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RESEARCH ARTICLE

The Impact of Government Credits on Banks' Risk and Profitability (Case Study: the Member States of the Organization of Islamic Cooperation)

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Abstract

Profitability and risk indicators are considered factors for evaluating financial and banking systems. A bank is considered stronger than another if it is stable and capable of absorbing risks. This research aims to investigate the influence of factors affecting the risk and profitability of banks, emphasizing the role of government credits. The study's statistical population is all banks in the central bank's database between 2005 and 2019. In this study, to investigate the factors affecting profitability in the banking industry of the Organization of Islamic Cooperation, the emphasis was on the role of government credit. The Generalized Method of Moments System (GMM-SYS) was used. The results show that while previous government loans and credits have a negative and significant effect on banks' profitability, current government loans and credits have a positive and significant effect on risk. The high level of government loans and credits, as an indicator of financial development, and the high level of domestic investment, indicate the development of a country's financial systems. In countries where the financial system emphasizes public sector payments, transaction costs, risk control and management, and savings mobility are higher than in other countries. Specifically, the highest rates are in high-income countries, indicating the role of banks in the financial markets of those countries.

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1. Introduction

Government credit programs are inclusive in many countries and are influential in allocating capital, especially to infrastructure investment and State-Owned Enterprises (SOEs). For example, the United States implemented its first federal credit program - the Farm Credit System - in 1916 to provide credit to American agriculture and rural areas. Following the great depression, government credit programs increased. In 2010, the US government defaulted on loans, while guarantees were approximately one-third of the total US bank loans (Elliott, 2011). In addition to the United States, many other countries have developed banks that typically offer government credit.

The literature draws two conflicting perspectives on the effects of government credit. On the one hand, it can be explained despite the failure of the credit market. Private banks may not spend money on high-yield projects since they will likely have external effects if returns are not easily achievable (e.g., Stiglitz, 1993). Examples of infrastructure investments, such as highways or airports, can also be mentioned. Private companies can draw profit from the positive externalities of these projects. On the other hand, government credit can lead to a loss of private sector investment, especially when credit is paid below the market or to firms with contorted incentives (e.g., Demirgüç-Kunt and Maksimovic, 1998; King and Levine, 1993a, 1993b; Rajan and Zingales, 1998). One issue is that when subsidized companies (e.g., state-owned companies) are financed, more effective investment companies (e.g., private companies) harm the economy and are crowded out in the long term.

Empirical studies reported mixed results about the role of government credit in forcing private sector investments to grow or if it encourages the private sector to invest and grow (e.g., Cohen et al., 2011). Due to limited data, these studies usually focused on the effects of collective government credit. Moreover, there is a large body of literature on the determinants of financial development and the link between financial development and growth. However, the potential effects of bank credit on the government on the banking sector's performance remain unexamined.

In any case, it can be said that since the mid-1990s, the reduction in foreign debt in many developing countries has been offset by an increase in the share of bank credit absorbed by governments. Thus, the potential consequences of macro-bank loans to the government in the optimal debt structure are also missing key pieces (Eichengreen et al., 2005). In addition, profitability is a determining element in managing the resources and expenses of banks, and the study of the influencing factors can provide the banks with a correct understanding of the current situation for future planning. Also, no study has examined the impact of government credit on profitability and banks' risk among the member countries of the Organization of Islamic Cooperation. For this purpose, this study contributes to the literature by explaining the relationship between profitability and risk through estimating equations in conjunction with control variables, including government loans and credits (as indicators of financial development) and other internal determinants of banks. This research aimed to answer this question: what are the internal factors affecting banks' profitability? To answer the research question and to examine the effect of internal variables of banks, especially government loans and credits, on the risk and profitability of banks, the generalized method of moments (GMM) has been used.

In the next sections of the paper, the literature review and prior studies are reviewed, and then the research methodology and models are explained. Then, the results of the research are discussed. Finally, conclusions and suggestions are provided.

2. Literature Review

The term "profitability" refers to a company's profit-making ability. Banks, like other

manufacturing companies under the program to maximize earnings, can offer their services optimally. Increasing bank profits is possible by increasing revenues and reducing costs. Often from the variables of profit to sales, return on assets and Return on equity are used to measure profitability (Fotros, 2015). A profitable and powerful banking system significantly stabilizes the financial system by withstanding adverse market shocks (Athanasoglou et al., 2008). Profitability maintains the health of an institution or bank, and non-profitability and very high profitability both reflect high risk.

