






# “Factors influencing commercial bank profitability in Iraq: A quantile regression approach”

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<b>ARTICLE INFO</b>	Hatem Hatef Abdulkadhim Altaee, Naz Hiwa Ghani, Saya Jamal Azeez and Sameer Abduljabbar Abdulwahab (2024). Factors influencing commercial bank profitability in Iraq: A quantile regression approach. <i>Banks and Bank Systems</i> , 19(2), 172-183. doi: <a href="https://doi.org/10.21511/bbs.19(2).2024.14">10.21511/bbs.19(2).2024.14</a>
<b>DOI</b>	<a href="http://dx.doi.org/10.21511/bbs.19(2).2024.14">http://dx.doi.org/10.21511/bbs.19(2).2024.14</a>
<b>RELEASED ON</b>	Thursday, 20 June 2024
<b>RECEIVED ON</b>	Sunday, 11 February 2024
<b>ACCEPTED ON</b>	Thursday, 18 April 2024
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<b>JOURNAL</b>	"Banks and Bank Systems"
<b>ISSN PRINT</b>	1816-7403
<b>ISSN ONLINE</b>	1991-7074
<b>PUBLISHER</b>	LLC “Consulting Publishing Company “Business Perspectives”
<b>FOUNDER</b>	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

**51**



NUMBER OF FIGURES

**0**



NUMBER OF TABLES

**10**

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## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

**Received on:** 11<sup>th</sup> of February, 2024

**Accepted on:** 18<sup>th</sup> of April, 2024

**Published on:** 20<sup>th</sup> of June, 2024

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### **Conflict of interest statement:**

Author(s) reported no conflict of interest

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# FACTORS INFLUENCING COMMERCIAL BANK PROFITABILITY IN IRAQ: A QUANTILE REGRESSION APPROACH

## Abstract

This study aims to empirically examine the influence of bank-specific determinants, macroeconomic factors, and governance factors on profitability in Iraq's banking industry. In addition, bank-specific and macroeconomic determinants were included in the analysis. In terms of governance, the average of corruption control and rule of law was used. Different pre-estimation tests were used to check the properties of the data. The method of moment quantile regression was used as the baseline model. The PCSE and FGLS techniques were used for robustness checks. A sample of balanced panel data consisting of nine commercial banks listed on the Iraq stock exchange from 2012 to 2021 was selected. The results suggested that liquidity and total debt to total shareholders' equity ratios have a significant positive relationship with ROA. Inflation and openness negatively impact bank profitability only at the 50th and 90th quantiles. Institutional governance appeared to be a positive and significant contributor to bank profitability. The findings suggest that a certain level of liquidity is required for a continuous increase in ROA. Moreover, institutional governance emerged as a noteworthy and positive factor influencing bank profitability.

## Keywords

profitability, bank-specific, macroeconomic, governance,  
MMQREG, FGLS, PCSE

## JEL Classification

G21, G28, M41, M48

## INTRODUCTION

Identifying bank profitability determinants is an important task facing commercial banks as they confront the risks associated with the required conditions in a highly globalized and open world. At the same time, it would improve the competitiveness of the banks. A profitable banking sector is more resilient in the face of adverse shocks, playing an important role in sustaining the stability of the financial system.

The banking sector is the basis of any financial system and economy. Commercial banks serve as essential players in the growth and development processes of both developed and developing economies by mobilizing resources and ensuring their effective allocation. Commercial bank profitability is affected by a multitude of factors, some originating from within the bank (internal) and others stemming from the environment (external).

Iraq's banking sector is the strongest segment of its financial services industry, with a history dating back to 1890 when the Ottoman Bank was opened in Baghdad Hamid and Alwan (2023). The number of

commercial banks operating in Iraq at the end of 2020 reached 76 banks, seven of which were state-owned banks, including three commercial banks, three specialized banks, and one Islamic bank. 69 private banks, including 27 domestically-owned Islamic banks, 24 domestically-owned commercial banks, 16 foreign-owned banks, and two foreign-owned Islamic banks CBI (2020). The Iraqi financial and banking systems were significantly influenced by the economic and political environment that prevailed in the country after 2003.

