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

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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

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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.

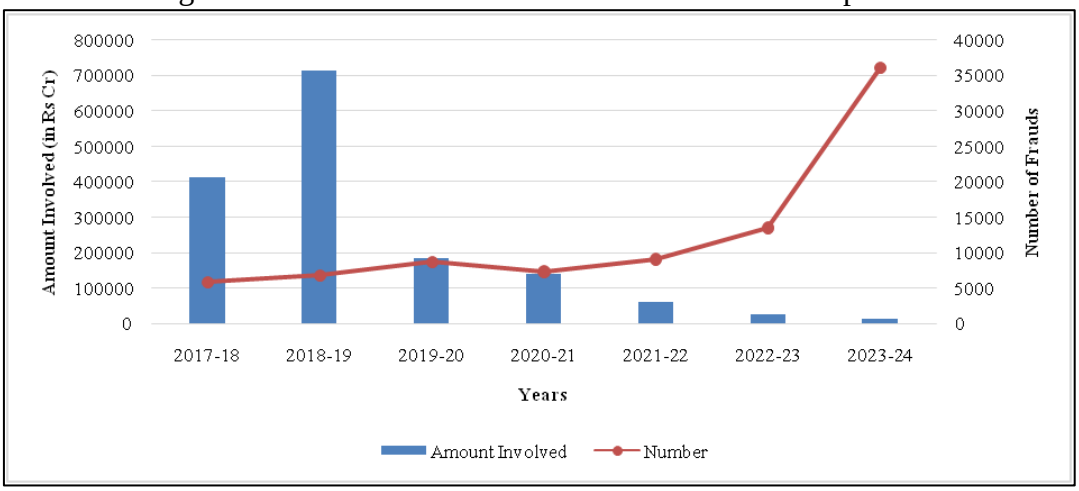
4. Results and Analysis

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.

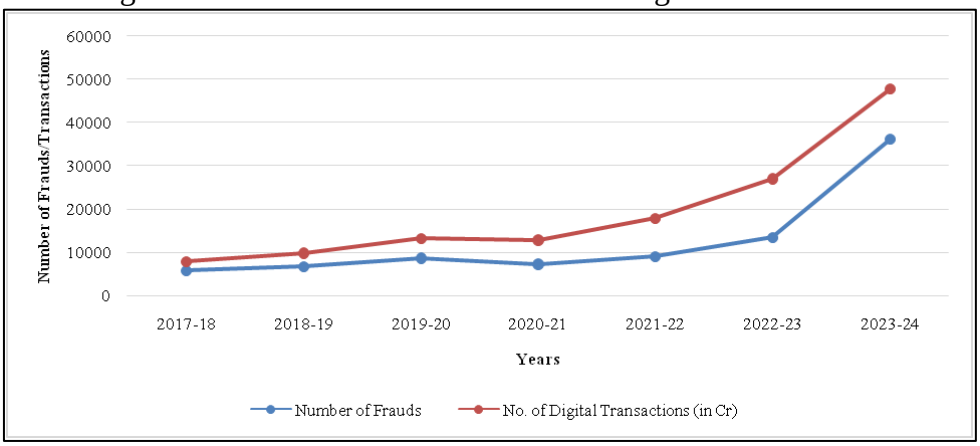
The Covid pandemic saw a massive increase in digital banking transactions, leading to more opportunities for cyber fraud and digital scams. This transition likely contributed to the surge in the number of fraud cases, as online transactions became more susceptible to hacking, phishing, and cyber-attacks. 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).

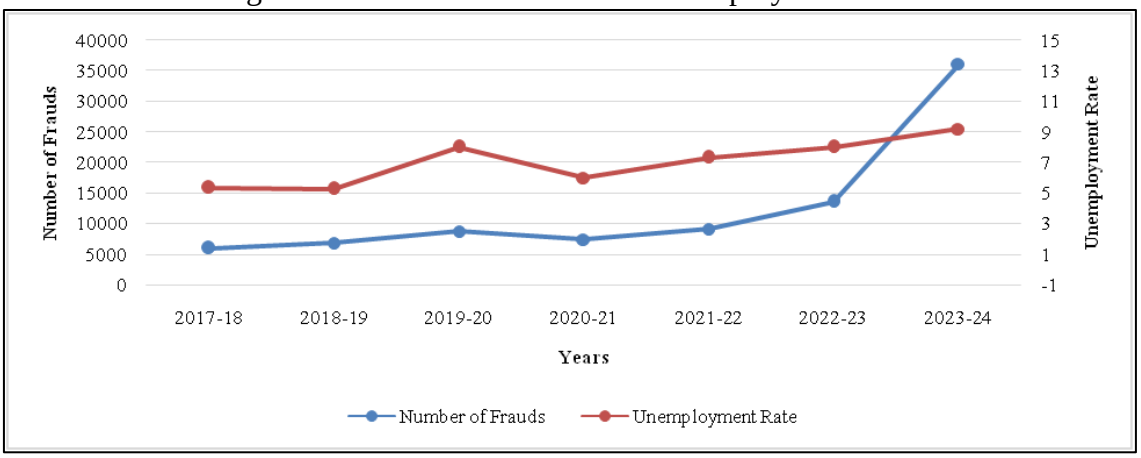
Further, the sharp decline in the amount of money involved after 2018-19 indicates stricter regulatory measures implemented to prevent large-scale fraud. Therehave been targeted interventions or reforms by the RBI to mitigate high-value fraud, which resulted in fewer high-stakes cases post-2019. The 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.

