# Comparıson Of The Turkey And Pakıstan Bankıng Sector Durıng The Covıd 19 Pandemıc Process And Analysıs Of The Relatıonshıp Wıth The Internal Factors Determıned Regardıng Fınancıal Vulnerabılıtıes


## ABSTRACT

**The banking sector, the importance of which cannot be denied in the development of national economies, may be subject to many internal or macroeconomic factors that can cause vulnerability. On December 1, 2019, the adverse effects of the covid 19 pandemic, which started in Wuhan, China and spread all over the world in a brief period, revitalized the importance of the financial fragility problem in the Turkish banking sector as well as in the banking sectors of other countries around the world. This study it is aimed to analyze the relationship levels of the endogenous factors associated with financial vulnerability in the Turkish-Pakistani banking sector with the data for the period of 2016-2020 based on two countries. For this purpose, the micro variables of 24 deposit banks operating in the Turkish banking sector and 23 deposit banks operating in the Pakistani banking sector were determined as return on assets, interest margin, return on equity, liquidity, and financial leverage. Financial vulnerability is defined as the capital adequacy ratio and correlation and regression analyses were conducted to identify the relationship with micro variables. In the literature review, it has been observed that studies and research have been undertaken on financial vulnerability and stability in the Turkish banking sector and in different countries. However, these studies are mainly regional assessments rather than comparisons between two different countriesın this context, the evaluation of the vulnerability of the banking sectors of the two countries in the covid 19 process indicates that this study is distinct from the others. In addition, this comparison of the financial vulnerability levels of banks in the event of a possible crisis in the banking sector of the two countries is intended to assist similar academic studies and to enrich and diversify the literature.**



*Key Words: Covid-19 Pandemic, Financial Vulnerability, Capital Adequacy Ratio, Turkish and Pakistani Banking Sector, Return on Assets (ROA), Return on Capital (ROE), Liquidity, Financial Leverage*


## 1. INTRODUCTION

Due to financial intermediaries, the financial sector ensures that funds are transferred to investments by introducing those who supply and those who demand funds to each other at the right time and in the right amounts, thus playing a very significant role in economies. A sound and efficient financial sector structure will only increase savings. With certainty, it will be feasible to channel these savings into investments. The positive impact of productive investments on the recovery and development of the national economy cannot be denied. From the perspective of all countries, banks are the most important financial intermediaries in the financial system and are eager and successful in fulfilling their functions. However, financial vulnerabilities may increase in some periods due to currency, stock market and banking crises. Therefore, the impacts of the increase in financial vulnerabilities may be experienced by large segments of the population. Especially in a globalized world, a crisis in the banking sector in any country will affect all countries at the speed of light. The best and most recent evidence of this was the subprime mortgage crisis in 2008, which affected not only a tiny segment of the US financial system but the entire US financial system and led to a crisis in countries worldwide. This illustrates that if a large-scale bank in one country fails, it will not only affect other banks in that country, but in a brief period, it will also affect banking sectors in other countries around the world to a greater or lesser extent. The soundness of banks can be assessed by indicators such as the ratio of non-performing loans to total loans, capital adequacy ratio (CAR) and return on average equity. In this

context, the financial stability of the Turkish and Pakistani banking sectors, especially in times of crisis, is as crucial for the global economy's rapid recovery as other countries' banking sectors. In both countries, the industry has been encouraged by the measures and incentives undertaken by the authorities. As of 2016, it is observed that a Turkish banking sector that has adapted to Basel III regulations exhibits a reliable balance sheet structure and performance according to essential criteria such as capital adequacy, liquidity, asset quality, ability to cope with risks, and sustainability of credit growth.[9] Similarly, the State Bank of Pakistan (SBP) issued Basel III guidelines for implementation in Pakistan in August 2013 and adopted the statements published by the Basel Committee on capital adequacy [41]. Furthermore, the SBP has contributed to the efficient and effective growth of savings and investment decisions to stabilize the banking system and contribute to the productive and impactful development of savings and investment decisions, supported the performance of the banking system, especially in the fields of monetary policy, transparent fiscal policy and financial stability, through macroeconomic measures, and endeavored to improve the sector's ability to anticipate and hedge risks by guiding the industry. Therefore, with the consciousness that profitability is the cheapest source of hedging for competitive banking, there have been significant improvements in the banking sector's profitability. Although the industry had some liquidity and solvency problems, the SBP contributed by reducing the cash and liquidity reserve requirements.

The effective functioning of financial intermediation provided by the banking sector depends on the continuation of financial stability without any deterioration despite any internal or external shocks. The more accurately the banking sector comprehends the economy's demands, the more positive its contribution to financial stability will be. The banking sector's strength is the guarantee of economic agents' reliance on the financial system. Crises such as the Covid 19 pandemic in China in 2019, whose devastating impact was not immediately recognized, can sometimes expose the banking sector to the consequences of unpredictable developments. The coronavirus, which was mistakenly assumed to be a local problem for the Chinese economy and that its spread to the rest of the world would be easily managed with some policy loosening by central banks, but contrary to predictions, the coronavirus, which affected the whole world with incredible speed, has caused enormous damage. However, it has begun to decline recently. Some authors have claimed that the effects of this crisis will be greater than the global financial crisis of 2008-2009 [20]. In this process, the extent to which banks, the essential components of the financial system, will be affected and indicators of their economic vulnerability have become much more critical. Therefore, in this study, the financial vulnerability measure CAR and bank-specific micro factors were determined based on the Turkish and Pakistani banking sectors, which are considered to have similarities based on the idea that crises can quickly occur in all countries. For this purpose, to determine whether the COVID-19 pandemic has created a vulnerability in the functioning of the sector in the Turkish and Pakistani banking sectors for the 2016-2020 period and to make a comparison on a country basis, correlation analysis was implemented to analyze the level of relationship between the capital adequacy ratio, an indicator of bank financial fragility, and the micro factors of commercial banks. Regression analysis was implemented to model these relationships on a country basis.