According to the World Bank's World Global Financial Development, Iraq's average bank return on assets ranked third lowest in 2021, preceding Greece and Lebanon. The average return was as low as  $-0.027$ , which is well below the overall average of  $1.24$ . Recognizing this fact allows for an understanding of the importance of this research, which focused on investigating the factors influencing the return on assets for a selected sample of Iraqi banks.

## 1. LITERATURE REVIEW

To conduct this study, a literature review was undertaken, specifically examining the effect of bank-specific, macroeconomic, and governance factors on bank profitability at the individual country level and as a group of countries. The relationship between inflation and bank performance is not always easy to understand, though. Higher inflation reduced lending and increased interest expenses and income, which, therefore, reduced banks' net interest income, according to certain studies.

Profitability is often used as a measure of a bank's performance; this indicator reflects the effectiveness of management in managing the assets of the bank. In studies that concentrate on profit determinants, return on equity (ROE) and return on assets (ROA) are the most frequently utilized indicators. The principal differentiator between the two measures is financial leverage or debt.

Return on assets (ROA) is used in this study as a measure of bank performance. This measure has been used as a measure of bank performance in several bank profitability studies, including Obeid (2023), Al-Homaidi et al. (2018), Didar (2019), Nurhayati et al. (2021), Khan (2022), and Muslimin and Hannase (2023).

When considering the literature on governance and bank profitability, the conclusions suggest no consensus. While some research finds that there is a negative relationship between governance and bank performance, other research shows that there is a positive relationship between the two variables. Altaee et al. (2013) have found that gov-

ernance positively contributes to bank profitability in the GCC. Jadah et al. (2020) used a sample of 18 Iraqi conventional banks in the period from 2005 to 2017 to examine the impact of government effectiveness on bank performance. He concludes that government effectiveness has a significant and positive impact on bank performance. Kandil (2009) examines the influence of institutional quality and governance on the risk and performance of financial institutions in the MENA region, using a sample of banks from 18 countries from 2005 to 2017. The main conclusion that has been reached is that the overall quality of institutions is significantly and negatively correlated with bank performance.

Numerous studies have examined the relationship between economic activity peroxide by GDP and bank profitability. Several studies, such as Yüksel et al. (2018), Sinişin and Socol (2020), Gazi et al. (2021), and Yuan et al. (2022), have found a positive effect of GDP on bank profitability. However, some other researchers, like Tan and Floros (2012), concluded that GDP has no significant effect on bank performance.

The size of a bank serves as a metric to characterize its financial prosperity, which is determined by the amount of bank assets. Many investors hold the belief that larger banks, in terms of their asset size, offer greater security and profitability compared to smaller banks. This perception is grounded in factors such as economies of scale and the more robust establishment of larger banks when compared to smaller banks. Several previous studies were conducted by Hameeteman and Scholtens (2000), Noman et al. (2015), Sarwar et al. (2018), Anggari and Dana (2020), Islam et al. (2022),

Yuan et al. (2022), Jigeer and Koroleva (2023), and Sudiyatno et al. (2024). Generated empirical data illustrate that bank size exerts a detrimental impact on bank profitability. Some other studies, such as Allen and Rai (1996), Al-Harbi (2019), and Islam et al. (2021), found opposite results. Moreover, some other studies, such as Bangun (2019), Tharu and Shrestha (2019), AlFadhli and AlAli (2021), and Naseri et al. (2020), revealed that bank size really does matter in the banking industry.

Rahman et al. (2023) attempted to investigate the impact of trade openness on the cost of financial intermediation and bank performance. System generalized method of moments (GMM), fixed effect, pooled ordinary least squares (OLS), and vector error correction model (VECM) regression methodologies were employed. To test the formulated hypothesis, a sample of 885 banks from BRICS countries was used over the period 2000 to 2017. The main results showed that embedding higher trade openness improves bank performance and decreases financial intermediation costs. Khan et al. (2021) investigated the impact of trade on financial development in the GCC region using a dataset of 43 Islamic and 49 conventional banks for the period 2007–2015. The main outcome of this study is that trade has a positive effect on the profitability of both Islamic and conventional banks.

Among several internal determinants of profitability, the most commonly used bank-specific characteristics are considered in the study as potential determinants of Iraqi banks' profitability. Precisely, total debt to total shareholders' equity, the ratio of loan loss provisions to total loans, current assets to current liabilities, and total loans to total deposits.