Risk is a phenomenon that causes direct damage to capital in the institution by reducing the flow of income. The term "z-score" refers to one of the most widely used criteria for measuring financial stability and risk in financial institutions (Trad et al., 2017). In countries where the largest financial institutions are banks and a significant part of the resources of economic units depends on bank credits, their restrictions on lending and services can significantly impact the level of activity of enterprises and limit economic growth, so stability and health. The country's banking system plays a vital role in economic development. Thus, paying attention to influential internal and external factors in banks' profitability is essential. Understanding the factors affecting banks' profitability can help the country's policymakers implement appropriate monetary policies and strengthen the banking system (Rajan and Zingales, 1998).

Government borrowing is likely to affect the economy in different ways. The size of debts could have significant consequences, while the effects of repaying debts could also be substantial. When a government borrows funds, funds are transferred from the lender to the government. In other words, the lender exchanges its money for government securities. The effect of this transaction is transforming the liquidity of the lender into securities. On the other hand, lending to the government almost certainly originates from savings that are more likely to be exhausted. This increase could redirect extra money to save if government borrowing raises market interest rates. The existence of government debt is more important and is distinct from the effects of borrowing. Central bank lending to the government has attracted less attention in the literature. Studies such as Leone (1991), Cukierman (1992) and Cottarelli (1993) surveyed restrictions on central bank lending to the government and designed the model for this restriction considering economic variables. In the following, different lending methods by the central bank to the government, as provided in the laws of their respective countries, are mentioned. Then, the main criteria for financing the government's central bank are stated. Legal provisions can be divided into four groups based on the following interim criteria:

- Complete interdict

In many countries, central banks are forbidden from financing government spending in the primary market or providing security-free loans.

- Short-term financing or credit

Typically, a short-term loan to the government aims to compensate for the seasonal deficit in government revenues.

- Long-term financing or credit
- Other methods of financing the central bank

These methods are available in countries where lending to government-specific economic activities or government funds is legally permitted to deal with financial crises (Jácome et al., 2012).

2.1. Parameters for borrowing

In countries where central banks can provide credit to the government, it is essential to identify the key criteria underlying these transactions. Moreover, since these criteria may adversely affect

the central bank's independence and ability to implement monetary policy, it is crucial to examine them. These criteria include:

- The ceiling of credits paid to the government

This criterion also examines whether this credit limit is set in cash, in relation to the base currency, or debt of another central bank.

- The authority responsible for deciding on credit terms and interest rates.
- Central Bank loan beneficiaries
- Maximum maturity of the government credit (one year)

Shorter maturities are compatible with financing the government's lack of liquidity, while longer maturities usually finance the government's structural deficits (Jácome et al., 2012).

According to Trujillo-Ponce (2013), the factors affecting the banks' profitability are divided into two main groups. The first group is the profitability criteria for each bank (i.e., internal factors such as capital structure and size) that are the direct results of management decisions, and the second group include factors (i.e., external factors such as the focus of the industry) related to industry structure and macroeconomic environment.

Reviewing the literature shows that government credits have received very little attention, particularly since the early 1990s. Research at that time represented central bank financing from the government across the countries and their institutional and macroeconomic implications. Leone (1991) investigated legal restrictions on central banks' lending to the government in more than one hundred countries and analyzed its macroeconomic outcomes in 44 developing and industrial countries. From an academic perspective, Cukierman (1992) incorporated the restrictions on the central banks' lending to the government into their respective indicators of the central bank's independence. Many studies have used these indicators to determine how the central bank's independence affects inflation across different countries. In other studies, the institutional basis of central banks' lending to the government and its effects on the independence of central banks was studied. For instance, Cottarelli (1993) investigated the appropriate model of constraining central banks' lending to the government (when drafting the legislation to create the ECB), which restrained their ability to provide credit to the government.

The rules governing central banks' lending to the government have been revisited as a part of the good practices for central banks (BIS, 2009). The main recommendation is to establish explicit restrictions on central banks' financing for governments to avoid disrupting central banks' objectives: preserving price stability. Athanasoglou et al. (2008), in a study entitled "Determinants of Bank Profitability" from 1985 to 2001, showed that capital, productivity growth, and cost management have a positive relationship with profitability and variables of bank size and ownership have little effect on bank profitability.

Hauner (2008) investigated the impact of credit on governments for 142 countries on three aspects of the performance of the banking sector, and they investigated how it deepens over time, its profitability, and its efficiency. The results showed the negative effect of credit to governments on the deepening of banks in developing countries, but they found no impact in advanced economies. Moreover, the results show that while credit to governments raises profitability, it reduces the efficiency of banks in developing countries. On the contrary, while the results showed no impact on profitability in advanced economies, they positively affected efficiency. Moreover, an alternative estimation with system GMM confirms the OLS results. Using the panel's cross-sectional fixed effects method, Söğüt (2008) examined the determinants of financial development and private sector credit for 85 developing and industrialized countries from 1980 to 2006. The results concluded that public sector credits lead to financial congestion and increased financial

development. In high-middle-income and high-income countries, private-sector credit is directly related to public-sector credit and financial development and is inversely related to central government debt.

