscore the need for systemic reform. Building on Verma's findings, Singh (2023) delves deeper into the systemic inefficiencies within PSBs that contribute to loan-related fraud. These banks manage a substantial share of high-value, long-term loans in sectors such as infrastructure and mining, making them particularly vulnerable due to insufficient due diligence and delayed recognition of non-performing assets (NPAs). Singh identifies collusion among bank officials, borrowers, and third parties, such as auditors, as a critical factor exacerbating the fraud problem. His research calls for enhanced governance practices and stronger regulatory oversight to curb fraud in PSBs, echoing the themes raised by Verma (2021).

The legal framework surrounding financial fraud emerges as another vital area of concern. Gulpham (2022) highlights that India's judicial system has not been able to adequately address the seriousness of financial fraud. Current penalties are perceived as insufficient, prompting calls for stricter laws that could classify banking fraud as non-bailable offenses, thereby increasing their deterrent effect. This advocacy for more stringent legal measures resonates with the need for improved enforcement mechanisms across the banking sector, further emphasizing the interconnectedness of legal and governance issues. In parallel, Chakrabarty (2013) examines the governance failures in public sector banks that enable large-scale loan frauds. His recommendations focus on enhancing corporate governance and fraud monitoring systems, as well as holding senior management accountable for fraudulent activities. This perspective reinforces the importance of establishing robust governance structures to mitigate the risks associated with banking fraud.

As the banking sector increasingly adopts digital platforms, a significant shift in the nature of fraud has occurred. Verma, Roy & Lohana (2024) document this transition, noting a surge in digital fraud, particularly in card-based and internet transactions, following 2018. The integration of digital security within traditional banking operations becomes crucial, as these new vulnerabilities demand a reimagined approach to fraud detection and prevention. Moreover, the COVID-19 pandemic has further accelerated the prevalence of digital fraud. Verma and Jaiswal (2023) observe that the rapid shift to online banking during lockdowns provided cybercriminals with numerous opportunities to exploit vulnerabilities, particularly targeting private banks. The economic pressures stemming from the pandemic, including high unemployment rates among tech-savvy youth, have also contributed to a rise in cyber fraud. This connection between economic hardship and fraudulent behaviour highlights a critical social dimension that cannot be overlooked.

Amid these challenges, there is hope for innovative solutions in the fight against fraud. Odeyemi et al. (2024) provide an optimistic perspective on how Artificial Intelligence (AI) can revolutionize fraud detection. AI's ability to process vast datasets and identify patterns in real-time has already shown promise in preventing fraud. For example, machine learning models employed by banks and credit card companies have successfully detected unusual transaction patterns, thereby averting significant financial losses. Unlike traditional rule-based systems, AI's adaptability to evolving fraud tactics positions it as a vital tool in addressing the complexities of digital fraud. In conclusion, the literature reveals a multifaceted landscape of banking fraud in India, characterized by governance issues, technological vulnerabilities, and an evolving nature of fraud. By synthesizing insights from various studies, this review underscores the pressing need for enhanced regulatory frameworks, improved governance, and innovative technological solutions to effectively combat the rising tide of banking fraud.

3. Research Methodology

3.1. Research Design

Data from annual reports of commercial banks and RBI reports spanning from 2016 to 2024, was analysed, focusing on the number of frauds, classified by the type of bank and the type of operations. Other data sources include the Annual Reports of respective banks and the Reserve Bank of India's (RBI) Annual Reports, specifically Section VI on Regulation, Supervision, and Financial Stability. A sample size of 12 banks was selected for the study, both public sector and private sector banks, to allow for a comparative analysis between public and private sector banks, highlighting differences in fraud trends and mitigation strategies.

3.2. Research Objectives

The primary objective of the study was to analyse the trend of financial frauds in the Indian banking sector from 2017 to 2024. The paper analysed the following issues:

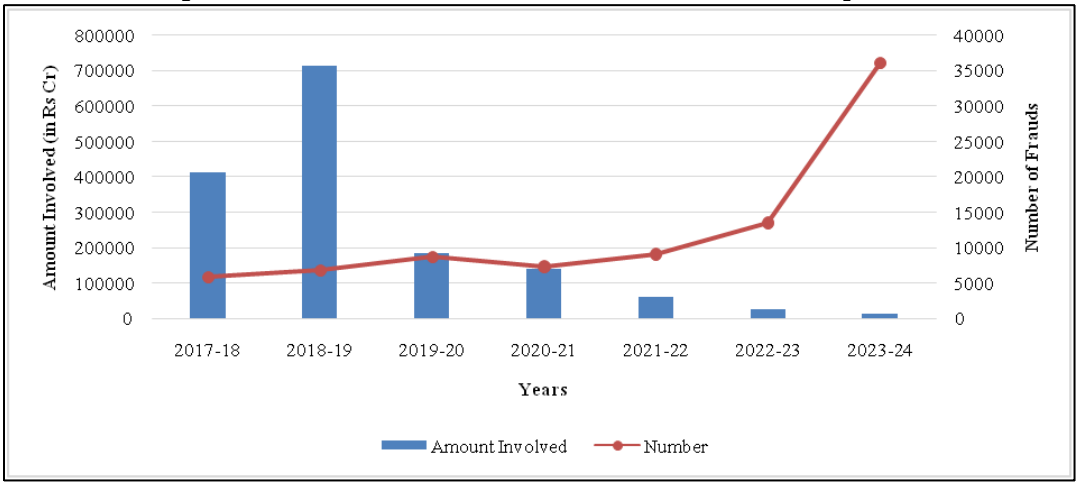
- The prevalence and nature of financial frauds post-Covid pandemic, focusing on the trend of increasing fraud numbers involving smaller amounts.
- The operational areas most vulnerable to fraud, such as internet banking and credit/debit card transactions, and investigate the reasons for their susceptibility.
- The fraud trends in public and private sector banks, identifying why private banks have surpassed public banks in terms of reported fraud cases.
- The impact of frauds on the financial health of banks, focusing on fraud-deposit ratios, NPA levels, profitability, and ROA metrics for both public and private banks.
- The fraud mitigation measures and proposed improvements for regulatory mechanisms within the Indian banking sector.

4. Results and Analysis

4.1. Macro-Level Trend Analysis

The landscape of banking frauds has been undergoing significant shifts, driven by the rise of digital banking, evolving fraud techniques, and regulatory interventions. Analysing these trends is essential for identifying the critical areas most susceptible to fraud, as well as understanding which types of banks—whether public, private, or cooperative—are more vulnerable. This examination helps to reveal the underlying reasons and nature of frauds, such as internal collusion or technology-driven breaches. Studying these patterns allows us to evaluate the effectiveness of existing regulatory frameworks, including those implemented by the RBI, and to assess their impact on fraud trends across sectors. It also highlights areas where these frameworks may fall short, revealing opportunities for further enhancements to better safeguard the banking ecosystem against emerging threats. Figure 1 highlights the trend of banking frauds in terms of number of frauds reported and the amount involved for the period 2017-2024.

Figure 1: Amount Involved and Number of Frauds Reported



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

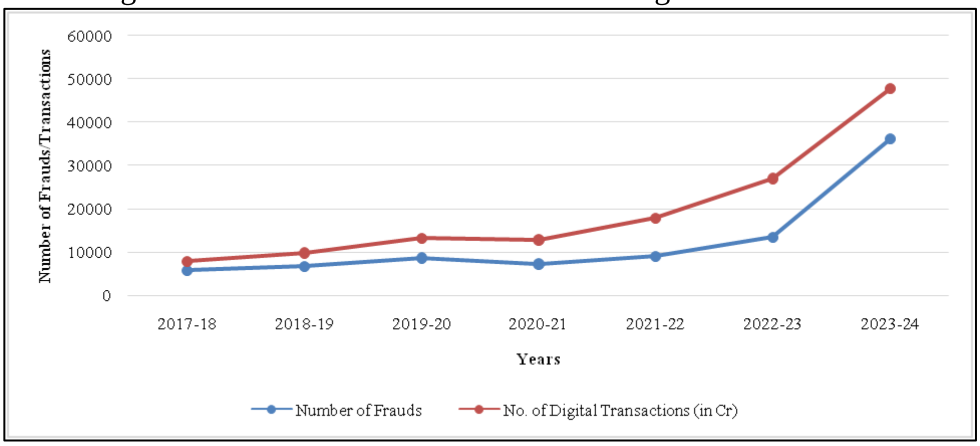
There is a significant peak in the amount of fraud reported during 2018-19, which was the highest in the seven-year period. The amounts involved drop notably after 2018-19 and remain relatively low until the end of the period. Interestingly, despite a sharp rise in the number of frauds reported after 2021, the amount involved remains comparatively low. However, the number of fraud cases follows a steady trend from 2017-18 to 2020-21, with some minor fluctuations following a notable spike in fraud cases beginning in 2021-22, with a dramatic rise post 2022-23. This indicates an increasing frequency of fraudulent activities post-pandemic, even though the monetary value per fraud case appears to have diminished.

The Covid pandemic saw a massive increase in digital banking transactions, leading to more opportunities for cyber fraud and digital scams. This transition likely contributed to the surge in the number of fraud cases, as online transactions became more susceptible to hacking, phishing, and cyber-attacks. Small-scale frauds like fraudulent digital transactions or scams in financial products may have become more prevalent due to the financial vulnerabilities exposed during the pandemic. Thus, the substantial increase in the number of fraud cases could be due to a surge in small-scale fraudulent activities, particularly in the realm of digital transactions (internet banking, credit/debit card fraud). These frauds often involve smaller amounts but occur more frequently, aligning with the observed trends where the number of frauds increased while the amount involved decreased.

The COVID-19 pandemic also created economic distress for many individuals and businesses, which may have led to a higher propensity for fraud due to rising unemployment, which further exposed individuals to financial risks and frauds. However, unemployment alone cannot fully explain the surge in fraud cases. While financial distress contributes to susceptibility, the number of frauds has grown much faster than unemployment. Instead, the trend in frauds closely follows the rapid rise in digital transactions, indicating that the shift to digital platforms, without adequate safeguards and consumer education, is a primary factor driving the increase in frauds (Figure 2).