Numerous studies have been done on the effects of bank liquidity and profitability. Some studies have found that higher liquidity levels are associated with profitability. Think et al. (2022) examines the relationship between liquidity and bank profitability in Vietnam. ROA, ROE, and NIM are used as measures for profitability. The study analyzes data from 18 Vietnamese listed commercial banks for a period of nine years, from 2011 to 2019. The study uses a panel regression for estimation. A similar result has been obtained by Gazi et al. (2021), who investigated the impact of liquidity

on the Bangladesh banking sector using fixed effects and random effects models for a period covering 2011 to 2020. Yuan et al. (2022) investigate the influence of ROA and ROE on two lists of total banks from Bangladesh and India. The period covered in this study is 2010 to 2021. The Pooled Ordinary Least Square Approach, Random Effect Model, and Fixed Effect Model were employed in this examination.

The study finds that bank profitability, as measured by ROA, positively correlates with bank size and debt-to-asset ratio. While the deposit-to-asset ratio and the loan-to-deposit ratio are found to be negative and significant, the equity-to-asset ratio and debt-to-equity ratio have no impact on a bank's profitability. The inflation rate and the GDP growth rate, identified as macroeconomic variables, have been determined to display a positive and significant correlation with ROA. Ibrahim (2017) investigated the factors that influenced bank profitability in Iraq from 2005–2013 and discovered that liquidity had a beneficial impact on the banks' ROA.

Although there are a number of studies regarding the profitability of commercial banks in Iraq, this study differed in its use of the Method of Moment Quantile Regression, which can overcome undesirable characteristics in the data, in addition to the method of calculating the governance index as an average for the dimensions of corruption control and the level of the rule of law.

To examine the determinants of bank profitability in the banking industry of Iraq, a number of hypotheses were keenly sought to be tested, including the following:

$H_{01}$ : *Debt-to-equity ratio exhibits no significant impact on commercial bank profitability in Iraq.*

$H_{02}$ : *Liquidity exhibits no impact on bank profitability in Iraq.*

$H_{03}$ : *Asset size has no significant impact on bank profitability in Iraq.*

$H_{04}$ : *Loan-to-deposit ratio exhibits no significant impact on bank profitability in Iraq.*

- $H_{05}$ : Economic growth has no significant effect on commercial banks' profitability in Iraq.
- $H_{06}$ : Openness has no significant effect on Iraq commercial bank profitability in Iraq.
- $H_{07}$ : Inflation has no significant effect on commercial bank profitability in Iraq.
- $H_{08}$ : Governance has no significant effect on commercial bank profitability in Iraq.

## 2. METHODOLOGY

This study uses a balanced panel of data, and the time periods for banks range from 2012 to 2021. Bank-level data are collected directly from the annual reports of individual banks (Table A1) or calculated indirectly, as stated in Table 1. Macroeconomic data were collected from the World Bank Indicators (WDI) database. The data on governance indicators were obtained from the World Bank Worldwide Governance Indicators | DataBank.

This study uses the Method of Moments Quantile Regression (MMQREG) to achieve the intended objectives. This newly structured novel method will allow us to trace the heterogeneous and distributional variations across different quantiles between the dependent variable (ROA) and its selected profit determinants at the bank.

The baseline model to be estimated can be written as follows:

$$ROA = f \left( \begin{matrix} DER, LIQ, SIZE, LDR, \\ GDPPCGR, OP, CPI, \\ INSGOV \end{matrix} \right). \quad (1)$$

Following Machado and Silva (2019) and Jahanger et al. (2023), the conditional quantile equation of a random variable  $Q_Y(\tau|X)$  can be written as:

$$Y_{it} = \alpha_i + X'_{it}\beta + (\hat{u}_i + Z'_{it}\vartheta)\mu_{it}, \quad (2)$$

where  $i$  (1, 2, ..., 9) denotes the cross-section dimension, and  $t$  (1, 2, ..., 10) denotes the time dimension.  $Y_{it}$  is the response variable and  $X_{it}$  is the independent variable, which in the present study are DER, LIQ, SIZE, LDR, GDPPCGR, OP, CPI, and INSGOV.  $\alpha$ ,  $\beta$ ,  $\vartheta$ , and  $\mu_{it}$  are parameters to be estimated within the model. Besides,  $Z$  is a  $k$ -vector of the known components of  $X_{it}$ .  $\mu_{it}$  is an error term assumed to be (iid).

