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Bank-Specific Determinants of Financial Stability in Participation Banks: Fresh Evidence from the Driscoll-Kraay Estimator

Katılım Bankalarında Finansal İstikrarın Bankaya Özgü Belirleyicileri: Driscoll-Kraay Tahmincisinden Yeni Kanıtlar

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ABSTRACT

Since its first introduction as a primary policy goal by a big central bank, financial stability has received much interest as a distinct matter, separate from price stability and the efficient functioning of the financial sectors. Accordingly, different financial analysts and scholars in the financial system have tried to unravel the complexity of financial stability and have conducted theoretical and empirical research at different levels. This study aims to reveal the internal factors affecting the financial stability of participation banks in Turkey. Therefore, we consider the data of 6 participation banks for the 2019Q1-2023Q1 period. Moreover, we assess the stability of participation banks with the Z-score. As a result of the analyses with the Driscoll &Kraay robust standard errors estimator, firstly, we found a negative relationship between risk-weighted and non-risk-weighted capital ratios and bank stability. Secondly, we concluded that while there is a negative relationship between bank stability and bank size, there is a positive relationship between cost-to-income ratio, loan ratio and collected funds ratio and bank stability. Finally, we observed a negative relationship between asset and fund diversifications and bank stability; in contrast, there is a positive relationship between income diversification and bank stability. The results of the research state that the factors affecting bank stability from most to least are income diversification, fund and asset diversifications, collected funds ratio, non-risk weighted capital ratio, cost-to-income ratio, loan ratio, risk-weighted capital ratio and bank size, respectively. The research results also indicate that participation banks must improve their management efficiency, credit, collected fund and income diversification levels to support their sustainable financial stability and soundness.

Anahtar Kelimeler:

Finansal İstikrar,

Katılım Bankaları,

Bankaya Özgü Göstergeler,

Driscoll-Kraay Tahmincisi

Jel Kodları:

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ÖZET

Finansal istikrar, büyük bir merkez bankası tarafından birincil politika hedefi olarak ilk kez ortaya atıldığından bu yana, fiyat istikrarından ve finansal sektörlerin etkin işleyişinden ayrı bir konu olarak büyük ilgi görmüştür. Bu doğrultuda, finansal sistemdeki farklı finansal analistler ve akademisyenler finansal istikrarın karmaşıklığını çözmeye çalışmış ve farklı düzeylerde teorik ve ampirik araştırmalar yürütmüşlerdir. Bu çalışma, Türkiye'deki katılım bankalarının finansal istikrarını etkileyen içsel faktörleri ortaya koymayı amaçlamaktadır. Bu nedenle 2019Q1-2023Q1 dönemi için 6 katılım bankasının verilerini dikkate alınmıştır. Ayrıca, katılım bankalarının istikrarı Z-skor ile değerlendirilmiştir. Driscoll & Kraay dirençli standart hatalar tahmincisi ile yapılan analizler sonucunda, ilk olarak, risk ağırlıklı ve risk ağırlıklı olmayan sermaye oranları ile banka istikrarı arasında negatif bir ilişki bulunmuştur. İkinci olarak, banka istikrarı ile banka büyüklüğü arasında negatif bir ilişki varken, maliyet-gelir oranı, kredi oranı ve toplanan fonlar oranı ile banka istikrarı arasında pozitif bir ilişki olduğu sonucuna varılmıştır. Son olarak, varlık ve fon çeşitlendirmeleri ile banka istikrarı arasında negatif bir ilişki varken, gelir çeşitlendirmesi ile banka istikrarı arasında pozitif bir ilişkinin olduğu gözlemlenmiştir. Araştırma sonuçları, banka istikrarını en çoktan en aza doğru etkileyen faktörlerin sırasıyla gelir çeşitlendirmesi, fon ve varlık çeşitlendirmeleri, toplanan fonlar oranı, risk ağırlıklı olmayan sermaye oranı, maliyet-gelir oranı, kredi oranı, risk ağırlıklı sermaye oranı ve banka büyüklüğü olduğunu belirtmektedir. Araştırma sonuçları ayrıca, katılım bankalarının sürdürülebilir finansal istikrar ve sağlamlığını desteklemek için yönetim etkinliğini, kredi, toplanan fon ve gelir çeşitlendirme düzeylerini geliştirmeleri gerektiğini göstermektedir.

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1. INTRODUCTION

Financial stability implies the stability of the overall financial sector and individual financial institutions. The topic is crucial as the financial industry affects the economy and its players in various ways. A breakdown in the financial sector may disturb the payment system since intermediaries own the resources. Still, they need a plan for processing or saving payments. As economic deterioration can affect the valuation of assets and currencies, payment obligations that were previously possible may no longer be potential due to fluctuations in the price of money or other assets in the payer's asset portfolio. Similarly, a large discrepancy between cash inflows and outflows can trigger a crisis, affecting the regular flow of economic activities of governments, private enterprises and individuals. Market actors could extend the list of possible scenarios. All these examples emphasize that the stability of the overall financial sector and individual institutions is vital for the health of the economy and, indirectly, for sustaining social harmony (Ali & Izhar, 2015).

Since various periods of financial instability affect countries with different intensities and cause unemployment and production losses, financial stability is still necessary today. The great depression is one of history's most severe periods of financial instability. At that time, top economists argued for a banking system to sustain long-term financial stability and proposed the Chicago reform plan. Their suggestions formed some of the basic structures of Islamic finance. After this plan, it became apparent that a financial system that respects Islamic regulations is invulnerable to instability. The 2008 Global Financial Crisis, characterized by many bankruptcies and other economic turmoil, dominated the world and brought the old thorny issue of the search for financial stability back to the agenda (Iqbal et al., 2010; Belouafi et al., 2015).

In this environment of intense debate, Islamic financial organizations and the principles governing their activities attracted great interest. Indeed, official and formalized Islamic banking agencies have emerged recently, although they need to be more organized and engaged in private actions. The fundamentals of Islamic finance were laid in the 1940s. In the following years, Muslim countries such as Pakistan, Malaysia, Dubai, Kuwait, Qatar and Egypt have taken various initiatives based on Islamic finance and banking mechanism (Iqbal & Molyneux, 2016). The interest-free (Islamic) banking structure, which started to develop worldwide in the 1970s, emerged in Turkey in 1983 a "private finance institution". Private Finance Institutions began to take place in the banking sector as "Participation Banking" in Turkey in 2005. Participation banks' market share in the sector, which was 5% in 2017, reached 8.3% at the end of 2022, and their asset size reached TL 1.2 trillion. With the expansion of the inclusion area, the funds disbursed reached TL 643.8 billion, with an increase of 74.3% without compromising the basic risk management principles. While developing digital channels without lagging behind technology, the bank continues to invest in traditional distribution channels. The number of branches reached 1.379, and the number of employees earned 17.868. Considering the development of participation banks in recent years, it is seen that they achieved growth above the sector in 2022 as well (TKBB, 2022). Due to several countries' adoption of this experience, the Islamic banking sector is undergoing unparagoned expansion. This fact has increased the significance of Islamic financial stability and the factors affecting it. For this reason, various theories have tried to explain the factors that can make Islamic banking a stable banking system in the literature.

Based on Islamic banking theory, the first factor evaluated in the literature in line with the financial stability of Islamic banks is the balance sheet structure. In Islamic banks, the balance sheet's assets consist of Islamic financing and investment accounts, while the liabilities consist of investment accounts and demand deposits. In addition, the balance sheets of Islamic banks allow for balance sheet transfers while acting on the assumption that the maturities of assets and liabilities are compatible (Ghassan & Krichene, 2017).