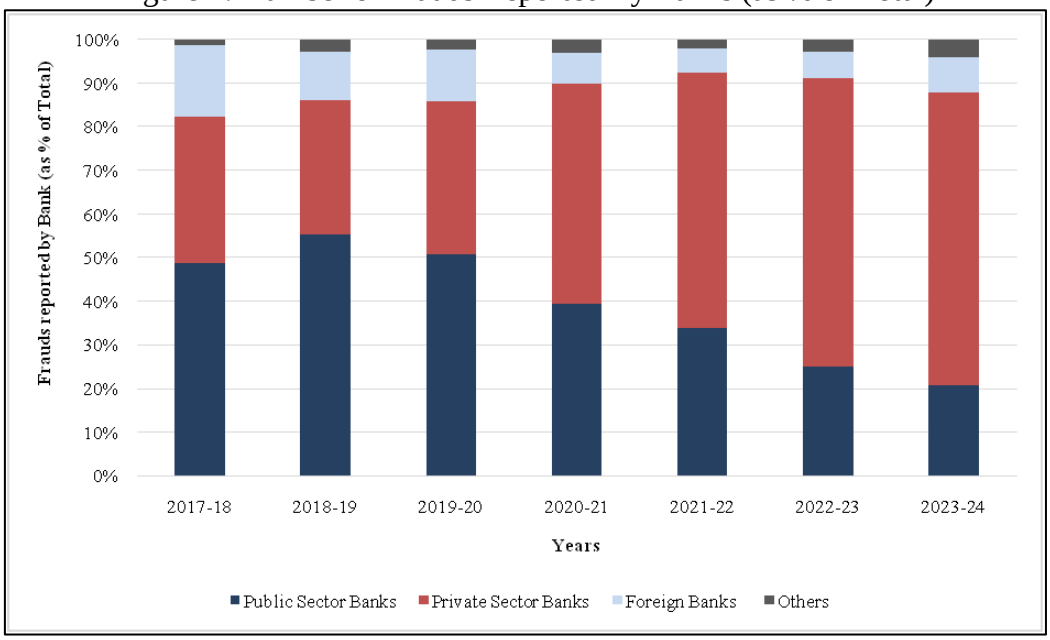
4.2. Classification by the Types of Banks

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)

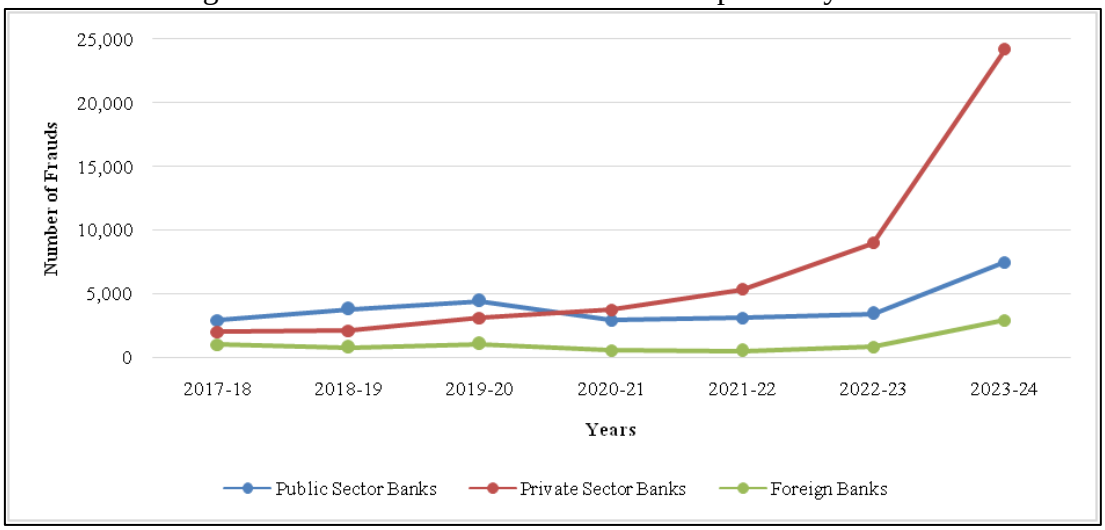


Source: Author's analysis based on company annual reports (2017–2024), RBI Annual Report, Section VI: Various Years

