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The role of green finance indicators in achieving financial recovery using the return on deposits indicator: An applied study on a sample of Iraqi banks

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Abstract
In light of the escalating environmental and economic challenges facing the world, green finance has emerged as one of the key mechanisms for promoting financial stability and achieving economic recovery, particularly in developing countries. In this context, the present study aimed to investigate the impact of a set of green finance indicators on supporting financial recovery within the Iraqi banking sector, using the return on deposits as a representative indicator of this recovery. The study relied on the analysis of data from eight private commercial banks listed on the Iraq Stock Exchange during the period from 2014 to 2023. The research adopted a descriptive-analytical approach and focused on four main financial indicators representing green finance instruments: return on investment, return on assets, debt coverage ratio, and return on equity, all of which were linked to the return on deposits as an indicator of financial recovery. Data analysis was conducted using EViews software, version 13.
The indicators were analyzed on two levels: a sectoral level by comparing the performance of the banks within a reference year, and a temporal level to monitor changes in the indicators throughout the study period. The results revealed noticeable differences among the banks in terms of activating green finance indicators, with a gradual improvement observed in the financial recovery indicator in recent years, reflecting a growing orientation toward sustainable financing practices. The study concluded that there is a statistically significant relationship between some green finance indicators and the level of financial recovery. It recommended the development of the legislative framework for green finance and the expansion of its instruments within the Iraqi banking sector.

Keyword: Green finance, financial recovery, statistically significant

Introduction
The global economic landscape is undergoing rapid transformations attributed to the intensifying environmental.
And financial crises, prompting policymakers and market actors to reconsider traditional financing models that have proven limited in addressing emerging challenges. Within this context, the concept of "green finance" has emerged as an alternative framework aimed at aligning economic objectives with environmental considerations, based on a holistic vision that prioritizes long-term sustainability. It has become widely acknowledged that financial stability cannot be achieved in isolation from the environment and sustainable development. This necessitates the adoption of financing models that take into account the environmental impact of economic activities. Accordingly, banks as the primary arms of financing in any economy—are now called upon to reformulate their credit and investment strategies in line with sustainable finance standards.
In light of these transformations, there arises a pressing need for analytical studies that explore the impact of green finance indicators on supporting the financial trajectory of banking institutions, particularly in emerging economies seeking to overcome financial fragility. From this standpoint, the present research seeks to shed light on the relationship between green finance indicators and the financial recovery indicator, through an applied study on a sample of Iraqi banks, drawing on actual data spanning a ten-year period.

Section One
Research Methodology
First: Research Problem and Questions

Amid the mounting financial and economic challenges particularly those resulting from recurrent global crises green finance has emerged as one of the modern financial instruments relied upon to achieve financial recovery through the return on deposits indicator and to promote sustainable economic growth. Despite the increasing global trend toward adopting this type of financing, there remains a clear knowledge gap regarding the effectiveness of green finance indicators in achieving the objectives of financial recovery and their role in supporting the stability of financial systems, as well as in promoting sustainable investments.

Accordingly, the core problem of this study is encapsulated in the following main question:

To what extent do green finance indicators affect the achievement of financial recovery using the return on deposits indicator in the Iraqi banking sector?

This main question branches into a set of sub-questions

- To what extent does the return on investment, as a green finance indicator, affect the achievement of financial recovery using the return on deposits indicator?
- How does the return on assets, as one of the green finance indicators, influence the path toward achieving financial recovery using the return on deposits indicator?
- To what extent does the return on equity within the framework of green finance contribute to achieving financial recovery using the return on deposits indicator?
- What is the effect of the debt coverage ratio, as one of the green finance indicators, in supporting financial recovery using the return on deposits indicator?

Second: Importance of the Study

The importance of this study is evident in light of the numerous challenges facing global economies, particularly those related to climate change and financial crises. The significance of the study is highlighted in the following points.

- Establishing a link between the concepts of sustainability and financial recovery by clarifying the potential role of green finance in supporting recovery pathways alongside achieving long-term environmental goals.
- Enhancing financial stability by encouraging investment in green and sustainable projects, which reduces the risks of financial market volatility and strengthens investor confidence.
- Attracting local and foreign investments due to the increased transparency and credibility that green finance indicators offer in directing funds toward environmentally friendly projects.
- Contributing to the achievement of sustainable development goals, particularly in areas such as clean energy, economic growth, and climate action.
- Promoting innovation in financial instruments through
- The development of new tools such as green bonds and sustainable funds, thereby enhancing the financing of recovery projects.

Third: Objectives of the Study

The study aims to analyze the impact of green finance indicators on achieving financial recovery using the return on deposits indicator in the Iraqi banking sector through a set of objectives intended to clarify the dimensions of the relationship between the studied variables. These objectives are as follows.

- To analyze the contribution of return on investment, as one of the green finance indicators, in supporting financial recovery efforts in the Iraqi banking sector.
- To determine the extent to which return on assets influences the enhancement of financial performance of Iraqi banks within the framework of green finance.
- To explore the relationship between return on equity and the achievement of financial recovery using the return on deposits indicator in light of the shift toward adopting green finance tools and practices.
- To measure the role of the debt coverage ratio, as one of the green finance indicators, in improving financial stability and enhancing the ability of Iraqi banks to achieve financial recovery.

