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Research paper

Financial Intelligence and Performance Industry: An Analysis of Its Impact on The Productivity of Iraqi Private Banks As A Model

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Abstract

Importance stems from its focus on a modern and vital topic: financial intelligence and its role in improving banking productivity. This aspect has not received sufficient attention within the Iraqi environment. It provides a cognitive framework that helps foster a deeper understanding of the relationship between smart financial capabilities and productivity levels. It also helps decision-makers in banks formulate strategies based on investing in smart financial capabilities, enhancing operational efficiency, and increasing competitiveness towards building a strong banking sector capable of facing economic challenges. Aim : Clarifying the concept of financial intelligence and its theoretical and practical dimensions in the banking sector , measuring the level of financial intelligence among the management of Iraqi private banks. In addition, analysing the relationship between financial intelligence and productivity in private banks to verify the impact of financial intelligence as an indicator of improved banking performance. Problem : The Iraqi banking sector is characterized by relatively weak productivity and performance efficiency compared to banking sectors in other countries. This is due to several reasons, most notably the lack of sufficient attention to the concept of financial intelligence as a strategic tool that contributes to improving banking performance. Hypothesis: Financial intelligence has a positive and statistically significant impact on productivity levels, which in turn improves banking performance in the Iraqi private sector. Results show a statistically significant, positive, and long-term relationship between financial intelligence and banking productivity in Iraqi private banks. This indicates that efforts to enhance financial understanding, analytical capabilities, and financial resource management translate into sustained improvements in the efficiency and effectiveness of banking operations over the long term.

Keywords: *Financial Intelligence; Productivity; Financial Performance; Private Banks.*

1. Introduction

Financial institutions, especially banks, can maintain stability and achieve rapid growth. Hence, the concept of financial intelligence emerges as a deep understanding of how money flows, how value is created, and how decisions are made that enhance financial performance and ensure long-term sustainability (Al-Tablee & Hassoon, The Role of Financial Intelligence in Enhancing Performance Efficiency of Private Iraqi Banks: A Case Study Bank of Baghdad, 2025). Organizations with high levels of financial intelligence are those capable of transforming complex financial data into actionable strategic insights, enabling them to anticipate risks, exploit opportunities, and continuously improve their performance. Conversely, financial performance is the ultimate measure of any organization's success, reflecting the efficient use of resources and the extent to which it achieves its pre-defined financial goals (Asadi s. , 2021) Financial performance indicators encompass vital aspects such as profitability, liquidity, solvency, and operational efficiency, which together paint a comprehensive picture of a bank's financial position Achieving superior financial performance is not an end in itself; rather, it is a natural result of implementing sound, well-thought-out financial strategies based on a thorough understanding of internal and external variables. Considering the current economic challenges characterized by market volatility and intense competition, the relationship between financial intelligence and performance has become more intricate and necessary than ever (Majon & Hameed, 2025). Organizations that invest in developing the financial intelligence of their employees and leaders, enhancing their analytical capabilities and informed decision-making skills, often witness tangible improvements in their financial indicators. Despite the theoretical foundations that indicate a strong relationship between these two concepts, applied studies that quantitatively assess the causal relationship between multifaceted financial intelligence and industry performance indicators, particularly banking productivity, remain limited in the Iraqi context (Abdel Rahman & al-Bashar, 2025). Financial intelligence represents the "hidden catalyst" that drives bank productivity. Furthermore, the skills and capabilities inherent in financial intelligence translate into strategic decisions that enhance overall financial performance, ultimately contributing to the creation of sustainable value for stakeholders. Thus, this study seeks to enrich the academic literature and provide practical insights for financial

institutions seeking to enhance their competitive position and achieve growth in an ever-changing global economy (Al-Diyasti, Arafa, & Zaazou, 2021).