## 2. LİTERATURE

In all countries of the world, the financial vulnerability of the banking sector significantly impacts the entire financial system. For this reason, many studies have been conducted in the literature to determine the underlying factors affecting financial fragility and to examine the relationship between the financial vulnerability of banks and economic crises.

Ahumoda and Budnevich (2002) analyzed the relationship between financial vulnerability and economic welfare in the Chilean banking system. This study determined that economic developments that increase financial exposure harm the country's economic growth. The importance of warning mechanisms that would signal an increase in financial vulnerability for financial institutions, which are associated with all kinds of policies and implementations of the financial system enacted by the government for economic purposes, was emphasized.

Kibritçioğlu (2003), because of the increasing importance of research on the timing, duration, causes, effects and solutions of banking crises, he (2003) used a monthly weighted banking sector fragility (BSF) index to measure and monitor changes in the banking sector's vulnerability to crises. The BSF3 and BSF2 indexes are calculated for each of the 22 selected countries recognized to have experienced systemic or at least significant banking sector problems over the past three decades. The BSF index proposed in this paper is proven effective in helping monitor and identify banking sector difficulties by utilizing monthly data. It was concluded that the BSF index significantly reduces the

likelihood of misidentifying periods of crisis or high vulnerability, as it reflects changes in the sectoral climate more accurately and timely.
Porras (2009) analyzed the effects of financial structure and financial development on banking fragility. The study employs fixed-effect panel data regressions and controls the impact of specific banking indicators. The indicators include data for 211 countries between 1990 and 2003. Consequently, banking stability increases and financial development decreases in market-based economic systems. When a financial structure is taken into account, the fragility-enhancing impact emerges. Therefore, financial structure and development altogether are significant in assessing banking vulnerability.
Tunay (2009) empirically investigated the relationship between competitiveness and vulnerability in the Turkish banking sector. The study reveals a negative relationship between competition and vulnerability in the Turkish banking sector. In addition to the increased concentration in the national banking system and thus the increase in the scale of banks also increases vulnerability, it is emphasized that the structure of the banking system and macroeconomic variables also have significant relationships with vulnerability. Among these, the strong negative relationship between profitability and vulnerability stands out in all models. It is consistent with the thesis that banks tend to take more risks as profitability decreases. In general, macroeconomic imbalances are associated with increased bank fragility.

Cheang and Choy (2011) calculated an aggregated financial stability index of Macao for 15 years, considering the 1997-1998 Asian Crisis and the 2008 financial turbulence, where the variables and conditions leading to financial instability can be addressed collectively. They found that solid capitalization of financial institutions and good economic conditions will reduce the risk of financial crises and the impact of crises on the economy.

Degryse et al. (2013), the financial crises that occurred in the period (1994-2008) representing the stress periods in the banking system are taken as a measure of vulnerability in their study. Utilizing a multinomial logistic approach, this study examines whether regional banking system characteristics impact regional banking system vulnerability in Asia, Europe, Latin America and the US. The study's main findings are that a region's banking system characteristics play an essential role in determining regional banking system vulnerability, higher liquidity reduces regional banking system vulnerability in all areas, and increased competition in the banking sector supports the competition-stability perspective in most regions. The increased presence of foreign banks dampened regional banking fragility in Asia and Latin America. Regional banking system vulnerability is likely to be reduced when regional banks collectively possess more liquid assets, are well capitalized, and when regional banking systems are more competitive.

Barışık S. and Demirel B. (2014) analyzed how the rehabilitation of the banking system and the regulations for the system, which are discussed more in the literature that emerged after the 2008 crisis, influence the risk structure of the banking sector and the measures taken by Turkey, which had a similar experience in 2001, with the Transition to a Strong Economy Program.

Sun B. L. et al. (2014), three independent variables, namely interest rate, exchange rate, reserve and financial crisis, are determined as independent variables and liquidity as the dependent variable. This study investigates the determinants of banking vulnerability in Malaysia, considering the effects of the global financial crisis in 2008. As a result, it is determined that the liquidity reserves of banks in Malaysia are influenced by interest rates, exchange rates and the financial crisis, that the relationship between them is positive and strong, and that the interest rate and bank liquidity are firmly negatively correlated. In addition, it is stated that if even one of the banks in the country fails, the confidence of depositors in all other banks will be shaken and major bank panics may be experienced.

Iftikhar (2015) examined the relationship between financial reforms, financial liberalization and the quality of banking regulation and financial fragility supervision by implementing a dynamic two-stage system generalized method of moments GMM panel estimation technique. This study concludes that the economic vulnerability of the banking sector is not only related to bank-specific and macro-specific variables but also that financial reforms and financial liberalization significantly increase the probability of financial exposure and that strong banking regulation and supervision have an inverse relationship with economic vulnerability.

Demirel and Barışık (2016) study aims to analyze the domestic and global factors affecting the vulnerability of the Turkish banking sector. BSF4 (Extended Banking Sector Fragility Index) is adopted as a proxy-dependent variable to represent the vulnerability of the Turkish banking sector. According to the findings obtained from the analysis, it is stated that the increase in non-performing loans and

adverse developments in global factors are the main factors leading to a rise in the vulnerability of the Turkish banking sector.

Korkmaz et al. (2016), their study aims to identify the variables affecting financial vulnerability in the Turkish banking sector in the 2007-2014 period, to unearth the short and long-term effects of these variables, to determine the effect of concentration on financial vulnerability and to investigate the existence of a correlation between engagement and economic vulnerability. As a result of the causality analysis carried out with Pearson Correlation matrix, Panel Classical regression equations and Holtz-Eakin causality analysis, it is concluded that concentration does not significantly affect financial vulnerability and capital adequacy affects economic vulnerability in the same direction in the short-run model. In the long-run model, the lagged values of financial vulnerability, the current value of capital adequacy and the lagged values of the related variable are determined to have a statistically significant effect on the present value of financial vulnerability. For Turkey, there is a bidirectional interaction between concentration in the banking sector and economic vulnerability.