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



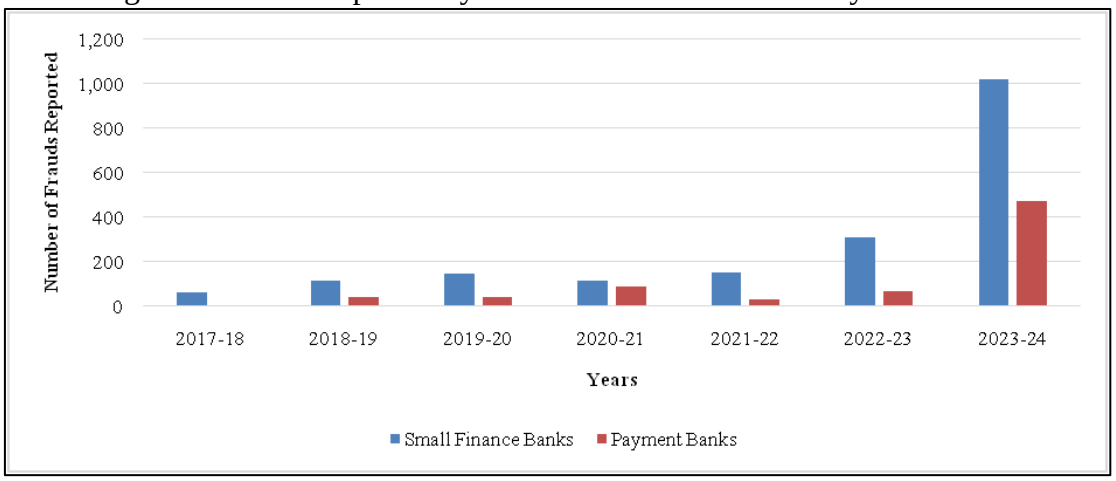
Source: Author's analysis based on company annual reports (2017–2024), RBI Annual Report, Section VI: Various Years

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.

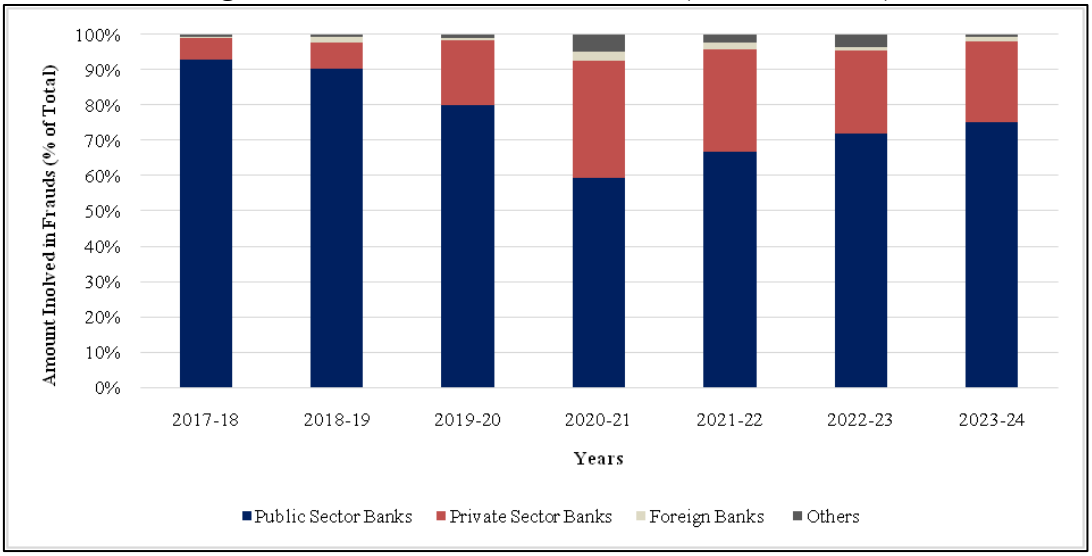
4.2.2. Amount of Frauds

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.