Now, following Ike et al. (2020) and Jahanger et al. (2023), equation (2) can be rewritten as:

$$Q_Y(\tau|X_{it}) = (\alpha_i + \hat{u}_i q(\tau)) + X'_{it}\beta + (Z'_{it}\vartheta q(\tau)) \quad (3)$$

In equation (3), the term  $Q_Y(\tau|X_{it})$  denotes the quantile distribution of the dependent variable  $Y_{it}$  (bank profitability ROA).

## 3. RESULTS AND DISCUSSION

The descriptive statistics of the variables included in the panel are incorporated in Table 2. There is a point that merits attention: the kurtosis analysis divulges that all variables, except for SIZE, INSGOV, and OP, carry relatively heavier tails, with values exceeding the threshold limit of three. Furthermore, the examination of skewness affirms that all factors, but not GDPPCGR and LOP, exhibit a right-tail distribution skewness, and the variables demonstrate moderate symmetry.

**Table 1.** Notations, definitions, and sources of data used

Notation	Definition	Source
DER	Total Debt / Total Shareholders' Equity	Bank Scope
LIQ	Current Assets / Current Liabilities	Bank Scope
SIZE	Natural Logarithm of Total Assets	Bank Scope
LDR	Total Loans / Total Deposits	Bank Scope
GDPPCGR	Annual Growth Rate of GDP	WDI
OP	Trade openness (Exports + Imports) / 2	WDI
CPI	Inflation (Annual growth of Consumer Price Index)	WDI
INSGOV	(The Level of Rule of Law + Corruption control) / 2	WGI



**Table 2.** Descriptive statistics

Source: Author calculations (2023).

Statistics	ROA	DER	LIQ	SIZE	LDR	GDPPCGR	OP	CPI	INSGOV
Mean	0.524	1.727	21.994	23.122	0.659	0.568	4.168	4.777	-1.524
Median	0.012	1.241	1.769	20.877	0.367	1.050	4.199	4.782	-1.537
Maximum	45.710	5.276	1815.57	28.069	4.234	11.023	4.299	4.849	-1.406
Minimum	0.000	0.324	1.137	19.636	0.000	-14.090	4.000	4.721	-1.629
Std. Dev.	4.817	1.286	191.185	3.415	0.869	6.708	0.091	0.032	0.081
Skewness	9.328	1.264	9.328	0.353	2.479	-0.523	-0.462	0.415	0.267
Kurtosis	88.009	3.612	88.010	1.186	9.202	3.221	2.032	3.617	1.575
Jarque-Bera	28405***	25.382***	28405***	14.201***	236.40***	4.291	6.711**	4.012	8.684**
Probability	0.000	0.000	0.000	0.001	0.000	0.117	0.035	0.135	0.013
Observations	90	90	90	90	90	90	90	90	90

Note: Figures below the estimated result represent the P-value. \*\*\*  $p > 0.01$ , \*\*  $p > 0.05$ , and \*  $p > 0.1$ .

**Table 3.** Shapiro-Wilk W test for normal data

Source: Author calculations (2023).

Variable	Obs.	W	V	z	Prob>z
ROA	90	0.08305	69.357	9.35	0.0000
DER	90	0.83621	12.389	5.551	0.0000
LIQ	90	0.08302	69.36	9.35	0.0000
SIZE	90	0.72803	20.572	6.669	0.0000
LDR	90	0.67588	24.516	7.056	0.0000
GDPPCGR	90	0.93875	4.633	3.382	0.0004
OP	90	0.94443	4.203	3.167	0.0008
CPI	90	0.88642	8.591	4.743	0.0000
INSGOV	90	0.92319	5.81	3.881	0.0001

Moreover, the Jarque-Bera statistics (Bera & Jarque, 1981) disclose that the null hypothesis of normality is rejected for seven out of nine variables.

Table 3 incorporates the Shapiro-Wilk test results. The results provide a similar outlook to what has been obtained using the Jarque-Bera test. In light of what has been inferred from the results of the previous two tests, it becomes crucial to select an estimation technique that takes the variables' non-normality property into consideration.