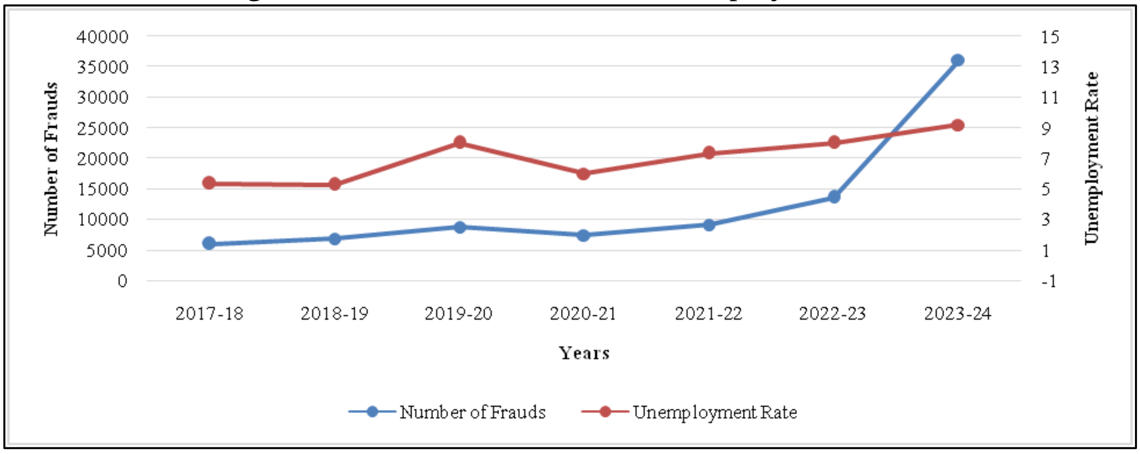
Further, the sharp decline in the amount of money involved after 2018-19 indicates stricter regulatory measures implemented to prevent large-scale fraud. Therehave been targeted interventions or reforms by the RBI to mitigate high-value fraud, which resulted in fewer high-stakes cases post-2019. The rise in fraud cases may also reflect improved detection and reporting systems post-pandemic, as banks and regulatory bodies have enhanced their internal monitoring processes. The quicker detection of fraud, especially in digital platforms, could lead to more reported cases with smaller amounts before they escalate.

Figure 2: Increase in Frauds with Rise in Digital Transactions



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Figure 3: Increase in Frauds with Unemployment Rate



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

In summary, the graphs showcase the growing prevalence of frauds, especially in the digital domain, as India moves towards a cashless economy. The shift in fraud patterns, from large-scale frauds in 2018-19 to a higher volume of smaller frauds in recent years, reflects both the evolving nature of fraud and the banking sector's increasing exposure to cyber risks.

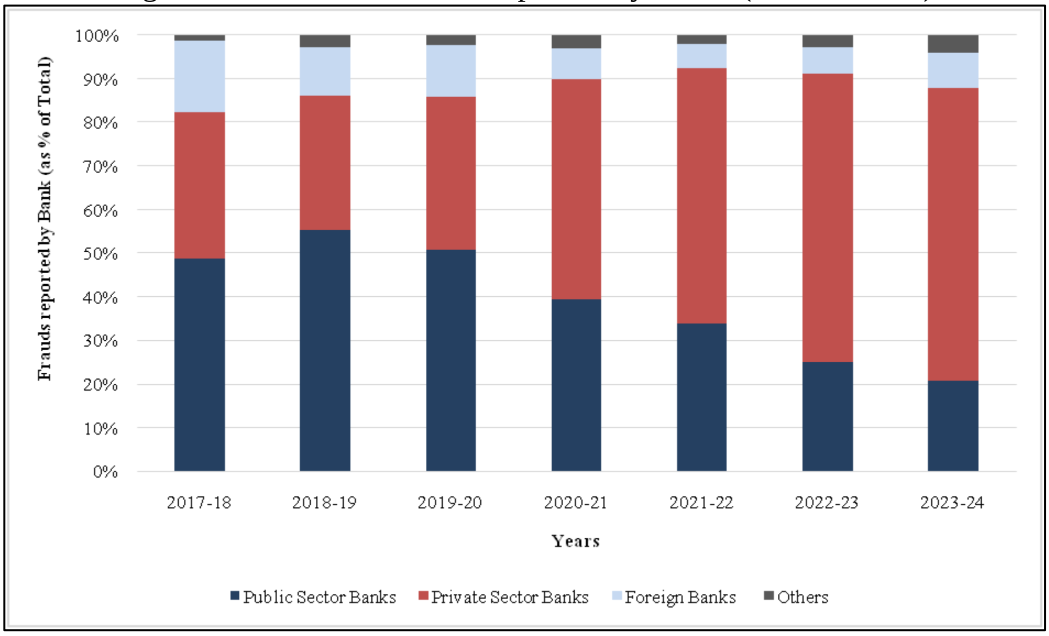
4.2. Classification by the Types of Banks

4.2.1. Number of Frauds

Public sector banks (PSBs) and private sector banks differ significantly in their operations and risk profiles. PSBs, with their larger focus on traditional banking activities such as loan disbursement and advances, are more susceptible to frauds related to advances and corporate lending, which tend to involve larger sums but occur less frequently. In contrast, private banks, with their emphasis on digital services and rapid transaction processing, are more vulnerable to technology-driven frauds, such as those involving digital payments. While PSBs often dominate in large-scale, high-value fraud cases, private banks experience more frequent, but lower-value, frauds in the digital domain. This operational difference shapes the nature of risks each bank type faces. We assess the trends between the various types of banks – public, private, foreign, small finance, and payment banks.

Public sector banks have historically reported a significant proportion of frauds, but their share in the total number of frauds has declined consistently over time. From 2017-2020, public sector banks were dominant in reporting frauds, but since 2021-22, their share of total frauds has been decreasing. In terms of the number of frauds, public sector banks saw a slow growth in recent years compared to the sharp increase in private banks. This may be because they have maintained a more stable level of frauds reported, possibly due to stricter internal controls, and improved monitoring mechanisms in recent years, leading to fewer fraud cases.

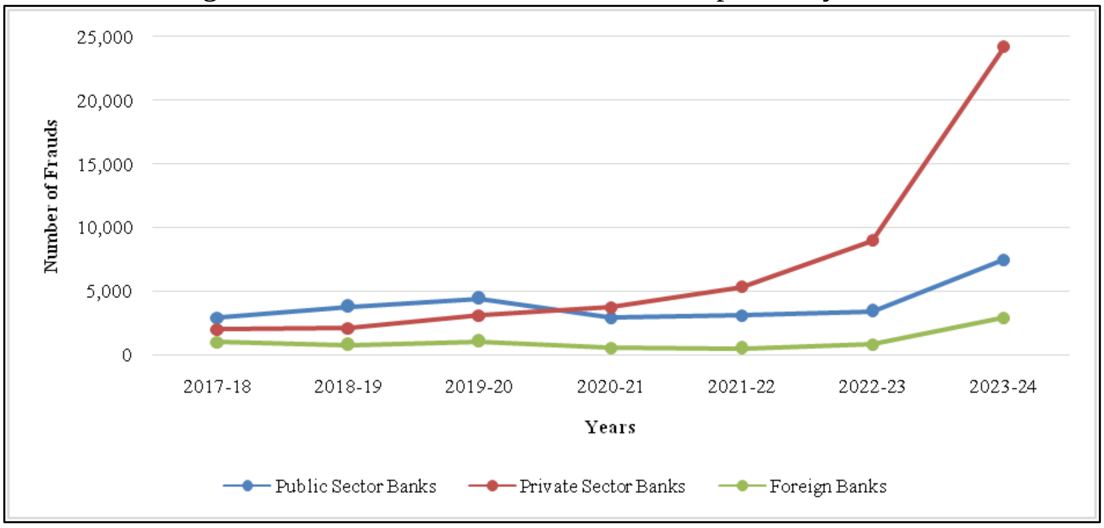
Figure 4: Number of Frauds Reported By Banks (as % of Total)



Source: Author's analysis based on company annual reports (2017–2024), RBI Annual Report, Section VI: Various Years

Private sector banks have experienced a sharp rise in the number of frauds since 2020-21, and surpassed public sector banks in terms of fraud cases. The second graph shows the exponential growth in frauds reported by private sector banks, especially from 2021-22 onwards. This significant rise suggests that private sector banks are becoming more susceptible to frauds, particularly in the domain of digital transactions, internet banking, and credit card frauds. Increased digital banking transactions leading to more opportunities for cyber-related fraud and greater exposure to retail clients and smaller transactions, where fraud detection systems may be less effective may make them more prone to frauds.

Figure 5: Growth in Number of Frauds Reported by Banks

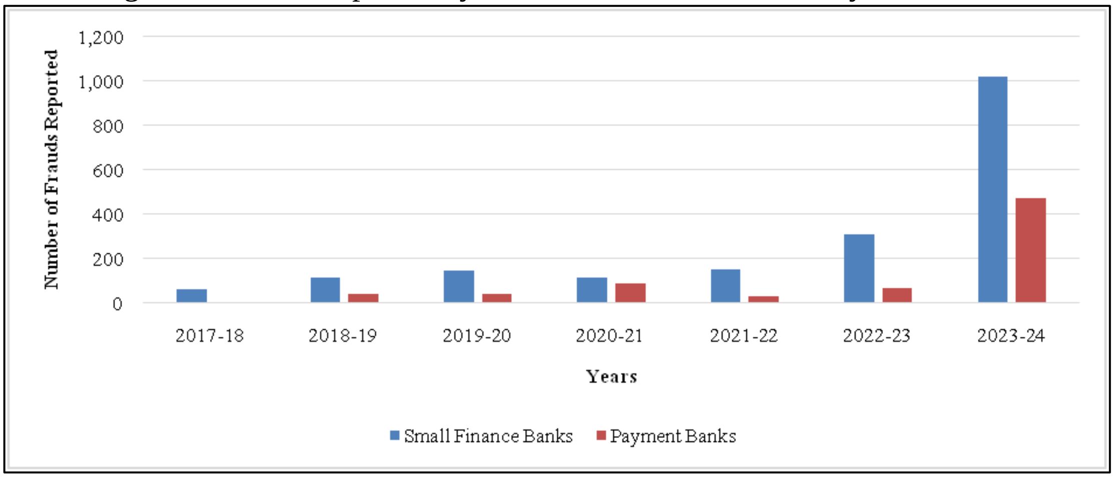


Source: Author’s analysis based on company annual reports (2017–2024), RBI Annual Report, Section VI: Various Years

The sharp increase in the number of frauds reported by private sector banks indicates that they are becoming more vulnerable to fraud post-pandemic. This could be attributed to their growing digital footprint and increased use of internet-based banking services. Public sector banks, despite having traditionally reported more frauds in the past, appear to have improved their controls, leading to a decline in fraud cases. This trend highlights a potential shift in the banking sector's fraud landscape, where private sector banks are now bearing the brunt of fraudulent activities, especially in digital operations.

Foreign banks have consistently contributed a smaller percentage of the overall fraud cases, but there has been an upward trend in the last two years (2022-23 and 2023-24). While their contribution to the total number of frauds remains relatively low, the increase in recent years might suggest growing risks for foreign banks operating in India, potentially due to cross-border transactions and international fraud risks. The "Others" category, including small finance banks and payment banks, has seen a very small proportion of total fraud cases. Despite their relatively low share, these banks are still emerging as more vulnerable entities due to their digital-first operations and focus on underserved market segments, which could expose them to fraud risks (Figure 6).