Fourth: Research Hypotheses

The study is based on the following two hypotheses.

Null Hypothesis (H0): There is no statistically significant effect of green finance indicators on financial recovery using the return on deposits indicator. This hypothesis includes the following sub-hypotheses.

- There is no effect of return on investment on financial recovery using the return on deposits indicator.
- There is no effect of return on assets on financial recovery using the return on deposits indicator.
- There is no effect of the debt coverage ratio on financial recovery using the return on deposits indicator.
- There is no effect of return on equity on financial recovery using the return on deposits indicator.

Alternative Hypothesis (H1): There is a statistically significant effect of green finance indicators on financial recovery using the return on deposits indicator. This hypothesis includes the following sub-hypotheses.

- There is an effect of return on investment on financial recovery using the return on deposits indicator.
- There is an effect of return on assets on financial recovery using the return on deposits indicator.
- There is an effect of the debt coverage ratio on financial recovery using the return on deposits indicator.
- There is an effect of return on equity on financial recovery using the return on deposits indicator.

Fifth: Study Methodology: The study adopts the descriptive-analytical approach due to its suitability for examining the relationship between green finance indicators and financial recovery. Financial analysis tools will be employed to measure the adopted indicators using actual data obtained from the banks included in the study sample.

Sixth: Study Population and Sample

The study population consists of the Iraqi banking sector. A sample of eight private commercial banks listed on the Iraq Stock Exchange was selected, based on criteria that reflect various patterns of financial activity and geographical distribution.

Seventh: Data Collection Tools

- **Theoretical Aspect:** The theoretical data will be collected from books, academic theses, peer-reviewed scientific journals, relevant official reports, in addition to reliable electronic sources.
- **Practical Aspect:** The study will rely on the financial data published by the banks in the study sample listed on the Iraq Stock Exchange.

Eighth: Study Limitations

- **Spatial Limitations:** The study was limited to the following banks: Bank of Baghdad, Iraqi Investment Bank, Middle East Bank, Ashur International Bank, National Bank of Iraq, Iraqi Commercial Bank, International Development Bank, and Kurdistan International Bank.
- **Temporal Limitations:** The study covered the financial data for the period from the year 2014 to 2023.

Section Two

Theoretical Framework

First: The Concept of Green Finance

Green finance is a form of capital directed toward supporting projects and activities that aim to protect the environment and promote sustainable development. It serves as a bridge toward a more sustainable and less polluted economy, as such projects contribute to combating climate change and preserving valuable natural resources. Among the most notable initiatives in this regard are renewable energy projects and energy efficiency improvements such as building upgrades and the application of energy-saving technologies alongside efforts to preserve biodiversity and enhance recycling processes.

Green finance can be regarded as financing for green investments, whether in the public or private sector, encompassing several areas such as the funding and production of environmental goods and services, compensation for and mitigation of environmental damages (e.g., dam maintenance, renewable energy generation), as well as financing public policies that encourage organic agriculture and ecological projects. It also includes components of the financial system operating in the field of green investments (Ben Jannah & Obada, 2022: 14) [1].

Green finance refers to the financing of investments that provide environmental benefits within the broader context of environmentally sustainable development. These environmental benefits include reducing air and water pollution, increasing energy efficiency through the use of natural resources, mitigating the effects of climate change, and adapting to its consequences (Arasto *et al.*, 2017: 8) [18].

It is also defined as a strategic approach to transitioning to a low-pollution and low-carbon economy, integrating the financial sector into banking operations within the context of climate change adaptation (Karachi, 2015: 4) [12].

Green finance involves increasing financial flows to support green and sustainable development goals. This includes aligning lending and investment portfolios with climate- and environment-friendly assets and investments, particularly those that facilitate the transition to a more sustainable and low-carbon world. It also entails diverting funds away from companies and financial sectors that are not moving toward more sustainable business models (Thompson, 2023: 12) [13].

Second: Green Finance Indicators

1. Return on Investment (ROI)

Investment in various investment projects is evaluated by assessing their environmental performance alongside the financial performance associated with that environmental impact. The financial performance is measured by calculating the rate of return on investment (Hassan, 2014: 224) [2]. It can be measured using the following formula (Al-Shammari & Jabr, 2015: 122) [3].

$$\mathbf{ROI} = \frac{\mathbf{Niat}}{\mathbf{TI}}$$

- **ROI:** (Return on Investment)
- **NIAT:** (Net Income after Tax)
- **TI:** Total Investment

2. Return on Assets (ROA)

This indicator is used to assess the efficiency of asset utilization and investment to the fullest extent in order to generate profits. The higher the value of this indicator, the more it reflects the bank's ability to optimally utilize its assets to achieve maximum profitability. This indicator reflects the bank's ability to generate profits through asset management functions (Kohlscheen *et al.*, 2018: 8) [14]. It can be calculated using the following formula (Jasim, 2019: 45) [4].

$$\mathbf{ROA} = \frac{\mathbf{Nait}}{\mathbf{TA}}$$

- **ROA:** (Return on Assets)
- **NIAT:** (Net Income after Tax)
- **TA:** Total Assets