Moreover, using the Central Bank Rules Database, the global organizational arrangements for central bank lending to the government were examined by Jácome et al. (2012) and recognized international practices. The results showed that central banks do not finance government expenditures in most developed countries. In contrast, short-term financing is carried out in many emerging and developing countries to smooth out tax revenue fluctuations. In most countries, the terms and conditions of government credit are mainly enforced by law at market interest rates when they mature within the same fiscal year. Petria et al. (2015) examined the effective profitability factors of Spanish banks for the period 1999-2009. The results showed that the bank's profitability has a significant relationship with the ratio of deposits, efficiency and quality of assets, and no evidence of the effect of macroeconomic factors in the Spanish banking industry was observed.

Trad et al. (2017) examined the possibility of Islamic Finance being an alternative to the traditional financial system to guarantee stability in times of crisis. To this end, 78 Islamic banks in 12 countries were studied using dynamic panel data econometrics from 2004–2013. The results indicated that bank size and capital are the main factors responsible for increasing the profitability and stability of Islamic banks and reducing their credit risk. This study concluded that no significant differences exist between IBs and CBs in profitability and risk features.

Ru (2018) analyzed the impact of government credit on corporate operations using data from the China Development Bank (CDB). This study examined the effects of different types of government credit (infrastructure versus government corporate credit (SOEs)) on different levels of the supply chain. The results showed that CDB infrastructure loans were crowded in private companies. Abdi et al. (2021) evaluated the effect of government microcredit on entrepreneurship and sustainable rural employment in Javanrood City from 2006 to 2016. The results showed that government microcredit, one of the main dimensions of rural development, played an essential role in creating entrepreneurship and sustainable employment for villagers.

Using panel data for 23 banks between 2005 and 2018, Ahamed (2021) examined the bank-specific and external factors that affect the liquidity risk in commercial banks in Bangladesh. The results show that asset size and inflation negatively correlate with liquidity risk, whereas GDP and domestic credit positively affect it. Private and public sector credits increased investments, which fueled GDP growth. They concluded that growth in domestic credit reduced liquidity and may create insolvency.

Recently, Al-Hassan et al. (2022) stated that despite increased government exposure, banks continue to have a significant impact on supporting credit flows to the economy during the COVID-19 pandemic. In addition, they stated that strengthening the relationship between independent banks in 2020 did not prevent lending to the private sector. Specifically, the ratio of banks with government securities to private sector credit increased slightly in Bahrain, Oman, Saudi Arabia, and the UAE, while it declined slightly in Kuwait and Qatar. However, if the prevalence of new variants of COVID-19 is realized, it could increase, leading to more austerity measures and government support.

2.2. Research hypotheses

Based on the literature review, the conceptual framework and research hypotheses for examining the effect of government credits on banks' risk and profitability are as follows:

H_1: Government Credits significantly affect the banks' risk and profitability.

H_2: Central bank assets ratio significantly affects the banks' risk and profitability.

H_3: Cost to income ratio significantly affects the banks' profitability.
H_4: The deposit ratio significantly affects the banks' profitability.
H_5: The capital adequacy ratio significantly affects the banks' risk.
H_6: The loan-to-deposit ratio significantly affects the banks' risk.

