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IMPACT OF FINANCIAL ENGINEERING INNOVATIONS ON PROFITABILITY: A CASE STUDY ON THE COMMERCIAL BANK OF IRAQ (TBI) FOR THE PERIOD (2012-2021)

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Abstract: *The study objective was to examine the impact of financial engineering innovation on the profitability of commercial banks in Iraq (Trade Bank of Iraq). For this purpose, quantitative data was collected from the annual reports of the Trade Bank of Iraq for the period of 2012 to 2021. The data covered a total of five years before the bank approved the services for the years (2012-2016) and a period of (5) years after the adoption of the bank's new financial innovations (2017-2020) as contemporary sources of financing aimed at achieving efficiency in current financial products and developing them in a way that enhances renewable and diversified financial needs. Various profitability indicators were used namely return on assets, return on equity, earning per share, and gross income profit. The independent sample T-test results show that commercial banks' profitability in Iraq commercial bank after the adoption of financial engineering has a statistical difference. These findings contributed that there is a statistically significant effect of these innovations on the profitability of the bank for all indicators measuring the profitability of the Trade Bank of Iraq for the period before and after the use of financial innovations. The study limitations and future directions were also discussed after the conclusion of the study.*

Keywords: *Financial engineering innovations, Traditional financial tools, Profitability, Decision Making.*

1. Introduction

Financial engineering is integral in modern finance through providing advanced technologies and innovative solutions to handle difficult challenges (Finnerty, 1988). It consists of a multidisciplinary approach which consists of technology advancement, financial theory, statistical analysis, and mathematical modeling (Ruppert & Matteson,

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2011). These tools facilitate better risk management, efficient allocation of resources, and market optimization (Park & Sharp, 2021). As the global market becomes complex and interconnected, so here financial engineering also becomes essential for creating strategies that mitigate systemic risk to increase firms' profitability (Gryglewicz & Mayer, 2023). The firm could hedge its funds through derivatives which provide a firm's ability to hedge against market volatility and fluctuations in exchange rates that could give financial benefits to the organizations (Lien, 2022). This capacity to transform theoretical insights through technological advancement could insights into actionable strategies that allow businesses, investors, and policymakers to better manage financial risks that can enhance firms' profits (Abd Ali & Smaoui, 2023). These previous studies emphasized that financial engineering is an important component in increasing the profitability of the organization.

In this regard, due to little attention to financial engineering practices in the organizations could lead to adverse consequences to the financial institutions in their long-term stability (Acharya et al., 2009; Xu, 2024). Historically, in the 2008 financial crisis, various also emphasized the importance of effective financial engineering, where the failure to properly assess and manage risks within structured financial products had devastating repercussions on the global economy (Tavakoli & Hosseini Nourzad, 2020). Without appropriate financial engineering frameworks, markets are left more vulnerable to speculative bubbles, sharp downturns, and sudden collapses in asset values. Institutions lacking robust risk management tools may experience liquidity crises, capital depletion, or insolvency, ultimately destabilizing the financial system as a whole (Allen, 2020). Furthermore, the absence of innovations in financial products could hinder the competitors limit access to diversified investment options, and reduce the overall resilience of the financial market. Regulatory bodies may also struggle to keep pace with emerging financial complexities, further exacerbating vulnerabilities. As such, if the organizations neglect financial engineering then it could lead to market inefficiencies which can increase systemic risk, and weaken investor confidence could lead to dampens in performance and economic growth (Ullah et al., 2024).

Therefore, attention towards financial engineering is an important concern for organizations to sustain their performance long term. It has been further emphasized by Onita and Ochulor (2024) that financial engineering significantly increased the profitability of organizations by optimizing financial strategies and operational efficiency across different market segments. Through structured financial instruments, derivatives products, and portfolio optimization techniques, financial engineers can enhance resource allocation, reduce the cost of capital, and generate superior risk-adjusted returns for investors (Imerman & Fabozzi, 2020) which could lead to improving the performance of the organizations. For example, the use of derivatives like options, futures, and swaps allows organizations to hedge against unpredictable risks, reducing potential losses and enabling more predictable cash flows that increase the profitability of the organizations (Li et al., 2024). Moreover, financial engineering also enables them to increase the financial products to specific client needs increasing market penetration, enhancing customer satisfaction, and generating new revenue streams (Sjol, 2023). Structured products like collateralized debt obligations (CDOs) and asset-backed securities (ABS) exemplify how financial engineering can transform illiquid assets into tradable securities, unlocking liquidity and increasing the profitability of organizations (Dhar et al., 2023). Furthermore,