The second factor is profit and loss sharing (PLS). Chishti (1985) agrees that profit and loss-sharing financing provides stabilizing instruments incorporated into the projects in which investments are made. This argument describes the need for a gap between payment obligations and cash flows. A shortfall has long been seen as a source of financial instability. In addition, PLS allows the bank to actively engage in investments in exceptionally efficient industries, diversification of assets, and follow-up of banks to improve projects and mitigate potential risks (Khoutem & Nedra, 2012).

The quality of banking assets is considered the third factor. It is observed that Islamic banks have superior asset quality because they protect their shareholders' equity in terms of investment deposits, savings and lower non-performing loans (Prima Sakti & Mohamad, 2018).

The link between the real economy and the financial sector contributes to Islamic finance's stability in the literature. Islamic banking theory proposes that Islamic banks can connect the real economy and the financial field due to the Shariah imperative that a monetary asset must back all financial transactions (Njima & Zouari, 2012).

In this context, this study aims to reveal the factors affecting the financial stability of participation banks operating as Islamic banks in Turkey for 2019Q1-2023Q1.

The motivation to investigate this topic stems from two reasons. Firstly, the average value of the financial stability of participation banks in Turkey, according to the Z-score indicator from 2019Q1 to 2023Q1, varies between 0.929 and 188.877. This fact indicates significant differences with a standard deviation of 29.413%. These contradictions raise the question of exactly which factors influence the financial stability of participation banks. Therefore, this study plans to address this gap by examining bank-specific variables affecting participation banks' financial stability. Secondly, when reviewing domestic and foreign literature, we observe that studies focus on comparing financial stability levels between Islamic and conventional banks. In addition, we conclude that a limited number of studies (Iskenderoglu & Tomak, 2013; Danisman, 2018; Alihodzic et al., 2020; Ekinci & Kok, 2020; Collu, 2021; Tunay & Tunay, 2021) have examined the determinants of financial stability, especially for participation banks in Turkey.

The remainder of the study is planned as follows. Section 2 summarizes the determinants of financial stability in Islamic banks and empirical studies. Section 3 highlights the data set and methodology. Section 4 reports and discusses the results of the research. The last section concludes the paper and provides policy recommendations.

2. LITERATURE REVIEW

This section discusses the financial stability levels of banks as revealed by empirical studies and the main factors affecting financial stability.

Farook et al. (2009), one of the studies investigating the issue of 200 banks abroad, found that small Islamic banks are, on average, more financially stable than their conventional counterparts; however, large Islamic banks are weaker on average. Čihák & Hesse (2010) compared the financial stability levels of Islamic and commercial banks on 19 banks, Shahid & Abbas (2012) on 16 banks, Ouerghi (2014) on 94 banks and Chakroun & Gallali (2015) on 136 banks. They reported that small Islamic banks tend to be financially stronger than small commercial banks, large commercial banks tend to be stronger than large Islamic banks and small Islamic banks tend to be stronger than large Islamic banks. Rajhi & Hassairi (2013) examined the issue of 557 banks and determined that Islamic banks are more financially stable than commercial banks, except for small Islamic banks. Altaee et al. (2013) compared the financial stability of commercial and Islamic banks on 97 banks before and after the global financial crisis. They stated that there was no significant difference between the financial stability levels of commercial and Islamic banks for the relevant periods; however, commercial banks tended to be financially stronger than Islamic banks. Wahid & Dar (2016) examined the issue in 38 banks. They concluded that large Islamic banks are less stable than large commercial banks, while small Islamic banks are more stable than small commercial banks. They also revealed that bank size, level of capitalization and income diversification are essential determinants of the stability of Malaysian Islamic and commercial banks. Rashid et al. (2017) investigated the issue using data from 20 banks. They reported that income diversity, profitability ratio, loan/asset ratio, bank size and market concentration ratio have significant effects on the stability of banks. They also found that Islamic banks contribute more effectively to the banking sector's stability than commercial banks. Alqahtani & Mayes (2018) examined whether Islamic banks outperformed commercial banks during the financial shocks in the 2000-2013 period. They identified no significant difference between the two banking types during the global financial crisis; however, when the economic shock spread to the real economy in the later stages of the crisis, large Islamic banks were less stable than commercial banks. Kasri & Azzahra (2020) tested the issue on a total of 94 banks, including commercial and Islamic banks, and showed that the main factors that positively affect the stability of banks in Indonesia are exchange rate, financial inclusion, asset returns and loan/financing growth; however, interest rates have a negative impact on stability. Safiullah (2021) examined the level of financial stability of Islamic and commercial banks on 198 commercial and Islamic banks from 28 countries and stated that Islamic banks have higher stability efficiency than commercial banks.

Studying 45 Islamic banks from 13 countries, Ibrahim & Rizvi (2017) argued that larger Islamic banks are more stable when they exceed a specific threshold size and that operating restrictions and capital tightening play a role in strengthening the stability-size relationship. Lasty et al. (2019), who examined the issue of 11 Islamic banks in Indonesia, determined that an increase in competition, bank size and capital buffer increase bank stability. In a similar study, Widarjono (2020) revealed that the factors affecting bank stability of Indonesian Islamic banks are bank size, capital adequacy ratio and operating efficiency. In a study of 81 Islamic banks from 22 countries, Daoud & Kammoun (2020) reported that risk-based and non-risk-based capital ratios, bank size, loans to total assets ratio, total deposits to total assets ratio, and fixed costs to total assets ratio are essential determinants of bank

stability in the Islamic banking sector. Amaroh (2023) analyzed the determinants of bank stability during the pandemic period on 10 Islamic banks in Indonesia and concluded that capital adequacy, profitability, and financing ratio positively affect bank stability, while the COVID-19 pandemic has no significant effect. Joudar et al. (2023) investigated 31 Islamic banks from 12 Middle East and North Africa (MENA) countries and stated that capital adequacy ratio and liquidity positively affect bank stability, while size, governance and bank concentration level have a negative effect. Sari & Sudarmawan (2023), who tested the issue on 11 Islamic banks from 3 Southeast Asian countries, concluded that while the quality of institutions positively affects bank stability, the impact of financing growth is negative. They also detected that earnings management variables do not significantly affect bank stability. Shahriar et al. (2023), who investigated the relationship between diversification and bank stability on a total of 105 banks consisting of Islamic and commercial banks from 10 MENA countries, found that asset and fund diversification has a negative effect on bank stability, while income diversification has a positive impact on bank stability.

There are also studies in the literature that compare the financial stability levels of commercial and Islamic (participation) banks in the Turkish banking sector and test the determinants of bank stability. Sakarya (2016) examined whether Islamic banks in Turkey are more stable than commercial banks and reported that Islamic banks in Turkey have a significant level of stability compared to commercial banks and that low bank size in Islamic banking leads to low levels of risk. Elbadri & Bektas (2017) compared the financial stability levels of commercial and Islamic banks on 29 banks. They concluded that the level of financial stability is lower for large Islamic banks than for large commercial banks and that small Islamic banks tend to be more financially stable than large Islamic banks. They also found that bank size, loan/asset ratio, cost/income ratio, income diversification and inflation rate, economic growth, oil prices and political stability have a negative effect on financial stability in the banking sector; in contrast, stock prices have a positive impact. Ece & Cadirci (2022) tested the effect of loan concentration level on bank stability in Islamic and commercial banks. They observed that loan portfolio diversification has both negative and positive lagged effects on the commercial banking system in the short run and reduces the risk of bankruptcy in the long run. They also revealed that in the Islamic banking system; at the same time, diversification reduces the financial stability of banks in the short run, and the relationship between diversification and financial stability is not significant in the long run.