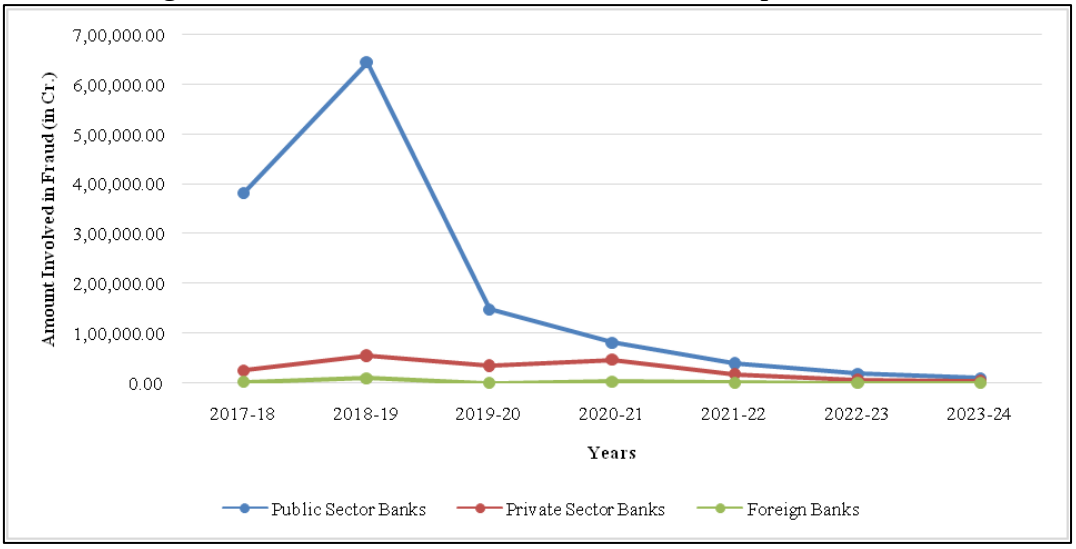
The significant reduction in the amount involved in frauds, as seen in Figure 8, highlights the success of various fraud mitigation frameworks introduced by the RBI. Key frameworks such as the Early Warning Signals (EWS) & Red Flagged Accounts (RFA) framework, the Risk-Based Supervision (RBS) framework, 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.

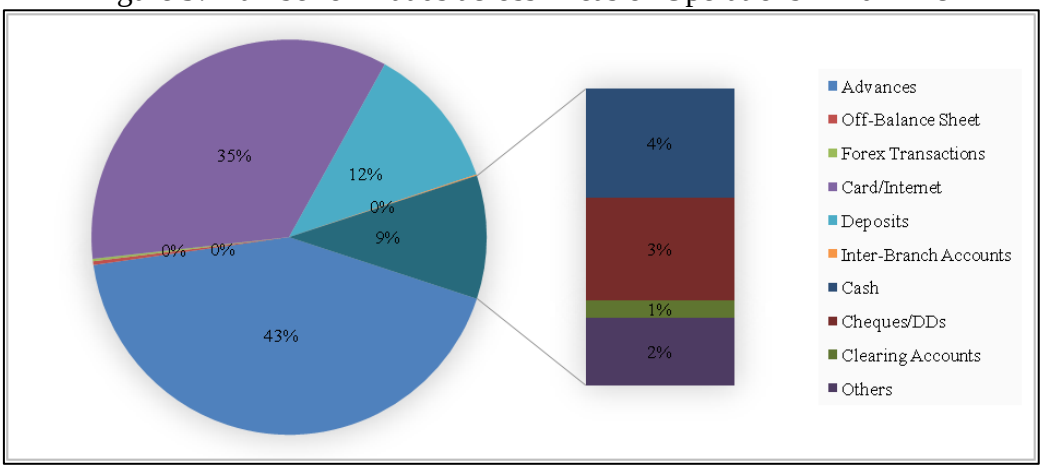
By 2023-24, fraud patterns had shifted drastically. Card/internet frauds skyrocketed to 81%, a clear indication of how cybercrime and fraudsters have adapted to the growing reliance on digital platforms. Despite significant efforts to secure these systems, they have become the largest fraud area due 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