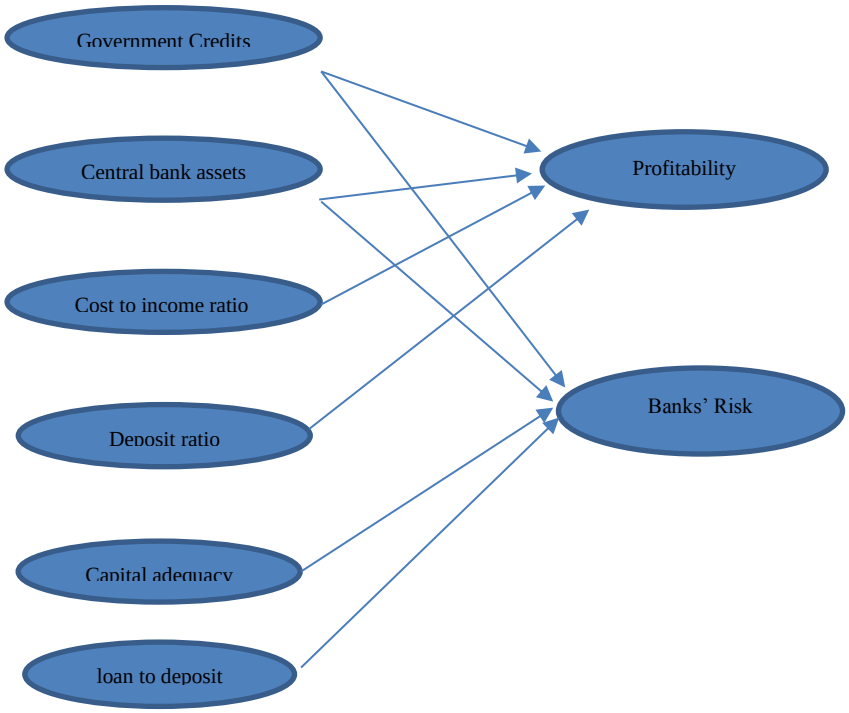

Figure 1. Conceptual framework

3. Research Methodology

This research is applied research in terms of purpose and is in the group of descriptive-correlational research. GMM-SYS is a method for estimating model parameters in the dynamic panel data approach, which can be used for time series, cross-sectional and panel data, and estimating simultaneous equations. The tool matrix correlates the intermittent variables and other explanatory variables. In this study, the Sargan test was used to estimate the validity of the tool matrix. In this test, hypothesis zero indicates that the tools are not correlated with disturbance components.

3.1. Research samples and data collection

The statistical population of this study included the member countries of the Organization of Islamic Cooperation (Iran, Afghanistan, Albania, Algeria, Azerbaijan, Bahrain, Bangladesh, Benin, Brunei, Burkina Faso, Cameroon, Chad, Comoros, Libya, Djibouti, Egypt, Gabon, Gambia, Guinea, Indonesia, Iraq, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Malaysia, Maldives, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Oman, Pakistan, Qatar, Saudi Arabia, Senegal, Sierra Leone, Sudan, Suriname, Tajikistan, Togo, Tunisia, Turkey, Turkmenistan, Uganda, United Arab Emirates, Uzbekistan, Yemen)), whose financial information (between 2005 and 2019) has been collected from economic time series listed on the database of the Central Bank of the Islamic Republic of Iran, World Bank, and banking time series published by the Monetary-Banking

Research Institute. Statistical samples were selected according to the purposeful method during the research period. For this purpose, the countries were selected based on the availability of their financial information during this period in the Monetary-Banking Research Institute and the World Bank system. After applying the mentioned limitations, 52 countries have been selected as the research sample from all the OIC members. The data was analyzed using inferential statistics and cognitive tests, and panel data were used to test the research hypothesis. For this purpose, the significance of all variables used in the estimates was first tested. The significance test results showed that, at a significance level of 5%, all research variables were statistically significant. Then, before interpreting the regression results, diagnostic tests were performed to ensure that the model had the necessary statistical properties. The consistency of GMM-SYS depends on the validity of the serial non-correlation hypothesis, which can be tested using two tests specified by Arellano and Bond (1991) and Blundell and Bond (1998). The first test (i.e., the Sargan method) evaluates the validity of the instruments. The second test (i.e., the Arellano and Bond test) is the serial correlation test, which examines the existence of a second-order serial correlation in first-order differential error statements. Failure to reject the null hypothesis of both tests suggests the absence of a serial correlation and the validity of the tools (Zalbegi, 2014). However, suppose a one-step method is used to estimate the system's generalized method of moments. In that case, there is no need to perform Arellano and Bond tests to check the model's absence of first and second-order autocorrelations (Ghaemi et al., 2019).

This study used the Sargan test to evaluate the estimator compatibility of the generalized method of moments. In other words, the Sargan test was employed to check the validity of variables. The results confirmed the significance of the whole regression model and variables used. In order to analyze the research data, the Eviews software and econometric techniques (e.g., regression analysis with dynamic combined data and GMM-SYS) were utilized (Arellano and Bond, 1991). By estimating the equations simultaneously, the effects of government loans and credits, along with other internal factors, affecting the risk and profitability of banks in 52 OIC member countries during 2005-2019 were investigated.

3.2. Research model

Based on studies on banking profitability and risk by Trad et al. (2017), the subordinate relationship between risk and profitability and a set of explanatory variables (including internal variables) were defined in equations (1) and (2).