Ashraf D. et al. (2016) examined the role of ownership structure and income diversification in the financial vulnerability of banks in the region defined as the GCC, which includes Bahrain, Kuwait, Oman, Qatar, the United Arab Emirates and Saudi Arabia. Higher financial vulnerability is also associated with the size of the bank and whether it is an Islamic bank. This study employed a composite measure of financial stability, the Z-score, which considers the financial institution's overall stability regardless of any particular source of risk. The results demonstrate that shareholder concentration influences the stability of banks. Banks that generate more income from fee-based activities are more financially stable than banks that engage in traditional intermediation activities. There is no statistically significant change in the financial stability indicator for banks in the GCC region at the peak of the global financial crisis.

Korkmaz Ö. et al. (2016), based on the case of Turkey for the period 2007:01-2014:09, identified the variables affecting the financial vulnerability in the banking sector for 19 banks operating in Turkey, revealed the short and long-term effects of these variables, determined the effect of concentration on economic vulnerability and investigated the existence of a correlation between engagement and financial vulnerability.

Demirel B. et al. (2016), in this research, aimed to analyze the factors that are believed to affect the financial vulnerability of the Turkish banking sector in the 2010-2015 period and examined the relationship with the variables that are considered to affect the BSF4 index, which is an extended version of the banking sector vulnerability index (BSF3) formulated in the study of Kibritçioğlu (2003). The analysis reveals that the increase in non-performing loans and adverse developments in global factors are the main factors leading to increased vulnerability in the Turkish banking sector. In addition, it is stated that the sector is dependent on external financing due to the strong impact of global factors on the vulnerability of the Turkish banking sector.

Topaloğlu E. (2017), in this research, which aims to determine whether the banking sector has a vulnerable structure and which factors account for this vulnerability, it is determined that the Turkish banking sector does not have a vulnerable structure and behaves more cautiously in line with the negative consequences of the financial crises that occurred during the period analyzed.

Bölükbaşı Ö.F. et al. (2017), In this study, a banking fragility index is constructed for the period 2005-2016 and the course of vulnerability is examined as of the analyzed period. Granger causality and VAR analysis methods were preferred to explore the possible relationship between the banking fragility index and the real economy. According to the Granger causality test, it was found that the industrial production index is the granger cause of the banking fragility index. However, the banking fragility index is not the granger cause of the industrial production index. According to the results of the impulse response analysis, it is determined that there is a negative relationship between the banking fragility index and economic activity and it is revealed that the banking fragility index will increase as a result of the contraction in the real economy.

Montesi G. and Papiro G. (2018) employed a stochastic simulation forecasting model for stress testing to assess banks' capital adequacy, financial fragility and default probability. The paper provides a theoretical presentation of the methodology and the main features of the forecasting model on which it is based. In conclusion, the advantage of the proposed simulation methodology is that it produces results expressed in probability terms, taking into account the effects related to many potential adverse future scenarios. Thus, a bank's risk can be assessed more effectively and in advance in a

comprehensive framework. This way, stress testing is an effective tool for assessing banks' financial vulnerability and supporting capital adequacy decisions.

Babar et al. (2019) in their study, aim to develop a financial stability index for the Pakistani financial sector with data from financial reports from 2001-2011. In this study, three different classes of indices were constructed based on an equal-weighted approach to variance, a linear probability approach, and a logistic approach. All indices indicate that profitability, liquid liabilities, non-performing loans, and interest margin variables contribute significantly to determining the financial vulnerability of commercial banks. It is also concluded that the financial stability indices developed in this study can be helpful for decision-makers to detect and prevent future instability.

Akkaya M. and Kantar L. (2019) in their study, by taking into account the importance of financial fragility in the banking sector after the 2008 crisis, the vulnerability structure of the Turkish banking sector was analyzed using annual data and Logit/probit models for the period 1996-2017. It is concluded that the bank fragility index constructed in the study successfully reflects the economic crises of 1998, 1999 and 2001. It has been close to the threshold value since 2010 and has fallen below the threshold value as of 2011, 2013 and 2017. In this case, the banking sector is vulnerable to fragility and prone to a crisis. In addition, it has been determined that the rapid increase in exchange rates, inflation, and interest rates as of 2018 will increase the banking sector's vulnerability.

Islatince N. (2019) calculated the Herfindahl Hirschman (HHI) index with the Andersen-Rubin method and tested the differences in the HHI index by years and banks using ANOVA. As a result of this study, which investigated the relationship between vulnerability and internal banking factors, it was determined that HHI index measurements differed according to banks. The vulnerability level of the Turkish banking sector's HHI vulnerability index measurements for 2008-2012 was calculated to be low and negative. The reason for this is the increase in the profitability and strengthening of the equity of the Turkish banking sector due to the decline in policy and market rates after the global crisis.

## 3. TURKİSH BANKİNG SECTOR

The first step for the banking sector in the Republican Period of Turkey was initiated at the Izmir Economic Congress (IEC) held in 1923. The subject of the congress was how the economy could be developed for the newly established Republic and what incentive steps should be adopted by creating a financial system for this purpose. As a result, in 1924, the privately invested Türkiye İş Bankası INC. was established as a private bank in partnership with the government. In 1929, the Great Depression broke out and world economies collapsed. Following this crisis, the public weight in the Turkish banking sector increased and public banks were instrumental in the capital accumulation of the banking sector. Thus the accumulated capital was directed to the sectors determined by the public sector. After the end of World War II in 1945, commercial activities increased, national capital began to form and the economy was revived with new incentives due to the importance of industrialization. All these endeavors provided a suitable environment for the establishment and rapid growth of private banks and the number of banks increased.