2. Literature Review

2.1. Financial intelligence concepts

The term “financial intelligence” (which will have an important development direction in the future of finance and, in the long run, will have a revolutionary impact on traditional commercial banking finance) (Xu & Cheng, 2017) In the organizational context refers to the knowledge and skills gained from understanding the principles of finance and accounting that will be applied to the business world. In the banking world, financial intelligence refers to the efficiency and best practices that lead to improved organizational performance (Kamila, Musab, & Sahak, 2014). Financial intelligence is a set of skills that can be learned through training. People working in finance can easily acquire these skills. Financial intelligence is defined as the basic knowledge of how money works and the application of this knowledge to making financial decisions that improve life. Hence, the term "FINTEL" was coined. It is important to note that, contrary to popular belief, financial intelligence is not a goal. It is not a state of having a lot of money, nor is it something you are evaluated on, as is the case with "school intelligence." Rather, it is a means of achieving a goal (Fatehi, Hajiha, & araghi, 2021). Moreover, the concept of human financial intelligence is the ability to understand the flow of money, analyse risks, predict opportunities, and allocate resources in a way that achieves short- and long-term financial goals. It differs from computational or software intelligence in that it encompasses psychological, social, and strategic dimensions, such as controlling emotions, building relationships, and making decisions under environmental and economic pressures. (Majon & Hameed, 2025).Emerging financial intelligence (EFI) is the institutional or individual capabilities and indicators that begin to develop within private banks (or other financial institutions) through initial practices of financial resource management, financial data analysis, information-based decision-making, and financial monitoring, enabling the bank to improve performance and productivity. It is a stage between traditional expertise and full-fledged financial intelligence, encompassing skills such as understanding costs and revenues, comparing financial performance to benchmarks, detecting anomalies, and creating an environment for continuous financial learning. (Gang KOU, Xiangrui CHAO, Yi PENG, & Fawaz E. ALSAADI, 2019). Emerging financial intelligence is the initial stage of banks' adoption of advanced financial analysis mechanisms based on data, artificial intelligence, and machine learning technologies, with the aim of enhancing their financial awareness and improving their ability to predict and manage banking risks efficiently. This intelligence represents a combination of traditional financial awareness and the ability to leverage modern technologies to understand invisible financial patterns, contributing to supporting stable performance and increasing productivity. In other words, machine learning helps banks discover hidden patterns in financial data (such as predicting defaults or identifying riskier customers) (Sajani Ranasinghe, Buddhika Ekanayake, & Isuri Fonseka, 2020).Emerging financial intelligence utilizes these tools to develop its ability to read data beyond mere numbers, transforming them into smart decisions. Banking risks (such as credit, liquidity, and operational risks) are reduced when banks have emerging financial intelligence capable of learning from historical data and predicting future scenarios. The result: more stable performance and higher productivity, because the bank reduces its losses and optimizes the use of its resources. (Yuchen, 2025).

2.2. Financial intelligence goals

Financial intelligence aims to enable individuals to achieve their long-term financial goals while supporting organizations in improving their financial performance and increasing their market value. These key goals can be summarized as follows: (Asadi & ALmshhdani, , 2021).

- Mastering the understanding of key financial indicators: This goal involves enhancing the ability to read financial statements such as the income statement, balance sheet, and cash flow statement. This understanding is essential for accurately assessing financial performance and making sound financial decisions.
- The ability to effectively handle financial statements: Financial intelligence enables individuals and organizations to accurately interpret accounting figures, allowing for accurate conclusions about current and future financial performance and supporting balanced strategic decision-making.
- Conducting in-depth financial data analysis: In-depth analysis of financial information helps establish logical connections between figures and results, enhancing individuals' ability to make decisions that support the organization's goals and improve its financial outcomes (Al-Awadly & Shousha, The role of financial intelligence in the relationship between behavioral factors and investment decisions, 2023).
- Understanding the organization's comprehensive vision: Financial intelligence is not limited to interpreting numbers alone; it also encompasses understanding the economic, technological, competitive, and environmental contexts that impact the organization's performance, providing a comprehensive view that contributes to more strategic decision-making.
- Enhancing shareholder value: Financial intelligence seeks to increase organizations' market value and maximize shareholder profitability, which leads to enhanced shareholder wealth, the achievement of long-term financial goals, and the improvement of the internal financial system's efficiency and cost reduction.
- Improving financial operations and risk management: By implementing smart financial practices, operational efficiency can be improved, costs controlled, and potential risks reduced. Understanding the relationship between returns and risks is a key pillar of financial intelligence to ensure stability and sustainable growth (Ali, 2025).