through data-driven analytics and quantitative modeling, firms can identify emerging market trends, capitalize on profitable opportunities, and achieve sustainable competitive advantages. This, in turn, drives improved shareholder value, fosters innovation, and positions firms for long-term growth (Islam et al., 2023). These previous studies emphasize that financial engineering is an important factor that could increase the profitability of organizations. Therefore, the study focused on the relationship between financial engineering and profitability.

Along with the significance of financial engineering for financial performance. There are still various gaps between the practical application of financial engineering and its impact on profitability that could be explored in the current study. For instance, previous studies conducted on financial engineering products, such as derivatives and structured securities, have at times introduced systemic risks and ethical dilemmas in financial markets (Mądra-Sawicka, 2022), (Islam et al., 2023), (Li et al., 2024) and (Tavakoli & Hosseini Nourzad, 2020) but these studies have little attention profitability impact. Furthermore, extant studies also have a descriptive nature of studies or content analysis but previous studies have little attention on the hypothesis (Gryglewicz & Mayer, 2023; Onita & Ochulor, 2024; Xu, 2024). In other contexts, previous studies also majorly focused on other countries with limited attention on Iraq's banking sector. Furthermore, there is a lack of universally accepted standards for measuring and quantifying the outcomes of financial engineering strategies, making it challenging for firms and regulatory bodies to assess their efficacy (Allen, 2020). The dynamic nature of financial markets also requires continuous innovation, posing a challenge to maintaining transparency, regulatory compliance, and ethical conduct in financial engineering practices. Consequently, addressing these gaps is essential to ensure that financial engineering continues to enhance financial performance without compromising market stability and integrity. Therefore, the study aimed to test the impact of financial engineering in the context of Iraq's banking sector. This research objective by four research questions.

1. Have financial engineering innovations contributed to enhancing the return on assets of the Commercial Bank of Iraq?
2. Have financial engineering innovations contributed to enhancing the return on equity of the Commercial Bank of Iraq?
3. Have financial engineering innovations contributed to enhancing the earnings per share of the Bank of Commerce of Iraq?
4. Have financial engineering innovations contributed to enhancing the gross income margin of the Commercial Bank of Iraq?

The study's significance lies in that this study brought theoretical and practical implications that offer valuable insights for practitioners, policymakers, and scholars. The study contributed a body of literature in the context of Iraq's banking sector where extant literature has limited attention. Furthermore, this study also contributed an extended research framework that could help other researchers and policymakers to conduct their research by adding some other variables to increase the strength of financial engineering for further research. Additionally, this study contributes to the broader discourse on financial innovation, shedding light on the ethical considerations and regulatory frameworks necessary to balance innovation with market stability of the banking sector. Furthermore, the study findings also contributed to lies in the fact that it looked at the innovations of financial engineering important in contemporary transactions, where the innovations of a new type of special financial tools to provide

liquidity to financial institutions and banks, leads to the development of banking and development. Furthermore, the study could also contribute to guiding policymakers and regulatory bodies that could benefit from these insights by designing policies that promote transparency, ethical behavior, and sustainable growth within the banking sector. Moreover, this research also contributed to emphasizing the need for continuous innovation and adaptation in financial engineering practices to address evolving market challenges, ensuring resilience and competitiveness in an increasingly complex global financial environment. The study was further divided into four chapters, a literature review where both theoretical and empirical studies were discussed. The next chapter was related to research methodology and discussed the research design and research approach. The next chapter discussed the data analysis and results. The last chapter consisted of a discussion and implications of the study.

