



**An Internship Report On “Impact of Fintech on Bank Profitability :
A study on Commercial Banks in Bangladesh”**

Submitted To

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Session: 2020-21

Department of Finance and Banking,

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Date of Submission: 19-04-2026

Letter of Transmittal

19th April, 2026

Tama Saha

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Department of Finance and Banking,

Comilla University, Cumilla.

Subject: Submission of internship report.

Dear Sir,

With due respect, I would like to inform you that, it is a privilege and great pleasure for me to submit the internship report on **“Impact of Fintech on Bank Profitability: A study on Commercial Banks in Bangladesh”** as a requirement for the completion of BBA program under Department of Finance and Banking, Comilla University. I have completed my three months internship under your supervision.

During the preparation of the report, I have tried my best to make full use of my capabilities in making the report meaningful and worthwhile. I earnestly thank you for your guidance during the preparation of this report. Please, consider all mistakes and shortcomings as a result of human limitation.

I shall be highly glad if you kindly receive this report and provide your valuable judgment. It would really be my immense pleasure if you find this report useful and informative.

Sincerely yours,

Khadija Akter Lily

Class ID: 12117049

Session: 2020-21

Department of Finance and Banking, Comilla University.

Acknowledgement

At first, I would like to express my gratitude to Almighty Allah giving me the strength and opportunity to successfully complete my internship report within the scheduled time. In every step of this study, invaluable help and suggestions from many individuals and institutional experts supported me. Now it gives me an immense pleasure to acknowledge them with my gratitude.

First of all, I wish to express my sincere gratitude to my honorable internship supervisor, Tama Saha, Assistant Professor, Department of Finance and Banking, Comilla University for her continuous support and guidance while preparing this report. I could not have dreamed that I would have had a better consultant and mentor for my internship report. Your sincere guidance, untiring co-operation, valuable advice and endless inspiration enabled me to overcome all the problems that I faced during the preparation of the report.

I would like to thank the respected assistant manager, Md. Abul Kashem, Sonali Bank PLC, Wapada Building Branch, Cumilla for giving me all the information and help that I need during the internship period.

I have tried with my best in order to serve every objective of this report and tried to prepare the report accurately. However, there might be some mistakes or limitations due to my limited aptitude and time constraint. In this regard, I seek your kind consideration as I am in the process of learning.

Student's Declaration

I somberly declare that the work in this internship report titled “**Impact of Fintech on Bank Profitability : A study on Commercial Banks in Bangladesh**” is an original work done by me under the honorable supervisor Tama Saha, Assistant Professor, Department of Finance and Banking, Comilla University.

No part of this report has been previously submitted to any other University/College/ Institution/ Organization for any academic certificate/ degree/ diploma. This work I have presented does not breach any existing copyright and no portion of this report is copied from any work done earlier for any degree.

I further undertake to identify the department against any lost or damage arising from breach of the forgoing obligation, If any.

Khadija Akter Lily

Class ID: 12117049

Session: 2020-21

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Comilla University, Cumilla.

Supervisor's Declaration

This is to certify that Khadija Akter Lily and class ID: 12117049 is a student of Department of Finance and Banking, Comilla University has successfully completed her Internship Program and report entitled “**Impact of Fintech on Bank Profitability: A study on Commercial Banks in Bangladesh**” under my supervision as a partial fulfillment of the requirement of Bachelor of Business Administration (BBA) Program from Comilla University, Cumilla.

The Report has been prepared and carried out under my guidance and supervision, is a record of the authentic work which is carried out successfully. I think this program will help her in the future to build up her career.

She is permitted to submit the Report. I wish her success and prosperity.

Tama Saha

Assistant Professor

Department of Finance and Banking,

Comilla University, Cumilla

Executive summary

This report analyzes the impact of financial technology (FinTech) on the profitability of commercial banks in Bangladesh, focusing on how technological advancements influence financial performance in an increasingly digitalized banking environment. As the banking sector undergoes rapid transformation, FinTech has become a critical factor in enhancing operational efficiency, expanding service accessibility, and improving customer experience. Therefore, evaluating its contribution to profitability is essential for both practitioners and policymakers.

The primary objective of this study is to examine the effect of selected FinTech variables on bank profitability, measured by Return on Assets (ROA). The key FinTech indicators considered include the number of Automated Teller Machines (ATMs), agent banking outlets, and online banking branches. Additionally, control variables such as the cost-to-income ratio and bank size are incorporated to provide a comprehensive understanding of the determinants of profitability.

The study utilizes secondary data collected from the annual reports of selected commercial banks over a defined period. A panel dataset is constructed, combining both cross-sectional and time-series data to enhance analytical robustness. The analysis is conducted using Stata, applying econometric techniques including descriptive statistics, correlation analysis, Hausman test, and panel data regression models.

The empirical findings reveal that FinTech adoption has a varying impact on bank profitability. Among the FinTech variables, ATMs demonstrate a positive and statistically significant relationship with ROA, indicating that ATM expansion improves customer access, enhances transaction efficiency, and supports profitability growth. In contrast, agent banking and online banking show positive but statistically insignificant effects, suggesting that their financial benefits may take longer to materialize due to factors such as high initial investment costs, adoption challenges, and operational complexities.

Overall, the findings suggest that while FinTech is an important driver of modernization and long-term growth, its effectiveness depends on strategic implementation and efficient cost management. Technologies like ATMs provide immediate benefits, whereas newer channels such as agent

banking and online banking require sustained investment and improved execution to generate significant returns.

In conclusion, this study provides valuable evidence on the relationship between FinTech and bank profitability in Bangladesh. It underscores the importance of balancing technological innovation with operational efficiency and strategic management to ensure sustainable financial success in the evolving banking landscape.



ওয়াপদা বিল্ডিং শাখা, কুমিল্লা।

No: SBPLC/Wapda/Cumilla/Intern/2026/

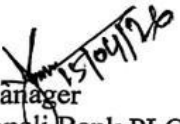
Date: 15/04/2026

To Whom It May Concern

This to certify that **Khadija Akter Lily**, S/O **Delowar Hossain & Nazma Akter** student of Department of Finance and Banking of Comilla University, session: 2020-2021 bearing ID: 12117049 had successfully completed her internship program on “**Impact of Fintech on Bank Profitability a study of Commercial Banks in Bangladesh**” at Wapda Building Branch, Cumilla from 27/01/2026. She was found regular, sincere, and dutiful to her work.

During the period she had gone through the day-to-day operation of the different wings of the bank and gathered good knowledge about overall banking department.

I wish her every success in life.


Manager
Sonali Bank PLC.
Wapda Building Branch, Cumilla.

মুহাম্মদ আব্দুল কাশেম
ম্যানেজার
(সিনিয়র ফ্রান্সিস অফিসার)
জি-৩৭৬৩৫
সোনালী ব্যাংক পিএলসি
ওয়াপদা বিল্ডিং শাখা, কুমিল্লা

Executive summary

This report analyzes the impact of financial technology (FinTech) on the profitability of commercial banks in Bangladesh, focusing on how technological advancements influence financial performance in an increasingly digitalized banking environment. As the banking sector undergoes rapid transformation, FinTech has become a critical factor in enhancing operational efficiency, expanding service accessibility, and improving customer experience. Therefore, evaluating its contribution to profitability is essential for both practitioners and policymakers.

The primary objective of this study is to examine the effect of selected FinTech variables on bank profitability, measured by Return on Assets (ROA). The key FinTech indicators considered include the number of Automated Teller Machines (ATMs), agent banking outlets, and online banking branches. Additionally, control variables such as the cost-to-income ratio and bank size are incorporated to provide a comprehensive understanding of the determinants of profitability.

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Overall, the findings suggest that while FinTech is an important driver of modernization and long-term growth, its effectiveness depends on strategic implementation and efficient cost management. Technologies like ATMs provide immediate benefits, whereas newer channels such as agent

banking and online banking require sustained investment and improved execution to generate significant returns.