Profitability equation is:

$$ROA_{it} = \alpha + \beta_1 \sum \beta_{it} + \beta_2 \sum M_{it} + \varepsilon_{it} \quad (1)$$

Risk equation is:

$$Z\text{-}Score_{it} = \alpha + \beta_1 \sum \beta_{it} + \beta_2 \sum M_{it} + \varepsilon_{it} \quad (2)$$

Based on the literature and using the models presented in the econometrics of panel data models in (1) and (2) (factors affecting banks' profitability in a panel data pattern), the dependent variable was added to the right of the pattern equation as a delay. Finally, the econometric model of the research was defined as follows:

$$ROA = \alpha_1 ROA(-1) + \alpha_2 GOV(-1) + \alpha_3 Z(-1) + \alpha_4 \text{Central Bank Assets} + \alpha_5 DEPO + \alpha_6 CIR + \varepsilon_{it} \quad (3)$$

$$Z\text{-score} = \beta. + \beta_1 Z(-1) + \beta_2 CAP(-1) + \beta_3 CreditDEPO + \beta_4 ROA(-1) + \beta_5 \text{Central Bank Assets} + \beta_6 GOV + \varepsilon_{it} \quad (4)$$

The independent variables in the profitability model are three control-explanatory variables (i.e., central bank asset ratio, deposit ratio, and cost-to-income ratio), along with the independent variables from the previous period (i.e., the total return on assets, government credit ratio, and banking stability index). Similarly, independent variables in the risk model are three control variables (i.e., loan-to-deposit ratio, central bank assets ratio, and government loans and credit ratio), along with independent variables related to the previous period (i.e., banking stability index, capital adequacy, and total return on assets). Thus, the explanatory variables related to banks' risk and profitability include the bank's internal factors. Dependent variables (e.g., the return on assets ratio) provide a good basis for management evaluation. Therefore, banks' profitability was measured using the total return on assets. The bank stability index was a risk measurement developed by Altman (Ningsih and Permatasari, 2018) and has gradually become a reliable measure of the health of banks' financial systems. This ratio was used as a measurement for bank stability by Boyd and Rankle (1993) and De Nicolo et al. (2004), and it was used in this research as a dependent variable.

Return on assets (ROA): In this study, the return on assets ratio measures banks' profitability to achieve maximum bank value based on the interactions between different performance measures. The ratio of return on assets is the best ratio to evaluate management and indicates the ability of management to make optimal use of the bank's real capital and financial resources to generate profits (Trad et al., 2017). The return on assets ratio is calculated as follows:

$$\text{Return on assets} = (\text{net profit after tax} / \text{average total assets}) \quad (5)$$

Bank stability index (Z-Score index): This index is defined as the sum of the return on assets and the ratio of capital to assets divided by the standard deviation of the return on assets and is as follows:

$$Z = (\mu + K) / \delta \quad (6)$$

Where in,

μ is the return-to-assets ratio, k is the capital-to-assets ratio, and δ is the deviation of asset return which is approximate for the frequency of changing returns (Trad et al., 2017).

Government loans and credit ratio: credits are one of the primary sources of financing in the economy and the money market and banks are the country's leading suppliers of financial needs. Bank credits are paid to both the public and private sectors. In this study, the government credits ratio equals the share of government credits in total credits (Hauner, 2008).

Central bank assets ratio: central bank balance sheet assets are foreign assets (including gold inventories, foreign exchange reserves, shares in international institutions, liquidated currencies, etc.), coin and banknote inventories, government sector debt or holding government securities, bank debt or loans to the banking system, and other assets (including property, silver inventories, stamps and other assets).

Deposit ratio: deposit refers to the total amount of banknotes and coins people deposit. The ratio of deposits shows the amount of cash used with great stability to finance assets (Zalbegi, 2014). In this study, the ratio of deposits to GDP was used.

Cost ratio: the cost-to-income ratio is one of the criteria for determining better performance in the banking system. Bank costs include administrative and general costs (personnel, depreciation, doubtful receivables, and commission costs). A smaller amount of this ratio indicates proper management and efficiency of costs (Shahchera, 2011). The cost-to-income ratio is equal to the cost mentioned above income ratio.

Capital adequacy ratio: The optimal combination of bank capital is a determining factor in achieving goals such as profitability, liquidity, risk-taking and, in general, advancing the operations of a bank (Udom and Eze, 2018). In this study, the capital adequacy ratio is obtained from the ratio of capital to total risky assets.

Loan to deposit ratio: This ratio indicates that the bank can equip deposits for supporting lending operations and assess the amount that the bank lends from deposits. A higher value of the loan-to-deposit ratio indicates lower liquidity and vulnerability to lenders and unfavorable economic trends or withdrawals from deposits. The low ratio indicates the lack of sufficient opportunities for lending or unwillingness to lend due to the risks involved in lending (Shahchera, 2011).

4. Research Findings

4.1. Descriptive statistics

In order to gain more knowledge of the statistical sample and the studied variables, a summary of the descriptive statistics of the research variables is presented in Table (1).