In the period between 1960-1980, the Turkish banking sector was under state control to a significant extent. In addition, during this period, specialized banks were prioritized and the idea that the number of commercial banks was sufficient was dominant. This period was when no new foreign banks were allowed and commercial banks could only be established with exceptional circumstances. Within this framework, banks' primary function was financing the investments included in the development plans. January 24, 1980, can be acknowledged as a milestone for the Turkish banking sector. To ensure financial liberalization in the banking sector, the banking sector underwent significant changes, with the decisions taken regarding opening up and transitioning to a free market economy within the scope of the new economic policy. In line with the objective, efforts were undertaken to strengthen the market mechanism and reduce the conditions restricting the free competition of banks. In addition, interest rates on time deposits and loans were liberalized, and introducing new banks into the banking sector was allowed and facilitated. New regulations were introduced for foreign banks and an environment was established for them to conduct their activities in Turkey under favorable conditions. One of the essential practices was the liberalization of the ability of the sector to obtain funds from international markets. In this process, banks were also allowed to conduct transactions in foreign currency. As a result of these efforts, total assets, loans and deposits in the banking sector increased significantly. The Banking Supervision and Regulation Agency (BSRA) was established in 2000 to supervise and regulate the banking sector. The main objectives of this institution are to increase confidence in the Turkish banking sector, to increase the efficiency and competitiveness of banks, to minimize the

losses that banks may cause on the national economy due to their essential functions in the financial system, to protect the rights of depositors who invest their savings in banks and to increase the resilience of the banking sector. Another innovation that took place this year is the Savings Deposit Insurance Fund, which was established on 22.07.1983 within the Central Bank of the Republic of Turkey (CBRT) to strengthen the financial structure of banks and restructure them when necessary, in addition to ensuring savings deposits to provide a healthier structure of the banking sector [47].

Following the 2001 crisis, it was determined that resolving and restructuring the problems in the Turkish banking sector was necessary to ensure macroeconomic stability. This determination transferred banks with weak asset structures and insufficient capital to the SDIF. In addition, other banks in the sector were requested to strengthen their capital structures and increase their wealth. In this context, the state provided liquidity support for banks that could meet the conditions. Efforts were undertaken to ensure that weak banks in the sector that could not strengthen their capital structures terminated their operations and withdrew from the sector. Moreover, it was determined that the crisis in the banking sector was the need for more effective management and supervision, and arrangements were made to overcome this deficiency.

It lasted until 2003 for the Turkish banking sector to recover and overcome the negative effects of the 2001 crisis. As of 2003, there were three state-owned banks in the sector and these state-owned banks still dominate most of the sector. While the number of private national deposit banks declined, foreign deposits increased, especially after 2005. The balance sheet of the Turkish banking sector grew steadily and rapidly after 2002, reflecting financial deepening. The realization of the banking sector's intermediation activities at desired levels has significantly increased the share of loans in total assets compared to the 10-year average. As a result of this credit expansion, the ratio of loans to deposits also increased significantly. Therefore, in the post-crisis period, the Turkish banking sector fulfilled the important intermediation function in the financial system soundly and contributed significantly to economic growth through loansIn fact, one of the most important post-crisis developments for the Turkish banking sector was the realization of the importance of maintaining strong capital structures. All policies implemented in this period aimed to maintain a strong capital structure. The capital adequacy ratio (CAR), which was 9.3% in 2000, increased rapidly during this period. As of end-2013, the CAR stood at 15%, well above the legal limit of 8% and the target level of 12% [46]. The asset structure of banks operating in the Turkish banking sector significantly changed from 2002-2016. The balance sheet structure of banks shifted from a securities-weighted balance sheet structure to a credit-weighted balance sheet structure. Banks started to make significant contributions to the real sector financing by lending the resources they collected. In this context, the positive reflections of the measures and incentives taken on the sector are the increase in the loan-deposit ratio every year due to more loans provided than deposits collected. Moreover, there has been a sustained increase in profitability ratios in the Turkish banking sector. With the support of profits to equity and the slowdown in the increase in risky assets, capital adequacy remained high in both the core capital ratio and the regulatory capital ratio. After all these positive developments, the COVID-19 pandemic, which will deeply affect the whole world and spread rapidly at the end of 2019, has made its mark in almost every sector of the economy and caused many negativities. Education has switched to an online system, working from home has been introduced, travel has been banned, everywhere has been closed and new working plans have been introduced in the banking sector. The main purpose of all measures taken is to minimize the negative effects of COVID-19. In this context, urgent measures have been implemented to mitigate the risks the banking sector may encounter during the COVID-19 disease process and the financial and economic effects of the coronavirus, such as decreases in profitability rates and an increase in non-performing loans. In this process, the Turkish banking sector took measures and provided financial resources for their customers. Although it is believed that the income and production losses during the COVID-19 pandemic will mostly affect the banking sector through loans, it can be stated that the banking sector has reacted harmoniously to economic measures in this process. Banks provided support such as restructuring loans or postponing loan payments for commercial firms or individuals with cash flow problems and offering insurance packages for customers who became ill or suffered losses due to COVID-19. On the other hand, the Banking Regulation and Supervision Agency (BRSA) issued temporary regulations on certain liabilities to mitigate the adverse effects of the COVID-19 pandemic on the banking sector at a time of high uncertainties and risks in global markets by making adjustments in the classification of loans, providing flexibility in loan defaults and financing conditions, mitigating the expected negative effects on economic and commercial activities due to COVID-19, and supporting the real sector, bank customers and banks. As a result of the measures and regulations adopted, the activity of the Turkish banking sector in 2021 was largely shaped by economic growth, monetary policy, currency substitution and the

economic effects of the pandemic. However, the negative effects of the pandemic on the economy have started to ease as of today. In this context, the banking sector balance sheet showed a steady and moderate increase for most of the year. Currency substitution and inflation increased the importance of TL liquidity. Due to the need for TL liquidity, deposit rates rose faster than loan rates. The banking sector supported economic activity with regular and widespread funding. The monetary policy priorities were stabilizing liquidity, strengthening TL preferences, and improving inflationary expectations. The increase in TL loan supply and securities portfolio and the depreciation of the TL accelerated the banking sector's total balance sheet expansion. The average return on equity rose from 10.7 percent to 14.1 percent. The capital adequacy ratio, regulatory capital to risk-weighted assets ratio, and core ratio remained high at 18.3 percent and 13.4 percent, respectively [45].