In conclusion, this study provides valuable evidence on the relationship between FinTech and bank profitability in Bangladesh. It underscores the importance of balancing technological innovation with operational efficiency and strategic management to ensure sustainable financial success in the evolving banking landscape.

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Chapter one

Introduction

1.1 Introduction

Financial Technology, commonly known as FinTech, describes the application of modern digital technologies to provide financial services in a quicker, more efficient, and innovative manner. It combines financial systems with advanced tools such as software platforms, mobile applications, artificial intelligence, and data analytics to enhance and modernize traditional banking operations. The rapid expansion of FinTech has significantly reshaped the global banking sector by offering more affordable, accessible, and scalable financial solutions. Although the rise of FinTech companies gained momentum after the global financial crisis of 2007–2008, its origins date back much earlier. The foundation of FinTech can be traced to the 1950s with the introduction of credit cards and automated teller machines (ATMs), marking the beginning of technological transformation in finance. Modern banking innovation is largely driven by two key elements: information technology and electronic fund transfer systems. These technologies have paved the way for new financial institutions, such as payment banks, to enter the market and expand the financial ecosystem. As a result, both traditional banks and FinTech firms are under constant pressure to improve their services, leading to increased innovation and customer focused solutions. Furthermore, the barriers to entering the banking industry have decreased over time due to the emergence of specialized firms and innovative business models. This shift has encouraged greater competition and has contributed to a more dynamic and evolving financial landscape.

1.2 Background of the Study

In recent years, the banking sector has undergone a major upheaval due to the rapid advancement of Financial Technology (FinTech). FinTech refers to the integration of technology into financial services, enabling faster, more efficient, and customer-friendly banking procedures. Services such as mobile banking, online banking, automated teller machines (ATM), card-based transactions, and agent banking have become key components of modern banking systems. In Bangladesh, the deployment of FinTech has expanded under the leadership of Bangladesh Bank, leading to increased digitalization across commercial institutions. As a result, banks are investing substantially in IT, infrastructure and creating digital service channels to better customer experience and remain competitive in the market.

The international banking business is undergoing a paradigm transformation, moving from traditional "brick-and-mortar" banking to "bits-and-bytes" digital services. In the context of Bangladesh, this transformation is part of the government's "Smart Bangladesh 2041" vision. Financial Technology, or Fintech, has emerged as a crucial motivation for commercial banks to enhance efficiency and service the unbanked population. Commercial banks are progressively investing in digital infrastructure such as Automated Teller Machines (ATMs), agent banking services, and online banking systems. These technologies have transformed the previous banking system by lessening dependency on physical branches and enhancing service delivery. As a result, FinTech is predicted to play a big role in enhancing bank performance and profitability.

In recent years, the banking sector in Bangladesh has seen rapid expansion in Mobile Financial Services (MFS), Agent Banking, and Internet Banking. With the advent of the Real-Time Gross Settlement (RTGS) and National Payment Switch Bangladesh (NPSB), banks are investing substantially in IT infrastructure to stay competitive.

Financial Technology has become a significant factor in Bangladesh's dynamic financial sector, notably in the context of state-owned commercial banks in Bangladesh (Das, 2021; Hossain et al., 2021; Wu, 2023). According to (Basdekis et al., 2022; Wang et al., 2022), the nation's financial ecosystem is heavily formed by these six state-owned commercial banks, which function as accelerators for economic stability and advancement.

1.3 Problem Statement

In recent years, the banking sector has seen a considerable transformation due to the rapid progress of financial technology (FinTech). The incorporation of digital technologies into banking operations has revolutionized the way financial services are offered and consumed. In Bangladesh, commercial banks have increasingly adopted various FinTech innovations such as Automated Teller Machines (ATMs), agent banking outlets, and online banking platforms to improve efficiency, enhance customer convenience, and remain competitive in a rapidly evolving financial environment.

Despite this increased acceptance of FinTech, the actual impact of new technologies on bank profitability remains vague and confusing. While FinTech is projected to improve operational

efficiency, reduce transaction costs, and raise customer happiness, it also demands major investment in infrastructure, technology, and cybersecurity. These investments may increase operational costs in the short run and may not immediately translate into better profitability.

Therefore, the relationship between FinTech adoption and bank profitability is not always obvious. In the case of Bangladesh, this issue becomes even more essential due to the specific peculiarities of the banking system. The country has a huge unbanked population, increasing demand for digital financial services, and a growing focus on financial inclusion.

Another key worry is the difference in the influence of different FinTech components. While some technologies, such as ATMs, may have a direct and immediate effect on profitability, others, such as agent banking and online banking, may have delayed or indirect benefits. Additionally, factors such as operational efficiency and bank size may also influence profitability, making it vital to adjust for these variables in the research. Moreover, there is a lack of relevant empirical studies in Bangladesh that focus on the specific influence of FinTech variables on bank profitability using panel data analysis.

1.4 Significant of the Study

This study holds important value for different stakeholders, including commercial banks, policymakers, regulators, and researchers. It gives useful insights into the relationship between FinTech adoption and bank profitability in Bangladesh, which is essential for making educated decisions.

Firstly, the study is particularly relevant for commercial banks. As banks continue to invest extensively in digital technology, it is crucial to determine whether these investments are delivering positive financial returns. The outcomes of this study can help bank management analyze the efficiency of different FinTech components and make strategic decisions regarding resource allocation..

Secondly, the study is relevant for policymakers and regulatory bodies. In Bangladesh, encouraging financial inclusion and digital banking is an important policy priority. The government and central bank have made numerous steps to stimulate the adoption of FinTech.

Thirdly, the study contributes to academic research by filling a gap in the existing literature. While FinTech has been widely explored in industrialized countries, there is scant empirical information from developing economies like Bangladesh.

Furthermore, the work is valuable for future scholars. It provides a framework for additional research on FinTech and bank performance. Future studies can improve upon this research by integrating additional factors, extending the time span, or employing different analytical methodologies. It also opens up opportunity for comparative studies between different countries or banking systems.

Finally, the study has practical implications for enhancing the overall efficiency and sustainability of the banking sector. By identifying the important factors that drive profitability, the study helps stakeholders understand the role of technology in ensuring long-term financial stability. It underlines the necessity for a balanced approach that blends technology innovation with smart cost management.

1.5 Scope of the Study

This study is confined to commercial banks operating within Bangladesh, with the primary objective of examining how the adoption of FinTech influences bank profitability. Profitability is measured using Return on Assets (ROA), a widely accepted indicator that reflects how effectively a bank utilizes its total assets to generate earnings.

To represent FinTech adoption, the study considers key variables such as the number of Automated Teller Machines (ATMs), agent banking outlets, and online banking branches. These elements serve as practical indicators of technological integration in banking services. Additionally, the cost-to-income ratio is included to capture operational efficiency, while bank size is incorporated as a control variable to account for variations in scale, capacity, and resource availability among different banks.

The sample includes both conventional and Islamic banks, ensuring a broader perspective on the banking sector in Bangladesh. However, due to data constraints, not all banks operating in the

country are included in the analysis. The timeframe of the study focuses on recent years, allowing for an assessment of current FinTech trends, though it may not fully capture long-term effects.

Methodologically, the study applies panel data analysis techniques to examine the relationships among the variables. Appropriate statistical tools are used to ensure the robustness and validity of the findings. The analysis primarily focuses on the short-term impact of FinTech adoption on bank performance, without addressing long-term implications. Furthermore, qualitative aspects such as customer satisfaction, service quality, and technological challenges are not directly evaluated.

Overall, the study offers a focused quantitative assessment of how selected FinTech-related variables affect bank profitability in Bangladesh. While it provides meaningful insights into the role of digital transformation in banking performance, the conclusions are limited to the chosen variables, sample banks, and the specific timeframe considered.