Table 1. Descriptive statistics of variables

Variables	Mean	Median	Standard Deviation
Return on Assets	3.970	1. 710	6. 850
Bank stability index	15.524	13.770	9.720
Capital adequacy	15.755	15.350	8.180
Government Credit Ratio	12.880	6.040	16.760
Central Bank Assets Ratio	6.256	2.901	11.790
Cost-to-income ratio	52.680	52.740	18.108

Source: Research findings

According to the information presented in Table (1), the highest mean value and the standard deviation were related to the cost-to-income ratio variable, indicating a greater dispersion of this variable than other variables.

Table 2. Results of the collective unit root test of variables

	Fisher-PP		ADF-Fisher		SPMI		LLC	
Variable	Test Statistics	Probability Level	Test Statistics	Probability Level	Test Statistics	Probability Level	Test Statistics	Probability Level
Government Credit ratio	401.681	0.000	214.996	0.000	-6.549	0.000	-15.126	0.000
Capital adequacy	556.519	0.000	306.516	0.000	-14.287	0.000	-30.506	0.000
Central Bank Assets ratio	271.791	0.000	256.426	0.000	-7.947	0.000	-14.452	0.000
deposit to GDP	307.798	0.000	199.116	0.000	-5.739	0.000	-11.621	0.000
Cost to income	592.525	0.000	254.076	0.000	-8.431	0.000	-9.047	0.000
Loan to deposit	186.655	0.000	222.533	0.000	-7.047	0.000	-14.094	0.000
z-score	534.159	0.000	265.112	0.000	-8.850	0.000	-12.890	0.000
Return on assets	190.213	0.000	155.835	0.000	-2.855	0.000	-5.632	0.000

Source: Research findings

Before estimating economic relationships using time series data, the properties of the time series data should be examined using unit root tests. Modeling and estimating these relationships using time series data is invalid without unit root tests. Because a large number of economic time series

are unstable, there is no significant relationship between variables despite the high coefficient of determination. Various problems, including long-term time series and deficiencies in single root tests (e.g., Dickey-Fuller, Generalized Dickey-Fuller, and Peron), motivated economists to extend root and co-integration tests to panel data (Zalbegi, 2014).

Table 3. Estimation of the system of simultaneous equations by the generalized method of moments

Dependent Variable	Equation Coefficients	Independent Variables	Symbol of Variables	Coefficients of Variables	Standard Error	T-statistic	P-value
Return on total assets	α 1	The first interruption of return on assets	ROA (-1)	1.007	0.019	50.534	0.000
	α 2	The first interruption of government credits	GOV (-1)	-0.024	0.011	-2.152	0.031
	α3	The first interruption of the bank stability index	Z(-1)	0.009	0.005	1.642	0.107
	α4	Central bank assets ratio	CBA	0.015	0.009	1.642	0.100
	α5	Deposits	DEPO	0.003	0.002	1.722	0.028
	α6	Cost to Income ratio	CIR	-0.004	0.002	2.282	0.022
Bank Stability Index	β0	Coefficient of the risk equation	β0	-1.532	0.531	-2.885	0.004
	β1	The first interruption of the bank stability index	Z (-1)	1.080	0.028	38.183	0.000
	β 2	The first interruption of capital Adequacy	CAP (-1)	0.048	0.016	2.923	0.003
	β 3	Credit to deposit	Credit DEPO	0.006	0.003	1.828	0.003
	β 4	The first interruption of return on assets	ROA (-1)	0.042	0.030	1.378	0.168
	β 5	Central bank assets ratio	CBA	0.064	0.032	2.089	0.036
	β6	Government credits ratio	GOV	0.013	0.013	1.963	0.003

J value: 0.066
Profitability equation:

$$ROA = \alpha_1 ROA(-1) + \alpha_2 GOV(-1) + \alpha_3 Z(-1) + \alpha_4 CBA + \alpha_5 DEPOGDP + \alpha_6 CIR$$

R^2= 0.884
Adjusted R^2= 0.883
Durbin-Watson = 2.596
Risk equation:

$$Z = \beta. + \beta_1 Z(-1) + \beta_2 CAP(-1) + \beta_3 CreditDEPO + \beta_4 ROA(-1) + \beta_5 CBA + \beta_6 GOV$$

R^2= 0.826
Adjusted R2= 0.824
Durbin-Watson = 2.298

Source: Research Findings

Among the studies on the generalization of linear unit root models to single root models in panel data, Levin et al. (2002) and Im et al. (2003) are worth mentioning. These studies indicate that panel data-based unit root tests are more powerful and accurate than time series tests. In this study, using Levin Lin Chu, Im-Pesaran-Shin, and Fisher tests, the root of the unit of variables has been investigated. The results are presented in Table (2).