3. Return on Equity (ROE)

This indicator reflects the interrelationship between profitability and risk, as it is based on financial statements and relies on indicators of return and risk. The profitability of a bank is measured through the return on equity, which is considered one of the most important indicators due to its sensitivity to the bank's performance. It measures the return per monetary unit of shareholders' equity. The higher this indicator, the more favorable it is for the bank, as it enables greater profit distribution to shareholders (Massoudi, 2015: 45) [5]. This indicator can be financially measured using the following formula (Masjat, 2018: 12) [6].

$$\mathbf{ROE} = \frac{\mathbf{Nait}}{\mathbf{E}}$$

- **ROE:** Return on Equity
- **NIAT:** Net Income after Tax
- **E:** Equity

4. Debt Service Coverage Ratio (DSCR)

The Debt Service Coverage Ratio is one of the most important ratios considered by most lenders when approving a loan. Although each lender may interpret it differently, this ratio simply informs the lender of the borrower's ability to repay the loan amount and interest on time. In general, the higher this ratio, the better it is for the lender (Nair, 2020: 1). It can be calculated using the following formula (Al-Hasnawi, 2018: 68) [7].

$$\text{DSCR} = \frac{\text{NOI}}{\text{TD}}$$

- **DSCR:** Debt Service Coverage Ratio
- **NOI:** Net Operating Income (Cash flows from operating activities)
- **TD:** Total Debt

Third: The Concept of Financial Recovery

Financial recovery is defined by some as the improvement in financial conditions following a financial crisis, including the correction of distortions in fiscal policy performance and the preparedness to face any future crises, thereby restoring the financial position to its pre-crisis state. This recovery may be reflected through rising stock prices or growth in output after a period of recession (Al-Ramli & Taj Al-Din, 2022: 44) [8]. Alternatively, it is viewed as a series of strategic changes aimed at transforming the bank and repositioning it to achieve profitability and sustainable growth (Schmitt & Raisch, 2013: 12) [16]. It also refers to the period that enables a financial institution to regain its financial strength and enhance its resilience in facing extreme financial stress (Dawood & Shili, 2023: 409) [17].

Fourth: Financial Recovery Indicators

Return on Deposits Indicator

The return on deposits rate is the rate by which a bank's ability to generate profits is measured. It reflects the bank's ability to compete for available funds in order to invest them and earn returns through profitable and rewarding ventures and activities (Saeed & Hussein, 2022: 302) [9]. This rate can be calculated using the following formula (Ahmed & Hammoud, 2016: 193) [10].

- **ROD** = (NI / TD) × 100
- **ROD:** Return on Deposits
- **NI:** Net Income
- **TD:** Total Deposits

Section Three

Practical Aspect

First: Financial Analysis of the Indicators

1 - Bank of Baghdad

Table 1: Financial Analysis of Bank of Baghdad

Indicator / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.067	0.017	0.159	0.104	0.023
2015	0.025	0.004	0.017	0.024	0.008
2016	0.196	0.017	-1.286	0.072	0.024
2017	0.096	0.006	-0.138	0.022	0.009
2018	0.046	0.004	0.452	0.016	0.005
2019	0.071	0.006	-0.333	0.027	0.009
2020	0.120	0.014	2.967	0.073	0.019
2021	0.067	0.019	1.892	0.097	0.026
2022	0.080	0.031	0.580	0.152	0.041
2023	0.247	0.057	14.785	0.329	0.071

Prepared by the researcher based on the published reports of the studied banks: Based on the time-series data of green finance indicators and financial recovery indicators for the period from 2014 to 2023, it is evident that there is a noticeable variation in the performance of the Iraqi banking system over this period. The figures reflect fluctuations in some indicators and gradual improvements in others, which indicates the banks' interaction with economic changes and the adopted public policies.

With regard to the Return on Investment (ROI), the indicator began at moderate levels in 2014 and 2015, then experienced fluctuations between decline and growth, reaching its highest level in 2023 at 0.247. This reflects a clear improvement in investment management and return generation, despite the gaps observed in the middle of the time period.

As for the Return on Assets (ROA), it remained at low levels throughout the ten years but showed a significant increase in 2022 and 2023, reaching 0.031 and then 0.057, respectively. This indicates the beginning of an improvement in the efficiency of asset utilization and their conversion into operating profits.

Concerning the Debt Service Coverage Ratio (DSCR), it was negative in some years, reflecting a high debt burden relative to operating income most notably in 2016, 2017, and 2019. However, the ratio recorded a significant jump in 2020 and 2023, reaching 2.967 and 14.785, respectively, which reflects a substantial improvement in debt coverage, particularly in recent years.

The Return on Equity (ROE) varied between years of clear

decline—such as 2015 and 2018—and years of gradual growth, as seen in 2021 and 2022, reaching its peak in 2023 at 0.329. This indicates successful financial management in enhancing equity and generating added value for shareholders in the latter years of the period.

Regarding the financial recovery indicator represented by the Return on Deposits (ROD), it was low during most years but began to gradually improve starting in 2020, reaching 0.071 in 2023. This reflects an improved capacity of banks to profitably utilize depositors' funds.