1.6 Research Questions

The rapid growth of financial technology (FinTech) has considerably revolutionized the banking sector, particularly in Bangladesh. Commercial banks are progressively using digital technologies such as Automated Teller Machines (ATMs), agent banking, and online banking services to increase operational efficiency, boost consumer convenience, and remain competitive in the developing financial landscape. However, despite this increased use, the true impact of these FinTech components on bank profitability remains uncertain. This uncertainty promotes the necessity for an organized examination through specified research questions.

The primary research question of this study are

1. Does ATM usage improve bank profitability?
2. Does agent banking significantly affect profitability?
3. What is the impact of online banking on ROA?
4. How does cost-to-income ratio influence profitability?
5. Does bank size affect financial performance?

1.7 Objective of the Study

The main purpose of this report is to assess how the adoption of FinTech influences the profitability of commercial banks in Bangladesh. Specifically, the study aims to identify the key factors driving FinTech adoption in state-owned commercial banks, with a strong focus on aspects such as network connectivity, security issues, expected performance benefits, regulatory conditions, and social influences. This research also explores how these factors impact broader areas such as financial inclusion, customer satisfaction, and the overall modernization of banking services.

- To achieve these goals, the study is guided by the following specific objectives:
- To investigate how the number of ATMs affects Return on Assets (ROA)
- To examine the relationship between agent banking outlets and bank profitability
- To assess the contribution of online banking branches to financial performance
- To evaluate the effect of the cost-to-income ratio on overall bank efficiency and profitability
- To analyze the influence of bank size on profitability

In summary, these objectives are designed to offer a comprehensive insight into the role of FinTech in shaping the financial performance of banks in Bangladesh.

Chapter Two

Literature Review

2.1 Literature Review

This report is grounded in existing literature that examines the relationship between FinTech development and bank profitability. A large body of research suggests that advancements in FinTech contribute positively to both profitability and financial stability within the banking sector. By integrating modern technologies into service delivery, risk assessment, and data utilization, FinTech enables banks to improve operational efficiency and make better use of customer-generated information and big data (Fuster et al., 2019).

Numerous empirical studies have explored the link between FinTech adoption and banking performance. For instance, Beck et al. (2016) highlight that technological innovation significantly enhances operational efficiency, which in turn improves profitability. Similarly, Frame et al. (2019) argue that digital banking services increase customer satisfaction and transaction frequency, ultimately strengthening financial performance. In addition, FinTech has been shown to improve risk management practices and reduce operational costs (Wang et al., 2021), while also enabling the development of more tailored and diversified financial products that better meet customer needs (Gomber et al., 2017). According to Mirza et al. (2023), investments in FinTech can directly improve risk-adjusted returns through cost reduction, product expansion, and lower capital requirements.

From a financial stability perspective, several studies indicate that FinTech can enhance resilience in the financial system. Fung et al. (2020) suggest that FinTech contributes to greater transparency, decentralization, and service accessibility, thereby reducing systemic instability. Likewise, Daud et al. (2022), using data from multiple countries, find a positive association between FinTech development and overall financial stability, driven by technologies such as artificial intelligence, cloud computing, and data analytics.

However, findings are not entirely consistent, particularly in developing economies. Some studies report that technologies such as ATMs and digital banking services improve profitability by lowering operating costs and increasing service reach (Hasan et al., 2020). Conversely, others argue that the substantial initial investment required for FinTech infrastructure may negatively affect profitability in the short term. Research on agent banking highlights its importance in promoting financial inclusion, especially in rural areas. Sarker (2018) notes that while agent

banking supports deposit growth, its contribution to profitability may be limited initially due to associated operational costs.

The cost-to-income ratio is widely recognized as a key indicator of bank efficiency, with higher ratios generally linked to lower profitability. Athanasoglou et al. (2008) identify a strong negative relationship between operating expenses and bank performance. Bank size also plays a crucial role, although its impact remains inconclusive. While larger banks may benefit from economies of scale, excessive size can lead to inefficiencies, making the overall relationship between size and profitability complex.

In the context of Bangladesh, this study makes an important contribution by focusing specifically on state-owned commercial banks, an area that has received limited attention in prior research. Unlike earlier studies that broadly examine FinTech adoption, this research emphasizes key determinants such as connectivity, security and trust, performance expectations, regulatory environment, and social influence. By analyzing these factors, the study aims to provide practical insights for policymakers, regulators, and bank management on how to enhance FinTech adoption and promote financial inclusion and economic development.

Chapter: Three

Organizational Profile

3.1 Overview of Sonali Bank PLC



Sonali Bank is a state-owned commercial bank in Bangladesh. It is the largest bank of the country. A fully state-owned enterprise, the bank has been discharging its nation-building responsibilities by undertaking government entrusted different socio-economic schemes as well as money market activities of its own volition, covering all spheres of the economy. Sonali Bank Limited singularly enjoys the prestige of being the agent of the Central Bank of Bangladesh in such places where the guardian of the money market has chosen not to act by itself.

Sonali Bank was established in 1972 under the Bangladesh Banks (Nationalization) Order, through the amalgamation and nationalization of the branches of National Bank of Pakistan, Bank of Bhowalpur and Premier Bank branches located in East Pakistan until the 1971 Bangladesh Liberation War. When it was established, Sonali Bank had a paid up capital of 30 million taka. In 2001, its authorized and paid-up capital were Tk. 10 billion and Tk. 3.272 billion respectively. The bank's reserve funds were Tk. 60 million in 1979 and Tk. 2.050 billion on 30 June 2000.

The management of Sonali Bank is vested in a 7-member board of directors appointed by the government. The managing director is the chief executive. He is assisted by a deputy managing director, six general managers, and other senior executives. The general managers are in charge of the bank's branches in the headquarters of the six administrative divisions of the country namely, Dhaka, Chittagong, Rajshahi, Khulna, Sylhet and Barisal. The bank has 32 departments at its head office including a training institute in Dhaka. On 30 June 2000, the total number of employees of the bank was 26,085.

Sonali Bank Limited was incorporated in Bangladesh on 03 June 2007 as a Public Limited Company under Companies Act 1994. Formally this bank was incorporated as a nationalized commercial bank named as Sonali Bank established by The Bangladesh Bank Order 1972 (Presidential Order no. 26 of 1972) and was fully owned by the Government of the People's Republic of Bangladesh. After incorporation dated 15 November 2007 Sonali Bank Ltd. has taken over the undertaking and business of Sonali Bank.

Sonali Bank's Vision:

Socially committed leading banking institution with global presence.

Sonali Bank's Mission:

Dedicated to extend a whole range of quality products that support divergent needs of people aiming at enriching their lives, creating value for the stake holders and contributing towards socio-economic development of the country.

Sonali Bank's Slogan:

Your trusted partner in innovating banking.

Corporate Profile

Name of the Company	Sonali Bank PLC
Chairman	Mohammad Muslim Chowdhary
CEO & Managing Director	Md.Shawkat Ali Khan
Company Secretary	Md. Tauhidul Islam
Status	Public Limited Company
Company Genesis	Emerged as Nationalized Commercial Bank in 1972, following the Bangladesh Bank Order No. 1972(PO No. 26)
Date of Incorporation	03 June 2007
Authorized Capital	Taka 6000.00 crore
Paid-up Capital	Taka 4530.00 crore
Number of Employees	22446
Number of Brances	1230 Branches across the country and 2 overseas Branches
SWIFT	BSONBDDH

Fintech of Sonali Bank PLC

Sonali Bank PLC is the largest state-owned commercial bank in Bangladesh and plays a significant role in promoting financial inclusion and digital transformation in the banking sector. In recent years, the bank has increasingly adopted financial technology (fintech) to modernize its services, improve operational efficiency, and enhance customer experience.

