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The effect of financial literacy and financial inclusion on financial stability: Selection of oil exporting countries

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***Abstract* :** Financial stability is one of the important issues that policymakers have increasingly noticed in the last two decades. Adopting preventive measures to deal with risk in the financial sector and building strength in financial institutions to reduce costs during financial crises are the main elements of financial stability policy. Accordingly, over the past three decades, financial systems in many countries have seen major reforms through the adoption of financial inclusion and, more recently, increased financial interest. In this regard, the purpose of this study is to investigate the effect of financial literacy and financial inclusion on financial stability in a selection of exporting countries during the period 2010 to 2021. In order to analyze the data, the generalized method of moments (GMM) has been used. The findings of the research show that financial inclusion has had a negative and significant effect on financial stability in the selected countries. Also, the results showed that financial literacy has been able to improve financial stability in the studied countries to some extent. Based on this, it is concluded that the expansion of financial inclusion due to the wide participation of low-income people in the formal financial system increases the cost of transactions and information, which causes greater inefficiency in the financial system. Also, increasing the level of financial literacy, on the one hand, helps people to make the most appropriate financial decisions according to their situation and, on the other hand, reduce errors caused by behavioural tendencies. In addition, the active participation of financially literate people in financial markets and their preference for formal financial institutions for their financial needs reduces the likelihood of financial system fragility.

Keywords: financial inclusion, financial literacy, financial stability, selected oil exporting countries.

INTRODUCTION: Ensuring financial stability is vital in order to mitigate imbalances within the financial system that pose a risk to economic efficiency. Financial risk management encompasses the evaluation, recognition, and control of potential financial hazards, such as credit, liquidity, and market risks, with the aim of optimizing economic effectiveness. Banks play a crucial role in maintaining financial stability by providing a platform for investors to deposit their funds, facilitating the transmission of monetary policy, and aiding in the allocation of resources towards profitable enterprises. The presence of stability may result in heightened economic expansion and investment, hence enhancing market performance and reducing systemic risk.

Financial literacy and inclusion are crucial concerns in governments, especially in emerging nations. The 2008 global economic crisis brought attention to the problem of inadequate financial literacy, which is prevalent among certain demographic groups and particularly pronounced among certain demographic groups. The decline in financial knowledge with age gives rise to worries over fraud targeting older individuals and gender disparities in risk diversification.

Financial inclusion has been a focal point for governments and international agencies because of its significance in promoting economic growth, reducing poverty, and fostering sustainable communities. Scholars have examined the pivotal role of financial inclusion in the economy since it is a subject of interest for scholars, policymakers, and stakeholders in the financial industry.

This article analyses the impact of financial literacy and financial inclusion on the financial stability of nations that rely on oil exports. The study is structured to include an examination of the theoretical underpinnings and empirical backdrop, a presentation of the research methods, an analysis and interpretation of the results, and a summary and conclusion.

1. Theoretical foundations and research background:

1.2. The effect of financial literacy on financial stability

The significance of financial literacy has substantially increased as a result of the widespread adoption of the free market economy. Financial literacy has three key components: savings, investing, and awareness of financial fraud. It assists people in making sound financial choices tailored to their circumstances and mitigates mistakes resulting from behavioural biases. Financial literacy, as defined by the Organisation for Economic Co-operation and Development (OECD), refers to the enhancement of individuals' financial well-being through the provision of information and awareness about financial products, concepts, and the ability to make informed decisions regarding financial risks and alternatives.

Jumpstart, a financial literacy programme in the United States, defines financial literacy as the capacity of a person to proficiently use financial resources and acquire knowledge that may ensure financial stability throughout their lifetime. Studies have shown that individuals belonging to low-income backgrounds, with lower levels of education, from minority groups, and women in industrialized nations have significantly low levels of financial literacy. This issue is prevalent among these specific demographics.