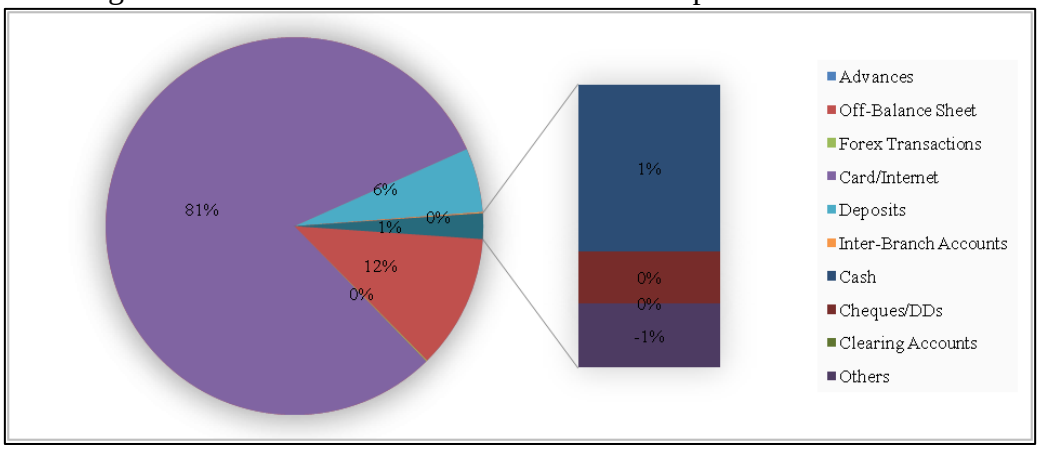
Early Warning Signals (EWS) & Red Flagged Accounts (RFA) system. These measures have improved monitoring and reporting of contingent liabilities, ensuring tighter control over potential risks. Meanwhile, card and internet-based frauds, which contributed negligibly in 2017-18 in terms of the amount (less 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



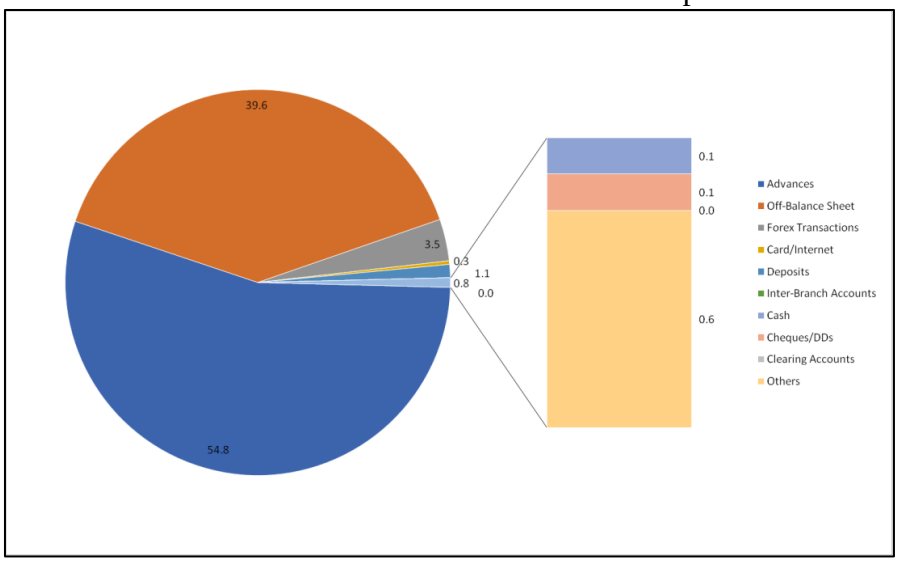
Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

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



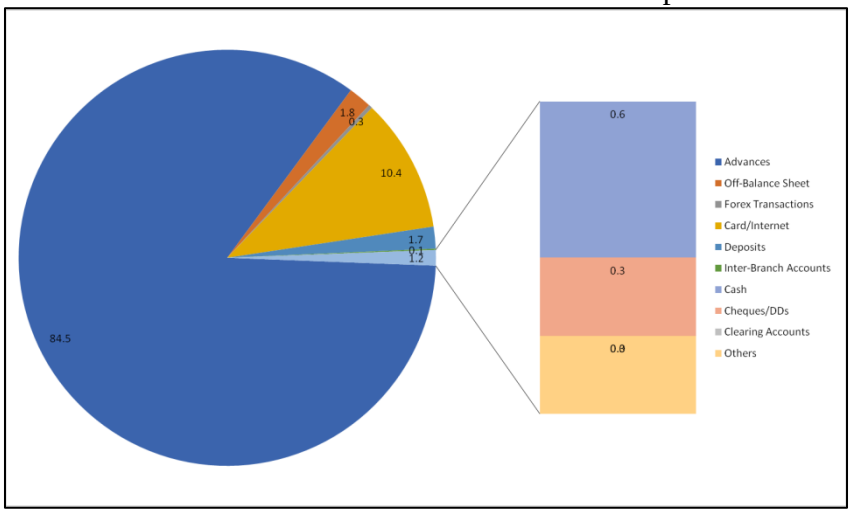
Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