## PAKİSTAN BANKİNG SECTOR

Pakistan's financial sector is important in the country's economic development. The sector consists of Commercial Banks, Development Finance Institutions (DFIs), Microfinance Banks (MFBs), Leasing Companies, Investment Banks, Modaraba Companies, Stock Exchange Companies, Insurance Companies, and Other sectors (Mutual funds, Venture capital). For Pakistan, as in other countries, commercial banking is a key element of the economy. Supervisory responsibility for banks, development finance institutions (DFIs) and microfinance banks (MFBs) in the sector falls under the statutory purview of the State Bank of Pakistan. The State Bank of Pakistan (SBP) functions as the country's central bank and is empowered under the State Bank of Pakistan Act of 1956. The SBP Act empowers the State Bank of Pakistan to regulate Pakistan's monetary and credit system and to promote the country's growth in the best national interest to ensure monetary stability and full utilization of the country's productive resources. Like a Central Bank in any developing country, the State Bank of Pakistan fulfills its traditional and developmental functions to achieve macroeconomic objectives. It also plays an active role in the process of Islamization of the banking system. In this context, Pakistan's banking sector has a mix of commercial banks that provide conventional financial services and Islamic banks that market sharia-compliant financial products. Islamic banking occupies a vast place in the sector. Whether conventional or Islamic, Pakistan's financial system is dominated by commercial banks. Pakistan's banking system structure has significantly changed since 1997 when the banking supervision process was harmonized with international best practices. Privatizing state-owned banks and the ongoing merger/consolidation process has brought noticeable changes in ownership, structure and concentration in the banking sector [27]. These innovative policies have been sustained over the following years with significant reforms to ensure a sound and efficient financial sector in Pakistan, according to the IMF and World Bank's joint financial sector assessment program in 2005. The most important achievement of the reform process has been transforming a weak state-owned banking sector into a healthy and market-based, primarily privately owned system. The restructuring of large banks was facilitated by the ongoing consolidation of the sector, in-place regulations, and improvements in transparency, corporate governance and credit culture. Improvements in financial soundness indicators due to this reform are attributable to favorable macroeconomic and policy developments. Nevertheless, the objective was still to consolidate and institutionalize supportive and incentive reforms for the sector and to strive to deepen and diversify the sector. All indicators of the financial soundness of commercial banks have improved significantly and state intervention in bank operations has been decisively reduced. The ratio of capital to risk-weighted assets improved, with significant variation across banks. Profitability and liquidity indicators improved significantly, due to increased business volumes, significant headcount reductions, the closure of many unprofitable branches, and higher non-interest income, despite the contraction in the net interest margin. In addition, liquidity in the banking sector increased due to the significant increase in remittances. Non-performing loans have also been reduced through rescue initiatives, loan restructuring, the announcement of a foreclosure law, and the Corporate and Industrial Restructuring Corporation (CIRC) taking over a large portion of non-performing loans, especially for large banks. With an average GDP growth rate of 4.04% for the period 2006-2017 [16], Pakistan has exhibited the characteristics of an improving and developing economy. The concentration of private banks in the sector has supported growth and competition and created a huge potential for new banks to join the sector. The National Bank of Pakistan (NBP), an independent institution, Bank Alfalah, Standard Chartered, Habib Bank, Meezan Bank, United Bank Limited, MCB Bank, and Faisal Bank are the largest banks in Pakistan and hold the largest market share in the banking sector. Moody's rating agency rates Pakistan's banking system as stable due to a rapidly growing economy, high levels of liquidity and stable funding from customer deposits. Despite all the positive developments, the use of banking services by households in Pakistan is not widespread enough. According to Central Bank

data, only 23 percent of the country's adult population uses banking services, and 24 percent indirectly benefit from these services. In comparison, 53 percent do not use any formalized financial services. Pakistan's banking system is still undergoing a serious transformation and restructuring process. Major privatization projects have been carried out in the sector and state-owned banks other than the National Bank of Pakistan have been privatized. Banks invested heavily in low-risk government bonds and commercial loans, enabling the banking sector to maintain its profitability even when the Pakistani economy was experiencing difficulties. Reforms initiated to make the financial sector competitive, raise awareness of various risks and increase quality assets have led to significant changes in commercial banks' performance, structure, and size. During the COVID-19 pandemic, the health and economic crisis raised concerns about growing financial vulnerability. The strength of the financial system, especially the banking sector, is an important part of the infrastructure for macroeconomic policy performance and sound money at the national level. The financial system allows for massive investment and efficient capital allocation through the banking sector leading to revenue growth. The size of the banking sector in Pakistan accounts for three-fourths of Pakistan's financial sector, which can be attributed to the rapid growth of the banking sector over the last two decades [22]. Pakistan, as well as other countries, is going through an important period, such as COVID-19, which can be indirectly related to the performance of the banking sector. The banking sector is sensitive to political, financial and natural events. During and after the end of this process, the banking sector must have a robust structure that will not contribute to the vulnerability of the country's economy against global crises and whether it has a structure that can carry out banking activities stably.