Among the studies testing the factors affecting bank stability, Iskenderoglu & Tomak (2013) tested the relationship between competition and bank stability on 15 commercial banks and identified a positive relationship between asset composition and non-performing loans representing bank stability. They also detected a negative relationship between bank size and Z-score, which means bank stability, while the relationship with the deposit ratio is positive. Sakarya & Akkus (2017) analyzed the data of three banks suitable for analysis in participation banks in the Turkish banking sector and the sector regarding credit risk. They concluded that participation banks in the Turkish banking sector have adequate capital adequacy ratios and are resilient against potential shocks in terms of financial stability. Danisman (2018) examined the determinants of bank stability on 27 commercial banks and stated that the inefficiency index, loans to total assets ratio, non-interest income ratio, loan loss provisions ratio and return on assets ratio are leading indicators affecting bank stability. Similarly, Alihodzic et al. (2020) tested the stability of commercial banks in Turkey and some Balkan countries. They observed that the strongest correlation with non-performing loans representing bank stability is between the ratio of total non-interest income to total income and the foreign bank assets to total bank assets. They also concluded that the indicators most strongly correlated with Z-score, representing bank stability, are gross domestic product, Lerner index, net interest margin and cost-to-income ratio. Ekinci & Kok (2020) investigated the relationship between competition and bank stability in 156 commercial banks from 26 European Union countries. They found a positive relationship between market power and bank stability. Collu (2021) examined the issue of 25 commercial banks and found a positive relationship between bank stability return on equity and funding risk and a negative relationship between liquidity risk and bank size. Tunay & Tunay (2021) tested how financial and macroeconomic variables affect commercial banks' stability. They reported that the Z-score representing bank stability is negatively affected by unemployment, broadly defined money supply, interest rate, exchange rate and income level of countries. They also revealed that non-performing loans, representing bank stability, are negatively affected by growth and broadly defined money supply but positively affected by inflation, unemployment and current account balance.

When we evaluate all the empirical studies mentioned above, the studies focus on Islamic banks and compare Islamic and conventional banks regarding financial stability. The literature review verifies the relationship between bank stability and macroeconomic and bank-specific variables; however, it presents different results. Moreover, the existing literature uses a unique econometric model that simultaneously covers both types of banks through stress testing, panel regression, ARDL, VAR, and two-system GMM methods. We analyze the internal

determinants of Islamic banks' financial stability using robust estimators that consider autocorrelation and heteroscedasticity problems and static models that do not. The facts mentioned above prove that the research will contribute to the scientific world by filling the gap in the literature.

3. DATASET AND METHODOLOGY

This study investigates bank-specific factors affecting the stability of Islamic banks. Accordingly, we consider the quarterly data of 6 participation banks operating as Islamic banks in Turkey for 2019Q1-2023Q1. The reason for choosing this period is to reveal what exactly determines the financial stability of participation banks at different risk levels, such as pre-COVID-19, COVID-19 and inflationary periods. We calculate the financial data of the banks from the data obtained from the solo audit reports published by the Banking Regulation and Supervision Agency (BRSA) on a bank basis, and we conduct the analyses in the study with Stata and Gauss packages.

We utilize the Z-scores of banks to represent bank stability, which is the dependent variable in the study. The insolvency of a bank means the probability that its assets' value is lower than its liabilities, which means that as the Z-score increases, the bank's risk of insolvency decreases. Therefore, the Z-score ratio is a standard measure of bank strength and is calculated as follows:

$$Z = \frac{(\mu + K)}{\sigma} \tag{1}$$

In equation (1), μ is the bank's return on assets (ROA), K is the ratio of total equity to total assets, and σ represents the standard deviation of ROA. A Z-score greater than 2.99 means that the bank does not have a problem with financial conditions, while a Z-score less than 1.88 means that the bank has serious financial difficulties or has defaulted. A Z-score between 1.88 and 2.99 indicates that the bank faces minor problems related to financial conditions (Lasty et al., 2019:661).

Bank-specific variables (independent variables) in the study are non-risk weighted capital ratio (CAP), risk-weighted capital ratio (CAR), bank size (SIZE), cost-to-income ratio (CIR), loan ratio (LTA), deposits (collected funds) ratio (DEPA), asset diversification (AST_DIV), fund diversification (FUND_DIV) and income diversification (INC_DIV). We also present detailed information on the variables in Table 1.

Table 1. Detailed Information on Variables

Variables	Formulas	References
	Dependent Variable	
Bank Stability	Z-score = $\frac{\mu ROA + CAP}{\sigma ROA}$	Sakarya (2016); Rashid et al. (2017); Alqahtani & Mayes (2018); Lasty et al. (2019); Daoud & Kammoun (2020); Widarjono (2020); Ece & Cadirci (2022); Shahriar et al. (2023).
	Bank-Specific Variables (Independent Variables)	
Non-Risk Weighted Capital Ratio (CAP)	Total Equity/Total Assets	Sakarya (2016); Wahid & Dar (2016) Alqahtani & Mayes (2018); Daoud & Kammoun (2020); Widarjono (2020); Joudar et al. (2023).
Risk-weighted Capital Ratio (CAR)	(Tier 1 Capital + Tier 2 Capital)/Risk-Weighted Assets	Daoud & Kammoun (2020); Amaroh (2023).
Cost-to-Income Ratio (CIR)	Operating Expenses/ Operating Income	Sakarya (2016); Wahid & Dar (2016); Elbadri & Bektas (2017); Rashid et al. (2017); Widarjono (2020); Joudar et al. (2023).
Bank Size (LNBS)	Natural Log of Total Assets	Sakarya (2016); Wahid & Dar (2016); Elbadri & Bektas (2017); Rashid et al. (2017); Alqahtani & Mayes (2018); Daoud & Kammoun (2020); Ece & Cadirci (2022).

Loan Ratio (LTA)	Net Loans/Total Assets	Wahid & Dar (2016); Rashid et al. (2017); Daoud & Kammoun (2020).
Deposits (Collected Funds) Ratio (DEPA)	Total deposit (Collected Funds)/Total Assets	Daoud & Kammoun (2020).
Asset Diversification (AST_DIV)	$1-\left(\frac{Net\ Loans - Other\ Earning\ Assets}{Total\ Earning\ Assets}\right)$	Shahriar et al. (2023).
Fund Diversification (FUND_DIV)	$\frac{Total\ Liabilities - Total\ Deposits\ (Collected\ Funds)}{Total\ Liabilities}$	Shahriar et al. (2023).
Income Diversification (INC_DIV)	INC_DIV = $1-(NIT_s^2 - NII_s^2)$ NIT is net interest income, and NII is net non-interest income. In addition, NIT is the share of net operating income from net interest sources, while NII is the share of net operating income from non-interest sources. Their calculation is as follows: $NIT_s = \frac{NIT}{NIT + NII}$ $NII_s = \frac{NII}{NIT + NII}$ INC_DIV measures the degree of diversification in an entity's net operating income. The higher this value is, the more diverse the mix will be. A value of 0.0 means that all income comes from a single source, while 0.5 means an equal split between net interest income and non-interest income (Stiroh & Rumble, 2006: 2137).	Shahriar et al. (2023).