2. Literature Review

Financial engineering growth has been driven through the adoption of artificial intelligence, machine learning, etc which could help to get decisions to the financial analysts and formulation of strategy (Finnerty, 1988). Remillard (2013) further supported this notion and explained that AI and machine learning capabilities big data, identifying market trends, and traditional methods. Companies with these actionable insights could be capable of predicting and forecasting more accurately trends of the organization which improves the returns in the ever-changing environment and these tools could also empower companies to dynamically respond to changing economic conditions (Ye, 2023). In portfolio management, AI helps optimize asset allocation and reduce risk, while data analysis enhances investment decisions by uncovering hidden market patterns (Deepthi & Bansal, 2024; Ionescu & Diaconita, 2023). Additionally, blockchain technology has brought security and innovation, which are particularly advantageous for companies that handle high-value transactions and sensitive customer data (Bekti et al., 2021). By eliminating intermediaries, blockchain lowers transaction costs and increases transaction speeds, giving companies greater flexibility in managing their financial operations.

In another context, financial engineering has been shaped in the corporate fiancé by making more efficient processes and reducing operational costs (Ye, 2023). These tools streamline cash management, simplify compliance, and improve risk assessment. Machine learning models can accurately predict credit risk, which is important for industries like banks, where accurate risk assessment is essential to maintain stability and protect capital. Big data also led to changes in customer segmentation and personalized financial services and enabled organizations to better meet the diverse needs of customers which helps to accelerate companies positioning themselves to compete and agility in the evolving market environment (Zhang et al., 2023). Despite these advantages, the use of financial engineering also presents challenges. Integrating technologies such as AI and blockchain requires significant investments not only in infrastructure but also in human resources and compliance with data privacy and cybersecurity standards (Ye, 2023). As companies embrace these innovations, they face additional pressures to adapt to regulatory changes and protect against cyber threats (Tamimi & Orbán, 2022). Compliance costs can increase dramatically as organizations strive to comply with stricter financial regulations, particularly in areas that require more frequent and transparent reporting (Alamad et

al., 2021).

In addition, if the companies have little attention on the adoption of financial technology in their operation then it could create a difficulty to standardize data flows and maintain consistent business cases (Okoye et al., 2023). In this scenario, if the companies are unable to address these issues properly then they could face inefficiencies and increased costs, which can undermine the profitability of the organizations (Koijen & Yogo, 2021). Therefore, organizations need to focus on financial engineering by developing a proper IT infrastructure and advanced training for their employees. A properly skilled full workforce of employees who can understand technology and economics is needed to bridge the gap between technological innovation and practical use (Bakar et al., 2020). Additionally, given the high risk of data breaches in financial transactions, companies need to prioritize cybersecurity (Bakar et al., 2020). Effective cybersecurity measures, such as blocking decentralized ledger systems, help build customer trust and reduce risks (Mandala et al., 2023). Through investment in cybersecurity, companies can protect sensitive data and ensure that the benefits of financial engineering innovations are not compromised by security vulnerabilities. Companies that focus on creating an adaptable, secure, and innovation-friendly environment can increase their company's profitability (Setiawan et al., 2022). These studies have shown that financial engineering is an integral component of increasing the profitability of organizations.

Furthermore, various empirical studies have been conducted where they found the positive and significant of financial technology on the financial performance which is highlighting how technology can facilitate economic activity. Bai et al. (2022) conducted a study on digital transformation and found that digital transformation increases the profitability of the organization. They also argued that further research could be explored on other countries where the banking sector contributes to the social and economic development adequately. This efficiency is attributed to automated financial analysis, which reduces errors and speeds up decision-making. Markov et al. (2022) further found that the adoption of financial engineering solutions reduces transaction costs and improves customer service, ultimately increasing profitability. These findings emphasize the importance of continuous innovation in financial technology, as firms adopting advanced technologies are more likely to report improved financial performance and greater resilience to market fluctuations. Hammami et al. (2023) further highlighted that financial engineering has enabled businesses to analyze customers in real time and optimize their services accordingly, improving customer satisfaction and loyalty. Digital tools also simplify financial reporting, making it easier for businesses to fulfill legal requirements while saving time and resources. This shift to data-driven finance has proven particularly beneficial in areas such as banking, where personalized financial products help retain customers and increase revenue (Alhawamdeh et al., 2024). In other studies, it was also found that financial technology has a significant influence on the profitability of the companies and they further argued that companies should continue to innovate and integrate these technologies then they often increase their profitability more effectively and increase their products (Hammami et al., 2023; Hongxina & Mingming, 2024).