2. Iraqi Investment Bank

Table 2: Financial Analysis of Iraqi Investment Bank

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	7.238	0.049	0.348	0.097	0.107
2015	0.450	0.030	0.474	0.059	0.064
2016	0.599	0.018	0.432	0.035	0.040
2017	0.168	0.007	-0.152	0.014	0.016
2018	0.013	0.001	-0.204	0.001	0.001
2019	3.895	0.032	-0.509	0.066	0.065
2020	1.063	0.008	0.268	0.018	0.016
2021	0.093	0.001	-0.288	0.004	0.003
2022	0.250	0.010	-0.315	0.026	0.022
2023	0.665	0.034	0.520	0.104	0.068

Prepared by the researcher based on the published reports of the studied banks

Based on the time-series data of selected green finance indicators and financial recovery measures for the period from 2014 to 2023, there are evident and irregular fluctuations in the financial performance levels of the studied banks. The indicators reflect a lack of financial and funding stability over the years, particularly in some variables that recorded negative values or experienced sharp declines.

Regarding the Return on Investment (ROI), the exceptionally high value in 2014 (7.238) stands out in contrast to the rest of the years, as the indicator declined significantly in subsequent years, reaching its lowest point in 2018 at 0.013. However, it gradually improved over the last three years, reaching 0.665 in 2023, which may suggest a gradual response to investment improvement policies and a rebalancing in resource utilization.

The Return on Assets (ROA) remained at very low levels throughout the study period, with the exception of 2014, which recorded a value of 0.049. In all subsequent years, the values remained below 0.035, indicating a general weakness in the efficiency of asset utilization to generate operating profits.

The Debt Service Coverage Ratio (DSCR) showed sharp fluctuations and recorded negative values in several years such as 2017, 2018, 2019, 2021, and 2022, indicating that the banks struggled to cover their financial obligations from stable operating sources. However, there were limited positive signals in years like 2014, 2015, and 2023.

As for the Return on Equity (ROE), most years recorded very low percentages, except for 2014 and 2023, which showed relatively higher rates of 0.097 and 0.104, respectively. This reflects a weak capacity of financial management to maximize shareholder returns throughout most of the study period.

Regarding the financial recovery indicator represented by the Return on Deposits (ROD), the indicator showed evident fluctuation, beginning at a high level of 0.107 in 2014, then dropping significantly in the following years, with nearly negligible values in 2018 and 2021. It eventually showed improvement in 2023, reaching 0.068.

3. Middle East Bank

Table 3: Financial Analysis of Middle East Bank

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.128	0.005	2.984	0.011	0.010
2015	0.121	0.008	2.724	0.019	0.016
2016	0.295	0.019	0.073	0.043	0.047
2017	-0.017	-0.001	0.954	-0.002	-0.001
2018	-0.069	-0.003	0.562	-0.009	-0.005
2019	0.002	0.000	-1.569	0.000	0.000
2020	-0.064	-0.003	-0.048	-0.008	-0.008
2021	0.008	0.000	0.413	0.001	0.001
2022	0.000	0.000	-0.350	0.000	0.000
2023	-0.275	-0.016	-0.523	-0.043	-0.048

Prepared by the researcher based on the published reports of the studied banks

Based on the data spanning from 2014 to 2023 related to green finance indicators and financial recovery measures, an analytical reading reveals that the overall performance exhibited irregular fluctuations, indicating clear imbalances in financial stability and profitability during this period-particularly in the later years, which were marked by negative indicators across multiple dimensions.

Regarding the Return on Investment (ROI), the trend started relatively stable with low but acceptable positive values in the first three years. However, the indicator began a gradual

decline, reaching a sharply negative value in 2023 at -0.275. This suggests that the banks experienced investment losses or a decline in investment efficiency during the later years of the study.

As for the Return on Assets (ROA), it followed a similar pattern. Although the early years showed weak but positive values, the indicator turned negative in multiple years, most notably in 2023, which recorded -0.016. This reflects a severe weakness in asset utilization for generating adequate operating returns.

The Debt Service Coverage Ratio (DSCR) started at a favorable level in 2014 with a value of 2.984, but then declined progressively and inconsistently in the following years. It turned negative in years such as 2019 and 2023, signaling a shortfall in the operational ability to cover financial obligations.

As for the Return on Equity (ROE), it remained weak throughout the period, not exceeding 0.043 in its best year (2016). It also recorded negative values in several years, including 2023, indicating a severe weakness in the returns generated for shareholders.

Regarding the financial recovery indicator, the Return on Deposits (ROD) was very low and continued to decline gradually, eventually reaching a clearly negative value in 2023. This presents a serious challenge to the bank's ability to compensate depositors for the opportunity cost or inflation impact.