The next step is to verify the presence of multicollinearity between any pair of variables. A pairwise correlation test is conducted, and the results are stated in Table 4. The values of the pairwise correlation coefficients clearly show that the selected variables do not share any strong association.

The variance inflation factors (VIFs) are carried out to further study the issue of multicollinearity in the panel. According to O'Brien (2007), if  $0 < \text{VIF} < 10$ , one can safely conclude that multicollinearity does not exist. Here, all VIFs are less than 5 (see Table 5).

**Table 4.** Correlation matrix of panel variables

Source: Author calculations (2023).

Variables	DER	LIQ	SIZE	LDR	GDPPCGR	OP	CPI	INSGOV
DER	1.0000	–	–	–	–	–	–	–
LIQ	-0.0479	1.0000	–	–	–	–	–	–
SIZE	0.0858	-0.1089	1.0000	–	–	–	–	–
LDR	-0.3042	-0.0344	-0.0105	1.0000	–	–	–	–
GDPPCGR	0.0449	0.1329	0.0280	-0.0605	1.0000	–	–	–
OP	0.1154	0.1527	0.2175	-0.0823	0.2462	1.0000	–	–
CPI	-0.0794	-0.1854	-0.1662	0.1036	-0.3493	-0.5099	1.0000	–
INSGOV	0.1504	0.1521	0.2563	-0.0619	0.1123	0.6528	-0.5096	1.000

**Table 5.** VIF results

Source: Author calculations (2023).

Variable	VIF	1/VIF
DER	1.12	0.889805
LIQ	1.09	0.921181
SIZE	1.09	0.918769
LDR	1.11	0.898715
GDPPCGR	2.14	0.467647
CPI	2.06	0.485506
OP	1.42	0.704402
INSGOV	3.12	0.320834

Panel data integrate both time-series and cross-sectional data, where the same unit cross-section is measured at different points in time. One should check for a problem that often exists in time-series data, for instance, the serial correlation of the disturbance terms. At the same time, it is likely that the problem of the cross-section data may be encountered. Therefore, when the panel data are used, the probability of the existence of autocorrelation should be checked. For this task, the autocorrelation test, as conducted by Wooldridge (2002), is utilized (see Table 6).

**Table 6.** Wooldridge test results

Source: Author calculations (2023).

$H_0$ : No first-order autocorrelation	
F(1, 8)	prob.
13.293	0.0065

Based on the result reported in Table 6, the null hypothesis of no first-order autocorrelation is rejected at the 1% significant level. From the result listed in Table 6, the probability value is less than 0.01 percent. Thus, there is an autocorrelation problem in the panel.

**Table 7.** Wald test results

Source: Author calculations (2023).

$H_0$ : There is homoskedasticity	
chi2 (9)	prob.
4.839	0.0000

Table 7 depicts the results of the modified Wald test for group-wise heteroskedasticity. The results outline that the panel dataset is serially correlated and heteroskedastic at the 1 percent significant level. From the result listed in Table 7, the probability value is less than 0.01%. Thus, there is an autocorrelation problem in the panel.

Table 8 presents the baseline results of the MMQREG analysis, in which five quantiles of the conditional distribution of ROA (the 15th, 25th, 50th, 75th, and 95th quartiles) are specified. The results of the MMQREG method reveal that DER is positively associated with ROA across all the quantiles except the upper one. Interestingly, the signs of location and scale for this variable are different, suggesting that the rise in DER reduces average bank profitability. Moreover, in the lower quantiles, the DER has a greater effect on bank profitability than in the higher quantiles. For instance, at the 15th quantile, a 1% boost in DER soars profitability by 0.84%, whereas at the 95th quantile, a 1% upswing in DER inflates bank profitability by 0.28%. This result indicates that each decrease in the debt-to-equity ratio will be followed by an increase in profitability of around 0.6%, assuming other independent variables are considered constant. Based on the obtained results, it is concluded that  $H_0$  is rejected. This shows that the debt-to-equity ratio has a partially positive and significant impact on the return on assets.

The findings indicate that LIQ's influence on bank profitability is homogeneous across profitability-conditional distributions. This result further elucidates that a 1% increase in LIQ will increase ROA by 0.52 across all quartiles.

