

Bank stability, performance and efficiency: an experience from West Asian countries

Bank stability,
performance
and efficiency

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Abstract

Purpose – The banking sector in West Asia has always experienced positive growth except for Palestine. Apart from some negligible outlying outcomes in some countries that have faced political crises and war, most West Asian countries have gained bank profitability and efficiency. However, the stability in the banking sector has been rarely examined in the literature. Hence, this study sheds light on examining bank stability by considering 12 countries in West Asia.

Design/methodology/approach – A fixed effect panel data regression analysis is employed on strongly balanced panel data using data from 2004 to 2018.

Findings – Results reveal that the net interest margin has a positive relationship with bank stability. The bank's stability rises as the net interest margin improves. Furthermore, the non-interest income reveals a positive significant impact on the stability of banks, depicting that the increase in non-interest income increases the stability of banks. Additionally, the non-interest expense also reveals positive significant results with the stability of banks. Nevertheless, leverage ratio and long-term debt portray a negative significant impact on banks' stability. The finding reveals that higher long-term debt and leverage ratios may decrease the stability of the banks in West Asia.

Practical implications – Overall, the authors' findings add to the literature on the stability of the banks by providing some new but significant information. Some of the recommendations may be beneficial to the long-term success of 12 Western Asian countries' banks.

Originality/value – The study examines the stability of banks by incorporating both profitability and operating efficiency along with net-interest income, which extends to the current literature's insight.

Keywords Stability, Performance, Efficiency, Bank, West Asia, Management

Paper type Research paper

1. Introduction

Financial stability is the key to economic progress. A stable financial system allows any economy to effectively distribute resources, reduces financial risk and absorbs financial turbulences. However, for the west Asian countries, it shows that there is a significant development gap between poor and industrialized nations while comparing in terms of



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financial stability (Svirydzenka, 2016; Them, 2009). Furthermore, during the post-crisis period, literature shows that a rigorous improvement specially in the financial stability is crucially needed for the west Asian countries (Audi, Kassem, & Roussel, 2021). This is because Asian banks perform much better than banks in other regions of the world, according to Vinayak, Lee, Rajendran and Sengupta (2016), and hence have a considerable influence on global banking stability and performance (Vinayak *et al.*, 2016). Financial instability, on the other hand, like non-performing loans (NPLs), limits commercial banks' capacity to distribute credit and restricts money mobility in the market. A higher percentage of nonperforming loans harms the monetary transmission system to the actual economy and the financial intermediary function of financial institutions, thereby impacting trade and investment both in and out of the country. The global financial crisis and systemic risk are tied to banking instability. The latter describes not only the social welfare downsides of a scenario that ends in an environment of distrust and uncertainty but also the characteristics and features of an unstable and unbalanced organization. The crisis showed us that economic systems can be insecure and that the price of such insecurity is high. Whether it's unemployed or public debt, dealing with the fallout from a few months when the global banking system was on the verge of collapsing will take several years. We look into the factors that influence banking stability. Although some regulators like to conceive of banking stability as such absent of bank failure, there is no agreed-upon definition for the term. Because of this lack of agreement, each community bank regulator must define financial stability and determine whether it includes traditional banks, non-bank financial enterprises and shadow banks operating outside the formal financial system. However, only a few studies have been written about non-interest income (NII) and net interest margin (NIM) as a determinant of bank stability altogether (Mkadm, Baccari, & Ncib, 2021).

In this study, we examine the impact of NIM, NII and non-interest expense altogether on banks' stability. When NIM is taken into consideration, Ali (2015), Borio (2003) and Mörttinen Poloni, Sandars and Vesala (2005) found the drivers of bank profitability have a clear association with the stability of the banking sector. However, Muizzuddin, Tandelilin, Hanafi and Setiyono (2021) reveal that NIM has a negative impact on bank stability. Furthermore, when we take into account NII, there also has been a lot of argument about it. Many researchers look at income diversity in conventional banking and find both good (Ahamed, 2017; Al-Obaidan, 1999; Elsas, Hackethal, & Holzhäuser, 2010; Meslier, Tacneng, & Tarazi, 2014) and negative results (Acharya, Hasan, & Saunders, 2006; DeYoung & Rice, 2004; Maudos, 2017; Stiroh, 2004). Additionally, in terms of non-interest expense proxied by operating efficiency is the most significant component in determining a bank's long-term profitability, efficiency and stability, according to Ayayi and Sene (2010) and Ghosh and Sanyal (2019).