## 4. RESEARCH METHOD, DATA SET AND VARİABLES

The role of the Turkish and Pakistani banking sectors in the financial system is very significant. The fact that these two sectors have a financially sound structure and are located in countries with regular banking activities can prevent the vulnerability of the country's economy against global crises. Developments in the banking sector are essential for the real economy as well as the financial sector. It is vital for economic units and decision-makers to monitor the course of variables related to the banking sector's vulnerability and to identify periods of severe vulnerability. In this study, the dependent variable for the banking sector fragility measure is the capital adequacy ratio. Data on the micro variables of return on assets, interest margin, return on equity, liquidity and financial leverage and capital adequacy ratio for 24 deposit banks operating in the Turkish banking sector and 23 deposit banks operating in the Pakistani banking sector are obtained from the data internet system of the Banks Association of Turkey (BAT) for the Turkish banking sector and from the Financial Statements Analysis of Financial Sector (2020) data set published by the Statistic and DWH Department State Bank Pakistan for the Pakistani banking sector. The Herfindahl- Hirschman Index (HHI) calculated in the study is the sum of the squares of the sector shares of all banks in the sector.

In the analysis, descriptive statistics frequency, percentage, mean, and standard deviation values will be calculated and t-test analysis will be employed to analyze the data of Turkey and Pakistan banks by country. Correlation analysis will be conducted to examine the relationships between CAR and other parameters and Regression analysis will be performed to model these relationships on a country basis. In the study, p-values less than 0.05 are considered significant. Analyses will be conducted with SPSS 25.0 package program. The banks included in the analysis are provided in Table 1. The study analyzed the data of 5-year banks covering 2016-2020.

**Table 1a. Analyzed Turkish Deposit Banks**

| Foreign Invested Banks | Public Banks | Private Equity Banks |
|---|---|---|
| Alternatifbank INC. | T.C. Ziraat Bankası INC. | Akbank TINC. |
| Arap Turk Bank | Türkiye Vakıflar Bankası T.A.O. | Anadolubank INC. |
| Burgan Bank INC. | Türkiye Halk Bankası INC. | Fibabanka INC. |
| Citibank INC. | | Şekerbank TINC. |
| Deniz bank INC. | | Turkish Bank INC. |
| Deutsche Bank INC. | | Türk Ekonomi Bankası INC. |
| HSBC Bank INC. | | Türkiye İş Bankası INC. |
| ICBC Turkey Bank INC. | | Yapı ve Kredi Bankası INC. |
| ING Bank INC. | | |
| Odea Bank INC. | | |
| QNB Finansbank INC. | | |
| Turkland Bank INC. | | |
| Türkiye Garanti Bankası INC. | | |

**Table 1b. Analyzed Pakistani Deposit Money Banks**

| Foreign Invested Banks | Public Banks | Private Equity Banks |
|---|---|---|
| Bank of China Ltd. | First Women Bank Ltd. | Samba Bank Ltd. |
| Citi Bank NA. | National Bank of Pakistan | Allied Bank Ltd. |
| Deutsche Bank AG | Sindh Bank Ltd. | Askari Bank Ltd. |
| Industrial and Commercial Bank of China Ltd. | The Bank of Khyber | Bank Al-Habib Ltd. |
| | The Bank of Punjab | Soneri Bank Ltd. |
| | | Standard Chartered Bank (Pakistan) Ltd. |

| | | |
|---|---|---|
| | | Summit Bank Ltd.<br>Bank Alfalah Ltd.<br>JS Bank Ltd.<br>MCB Bank Ltd.<br>Faysal Bank Ltd.<br>Habib Bank Ltd.<br>Habib Metropolitan Bank Ltd.<br>Silkbank Ltd. |

**Table 2. Variables Subject to Analysis**

| **Independent Variables** | **Description** | **Notation** |
|---|---|---|
| Herfindahl Hirschman Index | $HHI = \sum_{i=1}^{N} (\frac{Z_i}{Z_T})^2$ | HHI |
| Return on Assets | Net Profit /Total Assets | ROA |
| Return on Equity | Net Profit / Total Equity | ROE |
| Liquidity | Liquid Assets/Total Assets | LIQ |
| Financial Leverage | Total Debt/Total Assets | FL |
| Net Interest Margin | Net Interest Income/Total Assets | NIM |
| **Dependent Variable** | | |
| Capital Adequacy Ratio | Equity/(KRET+PRET+ORET)x100 | CAR |

## 5. RESULTS AND DISCUSSION

In this section, t-test analysis is employed to examine the data of Turkish and Pakistani banks regarding the countries. Correlation analysis is carried out to explore the relationships between CAR and other parameters, and Regression analysis is implemented to model these relationships on a country-by-country basis.

**Table 3. Comparison of Turkey and Pakistan**

| | **Country** | | |
|---|---|---|---|
| **measurement** | Turkey | Pakistan | **p** |
| | X±s.s. | X±s.s. | |
| **NIM** | 2,67±2,17 | 2,55±0,99 | 0,57 |
| **ROA** | 1,10±1,80 | 0,92±3,28 | 0,61 |
| **ROE** | 8,66±19,4 | 9,81±14,97 | 0,61 |
| **LIQ** | 24,08±11,69 | 67,34±16,25 | 0,01* |

| | | | |
|---|---|---|---|
| **FL** | 62,67±10,77 | 89,46±12,97 | 0,01* |
| **CAR** | 18,31±4,12 | 9,48±11,02 | 0,01* |
| **HHIx10$^{16}$** | 2,56±3,33 | 4,23±1,28 | 0,01* |

The study observed that NIM, ROA and ROE measures were not at different levels in Turkey and Pakistan banks (p>0.05).

It was found that LIQ, FL, CAR and HHI levels differed across countries. The study determined that LIQ, FL and HHI levels were realized at higher levels in Pakistani banks in the relevant period. On the other hand, CAR levels were observed to be higher in Turkish banks (p=0.01, p<0.05).