2.3. Seven administrative functions

From a management perspective, financial intelligence is the ability to perform the seven functions of money management, as follows:

- Financial Information System: Is the sum of information, instructions, methods, plans, and procedures required or used by those who will generate money. To successfully develop financial affairs, the level of financial information must be improved to provide the most accurate financial and economic information that best fits each organization's strategy
- Financial Control: Is a measure of the gap between production and instructions, i.e., a measure of compliance. For an organization to be financially successful, it is also necessary to monitor costs, conduct regular and periodic audits of funds, monitor signature systems, and ensure the security and integrity of transactions

- Financial adjust: Is the ability to produce money in accordance with standards in the event of non-conformity. Control is a means of measuring potential gaps, and if gaps exist, the necessary adjustments must be made. This is the third function of financial management (Tudose, M. B., Rusu, V. D., & Avasilcai, S. , 2022).
- Financial Coordination: This is the ability to strengthen financial resources by providing additional or temporary resources in the event of a breakdown in self-control. This means that when expenditures and investments are fragmented and revenue and profit forecasts are inaccurate, we urgently need a more future-oriented policy that refocuses investment and financial allocations to ensure financial success.
- Financial Management: This is the ability to consistently allocate funds in the form of budgets and plans. To ensure future financial success, we must reallocate budgets and financial resources and review accounting and financial organization
- Financial Evaluation: This is the ability to evaluate various forms of financial resource organization to select the most effective ones. To ensure future financial success, we must understand our profit centres and seek profitable businesses, products, and services.
- Financial Orientation: This is the ability to anticipate and forecast the future and provide effective guidance to find the most effective future financial balances (Matrood, 2023). The figure is as follows show Financial Intelligence:

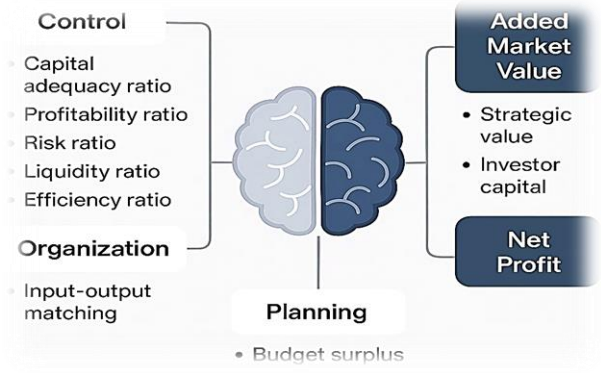

Fig. 1: Financial Intelligence.

Source: (Al-Tablee & Hassoon, 2025).

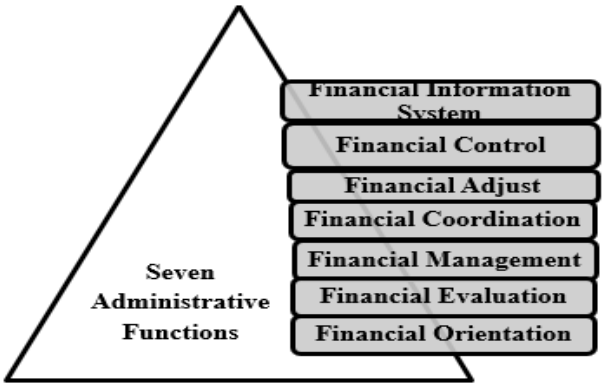

Fig. 2: Seven Administrative Functions.

Source: Researchers through literature.

2.4. Concept of financial performance

Performance is defined as efficiency, effectiveness, and value creation for stakeholders. Therefore, financial performance is an assessment of the effectiveness and efficiency of an organization's use of financial implementation standards. It is one of the many basic methods of evaluation to ensure the financial soundness of an organization, based on examining its financial ratios. (ADEGBOYEGUN & IGBEKOYI, 2022). The results evaluated in the financial results of the business may serve as a reference to determine the organization's status and success in its operational processes. It reflects the level of achievement of the results obtained from implementing the bank's activities over a specific period. Performance has been defined as the inputs and outputs of resources, regardless of the outcome, whether positive or negative, upon which the decision-maker makes the final judgment. It is "efficiency" or the skilful process of generating income over a specific period. It is a financial achievement resulting from increased sales and profits and an increase in the organization's value to its shareholders through the sound management of its funds. Good financial performance indicates an increase in shareholder wealth. (Khalil, 2023).

2.5. Importance of financial performance

It is one of the most important tools used to evaluate corporate performance from various perspectives, meeting the needs of financial users and analysing institutional efficiency. This is due to the following reasons:

- Motivating employees and management, as financial performance serves as a motivational tool for management and employees to achieve the highest levels of performance by directing efforts toward positive results (Muhailan, 2025).