When the time dimension T is large, Driscoll & Kraay (1998) showed that standard nonparametric time series covariance matrix estimators can be improved to be robust to all general spatial and periodic correlation forms. Driscoll & Kraay's methodology performs a Newey-West type correction for the series of cross-sectional averages. In this way, the corrected standard error estimates improve the consistency of the covariance matrix estimators regardless of the cross-sectional dimension N (even N→ ∞). Thus, Driscoll & Kraay's approach is derived as an alternative to the Parks-Kmenta or PCSE approaches, which produce consistent covariance matrix estimators only for large T, which are weak in the case of sizeable cross-sectional size, especially in micro econometric panels. This estimator has standard errors consistent with heteroscedasticity even in the case of large T and N and is robust to general forms of spatial and periodic correlation. In the following panel data model, assuming that the error term $Y_{it} = \beta X_{it} + u_{it}$ is heteroscedastic, autocorrelated and interdivisional correlated, the parameters can be estimated consistently by the pooled least squares method (Driscoll & Kraay, 1998: 551; Yerdelen Tatoglu, 2016: 276):

$$\hat{\beta} = (X\acute{X})^{-1}X\acute{Y} \tag{2}$$

The Driscoll & Kraay standard errors of the parameter estimates are also obtained from the square roots of the diagonal elements of the asymptotic (robust) covariance matrix.

$$V(\hat{\beta}) = (X\acute{X})^{-1}\hat{S}_T(X\acute{X})^{-1} \tag{3}$$

where $\hat{S}_T$ is defined as follows:

$$\hat{S}_T = \hat{\Omega}_0 + \sum_{j=1}^{m(T)} w(j,m)\left[\hat{\Omega}_j + \hat{\Omega}'_j\right] \tag{4}$$

m(T) denotes the lag length for autocorrelation. Bartlett weights, expressed as *w(j.m(T))=1-j/(m(T)+1),* ensure that $\hat{S}_T$ is positive definite and allows higher order lags in the sample autocovariance function to receive lower weights. The (K+1)×(K+1) dimensional matrix $\hat{\Omega}_j$ is also stated as follows:

$$\hat{\Omega}_j = \sum_{t=j+1}^{T} h_t(\hat{\beta})\, h_{t-j}(\hat{\beta})' \tag{5}$$

In equation (5) there is equality $h_t(\hat{\beta}) = \sum_{i=1}^{N(t)} h_{it}(\hat{\beta})$. The square of the moment conditions t for each unit $h_{it}(\hat{\beta})$ is computed for N's with different T's. With this minor correction, the Driscoll & Kraay covariance matrix estimator can also be used in unbalanced panel data models. The orthogonality conditions $h_{it}(\hat{\beta})$ for the units in pooled least squares estimation are the (K+1)×1 dimensional moment conditions of linear regression. For example, It can be shown as $h_{it}(\hat{\beta}) = X_{it}\hat{u}_{it} = X_{it}(Y_{it} - X'_{it}\hat{\beta})$. Driscoll & Kraay's covariance matrix estimator, which is calculated with the help of equations (4) and (5), is equal to Newey-West's covariance matrix estimator for the time series of the cross-sectional means of $h_{it}(\hat{\beta})$, which is robust in the presence of heteroscedasticity and autocorrelation. With this approach based on cross-sectional averages, standard error estimates are consistent regardless of the cross-sectional dimension N of the units. Driscoll & Kraay demonstrate consistency, even when N goes to infinity. Moreover, the standard errors from the estimated covariance matrix are robust to general spatial and periodic correlation forms (Driscoll & Kraay, 1998: 552; Yerdelen Tatoglu, 2016: 276).

4. EMPIRICAL RESULTS AND DISCUSSION

In this section, we first present the descriptive statistics of the variables in Table 2.

Table 2. Summary Statistics

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (Prob)
ZSCORE	33.96002	26.28736	188.8773	0.929496	29.41304	3.146057	14.40652	721.2226*** (0.0000)
SIZE	18.06051	18.16877	19.89098	14.16117	0.959987	-1.072161	5.270246	41.44655*** (0.0000)
LTA	0.577444	0.576784	0.833086	0.400929	0.084892	0.503812	3.627375	5.987843** 0.0500)
CAP	0.081881	0.066763	0.789669	0.040830	0.077227	7.802372	70.90572	20632.45*** (0.0000)
CAR	0.230201	0.171708	2.269101	0.121729	0.245156	6.468659	50.38240	10252.98*** (0.0000)
DEPA	0.738430	0.752275	0.855484	0.115548	0.090589	-3.500718	23.57340	2007.211*** (0.0000)
AST_DIV	0.420453	0.420593	0.579790	0.221642	0.072770	-0.145326	3.791932	7.543025** (0.0422)
FUND_DIV	0.261570	0.247725	0.884452	0.144516	0.090589	3.500718	23.57340	2007.211*** (0.0000)
INC_DIV	0.480709	0.496814	0.499998	0.097268	0.052263	-5.360888	35.39282	4948.069*** (0.0000)

*** and ** indicate statistical significance at the 1% and 5% level, respectively.

Table 2 suggests that all values are positive except for some skewness values; the sample mean, median, maximum, minimum and standard deviation values are close to 0 except for ZSCORE and SIZE variables. When we analyze the skewness values of the variables, we observe that all variables except SIZE, DEPA, AST_DIV and INC_DIV show positive asymmetry and right-skewed distribution. The fact that the skewness parameters of the other variables are negative indicates that they show negative asymmetry and exhibit a left-skewed distribution. In addition, kurtosis values of the variables above 3 mean that the distribution curves are flatter and have leptokurtic. When we examine the Jarque-Bera test statistics, we conclude that the variables do not exhibit a normal distribution since the test statistics are generally significant at the 5% level. Following the descriptive statistics, we investigate the presence of multicollinearity between the independent variables by the Spearman correlation test and report the findings in Table 3.

Table 3. Spearman Correlation Test Results

Probability	ZSCORE	SIZE	LTA	CAP	CAR	CIR	DEPA	AST _DIV	FUND_DIV	INC_DIV
ZSCORE	1.000000									

SIZE	**-0.281591*****	1.000000								
	0.0041	-----								
LTA	**0.196928****	**-0.502615*****	1.000000							
	0.0473	0.0000	-----							
CAP	0.106191	**-0.473643*****	**0.312744*****	1.000000						
	0.2881	0.0000	0.0014	-----						
CAR	-0.064501	-0.031021	**-0.405252*****	**0.281696*****	1.000000					
	0.5195	0.7569	0.0000	0.0041	-----					
CIR	**0.274270*****	**-0.233357****	**0.355129*****	**-0.191529***	**-0.442826*****	1.000000				
	0.0053	0.0183	0.0002	0.0538	0.0000	-----				
DEPA	**-0.202662****	**0.647586*****	**-0.374264*****	**-0.603922*****	**-0.228142****	0.059909	1.000000			
	0.0411	0.0000	0.0001	0.0000	0.0211	0.5498	-----			
AST_DIV	**-0.267609*****	**0.525810*****	**-0.591717*****	**-0.371223*****	**0.253378****	**-0.309928*****	**0.390402*****	1.000000		
	0.0065	0.0000	0.0000	0.0001	0.0102	0.0015	0.0000	-----		
FUND_DIV	**0.202662*****	**-0.647586*****	**0.374264*****	**0.603922*****	**0.228142****	-0.059909	**-0.632174*****	**-0.390402*****	1.000000	
	0.0411	0.0000	0.0001	0.0000	0.0211	0.5498	0.0000	0.0000	-----	
INC_DIV	-0.033288	0.117360	0.044450	**0.271218*****	**0.393174*****	**-0.258359*****	-0.150878	-0.083941	0.150878	1.000000
	0.7398	0.2401	0.6573	0.0058	0.0000	0.0087	0.1301	0.4016	0.1301	-----

***, ** and * indicate statistical significance at the 1%, 5% 10% level, respectively.

Table 3 demonstrates that there is no correlation value of 0.75 and above between the model's error term and the independent variables. The findings indicate that there is no multicollinearity problem among the independent variables. Since the time dimension is larger than the cross-sectional dimension (102 terms > 6 banks), we test the cross-sectional dependence of the variables with Breusch-Pagan LM (1980), and Pesaran et al., (2008) Bias-Corrected Scaled LM tests and present the findings in Table 4.