4. Ashur Bank

Table 4: Financial Analysis of Ashur Bank

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	1.863	0.021	0.554	0.034	0.084
2015	0.801	0.023	4.803	0.038	0.085
2016	5.875	0.039	-0.646	0.058	0.155
2017	5.164	0.036	-1.270	0.051	0.152
2018	1.780	0.010	17.501	0.018	0.027
2019	2.245	0.014	-2.557	0.023	0.043
2020	5.122	0.031	1.164	0.054	0.131
2021	1.956	0.012	-0.200	0.027	0.049
2022	5.376	0.017	-0.410	0.044	0.061
2023	5.201	0.033	-0.017	0.081	0.119

Prepared by the researcher based on the published reports of the studied banks

Based on the time-series data of green finance indicators and financial recovery metrics for the years 2014 to 2023, a clear variation in the performance of the studied banks can be observed. The recorded values reflect discrepancies in operational efficiency, financial structure, and the ability to generate returns or meet financial obligations. Notably, some indicators showed improvement in certain years and decline in others.

With regard to the Return on Investment (ROI), the indicator experienced significant fluctuations. It began at a moderate level in 2014, declined in 2015, then surged significantly in 2016 and remained relatively high through to 2023. The highest values were recorded in 2022 and 2023, reflecting a volatile pattern in investment efficiency but also indicating successful investment opportunities during certain periods.

The Return on Assets (ROA) remained within a relatively narrow margin throughout the period, reaching its highest levels in 2016, 2017, and 2023. This reflects a relative improvement in asset management efficiency during these years, whereas the levels were lower in years such as 2018 and 2021.

The Debt Service Coverage Ratio (DSCR) revealed major fluctuations, recording negative values in years like 2016, 2017, 2019, 2021, and 2022. This indicates a weakness or inability to cover operational financial obligations from earnings. In contrast, the banks achieved strong coverage in 2015 and especially in 2018, which recorded the highest ratio at 17.501, suggesting an exceptional recovery that may be linked to non-recurring factors.

As for the Return on Equity (ROE), the indicator maintained a relatively upward trend, reaching its highest value in 2023. This suggests a gradual improvement in the management's ability to generate returns for shareholders.

Regarding the Return on Deposits (ROD), the indicator showed a positive increase in 2016, 2017, 2020, and 2023, indicating a relative improvement in deposit utilization and the generation of appropriate returns for depositors. In contrast, it recorded its lowest levels in 2018 and 2021.

5. National Bank of Iraq

Table 5: Financial Analysis of the National Bank of Iraq

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.476	0.011	-0.478	0.027	0.021
2015	0.903	0.004	-0.533	0.009	0.009
2016	14.573	0.041	0.552	0.082	0.144
2017	1.168	0.005	0.386	0.010	0.016
2018	-0.293	-0.015	0.146	-0.031	-0.042
2019	0.155	0.014	0.052	0.036	0.359
2020	0.278	0.022	0.040	0.065	0.047
2021	0.208	0.014	0.103	0.083	0.021
2022	0.075	0.011	0.401	0.084	0.016
2023	1.084	0.048	0.755	0.380	0.064

Prepared by the researcher based on the published reports of the studied banks

The data presented for the period from 2014 to 2023 reveals clear fluctuations in green finance indicators and financial recovery measures for the studied banks. The recorded values show sharp disparities in performance, both in terms of profitability and financial stability, as well as in the ability to meet financial obligations.

The Return on Investment (ROI) reached its highest value in 2016 at 14.573, which is exceptionally high compared to other years. Conversely, it recorded its lowest value in 2018 at -0.293, reflecting significant variation in investment management efficiency across the years and indicating occasional operating losses.

The Return on Assets (ROA) remained at low levels throughout the period, not exceeding 0.048 at its peak in 2023, while a negative value of -0.015 was recorded in 2018. This suggests a persistent weakness in the efficiency of converting assets into operating profits.

The Debt Service Coverage Ratio (DSCR) also experienced noticeable fluctuations. It started with negative values in the first two years, 2014 and 2015, and then gradually improved, reaching 0.755 in 2023. This indicates an enhancement in the bank's ability to cover its obligations following a period of deficit or underperformance.

The Return on Equity (ROE) fluctuated between low positive values in most years and negative values, such as in 2018, indicating a general weakness in maximizing shareholder equity. However, 2023 recorded the highest value at 0.380, signaling a tangible improvement in the bank's investment performance during that year.

Regarding the Return on Deposits (ROD), the indicator remained low throughout the period, except in 2016 and 2019, which witnessed a spike to 0.144 and 0.359, respectively. This could reflect exceptional conditions that temporarily enhanced the return on deposit utilization.

6. Iraqi Commercial Ban

Table 6: Financial Analysis of the Iraqi Commercial Bank

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.030	0.018	4.444	0.029	0.069
2015	0.027	0.015	-3.268	0.023	0.069
2016	0.012	0.018	2.930	0.027	0.063
2017	0.021	0.022	2.348	0.034	0.075
2018	0.054	0.024	0.634	0.038	0.080
2019	0.033	0.015	1.866	0.024	0.045
2020	0.189	0.057	4.706	0.115	0.130
2021	0.045	0.025	-4.184	0.041	0.081
2022	0.034	0.022	2.578	0.036	0.069
2023	0.047	0.031	-1.764	0.047	0.114

Prepared by the researcher based on the published reports of the studied banks

The data presented for green finance indicators and financial recovery measures from 2014 to 2023 reveals a marked variation in financial and structural performance. The indicators showed an overall unstable trend across the ten-year period, reflecting the influence of economic and financial changes on the performance of the concerned banks.