The study's primary goal is to investigate the impact of bank performance and operational efficiency on bank stability in Western Asian countries. One of the key goals is to determine the banking sector's stability in Western Asian countries across the research period. Although the banking industry in Asia is more stable than any other economy, the financial stability of Central Asian countries is deteriorating. In Tajikistan, for instance, the 2015 banking crisis drastically damaged public trust in the financial system's soundness (OECD, 2018). Meanwhile, bank stability has declined in other countries such as Uzbekistan, Kazakhstan and the Kyrgyz Republic in recent years. This detrimental impact on several parts of Asia has motivated us to draw our attention to investigating the countries in Western Asia. Several studies on bank stability have been made in South East, Asia and East Asia (Islam, Ebenezer, Sobhani, & Shahriar, 2020; Nguyen, Skully, & Perera, 2012; Phan, Anwar, Alexander, & Phan, 2019; Soedarmono, Machrouh, & Tarazi, 2013) or considering the Asia Pacific (Fu, Lin, & Molyneux, 2014; Santoso, Yugianoro, Soedarmono, & Prasetyantoko, 2021). Additionally, prior studies investigated the banking sector performance by considering low-income growing economies such as Ethiopia as noted (Ayalew, 2021).

Again, some narrowed their focus by analyzing one of the rising economies of South-East Asia, such as Bangladesh (Rana-Al-Mosharrafa & Islam, 2021). However, Mehzabin, Shahriar, Hoque, Wanke and Azad (2022) analyzed both emerging and developed economies by considering a large number of countries in Asia. Nevertheless, to our understanding, a limited handful of studies have been carried out which examined the banking sector in the context of both developing and advanced economies of the western part of Asia. In addition, given the period under consideration, the study investigates banking condition by covering a significant event in the banking history (Global economic meltdown), which is an important insight into the literature. However, we examine descriptive data on banking sector performance, financial stability or soundness and efficiency of sample banks. In addition, we investigate the magnitude and direction of the influence of bank performance and operational efficiency on sample banks' stability across the research period. Empirical research often uses either NIM or NII, but hardly both, making it difficult to find the impact on banks' stability. As a result, the goal of this study is to look at the influence of NIM, NII (NII_Ratio) and non-interest expense proxied by operating efficiency altogether on banks stability of 12 Western Asian countries (Saudi Arabia, Qatar, Bahrain, Jordan, Kuwait, Oman, Israel, United Arab Emirates, Palestine, Turkey, Lebanon, Cyprus) which includes both developing and developed economies by using a large set of panel data from its most recent generation between 2004 and 2018. Second, we mostly focus on major issues altogether, i.e. NIM, NII and non-interest expense. Furthermore, the previous study has shown the impact of these characteristics on a certain country or region. As a result of the scarcity of previous studies, we concentrated our investigation on the banks of 12 nations in the western part of Asia. Finally, we employed a regression model that integrated cross-sectional and time series data to evaluate the influence on bank stability, whereas some research solely used a cross-sectional approach to analyze their findings. As a result, the study's purpose is to fill in the gaps in the existing knowledge.

The rest of this paper is organized in the following manner. Section 2 describes the background and hypothesis development that underlie the study of the paper. Section 3 presents the methodology. Section 4 discusses data analysis. Finally, section 5 concludes the research paper.

2. Background and hypotheses development

There has been an extensive debate regarding the bank insolvency in the existing literature. Since the financial globalization has been increasing rapidly, the consequences of bank insolvency might be transferred from nation to another at a fast pace (Audi *et al.*, 2021). Governments from West Asian countries cannot readily control large-scale bank bankruptcy transfers, which can wreak havoc on stabilization efforts (Altman, 1968; De Bandt & Oung, 2004; Haldane, 2009; Hannan & Hanweck, 1988; Sinkey & Nash, 1993; Stávárek & Řepková, 2012). However, the effective operation of the economy relies on a sound and stable financial system (Ivičić, Kunovac, & Ljubaj, 2008). In addition, a sound financial system optimally assigns capital, reduces investment risk and integrates catastrophes by employing self-corrective processes (Rahman, Chowdhury, & Tania, 2021). Hence, a sound and stable financial structure is a prerequisite for the future growth of any nation.

2.1 Bank stability and bank performance:

Following the great recession of 2007/2008, there has been an extensive debate regarding the bank profitability and stability of the financial sector among policymakers and bank authorities which has received considerable interest from researchers (Ali & Puah, 2019).

The rationale for this is apparent because a banking sector with greater functionality is better able to shield against monetary distress. Every bank strives to make a profit to stay in business, especially as the financial markets become more competitive. A prosperous banking industry should be able to absorb negative external shocks and maintain financial system stability (Al-Homaidi, Tabash, Farhan, & Almaqtari, 2018). However, Fu *et al.* (2014) studied 1500 observations throughout the Asia Pacific region to investigate the factors that influence banking stability in numerous countries between 2003 and 2010. Moreover, the drivers of bank profitability seem to have a clear association with the stability of the banking industry (Ali, 2015; Borio, 2003; Mörttinen *et al.*, 2005). Nevertheless, Mkadmi *et al.* (2021) reveal in his studies that NIM has a minor yet favorable influence on bank stability. The "margin effect", according to Martinez-Miera and Repullo (2010), suggests that reduced interest payments on loans diminish bank profits, increasing bank risk. The eventual effect of greater competition on stability is determined by which factors take precedence. Nevertheless, Muizzuddin *et al.* (2021) reveal in his study that NIM has a negative significant relationship with bank stability. Tabak, Gomes and da Silva Medeiros (2015) studied the drivers of commercial bank stability in Brazil over 11 years. According to the research, the ROA promotes banking stability. However, between 2003 and 2013, Tan and Anchor (2016) investigated the link between performance and stability in the Chinese banking system. They discovered that stability and ROA ratio have a substantial and unfavorable relationship. Hence, concerning the empirical evidence found in the empirical literature regarding the relationship between bank performance and stability, the following hypothesis can be drawn:

H1. Improved financial profitability increases the stability of banks.