Enhancing financial literacy is necessary to address the growing complexity of financial transactions. Individuals who possess financial literacy may enhance their financial well-being by seeking guidance from financial consultants, devising pragmatic budgeting strategies, exploring alternative borrowing choices, and accumulating funds inside the private pension scheme. Financial literacy is crucial for people to make informed choices when managing their finances, ensuring they can effectively prepare for themselves and their families. This knowledge helps minimize the risk of encountering unexpected financial setbacks and enhances overall economic stability and welfare.

Financial literacy is crucial for the optimal and streamlined operation of markets. By enhancing their expertise and financial awareness, suppliers of financial goods and services may reduce their informational advantage. Rational decision-making by people, devoid of emotional biases, mitigates financial mistakes and enhances the robustness of the financial system.

Enhancing people's financial literacy fosters market discipline and transparency, promotes the expansion of financial markets, and contributes to economic progress. While there is a lack of empirical evidence in the literature about the connection between financial literacy, financial inclusion, and financial stability, it is widely believed that there is a mutual link between these factors. Individuals with a strong understanding of finance contribute to the establishment and preservation of financial stability by efficiently allocating financial resources. They are anticipated to use sound financial judgment by asking pertinent inquiries and selecting the product and service that aligns with their financial requirements.

Financial literacy is essential for the competitiveness and efficiency of markets, as well as the resilience of the financial system.

2.2 The effect of financial inclusion on financial stability

The correlation between financial inclusion and financial stability can be illustrated through two categories of research: the first category posits that financial inclusion fosters heightened and enhanced economic stability, particularly within the banking industry. In contrast, the second category advocates the perspective that financial inclusion exacerbates instability within the banking sector.

Multiple studies have verified the beneficial influence of enhancing financial inclusion on financial stability, including the widespread establishment of accounts, more comprehensive and effective savings, and the accumulation of modest deposits by people in society. In their study, Morgan and Pontines (2014) confirmed the accuracy of a model's

estimation of the notable and beneficial impact of financial inclusion on financial stability. According to Ahmad and Malik (2019), a rise in capital results in larger deposits and lowers the overall expenses of banking services. Lopez and Winkler (2019) found that nations with more financial inclusion have less impact from significant declines in lending and borrowing. This finding supports the notion that a more robust financial inclusion process is associated with a resilient financial market in times of crisis.

Allen et al. (2014) demonstrated that by enhancing financial infrastructures and implementing mobile banking, it is possible to address geographical limitations and provide a greater range of financial services. Okpara (2011) identified a reciprocal relationship between financial stability and financial inclusion and argued that there exists a long-term causal connection between the two. In their study, Naim and Geist (2018) investigated the impact of financial inclusion on financial stability, income inequality, and poverty levels in Tunisia, Libya, Egypt, Yemen, and Syria. The results indicate that there is an inverse correlation between financial inclusion and income inequality, whereas there is a positive correlation between financial inclusion and financial stability.

Fongakowa and Wil (2015) substantiated the significance of demographic parameters, including education, age, and income, in contributing to the disparity in the degree of financial inclusion between China and the BRICS nations. It has been verified that financial inclusion may bolster financial stability by expanding the variety of financial choices available in financial institutions and enabling a broader spectrum of economic actors to engage in a resilient and adaptable economy. According to Wu et al. (2019), financial literacy has a crucial role in boosting disposable income for rural families and small and medium companies, which are regarded as the most susceptible segments of the economy.

In their study, Chiak et al. (2016) investigated the potential trade-off or synergy between financial inclusion and economic stability. They discovered that the extent of financial inclusion is mostly influenced by the variety of financial services used by people and businesses rather than just their access to such services. In their study, Dabla-Norris et al. (2015) developed a comprehensive model to analyze the limitations of financial inclusion, such as GDP, non-performing loans, and inequality. They found that country-specific factors influence the impact of financial inclusion on financial stability.

2.3 background research

Al-Tamimi and Ben Kali" (2009) conducted a descriptive survey study titled 'Financial Literacy and Investment Decision among UAE Investors'. This research was a quantitative, applied field study executed cross-sectionally. The statistical sample consisted of 290 Emirati investors, from whom data was collected using a questionnaire. The findings of this research show that the level of financial literacy among Emirati investors is significantly below the required level.