**Table 4. Relationship between CAR and FC and NIM, ROA, ROE, LIQ, FC, and HHI by country**

| Country | | | NIM | ROA | ROE | LIQ | FL | HHI |
|---|---|---|---|---|---|---|---|---|
| **Turkey** | CAR | r | 0,49* | 0,18* | 0,19* | 0,43* | -0,19* | 0,21* |
| | | p | 0,00 | 0,04 | 0,03 | 0,00 | 0,04 | 0,02 |
| **Pakistan** | CAR | r | -0,21* | -0,20* | -0,18* | -0,38* | -0,66* | -0,04 |
| | | p | 0,02 | 0,02 | 0,04 | 0,01 | 0,01 | 0,69 |

Regarding the Turkish banks analyzed in the study, there is a positive and moderately strong relationship between CAR and NIM levels (r=0,49, p=0,01).

Regarding the Turkish banks analyzed in the study, there is a positive and weak relationship between CAR and ROA levels (r=0.18, p=0.04).

Regarding the Turkish banks analyzed in the study, there is a positive and weak relationship between CAR and ROE levels (r=0.19, p=0.04).

Regarding the Turkish banks analyzed in the study, there is a positive and moderately strong relationship between CAR and Liquidity levels (r=0.43, p=0.01).

Regarding the Turkish banks analyzed in the study, there is a negative and very weakly significant relationship between CAR and FL levels (r=-0.19, p=0.04). If the level of CAR increases in Turkish banks, the level of FL will decrease.

Regarding the Turkish banks analyzed in the study, a very weakly significant positive relationship exists between ROA and HHI levels (r=0.21, p=0.02).

Regarding the Pakistani banks analyzed in the study, there is a negative and weak relationship between CAR and NIM levels (r=-0.21, p=0.02).

Regarding the Pakistani banks analyzed in the study, there is a negative and weak relationship between CAR and ROA levels (r=-0.20, p=0.04).

Regarding the Pakistani banks analyzed in the study, there is a negative and weak relationship between CAR and ROE levels (r=-0.18, p=0.04).

Regarding the Pakistani banks analyzed in the study, there is a negative and moderately strong relationship between CAR and Liquidity levels (r=-0.38, p=0.01).

Regarding the Pakistani banks analyzed in the study, there is a strong negative and significant relationship between CAR and FL levels (r=-0.66, p=0.04). If the level of CAR increases in Pakistani banks, the level of FL will decrease.

Regarding the Pakistani banks analyzed in the study, there is no significant relationship between ROA and HHI levels.

**Table 5: CAR model for Turkish Banks**

| Dependent Variable | Independent Variables | | | | | | |
|---|---|---|---|---|---|---|---|
| | NIM (β) | HHI (β) | LIQ (β) | FL (β) | F Model | $R^2$ | DW |
| CAR(Y) | 0,34 p=0,01 | 0,32 p=0,01 | 0,33 p=0,01 | -0,15 p=0,02 | 85,45 | 0,44 | 1,82 |

*Regression analysis was executed

As a result of the regression analysis in Table 5, it is observed that NIM, HHI, LIQ and FL levels are related to CAR levels for Turkish Banks. ROA and ROE levels do not affect CAR levels.

The model identified in the study was significant (F=85.45, p=0.01, p<0.05). The explanation percentage of the model is 44% (R2=0.44) and this rate is high. The model's NIM, HHI, LIQ and FL coefficients are also significant (p<0.05). According to the results of the Durbin-Watson test conducted to examine the presence of autocorrelation in the model, it was observed that there was no autocorrelation in the model (D.W= 1.97). Consequently, the model was found to be significant. The model obtained is presented below.

**$CAR(Y)_{Turkey}$=0,34* NIM+ 0,32 HHI+ 0,33*Liquidity-0,15*FL**

**Table 6: CAR model for Pakistan Banks**

| Dependent Variable | Independent Variables | | | | |
|---|---|---|---|---|---|
| | FL (β) | HHI (β) | F Model | $R^2$ | DW |
| CAR(Y) | -0,66 p=0,01 | 0,20 p=0,01 | 34,87 | 0,38 | 1,79 |

*Regression analysis was executed

As a result of the regression analysis in Table 6, it is observed that HHI and FL levels are correlated with CAR levels for Turkish Banks. NIM, LIQ, ROA and ROE levels do not affect CAR levels.
The model identified in the study was significant (F=34.87, p=0.01, p<0.05). The percentage of explanation of the model is 38% (R2=0.38) and this rate is high. The HHI and FL coefficients in the model were also significant (p<0.05). According to the results of the Durbin-Watson test conducted to examine the presence of auto-correlation in the model, it was observed that there was no auto-correlation in the model (D.W= 1.79). As a result, the model was found to be significant. The model obtained is presented below.

**$CAR(Y)_{Pakistan}$= -0,66*FK+0,20*HHI**

## 6. CONCLUSİON

The Covid-19 pandemic was predicted to have widespread effects on global macroeconomic and financial events due to the financial and economic integration between countries. The world's countries closed their borders at the beginning of the pandemic, which is unknown when it would end, and restricted all kinds of activities that could affect their economies. The known fact is that financial instability can harm economies in different ways by disrupting the functioning of financial intermediaries and financial institutions. However, the measures adopted in the health sector and the rapid implementation of the vaccine developed in a short period in all countries of the world contributed to ensuring financial stability by preventing losses in the economy or vulnerability of the financial system through the working mechanisms of the countries of the world. For the countries of the world to achieve recovery and serious development in their economies whose functioning has deteriorated, it is crucial that the financial intermediation service provided by the banking sector, which is the most important factor of the financial system, works effectively and maintains sustainability without being affected by any internal or external shocks, in other words, bank stability is extremely