2.2 Bank stability and non-interest income streams

Despite contradictory conceptual and empirical arguments that have been highlighted in the literature of economics and finance, the influence of diversification on performance of banking industry is still a subject of great interest. However, non-interest-bearing activities that are not completely associated with typical banking operations would have to provide revenue smoothing, resistance to negative risks and a decrease in the firm's overall risk level (Chiorazzo, Milani, & Salvini, 2008). A large number of studies looked at income diversity in traditional banking and find both a positive (Ahamed, 2017; Al-Obaidan, 1999; Elsas *et al.*, 2010; Meslier *et al.*, 2014) and negative association (Acharya *et al.*, 2006; DeYoung & Rice, 2004; Maudos, 2017; Stiroh, 2004). Bank diversification and financial stability have an inverted U-shaped connection, according to an examination of bank-year records from 34 OECD nations from 2002 to 2012. Financial stability grows with bank diversity until it reaches its ideal level, according to the data, but it then begins to decline after bank diversification exceeds this level. However, bank diversity has different implications on financial stability before and after the global financial crisis (Kim, Batten, & Ryu, 2020). Additionally Demirgüç-Kunt and Huizinga (2010) suggest that operations that produce non-interest revenue might improve bank performance and help distribute risk by presenting diversification in a good way. According to Filson and Olfati (2014), the Gramm-Leach-Bliley Act encourages US bank holding firms to diversify their activities by expanding into investment banking, securities brokerage and insurance. Similarly, Edirisuriya, Gunasekarage and Dempsey (2015) discover that bank diversification increases market-to-book ratios in South Asian stock markets. They also demonstrate how diversity might help banks become more solvent. This implies that banks with a higher degree of income diversity are much more stable than banks with a lower level of financial diversification. Moreover Mkadmi *et al.* (2021) reveal NII has an insignificant but favorable effect on bank stability.

Therefore, owing to the findings revealed in the prior literature regarding the impact of NII sources on bank soundness, we draw the following hypothesis:

H2. Banks with a higher degree of NII are more stable.

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2.3 Bank stability and operational efficiency

The scholarly research on the link between banking efficiency and stability is still in its early stages. The majority of research in the previous several decades has looked at the link between efficiency and stability in industrialized nations, particularly the United States and Europe (Altunbas, Carbo, Gardener, & Molyneux, 2007; Berger & DeYoung, 1997; Brissimis, Delis, & Papanikolaou, 2008; Fiordelisi, Marques-Ibanez, & Molyneux, 2011; Kwan & Eisenbeis, 1997). However, using Granger-causality approaches, Berger and DeYoung (1997) explored the inter-temporal linkages among nonperforming loans, cost efficiency and capital in the US banking sector from 1985 to 1994. Their findings revealed two possible paths for these correlations. To begin with, higher nonperforming loans precede lower measured cost efficiency, confirming the bad-luck theory that higher nonperforming loan administration costs lower measured cost efficiency. In both cost efficiency and loan portfolio, however, decreased overall efficiency precedes rises in nonperforming loans, supporting the bad-management argument. Ayayi and Sene (2010) and Ghosh and Sanyal (2019) found that operational efficiency is the most important factor in determining a bank's long-term viability, efficiency and stability. High bank efficacy, according to Beck, Demirgüç-Kunt, and Levine (2000), arose from the creation and allocation of income, which encouraged productivity and financial growth. The expense ratio was traditionally used to measure operational efficiency (Shah & Jan, 2014). Operational efficiency ratios were evaluated in particular to show how effective management may reduce costs and increase income. Operational efficiency illustrates the capability of management to regulate expenditures. Knowledgeable and skilled staff, capital usage (Gupta & Raman, 2020) and technical input (Mohapatra & Mohanty, 2017) were all important variables in the firm's operational efficiency. High ratios demonstrated inefficiencies in the bank's efforts to reduce operating expenses and, as a result, business losses. Because of its strong relationship with both competitiveness and financial stability, operational efficiency is an important issue to consider when explaining financial stability. Competition, according to Allen and Gale (2004), may be beneficial to efficiency while also being necessary for financial stability. The academic debate surrounding this connection is currently ongoing and unresolved. According to one school of thought, competitiveness and efficiency can be favorably (Allen & Gale, 2004; Berger & Hannan, 1998) or adversely (Pruteanu-Podpiera, Weill, & Schobert, 2016) connected. Another line of evidence suggests that increased efficiency aids in the reduction of nonperforming loans (Berger & DeYoung, 1997) and has a beneficial influence on stability (Phan *et al.*, 2019). Furthermore, financial organizations, such as banks, provide premium banking services by keeping operating costs low and demonstrating operational efficiency (Allen & Rai, 1996). In addition, efficient banks have greater market power than inefficient banks (Kasman & Carvallo, 2014) and are projected to have a reduced risk level (Fiordelisi *et al.*, 2011), which might contribute to a more stable financial system. Thus, the following hypothesis can be made:

H3. Greater operating efficiency enhances the bank's stability.