Posting and colleagues (2013), in a descriptive survey study titled 'Development and Standardization of Perceived Investment Value (PIV) Scale', focused on developing the concept of perceived investment value. They endeavoured to explain the concept of perceived investment value and provide a tool for its measurement. Eventually, they developed and tested a scale with components including the perceived economic value of investment, perceived functional value, emotional value, and symbolic value of investment.

A study by Rohman (2018) titled 'Financial Literacy and Financial Behavior: Evidence from the Emerging Middle Class in Asia' was a forward-looking study based on a sample of individuals in Bangkok. Unlike most financial literacy studies that focus on individuals in developed countries, Rohman surveyed individuals living in Bangkok. Using standard financial literacy questions, this study showed that levels of financial knowledge are largely comparable to industrialized countries, but understanding of more complex financial concepts is relatively lower. Most people have savings accounts, but less common are more complex financial products. This study indicated that increased financial knowledge leads to improved financial decision-making.

Barik and Pradhan (2021) conducted a study to examine the impact of financial inclusion on financial stability among BRICS countries during the period from 2005 to 2015. To ascertain the causality between financial inclusion and financial stability, the study used the Panel Granger causality test. Additionally, the Generalized Method of Moments (GMM) estimator was employed to understand the impact of financial inclusion on financial stability. The empirical findings of this research indicate that financial inclusion had a significant negative impact on financial stability.

Yaghoub Nejad and colleagues (2011), in a qualitative study titled 'Developing a Model for Measuring the Financial Literacy of Iranian Students Using Fuzzy Delphi Method', endeavoured to develop and present a model for measuring the financial literacy of students. Their research results show that the selected questions from the consensus of experts encompass

various concepts, including the time value of money, taxation, investment in stocks and bonds, inflation, electronic banking, various borrowing methods, insurance, retirement, etc.

Kianoush and colleagues (2014), in a descriptive survey study titled 'Understanding and Awareness of Students on Personal Financial Management Knowledge (Analysis of Students' Behavior towards Personal Financial Management Knowledge)', examined and analyzed the behaviour of students and their understanding and awareness of personal financial management knowledge. The results showed that the behaviour and understanding of business management students at Azad University, Abhar branch, regarding personal financial management knowledge do not differ based on field of study or gender.

Balounjad Nouri (2021) investigated the relationship between financial stability, governance quality, and financial inclusion during the period 2004-2020 for higher-income developing countries using a multidimensional indexing method and two-stage GMM. Additionally, the mediating role of financial inclusion in the relationship between governance quality and financial stability was tested using the estimation of equations and Sobel test statistics. The research findings indicate that financial inclusion and governance quality have a significant positive effect on financial stability, and the effect of financial inclusion as a mediating variable in the impact of governance on financial stability was also confirmed by the Sobel test statistic.

Esmaeilian and Sefidbakht (2022) examined the relationship between financial inclusion, the structure of the banking market, and financial stability. The data of this research over 10 years, from 2011 to 2020, was analyzed using regression methods. In this study, to examine financial stability, three factors were used: a bank's a-score, bank profitability, cash assets to deposits and short-term financing. Also, for examining financial inclusion, factors like borrowing from financial institutions, market concentration, and savings in financial institutions were used. The results of the research indicate that a bank's a-score has no relationship with borrowing from a financial institution but has a direct and significant relationship with market concentration and savings in a financial institution. Bank profitability has a direct and significant relationship with savings in a financial institution, and the bank's cash assets to deposits and short-term financing have an inverse and significant relationship with borrowing from a financial institution and market concentration and a direct and significant relationship with savings in a financial institution.

The review of domestic and international studies related to the research topic shows that many studies in the literature emphasize the growing importance of financial literacy and theoretically discuss the impact of financial literacy and financial inclusion on financial stability. In contrast, some other studies have focused on the impact of financial literacy. This article, for the first time, focuses on the empirical measurement of

the effect of financial literacy and financial inclusion on financial stability to fill the gap in the literature.