Figure 6: Frauds Reported by Small Finance Banks and Payment Banks



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

The rapid growth in frauds in Small Finance Banks (SFBs) and Payment Banks, as seen in the graph, can be attributed to their expanding role in providing financial services, particularly in underserved and rural areas. As these banks cater to a wide range of customers who may be newer to formal banking systems, they are more vulnerable to fraud due to lower financial literacy and weaker internal controls. Additionally, the rise of digital platforms in these banks, while enhancing accessibility, has also exposed them to cyber-related frauds.

Payment Banks, with their focus on digital payments and small transactions, are particularly susceptible to fraud due to the nature of their operations, which often involve minimal oversight over large volumes of low-value transactions. As the use of mobile banking grows, the gaps in security measures can lead to a higher risk of exploitation by fraudsters. The growth in frauds seen in these sectors reflects the challenges of balancing rapid expansion with adequate security protocols.

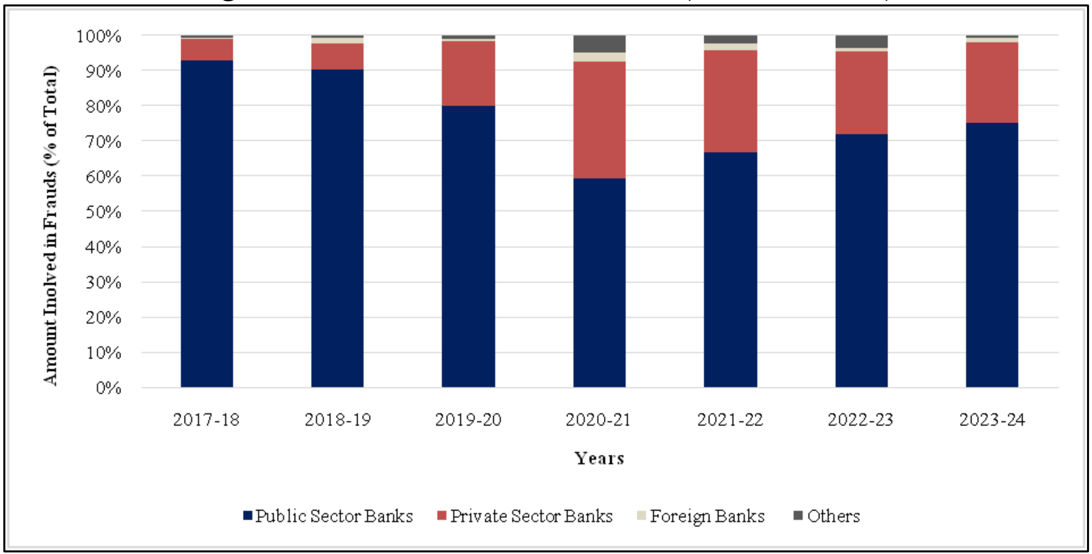
4.2.2. Amount of Frauds

Although private banks have surpassed public sector in terms of the number of frauds reported, public sector banks still contribute significantly to fraud amounts, likely due to their larger scale of operations, legacy systems, and more exposure to high-value loans. However, the steep decline in recent years reflects improved governance and control mechanisms. The share of fraud amount in private sector banks has increased significantly, while the public sector's share has reduced. Foreign banks and others remain minor contributors. Conversely, private sector banks, due to their aggressive growth strategies, increased lending, or weaker oversight, might have become more vulnerable to frauds involving larger amounts.

The overall amount involved in frauds has declined, especially for public sector banks, which showed a sharp drop after 2018-19. Post-2018, following major financial scandals (e.g., the Nirav Modi scam), the Indian government and the Reserve Bank of India have imposed stricter regulations, enhanced oversight, and implemented reforms that have significantly reduced fraud in public sector banks. The continuous drop suggests that these measures are having a long-term impact. Private sector banks, while not facing such dramatic reductions, still show relatively stable fraud levels, indicating a potential lag in implementing these safeguards.

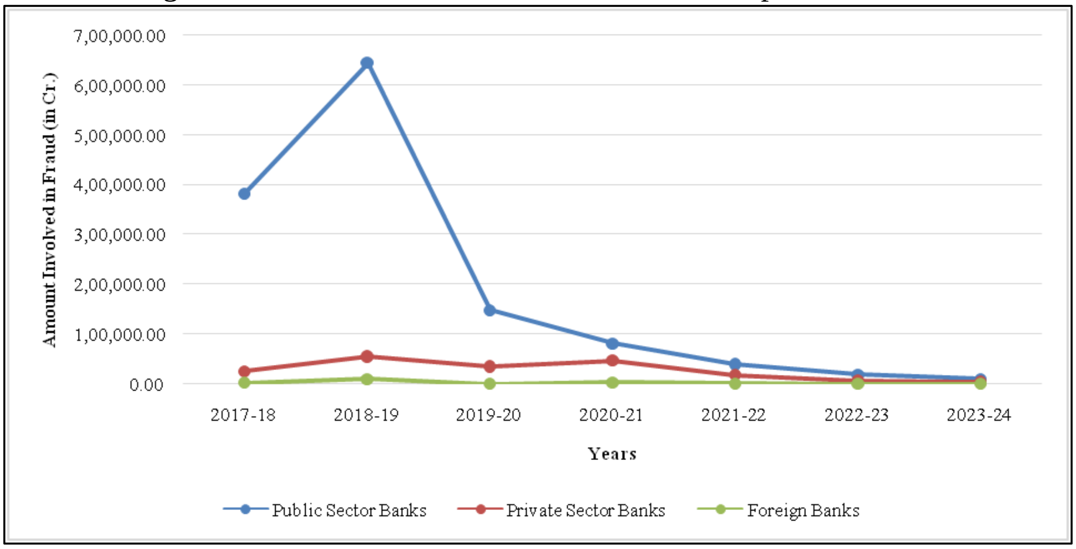
The significant reduction in the amount involved in frauds, as seen in Figure 8, highlights the success of various fraud mitigation frameworks introduced by the RBI. Key frameworks such as the Early Warning Signals (EWS) & Red Flagged Accounts (RFA) framework, the Risk-Based Supervision (RBS) framework, and the Framework for Governance in Commercial Banks have been instrumental in curbing large-scale frauds, particularly in Public Sector Banks (PSBs). These frameworks, discussed in detail in the following section, focus on earlier detection, enhanced reporting requirements, and stricter internal controls. Special directions for PSBs, such as mandatory reporting of suspicious loan accounts, enhanced oversight by senior management, and real-time fraud monitoring systems, have been effective in reducing high-value frauds by enabling proactive risk management. This focus on early intervention has been a key factor in the reduction of the size of frauds, especially in the traditionally vulnerable area of advances in PSBs.

Figure 7: Amount Involved in Frauds (as a % of Total)



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Figure 8: The Decline in Amount Involved in Reported Frauds



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

4.3. Operations Wise Breakup of Frauds

The banking sector's fraud landscape has shifted significantly from 2017-18 to 2023-24, with digitalization and increased credit facilities influencing the types of fraud encountered. As digital transactions and lending practices evolved, the nature of fraud in different operational areas has undergone major changes.

In 2017-18, frauds related to card/internet transactions accounted for 35% of all fraud cases, reflecting vulnerabilities in digital payment systems as online banking was expanding rapidly. The highest category, advances, represented 43% of the total frauds, indicating the susceptibility of loan and credit distribution processes to fraud. Traditional areas such as cheques/demand drafts contributed to only 4% of the total frauds, signalling declining fraud instances in paper-based transactions. Deposits and foreign exchange transactions together accounted for 12% and 10%, respectively (RBI), representing potential weaknesses in customer account management and international transactions. This mix shows a heavy focus on fraud in both credit and digital areas as banks navigated the early phases of modern financial infrastructure. Figure 9 illustrates this distribution.

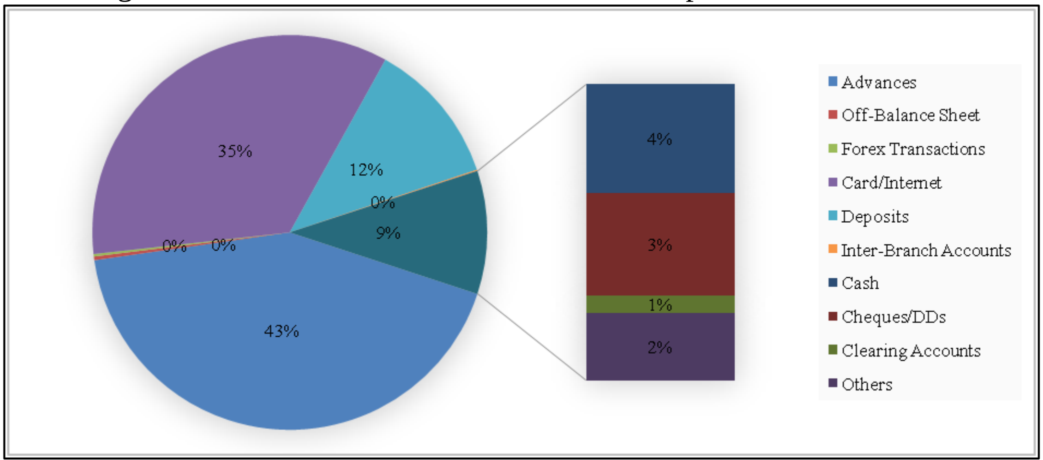
By 2023-24, fraud patterns had shifted drastically. Card/internet frauds skyrocketed to 81%, a clear indication of how cybercrime and fraudsters have adapted to the growing reliance on digital platforms. Despite significant efforts to secure these systems, they have become the largest fraud area due to the sheer volume of online transactions and digital banking activities. In contrast, advances fraud dropped sharply from 43% to 12%, indicating improved controls in lending and credit distribution. Traditional frauds like cheques/demand drafts now accounted for a negligible 1%, reflecting the decline of paper-based instruments in a largely digital economy. The share of frauds in deposits remained stable at 12%, pointing to persistent risks in deposit handling and management processes. Figure 10 illustrates this distribution.

The data between 2017-18 and 2023-24 clearly demonstrates a shift in the banking sector's vulnerabilities. While significant improvements have been made in controlling fraud in advances and traditional paper-based transactions, the rapid surge in card/internet fraud shows the growing challenge of securing digital platforms as the financial sector becomes increasingly reliant on online transactions. The trends call for heightened focus on cybersecurity and fraud prevention in digital banking environments.