3. Methodology

We performed a panel data estimate in this study. The estimation model utilized in this study complies with Ali and Pua (2019), Mkadmi *et al.* (2021) and Rahman *et al.* (2021). Our study

encompasses a sample of all commercial banks listed on the individual Stock Exchange to examine the stability of particular 12 Western Asian country (Saudi Arabia, Qatar, Bahrain, Jordan, Kuwait, Oman, Israel, United Arab Emirates, Palestine, Turkey, Lebanon and Cyprus) banks. The study spans 15 years, beginning in 2004 and ending in 2018 with a total of 1755 observations, where the panel data is strongly balanced. The input for the dataset came from several sources [FitchConnect and WorldBank database]. At the end of each financial year, financial statements and stock quotes were gathered using Thomson Reuters' database.

Table 1 lists the dependent, explanatory and control variables used in the study, as well as their associated computations. The first independent variable in our study is NIM which we found in (Mkadmi *et al.*, 2021; Muizzuddin *et al.*, 2021) past research as calculated by net interest income to total assets as a measure of bank profitability. NIM stands for "interest income minus interest costs divided by interest-bearing assets," and it is a measure of the profitability of the banking industry. We believe that profitable banks have a greater NIM and are hence more stable. In our research, return on asset (ROA) is also used as a measure of bank profitability. ROA is estimated here by net income to total assets as suggested by Ali and Puah (2019), Audi *et al.* (2021) and Mkadmi *et al.* (2021). The influence of financial institution profitability on institutional stability was determined using NIM and ROA. Another independent variable we consider here is the NII ratio which measures as NII to total assets as recommended by Mkadmi *et al.* (2021). The greater the value, the more stable the banking system is. In our study, we measure operating efficiency as proxied by the non-interest expense ratio suggested by Ali, Shuib and Nor (2021), Dutta and Saha (2021), Rahman *et al.* (2021) and Supiyadi (2021) which is calculated as a non-interest expense to the total asset. So, we may claim that increased operational efficiency improves the financial sector's stability. The control variable in our research is the leverage ratio which we measure by total debt to total assets as most authors do (Mkadmi *et al.*, 2021). Moreover, LDTA is calculated as long-term debt to total assets as suggested by Ayalew (2021). An increased debt of a firm rises the probability of a firm being more instable. Another control

Variables	Measure	Data source
Z-Score	Measure of bank stability (ROA + Capital Adequacy Ratio)/sd(ROA)	Ali and Puah (2019), Audi <i>et al.</i> (2021), Mkadmi <i>et al.</i> (2021), Muizzuddin <i>et al.</i> (2021), Rahman <i>et al.</i> (2021), Rupeika-Apoga <i>et al.</i> (2018), Supiyadi (2021)
NPLTL	Measure of bank stability (Non-Performing Loan/Total Gross Loan)	Rahman <i>et al.</i> (2021)
NIM	Measure of profitability (Net Interest Income/Total Asset)	Mkadmi <i>et al.</i> (2021), Muizzuddin <i>et al.</i> (2021)
ROA	Measure of profitability (Net Income/Total Asset)	Ali and Puah (2019), Audi <i>et al.</i> (2021), Mkadmi <i>et al.</i> (2021)
NII_Ratio	Non-Interest Income ratio (Non-Interest Income/Total Asset)	Mkadmi <i>et al.</i> (2021)
Operating_Efficiency	Non-Interest Expense/Total Asset	Ali <i>et al.</i> (2021), Dutta and Saha (2021), Rahman <i>et al.</i> (2021), Supiyadi (2021)
Leverage_Ratio	Debt-to-asset ratio (Total debt/Total asset)	Mkadmi <i>et al.</i> (2021)
LDTA	Long-term debt ratio (Long-term Debt/Total Asset)	Ayalew (2021)
Credit_Risk	Loan-to-asset ratio (Net Loan/Total Asset)	Ali and Puah (2019), Rupeika-Apoga <i>et al.</i> (2018), Supiyadi (2021)
Size	Size of financial institution (ln(TA))	Dutta and Saha (2021), Mkadmi <i>et al.</i> (2021), Rahman <i>et al.</i> (2021), Supiyadi (2021)

Table 1.
Variables descriptions

variable that we used in our study is credit risk proxied by loan-to-asset ratio calculated by net loan to total assets recommended by Ali and Puah (2019), Rupeika-Apoga, Zaidi, Thalassinou and Thalassinou (2018) and Supiyadi (2021). The higher the loan of a firm, the greater the amount of risk. When banks lend loans to borrowers, they are exposed to credit risk. Credit risk refers to the likelihood that borrowers may be unable to make their principal and interest payments. Therefore, credit risk is an important determinant in analyzing the stability of the financial sector. Finally, we took financial institutions' size which measures as a logarithm of total assets of financial institutions. Because this ratio is so important in determining bank stability, the research concentrates on the influence of size. Several studies have found that large banks may lower risk and credit costs while also being more stable than small banks. Smaller banks, on the other hand, are more unstable, riskier and hence better prepared to endure a large banking crisis.