3 Research Methodology

The statistical sample of the research includes selected oil-exporting countries, comprising 12 oil-exporting countries such as Algeria, Indonesia, Ecuador, Iraq, Iran, Libya, Kuwait, Nigeria, Venezuela, Saudi Arabia, Angola, and the United Arab Emirates, considering the availability of the required data. The reason for choosing oil-exporting countries is that these countries, due to their oil sales, earn extensive foreign exchange revenues and fluctuations in these revenues can threaten the financial stability of such countries. Additionally, due to the acquisition of oil revenues, these countries can expand financial inclusion in their countries on a broader scale. Therefore, the discussion of financial literacy in these countries and the implications of expanding financial inclusion on their financial stability become significant.

Based on the theoretical foundations presented and the studies of Dimitrisiou and Hurlin (2012) and Barik and Pradhan (2021) regarding the relationship between financial inclusion and financial stability and considering financial literacy in this relationship, the following model can be introduced:

$$Z\_SCORE_{it} = \alpha_i + \beta_1(Z\_SCORE_{it-1}) + \beta_2 FINDEX_{it} + \beta_3 FLITEX_{it} + \beta_4 C_{it} + \mu_t + v_i + \varphi_{it} \qquad (1)$$

In which *Z_SCORE_it* is the dependent variable representing financial stability. *FINDEX_it* represents the independent variable of financial inclusion, and *FLITEX_it* represents the independent variable of financial literacy. Additionally, *C_it* is the vector of control variables, including the inflation rate (INF) and the rate of GDP growth (GDPGR). The financial stability variable is calculated based on the following equation:

$$\text{Z-SCORE} \equiv (k+\mu)/\sigma \quad (2)$$

In which k represents the capital stock as a percentage of assets, μ is the stock return, and σ is the standard deviation of stock returns, serving as an indicator of stock market return volatility. Data related to this variable is extracted from the World Bank's WDI database.

Financial inclusion is also derived from 6 parameters: the number of commercial bank branches per 1,000 square kilometres (BBKM2), the number of ATMs per 1,000 square kilometres (ATMKM2), the number of commercial bank branches per 100,000 population (BBPoP), the number of ATMs per 100,000 population (ATMPoP), the share of private sector non-performing loans as a percentage of GDP (ODC), and the share of private sector non-performing deposits as a percentage of GDP (OLC). In order to combine these six indicators and construct the financial inclusion index, the weights of each variable are identified using the Principal Component Analysis (PCA) method. Subsequently, based on the identified weights and following the model below, the financial inclusion index is calculated.

:

$$FINDEX_{it} = W_{1i}ATMKM_i^2 + W_{2i}ATMPoP_i + W_{3i}BBKM_i^2 + W_{4i}BBPoP_i + W_{5i}ODC_i + W_{6i}OLC_i \quad (3)$$

Financial literacy is assessed by administering questionnaires to more than 150,000 individuals who represent their respective nations and adults from over 140 countries in 2014. The target market consists of those aged 15 and above, with the exception of incarcerated individuals and military personnel. The poll evaluates fundamental comprehension of four core principles in financial decision-making: interest rate, compound interest, inflation, and risk diversification.

A person is deemed financially literate if they accurately respond to a minimum of three out of the four financial concepts. Inflation rate refers to the pace at which the Consumer Price Index (CPI) for goods and services increases. On the other hand, GDPGR is the per capita growth rate of the country's Gross Domestic Product.

The research employs a regression model using the Generalized Method of Moments (GMM) for the time frame of 2010-2021, with data collected on a yearly basis. The research's statistical sample comprises 12 oil-exporting nations, namely Algeria, Indonesia, Ecuador, Iraq, Iran, Libya, Kuwait, Nigeria, Venezuela, Saudi Arabia, Angola, and the United Arab Emirates.