The amount involved in frauds has historically been highest in the advances category, accounting for 55% of the total, followed by off-balance sheet transactions at 40%. However, the share of off-balance sheet frauds has shrunk significantly due to several regulatory actions and frameworks, such as the Risk-Based Supervision (RBS) Framework, the Central Repository of Information on Large Credits (CRILC), and the

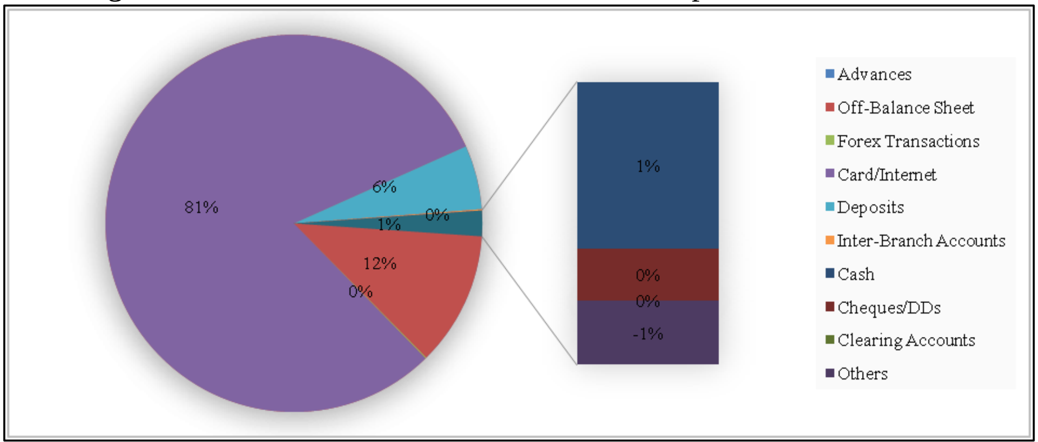
Early Warning Signals (EWS) & Red Flagged Accounts (RFA) system. These measures have improved monitoring and reporting of contingent liabilities, ensuring tighter control over potential risks. Meanwhile, card and internet-based frauds, which contributed negligibly in 2017-18 in terms of the amount (less than 1%), have surged to around 10% in 2023-24. Although still lower than advances frauds, the rapid increase in technology-driven frauds is becoming a concern due to the rising trend in digital payments and transactions, indicating the need for stronger cybersecurity measures and real-time fraud detection systems.

Figure 9: Number of Frauds across Areas of Operations in 2017-18



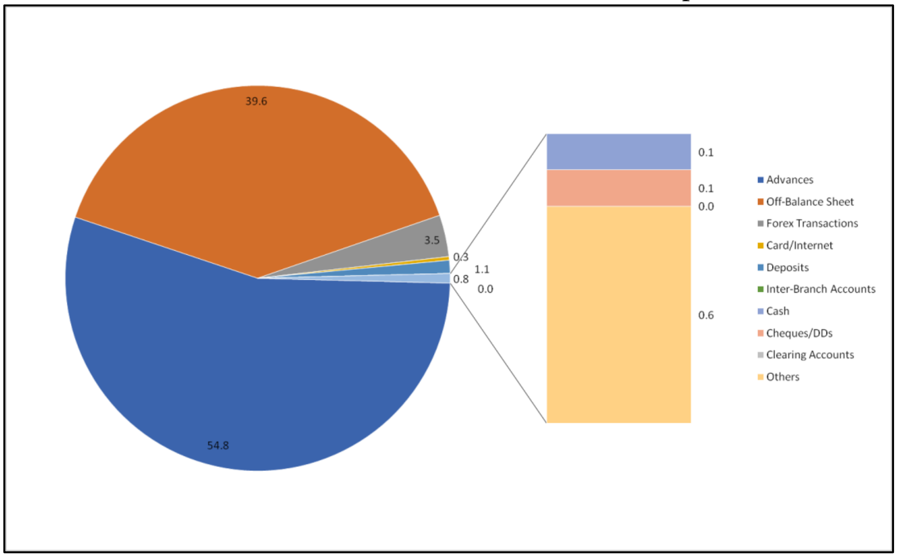
Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Figure 10: Number of Frauds across Areas of Operations in 2023-24



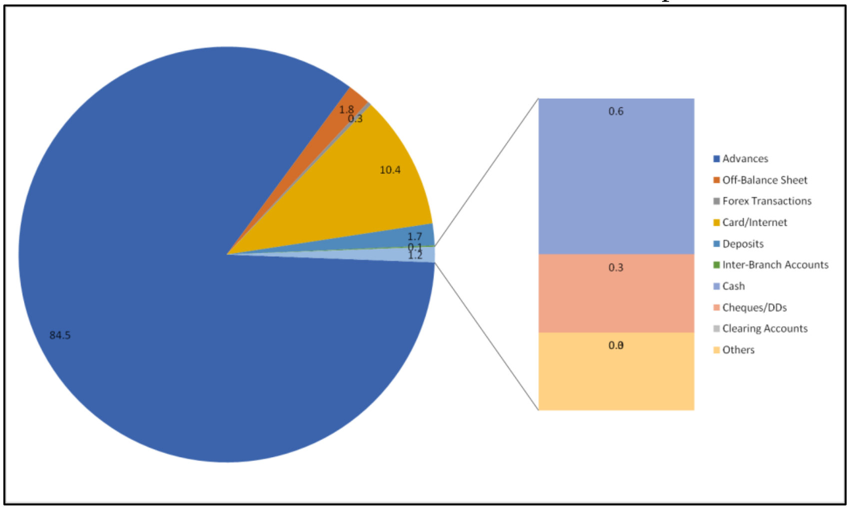
Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Figure 11: Amount Involved in Frauds across Areas of Operations in 2017-18



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

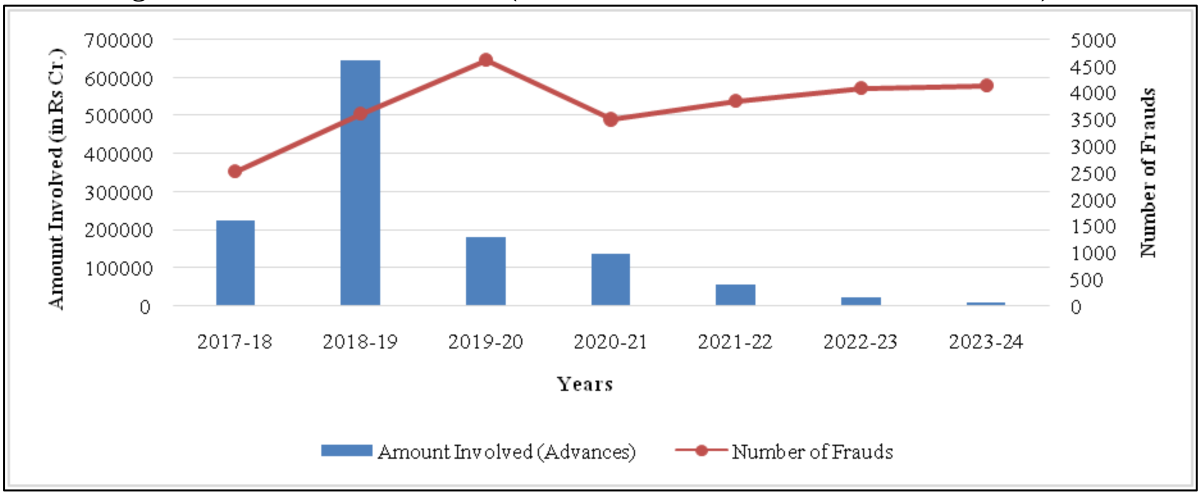
Figure 12: Amount Involved in Frauds Across Areas of Operations in 2023-24



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Advances constitute the majority of fraud amounts, accounting for 85% of the total, primarily due to several technical and procedural factors. The sheer value of transactions involved in advances, such as large-scale loans and credit facilities, naturally leads to higher financial stakes, amplifying the impact of fraudulent activities. The complex approval and sanctioning processes for these advances often involve multiple layers of decision-making and verification, creating potential loopholes for manipulation. Insufficient or inadequate monitoring systems can delay the detection of discrepancies, allowing fraud to accumulate over time before being identified. Furthermore, the lack of transparency in the documentation and processing of large advances can obscure fraudulent practices, making them harder to detect and rectify. Internal collusion between bank staff and external entities exacerbates the problem, as employees with access to sensitive information and decision-making powers may exploit their positions to facilitate fraud. Economic pressures, such as those experienced during financial downturns, can lead to increased fraudulent behaviour by borrowers attempting to avoid repayment.

Figure 13: Frauds in Advances (Number of Frauds and Amount Involved)



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Despite the high percentage of frauds in advances, banks have been successful in reducing the absolute scale of such frauds through several effective measures and regulatory interventions. One significant factor has been the implementation of stricter internal controls and oversight mechanisms, which have enhanced the monitoring and verification processes for large advances. Regulations such as the Early Warning Signals (EWS) & Red Flagged Accounts (RFA) framework have enabled banks to identify potential fraud risks earlier and take preventive actions, thus mitigating the extent of financial losses. The Risk-Based Supervision (RBS) Framework has also contributed by focusing regulatory resources on higher-risk areas, ensuring more rigorous scrutiny of banks with elevated risk profiles.

Additionally, the introduction of the Central Repository of Information on Large Credits (CRILC) has improved transparency and facilitated better tracking of large credit

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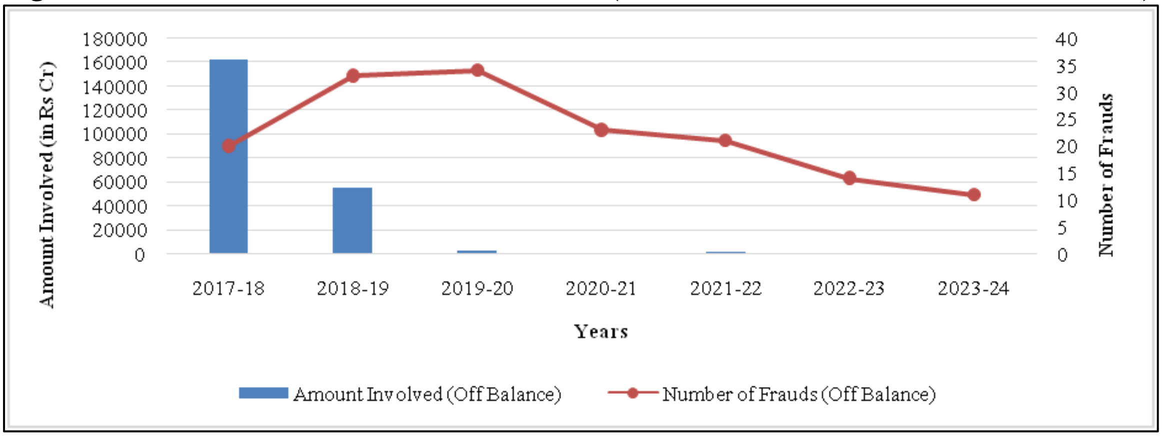
exposures, reducing the chances of fraudulent activities going unnoticed. Enhanced reporting requirements and increased accountability at senior management levels have further reinforced the fraud detection framework. Technological advancements, such as the integration of AI and machine learning in fraud detection systems, have also played a crucial role in identifying suspicious activities more effectively. These regulatory measures and technological improvements have collectively contributed to a reduction in the absolute scale of advances-related frauds, demonstrating the positive impact of the RBI's frameworks and the banking sector's ongoing efforts to combat fraud.