critical. The Covid 19 pandemic harmed the banking sector. This situation has caused the problem of financial vulnerability in the banking sectors of all countries around the world. In the study, the micro variables to be included in the analysis of deposit banks were determined as return on assets, interest margin, return on equity, liquidity, financial leverage ratios and Herfindahl Hirschman Index, and CAR was accepted as a measure of financial fragility. In the analysis, descriptive statistics frequency, percentage, mean and standard deviation values were calculated. Then, to determine whether the COVID-19 pandemic in the banking sector of Turkey and Pakistan for the period 2016-2020 has caused a vulnerability in the functioning of the banking sector of each country and to make comparisons on a country basis, correlation analysis was carried out to examine the relationship levels of the capital adequacy ratio, an indicator of bank financial fragility, with the micro factors of commercial banks and regression analysis was performed to model these relationships on a country basis. In the study, firstly, the relationship between CAR and other variables by country is examined separately. After this evaluation, CAR models for Turkey and Pakistan are analyzed from a comparative perspective. As a result, in comparing the Turkish and Pakistani banking sectors, it was observed that the determinants of banks' profitability, NIM, ROA and ROE, were not at different levels in the banks of both countries. The covid-19 pandemic did not impact the profitability of deposit banks at different levels for both countries. However, it was determined that LIQ, FL, CAR and HHI levels differed for the two countries. From 2016 through 2020, it was determined that LIQ, FL and HHI levels were realized at higher levels in Pakistani banks. Although liquid assets are considered among the most important tools to preserve the reputation of banks in the market and stakeholders, especially in times of economic crisis, maintaining a high amount of liquid assets for the Pakistani banking sector will increase bank costs. This may have a dampening effect on the profitability of Pakistan's banking sector. Optimal liquidity levels may allow the opportunity to emerge from crises with fewer losses. Especially profitability, asset quality and liquidity ratios may be adversely affected in crises caused by financial fragility during the Covid-19 pandemic. The CAR levels for the Turkish banking sector are found to be at higher levels. A high level of CAR will help increase bank stability. A higher level of CAR above the relevant regulations strengthens the Turkish banking sector's resilience to financial shocks and increases confidence in the sector. Therefore, a safe and sound banking sector will significantly contribute to developing and improving the national economy. Based on the Turkish deposit banks within the scope of the research, a positive and moderately strong relationship was found between CAR and NIM levels. A positive and weak relationship exists between CAR and ROA, ROE levels. A positive and weakly significant relationship was detected for the Turkish banking sector between ROA and HHI levels. At the same time, there is a positive and fragile significant relationship between ROA and liquidity levels and a negative and very weak significant relationship between FL levels and ROA. A negative and weak relationship was detected between CAR and NIM levels in the Pakistani banking sector. There is a negative and weak relationship between CAR and ROA and ROE. Based on Pakistani banks, a moderately strong negative relationship was found between CAR and Liquidity levels. In addition, there is a strong negative and significant relationship between CAR and FL levels. There is no significant relationship between ROA and HHI levels based on Pakistani banks.

The regression analysis of CAR for Turkish banks concluded that NIM, HHI, LICIT and FC levels are related to CAR levels, but ROA and ROE levels do not affect CAR levels. The percentage of explanation of the model is 44% ($R^2$=0.44) and this ratio is high. The model's NIM, HHI, LIQ and FL coefficients are also significant ($p<0.05$). According to the results of the Durbin-Watson test conducted to examine the presence of auto-correlation in the model, it was observed that there was no auto-correlation in the model (D.W= 1.97). Consequently, the model was found to be significant. When the results of the model obtained for Turkey in Table 5 are analyzed, it was observed that an increase in NIM, HHI and Liquidity levels would lead to an increase in CAR levels and an increase in FL level will decrease the CAR level. The effects of NIM, HHI and Liquidity levels are positive and similar. A one-unit increase in NIM, HHI and Liquidity levels will increase the CAR level between 0.34-0.32, while a one-unit increase in FC level will decrease the CAR level by 0.15 units.

As a result of the regression analysis conducted for the Pakistan banking sector, it was observed that HHI and FL levels are related to the CAR levels of Pakistan Banks. NIM, LIQ, ROA and ROE levels do not affect CAR levels. It can be noted that the percentage of explanation of the model is 38% (R2=0.38) and this ratio is high. The HHI and FL coefficients in the model are also significant ($p<0.05$). According to the results of the Durbin-Watson test conducted to examine the presence of auto-correlation in the model, it was observed that there was no auto-correlation in the model (D.W= 1.79).

Consequently, the model was found to be significant. When the results are analyzed, an increase in HHI levels will lead to an increase in CAR levels. On the other hand, increases in the DR level will

decrease the CAR level. While a one-unit increase in HHI levels will increase the CAR level by 0.20, a one-unit increase in the DR level will reduce the CAR level by 0.66 units.

A strong and sound banking sector is a prerequisite for the financial system's sustainability and economic growth. The ongoing Covid-19 pandemic poses asevere challenge for the banking sector and other economic actors, which maintain their importance in the financial system. However, the fact that the regulatory authorities of both countries' banking sectors, in line with the BASEL criteria, carry out regulations and audits to ensure economic recovery and that the CAR is above the specified levels will reduce risks in banking and eliminate the vulnerability to financial fragility. In this context, the high capital adequacy ratios of the banking sector in both countries suggest that they fulfill their functions as financial institutions that help increase social welfare with an effective operational strategy instead of creating risks for the national economy. In the exposure of the adverse effects of the COVID-19 pandemic on the economies, this study investigates the relationship between financial vulnerability and bank-specific micro variables in the banking sectors of the two countries during the crisis periods in the banking sector the two countries.It compares the two countries' banking sectors has a unique value and will make a decisive contribution to the literature. In addition,expanding the scope of the period to be analyzed with a later analysis, including data for different countries and macro variables and participation banks, and investigating this issue with other econometric models will provide diversity and enrichment to the literature.

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