Regarding the Return on Investment (ROI), it started at a low level (0.030) in 2014 and continued to fluctuate without significant spikes, except for 2020, which recorded a notable rise to (0.189). This may indicate a temporary recovery, possibly due to improved investment management or a reduction in operational costs.

The Return on Assets (ROA) remained relatively stable throughout the period, with its highest value recorded in 2020 (0.057), suggesting a relative improvement in the efficiency of asset utilization during that year. The remaining values hovered within a narrow margin, reflecting overall sluggish operational efficiency.

As for the Debt Service Coverage Ratio (DSCR), it experienced considerable volatility. It recorded a very high value in 2014 (4.444), indicating a strong ability to cover debts from operating income. However, this capability sharply declined in 2015, with a negative value (-3.268), followed by ongoing fluctuations in the subsequent years. This pattern points to a general weakness in financial stability and the ability to meet obligations consistently.

The Return on Equity (ROE) was also characterized by low but relatively stable levels, with the exception of 2020, which recorded the highest value (0.115). This reflects an improvement in the financial efficiency of managing internal resources but remained below expectations in other years.

Finally, the Return on Deposits (ROD) achieved its best performance in 2020 (0.130), surpassing all other years. This indicates effective utilization of available resources during that year, while it remained within medium to low levels throughout the rest of the period.

7. Development Bank for Investment and Finance

Table 7: Financial Analysis of the Development Bank for Investment and Finance

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.132	0.036	-0.048	0.097	0.071
2015	0.055	0.020	-0.045	0.060	0.036
2016	0.055	0.024	-0.457	0.058	0.050
2017	0.046	0.019	-0.064	0.045	0.038
2018	0.026	0.011	-0.067	0.028	0.022
2019	0.015	0.006	0.106	0.018	0.012
2020	0.036	0.012	0.581	0.046	0.020
2021	0.030	0.011	0.255	0.058	0.019
2022	0.016	0.007	0.027	0.043	0.011
2023	0.055	0.021	0.460	0.146	0.032

Prepared by the researcher based on the published reports of the studied banks

The presented data reveals varying trends in the performance of green finance indicators and financial recovery metrics during the period from 2014 to 2023. These trends indicate that the concerned bank faced ongoing challenges in achieving financial stability and efficiency, particularly with regard to profitability and the structure of financing.

Regarding green finance indicators, the Return on Investment (ROI) began at a relatively good level in 2014 (0.132) but quickly declined, remaining at relatively low levels without significant improvement except in 2023, which witnessed an increase to (0.055). This may indicate the beginning of a relative recovery.

The Return on Assets (ROA) recorded its highest value in 2014 (0.036), then steadily declined to its lowest level in 2019 (0.006), before slightly recovering to (0.021) in 2023. This reflects a general weakness in operational efficiency, with only slight improvement in the final year.

As for the Debt Service Coverage Ratio (DSCR), most years recorded negative values, except from 2019 onward, which showed positive and gradually improving figures—reaching (0.460) in 2023. This reflects a progressive development in the bank's ability to cover its obligations.

The Return on Equity (ROE) was at its highest in 2014 (0.097), then gradually declined in the following years, with some relative improvement in 2020 and 2023. This indicates a declining effectiveness in utilizing shareholders' equity, despite some recovery in recent years.

Regarding the financial recovery indicator, the Return on Deposits (ROD) declined after 2014 from (0.071) to its lowest value in 2022 (0.011), then increased slightly to (0.032) in 2023. This suggests a weakened ability to generate rewarding returns for depositors, despite the recent improvement.

8. Region Bank for Investment and Finance

Table 8: Financial Analysis of the Region Bank for Investment and Finance

Indicators / Year	Green Finance Indicators				Financial Recovery Indicators
	Return on Investment	Return on Assets	Debt Coverage Ratio	Return on Equity	Return on Deposits
2014	0.023	0.010	0.052	0.022	0.024
2015	1.497	0.009	0.502	0.023	0.031
2016	0.026	0.009	0.186	0.022	0.029
2017	0.022	0.010	0.518	0.019	0.024
2018	11.322	0.010	3.548	0.033	0.017
2019	4.166	0.013	0.356	0.042	0.021
2020	1.779	0.012	-6.200	0.026	0.027
2021	11.142	0.011	3.156	0.029	0.020
2022	13.166	0.009	3.881	0.033	0.015
2023	7.008	0.041	-2.718	0.113	0.074

Prepared by the researcher based on the published reports of the studied banks

The financial performance data from 2014 to 2023 indicates significant fluctuations in green finance indicators and financial recovery metrics, reflecting a state of operational instability in the policies of the concerned bank.

The Return on Investment (ROI) showed extreme volatility. It began at very modest levels such as 0.023 in 2014 then surged notably in 2018 to over 11, and continued recording relatively high levels in 2022 and 2023. This may suggest the execution of high-return investments in certain years or could reflect unstable profit fluctuations.

In contrast, the Return on Assets (ROA) remained within a narrow and relatively constant range, not exceeding 0.041 even at its peak. This indicates a persistent weakness in the bank's operational efficiency to utilize assets and convert them into profits.