The results of these tests for the research variables among the OIC members can be seen in Table (2). Since the significance levels for all variables in all unit root tests are less than 0.05, all research variables are significant.

4.2. Testing the research hypotheses

The model estimation results using the system's generalized method of moments are presented in Table (3). As can be seen, the values of the Sargan test statistic (in all specifications) have the necessary significance concerning their probability, which leads us to the conclusion that there is no correlation between the instrument matrix and the components of error. Therefore, it can be concluded that the tools used in all specifications are adequately valid for estimation. In the dynamic panel data, appropriate tools should be used to estimate the model, including dependent and independent variables within the model or related to the variables used.

Table (3) shows the results of the Sargan test for the validity of instrumental variables, confirming the significance of the whole regression model and all variables used. According to the results obtained from the profitability and risk model, it can be said that the coefficients of determination in the estimated model are approximately 88% and 82%, indicating that a total of 88% and 82% change in the return on assets can be explained using the research variables. The regression results focusing on the relationship between risk and bank profitability and explanatory variables are presented in Table 3. In this section, we will discuss the regression results and analyze the impact of each variable on the profitability and risk of banks in OIC members.

Government Credit (GOV) is one of the main sources of financing in the economy and the money market, and banks are the main suppliers of financial needs in the country. Institutionally, the regulations of central banks in lending to the government, especially when involving significant and long-term loans, may undermine the independence and/or the credibility of central banks. From an operational point of view, if the central bank loans to the government are implemented erratically, they may become a source of deviation for monetary operations and the management of central banks' liquidity. According to the regression results, the previous period's government credit ratio negatively impacts profitability. It indicates that increasing government loans and credit from the previous period decreases the banking system's profitability in the current period. This result is contrary to the results reported by Hauner (2008). However, government loans and credits positively affect risk in the current period.

According to the regression results, Central banks' asset ratio positively impacts the profitability

and risk of OIC countries' banks. In other words, one unit of increase in the ratio of central bank assets increases the return on assets and the risk by 0.015 and 0.064, respectively.

The Deposit to GDP Ratio (DEPO) measures the volume of deposits held by a bank. Deposits are banks' primary source of funds to invest and generate income. Considering the relationship between the ratios of bank deposits to GDP, it can be concluded that if the banks have a greater share in liquidity in the form of bank deposits, they will have enough tools to pay facilities to the real sectors of the economy and optimally direct resources and liquidity to production. Therefore, banks must attract deposits to earn money through lending and facilities and increase their profitability. Moreover, it provides the necessary basis to perform the duties (resource allocation) assigned to the banking system. Thus, increasing the deposit absorption by the bank can expand the service of repaying loans and credits and increase their profitability. In other words, with an increase in this index, bank deposits increase, and, as a result, their profitability is expected to increase. According to the regression results, the Deposit GDP ratio positively impacts the profitability of OIC countries' banks. Regression for DEPO has a significant coefficient of 0.003. The present study's results are similar to those obtained from domestic and foreign studies, such as Mehrabanpour et al. (2017) and Haw et al. (2010), in stating that deposits are cheap and suitable sources of financing. Increasing customer deposits is expected to increase profitability compared to other financing methods. In a competitive situation, banks will creatively employ banking tools to increase their profit, effectively attracting deposits and facility applicants. Some tools effective in attracting customers and bank shareholders are good performance, increased profitability, and financial strength.

Cost Ratio (CIR) is a criterion to determine performance in the banking system. Achieving an appropriate profit requires producing goods and services at a minimum cost and maximizing revenue. In some cases, inefficient banks that incur very high costs must reduce costs to increase their profit. To reduce a bank's costs, its performance in cost generation should be carefully examined to manage costs by controlling related variables (Saffari et al., 2016). Banks continuously try to design and use new tools for resources (the left side of the balance sheet) and expenses (the right side of the balance sheet). However, such actions are costly and require strong management power. The contrast between high costs and the need to achieve a good level of profitability drives banks to focus on designing and using tools and techniques to manage costs. Accordingly, bank managers focus on cost management in their approach and control. According to the regression results, it has a negative impact on the profitability of OIC countries' banks. The result of this research differs from those obtained by Shahchera (2011) and Fotros et al. (2015).

The Capital adequacy ratio (CAP) is defined as the value of a bank's net assets. The CAP of the previous period has a positive and significant effect on risk. The regression value for CAP has a significant coefficient of 0.048. This result is consistent with Slimi (2012) and Aghaei (2018), which reported a direct relationship between capital adequacy and risk. Adequate and appropriate capital is one of the basic and essential conditions for maintaining the health of the banking system, and to ensure the stability of their activities, each bank must attempt to establish a proper ratio between capital and risk in their assets.