- Measuring the extent of an organization's contribution to economic development, as financial performance measures the organization's contribution to achieving economic and social development by working to increase production and reduce resource waste at the lowest possible cost.
- Evaluating the organization's efficiency, as financial performance is a measure of the organization's efficiency by comparing its results with those of competitors, which helps highlight strengths and weaknesses. It is also used to verify the organization's ability to fulfil its obligations and achieve its financial goals (Najar, 2020).
- Financial performance is used in planning and monitoring actual implementation, as it helps management compare actual figures with planned figures. It also contributes to improving the ability to allocate available resources and use them effectively to achieve desired goals.
- Financial performance contributes to achieving multiple objectives for banks, such as achieving growth, increasing profits, promoting economic development, and enhancing the financial and investment position.
- Financial performance is used to measure companies' efficiency and achieve their strategic objectives. Financial performance supports indicators of profitability, liquidity, activity, and debt, which are essential for assessing an institution's financial position (Kori, Muathe, & Maina, 2020).
- Financial performance helps develop relationships with stakeholders by improving relations with the local and international community by providing reliable information about companies' financial performance, which aids in making efficient decisions that support sustainable growth (Sundqvista, Backlunda, & Chronéera, 2014).

2.6. Productivity as an indicator of financial performance

Productivity is considered one of the most important tools for measuring bank performance. Financial ratios are used to reflect the impact of financial operations on overall performance. This indicator is a fundamental basis for measuring bank financial performance. It is measured by calculating efficiency with effectiveness. Managers use these ratios to identify strengths and weaknesses, which helps in developing appropriate strategies. Financiers use them to measure a bank's performance compared to other banks or to evaluate the effectiveness of management performance. (Khalil, 2023).

2.7. The concept of productivity

Productivity is the process of transforming inputs (raw materials and materials) into outputs desired and demanded by consumers in the form of goods and services. It is the process by which benefits are created. The terms effectiveness and efficiency are used as key indicators of an organization's productivity. (Al-Qahri, 2017). These terms are sometimes viewed as synonymous or as overlapping terms with similar meanings. Efficiency is defined as using the least possible amount of resources to achieve the desired result. This concept is usually measured in terms of funding, inputs, or time. Conversely, the term effectiveness refers to achieving a desired outcome. Effectiveness is a type of activity that often leads to change in organizational management. And Efficiency refers to doing things right, i.e., something is executed most appropriately, given the available resources (high efficiency). On the other hand, effectiveness refers to doing the right things, i.e., choosing and focusing on producing a desired output. It is measured by the following equation:
Effectiveness + Effectiveness = Productivity (Kinza & Amina, 2022).

2.7.1. Effectiveness

It is defined as the relationship between the accuracy and completeness with which users achieve certain goals and the resources expended to achieve them. Measures of efficiency (direct and indirect) are often related to time and cost. In economics, the term efficiency focuses on various aspects of the balance between supply and demand. It also encompasses the ability to use skills and knowledge in appropriate situations within a professional field. It typically includes organization, planning, innovation, and the ability to adapt to new activities. In this sense, acquiring competencies is more challenging than acquiring skills and knowledge, and is measured by the following equation: 100 x Outputs / (Total Inputs) = Effectiveness. (Al-Awadly & Shousha, The role of financial intelligence in the relationship between behavioral factors and investment decisions, 2023).

2.7.2. Efficiency

It is the ability or capacity to accomplish objectives. This means that the focus is limited to achieving the desired objectives, i.e., it relates to the ends rather than the means. Effectiveness differs from the concept of efficiency. Effectiveness is the result of the interaction of the components of the organization's overall performance, including its technical, administrative, and functional activities, and the duration of its impact on the environment. It is also related to the extent to which the organization achieves its objectives. An organization that can achieve its objectives on time and at the lowest cost can be described or judged as an effective organization, measured using the following equation: 100 x (Goals Achieved) / (Goals Set) = Effectiveness (Mu, 2020).

3. Research Methodology

3.1. Descriptive analysis: research sample banks

The Bank of Baghdad (BBOB) was established as a private joint-stock company in Iraq in 1992, becoming the first licensed private bank in the country following the amendment of the Central Bank of Iraq Law. Its fully paid-up capital amounts to 300 billion Iraqi dinars. The bank's beginnings date back to a capital of 100 million Iraqi dinars. In 2004, its shares were listed on the Iraq Stock Exchange. The Bank of the Middle East Investment (BIME) was established as a private joint-stock company in Iraq in 1993. Nominal capital of the bank upon incorporation amounted to (400) million Iraqi dinars. The Bank of Gulf Commercial Bank (BGUC) was established as a private joint-stock company pursuant to the Certificate of Incorporation issued by the Companies Registration Department, pursuant to the provisions of the Iraqi Companies Law No. (21) Of 1997 and its amendments. The bank officially commenced its comprehensive banking activities on April 1, 2000, through its main branch, after obtaining a banking license from the Central Bank of Iraq.