RBI's regulations have been notably successful in reducing off-balance sheet frauds, both in terms of value and volume. The RBS Framework has allowed for more focused scrutiny of banks with substantial off-balance sheet exposures, ensuring that these institutions adhere to stringent risk management practices. By targeting higher-risk areas and implementing rigorous oversight, the framework has helped in mitigating the risks associated with off-balance sheet transactions. The CRILC has improved the tracking of large exposures and contingent liabilities, providing a comprehensive view of banks' off-balance sheet positions. This has enabled more accurate risk assessments and earlier detection of potential frauds. Additionally, the Guidelines on Off-Balance Sheet Items and related regulatory directives have mandated more stringent reporting requirements and better documentation practices for off-balance sheet transactions. These regulations have reduced the opportunities for fraudulent activities by ensuring that all relevant transactions are accurately reported and monitored.

As a result of these measures, the incidence of off-balance sheet frauds has decreased, with a notable reduction in both the monetary value and the frequency of such frauds, as seen in Figure 14. The improved regulatory framework has enhanced the overall integrity of financial reporting and risk management in the banking sector.

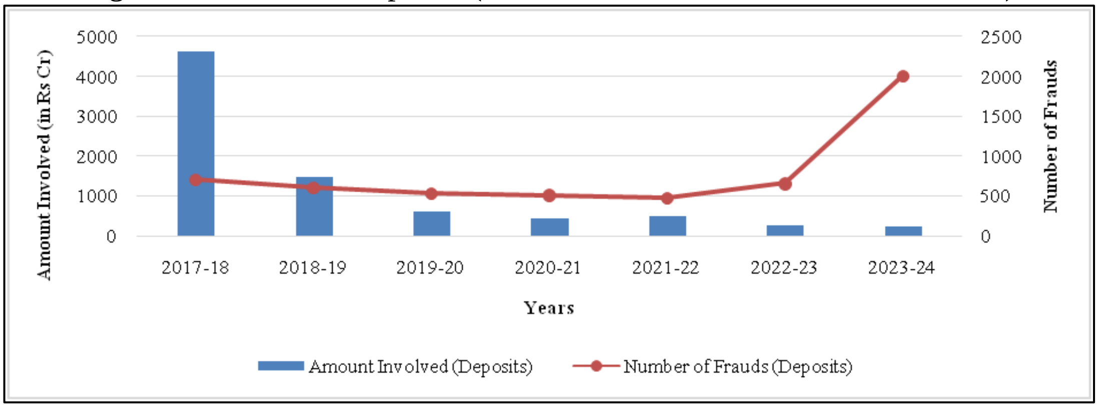
While the financial impact of deposit-related frauds has been relatively low, there is a troubling rise in the number of such fraud cases. This increase is largely driven by the expansion of digital banking platforms, which have become targets for phishing, unauthorized access, and other fraudulent activities. Inadequate security measures and outdated technology in some banks have further exacerbated the problem. Additionally, increased public awareness has led to more frequent reporting of these frauds. Despite the lower amounts involved, the rising number of deposit-related frauds highlights the need for enhanced security protocols, improved fraud detection systems, and better customer education to combat this growing trend.

Figure 14: Frauds in Off-Balance Transactions (Number of Frauds and Amount Involved)



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

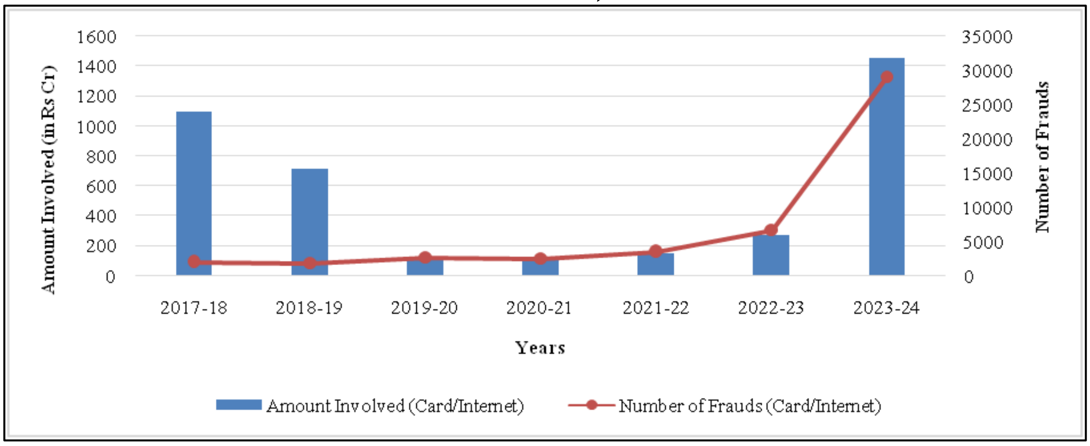
Figure 15: Frauds in Deposits (Number of Frauds and Amount Involved)



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

Card and internet transactions have experienced a significant rise in both the number and the amount involved in fraud cases, driven by several key factors. The rapid growth in digital payment platforms has led to an exponential increase in transaction volumes, providing more opportunities for fraudsters to exploit. Techniques such as phishing attacks, which trick users into revealing sensitive information, and card cloning, which involves duplicating card details to make unauthorized purchases, are becoming more sophisticated and widespread.

Figure 16: Frauds in Card/Internet Transactions (Number of Frauds and Amount Involved)



Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

The advent of contactless payments and mobile wallets, while convenient, has introduced new vulnerabilities. For instance, contactless cards can be skimmed using RFID technology, and mobile wallets can be compromised if users do not employ strong security practices. Moreover, the integration of machine learning and AI into fraud detection systems has improved the ability to identify and mitigate fraudulent transactions in real-time. However, these systems must continuously adapt to evolving fraud tactics, as cybercriminals develop more advanced methods to bypass traditional security measures.

In addition to technical vulnerabilities, the increase in card and internet frauds is also influenced by the growing volume of online transactions. This volume dilutes the effectiveness of fraud detection mechanisms and increases the likelihood of fraudulent transactions slipping through the cracks. As a result, both the frequency and financial impact of card and internet frauds have surged, highlighting the need for ongoing advancements in cybersecurity measures, such as enhanced encryption, real-time fraud detection, and multi-factor authentication, to better protect digital payment systems and user information.

4.4. Correlation Analysis

We assess the correlations between various areas of banking operations to identify common vulnerabilities that could render the system susceptible to fraud. This assessment involves examining the interplay between traditional and digital transaction channels, internal controls, and reporting mechanisms. By analyzing these correlations, we can pinpoint systemic weaknesses and understand how different types of fraud, such as those involving advances, off-balance sheet transactions, and digital payments, may exploit similar vulnerabilities.

For example, weaknesses in internal controls or approval processes for advances might also create opportunities for fraud in other areas, such as off-balance sheet transactions or digital platforms. Similarly, gaps in cybersecurity measures for card and internet transactions could reveal broader deficiencies in the overall fraud management framework. Identifying these common vulnerabilities helps in understanding the nature of frauds more comprehensively, allowing for the development of mitigation measures that are not only targeted but also complementary. A holistic approach ensures that improvements in one area, such as enhancing digital transaction security, also strengthen other related areas, such as internal controls and reporting systems. This comprehensive strategy is crucial for creating a robust defence against fraud across all operational facets of the banking system. Table 1 gives the correlation matrix.

The correlation matrix reveals significant insights into fraud patterns across various banking operations. Strong positive correlations between card/internet transactions and forex transactions (0.791), deposits (0.979), and inter-branch accounts (0.973) suggest a close interconnection in fraudulent activities. This implies that banks experiencing fraud in one digital area are likely to encounter similar issues in other related channels, potentially due to overlapping vulnerabilities like phishing and unauthorized transactions. For instance, fraud in forex transactions often parallels those in card and internet services, while deposit frauds frequently involve misuse of digital platforms.

Conversely, negative correlations highlight distinct risk profiles: advances and clearing accounts (-0.6636) and forex transactions and off-balance sheet items (-0.4469) show that frauds in these areas tend to occur independently. Advances and clearing accounts, with

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differing operational focuses, exhibit a reduced likelihood of concurrent fraud, while forex transactions, being highly regulated, are less associated with off-balance sheet frauds. Similarly, cash and cheque/DD frauds (-0.6583) reflect different methods of financial manipulation, further emphasizing their separate risk factors.

Table 1: Correlation Matrix between various areas of operations of frauds

	Advances	*Off-Balance*	*Forex*	*Card/Internet*	*Deposits*	*Inter-Branch A/c*	*Cash*	*Cheques/DDs*	*Clearing A/c*	*Others*
Advances	1.000									
Off-Balance Sheet	0.113	1.000								
Forex Transactions	0.244	-0.447	1.000							
Card/Internet	0.314	-0.656	0.791	1.000						
Deposits	0.177	-0.605	0.815	0.979	1.000					
Inter-Branch Accounts	0.141	-0.607	0.775	0.973	0.995	1.000				
Cash	0.376	-0.505	0.239	0.105	-0.033	-0.083	1.000			
Cheques/DDs	-0.351	0.700	-0.583	-0.646	-0.560	-0.499	-0.658	1.000		
Clearing Accounts	-0.664	0.193	0.011	-0.298	-0.124	-0.117	-0.380	0.520	1.000	
Others	0.428	-0.225	-0.132	-0.194	-0.356	-0.402	0.903	-0.490	-0.531	1.000

Source: Authors' analysis based on company annual reports (2017–2024), RBI

These observations underscore the need for targeted fraud mitigation strategies. Enhanced monitoring should focus on areas with strong positive correlations, such as card/internet transactions and deposits, using risk-based controls and behavioural analytics to address interconnected fraud risks. Strengthening anti-money laundering (AML) measures and providing comprehensive employee training are also crucial. Meanwhile, understanding the distinct fraud patterns associated with negative correlations can help tailor fraud prevention efforts to specific operational areas, ensuring a more effective and comprehensive fraud management framework.

4.5. Comparative Analysis of Public vs Private Sector Banks

4.5.1. Descriptive Statistics

Table 2 gives the descriptive statistics that highlight several key differences between public and private sector banks in terms of fraud, deposits, advances, non-performing assets (NPAs), and financial metrics like Return on Assets (ROA) and cash flows.