Table 4. Cross-Section Dependence Test Results

	CD Tests	**Stat.**	**Prob.**
ZSCORE	LM	437.071***	0.0000
	$LM_{Adj.}$	12.251***	0.0000
CAP	LM	630.906***	0.0000
	$LM_{Adj.}$	-1.225	0.8900
CAR	LM	243.300***	0.0000
	$LM_{Adj.}$	-2.176	0.985
SIZE	LM	604.978***	0.0000
	$LM_{Adj.}$	38.505***	0.0000
CIR	LM	462.529***	0.0000
	$LM_{Adj.}$	28.519***	0.0000
LTA	LM	229.850***	0.0000
	$LM_{Adj.}$	54.772***	0.0000
DEPA	LM	606.783***	0.0000
	$LM_{Adj.}$	11.179***	0.0000
INC_DIV	LM	295.434***	0.0000
	$LM_{Adj.}$	2.676***	0.0040
AST_DIV	LM	265.331***	0.0000
	$LM_{Adj.}$	26.809***	0.0000
FUND_DIV	LM	606.783***	0.0000
	$LM_{Adj.}$	11.179***	0.0000

*** indicate statistical significance at the 1% level.

Table 4 shows that the probability values of all variables except CAR and CAP variables are statistically significant at the 1% level in both tests. Therefore, we cannot accept the null hypothesis, which suggests that there is no cross-sectional dependence in the variables, and we conclude that there is cross-sectional dependence in the variables. We also confirm that there is cross-sectional dependence in the LM test for CAP and CAR variables; however, we conclude that there is no cross-sectional dependence in the Bias-Corrected Scaled LM test. Accordingly, we test the stationarity of the variables with the Hadri & Kurozumi (2012) unit root test, which can be used both with and without cross-sectional dependence and give the findings in Table 5.

Table 5. Hadri & Kurozumi Unit Root Test Results

	Z_A^{SPC}	Z_A^{LA}
ZSCORE	-0.9099 [0.8186]	0.3263 [0.3721]
CAP	-2.2247 [0.9870]	-2.5635 [0.9948]
CAR	-0.1155 [0.5460]	-0.0905 [0.5360]
SIZE	-2.2735 [0.9885]	-2.2905 [0.9890]
CIR	-2.3479 [0.9906]	-2.2044 [0.9863]
LTA	-2.2222 [0.9869]	-2.4324 [0.9925]
DEPA	-1.9639 [0.9752]	-1.8402 [0.9671]
INC_DIV	-1.6286 [0.9483]	-1.8677 [0.9691]
AST_DIV	-0.1003 [0.5399]	0.0321 [0.4872]
FUND_DIV	-1.9639 [0.9752]	-1.8402 [0.9671]

The values in [ ] are probability values for the test statistics.

In the Hadri & Kurozumi (2012) test, which runs in the KPSS test logic, if there is a cross-sectional dependence on the variables, it is decided according to the Z_A^{SPC} bootstrapping test statistics. If there is no cross-sectional dependence on the variables, it is selected according to the Z_A^{LA} test statistics. According to Table 5, since the probability values for both test statistics are not statistically significant, we accept the null hypothesis, which suggests the stationarity of the series. After we provide the stationarity condition required for panel data models, we analyze the factors affecting bank stability with fixed and random effects models, apply the Hausman test for the appropriate model selection and display the findings in Table 6.

Table 6. Fixed and Random-Effects Models and Hausman Test Estimation Results

Panel A: Fixed-Effects Models

ZSCORE	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
CAP	-45.35541 [32.30246] (0.164)	-	-	-	-	-
CAR	-	-	-	-	-	-24.09445** [11.51616] (0.039)
SIZE	-	-	-	-10.26822** [4.812976] (0.036)	-	-
CIR	26.50913 [18.91524] (0.164)	32.77612* [18.99714] (0.088)	34.29392* [17.55725] (0.054)	-	34.29392* [17.55725] (0.054)	27.54195 [17.75564] (0.124)
LTA	62.52285 [44.08123] (0.159)	69.70688 [43.84635] (0.115)	-	-	-	-
DEPA	-	65.01438** [32.5285] (0.049)	85.90163** [34.73893] (0.015)	-	-	-
INC_DIV	120.5145** [47.81537] (0.013)	125.1788** [47.3997] (0.010)	133.0865*** [47.189] (0.006)	154.541*** [49.02691] (0.002)	133.0865*** [47.189] (0.006)	125.8951*** [47.32635] (0.009)
AST_DIV	-	-	-87.39754** [43.78613] (0.049)	-89.64222** [42.64137] (0.038)	-87.39754** [43.78613] (0.049)	-69.05062 [42.27845] (0.106)

FUND_DIV	-	-	-	-134.2171*** [42.57162] (0.002)	-85.90163** [34.73893] (0.015)	-
R^2	0.1396 (0.0074) ***	0.1577 (0.0031) ***	0.1705 (0.0016) ***	0.1768 (0.0012) ***	0.1705 (0.0016) ***	0.1555 (0.0034) ***
Panel B: Random-Effects Models						
CAP	-45.05937 [31.89475] (0.158)	-	-	-	-	-
CAR	-	-	-	-	-	-23.94211** [11.25696] (0.033)
SIZE	-	-	-	-10.30542** [4.690166] (0.028)	-	-
CIR	27.7739 [17.83337] (0.119)	32.80025* [17.56869] (0.062)	33.09433** [16.60004] (0.046)	-	33.09433** [16.60004] (0.046)	27.87134 [16.92942] (0.100)
LTA	56.27785 [42.00831] (0.180)	62.40838 [41.63623] (0.134)	-	-	-	-
DEPA		61.74155* [31.63534] (0.051)	82.44592** [33.87747] (0.015)	-	-	-
INC_DIV	116.6905** [47.1135] (0.013)	118.3542** [46.9632] (0.012)	127.149*** [46.61399] (0.006)	153.4325*** [48.05503] (0.001)	127.149*** [46.61399] (0.006)	122.8728*** [46.54375] (0.008)
AST_DIV	-	-	-85.28969** [42.96352] (0.047)	-88.74069** [41.63506] (0.033)	-85.28969** [42.96352] (0.047)	-66.96903 [41.10493] (0.103)
FUND_DIV	-	-	-	-134.8742*** [41.74018] (0.001)	-82.44592** [33.87747] (0.015)	-
R^2	0.1394	0.1576	0.1705	0.1768	0.1705	0.1555
(Prob)	(0.0048) ***	(0.0022) ***	(0.0008) ***	(0.0004) ***	(0.0008) ***	(0.0016) ***
Hausman χ^2 Test Statistics	0.63 (0.9592)	8.05* (0.0896)	0.99 (0.9112)	0.04 (0.9998)	0.99 (0.9112)	0.20 (0.9952)

The values in ( ) are probability values for the coefficients. The values in [ ] are standard errors. ***, ** and * indicate statistical significance at the 1%, 5% 10% level, respectively.