3.2. Measuring and analysing the impact of financial intelligence on productivity

A Sample of Iraqi Private Banks for the period (2011-2023)

- First: Description of Fourth Standard Model: The research takes the impact of financial intelligence (X) as an independent variable on financial performance, represented by (productivity Y4) as the dependent variable, for a sample of Iraqi banks (Bank of Baghdad, Gulf Commercial Bank, and Middle East Iraqi Investment Bank). The model was estimated as shown in the equation below:

$$(Y4) = f(X) \quad (1)$$

$$\Delta Y4_t = C + \sum_{t-1}^{n} \propto_1 Y4_{t-1} + \sum_{t-1}^{n} \propto_2 X_{t-1} + \beta_1 X + \mu_t \quad (2)$$

Where:
Y4: Productivity.
X: Financial Intelligence Index.
Δ: First difference of the variable.
C: Constant term.
N: Upper bound of the optimal lag time.
∝_1, ∝_2: Short-run slope.
β_1: Long-run slope.
μt: Random error term.

- Second Determining Data for the Fourth Standard Model: The researcher dealt with the financial intelligence index (X) data for private Iraqi banks (Baghdad, Gulf Commercial Bank, and Middle East Iraqi Investment), as well as productivity (Y4) as an indicator of financial performance for the same three banks. The researcher relied on the annual data for the three banks (Baghdad, Gulf Commercial Bank, and Middle East Iraqi Investment) for the period (2011-2023). The natural logarithm formula was adopted, and thus, the number of observations was 39) observations, as shown in the following figure.

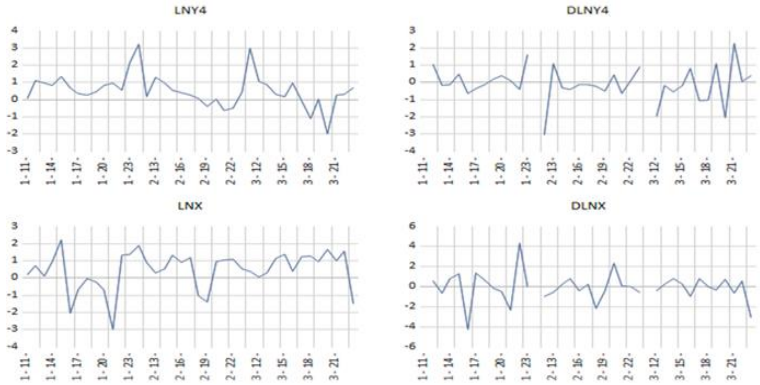

Fig. 3: Financial Intelligence Index (X) and Productivity (Y4) Data for Banks.

(Baghdad, Gulf Commercial, Middle East Iraqi Investment) for Period (2011-2023)

Source: Prepared by the researcher based on the (E-Views 13) program.

From the previous figure, we note that the labels are as follows: LNX: logarithm Natural of (financial intelligence), LNY4: logarithm Natural of (Productivity), DLNX: First difference of (financial intelligence) to logarithm natural, DLNY4: First difference of (productivity) to logarithm natural. And we used the natural logarithm for the following reasons: To reduce variance, to extract the elasticity of financial intelligence to productivity, and to characterize unit Root tests.

- Third: Unit Root Tests, Fourth Standard Model: The results of the table below reveal that the two research variables are stationary at the first difference [(1)], as the value of the (T) statistic for both tests (Levin-Lin-Chu, Im-Pesaran-Shin) is greater than the table, in addition to the value of (P - Value) which is less than (5%), which means rejecting the null hypothesis that the variables are not stationary and accepting the alternative hypothesis. With the two variables (financial intelligence (LnX) and productivity (LnY4)) remaining at the first difference [I (1)].

Table 1: (Levin-Lin-Chu, Im-Pesaran-Shin) Test for Third Standard Model

Unit Root Tests								
(Level)					At first difference			
Tests	Levin – Lin – Chu		Im – Pesaran – Shin		Levin – Lin – Chu		Im – Pesaran – Shin	
	T – Statistic	Prob	T – Statistic	Prob	T – Statistic	Prob	T – Statistic	Prob
Variables								
LnY1	-0.838	0.201	1.518-	0.065	-10.917	0.000	-7.877	0.000
LnX	1.622-	0.052	1.502-	0.067	-1.790	0.037	-1.753	0.040

Source: Prepared by the researcher based on the (E-Views 13) program.