Fintech in Sonali Bank refers to the integration of digital technologies such as online banking, mobile banking, automated teller machines (ATMs), and electronic fund transfer systems into traditional banking operations. The bank has introduced internet banking services that allow customers to perform various transactions such as fund transfers, utility bill payments, and account management from remote locations. This has reduced the dependency on physical branch visits and improved service accessibility.

In addition, mobile banking services have played a crucial role in expanding banking services to rural and unbanked populations. Through agent banking and mobile platforms, Sonali Bank has been able to reach customers in remote areas, thereby contributing to financial inclusion. The use of ATM networks and card-based transactions has also increased convenience and reduced transaction time for customers.

However, despite these advancements, Sonali Bank still faces several challenges in fully implementing fintech solutions. These include limited technological expertise, cybersecurity risks, and resistance to change within traditional banking structures. Additionally, infrastructure limitations in rural areas can hinder the effective deployment of digital banking services.

Financial Stability of Sonali Bank PLC

Sonali Bank PLC, the largest state-owned commercial bank in Bangladesh, has shown significant improvement in its financial stability in recent years through strengthened governance, improved asset quality, and better risk management practices. The bank has made notable progress in overcoming historical financial challenges, particularly capital shortfalls and high non-performing loans (NPLs).

One of the key indicators of financial stability is capital adequacy. Recently, Sonali Bank has successfully eliminated its previous capital deficit and achieved a capital surplus, with its Capital to Risk-Weighted Assets Ratio (CRAR) exceeding the regulatory minimum requirement of 10 percent. This reflects the bank's improved capacity to absorb financial risks and maintain stability.

In terms of profitability, the bank has recorded a strong turnaround. It achieved a record operating profit of over Tk 8,000 crore in 2025, driven by increased income, improved loan recovery, and better operational efficiency. This indicates a positive trend in financial performance and sustainability.

The bank has also made progress in reducing non-performing loans, which is a critical factor for financial stability. Through stricter borrower selection, enhanced recovery efforts, and improved credit monitoring, the NPL ratio has gradually declined. Additionally, Sonali Bank maintains strong liquidity, ensuring its ability to meet customer withdrawals and financial obligations even during economic uncertainty.

Furthermore, the bank is focusing on digital transformation and efficient lending strategies, particularly by shifting towards small and medium enterprises (SMEs) and reducing exposure to high-risk borrowers. These initiatives contribute to long-term financial resilience.

Core Values of Sonali Bank PLC

Sonali Bank PLC's core values proposition consists of ten key elements. The values would help the bank in motivating its employees to work as a team towards the accomplishment of assigned duties and responsibilities for the achievement of desired objectives. Teamwork: open communication and discussion interaction among the employees would ensure proper actions and efforts towards achieving the organization common goal.

Objectives of Sonali Bank PLC

The main objectives of Sonali Bank PLC is to play a key role in the national economy. To serve every one properly and with a sense of dedication and dignity is the motto of Sonali Bank. Other objectives of Sonali Bank as follows:

1. To provide the best services to each and every client through concentrated and coordinated efforts and a strict professional approach.
2. Forging a cordial, deep-rooted, and firm banker-customer relationship by dispensing prompt and improved clientele service.
3. To diversify and widen the overall operations and activities.
5. Ensuring the highest use of the professional workforce through enhancement of their attitude and competence.
6. To render innovative, customized, and cost-effective financial solutions to its clients.
7. Responding to the need of the time by participating in syndicated large loan financing with Like-minded banks of the country, thereby expanding the area of investment of the bank.
8. Elevating the image of the Bank at home and abroad by the sustained expansion of its activities.

3.2 Overview of other selected Commercial Bank

Janata Bank PL

Established in 1972, Janata Bank PLC is one of the largest state-owned commercial banks in Bangladesh. It provides extensive corporate and retail banking services and plays a key role in government financial activities. The bank is gradually adopting digital banking systems to improve service delivery and efficiency.

Director: Managed by a government-appointed Board of Directors, with a Managing Director & CEO responsible for operations.

Dutch-Bangla Bank Limited

Established in 1995, Dutch-Bangla Bank Limited is a leading private commercial bank in Bangladesh and a pioneer in fintech innovation. It has one of the largest ATM networks in the country and introduced mobile banking service “Rocket,” which significantly enhanced financial inclusion. The bank emphasizes digital transactions, online banking, and automation to improve efficiency and customer convenience. Its strong technological infrastructure supports fast and secure banking operations.

Director: Governed by a Board of Directors led by a Chairman, with a Managing Director & CEO responsible for daily operations.

BRAC Bank Limited

Established in 2001, BRAC Bank Limited is known for its strong focus on SME financing and digital banking services. The bank plays a vital role in supporting small and medium enterprises while also offering modern online and mobile banking facilities. Its fintech initiatives aim to enhance customer experience and expand financial access across Bangladesh.

Director: The bank is managed by a Board of Directors, including a Chairman, independent directors, and a Managing Director & CEO who oversees operational activities.

United Commercial Bank PLC

Established in 1983, United Commercial Bank PLC (UCB) is one of the leading private commercial banks in Bangladesh. It offers a wide range of services, including corporate, retail, and digital banking. The bank is gradually adopting fintech solutions such as online banking and automated systems to improve efficiency

and customer satisfaction.

Director: UCB operates under a Board of Directors headed by a Chairman, while the Managing Director & CEO handles the bank's daily management and strategic execution

NCC Bank PLC

Established in 1993, NCC Bank PLC provides a variety of banking services, including retail, corporate, and SME banking. The bank is adapting to technological advancements by introducing digital banking services and improving its operational systems. It aims to remain competitive in the evolving financial sector.

Director: The bank is governed by a Board of Directors led by a Chairman, and the Managing Director & CEO is responsible for overall management and decision-making.

First Security Islami Bank PLC

Established in 1999, First Security Islami Bank PLC offers Shariah-based banking services. The bank is expanding its fintech initiatives, including mobile banking and agent banking, to reach a broader customer base. It aims to ensure ethical and inclusive financial services.

Director: Governed by a Board of Directors and a Shariah Board, with a Managing Director & CEO handling daily management.

The City Bank PLC

Established in 1983, The City Bank PLC is one of the oldest private commercial banks in Bangladesh. It is well advanced in digital banking, card services, and fintech innovation.

Director: Managed by a Board of Directors led by a Chairman, with a Managing Director & CEO overseeing operations.

Bank Asia PLC

Established in 1999, Bank Asia PLC is known for its agent banking and digital financial services. It plays an important role in promoting financial inclusion through technology-driven solutions.

Director: Governed by a Board of Directors, including a Chairman and a Managing Director & CEO.

Mercantile Bank PLC

Established in 1999, Mercantile Bank PLC offers comprehensive banking services, including retail, corporate, and SME banking. It is gradually adopting fintech solutions to improve operational performance and customer service.

Director: Operates under a Board of Directors led by a Chairman, with a Managing Director & CEO in charge of operations.

Dhaka Bank PLC

Established in 1995, Dhaka Bank PLC provides a wide range of financial services, including corporate and retail banking. The bank is focusing on digital transformation to enhance service quality and efficiency.

Director: Managed by a Board of Directors with a Chairman and a Managing Director & CEO.

Prime Bank PLC

Established in 1995, Prime Bank PLC is a well-known private commercial bank offering corporate, retail, and digital banking services. It focuses on technological advancement to improve customer service and operational efficiency.

Director: Governed by a Board of Directors led by a Chairman, with a Managing Director & CEO overseeing daily activities.

Shahjalal Islami Bank PLC

Established in 2001, Shahjalal Islami Bank PLC provides Islamic banking services based on Shariah principles. The bank is integrating fintech solutions such as online and mobile banking to

improve service delivery and accessibility.

Director: Managed by a Board of Directors along with a Shariah Council, and a Managing Director & CEO responsible for operations.