Financial engineering innovation and profitability relationship further also found in various studies with the emphasis on financial engineering innovations. Kim (2022) found that financial engineering through advancement in technology has a positive

and significant impact on profitability. B et al. (2022) further found that companies that were initially slow to adopt digital finance tools AI-driven inventory management together with blockchain has now made the supply chain transparent they are facing the issue of growth which also hinders their performance. They further argued that companies should focus on innovation which could improve economies of scale and reduce reliance on manual operations, which translates into reduced errors and faster processing times. This argument is further supported by the findings of Ullah et al. (2024) who argued that financial engineering is an important indicator of increasing the profitability of the organizations. In other study also found the positive impact of financial engineering on profitability. They also argued that financial engineering helped firms to increase their productivity effectively which could enhance the competitive advantage of the organization along with profitability (Ionescu & Diaconita, 2023; Zhang et al., 2023). Further study also found the significance of financial engineering for profitability where they also recommended that the adoption of financial technological innovations is not only a means of increasing profits but also a means of achieving sustainable development. As companies develop flexible and flexible financing strategies, then they are better equipped to meet market challenges (Mandala et al., 2022).

(Ionescu & Diaconita, 2023; Zhang et al., 2023) also further found the importance of financial engineering for the organization's performance. They also recommended that companies should focus on the latest technologies that could help to provide robust strategies such as risk assessment, credit scoring, and portfolio management which could facilitate to take good decisions in line with market conditions. In other study found that blockchain technology further reduces transaction costs by eliminating middlemen and increasing transparency, which builds trust among stakeholders and reduces compliance costs (Mandala et al., 2022). These tools also improve scalability, allowing enterprises to handle higher transaction volumes with fewer additional costs. By integrating such advanced technologies, companies can achieve sustainable financial performance, higher profitability, and improved flexibility in a competitive market. These previous studies have shown that financial engineering is an important factor that helps to improve profitability. Extant studies majorly focused on the impact of financial engineering on other variables but have little attention in the context of Iraq. Therefore, a study has formulated the following research hypothesis below.

H1: *There is a statistically significant difference on the profitability of the Trade Bank of Iraq for the period before and after the adoption of financial engineering innovations.*
H1a: *There is a statistically significant difference in the return on assets of the Commercial Bank of Iraq for the period before and after the adoption of financial engineering innovations."*
H1b: *There is a statistically significant difference in the return on equity of the Commercial Bank of Iraq for the period before and after the adoption of financial engineering innovations.*
H1c: *There is a statistically significant difference in the return on earnings per share of the Commercial Bank of Iraq for the period before and after the adoption of financial engineering innovations."*
H1d: *There is a statistically significant difference in the gross income margin of the Commercial Bank of Iraq for the period before and after the adoption of financial engineering innovations."*

3. Research Methods

The research aimed to test the impact of financial engineering on the profitability of commercial banks in Iraq. For this purpose, a quantitative research approach was employed to test the employed. This research approach is considered effective when data is collected in numerical (Verlicchi et al., 2023). Further, the researchers adopted the descriptive and analytical approach in describing and analyzing the basic variables in the research, including measuring the relationship between the research variables, financial engineering innovations (any non-traditional financial product or service provided to customers), and the second variable, profitability, through the use of data in the annual reports of the Trade Bank of Iraq for the period from 2011-2021. The longitudinal research design was adopted because data was collected in different time frames and this is considered to be good when data is collected in different time frames (Davies, 1994).