The baseline model's results also proved that bank size has not significantly influenced profitability (ROA). The paper's findings are comparable with those of some recent studies (Tharu & Shrestha, 2019; Jadah & Mohammed, 2020). Nonetheless, they contradict Jadah et al.'s (2020) study, which found that bank size is significant when it comes to justifying the variations in banks' profitability in Iraq during the period 2014–2017.

Likewise, the growth of per capita gross domestic product (GDPPCGR) was found to have a positive and insignificant relationship with ROA. This result aligns with the findings of Jadah and Mohammed (2020), indicating that the performance of Iraqi commercial banks from 2009 to 2013 was not significantly influenced by GDP, and that of Krishna et al. (2021), who indicate that the performance of banks in the Pacific Small Island Developing State is indifferent during both economic downturns and economic growth. Thus, hypothesis 5 is rejected.

**Table 8.** MMQREG estimation results

Source: Author calculations (2023).

Variable	Location	Scale	Quantile				
			15th	25th	50th	75th	95th
_Cons	1.1136***	0.5084*	0.3110	0.7635	1.1391***	1.4540***	2.4333***
	0.0021	0.0612	0.6432	0.1025	0.0010	0.0000	0.0002
DER	0.0063***	-0.0013	0.0084***	0.0072***	0.0062***	0.0054***	0.0028
	0.0000	0.2145	0.0015	0.0001	0.0000	0.0001	0.2776
LIQ	0.0252***	0.0000***	0.0252***	0.0252***	0.0252***	0.0252***	0.0252***
	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000
SIZE	-0.0004	-0.0001	-0.0002	-0.0003	-0.0004	-0.0004	-0.0006
	0.5611	0.8134	0.8690	0.7234	0.5492	0.4463	0.5606
LDR	-0.0048	0.0023	-0.0084	-0.0064	-0.0047	-0.0033	0.0011
	0.1119	0.3154	0.1307	0.1034	0.1110	0.2463	0.8408
GDPPCGR	0.0004	0.0001	0.0003	0.0004	0.0004	0.0004	0.0006
	0.1821	0.7891	0.5786	0.3567	0.1722	0.1101	0.2995
OP	-0.0544**	-0.0202	-0.0226	-0.0405	-0.0555**	-0.0680***	-0.1068**
	0.0266	0.2722	0.6174	0.2034	0.0210	0.0031	0.0158
CPI	-0.1597**	-0.0696	-0.0497	-0.1117	-0.1632***	-0.2063***	-0.3405***
	0.0146	0.1547	0.6796	0.1857	0.0097	0.0010	0.0039
INSGOV	0.1007***	0.0511**	0.0200	0.0655*	0.1032***	0.1349***	0.2333***
	0.0008	0.0232	0.7202	0.0896	0.0002	0.0000	0.0000

Note: Figures below the estimated result represent the P-value. \*\*\*  $p > 0.01$ , \*\*  $p > 0.05$ , and \*  $p > 0.1$ .

The annual inflation rate, as measured by the natural logarithm of the CPI, was used to control for the effects of inflation. According to Pervan et al. (2015), a higher inflation rate will result in higher interest rates on loans, which in turn will create greater bank profitability. Alternatively, a higher inflation rate impacts the financial plans of borrowers, which threatens their liquidity and restricts their ability to pay debts. An increase in interest rates can uplift the risk associated with loan repayment. The findings of the present study show a significant negative impact of inflation rates on the profitability of Iraqi banks in the 50th to 95th quantiles. This result indicates the inability of banks to predict inflation. Accordingly, the seventh hypothesis is rejected, suggesting that the performance of Iraqi banks is influenced by the inflation rate. This finding is in line with the conclusions of Jadah et al. (2020), who explored the negative association between the inflation rate and the profitability of 18 Iraqi banks.

Additionally, there are highly significant and negative coefficients on trade openness variables across the 50th and 95th quantiles. There might be several factors behind this result, including the overall economic environment and the adaptability of banks to changing market conditions.

This study accounts for the impact of governance, represented by institutional governance, on bank profitability by using the governance indicator that was compiled by Kaufmann et al. (2005). Following Wen et al. (2022), a single-year index was extracted by taking the average of the rule of law and corruption control.