Analyzing fixed and random effects model findings, we conclude a statistically significant and positive relationship between ZSCORE and CIR, DEPA and INC_DIV; at the same time, there is a negative relationship between ZSCORE and CAR, SIZE, AST_DIV and FUND_DIV. According to the Hausman test results, the random effects model is the most appropriate in all models except model 2. In panel data models, it is generally assumed that there are no problems with heteroscedasticity, autocorrelation and interdivisional correlation. However, since these problems in the model will lead to a loss of efficiency in the estimated parameters, whether these problems are present after the model is estimated should be tested. Therefore, we apply the modified Wald test to examine whether there is a heteroscedasticity problem in fixed effects models, the Baltagi & Wu (1999) LBI and Bhargava et al., (1982) Modified Durbin Watson tests to check for autocorrelation, and the Breusch & Pagan (1980) LM test to assess interdivisional correlation. We also analyze the random effects models using Levene (1960); Brown & Forsythe (1974) tests for the heteroscedasticity problem, Baltagi & Wu (1999) LBI, and Bhargava et al., (1982) Modified Durbin Watson tests for the autocorrelation problem. We summarize the findings obtained in Table 7.

Table 7. Diagnostic Test Results for Models

Panel A: Fixed-Effects Models						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Breusch & Pagan (1980) LM Test	23.002* (0.0841)	17.524 (0.2885)	15.195 (0.4375)	9.788 (0.8328)	15.195 (0.4375)	19.548 (0.1900)
Bhargava et al. (1982) Modified Durbin Watson Test	1.0969394	1.1162919	1.1348216	1.1559003	1.1348216	1.109234
Baltagi & Wu (1999) LBI Test	1.1972717	1.2132493	1.2289758	1.2258483	1.2289759	1.2131083
Modified Wald Test	3932.02*** (0.0000)	6985.39*** (0.0000)	10966.08*** (0.0000)	10283.56*** (0.0000)	10966.08*** (0.0000)	4947.58*** (0.0000)
Panel B: Random-Effects Models						
Bhargava et al. (1992) Modified Durbin Watson Test	1.0969394	1.1162919	1.1348216	1.1559003	1.1348216	1.109234
Baltagi & Wu (1999) LBI Test	1.1972717	1.2132493	1.2289758	1.2258483	1.2289759	1.2131083
Levene (1960); Brown & Forsythe (1974) Test						
W_0	24.3396634*** df(5, 96) Pr > F = 0.00000000					
W_{50}	8.1652274*** df(5, 96) Pr > F = 0.00000187					
W_{10}	19.5974680*** df(5, 96) Pr > F = 0.00000000					

The values in ( ) are probability values for the coefficients and χ^2 test statistics. ***, ** and * indicate statistical significance at the 1%, 5% 10% level, respectively. df shows the degree of freedom.

According to the interdivisional correlation test results for fixed effects models, since the probability values are insignificant in all models except model 1, we accept the null hypothesis, which suggests no interdivisional correlation. However, we prove that there is an interdivisional correlation in model 1. According to the autocorrelation test results in Table 7 for all models, the test statistics are less than 2. In other words, the findings indicate an autocorrelation problem in all models. According to the results of the heteroscedasticity test estimated for all models, since the test statistics are statistically significant at the 1% level, we cannot accept the null hypothesis, which suggests no problem with heteroscedasticity in the models. In other words, we reveal a heteroscedasticity problem in the models.

According to the autocorrelation test results estimated for the random effects models, test statistics less than two mean an autocorrelation problem exists in the models. Moreover, the results of the variance test estimated for all models show that the test statistics are statistically significant at the 1% level in all dimensions. The findings obtained prove the existence of the problem of heteroscedasticity in all models. In the case of autocorrelation, interdivisional correlation and heteroscedasticity problems in the error terms of the panel data model, the Driscoll & Kray estimator, which has robust standard errors instead of biased standard errors, should be preferred (Hoechle, 2007:282). We report the results of the Driscoll & Kraay fixed effects robust standard errors estimator in Table 8.

Table 8. Driscoll & Kraay Fixed Effects Robust Standard Errors Estimator Results

ZSCORE	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
CAP	-45.35541*** [9.91087] (0.006)	-	-	-	-	-
CAR	-	-	-	-	-	-24.09445*** [3.770986] (0.001)
SIZE	-	-	-	-10.26822** [3.627539] (0.037)	-	-
CIR	26.50913** [6.90505]	32.77612** [8.21662]	34.29392*** [7.107896]	-	34.29392*** [7.107896]	27.54195*** [5.811779]

	(0.012)	(0.010)	(0.005)		(0.005)	(0.005)
LTA	62.52285** [22.41234] (0.038)	69.70688** [21.52041] (0.023)	-	-	-	-
DEPA	-	65.01438*** [15.1109] (0.008)	85.90163*** [12.13759] (0.001)	-	-	-
INC_DIV	120.5145** [36.13977] (0.021)	125.1788** [36.43935] (0.019)	133.0865** [37.73845] (0.017)	154.541*** [37.33046] (0.009)	133.0865** [37.73845] (0.017)	125.8951** [37.68364] (0.021)
AST_DIV	-	-	-87.39754** [26.98821] (0.023)	-89.64222*** [21.27227] (0.008)	-87.39754** [26.98821] (0.023)	-69.05062* [29.39537] (0.066)
FUND_DIV	-	-	-	-134.2171*** [21.4729] (0.002)	-85.90163*** [12.13759] (0.001)	-
R^2	0.1396	0.1577	0.1705	0.1768	0.1705	0.1555
F	15.51***	12.95***	20.28***	29.46***	20.28***	14.96***
Prob>F	0.0050	0.0075	(0.0027)	(0.0011)	(0.0027)	(0.0055)

The values in ( ) are probability values for the coefficients. The values in [ ] are standard errors. ***, ** and * indicate statistical significance at the 1%, 5% 10% level, respectively.

When we analyze Table 8, the F statistic results suggest that the models are generally significant. According to Model 1, we find that the relationship between CAP and ZSCORE is statistically significant and negative at the 1% level. In other words, increasing the non-risk weighted capital ratio decreases bank stability. The findings differ from the results of Wahid & Dar (2016), Daoud & Kammoun (2020), Widarjono (2020), and Joudar et al. (2023). They concluded that there is a positive relationship between the variables. The R^2 value of 0.1396 in Model 1 indicates that the independent variables in the model explain approximately 14% of the changes in bank stability. According to Model 6, the relationship between CAR and ZSCORE is statistically significant and negative at the 1% level. In other words, an increase in the risk-weighted capital ratio decreases bank stability. The findings differ from those of Daoud & Kammoun (2020) and Amaroh (2023). They concluded that there is a positive relationship between the variables. The R^2 value of 0.1555 in Model 6 shows that the independent variables in the model explain approximately 16% of the changes in bank stability. According to Model 4, the relationship between SIZE and ZSCORE is statistically significant and negative at the 5% level. In other words, an increase in bank size decreases bank stability. While the findings are similar to the results of Wahid & Dar (2016), Elbadri & Bektas (2017) and Joudar et al. (2023), they are different from the findings of Ece & Cadirci (2022). Ece & Cadirci (2022) concluded that while there is a positive relationship between the variables in the short run, there is no significant relationship in the long run. The R^2 value of 0.1768 in Model 4 states that the independent variables in the model explain approximately 18% of the changes in bank stability. According to both Model 1 and Model 2, the relationship between LTA and ZSCORE is statistically significant and positive at the 5% level. In other words, an increase in the loan ratio increases bank stability. While the findings are consistent with the results of Rashid et al. (2017), they are different from the findings of Wahid & Dar (2016) and Daoud & Kammoun (2020). Wahid & Dar (2016) and Daoud & Kammoun (2020) discovered a negative relationship between the variables. The R^2 value of 0.1577 in Model 2 shows that the model's independent variables explain approximately 16% of the changes in bank stability. According to both Model 2 and Model 3, the relationship between DEPA and ZSCORE is statistically significant and positive at the 1% level. In other words, increasing the deposits (collected funds) ratio increases bank stability. The findings are different from the findings of Daoud and Kammoun (2020). They detected that there was a negative relationship between the variables. The R^2 value of 0.1705 in Model 3 suggests that the independent variables in the model explain 17% of the changes in bank stability. According to both Model 4 and Model 5, the relationship between FUND_DIV and ZSCORE is statistically significant and negative at the 1% level. In other words, an increase in banks' fund diversification has a negative impact on bank stability. The R^2 value of 0.1705 in Model 5 indicates that the independent variables in the model explain approximately 17% of the changes in bank stability. We determine that the relationship