The Debt Service Coverage Ratio (DSCR) displayed significant variability ranging from solid positive values as seen in 2018 and 2022 to negative values such as in 2020 and 2023. This suggests inconsistent ability to cover the bank's debt obligations from operating profits.

The Return on Equity (ROE) remained at low levels throughout the period, with the exception of a relative increase in the final year, reaching 0.113 in 2023. This indicates a modest improvement in shareholder returns in that particular year compared to others.

As for the financial recovery indicator, the Return on Deposits (ROD) showed no significant improvement, remaining at low levels in most years. This may reflect inefficiency in utilizing customer deposits to generate profitable returns.

Second: Statistical Analysis

Estimating the Effect of Green Finance Indicators on the Return on Deposits

- Estimating the Effect of Green Finance Indicators on the Return on Deposits Using the Pooled Model (General Model Approach)
- Estimation of the Return on Deposits Equation According to the Pooled Model

Table 9: Dependent Variable: Y2

Variable	Coefficient	Std. Error	t-Statistic	Variable
C	0.005071	0.001029	4.929678	0.0000
X1	-1.10E-06	0.000266	-0.004126	0.9967
X2	3.468579	0.113444	30.57516	0.0000
X3	-0.000763	0.000237	-3.212708	0.0020
X4	-0.353088	0.030546	-11.55909	0.0000

Table 10: Weighted Statistics

Indicator	Value	Indicator	Value
R-squared	0.972675	Mean dependent var	4.773375
Adjusted R-squared	0.971178	S.D. dependent var	6.349858
S.E. of regression	0.962136	Sum squared resid	67.57648
F-statistic	649.6334	Durbin-Watson stat	1.504332
Prob(F-statistic)	0.000000		

The results of estimating the Panel EGLS model using the Seemingly Unrelated Regression (SUR) method for the variable Y2 demonstrated strong statistical performance, both in explaining the dependent variable and in the significance of the independent variables. The constant term (C) was approximately 0.005071 with a high level of significance (P = 0.000), indicating the existence of a baseline value for the dependent variable even in the absence of the explanatory variables' effects.

As for the variable X1 (Return on Investment), its effect appeared to be very weak and statistically insignificant (P = 0.9967), indicating no substantial impact of this variable on explaining Y2 within the study sample. This may be attributed to the volatility of investment outcomes or the limited role of investments in directly influencing the dependent indicator. In contrast, the variable X2 (Return on Assets) had the strongest effect, with a regression coefficient of 3.468 and a significance level approaching zero, confirming that the efficiency of asset utilization in generating revenue is one of the most critical determinants of the behavior of the dependent variable.

A significant and negative effect was also recorded for the variable X3 (Debt Service Coverage Ratio), with a coefficient of -0.000763, which may indicate that improvements in coverage do not always translate into a positive impact on this type of indicator, possibly due to risk management practices or the different financing sources adopted by banks. As for the variable X4 (Return on Equity), it showed a strong negative effect (-0.353) with high statistical significance (P = 0.000), highlighting a strong inverse relationship between this return and the Y2 indicator, which may suggest that high dividend distribution policies or reliance on high-yield financing contribute to the erosion of the institutional capital base or a decline in the bank's ability to maintain financial sustainability.

Regarding the model's quality, the very high values of the coefficient of determination (R^2 = 0.972) and its adjusted version (Adjusted R^2 = 0.971) indicate that the model has excellent explanatory power, accounting for more than 97% of the variation in the dependent variable. Additionally, the F-statistic value of 649.633 with a probability of (0.000) confirms the high overall significance of the model. On the other hand, the Durbin-Watson statistic (1.504) falls within a relatively acceptable range and does not indicate any clear problem of autocorrelation in the error terms, which reinforces the credibility of the estimated model.

2- Estimating the Effect of Green Finance Indicators on the Return on Deposits Using the Fixed Effects Model (FEM).

Table 11: Estimation of the return on deposits equation according to the fixed effects model

Dependent Variable: Y2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013853	0.000738	18.78210	0.0000
X1	-6.44E-05	0.000309	-0.208092	0.8358
X2	2.354671	0.069331	33.96250	0.0000
X3	-0.000893	0.000296	-3.017509	0.0036
X4	-0.135401	0.019771	-6.848647	0.0000

Table 12: Effects Specification Cross-section fixed (dummy variables)

Weighted Statistics			
Indicator	Value	Indicator	Value
R-squared	0.982829	Mean dependent var	0.284851
Adjusted R-squared	0.979967	S.D. dependent var	0.346355
S.E. of regression	0.039590	Akaike info criterion	-6.645879
Sum squared resid	0.103444	Schwarz criterion	-6.283308
Log likelihood	271.1893	Hannan-Quinn criter.	-6.500735
F-statistic	343.4178	Durbin-Watson stat	1.618287
Prob(F-statistic)	0.000000		

Based on the researcher's estimation using EViews (version 13) with cross-section weights, the fixed effects model for the dependent variable Y2 (Return on Deposits) produced statistically robust and stable results. The estimation converged after 29 iterations, indicating a successful and precise numerical equilibrium through the approximation algorithm.