- Fourth F-Test for Cointegration, Fourth Standard Model: The table below demonstrates that there is a long-run relationship (co-integration) between the two research variables (financial intelligence and productivity). The F-Bounds Test statistic reveals this, as it is greater than the upper limit value and at a significance level of 5%. This means rejecting the null hypothesis and accepting the alternative hypothesis of a long-run relationship between financial intelligence (LnX) and productivity (LnY4) in Iraq.

Table 2: F-Test Cointegration, Fourth Standard Model, PARDL

Null hypothesis: No level relationship						
Number of Cointegrating variables: 3						
Number of Cointegrating variables: 1						
Trend type: Unrest constant (Case 3)						
Cross-Section			Obs.		F-Stat.	T-Stat.
1			12		7.299198	-2.890656
2			12		9.928934	-4.287259
3			12		6.635682	-2.909846
	10%		5%		1%	
Sample Size	l(0)	l(1)	l(0)	l(1)	l(0)	l(1)
F-Statistic						
30	4.290	5.080	5.395	6.350	8.170	9.285
Asymptotic	4.040	4.780	4.940	5.730	6.840	7.840
t-Statistic						
Asymptotic	-2.570	-2.910	-2.860	-3.220	-3.430	-3.820
*l (0) and l (1) are respectively the stationary and non-stationary bounds.						

Source: Prepared by the researcher based on the (E-Views 13) program.

- Fifth: Estimating Fourth Panel Auto Regressive Distributed Lag (PARDL) Model: The researcher conducted an estimation process for the Panel Auto Regressive Distributed Lag (PARDL) model using three modelling methods: Dynamic fixed effect (DFE), Mean-group (MG) Method, and Plural Mean-Group (PMG) Method, as follows:

The Dynamic Fixed Effect (DFE) Method: is characterized by the homogeneity of the relationship between financial intelligence (LnX) and productivity (LnY4) for both the short and long term and for all banks (Baghdad, Gulf Commercial Bank, and Iraqi Middle East Investment Bank). This means that the model parameters are equal for all banks in the short and long term. Below is an estimation of the PARDL model using this method, as follows:-

Table 3: Estimation of Fourth PARDL Model Using DFE Method

Dependent Variable: D(LNY4)				
Method: ARDL				
Date: 07/22/25 Time: 17:52				
Sample: 2012 2023				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-Run Coefficients				
LNX	0.132626	0.187636	0.706825	0.4851
Short-Run Coefficients				
COINTEQ	-0.819513	0.123580	-6.631422	0.0000
D(LNX)	-0.132035	0.113098	-1.167434	0.2522
C	0.265472	0.147503	1.799778	0.0820

Source: Prepared by the researcher based on the (E-Views 13) program.

From the previous table, we note that the Dynamic Fixed Effect (DFE) method is characterized by the homogeneity of the relationship between financial intelligence and productivity for the short term and for all banks (Baghdad, Commercial Gulf, Middle East Iraqi Investment) for indictors (liquidity and safety), which means that the model parameters are equal for all banks in the short term.

3.3. Mean group (MG) method

It is unique in that it considers the heterogeneity of the relationship between financial intelligence (LnX) and productivity (LnY4) in both the short and long term. This means that it allows the model parameters to vary for each bank (Baghdad, Gulf Commercial Bank, Middle East Iraqi Investment Bank) in both the short and long term. Below is an estimate of the PARDL model based on this method:

Table 4: Estimation of Fourth PARDL Model Using (MG) Method

Dependent Variable: D(LNY4)				
Method: ARDL				
Date: 07/22/25 Time: 17:52				
Sample: 2012 2023				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-Run Coefficients				
LNX	-0.195461	0.400651	-0.487857	0.6292
Short-Run Coefficients				
COINTEQ	-0.977271	0.059521	-16.41900	0.0000
D(LNX)	0.045231	0.169769	0.266428	0.7917
C	0.675756	0.279156	2.420708	0.0218

Source: Prepared by the researcher based on the (E-Views 13) program.