One can conclude that institutional quality has a strong influence on bank performance, and this effect is intensified within the 50th to 95th quantiles. This finding provides evidence in support of hypothesis number eight that governance has an impact on ROA. This finding aligns with that of Alshareef and Rezgallah (2023), indicating a positive and significant relationship between the profitability of banks and the corruption control level. Furthermore, Jadah and Mohammed (2020) arrived at a similar conclusion by identifying a significant negative association between political instability and bank performance in Iraq during the period from 2014 to 2017.

To provide robust checks, two traditional regression models were employed, namely, the Panel-Corrected Standard Errors (PCSE) and the Feasible Generalized Least Squares (FGLS), due



**Table 9.** Results of the conditional mean approaches

Source: Author calculations (2023).

Variables	FGLS	PCSE
DER	0.0061*** 0.0000	0.0059*** 0.0000
LIQ	0.0252*** 0.0000	0.0252*** 0.0000
SIZE	-0.0002 0.2020	-0.0002 0.6340
LDR	-0.0044*** 0.0000	-0.0056* 0.0710
GDPPCGR	0.0004*** 0.0000	0.0005 0.1630
LOP	-0.0559*** 0.0000	-0.0582* 0.0670
LCPI	-0.1631*** 0.0000	-0.1582* 0.0540
INSGOV	0.0833*** 0.0000	0.0940** 0.0200
Cons	1.1062*** 0.0000	1.1108*** 0.0100

Note: Figures below the estimated result represent the P-value. \*\*\*  $p < 0.01$ , \*\*  $p > 0.05$ , and \*  $p < 0.1$ .

to the long panel used. The presence of both serial correlation and cross-sectional dependence in the data was confirmed with Wooldridge's (2002) test of serial correlation and the Wald test for heteroscedasticity, respectively. Driscoll-Kraay standard errors are applied due to their heteroskedastic and autocorrelation-consistent properties, making them robust against general forms of cross-sectional dependence and tem-

poral dependence, as demonstrated by Hoechle in 2007.

Table 9 reports the outcomes of those models. The information presented in Table 8, along with the figures listed in Table 9, will help track the overall trend in the findings and help reach robust inferences. It is obvious from Table 9 that the results are similar to those displayed in Table 8.

## CONCLUSION AND SUGGESTIONS

This study aims to empirically explore the influence of bank-specific determinants, macroeconomic factors, and governance factors on profitability in Iraq's banking industry. In terms of governance, the average of corruption control and rule of law was used. The return on assets (ROA) metric, reflecting bank profitability, was regressed against nine variables encompassing macroeconomic, bank-specific, and governance aspects. Data from nine private commercial banks listed on the Iraq Stock Exchange (ISE) between 2012 and 2021 were utilized for this analysis.

The recently developed MMQREG method serves as the baseline estimation technique to investigate the heterogeneous and distributional variations across different quantiles. Two long-run regressions were employed to validate the results' robustness.

The main conclusions are as follows. First, liquidity has a significant positive impact on bank profitability. Second, the size of a bank has no impact on the bank's profitability over the distribution of the independent variable. Third, the total loan-to-total deposit variable (LDR) has a significant positive impact on bank profitability. Regarding the macroeconomic variables, the results dictate that openness, as well as inflation, have contributed negatively to bank profitability. This gives the impression that Iraqi banks

lack the ability to compete in a more open environment. Furthermore, they failed to anticipate future changes in the general price level. Lastly, institutional governance has a positive and significant impact on the profitability of banks.

Based on the above analysis, the following policy recommendations are put forward. First, bankers and policymakers should place emphasis on the bank-specific factors that play an important role in the profitability of Iraqi banks. More specifically, the profitability of commercial banks in Iraq can be enhanced as bank liquidity increases. Moreover, controls of corruption and an increase in the level of the rule of law are essential determinants of bank profitability. Thus, more attention should be given to those factors.

## AUTHOR CONTRIBUTIONS

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## APPENDIX A

**Table A1.** List of banks

No.	Bank
1	Ashur Bank
2	Baghdad Bank
3	Credit Bank of Iraq
3	Credit Bank of Iraq
5	Iraqi Investment Bank
6	Iraqi middle east Bank
7	Mousel Bank
8	National Bank of Iraq
9	Union Bank