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

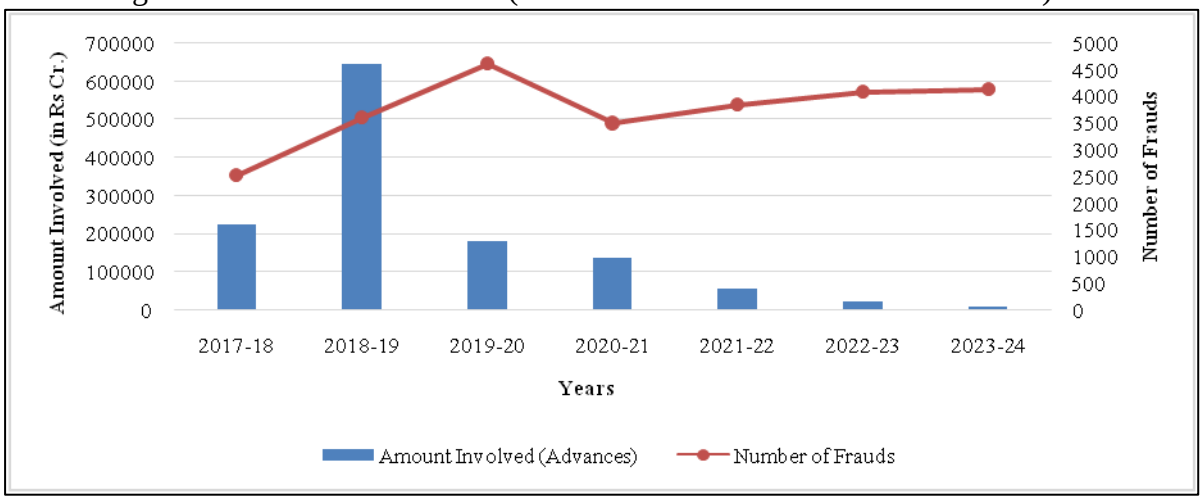


Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

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

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.

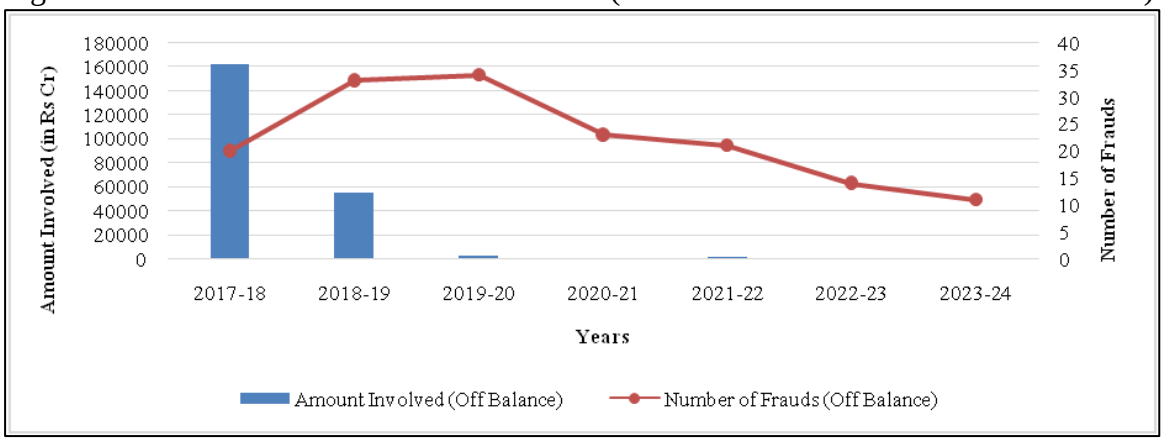
RBI's regulations have been notably successful in reducing off-balance sheet frauds, both in terms of value and volume. The RBS Framework has allowed for more focused scrutiny of banks with substantial off-balance sheet exposures, ensuring that these institutions adhere to stringent risk management practices. 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