The study employs a regression model with the Generalised Method of Moments (GMM) for the timeframe of 2010-2021. It focuses on 12 nations that export oil, namely Algeria, Indonesia, Ecuador, Iraq, Iran, Libya, Kuwait, Nigeria, Venezuela, Saudi Arabia, Angola, and the United Arab Emirates .

4 Analysis of the results:

The appropriate use of descriptive statistics may effectively convey the attributes of a dataset. Descriptive statistics are used to ascertain and articulate the attributes of data in the study. The primary central index is the mean, which signifies the equilibrium point and the focal point of the distribution and serves as a reliable measure of the centrality of the data. In the case of the inflation rate variable, the mean is 7.06 per cent. The median is a key measure that reflects the status of the community and represents the value below which half of the data falls and above which the other half falls. The proximity between the mean and median values suggests that the variable, namely the inflation rate, follows a normal distribution, with a value of 3.31. Dispersion parameters are often used to quantify the extent of dispersion between data points or their dispersion in relation to the mean. The standard deviation, a crucial measure of dispersion, is 5.82 for the inflation rate variable. The skewness score of 6.79 shows a high degree of asymmetry in the probability distribution of the inflation rate variable. Kurtosis quantifies the level of peakedness in relation to the normal distribution function, with a value of 5.16 for the inflation rate variable. All variables have a consistent number of observations, which is 144. The analysis of data pertaining to other variables follows a similar approach as that of the inflation rate variable, as previously stated.

Table (1) Descriptive statistics of the main research variables

Source: research findings

Before estimating the model, it is necessary to test the stationarity of all variables used in the estimations. This is because the non-stationarity of variables can lead to the problem of spurious regression. For conducting stationarity tests in this research, the Levin Lin Chu test has been utilized, and the results of this test are presented in Table.(2)
The unit root test is one of the tests used to detect stationarity and prevent the occurrence of spurious regression results. Given that the probability level obtained for the variables of the research is less than the 5 per cent error level, the stationarity results using the Levin Lin Chu method indicate the stationarity of all the research variables at the level. Next, the research model will be estimated, and the research hypotheses will be tested.

Table (2) examines the significance of the variables

Variables	t-Statistic	Probability	Result
FLITEX	-3.16	0.0008	Stationary at level
GDPGR	-12.03	0.0000	Stationary at level
INF	-1.65	0.0487	Stationary at level
FINDEX	-2.08	0.0187	Stationary at level
ZSCORE	-3.96	0.0000	Stationary at level

Source: research findings

For testing the research hypotheses and estimating the model, initially, the F-Limer test was conducted to choose between panel data methods or pooled data methods. The significance level of the F-Limer statistic is less than the 5 per cent error level, which indicates the superiority of using the panel data method over the pooled data method. To determine which method (fixed effects or random effects) is more appropriate for estimation (to identify whether the differences between cross-sectional units are fixed or random), the Hausman test is used. Suppose the significance level of the Chi-square statistic is greater than the 5 percent error level. In that case, it indicates the preference for using the random effects method in panel data over fixed effects, and if it is smaller, the fixed effects method will be used. The results indicate the confirmation of the fixed effects method.

Table (3) shows the results of the F-tests of Limer and Hausman

Test Statistic	Significance	Result
2.13	0.0232	Panel Data
21.82	0.0006	Fixed Effects

Source: research findings

Based on the results of the F-test of Limer and Hausman, the research model was estimated by the GMM method as follows:

Table (5) Regression analysis results of the research model

Variables	Coefficient	Standard Deviation	t-Statistic	Probability
C	0.48	0.058	8.27	0.0000
ZSCORE(-1)	0.49	0.142	3.49	0.0007
FINDEX	-0.54	0.168	-3.23	0.0079

Variable	Definition	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
FLITEX	Financial Literacy	53.33	58.02	86.32	25.39	35.53	-0.04	2.47
GDPGR	Economic Growth	4.95	4.68	26.17	-7.44	4.24	1.38	8.61
INF	Inflation Rate	7.06	3.31	24.76	5.01	5.82	6.79	5.16
FINDEX	Financial Inclusion	25.62	24.98	50.78	15.59	9.00	0.58	3.16
ZSCORE	Financial Stability	2.57	2.03	11.79	0.04	2.15	2.22	8.06