3.1 Study Population

Research conducted on one commercial bank is the Iraqi Trade Bank (TBI) (Trade Bank Iraq), Iraqi government bank established in 2003 in Baghdad as an independent government entity to facilitate the import and export of goods and services to and from Iraq to serve the national economy, taking into account the economic importance of trade in revitalizing the Iraqi economy and stimulating it to achieve long-term growth (Saber Said Al-Delawi, 2019) and the reasons for choosing this bank as a case study are QIB is one of the leading banks in the Middle East in the trade and investment finance sectors. The most experienced and confident in the field of banking in Iraq, where it has achieved rapid growth since its establishment to become one of the leading and effective institutions in the banking sector. The bank has established a global network of correspondent banks and built strong relationships with international banks. Owns correspondent banks numbering more than 428 banks located in 108 cities and covering (95) countries worldwide. One of the first Iraqi banks to obtain credit lines from international banks with a high financial reputation, despite Iraq's lack of credit rating.

3.2 Operationalization of the Variables

The following definitions have been adopted for research purposes:

A. Financial engineering innovations: It means generating or creating new financial instruments and devising means to meet the needs of investors or finance seekers and what the customer desires, which the current methods cannot meet (Bobrikova & Harčariková, 2017; Bolonin et al., 2021).

B. Profitability: One of the most important financial indicators used in evaluating the performance of commercial banks, as it can measure the ability of the commercial bank to achieve a net return on the invested funds, which means that these indicators focus on profit, which is the effective axis in the continuation and expansion of commercial banks, through the pivotal role played by the profits obtained in achieving the continuous growth of banks, which enhances their ability to survive and compete and thus stability by enhancing the confidence of customers and dealers with the commercial (Salazar et al., 2023). The profitability has been conceptualized through the following indicators.

3.2.1 Return on Assets (ROA)

This equation shows the extent of the bank's ability to manage and invest assets in a way that generates profits during a certain period, and whenever the ratio is high, it indicates the efficiency of the bank in investing its assets and its ability to control costs to ensure the achievement of a high profit margin level and the ratio is calculated according to the following equation:

ROA = net income / total assets

3.2.2 Return on Equity (ROE)

This ratio refers to the level of return achieved from the funds of the owners of the right ownership and is considered one of the most important profitability ratios used because based on which the owners decide to continue the activity or transfer the funds to other investments that generate more return and the ratio is calculated according to the following equation:

ROE=Net income/equity

3.2.3 Earnings Per Share (EPS)

Used to know the amount of return for each dinar invested in the operations and activities of the bank for the funds of the holders of ordinary shares, and the percentage is calculated according to the following equation.

EPS =Net income/equity

3.2.4 Gross Income Margin

This percentage refers to the remaining percentage of each dinar of the revenues achieved by the bank from the assets and the increase of this percentage means the ability of the assets to generate profits and the ratio is calculated according to the following equation (Andrianto & Amin, 2023).

4. Data Analysis and Results

Table 1 shows the results of testing the sub-hypotheses of the research, which were based on the data included in the annual financial reports of the Iraqi Trade Bank for the years researched. It is noted in the table that the bank's profitability after relying on financial engineering tools was high compared to its profitability before using financial engineering tools, as it reached a percentage The change in the average return on assets index (222.7%), as it is noted that this index during the years before the use of innovations was close in percentages, while noticeable changes were recorded during the years after the use of innovations, especially in the year (2021), by an amount of (6%), which is a high percentage. Compared to other years, this means that the bank relies on a good level of these innovations. As for the second indicator of profitability indicators, which is the return on equity, as the percentage of change in the average return on equity index reached (11%), it turns out that this indicator during the years After using the innovations, it was higher than it was before using those innovations, as the average percentage after use was (7.24) and before use was (6.52). This is a noticeable increase due to the use of financial engineering innovations in the bank's various activities. The percentage of change in the average also reached

The net income index based on the number of shares (137%), as the change appears significantly in this index after the use of innovations by (56.62), while the average of this index before use was (23.79), that is, by double after use, which was greatly reflected in the change index. relative to it, while the percentage change in the average index of net income on sales was (48%), where the average index during the years before the use of innovations was recorded at (5.5%), while the average index after using innovations was recorded at (8.1%), which is evident. The increase in this indicator in turn was reflected in its relative change index. We generally conclude an increase in profitability indicators through a comparison between before and after the bank's use of financial engineering tools, for all years studied.