On average, private sector banks report a significantly higher number of frauds compared to public sector banks. The minimum number of frauds is also higher for private banks (128.88 compared to 86.5), while the maximum number of frauds in private banks reaches 7500, far exceeding the 3307.88 in public banks. Median figures also follow this trend, with private banks at 6327.63 and public banks at 1088.56.The mean amount involved in frauds is almost double in private sector banks compared to public banks, indicating a shift towards larger fraud cases in the private sector.

Table 2: Descriptive Statistics for Public Sector and Private Sector Banks

DESCRIPTIVE STATISTICS (2016-2024) PUBLIC SECTOR

Statistic	*No. of frauds*	*Amount involved*	*Return on Assets*	*Fraud to deposit*	*Fraud to Advances*	*NPA to cash flow*	*Advance to deposit*
Mean	1193.09	43948094196.43	0.001	0.05	5.77	-23.82	0.56
Standard Error	406.26	12770461727.58	0.001	0.04	5.76	22.40	0.08
Median	1088.56	34902225000.00	-0.001	0.01	0.02	-0.39	0.66
Standard Deviation	1149.09	36120320345.82	0.003	0.11	16.29	63.36	0.24
Range	3221.38	100782387500.00	0.008	0.33	46.08	188.30	0.74
Minimum	86.50	8515312500.00	-0.003	0.00	0.01	-179.18	0.01
Maximum	3307.88	109297700000.00	0.005	0.33	46.09	9.12	0.75
Sum	9544.73	351584753571.43	0.005	0.39	46.19	-190.57	4.47

DESCRIPTIVE STATISTICS (2016-2024) PRIVATE SECTOR

Statistic	*No. of frauds*	*Amount involved*	*Return on Assets*	*Fraud to deposit*	*Fraud to Advances*	*NPA to cash flow*	*Advance to deposit*
Mean	5068.10	83757868750.00	0.275	11.23	24.50	6.35	0.56
Standard Error	1169.50	56946739667.67	0.263	6.94	9.33	6.19	0.17
Median	6327.63	35093700000.00	0.014	0.52	26.54	0.10	0.78
Standard Deviation	2864.68	139490454700.91	0.644	17.01	22.84	15.16	0.43
Range	7371.13	361505812500.00	1.582	35.29	47.72	37.25	0.92
Minimum	128.88	253187500.00	0.006	0.00	0.00	0.04	0.01
Maximum	7500.00	361759000000.00	1.589	35.29	47.72	37.29	0.93
Sum	30408.63	502547212500.00	1.651	67.38	147.01	38.12	3.34

Source: Authors' analysis based on company annual reports (2017–2024)

Additionally private sector banks experience a much higher percentage of fraud relative to their total deposits than public sector banks, and show a substantially higher proportion of fraud relative to the total advances they disburse. These ratios show that private banks face greater fraud incidence relative to their core banking activities (deposits and lending). However, despite the larger incidence of fraud, the impact on their overall financial health appears to be lower. Private Banks significantly outperform public banks in terms of ROA, reflecting better profitability despite a higher incidence of frauds. Public banks have a negative NPA to cash flow from operations ratio, indicating that they are struggling more to generate cash flow in relation to their NPAs. This contrasts sharply with private banks, which have a positive ratio and are better able to manage their NPAs in relation to operating cash flows.

Private Banks tend to have better operational efficiency, stricter controls, and advanced technology, allowing them to manage frauds better without severely affecting their profitability. Public banks, on the other hand, may have more legacy systems and bureaucratic processes, leading to greater inefficiencies in dealing with fraud. Private Banks may focus more on profitability, reflected in their higher ROA. This can mean quicker fraud detection and resolution mechanisms, minimizing long-term financial impacts. Public banks, with a larger base of government intervention, might be slower in fraud management and recovery processes. Public banks often have higher NPAs compared to private banks. This, combined with a higher amount of fraud, puts additional pressure on cash flows and overall profitability.

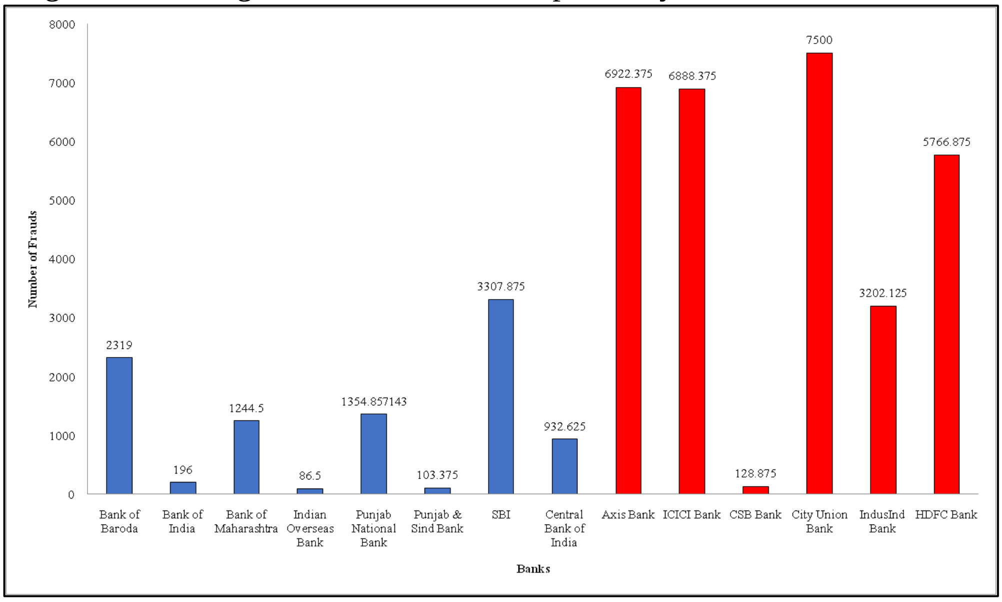
While private banks have a much higher number and proportion of frauds relative to their deposits and advances, they perform better financially, with higher ROA and better cash flow management relative to their NPAs. Public banks, while having fewer frauds in terms of both number and proportion, are more adversely affected, with near-zero ROA and significant struggles in managing NPAs. This divergence can be attributed to better operational efficiency, more stringent internal controls, and faster fraud detection in private banks compared to public banks. However, the trend of increasing frauds in private banks should not be overlooked, as it could pose future risks if not addressed.

In order to assess the incidence of frauds and compare them across private and public sector banks, we take the average number of reported fraud cases over the study period. This approach helps identify trends and provides a clearer understanding of the frequency of frauds committed by different banks (given in Figure 17). Red colour bars represent private banks, while blue colour bars represent public banks.

The chart displays the number of frauds reported by various banks. A noticeable pattern is observed, where private sector banks consistently report a higher number of fraud cases compared to their public sector counterparts. Banks such as ICICI Bank, Axis Bank, and HDFC Bank show particularly high levels of fraud reporting, with ICICI Bank leading the group. The higher number of frauds reported by private sector banks may imply that they either experience more fraud due to a higher volume of transactions and products, or they have more efficient fraud detection mechanisms in place. This presents a need for private banks to further enhance their internal controls, especially in areas prone to digital and operational risks.

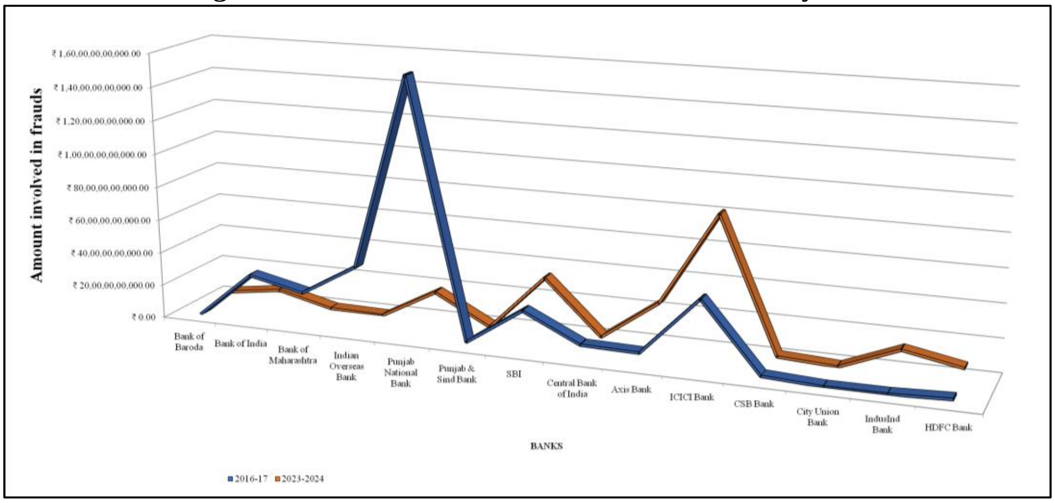
In contrast, public sector banks like Bank of India, Punjab National Bank, and Indian Overseas Bank report significantly fewer cases. State Bank of India (SBI), the largest public sector bank, also reports relatively fewer frauds than major private banks. This lower number for public banks may point to factors such as stronger internal controls, less complex transactions, or less exposure to risky financial products compared to private sector banks, which typically engage in more varied and high-risk ventures.

Figure 17: Average Number of Frauds Reported by Public & Private Banks



Source: Authors' analysis based on company annual reports (2017–2024)

Figure 18: Amount Involved in Frauds over the years



Source: Authors' analysis based on company annual reports (2017–2024)

Figure 18 presents the trend in the amount involved in frauds, comparing the years 2016-17 to 2023-24. In 2016-17, public sector banks, especially SBI and Punjab National Bank, had the largest amounts involved in frauds. However, over the period up to 2023-24, there has been a significant reduction in the amount involved in these frauds. This reduction suggests that public banks have implemented effective measures to control and mitigate fraud, such as enhanced fraud detection systems, stricter internal audits, and improved governance structures. The decline might also be indicative of reduced risk exposure or conservative banking practices in public banks. On the other hand, private sector banks like ICICI, Axis, and IndusInd have seen an increase in the amount involved in frauds over the same period. ICICI Bank, in particular, has reported a sharp rise in the amount involved in frauds by 2023-24. This growing trend in private banks could be attributed to the higher exposure to corporate lending, greater risk appetite, and more aggressive business strategies, which potentially leave them more vulnerable to large-scale fraud. Additionally, the digitalization and increased reliance on technology in private banks may expose them to a wider array of fraudulent activities.

The substantial decrease in the amount involved in frauds within public sector banks highlights the effectiveness of recent reforms and regulatory measures. This positive trend reinforces the importance of continuous improvements in governance and regulatory oversight, as public banks have successfully minimized financial damage despite ongoing challenges in fraud prevention. The upward trend in the amount involved in frauds within private sector banks raises concerns regarding risk management and the potential impact on their financial stability. These banks may need to reassess their risk exposure and implement more robust fraud prevention frameworks, particularly in areas of corporate lending, digital banking, and third-party involvements.