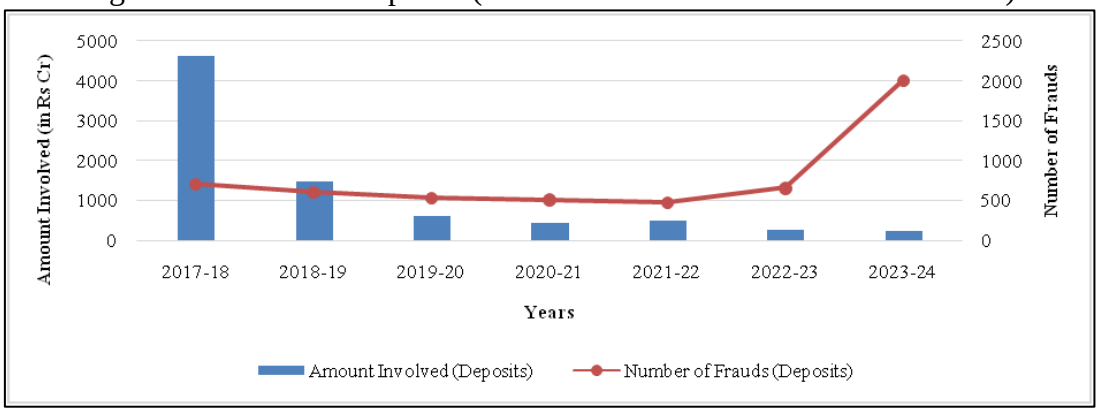
lower amounts involved, the rising number of deposit-related frauds highlights the need for enhanced security protocols, improved fraud detection systems, and better customer education to combat this growing trend.

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)

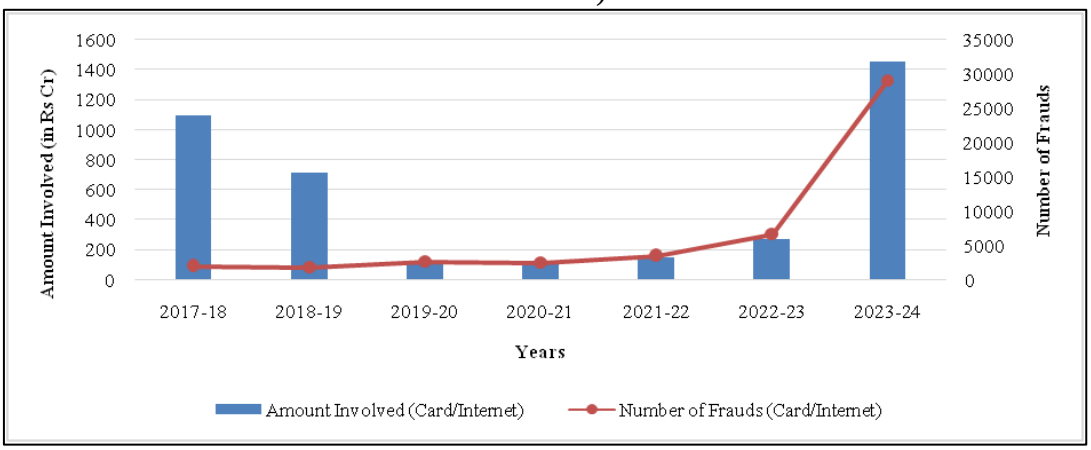


Source: Authors' analysis of RBI Annual Report, Section VI: Various Years

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

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.

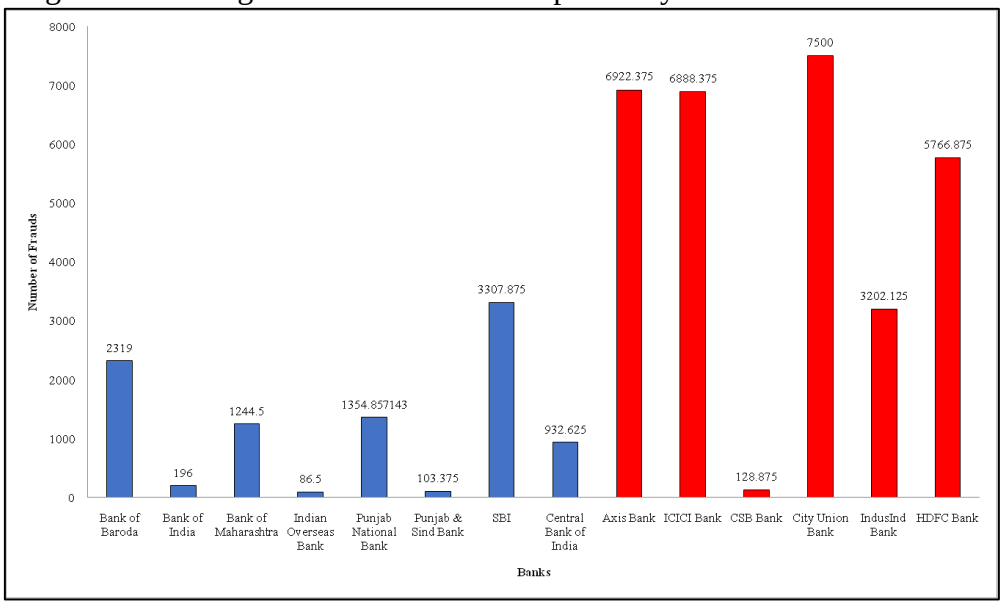
While private banks have a much higher number and proportion of frauds relative to their deposits and advances, they perform better financially, with higher ROA and better cash flow management relative to their NPAs. Public banks, while having fewer frauds in terms of both number and proportion, are 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.