Table 1: Analysis of profitability before using financial engineering for the period (2012-2016) and after using financial engineering for the period (2017-2021)

Financial Index	How long before financial engineering innovations are used						Duration after using financial engineering innovations						Percentage change in the general mean
	2012	2013	2014	2015	2016	Average	2017	2018	2019	2020	2021	Average	
Return on assets	%4.4	%3.1	%1.5	%2.0	%1.7	%2.2	%2.1	%2.4	%1.4	%1.2	%6	%7.1	%222.7
Return on equity	%9.9	%5.4	%4.9	%6.8	%5.6	%6.52	%5.4	%8.8	%6.4	%8.5	%7.1	%7.24	%11
Earnings per share	33.667	25.036	14.823	15.117	30.311	23.790	39.69	43.45	26.12	32.03	141.8	56.62	%137
Return on sales	%8.4	%5.1	%4.3	%5.5	%4.2	%5.5	%4.1	%5.6	%3.8	%5.3	%2.1	%8.1	%47.2

Source: Author's Estimation

From the foregoing, we can note in Table 1 that the profitability indicators for all years before and after the use of financial engineering tools were varying ratios among themselves in rise and fall, as the researcher sees despite the emergence of financial engineering tools, but they were not widely approved by the bank and at the same time dealers with the bank were not sufficiently aware of the positives of their use, While we notice, for example, in the year 2021 with regard to the four indicators, they were higher compared to other years, and it can be attributed to the increased use of these innovations such as electronic sukuk, the adoption of some types of financial derivatives, and the emergence of some securitization cases, and what coincided during the study years, the use of financial engineering began in the various outlets served by this bank, and education increased to the need to adopt these products, whether for financial engineering or financial engineering of all kinds, This reflected positively on the financial performance of the bank represented by enhancing its profitability and improving its financial position and thus achieving a state of financial stability in its current business environment.

Furthermore, Table 2 results show that there are statistically significant differences before and after using financial engineering tools for all profitability indicators, where the level of morale for the test (t) and all hypotheses is less than the level of moral hypothesis in the research (0.05), which means that there is a significant

impact on the profitability of the bank resulting from the bank's use of financial engineering tools in its various operations and activities, so accept all sub-hypotheses approved in the research, which entails He must accept the main hypothesis, which states that "there is a statistically significant difference on the profitability of the Commercial Bank of Iraq for the period before and after the adoption of financial engineering innovations. The above results are predicted in the following Table.2 below.

Table 2: Paired Sample T-test results for research hypotheses

Hypothesis	T Calculated	Sig. Calculated morale level	Resolution
First sub-hypothesis	5.245	0.0012	Acceptance
Second sub-hypothesis	5.672	0.000	Acceptance
Third sub-hypothesis	4.546	0.000	Acceptance
Fourth sub-hypothesis	6.670	0.000	Acceptance

Source: Author's Estimation

5. Discussion

Financial engineering is important for banks because it enables them to innovate financial products, change risk management, and increase returns. Banks can improve profitability by taking action on financial technology. It also helps banks adapt to changing market conditions, giving them a competitive edge and more efficient capital allocation. Therefore, the study objective is to test the impact of financial engineering on the profitability of commercial banks in Iraq. For this purpose, a quantitative research approach was employed to test the employed. The study findings show that financial engineering has a positive and significant effect on the profitability of commercial banks in Iraq before and after adoption. These findings show that in Iraq banks after the adoption of financial engineering practices banks have increased their profits. The result is consistent with the study of Sjol (2023) who found that with the analysis of the transformational potential of new financial technologies in the banking industry, through improved risk management the supply chain has been enhanced with improved productivity. The results are further in line with the study of Chikwira (2021) where they found that through the use of innovations such as derivatives, structured financial products, and risk-hedging instruments, banks tend to achieve increased earnings and reduced vulnerability to market fluctuations, eventually leading to performance. These findings emphasized that Iraqi banks should focus on financial engineering practices because banks with financial engineering could be able to facilitate diversification, whereby banks can adapt to changing market requirements, and significantly strengthen their competitive advantage.