The data highlights a divergence in the fraud-related trends between public and private sector banks in India. While private banks report higher fraud occurrences, public banks have managed to significantly reduce the financial impact of these frauds. The increasing fraud amounts in private banks signal a need for stronger governance and risk management practices, particularly as these institutions play an increasingly vital role in the banking ecosystem. Understanding these trends and addressing underlying risks will be crucial for maintaining the integrity and financial health of both sectors.

4.5.2. Impact of Frauds on Financial Performance

Frauds have a significant impact on the financial performance of banks, particularly affecting their lending capabilities. When frauds occur, they not only erode the bank’s financial resources but also undermine stakeholder trust, which can adversely affect deposits and overall liquidity. In this context, understanding how frauds influence a bank's ability to extend credit is crucial. To explore this, we assess the correlation between the fraud-to-deposit ratio and the advance-to-deposit ratio for both private and public sector banks. The fraud-to-deposit ratio reflects the proportion of fraudulent activities relative to the bank’s deposit base, serving as an indicator of the bank's exposure to fraud. On the other hand, the advance-to-deposit ratio measures a bank’s lending capacity by comparing the amount of loans (advances) it issues to the deposits it holds. A higher advance-to-deposit ratio suggests a more aggressive lending approach, while a lower ratio indicates more conservative lending practices. The results are summarized in Tables 3 and 4.

The correlation results between the fraud-to-deposit ratio and the advance-to-deposit ratio provide critical insights into how fraud impacts lending capacity for private and public sector banks. For private sector banks, the correlation is 0.096, indicating a very weak positive relationship between fraud incidents and lending capacity. This suggests that frauds in private banks do not significantly affect their ability to extend loans. One possible reason could be that private banks have more efficient risk management practices or higher capital buffers, allowing them to absorb the financial impact of frauds without compromising their lending capabilities. Additionally, private banks might continue focusing on lending growth to maintain market competitiveness, despite fraud incidents. In contrast, public sector banks show a strong negative correlation of -0.92. This suggests that as frauds increase, the lending capacity of public banks decreases sharply. Public sector banks may be more risk-averse, tightening their lending practices in response to frauds. Moreover, the financial strain caused by frauds could lead to stricter regulatory scrutiny or reduced liquidity, forcing these banks to curtail their lending activities. Public banks often operate with more conservative risk appetites, and the occurrence of fraud may lead to a more significant disruption in their financial operations, impacting their ability to lend.

Table 3: Fraud to Deposit and Advance to Deposit Ratio

Bank	Fraud to deposit	Advance to deposit
Bank of Baroda	0.004522005	0.745756495
Bank of India	0.007922892	0.677865529
Bank of Maharashtra	0.011087179	0.65928653
Indian Overseas Bank	0.009132577	0.618969437
Punjab National Bank	0.009250672	0.656586299
Punjab & Sind Bank	0.008637704	0.668420098
SBI	0.330372294	0.007185902
Central Bank of India	0.004441646	0.433707141
Axis Bank	0.102067803	0.008957596
ICICI Bank	0.413932903	0.008910171
CSB Bank	0.309321562	0.744312687
City Union Bank	0.634797395	0.842612785
IndusInd Bank	0.359337321	0.807353289
HDFC Bank	0.000415848	0.928397701

Source: Authors' analysis based on company annual reports (2017–2024)

Table 4: Correlation between Fraud to deposit and Advance to deposit

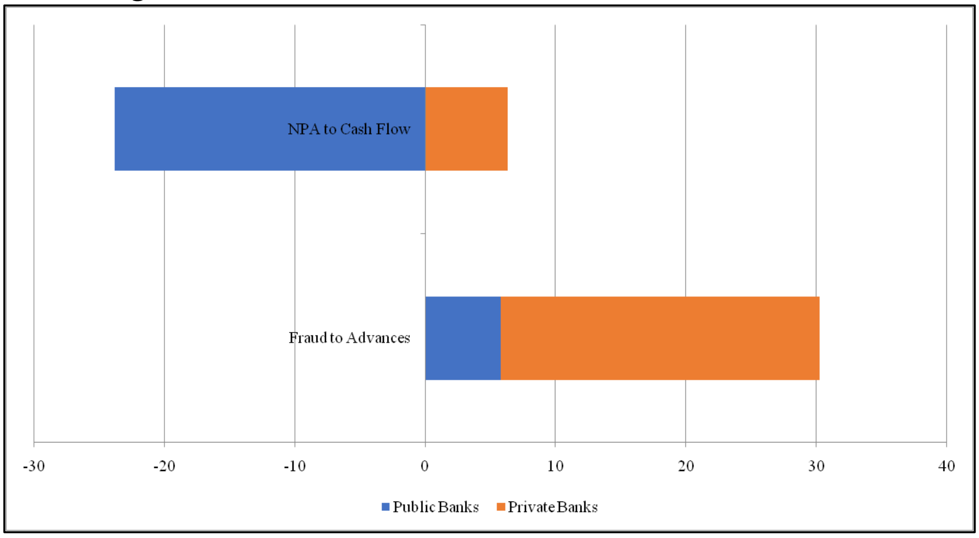
Private Sector	Fraud to deposit	Advance to Deposit
Fraud to deposit	1	
Advance to deposit	0.096646895	1
Public Sector	Fraud to deposit	Advance to deposit
Fraud to deposit	1	
Advance to deposit	-0.924358179	1

Source: Authors' analysis based on company annual reports (2017–2024)

The stark difference between the two sectors highlights varying levels of resilience to fraud. While private banks may be better equipped to manage fraud without drastically affecting their lending, public sector banks appear to be more vulnerable to frauds, which severely constrain their ability to provide credit. This disparity underscores the importance of strengthening fraud prevention and detection mechanisms, especially in the public sector, to ensure that frauds do not cripple their lending functions.

To further understand the impact of frauds on bank performance, we analyze the relationship between frauds as a percentage of advances and non-performing assets (NPAs) in both public and private sector banks. This relationship is crucial because frauds can directly contribute to financial distress, which may eventually lead to higher levels of NPAs—a key indicator of the quality of a bank's loan portfolio as given in Figure 19.

Figure 19: NPA to Cash Flow and Frauds as % of Advances



Source: Authors' analysis based on company annual reports (2017–2024)

The graphs indicate a distinction between public and private sector banks regarding fraud-to-advances ratios and NPA-to-cash-flow ratios. The Fraud to Advances ratio represents the amount involved in frauds as a percentage of the total advances (loans) extended by the bank. It is a direct indicator of the proportion of fraudulent activities affecting the bank's loan portfolio. The graph shows that private sector banks have a higher fraud-to-advances ratio compared to public sector banks. This means that a larger proportion of the loans they disburse are affected by frauds. This could be since private banks tend to lend more aggressively, often taking on higher-risk borrowers, or are more susceptible to fraudulent activities due to the nature of their operations. On the other hand, public sector banks have a lower fraud-to-advances ratio, indicating that fewer of their loans are impacted by fraud.

Non-Performing Assets (NPA) to operating cash flow ratio shows the proportion of non-performing assets relative to the bank's ability to generate cash from its operations. A high NPA-to-cash-flow ratio means the bank has significant non-performing loans but lacks the operating cash flow to manage or cover them, which could signal financial distress. NPA-to-cash-flow ratio is positive and smaller in absolute terms for private banks. This suggests that despite their higher fraud-to-advances ratio, private sector banks generally have positive operating cash flows. This means they can generate sufficient cash from their core banking activities (interest income, fees, etc.), which helps them better manage the impact of NPAs. Private Banks are often more efficient and leaner, with better cash flow management and quicker recovery strategies, which could explain this smaller NPA-to-cash-flow ratio. In contrast, the NPA-to-cash-flow ratio is negative and large in absolute terms for public sector banks, indicating that these banks often have negative operating cash flows. This means that public sector banks are not generating enough cash from their operations to handle their NPAs, which exacerbates their financial distress. Public banks tend to have larger, more bureaucratic operations, slower recovery processes, and may be more burdened by social or government-driven lending mandates, which can lead to less efficient cash flow generation.

The key reason for this divergence lies in the operational efficiency and lending strategies of public versus private sector banks. Private Banks typically have more aggressive lending strategies, leading to higher fraud-to-advances ratios. However, they are also better at managing their operations and generating positive cash flows. Private banks are often quicker in handling bad loans, more proactive in their recovery efforts, and more efficient in cost management. As a result, despite having higher levels of frauds, they maintain a positive NPA-to-cash-flow ratio, indicating stronger financial health and better operational performance. Public banks, on the other hand, often face greater political and social pressures, leading to larger non-performing loan portfolios. Their focus on priority sector lending, government-mandated schemes, and the general inefficiency in recovery processes results in negative operating cash flows. Even though their fraud-to-advances ratio is lower, the inability to generate positive cash flows from core operations makes it harder for them to absorb the financial impact of NPAs, leading to a negative NPA-to-cash-flow ratio. This reflects the operational and financial management differences between the two banking sectors.

4.6. Regulatory Mechanisms and Existing Fraud Mitigation Measures

In response to several large-scale financial frauds and scams discovered in the banking sector, particularly up until 2018-19, the Reserve Bank of India (RBI) has introduced a series of regulatory measures aimed at strengthening the banking system's ability to detect and prevent fraud. Major frauds, such as the Punjab National Bank (PNB) scam and other loan-related irregularities in Public Sector Banks (PSBs), prompted a comprehensive overhaul of the risk management and fraud prevention frameworks across the banking system. These regulatory measures target both digital frauds, driven by the rapid expansion of digital payments, and traditional frauds, such as those related to advances and internal collusion in the banking sector.

The RBI's focus on reducing fraud size, particularly in terms of the value involved in PSBs, has seen substantial success. By introducing stricter internal controls, enhancing reporting requirements, and mandating the appointment of senior personnel dedicated to fraud risk management, the overall quantum of frauds, especially in advances (loans), has reduced. This includes measures such as the Early Warning Signals (EWS) and Red Flagged Accounts (RFA) framework, which allows banks to identify potential fraud risks early and take preventive actions before significant losses occur. Additionally, the Risk-Based Supervision (RBS) Framework ensures that higher-risk banks face more stringent oversight, thus reducing the likelihood of large-scale frauds going undetected. For PSBs, these measures have had a considerable impact, especially in reducing frauds related to advances. Fraudulent activity in loan disbursals, which historically involved large sums, has been curtailed by the proactive monitoring and reporting mechanisms enforced by the RBI. The data over recent years shows a marked decline in the amount involved in frauds in PSBs. This success can be attributed to the comprehensive frameworks introduced by the RBI that improve the transparency and accountability within these institutions, combined with enhanced technological controls.