In this study, we employ Z-score as a dependent variable. Most authors (Ali & Puah, 2019; Audi *et al.*, 2021; Mkadmi *et al.*, 2021; Rahman *et al.*, 2021; Rupeika-Apoga *et al.*, 2018; Supiyadi, 2021) calculate the Z-score as calculating the ROA with the addition the capital ratio by the standard deviation of the ROA.

$$Z - Score = \frac{ROA + CAR}{\sigma ROA}$$

where,

ROA indicates the return on assets, CAR represents capital adequacy ratio and σROA is the standard deviation of return on total assets.

In our research, we also take into account another dependent variable NPLTL to check the robustness. NPLTL measures as non-performing loan to total gross loan which is also proxied as the measure of bank stability.

We construct the following regression models:

$$\begin{aligned} Z - Score = & \beta_0 + \beta_1 NIM + \beta_2 ROA + \beta_3 NII_{Ratio} + \beta_4 Operating_{Efficiency} + \beta_5 Leverage_{Ratio} \\ & + \beta_6 LDTA + \beta_7 Credit_{Risk} + \beta_8 Size + Year\ Dummies + Country\ Dummies \\ & + \varepsilon_{it} \end{aligned}$$

$$\begin{aligned} NPLTL = & \beta_0 + \beta_1 NIM + \beta_2 ROA + \beta_3 NII_{Ratio} + \beta_4 Operating_{Efficiency} + \beta_5 Leverage_{Ratio} \\ & + \beta_6 LDTA + \beta_7 Credit_{Risk} + \beta_8 Size + Year\ Dummies + Country\ Dummies + \varepsilon_{it} \end{aligned}$$

where,

Z-Score is the measurement of bank stability;

NPLTL is the measurement of bank stability;

NIM is the net interest margin;

ROA is the return on assets;

NII_Ratio is the non-interest income ratio;

Operating efficiency is the non-interest expense ratio;

Leverage_Ratio is the debt to asset ratio;

LDTA is the long-term debt ratio;

Credit_Risk is the loan-to-asset ratio;
Size is the measure of financial institutions' size.

4. Data analysis

We used a fixed effect model to get our results. Because it is suitable for an unbalanced data set, we omitted pooled OLS regression. On the other hand, our panel data is extremely well balanced. The Hausman test, also known as the Durbin–Wu–Hausman (DWH), is used to determine if a fixed or random effect regression model is appropriate for our research. We noticed that the null hypothesis is rejected after doing the Hausman test, indicating that the fixed effect regression model is an excellent match for our estimation. We also ran a Wooldridge auto-correlation test on our panel data to see if our fixed effect model had any first-order auto-correlation. To see if our fixed effect model had any issues with group-wise heteroskedasticity, we utilized the modified Wald test for group-wise heteroskedasticity, which is commonly employed with cross-sectional time series data. To correct the problems, we used robust standard errors in our regression equation.

Table 2 lists the factors we looked into during our research. The Z-score is a metric that indicates how near a bank is to declaring bankruptcy; a higher number indicates more stability. The average Z-Score in our study is 8.908 which is greater than the average revealed by Rupeika-Apoga *et al.* (2018) with a standard deviation of 4.470. The average ratio of NPLs to total loans as a measure of bank stability is 0.063, indicating that about 63% of the banks in our analysis are stable. The standard deviation of NPLTL is 0.067. As a measure of profitability, we consider two variables NIM and ROA. Considering NIM, which has a mean of 0.028 along with a standard deviation of 0.011. ROA, on the other side, has a mean of 0.015 and a standard deviation of 0.016. The mean of the NII Ratio is 0.015, with a minimum and maximum range of -0.003 to 0.064 and a standard deviation of 0.009. Keeping a close look at another variable, for instance, operating efficiency which is proxied by non-interest expense to total assets has a mean of -0.021 which includes a range of minimum -0.082 to a maximum 0.005 . In terms of debt ratio proxied by leverage ratio and long-term debt ratio (LDTA) has a mean value of 0.068 and 0.032 respectively along with a standard deviation of 0.113 and 0.055 . Furthermore, credit risk is measured by the loan-to-asset ratio, which has an average value of 0.574 and a standard deviation of 0.153 . According to our findings, 57% of banks are at risk of default. The banking sector's stability is harmed by increased credit risk. Finally, the size of banks in 12 countries of Western Asia averages 22.566 which is greater than the value revealed by Ali and Puaah (2019) along with a standard deviation of 1.556 .