between INC_DIV and ZSCORE is statistically significant and positive at the 5% level, while the relationship between AST_DIV and ZSCORE is negative. In other words, while increasing banks' income diversification positively affects bank stability, we reveal that increasing banks' asset diversification negatively affects bank stability. The findings obtained are consistent with the results of Shahriar et al. (2023). Finally, we conclude the relationship between CIR and ZSCORE is statistically significant and positive. In other words, an increase in the cost-to-income ratio increases bank stability. The findings are different from the findings of Wahid & Dar (2016), Elbadri & Bektas (2017), Rashid et al. (2017), Widarjono (2020) and Joudar et al. (2023). Wahid & Dar (2016) and Elbadri & Bektas (2017) reported a negative relationship between the variables, while Rashid et al. (2017) and Joudar et al. (2023) concluded that the relationship between the variables was not significant. Widarjono (2020) also discovered a negative relationship between the variables in the short run and a positive relationship in the long run. Overall, the findings reveal that banks' income diversification is the most influential factor in bank stability. This factor is followed by banks' fund and asset diversification, deposits (collected funds) ratio, non-risk weighted capital ratio, cost-to-income ratio, loan ratio, risk-weighted capital ratio and bank size.

5. CONCLUSION

The overall purpose of setting up an Islamic bank is to create an economic balance by ensuring social well-being, generating job opportunities and decreasing poverty following Islamic values. Similar to conventional banks, Islamic banks also carry out commercial operations. Moreover, the rapid spread of COVID-19 globally demands strategic and tactical actions by Islamic banks to maintain good financial stability. This study investigates the bank-specific factors affecting the financial stability of participation banks in Turkey, which are traded as Islamic banks. Accordingly, we analyze the data of 6 participation banks for 2019Q1-2023Q1 with the Driscoll & Kraay (1998) fixed effects robust standard error estimator.

As a result of the analyses, we discover that the non-risk-weighted capital ratio has a negative impact on financial stability as measured by the Z-score. The findings suggest that equity is used for purposes other than increasing public confidence in banks. In addition, the findings indicate that banks' bankruptcy risk increases due to increased capital requirements and are not sufficiently resilient against financial shocks.

Another finding is that risk-weighted capital has a negative effect on the Z-score, a measure of financial stability. The findings imply that more than the increased regulatory capital is required to reduce banks' financial distress and improve their financial health; increasing the banking sector's resilience by increasing regulatory capital alone is impossible.

Bank size negatively affects the financial stability of participation banks. The findings demonstrate that banks are more likely to be exposed to risk due to their orientation towards risky investment areas with the expectation of further growth as their assets increase and are more vulnerable to critical conditions during adverse economic conditions. Moreover, the findings indicate that bank policymakers should proceed with caution when considering plans to increase the size of participation banks.

On the contrary, we identify that banks' loan ratios positively impact financial stability. The findings show that the increase in the credit risk of participation banks tends to increase stability. Such a case is possible only if the bank has an effective system for monitoring and controlling credit risk.

We determine that the effect of deposits (funds collected by banks) on financial stability is positive. The findings suggest that participation banks reduce the risk of default by diversifying the funds they manage and that fund owners are willing to accept a lower rate of return than what is due under the "real" terms of the investment contract. Similarly, we find that the cost-to-income ratio positively impacts financial stability. The findings mean that an increased cost-to-income ratio equals higher management efficiency.

Among the diversification indicators, firstly, we discover that fund diversification has a negative impact on financial stability. Secondly, we observe that income diversification positively affects financial stability. Lastly, we detect that asset diversification has a negative effect on financial stability. The findings argue that more excellent asset and fund diversification may weaken bank stability, in contrast to greater income diversification, which may enhance stability.

The research findings are precious for bank management, investors, customers, and policymakers. In particular, the results improve our understanding of how bank-specific variables are related to the financial stability of the banking system. The results also support the knowledge of the role of participation banks in financial stability.

Furthermore, the results indicate that the role of banks in financial soundness can be strengthened by creating robust competition in the banking sector.

This research can be utilized as a guideline to follow participation banks' financial stability and differentiate between stable and distressed banks. Other determinants other than financial ratios (macroeconomic and financial innovation indicators, product diversity, credit diversification, geographic diversification etc.) can be employed in future studies. In this regard, a qualitative approach can be implemented to obtain more results on the financial stability of participation banks.

AUTHORS' DECLARATION

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

AUTHORS' CONTRIBUTIONS

All sections are written by the author.

REFERENCES

Alqahtani, F., & Mayes, D. G. (2018). Financial stability of Islamic banking and the global financial crisis: Evidence from the Gulf Cooperation Council. *Economic Systems*, *42*(2), 346-360.

Ali, S. S., & Izhar, H. (2015). Financial stability and risk management in Islamic finance: An introduction to the issues and papers. (pp.11-16). *Financial Stability and Risk Management in Islamic Financial Institutions*, Vol:5, Bloomsbury Qatar Foundation Journals.

Alihodzic, A., Eksi, I. H., & Dogan, B. (2020). The determinants of bank stability: Evidence from selected Balkan countries and Turkey. *Romanian Statiscal Review*, (1-2), 23-39.

Altaee, H. H. A., Talo, I. M. A., & Adam, M. H. M. (2013). Testing the financial stability of banks in GCC countries: Pre and post financial crisis. *International Journal of Business and Social Research (IJBSR)*, *3*(4), 93-105.

Amaroh, S. (2023). Measuring financial distress of Islamic banks under pandemic and its determinants: Random effect approach. *IQTISHODUNA: Jurnal Ekonomi Islam*, *12*(1), 73-88.

Baltagi, B. H., & Wu, P.X. (1999). Unequally spaced panel data regressions with AR (1) disturbances. *Econometric Theory*, *15*(6), 814-823.

Belouafi, A., Bourakba, C. A., & Saci, K. (2015). Islamic finance and financial stability: A review of the literature. *Journal of King Abdulaziz University: Islamic Economics*, *28*(2), 3-42.

Bhargava, A., Franzini, L., & Narendranathan, W. (1982) Serial correlation and the fixed effects model. *Review of Economic Studies*, *49*, 533-549.

Breusch, T. S., & Pagan, A.R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, *47*(1), 239-253.