FLITEX	0.48	0.179	2.69	0.0208
GDPGR	0.51	0.175	6.77	0.0000
INF	-0.48	0.058	-8.27	0.0000
J-statistic = 8.153	Prob (J-statistic) = 0.319			

Source: research findings

The research demonstrates that there is a negative relationship between the financial inclusion variable (FINDEX) and the financial stability variable in the nations being examined. Specifically, for every 1% rise in the financial inclusion variable, there is a corresponding fall of 0.54% in the financial stability variable. This impact is

statistically significant at the 1% significance level. Conversely, the financial literacy variable (FLITEX) positively impacts the financial stability variable, resulting in a 0.48% rise for every 1% increase in the financial inclusion variable. This impact is likewise statistically significant at the 5% significance level.

The variable of economic growth (GDPGR) positively impacts the variable of financial stability, resulting in a 0.51 per cent rise for every 1% increase in the GDPGR variable. Nevertheless, the variable representing the inflation rate (INF) has a detrimental impact on the variable representing financial stability, resulting in a 0.48 per cent rise for every 1% increase in the INF variable.

In order to ensure the correctness of the findings, two primary requirements must be satisfied for the consistency of the GMM estimators: the instrumental variables must be valid, indicating that they are not associated with the error terms. The Sargan and Hansen tests, together with the J-statistic, indicate that the null hypothesis of residual correlation with instrumental factors is rejected with a 99 per cent confidence level. This confirms the validity of the instrumental variables used. Furthermore, it is necessary to verify the absence of second-order autocorrelation AR(2) in the residuals. This has been assessed by doing the Arellano and Bond serial correlation test at a 99 per cent confidence level.

Table (6) AR model autocorrelation test

AR Order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-15.97	-0.91	5.55	0.003
AR(2)	-10.66	-1.103	94.87	0.27

Source: research findings

Therefore, it can be said that the order of autocorrelation in the first-order difference of the disturbance terms is of the first order. Hence, the estimated model with the first-order lagged difference is appropriate and does not suffer from specification bias.

5 Conclusions and suggestions:

During the last thirty years, several nations have implemented substantial changes to their financial systems. These changes included various reforms such as financial liberalization, development, financial inclusion, and enhanced profitability. These measures have bolstered economic growth, facilitated more access to financial resources, reduced income inequality, poverty, and gender disparities, and augmented human development. Nevertheless, the growth of financial institutions might provide liquidity concerns as a result of factors including uneven access to information, moral hazards, limited financial knowledge, and lending to borrowers with poor credit histories.

This study investigates the influence of financial inclusion and financial literacy on the financial stability of certain oil-exporting nations between 2010 and 2021. The findings indicate that financial inclusion has had a substantial adverse effect on financial stability as a consequence of heightened transaction and information expenses, reputational risk, and the delegation of credit assessment responsibilities to small and medium-sized borrowers. Consequently, there has been an increase in instances of credit default, liquidity problems, and a decline in the strength of rules governing the financial sector as a whole.

Conversely, financial literacy has somewhat enhanced financial stability in the examined nations. Enhanced financial literacy enables people to make sound financial choices according to their circumstances and minimizes mistakes resulting from behavioural inclinations. Individuals who possess financial literacy may enhance their financial well-being by consulting financial consultants, creating realistic budgets, selecting low-cost alternatives when borrowing, and saving within private retirement schemes.

Financial literacy is crucial for enhancing market competitiveness and efficiency, as well as promoting active engagement in financial markets and a preference for formal financial institutions. The active engagement of people who possess a strong understanding of financial matters in financial markets, as well as their inclination towards established financial institutions, decreases the probability of instability in the financial system. This result is

consistent with the findings of Ozcham (2006), who showed that financial literacy might contribute to the financial stability of nations beneficially.

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