The pairwise correlation in our study is shown in Figure 1. Our findings reveal that NIM has a positive significant relationship with bank stability, implying that increased financial

Variable	Obs	Mean	Std. Dev	Min	Max
Z-SCORE	1679	8.908	4.470	-6.291	39.467
NPLTL	955	0.063	0.067	0.000	0.568
NIM	1654	0.028	0.011	0.001	0.093
NII ratio	1619	0.015	0.009	-0.003	0.064
OperatingEfficiency	1653	-0.021	0.011	-0.082	0.005
LeverageRatio	1681	0.068	0.113	0.000	0.770
LD/TA	1681	0.032	0.055	0.000	0.415
CreditRisk	1659	0.574	0.153	-0.069	1.000
ROA	1695	0.015	0.016	-0.188	0.135
Size	1697	22.566	1.556	16.504	26.054

Table 2.
Descriptive statistics

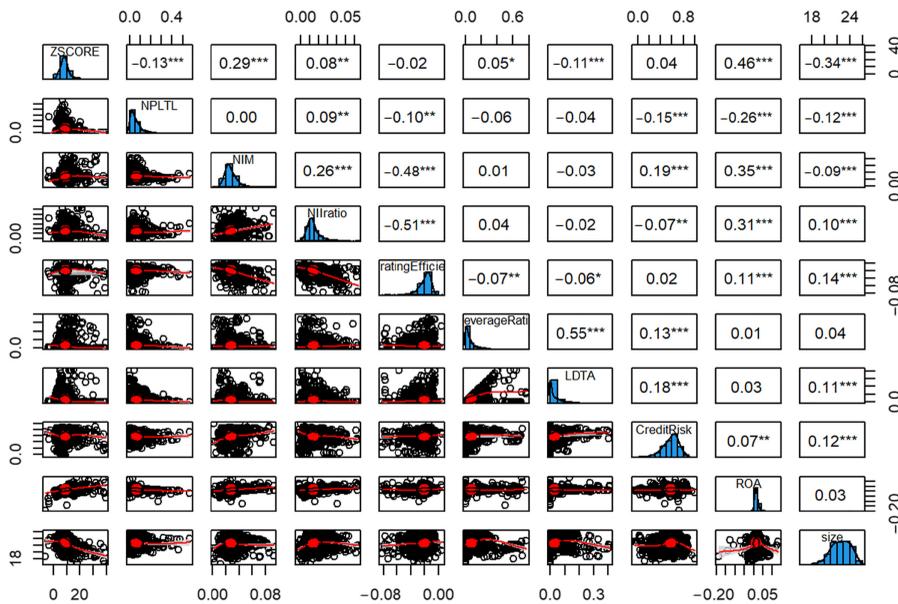


Figure 1.
Pairwise correlation

profitability boosts bank stability. NII has a positive significant relationship with Z-Score and NPLTL, implying that higher NII improves financial company stability. However, operating efficiency proxied as non-interest expense ratio, which has no significant but negative correlation with Z-Score but has a negative significant correlation with NPLTL, portrays that greater non-interest expense reduces the stability of banks. Furthermore, NIM and NII Ratio have a negative significant association with operational efficiency. The analysis of long-term debt also shows a negative significant correlation with the stability of banks. It means that the greater the long-term debt, the less stable the bank is. As a measure of a loan of asset ratio, we take into credit risk, which shows a negative significant correlation with NPLTL and NII_Ratio. On the contrary, credit risk indicates a positive significant correlation with NIM, leverage ratio and long-term debt ratio which depicts that increasing debt ratio and long-term debt increases the credit risk. Moreover, the association between ROA and Z-Score is positive, indicating that better bank profitability promotes bank stability. Furthermore, ROA shows a positive correlation with NIM, NII_Ratio, operating efficiency and credit risk. Finally, the size of the banks shows a negative significant correlation with Z-Score and NPLTL. The greater the bank sizes the less stable the banks are.

The fixed effect regression model, according to the Hausman test, is the best fit for our research. At the 1% level, our findings show that bank profitability, as measured by NIM, has a positive significant connection with bank stability (Z-Score). According to computed coefficients, a 1% increase in bank profitability can boost bank stability from 45.979% to 119.561% in model 7 and model 5, respectively. As a result, our data support our hypothesis (H1) that increased financial profitability improves bank stability. These findings comply with the findings of [Mkadmi et al. \(2021\)](#) and are inverse to the findings of [Muizzuddin et al. \(2021\)](#). NII ratio exerts positive significant relation with bank stability at a 1% level in model 2 to model 6 and 10% level in model 7. In model 2 and model 5, a 1% increase in the NII ratio can boost bank stability from 51.622% to 96.418%. Our analysis fully supports and accepts our hypothesis (H2) that banks with a higher degree of NII are more stable. Furthermore, another