Brown, M. B., & Forsythe, A. B. (1974). Robust tests for the equality of variances. *Journal of the American Statistical Association*, *69*(346), 364-367.

Chakroun, M. A., & Gallali, M. I. (2015). Islamic banks and financial stability: An empirical analysis of the Gulf countries. *International Journal of Business and Commerce*, *5*(3), 64-87.

Chishti, S. (1985). Relative stability of interest-free economy. *Journal of King Abdulaziz University: Islamic Economics*, *3*(1), 3-12.

Čihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, *38*, 95-113.

Collu, D. A. (2021). Bankaya özgü faktörlerin banka istikrarı üzerindeki etkileri: Türk bankacılık sektörü örneği. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, *10*(2), 1096-1117.

Danisman, G. (2018). Determinants of bank stability: A financial statement analysis of Turkish banks. *Sosyoekonomi*, *26*(38), 87-103.

Daoud, Y., & Kammoun, A. (2020). Financial stability and bank capital: The case of Islamic banks. *International Journal of Economics and Financial Issues*, *10*(5), 361.

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, *80*(4), 549-560.

Ece, O., & Cadirci, B. D. (2022). Kredi portföy yoğunlaşma düzeyinin finansal istikrar ve performans üzerine etkisi: İkili bankacılık sisteminde karşılaştırmalı bir analiz. *Journal of Economic Policy Researches*, *9*(2), 523-556.

Ekinci, R., & Kok, R. (2020). Avrupa Birliği bankacılık endüstrisinde rekabet ve istikrar ilişkisi: Ticari bankalar üzerine bir deneme. *İzmir İktisat Dergisi*, *35*(4), 879-894.

Elbadri, M., & Bektas, E. (2017). Measuring the financial stability of Islamic and conventional banks in Turkey. In *New Challenges in Banking and Finance: 2nd International Conference on Banking and Finance Perspectives* (pp. 115-137). Springer International Publishing.

Farook, S., Hassan, M. K., & Clinch, G. (2009). Islamic banks and financial stability: Further evidence. *Available at SSRN 1828663*.

Ghassan, Hassan B., & Krichene, N. (2017). Financial stability of conventional and Islamic banks: A survey. MPRA Paper No. 82372. Munich: University Library of Munich. Available online: https://ideas.repec.org/p/pra/mprapa/82372.html, (accessed: 20.07.2023).

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251-1271.

Hadri, K., & Kurozumi, E. (2012). A simple panel stationarity test in the presence of serial correlation and a common factor. *Economics Letters*, *115*(1), 31-34.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal*, *7*(3), 281-312.

Ibrahim, M. H., & Rizvi, S. A. R. (2017). Do we need bigger Islamic banks? An assessment of bank stability. *Journal of Multinational Financial Management*, *40*, 77-91.

Iqbal, Z., Mirakhor, A., Krichenne, N., & Askari, H. (2010). *The stability of Islamic finance: Creating a resilient financial environment for a secure future.* (Vol. 644), John Wiley & Sons.

Iqbal, M., & Molyneux, P. (2016). *Thirty years of Islamic banking: History, performance and prospects*. Springer.

Iskenderoglu, O., & Tomak, S. (2013). Competition and stability: An analysis of the Turkish banking system. *International Journal of Economics and Financial Issues*, *3*(3), 752-762.

Joudar, F., Msatfa, Z., Metwalli, O., Mouabid, M., & Dinar, B. (2023). Islamic financial stability factors: An econometric evidence. *Economies*, *11*(3), 79.

Khoutem, B. J., & Nedra, B. A. (2012). Islamic participative financial intermediation and economic growth. *Journal of Islamic Economics, Banking and Finance*, *3*(8), 44-59.

Kasri, R. A., & Azzahra, C. (2020). Determinants of bank stability in Indonesia. *Signifikan: Jurnal Ilmu Ekonomi*, *9*(2), 153-166.

Lasty A. D., Nusantara, S. T. D., Laba, A. R., Ali, M., & Soebarsah, M. (2019). Determinants of Islamic banking stability in Indonesia. *International Journal of Academic Research in Business and Social Sciences*, *9*(7), 654-669.

Levene, H. (1960). Robust tests for equality of variances. *Contributions to Probability and Statistics*, 278-292.

Njima, N. E. B., & Zouari, S. M. (2012). Enjeux et opportunités du développement de la finance Islamique en Tunisie. *Journal of Academic Finance*, *3*(1), 1-27.

Ouerghi, F. (2014). Are Islamic banks more resilient to global financial crisis than conventional banks?. *Asian Economic and Financial Review*, *4*(7), 941-955.

Pesaran, M. H., Ullah, A., & Yamagata, T. (2008). A bias-adjusted LM test of error cross-section independence. *The Econometrics Journal*, *11*(1), 105-127.

Prima Sakti, M. R., & Mohamad, A. (2018). Efficiency, stability and asset quality of Islamic vis-à-vis conventional banks: Evidence from Indonesia. *Journal of Islamic Accounting and Business Research*, *9*(3), 378-400.

Rajhi, W., & Hassairi, S. A. (2013). Islamic banks and financial stability: A comparative empirical analysis between MENA and Southeast Asian countries. *Région et Développement*, *37*(3), 149-179.

Rashid, A., Yousaf, S., & Khaleequzzaman, M. (2017). Does Islamic banking really strengthen financial stability? Empirical evidence from Pakistan. *International Journal of Islamic and Middle Eastern Finance and Management*, *10*(2), 130-148.

Safiullah, M. (2021). Financial stability efficiency of Islamic and conventional banks. *Pacific-Basin Finance Journal*, *68*, 101587.

Sakarya, B. (2016). Financial stability of Islamic (participation) banks in Turkey. 1-27, https://mpra.ub.uni-muenchen.de/69451/. (27.05.2023).

Sakarya, S., & Akkus, H.T. (2017). Türk bankacılık sektöründeki katılım bankalarının finansal istikrarının stres testi yöntemi ile analizi. *Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *20*(38), 215-234.

Sari, N. N. & Sudarmawan, B. N. (2023). The determinants of bank stability: An empirical investigation in Southeast Asia. *Jurnal Ekonomi Syariah Teori dan Terapan,* 10(2), 109-122.

Shahid, M. A., & Abbas, Z. (2012). Financial stability of Islamic banking in Pakistan: An empirical study. *African Journal of Business Management*, *6*(10), 3706-3714.

Shahriar, A., Mehzabin, S., & Azad, M. A. K. (2023). Diversification and bank stability in the MENA region. *Social Sciences & Humanities Open*, *8*(1), 100520.

Stiroh, K. J., & Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of Banking & Finance*, *30*(8), 2131-2161.

TKBB (2023). Katılım bankaları 2022, online: https://tkbb.org.tr/uploads/pages/1689162220_89b0afa1734729cb28c9.pdf (accessed: 20.07.2023).

Tunay, K. B., & Tunay, N. (2021). Macro-financial determinants of commercial banking stability in dual banking systems. *Eurasian Academy of Sciences Eurasian Business & Economics Journal*, 26, 36-48.

Wahid, M. A., & Dar, H. (2016). Stability of Islamic versus conventional banks: A Malaysian case. *Jurnal Ekonomi Malaysia*, 50(1), 111 – 132.

Widarjono, A. (2020). Stability of Islamic banks in Indonesia: Autoregressive distributed lag approach. *Jurnal Keuangan Dan Perbankan*, *24*(1), 40-52.

Yerdelen Tatoglu, F. (2016). *Panel veri ekonometrisi*, Genişletilmiş 3.Baskı, İstanbul: Beta Yayınları.