3.4. Pooled mean group (PMG) method

This method differs from the two methods in that it takes into account the heterogeneity of the relationship between financial intelligence (LnX) and productivity (LnY4) in the short term, meaning that it allows the model parameters to differ for each bank (Baghdad, Gulf Commercial Bank, Middle East Iraqi Investment Bank) in the short term. In addition, it allows the relationship to be homogeneous in the long term for all banks (Baghdad, Gulf Commercial Bank, Middle East Iraqi Investment Bank), meaning that the model parameters are equal for all banks in the long term. Below is an estimate of the PARDL model according to this method. As follows:

Table 5: Estimation of Fourth PARDL Model Using PMG Method

Dependent Variable: D(LNY4)				
Method: ARDL				
Date: 07/22/25 Time: 17:57				
Sample: 2012 2023				
Included observations: 36				
Number of cross-sections: 3				
Dependent lags: 2 (Automatic)				
Automatic-lag linear regressors (3 max. lags): LNX				
Deterministics: Unrestricted constant and no trend (Case 3)				
Model selection method: Akaike info criterion (AIC)				
Number of models evaluated: 8				
Selected model: PMG(1,1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-run (Pooled) Coefficients				
LNX	0.258630	0.107423	2.407587	0.0215
Short-run (Mean-Group) Coefficients				
COINTEQ	-0.894282	0.139513	-6.410043	0.0000
D(LNX)	-0.263972	0.122678	-2.151751	0.0388
C	0.278836	0.362677	0.768829	0.4475
Log-Likelihood:	-27.68818			

Source: Prepared by the researcher based on the (E-Views 13) program.

From the previous table, we note that the Pooled mean group (PMG) method is characterized by taking into consideration the heterogeneity of the relationship between financial intelligence, liquidity, and security. Short-term, meaning that the model parameters vary between the banks (Baghdad, Gulf Commercial, Middle East Iraqi Investment) in the short term.

3.5. Hausman test for the fourth PARDL model

The results of the table below show that the (Prob) value for the Hausman test for both cases indicates that the optimal estimation method is the PMG method. The (Prob) value is greater than 5%, which means rejecting the null hypothesis and accepting the alternative hypothesis. This means that the PMG-PARDL model is the optimal model, in which the long-run parameters are equal for all banks.

Table 6: Hausman Test for Fourth PARDL Model

PMG Hausman Specification Test			
Null hypothesis: Estimator is statistically like the PMG estimator			
Estimator	Stat.	DOF	p-value
Mean Group	1.384050	1	0.2394
Dynamic Fixed Effects	0.670838	1	0.4128

Source: Prepared by the researcher based on the (E-Views 13) program.

4. Results and Discussion

4.1. Interpretation of results of the fourth PMG-PARDL model

- Statistical Interpretation: The results of the Table above financial intelligence index (LnX), are statistically significant in the long run through the value of the (T) test, which is greater than the table. In addition, the value of (P – P-P-Value) is less than (5%), thus rejecting the null hypothesis and accepting the alternative hypothesis. An increase in the financial intelligence index (LnX) by (1%) leads to an increase in the productivity index (LnY4) for the three banks (Baghdad, Commercial Gulf, Iraqi Middle East Investment) by (0.26%), and the opposite occurs in the case of a decrease. The reason behind this decrease in the productivity flexibility towards financial intelligence in banks is that the latter is employed more in the areas of risk management, credit analysis, and strategic decision support, which makes its impact on operational productivity weak in the short term. This necessitates enhancing the investment of this intelligence in developing the technological infrastructure, improving human resource efficiency, and increasing the harmony between financial analysis and daily banking operations. Moreover, if any imbalance occurs in this relationship in the short term, the error correction model will restore balance to the economy at a speed of (-0.8943) annually, which means that approximately (89.43%) of the imbalance in the shock of last year will be corrected in the current year.
- Economic Interpretation: The results of the table reveal a long-term direct relationship between financial intelligence and banking productivity. As financial intelligence increases, the productivity (financial performance) of the banks (Baghdad, Gulf Commercial, and Middle East Iraqi Investment) increases
- A Comparison between Iraqi private banks and models from Emerging Markets: in some Middle Eastern/African countries, including Egypt, Turkey, and Jordan, as models representing “emerging markets” because they have official reports and reliable, comparable banking indicators. Through the following table

Table 7: A Comparison between Iraqi Private Banks and Models from Emerging Markets in Some Middle Eastern/African Countries

Dimension /Indicator	[1]Iraqi private banks (model)	[2]Egypt (Emerging Market)	[3]Türkiye (a large emerging market)	[4]Jordan (Small-Moderate Emerging Market)