variable we evaluate is operational efficiency as measured by the non-interest expense ratio, which shows a strong correlation with banking sector stability at the 1% level in models 3 to 5. However, model 7 it reveals insignificant yet favorable results towards bank stability. Additionally, a 1% increase in operating efficiency may increase the bank stability from 98.673% to 100.168% in model 4 and model 5 respectively. As a result, our data substantially support the hypothesis (H3), which states that increased operational efficiency improves bank stability. In our study, the leverage ratio shows a negative significant influence on bank stability at a 1% level in model 4. However, in model 5 to model 7, the finding reveals that insignificant yet negative relation with bank stability. Furthermore, long-term debt also depicts negative significant relation to bank stability at a 1% level. 1% increase in long-term debt may decrease the bank stability from 6.19% to 6.285% in model 5 and model 6 respectively. We choose size as a control variable since it has a negative significant relationship with firm stability at the 1% level. The findings suggest that keeping larger, more complex institutions stable is difficult.

4.1 Robustness check

To check the robustness of our regression analysis, we consider NPLTL as a measure of bank stability in place of the Z-Score recommended by [Rahman et al. \(2021\)](#). We see considerable changes in factors affecting bank stability after including NPLTL. The NIM confirms the findings of our earlier investigation. In regression [Table 3](#), we see there is a significant positive relation between NIM and Z-Score in model 1 to model 7 but in [Table 4](#) whereas we observe the insignificant yet positive result in model 2 to model 6. When we replace Z-Score with NPLTL, we see that model 1 and model 7 both exhibit significant positive results at the 1% level, but [Table 3](#) regression model consistently provides significant positive results from model 1 through model 6. However, when we consider Z-Score as a measure of stability, the result identifies strong significant positive relation between operating efficiency and Z-Score at a 1% level in almost all models except model 7.

On the contrary, due to the replacement of Z-Score with NPLTL reveals negative significant results at 5% level in model 3 to model 6. It portrays that the decrease in operating efficiency may increase the stability of banks when we measure the stability of NPLTL. Furthermore, in [Table 3](#), the long-term debt reveals negative significant relation with Z-Score in model 5 to model 7, whereas, in [Table 4](#) regression model, the finding depicts an insignificant positive relationship between long-term debt and the stability of banks. Finally, at the 5% level, credit risk as measured by loan-to-asset ratio shows a substantial positive outcome in [Table 3](#). In contrast, the loan-to-asset ratio in [Table 4](#) shows a negative significant result at the 1% level, indicating that reducing credit risk may boost bank stability.

5. Conclusions and implications

In a region with rapid development such as West Asian, the banking industry flourished and now contributes to a significant portion in the region's advancement. Considering the remarkable transformations that the banking industry of West Asian countries underwent, this study aims to how NIM, NII and non-interest expense changes the stability of the banks in 12 Western Asian countries (Saudi Arabia, Qatar, Bahrain, Jordan, Kuwait, Oman, Israel, United Arab Emirates, Palestine, Turkey, Lebanon, Cyprus) from 2004 to 2018. Only a few empirical studies have looked at the influence of non-interest expenditure on bank stability as operational efficiency. However, the influence of NIM, non-interest revenue and non-interest cost on bank stability in 12 Western Asian nations is shown in this study. We also consider leverage ratio, long-term debt and loan-to-asset ratio proxied by credit risk in our analysis. The results show that our first prime variable net-interest margin has a favorable correlation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	FV	FV	FV	FV	FV	FV	FV
NIM_w2	87.68*** (5.992)	91.399*** (5.955)	117.412*** (5.885)	118.501*** (5.814)	119.561*** (5.824)	116.521*** (5.765)	45.979*** (6.295)
Size	-0.877*** (0.078)	-0.829*** (0.073)	-0.817*** (0.06)	-0.795*** (0.059)	-0.781*** (0.059)	-0.783*** (0.059)	-0.799*** (0.054)
Nlratio_w2		51.622*** (5.332)	94.138*** (6.013)	96.009*** (6.002)	96.418*** (6.011)	96.355*** (5.963)	12.071* (6.538)
OperatingEfficiency			100.088*** (6.549)	98.673*** (6.534)	100.168*** (6.601)	99.423*** (6.617)	5.551 (7.236)
LeverageRatio_w2				-3.277*** (0.717)	-1.012 (0.894)	-1.062 (0.882)	-472 (0.762)
LDTA_w2					-6.19*** (1.324)	-6.285*** (1.315)	-6.233*** (1.177)
CreditRisk						0.812** (0.351)	0.768** (0.317)
ROA							111.063*** (5.085)
_cons	24.715*** (1.76)	22.659*** (1.643)	23.112*** (1.364)	22.668*** (1.34)	22.346*** (1.344)	22.049*** (1.335)	22.141*** (1.228)
Observations	1642	1600	1596	1590	1585	1575	1575
Pseudo R ²	.z	.z	.z	.z	.z	.z	.z
Year dummy	YES	YES	YES	YES	YES	YES	YES
Country dummy	YES	YES	YES	YES	YES	YES	YES

Note(s): Standard errors are in parentheses
****p* < 0.01, ***p* < 0.05, **p* < 0.1