Jamuna Bank PLC

Established in 2001, Jamuna Bank PLC is a private commercial bank offering a wide range of financial services. It is increasingly focusing on digital banking solutions to enhance customer convenience and operational efficiency. The bank aims to strengthen its position through innovation and service quality.

Director: Operates under a Board of Directors led by a Chairman, with a Managing Director & CEO managing operations.

IFIC Bank PLC

Established in 1976, IFIC Bank PLC (International Finance Investment and Commerce Bank) is one of the oldest private commercial banks in Bangladesh. The bank offers a wide range of services, including retail banking, SME financing, corporate banking, and Islamic banking through its window. In recent years, IFIC Bank has focused on digital transformation by introducing internet banking, mobile banking, and agent banking services to enhance financial inclusion and customer convenience. Its extensive branch and sub-branch network helps reach both urban and rural customers.

Director: The bank is governed by a Board of Directors led by a Chairman, with a Managing Director & CEO overseeing daily operations.

Chapter Four

Research Methodology

4.1 Introduction

This chapter discusses the methods used to analyze the influence of financial technology (FinTech) on bank profitability in Bangladesh. It outlines the research design, data sources, variables, and analytical methodologies employed in the study. A solid technique assures that the research findings are accurate, valid, and scientifically sound. Overall, this chapter provides a full summary of the research methodology, ensuring transparency and clarity in the research process.

4.2 Research Design

This study adopts a quantitative research design utilizing secondary data sources. Panel data analysis is applied to examine the relationship between FinTech-related variables and bank profitability. A total of seventy-five (75) observations are organized to construct the panel dataset used for regression analysis. For variables expressed in absolute values rather than percentages or ratios, natural logarithmic transformation is applied to ensure consistency and reduce data variability. Specifically, logarithmic values are used for bank size, number of ATMs, number of agent banking outlets, and number of online banking branches, while other variables are maintained in ratio or percentage form.

The research is explanatory in nature, aiming to establish causal relationships between the independent variables and the dependent variable. Two types of panel data models are considered in the analysis: Fixed Effects (FE) and Random Effects (RE). The Fixed Effects model assumes that individual-specific characteristics are correlated with the explanatory variables, whereas the Random Effects model assumes no such correlation exists.

To determine the most appropriate model, the Hausman test is conducted. Based on the results of this test, the Random Effects model is selected for the final estimation. Additionally, the methodology incorporates control variables—namely the cost-to-income ratio and bank size—to enhance the robustness of the analysis. These control variables help isolate the specific impact of FinTech-related factors on profitability by accounting for other influences on the dependent variable.

Overall, the research design is carefully established to ensure that the study generates trustworthy, valid, and meaningful data. By combining quantitative methodologies, empirical research, and panel data techniques.

4.3 Data Sources

The study is based on secondary data, which has been acquired from:

- * Annual reports of selected commercial banks
- * Published financial statements
- * Bangladesh Bank reports and webpages

The data covers a specified time range (e.g., 2019-2023) based on availability.

4.4 Sample Selection

The study involves chosen commercial banks operating in Bangladesh. A total of 15 banks are considered, including state-owned, commercial, and Islamic banks to ensure diversity and better analysis.

Although the sample does not cover all commercial banks in the country, it provides a representative overview of the sector. The selected banks reflect varied sizes, operating structures, and levels of FinTech engagement. This variation is significant for studying how different factors influence profitability. The selected commercial banks are:

Sonali Bank PLC, Janata Bank PLC ,City Bank PLC, Duch Bangla Bank PLC ,Prime Bank PLC
Brac Bank PLC, Bank Asia PLC, United Commercial Bank PLC ,National Credit and Commerce
Bank PLC(NCC) ,Dhaka Bank PLC ,First Security Islami Bank PLC ,Shajalal IslamIc Bank
PLC, Jamuna bank PLC, Mercantile Bank PLC International Finance Investment and Commerce
Bank PLC.(IFIC).

4.5 Variables of the Study

Variable	Definition	Expected Sing
Return on Assets (ROA)	Return on Assets (ROA) is a financial performance indicator used to evaluate how effectively a company or bank utilizes its total assets to generate earnings. It measures the amount of net profit earned for each unit of assets owned, thereby reflecting the efficiency of asset management in producing income.	Not applicable
Number of ATMs (ATM)	The number of Automated Teller Machines (ATMs) shows the extent of banking automation and accessibility. Its measure by utilizing natural logarithms of total number of ATMs operated by each bank. An increasing number of ATMs boosts client convenience, reduces transaction costs, and improves service efficiency. Therefore, an increased number of ATMs is predicted to positively improve bank profitability.	Positive
Number of Agent Banking Outlets (Agent)	This variable measures the extent of agent banking services provided by banks. Its measure by using natural logarithms of total number of agent outlets. It promotes financial inclusion by reaching unbanked populations. Although it may increase customer base and deposits, the impact on	Positive

	profitability may vary depending on operational costs and efficiency.	
Number of Online Branches	This variable shows the level of digital banking services supplied by the bank. Its measure by applying natural logarithms of total number of online or internet-based banking service points. Online banking allows clients to execute transactions anytime and anywhere. It lowers dependent on physical branches and improves service speed and efficiency. A bigger number of online branches suggests stronger digital adoption, which is likely to positively influence profitability in the long run.	Positive
Cost-to-Income Ratio (CTIR)	The cost-to-income ratio assesses the operational efficiency of a bank. This ratio illustrates how much expenditure is incurred to earn a unit of income. A larger ratio suggests higher costs and lesser efficiency, which negatively affects profitability. Therefore, CTIR is likely to have a negative connection with ROA. CTIR calculate measure by total operating expense divested by total operating income.	Negative

Bank Size	Bank Size refers to the overall scope or extent of a bank's operations, usually defined by the total assets it owns. It measure by utilizing natural logarithms of total asset. It represents how large or small a bank is in terms of its financial capacity, market share, and ability to issue loans. Bank Size plays a significant influence in determining a bank's ability to expand its loan portfolio. Larger banks, due to their better resource base, capital strength, and reputation, often experience faster loan growth rates, while smaller banks face limits that limit loan expansion.	Positive
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Table :1 Variables Explanation

4.6 Model Specification

To investigate the relationship between FinTech and bank profitability, the study uses a panel regression model. The model is specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 ATM_{it} + \beta_2 Agent_{it} + \beta_3 Online_{it} + \beta_4 CTIR_{it} + \beta_5 Size_{it} + \epsilon_{it}$$

Where:

i = Bank

t = Time period

β \beta = Coefficients

ϵ \epsilon = Error term

In this model, ROA represents the dependent variable, whereas ATM, Agent, and Online represent the independent factors associated to FinTech adoption. This approach allows the study to evaluate

both the direction and amplitude of the association between variables. Panel data models are particularly important since they allow the study to assess both cross-sectional and time-series variations. Two types of models are considered: Fixed Effects and Random Effects. The Fixed Effects model posits that individual-specific features are correlated with the independent variables, while the Random Effects model assumes no such association. The adoption of a panel regression model increases the accuracy of the results by including both cross-sectional and time-series variations. It also assists in managing unobserved variability among banks. Overall, the model is suitable for meeting the aims of the study.

4.7 Data Analysis Technique

In this study, various statistical and econometric techniques are used to analyze the relationship between FinTech variables and bank profitability in Bangladesh. The analysis is conducted using Stata, which is widely used for panel data analysis. The techniques applied in this study include descriptive statistics, correlation analysis, panel regression models, Hypothesis test, Multicollinearity test, Autocorrelation test.

Overall, this study uses a combination of descriptive statistics, correlation analysis, and panel regression techniques to analyze the data. Additional tests such as multicollinearity, heteroskedasticity, and autocorrelation are conducted to ensure the validity and reliability of the results. The use of these techniques provides a comprehensive understanding of the impact of FinTech on bank profitability.