Loan-to-Deposit Ratio (LDR) indicates a bank's ability to equip deposits for supporting lending operations and assess the amount that the bank lends from deposits. A higher value for LDR indicates lower liquidity, vulnerability to lenders, unfavorable economic trends, or withdrawals from deposits. On the other hand, a low ratio indicates insufficient opportunities for lending or unwillingness to lend due to the risks involved in lending. According to the regression results, LDR positively impacts the profitability of OIC countries' banks and risk, similar to Farhang et al. (2016) and Awad and Al Karaki (2019). A good combination of credit and appropriate interest rates will

increase the bank's revenue and profitability.

Finally, based on the results in Table (3), the relationship between all independent variables and return on assets and the banking stability index is statistically significant, indicating positive effects, except for government credit and the ratio of cost to income, which have negative and significant effects on the bank's profitability.

5. Discussion and conclusion

Bank interest is a function of how banks' resources are distributed. Facilities can be granted if the banks can freely and competitively allocate these resources through loans. In some countries, the distribution of equipped resources from the deposits of the people to those who receive the interest is under severe restrictions, including high legal deposit rates for public sector facilities and credits. At the same time, applicants for facilities will incur unwanted costs with this increase because banks' operating costs (to maintain profits) will enable granting new facilities to applicants at a higher rate.

According to the research results, at a 95% confidence level, the government credit variable significantly affected banks' profitability and risk. Based on the results of testing the first hypothesis, it was found that government loans and credits from the previous period have a negative relationship with profitability (i.e., with the increase of government loans and credits from the previous period, the profitability of the banking system in the current period decreases). Moreover, the results show that government loans and credits positively affect risk in the current period. The present study's findings have important policy implications, as they suggest that a high level of government loans and credit indicates financial development. In addition, a high level of domestic investment indicates the development of a country's financial system. In countries where the financial system emphasizes public sector payments, transaction costs, risk control and management, and savings mobility are higher than in other countries, with the highest rates in high-income countries that indicate the role of banks in their financial markets.

Government credit may stabilize the banking system and strengthen its functioning of the banking system. A stable banking system leads to the formation of an efficient financial intermediary that can be more successful in allocating resources to investment and thus improve economic growth and investment. Having a stable banking system will improve the efficiency of the banking system and the optimal allocation of resources in the economy. Given the issues raised in the research topic, government credit and banks' profitability are critical and bank managers should pay attention to them. Indeed, a bank can focus on economic areas and development projects that meet users' needs. This will attract institutional investors and the entry of stray capital into society and increase banks' profitability. Maximizing the interests of shareholders, paying attention to the interests of stakeholders and other stakeholders, and increasing efficiency and profitability are the main goals of the economy of any society.

As a result, in order to achieve the above goals and improve the profitability of banks, it is necessary to create suitable government credit through a sound banking system to meet the information needs of shareholders and other users to improve the country's economy. By examining the impact of government credit on the profitability of banks, the necessary information can be provided to stakeholders to analyze the performance of banks and determine the best investment option. When discussing the optimal allocation of financial resources, bank managers, including individuals, are willing to be informed about the future state of the bank and the risks that threaten them.

The present study's findings can make the required information on the banks' inefficiencies available to bank managers to improve and increase profitability and eliminate bank deficiencies.

The key outcomes are as follows: (i) A number of sample countries either face a ban on bank lending to the government or short-term lending. (ii) The most advanced countries and a large number of countries face severe constraints with a flexible exchange rate system for government financing by the central bank; And (iii) in the case of short-term loans, in most cases, market interest rates apply, this amount is limited to a portion of government revenues. Only this financing will benefit the government. However, progress is possible for many countries. With governments relying heavily on central bank money to finance public spending, central banks' political and operational independence to achieve their policy goal of maintaining price stability will inevitably be undermined.

The impact of the government's borrowing on the financial sector is an interesting issue for future research. Issues worth examining but beyond the scope of this research include the effect of credit to the government on banking sector performance and the effect of government debt on the non-bank financial sector. Also, identifying the variables that increase the efficiency and profitability of the banking system has always been important because, as efficient and profitable banks can be effective in economic growth and development, their inefficiency can lead to financial and economic crises. Thus, there is a need for further studies in this area. The following suggestions could be considered in future studies:

Determining higher interest rates on deposits than the returns on other alternative assets can increase the bank's resources, thereby increasing the creditworthiness and interest of banks due to the expansion of their intermediary role.

Using other profitability indicators in future studies and comparing their results with the present study.

Since a number of independent variables employed in this study did not provide similar results to other studies in other countries, the study of the causes for this difference is proposed as a new research topic.

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