Table 4.
Estimations with
panel data

	(1) FV	(2) FV	(3) FV	(4) FV	(5) FV	(6) FV	(7) FV
NIM_w2	0.336** (0.171)	0.265 (0.178)	0.093 (0.195)	0.11 (0.195)	0.12 (0.197)	0.233 (0.197)	1.156*** (0.235)
Size	-0.006*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)
Nlratiao_w2	0.611*** (0.155)	0.611*** (0.155)	0.351* (0.201)	0.273 (0.196)	0.273 (0.198)	0.245 (0.2)	1.29*** (0.251)
OperatingEfficiency			-0.452*** (0.228)	-0.507*** (0.225)	-0.483*** (0.227)	-0.48*** (0.224)	0.823*** (0.296)
LeverageRatio_w2				-0.008 (0.016)	-0.01 (0.019)	0 (0.019)	-0.022 (0.016)
LDTA_w2					0.017 (0.038)	0.016 (0.038)	0.019 (0.036)
CreditRisk						-0.059*** (0.015)	-0.057*** (0.014)
ROA							-1.227*** (0.185)
_cons	0.171*** (0.047)	0.186*** (0.044)	0.174*** (0.044)	0.17*** (0.045)	0.168*** (0.045)	0.192*** (0.045)	0.21*** (0.038)
Observations	950	937	936	930	927	927	927
Pseudo R ²	.z						
Year dummy	YES						
Country dummy	YES						

Note(s): Standard errors are in parentheses
***p < 0.01, **p < 0.05, *p < 0.1

with bank stability. The finding shows that increased bank profitability promotes bank stability. Furthermore, NII and non-interest expense also reveal positive impact on bank stability. That finding implies that the higher NII and the higher non-interest expense increases the stability of the 12 Western Asian banks altogether. The result also shows loan-to-asset ratio proxied by credit risk has a significant positive relation with 12 Western Asian banks, which is a new finding in our analysis. However, leverage ratio and long-term debt imply negative significant result with the stability of the banks. The finding portrays that, higher total debt or long-term debt reduces the stability of the banks in 12 Western Asian countries.

Overall, our findings contribute to the existing literature by analyzing the impact of NIM, NII and non-interest expense on the stability of banks by providing some new yet important insights. We believe our findings are significant for a variety of reasons. Firstly, our findings corroborate prior research on the value of financial firms in 12 Western Asian countries. Secondly, several studies on bank stability have been made in South East Asia and East Asia (Islam *et al.*, 2020; Nguyen *et al.*, 2012; Phan *et al.*, 2019; Soedarmono *et al.*, 2013) or considering the Asia Pacific (Fu *et al.*, 2014; Santoso *et al.*, 2021). Thirdly, we didn't concentrate our efforts just on one country. To examine the influence on the stability of the banks, we focus on 12 Western Asian countries. Finally, our study spans the years 2004 to 2018, including some of the most significant changes in the Western Asian financial system in recent years.

The findings in the study are aimed at assisting policy makers and business management to evaluate pertinent areas of performance and recommending corrective actions as necessary. The results of the study reveal a favorable relationship between NIM and bank stability. Measures should be implemented at 12 Western Asian banks to retain profitability. Furthermore, non-interest revenue has a favorable influence on the banks' stability. As a result of the findings, the bank regulatory authority should wisely disperse non-interest revenue streams, which will improve the banks' stability. Additionally, the regression result portrays that the net-interest expense proxied by operating efficiency also has a significant positive result. The competent authority should take necessary steps to increase the net-interest expense so that they can increase the stability of their banks. Furthermore, the loan-to-asset ratio proxied by credit risk shows significant positive relation with the stability of the banks which is a new finding in our analysis. Nevertheless, the leverage ratio shows a significant negative association with the stability of the 12 Western Asian country banks. The finding depicts that the banks should take proper measures to reduce the total debt so that they can maintain their stability. Similarly, long-term debt also shows unfavorable influence on bank profitability. The bank policymakers need to be careful regarding the long-term debt factors since, the stability is largely impacted due to its' influence. However, since the study consists of both developing and advanced economies of West Asia, the policy implications of the banking sector are somewhat similar to some extent. Again, the banking scenario of the Asia is flourishing and comparatively stable, therefore, a considerable effort should be given in maintaining sustainability of banks in developed countries and boosting the same in emerging economies.

Even though our study sample consists of active financial firms (banks) in 12 Western Asia and that key variables from the bank stability measure were included, there are some limitations. Firstly, this study focuses only on measures of 12 Western Asian country banks' stability. Secondly, this study is conducted on banks for the years 2004 to 2018. With a bigger sample, future studies might look at market-based performance monitoring. Several things will happen as a result of our investigation. As a first start, other factors of bank solvency (governance, concentration, diversification, inflation and so on) may be incorporated. Another method is to investigate the causes of bank solvency across a greater geographic range to increase the sample size and identify the most important factors impacting bank stability. To summarize, our work benefits relevant people such as bank clients, bank officials and bank regulators by providing vital information.

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