Further hypothesis results have shown that the financial engineering and return on assets relationship has a statistically significant difference in the return on assets of the commercial banks of Iraq before and after the adoption of new financial technologies. The results is supported by the study Imerman and Fabozzi (2020) which they found that companies with the adopt of the latest technologies in their operations increase their performance. They also further argued that organizations should focus on financial technologies that can effectively improve asset management through strategies such as safeguards, efficient capital allocation, use of risk-allocation tools, and ultimate growth. The results and arguments are further supported by the

study of Akhmedov et al. (2021) who also found that financial engineering improves asset management and enhances performance because financial engineering helps to risk adjustment in organizations. Further results also show the statistically significant impact of financial engineering on the return on equity of commercial banks in Iraq after the implementation of financial engineering innovation. This paper therefore supports and complements the existing studies that focus on the role of financial engineering(Howells, 2024). Innovations such as securitization, trading derivatives, and enhanced risk management lead to banks' ability to optimize their structure of capital, thus leading to strong performance of equity. A paper presented by Tavakoli and Hosseini Nourzad (2020) evidences that organizations with solid resources financial base use power. These findings underlined that one of the main focuses of Iraqi commercial banks should be the practice of financial engineering in pursuit of better return on equity and other profitability indicators, which in turn will lead to an improvement in return on equity.

Financial engineering and earning per share relationship also found statistical differences after the adoption of financial engineering. These findings show that financial engineering innovation is improved to increase gross profit margins and increase EPS revenue activity (Das et al., 2024). Previous research has shown that financial engineering enables banks to operate more efficiently, generate additional revenue, and adapt more quickly to dynamic market conditions (Broby, 2021). Increased returns through diversification, new financial services, and improved risk management can provide shareholders with higher returns and higher earnings per share. This study shows how financial engineering is a market capitalization combining diversification, and improving revenue growth, which will ultimately benefit investors and stakeholders. The findings enforced that commercial banks in Iraq should emphasize financial engineering to increase their competitive advantage at national and international levels. Further results indicated that the relationship between financial engineering and gross income margin is also a statistical difference that reflects the ability of the bank to increase revenue relative to costs by adopting financial engineering innovations Financial engineering in the enterprise focuses on increasing operational efficiency, reducing transaction costs and expanding revenue-generating activities, leading to improved overall revenue (Cho & Chen, 2021). Through other financial tools such as compositions and controlled derivatives, banks can diversify revenues and alter credit policy analysis so that as Organizations using advanced financial technologies have credit -growth-to-revenue ratio and thus more revenue (Dharmadasa, 2021). This result reinforces the role of financial innovation in flexible business processes that could be considered a fundamental tool of any organization's profitability.

Research on the impact of financial engineering on bank profitability highlights its important potential to restructure the economy by stimulating growth and reducing risk. Financial engineering enables banks to produce complex instruments such as goods derivatives, compositions, and risk strategies tailored to meet specific market requirements and authorized to use. This authority not only enables banks to raise additional funds but compels them their ability to manage risks associated with interest rate fluctuations, currency exchange rates, credit exposure, and market volatility Enhanced risk management ensures more predictable financial performance, and stability and it inspires investor confidence. Additionally, financial engineering facilitates asset and liability management by matching the bank’s capital

structure with strategic objectives to optimize capital allocation and reduce cost which increases profitability. It also provides the ability to develop customized solutions relevant to different customer segments improving customer satisfaction loyalty, and market conditions. Finally, financial engineering changes how banks operate, constantly adapting to changing economic conditions, looking for new opportunities, in a highly competitive industry, and being able to make a profit.