4.8 Hypothesis Development

Formulating hypotheses is an essential part of empirical research, as it provides a structured framework for examining relationships between variables. In this study, the hypotheses are developed based on relevant theoretical foundations and previous empirical findings related to financial technology (FinTech) and bank profitability in Bangladesh.

The research primarily investigates the effect of key FinTech indicators—such as the number of ATMs, agent banking outlets, and online banking branches—on bank profitability, measured by

Return on Assets (ROA). Additionally, control variables including the cost-to-income ratio and bank size are incorporated to improve the accuracy and reliability of the analysis.

Based on these considerations, the following hypotheses are proposed:

H₁: The number of ATMs has a positive effect on ROA

H₂: Agent banking outlets have a significant effect on ROA

H₃: Online banking branches have a positive effect on ROA

H₄: The cost-to-income ratio has a negative effect on ROA

H₅: Bank size has a significant effect on ROA

H₁: The number of ATMs has a positive effect on ROA

Automated Teller Machines (ATMs) are one of the earliest forms of FinTech in the banking sector. They provide 24/7 banking services, reduce the need for physical branches, and improve customer convenience. The availability of ATMs allows customers to perform basic transactions such as cash withdrawal, deposits, and balance inquiries without visiting a bank branch.

From a theoretical perspective, the use of ATMs reduces operational costs by minimizing the need for human resources and physical infrastructure. It also increases transaction efficiency and customer satisfaction, which can lead to higher customer retention and increased transaction volume. As a result, banks can generate more income with lower costs.

Empirical studies have found a positive relationship between ATM expansion and bank profitability. Therefore, it is expected that an increase in the number of ATMs will positively influence ROA.

H₂: Agent banking outlets have a significant impact on bank profitability (ROA)

Agent banking is a major FinTech invention that expands financial services to rural and neglected communities. Through agent outlets, users can obtain basic banking services such as deposits, withdrawals, and cash transfers without visiting a branch. This strategy promotes financial inclusion and expands the customer base of banks.

From a theoretical point of view, agent banking helps banks cut operating expenses involved with creating additional branches. It also helps banks to reach previously unbanked communities, increasing deposits and transaction volumes. However, the profitability impact of agent banking may not always be immediate, as early setup and operational costs can be substantial. Previous research indicate varied results about the effect of agent banking on profitability. Some studies find a favorable benefit due to increased outreach, while others find minor or negative effects in the short run.

H₃: Online banking branches have a positive impact on bank profitability (ROA)

Online banking is a significant component of modern FinTech, allowing users to execute transactions using digital platforms without visiting physical banks. It delivers convenience, speed, and accessibility, which enhances client satisfaction and reduces transaction time. From an economic perspective, online banking decreases operational expenses by decreasing the need for physical equipment and staff. It also boosts efficiency and enables banks to serve a large number of consumers concurrently

However, the introduction of internet banking demands significant investment in technology, cybersecurity, and system maintenance. Therefore, the impact on profitability may vary depending on how successfully banks manage these costs.

H₄: The cost-to-income ratio has a negative effect on ROA

The cost-to-income ratio (CTIR) is widely used as an important measure of operational efficiency in the banking sector. It reflects the amount of cost a bank incurs to generate a unit of income. A higher CTIR indicates lower efficiency, as it implies that more expenses are required to produce earnings.

From a theoretical standpoint, increased operating costs lead to a reduction in net profit, thereby negatively affecting overall profitability. Effective cost control and management are therefore crucial for enhancing financial performance. As a result, a lower cost-to-income ratio is generally linked with higher profitability.

Empirical evidence consistently supports this relationship, demonstrating a significant negative association between CTIR and bank performance. This implies that banks that manage their costs more efficiently tend to achieve better financial outcomes.

H5: Bank size has a significant impact on profitability (ROA)

Bank size is an essential aspect that may influence profitability. Larger banks often benefit from economies of scale, better access to resources, and improved technology. These advantages can boost efficiency and increase profitability.

However, excessive scale may also lead to inefficiencies, increased administrative expenses, and managerial complexity. Therefore, the relationship between bank size and profitability is not always obvious.

Empirical evidence provides varied outcomes regarding the effect of bank size on profitability. Some studies reveal a beneficial association, while others find no meaningful impact.

4.9 Study Period

The study covers a specified time period (for example, 2019–2023), which is selected to reflect the recent trends in FinTech and its impact on bank profitability. The chosen period highlights a time of significant digital development in the banking sector of Bangladesh, as institutions have progressively invested in technical infrastructure.

However, the study period is limited to a few years due to data availability limits. A longer time period could provide deeper insights into long-term effects, but the selected period is sufficient to capture short-term correlations between variables.

Overall, the chosen study period assures that the analysis is relevant, up-to-date, and capable of reflecting the current status of the banking sector.

Chapter Five

Data Analysis and Finding

5.1 Descriptive Statistics

Descriptive statistics are used to summarize and describe the basic properties of the dataset. It provides a summary of the variables utilized in the study, including their mean, standard deviation, minimum, and maximum values. The mean represents the average value of a variable, whereas the standard deviation indicates the level of variation or dispersion from the mean. Minimum and maximum values show the range of the data. These statistics help you understand the distribution and consistency of the data.

Descriptive statistics are crucial because they provide initial insights into the dataset and assist detect any unexpected values or outliers. It also facilitates comparison of variables and assures that the data is suitable for further research. In this study, descriptive statistics are computed for all variables, including ROA, ATM, agent outlets, online branches, cost-to-income ratio, and bank size.

Variables	Obs	Mean	Std.Dev.	Min	Max	Skew.	Kurt.
roa	75	.73	.35	.01	1.64	.06	2.63
atm	75	5.22	1.14	3.35	8.5	1.29	4.81
noao	75	5.65	1.59	0	8.6	-.20	3.79
noob	75	5.71	1.26	3.21	8.2	.34	2.21
ctir	75	56.12	11.29	41.8	87.13	1.20	3.89
size	75	13.13	1.10	11.2	21	4.80	35.03

Table: 2 Descriptive statistics

The mean value of ROA is 0.73, which represents the average profitability of the banks. The standard deviation is 0.35, demonstrating moderate heterogeneity among banks. The minimal

number is 0.01 and the maximum is 1.64, which implies that profitability varies across banks. The skewness (0.06) shows the data is approximately symmetric, whereas kurtosis (2.63) supports a normal distribution. The average number of ATMs is 5.22, with a standard deviation of 1.14, indicating substantial dispersion. The minimum and highest values are 3.35 and 8.5, respectively. The positive skewness (1.29) reveals that the data is slightly right-skewed, and kurtosis (4.81) implies a relatively peaked distribution. The average number of agent outlet is The mean value is 5.65, with a considerably higher standard deviation of 1.59, indicating greater variety among banks. The minimal value is 0, implying some banks have no agent outlets. The skewness (-0.20) reveals modest left skewness, while kurtosis (3.79) indicates moderate distribution shape. The average value number of online branch is 5.71, with a standard deviation of 1.26. The minimum is 3.21 and maximum is 8.2, suggesting diversity in digital adoption. The skewness (0.34) shows slight right skewness, while kurtosis (2.21) suggests a generally normal distribution. The mean value of cost to income ratio is 56.12, which represents the average operational expense level of banks. The standard deviation is 11.29, demonstrating significant variation. The minimum and maximum values are 41.8 and 87.13, respectively. The positive skewness (1.20) indicates right-skewed data, and kurtosis (3.89) shows a somewhat peaked distribution. The mean value of bank size is 13.13, with a standard deviation of 1.10, showing relatively minimal fluctuation. The minimum and highest values are 11.2 and 21, respectively. The skewness (4.80) reveals severe right skewness, and kurtosis (35.03) suggests extreme peakedness, implying the presence of outliers. Overall, the descriptive statistics indicate that the variables have reasonable variation and are suitable for further study. Most variables indicate modest dispersion, and there is no dramatic abnormality except mild skewness in few cases. This shows that the dataset is eligible for regression analysis.