However, despite these advancements, technology-based frauds, particularly in digital payments, continue to rise. The proliferation of digital platforms and the increasing volume of online transactions have exposed new vulnerabilities that fraudsters exploit. UPI frauds, phishing, and unauthorized digital transactions remain significant challenges despite the adoption of AI/ML-based fraud detection systems, multi-factor authentication, and tokenization. One reason for this increase is the lag in implementing robust, end-to-end encryption and real-time fraud detection systems across all banks. Moreover, private sector banks, which handle a significant portion of digital transactions, have seen an uptick in the number of fraud cases. This can be attributed to the higher volume of transactions they process compared to PSBs and, in some cases, delays or gaps in the implementation of RBI's regulatory measures, particularly around reporting and internal controls. Additionally, while the RBI has extended many of its fraud mitigation frameworks to private banks, differences in governance structures and risk management practices mean that private sector banks may not uniformly apply these measures as rigorously as PSBs. This could be contributing to the higher frequency of frauds, although the value of these frauds tends to be lower compared to PSBs.

In summary, the measures introduced by the RBI have made substantial progress in curbing large-scale financial frauds, particularly in PSBs, by focusing on stricter oversight, early detection, and enhanced internal controls. However, the evolving nature of digital payments and the varying implementation of these measures in private banks indicate that fraud risks are still prevalent. The various frameworks and measures adopted by banks under RBI's guidelines are summarized in Table 5, showcasing how they target different types of frauds and their impact on fraud reduction across the banking system.

5. Discussion

The paper sheds light on the evolving landscape of banking fraud in India, revealing critical differences between private and public sector banks in their experiences and responses to fraud. Consistent findings in existing literature indicate a higher incidence of fraud in private banks, largely attributed to their rapid digitalization and customer-centric approaches. These banks, while facing more frequent fraud incidents, often deal with smaller monetary amounts per case. In contrast, public sector banks experience fewer fraud cases, but the financial stakes involved are considerably higher, typically linked to large government transactions and corporate loans. This dichotomy emphasizes the different risk profiles and operational challenges each sector faces.

Our findings reveal that while public sector banks are adept at detecting fraud early, they struggle with managing its financial repercussions. When fraud occurs, it often results in significant financial damage, leading to increased non-performing assets (NPAs) and necessitating a reduction in advances. This defensive approach, though understandable, curtails their growth potential and affects their overall profitability. Conversely, private sector banks demonstrate greater financial resilience; they manage to maintain their lending activities despite a higher frequency of fraud cases.

Table 5: RBI Guidelines and Fraud Mitigation Techniques Adopted by Banks

RBI Policy/Action	Bank Measures	Objectives	Impact	Type of Fraud	Value	Volume
Central Payment Fraud Registry (2020)	Fraud detection systems, AI & ML for anomaly detection	A system to track and analyze digital payments fraud in real-time.	Improved fraud detection across banks and reduced large-scale fraud cases.	Digital payments fraud (e.g., UPI, wallets, etc.)	Medium to High	High
Tokenization Guidelines for Card Transactions (2021)	Tokenization, 2-factor authentication, end-to-end encryption	Replaces sensitive card details with unique tokens.	Reduced online card fraud by 20-30% in e-commerce transactions.	Card-not-present fraud (e.g., e-commerce fraud)	High	Medium to High
Enhanced Security for Digital Payments (2019)	2-factor authentication, EMV chip cards, geolocation & IP tracking	Introduced enhanced cybersecurity measures for digital transactions.	Reduced cyber fraud, phishing, and unauthorized transactions.	Cyber fraud, phishing, account takeovers	High	High
Risk-Based Supervision (RBS) Framework (2018)	Fraud detection systems, automated monitoring systems	Shift from compliance-based to risk-based monitoring.	Reduced frauds in Advances, rigorous scrutiny of high risk banks	Internal fraud, operational risk	High	Low
Framework for Governance in Commercial Banks (2020)	Anti-money laundering (AML) systems, compliance checks	Strengthen governance and senior-level accountability for risk management and fraud prevention.	Reduced Frauds committed by employees through stricter controls	Internal fraud, collusion within organizations	High	Low
Prepaid Payment Instruments (PPI) Interoperability (2018)	Whitelist-based transactions, geolocation tracking	Secure interoperability between wallets and prepaid instruments.	Prevented prepaid wallet fraud, cloning, and unauthorized transfers.	Wallet cloning, unauthorized transfers	Low	Medium to High
Framework for Processing e-Mandates on Cards for Recurring Transactions (2021)	2-factor authentication, OTP-based verification	Require customer authentication for recurring charges through OTP verification.	Reduced card/internet banking frauds due to two factor authentication	Recurring payment fraud, unauthorized charges	Low to Medium	Medium to High
Digital Lending Guidelines (2022)	AI & ML for loan approval, enhanced KYC checks	Introduced stricter oversight on digital lending platforms.	Significant improvements in frauds in loans/advanced	Loan fraud, identity theft, unauthorized charges	Low to Medium	Medium
Fraud Reporting Framework for UCBs (2021)	Automated fraud monitoring systems	Guidelines for timely reporting and better fraud risk management in Urban Cooperative Banks (UCBs).	Controlled the rise in frauds in UCBs through stricter guidelines for reporting.	Internal fraud, operational risks in UCBs	Medium	Low
Early Warning Signals (EWS) & Red Flagged Accounts (RFA) Framework (2015, updated 2021)	Fraud detection systems, AI & ML for identifying risk signals	Introduced to detect early signs of stress in loan accounts and flag high-risk accounts for early action.	Effective measure for assessing frauds timely to reduce scale of frauds in advances category.	Loan fraud, corporate lending fraud	High	Low
Framework for UPI Security (2023)	AI & ML for fraud detection, geolocation tracking, transaction limits, multi-factor authentication	A new security framework to enhance the safety and security of UPI transactions.	Significantly reduced UPI fraud by preventing phishing attacks, fake transactions, and identity theft.	UPI fraud (phishing, unauthorized transactions)	Medium to High	High

Source: Compiled by Authors

Their proactive risk management strategies, including tighter internal controls and investments in fraud detection and cybersecurity, enable them to absorb the impacts of fraud more effectively.

Additionally, the correlation between various forms of fraud underscores the need for a holistic approach to fraud management. Weaknesses in one area can expose vulnerabilities in another, necessitating a unified strategy that addresses all potential fraud risks. Our research suggests that public sector banks could greatly benefit from adopting the proactive strategies of their private counterparts, such as investing in advanced fraud analytics and enhancing governance frameworks. Furthermore, while private banks excel in managing the aftermath of fraud, they must also prioritize reducing the incidence of fraud by strengthening compliance with regulatory standards and enhancing customer awareness.

6. Recommendations

Fraudulent activities pose a significant threat to the stability and integrity of the banking sector in India. As both private and public sector banks continue to expand their operations and embrace digital transformation, they inadvertently become more susceptible to various forms of fraud, ranging from cybercrimes to traditional financial misconduct. The evolving landscape of financial transactions, coupled with the increasing sophistication of fraudsters, necessitates a proactive and robust approach to fraud mitigation. To address these challenges effectively, banks must adopt a multi-faceted strategy that incorporates specialized expertise, advanced technology, and rigorous oversight. This set of recommendations aims to enhance the capacity of both private and public sector banks in India to detect, prevent, and respond to fraudulent activities, ultimately safeguarding their financial health and maintaining customer trust.

Banks may take steps to make more robust the systems which are already in place such as the Establishment of Specialized Fraud Investigation Units, Comprehensive Risk Assessment and Market Analysis and Internal Evaluation and Monitoring Systems. Beyond these the banks may take steps to introduce the following features which may help to bolster their fraud mitigation strategies, thereby enhancing financial stability and maintaining public trust in the banking system.

- **Investment in Advanced Technology and Analytics**: To enhance fraud detection and prevention capabilities, banks must invest in cutting-edge IT systems and data analytics tools. Implementing advanced transaction monitoring systems that utilize artificial intelligence and machine learning algorithms can provide real-time profiling of customer transactions. These systems should incorporate early warning signal frameworks to proactively identify suspicious activities and enable banks to act swiftly to mitigate potential fraud risks.

- **Strengthening Accountability for Third Parties**: A comprehensive regulatory framework should be established to ensure accountability among third-party entities, such as auditors and credit rating agencies, involved in financial transactions. Implementing stringent oversight and punitive measures for negligent or collusive behaviour will deter misconduct. Additionally, banks should conduct regular audits of third-party service providers to assess their compliance with fraud prevention standards and ethical practices.

- **Enhanced Legal Framework and Compliance Measures**: The legal framework governing financial transactions should be fortified to improve accountability among banks and their partners. Strengthening Know Your Customer (KYC) regulations and making wilful default a criminal offense will create a robust deterrent against fraud. Furthermore, regular updates to compliance requirements should be mandated to keep pace with evolving fraud tactics and technologies, ensuring that banks remain vigilant in their efforts to combat financial crime.

- **Integrated Intelligence Gathering and Real-Time Monitoring**: Banks should collaborate with intelligence-gathering agencies to track borrower activities and ensure compliance with lending terms. Establishing a specialized fraud monitoring agency within banks, equipped with skilled personnel, will enhance the ability to detect and respond to potential fraud in real time. This agency should work closely with law enforcement and regulatory bodies, leveraging shared intelligence to identify patterns of fraud and prevent further incidents.

- **Ongoing Training and Awareness Programs for Staff**: Regular training and awareness sessions which are instituted to educate bank staff about emerging fraud schemes and best practices for early detection and reporting can incorporate case studies, simulations, and updates on regulatory changes, ensuring that employees are well-equipped to identify and respond to potential fraud. Cultivating a culture of vigilance and ethical behaviour within the organization is critical for effective fraud prevention.

- **Inter-Agency Collaboration and Information Sharing**: Banks may enhance coordination with relevant regulatory and enforcement agencies, such as the Central Board of Direct Taxes (CBDT) and the Central Vigilance Commission (CVC). Establishing secure channels for confidential information sharing will facilitate the detection of potential fraud risks associated with borrowers and promoters. This collaborative approach will improve the overall effectiveness of fraud prevention efforts and strengthen the integrity of the banking system.

7. Conclusion

In conclusion, the study highlights significant insights into how banking fraud impacts the financial health of private and public sector banks differently in India. While private sector banks grapple with a higher volume of fraud cases, they have developed robust mechanisms to mitigate the financial fallout. In contrast, public sector banks, though experiencing fewer frauds, suffer more substantial financial repercussions, indicating a need for improvement in their fraud management practices.

Ultimately, addressing the complexities of banking fraud requires a concerted effort from both sectors to refine their strategies and foster a more resilient banking environment. As fraud techniques evolve, both private and public sector banks must continuously adapt their frameworks to safeguard their financial health and ensure the stability of the banking sector. The public sector banks can adopt proactive fraud prevention strategies from private banks, while private banks must focus on enhancing compliance and reducing fraud incidents. This collaboration and knowledge sharing can play a pivotal role in enhancing the effectiveness of fraud management practices across the industry.

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