6. Implications

The study with significant results contributed from theoretical and practical perspectives. Theoretically, the study contributed to the role of financial engineering in improving bank profitability and performance in specific contexts of Iraqi commercial banks. These results strengthen theories linking financial technical practices to capital allocation and improved productivity and demonstrate the importance of instruments used in economic growth. The study makes further contributions in the context of the Iraqi banking industry because previous studies have little attention to examining financial engineering's impact on profitability. The study within the context of Iraqi commercial banks emphasizes the importance of a broad theoretical approach to the study of financial technology, including market dynamics, regulatory framework, monetary policy, and other contextual factors that determine its adoption and measure its effectiveness. This strong perspective provides a valuable lens for future research, enabling scholars to build on these findings and explore alternative finance innovations in finance within the same or developing ecosystem.

Furthermore, from a practical perspective, this study provides actionable insights for banks, regulators, and policymakers in Iraq who seek to enhance financial performance through innovation. The findings highlight the significant benefits of adopting financial engineering innovations and show that they can improve key profitability indicators and business efficiency. For banks, this means an opportunity to diversify income, reduce costs, and optimize capital structure through a combination of derivatives, composition, and effective risk management. Therefore, this study contributed that banks should emphasize financial engineering innovations because these practices can help Iraqi banks gain a competitive advantage, both domestically and internationally. The study results also contributed to helping policymakers and regulators which emphasize the importance of creating a regulatory environment that enables the responsible adoption of financial innovation. By ensuring adequate risk management and enforcing pro-innovation policies, Iraqi authorities could enhance financial stability and flexibility in the banking sector. Furthermore, the findings of the study also contributed to guiding educational institutions and training programs to develop curriculums focused on financial engineering innovation that could increase the skillful innovations that could help to improve the performance of the organizations.

7. Conclusion

Given the conditions and circumstances experienced by the country and the great transformation witnessed by the Iraqi banking sector after 2003, we note through the

division of the years of study before and after the use of financial engineering innovations of the Commercial Bank of Iraq that the use of these tools was weak and not widespread due to the limited use of them by other banks dealing with it. The limited use of financial engineering tools for the years (2012-2013-2014-2015-2016) for the bank and the banking sector, in general, was due to the need to provide the necessary infrastructure to adopt these tools represented by technology, informatics, and human expertise required and to create a banking culture that works to replace traditional tools with other more modern tools. Further, through the analysis, it was found that there is a statistically significant impact of financial engineering tools on the profitability of the Commercial Bank of Iraq for the years (2017-2018-2019-2020-2021) due to the openness that Iraq witnessed in those years and its stability to some extent, the significant increase in the number of private commercial banks and the entry of many foreign banks into the country reflected positively on the nature of banking business and the need to keep pace with modernity. The authors also found that the highest level of profitability indicators was achieved for the third indicator, which is earnings per share for the year 2021, as it recorded by (141.8), which means that there is a significant improvement in the bank's profitability compared to other years and the bank's total profits increase. In addition, it is also shown through the analysis that the lowest level of profitability indicators was for the first indicator, which is the return on assets, recorded by (7.1) compared to other indicators, due to reasons due to the privacy of the bank.

8. Study Limitations and Recommendations

The study with significant findings has several limitations that could addressed in further research to increase the generalizability of the findings. The study was limited to one bank which could not be generalized to all other banks because the culture and portfolio of each bank is different. Therefore, further research could be explored on all other banks on panel data to know about the adoption of financial engineering to improve their profitability. In addition, the study does not address the moderating and mediating variables which limited the actual findings of the study. Therefore, further research could be explored on adding other variables to increase the scope of the study. A comparative study could be conducted on other banks which have the same portfolio as the current study which could increase the generalizability of the findings. Lastly, studies could also be explored in other countries where the banking sector is in the initial stages and has little attention on the adoption of financial engineering technologies at their corporate level.

The study has the following recommendations. It is necessary to increase interest in the financial engineering tools approved by the bank while adopting all types and gradually abandoning other methods, given their clear impact on the profits and costs of various banking activities. Furthermore, increasing the financial culture of bank employees in general and directing their attention to the latest developments in the financial fields and banking operations in a way that serves various interests. In addition, it is also recommended that it is necessary to urge researchers and those interested in financial and banking affairs to expand studies and research related to financial engineering tools to demonstrate their impact on various bank activities and to diagnose the positive and negative aspects, if any.

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