5.2 Correlation Matrix and VIF

Correlation analysis is used to examine the strength and direction of the relationship between variables. It helps to identify whether independent variables are positively or negatively related to the dependent variable.

The correlation coefficient ranges from -1 to +1. A value close to +1 indicates a strong positive relationship, while a value close to -1 indicates a strong negative relationship. A value near zero

suggests no relationship between variables. In addition, correlation analysis helps to detect may affect the reliability of regression results. Therefore, this analysis is important before conducting regression.

Variables	roa	atm	noao	noob	ctir	size	VIF Factor
roa	1.000						
atm	0.4333	1.000					1.33
noao	-0.043	0.366	1.000				1.27
noob	-0.131	0.405	0.356	1.000			1.90
ctir	-0.534	0.100	0.284	0.537	1.000		1.92
size	-0.431	0.176	0.207	0.554	0.635	1.000	1.88
Main VIF							=1.66

Table: 3 Correlation Matrix and VIF

The pairwise correlation matrix indicates that most of the variables have moderate relationships with each other. The dependent variable (roe) shows a moderate positive correlation with atm (0.433), while it is negatively correlated with ctir (-0.534) and size (-0.431). This suggests that increases in ctir and size are associated with decreases in roa.

Among the independent variables, noob has a strong positive relationship with ctir (0.537) and size (0.554). Additionally, ctir and size exhibit the highest correlation (0.635), indicating a potential multicollinearity issue in the regression model. However, most other correlations are below 0.7, suggesting that severe multicollinearity may not be present.

To examine the presence of multicollinearity among the independent variables, the Variance Inflation Factor (VIF) test was conducted using the estat vif command in Stata. Multicollinearity arises when two or more explanatory variables in a regression model are highly correlated, which can distort the estimated coefficients and reduce the reliability of the results.

The VIF values for all independent variables included in the model are presented in the table. The results show that the VIF values for wctir, wnoob, wsize, watm, and wnoao are 1.92, 1.90, 1.88, 1.33, and 1.27 respectively. Additionally, the mean VIF of the model is calculated as 1.66.

According to standard econometric guidelines, a VIF value greater than 10 is considered indicative of serious multicollinearity, while values between 5 and 10 suggest moderate multicollinearity. In contrast, VIF values close to 1 indicate very low correlation among the variables. In this study, all VIF values are well below the commonly accepted threshold of 5, and even significantly lower than 10.

This clearly indicates that there is no significant multicollinearity problem among the independent variables. Moreover, the mean VIF value of 1.66 further strengthens this conclusion, confirming that the overall model is free from multicollinearity concerns.

Therefore, it can be concluded that the regression model satisfies the assumption of no multicollinearity, ensuring that the estimated coefficients are stable, reliable, and suitable for further analysis and interpretation.

5.3 Hausman Test

The Hausman test is an econometric test used in panel data analysis to determine whether the Fixed Effects (FE) model or the Random Effects (RE) model is more appropriate for the study. The main purpose of the Hausman test is to check whether there is any correlation between the individual-specific effects and the independent variables. If such correlation exists, the Fixed Effects model is more appropriate. Otherwise, the Random Effects model is preferred.

Hausman test	Prob >chi2
roa	1.00

Table: 4 Hausman test

As the p-value for roa is 1.000 which is excess of 5% levels of significance, therefore the random effects model is an efficient for the study compared to the fixed effects model. For this reason, the analysis adopt the Random Effects model. The Hausman test is undertaken to find the optimum panel data model between Fixed Effects and Random Effects. The test result indicates a chi-square value of 0.00 with a probability value of 1.0000, indicating that the null hypothesis cannot be rejected. Therefore, the Random Effects model is selected.

5.4 Random Effect Regression Analysis

The regression study is undertaken to assess the impact of FinTech variables on bank profitability (ROA) in Bangladesh. The independent variables are ATM (atm), agent outlets (noao), online branches (noob), cost-to-income ratio (ctir), and bank size (size). This section shows the results of the random effect regression analysis on the Impact of fintech on Bank profitability of Bangladesh commercial banks .The regression analysis findings of the model is shown in Table 5

Variables	Coefficient	t-value	p-value	Significant
atm	.157	5.77	0	***
noao	-.019	-0.91	.366	
noob	-.018	0.59	.557	
ctir	-.013	-3.89	0	***
size	-.155	-2.50	.015	**
Constant	2.662	3.81	0	***
Mean dependent var	.722	SD dependent var	1.240	
R-squared	0.58	Number of obs	75	
F-test	18.137	Prob>F	0.001	

Table 5: Random Effect Regression Analysis

The regression results presented in the table examine the effect of FinTech-related variables on bank profitability, measured by Return on Assets (ROA). The overall model is statistically significant, as indicated by the F-statistic (18.137) and its corresponding probability value ($\text{Prob} > F = 0.001$). The R-squared value of 0.58 suggests that approximately 58% of the variation in ROA is explained by the selected independent variables.

Among the explanatory variables, the number of ATMs demonstrates a positive and highly significant impact on profitability ($\beta = 0.157$, $p = 0.000$). This finding implies that increased ATM deployment contributes positively to bank performance. In contrast, agent banking (noao) shows a negative but statistically insignificant effect ($p = 0.366$), indicating that it does not have a meaningful influence on ROA within the study period. Similarly, online banking branches (noob) exhibit a positive but insignificant relationship with profitability ($p = 0.557$).

The cost-to-income ratio (ctir) is found to have a negative and statistically significant effect ($\beta = -0.013$, $p = 0.000$), confirming that higher operational costs reduce bank profitability. Bank size also shows a negative and significant relationship with ROA ($\beta = -0.155$, $p = 0.015$), suggesting that larger banks may face efficiency-related challenges.

Overall, the findings indicate that ATM expansion plays a significant role in enhancing profitability, while effective cost management remains crucial. Other FinTech variables, such as agent banking and online banking, do not exhibit a significant short-term impact on profitability.

In summary, the results confirm that ATM usage positively influences ROA, whereas higher cost-to-income ratios and larger bank size negatively affect profitability. However, agent banking and online banking variables are not statistically significant in explaining variations in bank performance within this analysis.

5.5 Findings of the Study

Positive Impact of ATM on Profitability

The study reveals that the number of ATMs has a favorable and statistically significant impact on bank profitability. This suggests that increasing ATM availability improves customer convenience, decreases operating burden on branches, and enhances transaction efficiency. As a result, banks are able to produce larger returns on assets.

Insignificant Impact of Agent Banking

The data demonstrate that agent banking outlets do not have a substantial impact on profitability. Although agent banking helps improve financial inclusion and reach rural customers, its contribution to profitability is not immediately obvious. This may be due to initial setup expenditures and operational issues.

Insignificant Role of Online Banking

Online banking is found to have a favorable but statistically negligible link with ROA. This shows that while digital banking services are developing, their effect on profitability may take time to emerge. Factors such as client acceptance rate and technology investment may influence this outcome.

Negative Impact of Cost-to-Income Ratio

The cost-to-income ratio has a strong negative and considerable impact on profitability. This finding demonstrates that increased operating costs diminish bank efficiency and profitability. Therefore, cost management is a vital aspect for enhancing financial success.

Negative Effect of Bank Size

The study reveals that bank size has a negative and significant link with profitability. This suggests that larger banks may encounter inefficiencies, higher administrative costs, and complexity in administration, which can impair overall performance.

The study demonstrates that ATM has a positive and statistically significant influence on bank profitability, showing that increasing ATM usage boosts financial performance. In contrast, agent banking and internet banking do not demonstrate any substantial effect on profitability, suggesting that their benefits may not be immediate.