The constant term (C) was estimated at 0.0138 with a very high level of significance (P = 0.000), indicating the presence of a substantial average value of the dependent variable that is not explained by the included independent variables.

- The variable X1 (Return on Investment) had a very small coefficient (-6.44E-05) and a high p-value (P = 0.8358), making it statistically insignificant. This reinforces the continued weak effect of this variable on Y2, possibly due to the diversity in investment types or their limited direct impact on this specific financial indicator.
- In contrast, X2 (Return on Assets) demonstrated the strongest and most significant effect in the model, with a coefficient of 2.3546 and a near-zero p-value. This confirms that the efficiency in utilizing assets plays a decisive role in enhancing the performance of Y2.
- The variable X3 (Debt Service Coverage Ratio) showed a significant negative effect (-0.00089) at the 1% significance level, indicating an inverse relationship between increased debt coverage and the dependent variable. This may suggest that excessive credit conservatism limits the bank's ability to balance risk and profitability.
- The variable X4 (Return on Equity) also had a strong and statistically significant negative impact (-0.1354, P = 0.000), supporting the hypothesis that prioritizing shareholder returns may come at the expense of the bank's capital accumulation and long-term financial sustainability.

In terms of model fit, the coefficient of determination (R^2) was 0.9828, indicating that the model explains over 98% of the variance in the dependent variable an exceptionally high and consistent result. Additionally, the F-statistic = 343.417 with P = 0.000 confirms the overall significance of the model.

Finally, the Durbin-Watson statistic (1.618) falls within an acceptable range, suggesting no serious autocorrelation issue in the residuals, thus further validating the reliability of the estimated model.

Redundant Fixed Effects Test
Equation: Untitled

Table 13: Test Cross-section fixed effects

Equation: Untitled		**Test: Cross-section fixed effects**	
Effects Test	Statistic	d.f.	Prob.
Cross-section F	16.516482	(7، 66)	0.0000

Source: Prepared by the researcher based on EViews version 13

The Redundant Fixed Effects Test for cross-sectional units showed an F-value of 16.516 with degrees of freedom (7, 66) and a p-value of 0.0000, which is highly significant at all conventional significance levels (1%, 5%).

Based on these results, the null hypothesis is rejected, which assumes that intercepts across cross-sections (such as banks) are equal, and thus fixed effects are not necessary. This statistical outcome confirms the existence of substantial differences between the cross-sectional units, meaning that the Fixed Effects Model is the most appropriate choice for this dataset.

The importance of this test lies in its ability to help the researcher determine whether the unique characteristics of each cross-sectional unit (such as the operational policies or financial structure of each bank) play a significant role in explaining the dependent variable. Rejecting the null hypothesis in this case implies that neglecting these differences would lead to inaccurate and potentially biased estimates. Therefore, using the Fixed Effects Model (FEM) in this context is not only preferred but represents an analytical necessity to ensure the validity of the estimation results and to provide a logical interpretation of the variables within the context of the banking data used.

Table 14: F-test results for comparison between fixed effects and random effects models

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test: Cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.331145	4	0.0063

The Hausman test serves as a critical statistical tool for determining whether the appropriate model for panel data analysis is the Fixed Effects or the Random Effects model, by testing the null hypothesis that assumes no correlation between the explanatory variables and the unobserved cross-sectional effects. The results presented in the table show a Chi-square statistic of (14.331) with 4 degrees of freedom and a probability value of (0.0063), which is lower than the adopted significance level (0.05). Accordingly, the null hypothesis suggesting the suitability of the Random Effects model is rejected, and the alternative hypothesis indicating a correlation between the independent variables and the unobserved effects is accepted. This outcome implies that the Fixed Effects model is more appropriate for the given data, as it better controls for unobserved heterogeneity across cross-sectional units, which could otherwise bias the

model estimates if the Random Effects model were used. These results are consistent with the findings from the F-test for Fixed Effects and reinforce the conclusion that the Fixed Effects model should be adopted to ensure the reliability of econometric interpretation, especially in a financial environment such as the studied banks, where unobservable internal characteristics differing from one bank to another are assumed to affect the dependent variable's performance.

First: Conclusions

- The results of the analysis revealed a clear disparity among Iraqi banks in their adoption of green finance indicators, reflecting differences in institutional policies and capabilities.
- Return on assets proved to be one of the most significant indicators positively associated with financial recovery, indicating the efficiency of some banks in utilizing their resources.
- Panel EGLS models confirmed that certain green finance indicators have a significant and direct effect on financial stability indicators, supporting the relevance of these indicators within the Iraqi banking environment.
- The time series indicators show a gradual improvement in financial recovery levels in some banks, particularly after the year 2020.

Second: Recommendations

- The Central Bank of Iraq should issue binding regulations requiring banks to incorporate green finance indicators into their financing operations.
- The green finance database in the Iraqi market should be expanded to facilitate future financial analysis and planning.
- Iraqi banks should be encouraged to issue green bonds and environmental sukuk to finance sustainable infrastructure projects.
- Periodic studies should be conducted to assess the relationship between green finance and financial stability indicators in order to update banking policies.

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