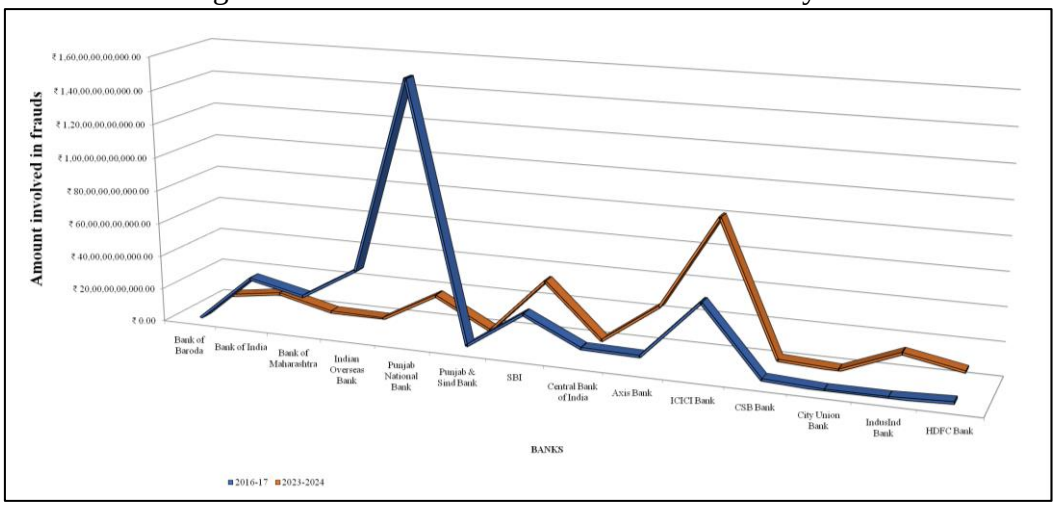
In contrast, public sector banks like Bank of India, Punjab National Bank, and Indian Overseas Bank report significantly fewer cases. State Bank of India (SBI), the largest public sector bank, also reports relatively fewer frauds than major private banks. This lower number for public banks may point 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

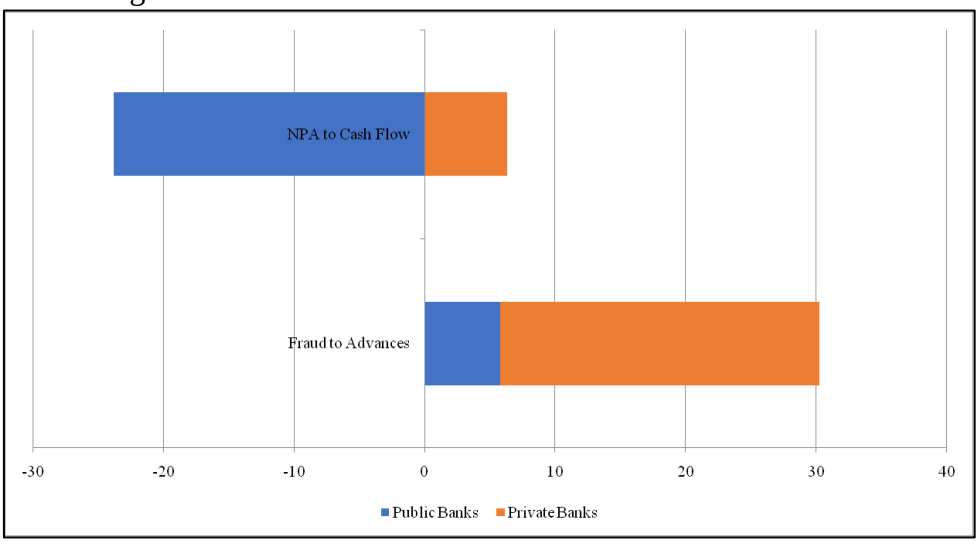
Source: Authors' analysis based on company annual reports (2017–2024)

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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