The cost-to-income ratio has a negative and significant association with profitability, which suggests that higher operational costs impair bank efficiency and performance. Additionally, bank size is revealed to have a negative substantial influence, indicating that larger banks may encounter inefficiencies.

Overall, the results demonstrate that while certain FinTech components contribute positively, operational efficiency remains a crucial factor of bank profitability

Chapter: Six

Conclusion and Recommendation

6.1 Conclusion

This study explores the impact of FinTech variables on the profitability of commercial banks in Bangladesh. The findings reveal that financial technology has a substantial role in influencing bank performance, while its impact differs across different components. The results reveal that ATM has a good and significant effect on profitability, showing that traditional digital banking technologies continue to boost efficiency and customer service. On the other hand, agent banking and online banking do not have a significant impact on profitability, which may be related to high initial investment costs and slower adoption rates.

Furthermore, the cost-to-income ratio has a strong negative association with profitability, underscoring the need of cost efficiency in banking operations. Bank size is also found to negatively effect profitability, indicating that larger banks may have operational inefficiencies.

Overall, the report indicates that while FinTech adoption is vital for the modernization and long-term growth of the banking sector, its effectiveness depends on adequate execution and efficient cost management. Therefore, banks should focus on optimizing their technical investments and minimizing operational costs to ensure sustainable profitability.

Additionally, the study highlights that customer trust and digital literacy play a crucial role in determining the success of FinTech initiatives, as users are more likely to adopt services they understand and feel secure using. It also suggests that regulatory support and a stable policy framework can significantly enhance the effectiveness of financial technologies by reducing uncertainty for both banks and customers. Moreover, collaboration between traditional banks and FinTech firms can foster innovation, allowing institutions to leverage technological expertise without bearing the full burden of development costs.

The findings further imply that investment in cybersecurity infrastructure is essential to protect customer data and maintain confidence in digital platforms. Employee training and organizational adaptability are also important, as the transition to digital systems requires a workforce that is both skilled and responsive to technological change. In addition, rural and underserved areas may

benefit more from targeted FinTech solutions, particularly through agent banking when properly implemented.

6.2 Recommendations

Based on the empirical findings of the study on the influence of FinTech on bank profitability in Bangladesh, the following recommendations are offered to boost the performance and sustainability of commercial banks:

- Increase the ATM network to boost profitability.
- Improve efficiency of agent banking through greater training and supervision.
- Strengthen online banking services for long-term benefits.
- Reduce operational costs by decreasing the cost-to-income ratio.
- Focus on efficiency rather than increasing bank size.
- Adopt a long-term FinTech investing plan.
- Ensure sufficient regulatory support and policies for digital banking.

Limitations of the Study

The limitation of the study are :

1. The study is based on secondary data, which may contain errors or inconsistencies.
2. Only a limited number of banks in Bangladesh are included, so results may not represent the whole sector.
3. The study covers a short time period, which may not reflect long-term trends.
4. Only a few FinTech variables (ATM, agent, online) are used; other important factors are excluded.
5. Macroeconomic variables (e.g., inflation, GDP) are not considered.
6. Some variables are measured using proxies, which may affect accuracy.
7. The Hausman test result had limitations, affecting model selection reliability.

References

1. Annual reports of the selected State Owned Commercial Banks
2. Abu Taher, S., & Tsuji, M., (2022). An Overview of FinTech in Bangladesh. In *Advances in Finance, Accounting, and Economics*, pp. 82–95. <https://doi.org/10.4018/978-1-7998-8447-7>.
3. Ahmad, A. H., Green, C., & Jiang, F., (2020). Mobile Money, Financial Inclusion And Development: A Review with Reference To African Experience. *Journal of Economic Surveys*, Vol. 34 (4), pp. 753–792. <https://doi.org/10.1111/joes.12372>
4. Ahmed, A., & EnamulHasan, Md. (2021). Bangladesh toward Digital Financial Inclusion: FinTech Experience. *Journal of Entrepreneurship and Business Innovation*, Vol. 8 (2), pp. 33-49. <https://doi.org/10.5296/jebi.v8i2.19115>.
5. Almashhadani, Mohammed and Hasan., (2023). The Impact of FinancialGimpel, H., Rau, D. and Röglinger, M., (2018). Understanding FinTech Start-Ups – A Taxonomy of Consumer-Oriented Service Offerings. *Electronic Markets*, vol.28(3), pp. 245–64. <https://doi.org/10.1007/s12525-017-0275-0>.
6. Gomber, P., Kauman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, vol. 35 (1), pp. 220–265. <https://doi.org/10.1080/07421222.2018.1440766>.
7. Greene, W. H. (2003). *Econometric analysis*. Prentice Hall google schola, 3, 116-125. Gržeta, I., Žiković, S. and Tomas Žiković, I., (2023). Size Matters: Analyzing Bank Profitability and Efficiency under the Basel III Framework. *FinancialInnovation*, vol.9(1), pp. 1-28. <https://doi.org/10.1186/s40854-022-00412>.
8. Hasan, S., M., Tawfiq, T. T., Hasan, M. M., & Islam, K. A. (2024). Corporate governance dynamics in financial institution performance: A panel data analysis. *Investment Management & Financial Innovations*, vol. 21(3), pp. 292-303. [http://dx.doi.org/10.21511/imfi.21\(3\).2024.24](http://dx.doi.org/10.21511/imfi.21(3).2024.24)
9. Wang, Y., Xiuping, S., & Zhang, Q. (2021). Can Fintech improve the efficiency of commercial banks? An analysis based on big data. *Research in International Business and Finance*, 55, 101338.

10. Yakubu, I. N., & Bunyaminu, A. (2023). Regulatory capital requirement and bank stability in Sub-Saharan Africa. *Journal of Sustainable Finance & Investment*, 13(1), 450-462.
11. Vives, X., (2019). Digital Disruption in Banking. In *Annual Review of Financial Economics* vol. 11 (1), pp. 243–272. <https://doi.org/10.1146/annurev-financial-100719-120854>.
12. Wang, P., Zheng, H., Chen, D. and Ding, L., (2015). Exploring the critical factors influencing online lending intentions. *Financial Innovation*, vol.1, pp.1-11.<https://doi.org/10.1186/s40854-015-0010-9>.
13. Yang, W., Sui, X. and Qi, Z., (2021). Can Fintech Improve the Efficiency of Commercial Banks? An Analysis Based on Big Data. *Research in International Business and Finance*, vol. 55, pp. 1-12. <https://doi.org/10.1016/j.ribaf.2020.101338>.
14. Mahmud, K., Joarder, M. M. A., and Sakib, K., (2023). Customer Fintech Readiness (CFR): Assessing customer readiness for fintech in Bangladesh. *Journal of Open Innovation: Technology, Market, and Complexity*, invol.9 (2), pp.1-21. <https://doi.org/10.1016/j.joitmc.2023.100032>
15. Md.AlAmin,ShaikhMasrickHasan,(2024)https://www.researchgate.net/publication/385302686_FinTech_Adoption_and_Its_Impact_on_Bank_Profitability_A_Study_of_Bangladeshi_Commercial_Banks
16. Hermuningsih, S., Sari, P. P., and Rahmawati, A. D., (2022). The moderating role of bank size: influence of fintech, liquidity on financial performance. *Journal Siasat Bisnis*, vol.27(1), pp. 106–117. <https://doi.org/10.20885/jsb.vol27.iss1.art8>.
17. Hossain, Md. Imran, Al-Amin, Md. and Toha, Md Abu, (2021). Are Commercial Agent Banking Services Worthwhile For Financial Inclusion?. *Business Management and Strategy*, vol.12(2), pp. 206-227. <https://doi.org/10.5296/bms.v12i2.19070>.Jakšič, Marko, and Mat

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