[1] Central Bank of Iraq's Bulletins and Annual Reports
[2] Central Bank of Egypt Bulletins and Annual Reports, cbc.org.eg
[3] Bulletins and annual reports for tbb.org.tr
[4] Bulletins and annual reports of the Central Bank of Jordan, cbj.gov.jo

Size of banking sector (value/role)	Small to medium-sized banking sector compared to the economy; highly dependent on government bills and bonds (bank liquidity accumulation)	A relatively larger sector, broader financing capabilities, and a greater role in financing local economic activity.	A large and integrated banking sector, playing a central role in the national financial system	A relatively stable sector with a focus on domestic lending and conservative oversight
Non-performing loan ratio (NPL)	Relatively high non-performing loan to deposit ratio	relatively low	Variable; generally, the NPL ratio is relatively low, but there are intermittent sectoral pressures	Medium; NPL fluctuation depending on the source
Capital Adequacy Ratio (CAR)	Volatile; tendency to invest in government instruments makes it conservative, but exposure to operational and credit risks is apparent due to high liquidity components, and variation in capital indicators.	Strong capital adequacy ratio, financial soundness indicators	Capital and solvency are generally strong, but profitability is subject to inflationary pressures and exchange rate risks.	Conservative regulatory authorities maintain generally good capital ratios.
Digitization and Machine Learning/Technology	Gradual Adoption: Private banks are adopting basic digital solutions (payment services, online banking), but widespread adoption of ML and advanced analytics is still nascent. Strong opportunities exist to expand "emerging financial intelligence" using credit behavior data.	Strong digital acceleration and the beginnings of advanced analytical applications are initiatives to enhance financial inclusion.	Widespread technology adoption (big data, ML, advanced credit scoring systems), especially among major banks, but varies by bank.	Moderate technology adoption focused on core digital services with initiatives to improve lending and governance.
Basic risks	Relatively high credit risk, liquidity risk associated with monetary and political changes, and operational/governance risk	Exchange rate and inflation risks were high and then declined.	Exchange rate, inflation, and credit risks are variable; external exposures and monetary policies create volatility	Moderate credit risk, exposed to regional fluctuations and domestic demand impacts
Prospects for Banking Productivity/Performance	The potential for productivity improvements is significant when developing “emerging financial intelligence” (improving risk assessment, expanding regulated lending, reducing NPL) — but requires strong technology and governance investments.	Bank performance improves with strong financial soundness indicators and project financing opportunities, boosting productivity.	Banks with productive capacity and growth programs, but affected by the macroeconomic environment; performance varies between banks.	Stable productivity but limited growth; improvements could come through digitization and governance

Source: Prepared by the researcher based on Bulletins and annual reports of the Central Bank (Iraqi, Egyptian, Turkish, Jordanian).

Finally, the research results showed that adopting financial intelligence tools leads to improved service quality, increased competitiveness, and enhanced customer confidence. Furthermore, the economic challenges faced by Iraqi banks after 2013 were highlighted, as private banks rely heavily on government bonds and bills, and credit risks are relatively high, along with liquidity risks linked to monetary and political changes. The potential for improving productivity is relatively large, as it requires developing "emerging financial information" (improving risk assessment, expanding structured lending, and reducing non-performing loans). Based on the above, it can be said that investing in developing the financial intelligence of employees and banking systems is an investment in the future of banks themselves, ensuring their position in the local and regional markets, which opens up broader horizons for further growth and innovation.

5. Conclusion and Recommendations

- The benchmark results show a statistically significant, positive, and long-term relationship between financial intelligence and banking productivity in Iraqi private banks. This indicates that efforts to enhance financial understanding, analytical capabilities, and financial resource management translate into sustained improvements in the efficiency and effectiveness of banking operations over the long term.
- Despite the positive effect, the results indicate that the elasticity of banking productivity to financial intelligence is relatively low. This means that an increase in financial intelligence leads to an increase in productivity, but at a lower rate than the increase in financial intelligence.
- Given the long-term positive impact of financial intelligence on productivity, Iraqi private bank management should consider investing in enhancing the financial intelligence of its employees, especially managers, as a strategic priority and not simply an operational cost. It is recommended to develop advanced and ongoing training programs that focus on the comprehensive aspects of financial intelligence, including advanced financial analysis, complex financial risk management, strategic planning, and forecasting economic trends, with an emphasis on practical applications in the banking sector.

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