

Article

Banks' Financial Stability and Macroeconomic Key Factors in GCC Countries

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Abstract: Purpose: This study examines the impact of macroeconomic factors on GCC banks' stability. As GCC countries still rely on oil export revenues to cover government expenses and perform an undiversified economy, hence, increased awareness of the financial diversifications in the GCC financial sectors is needed to contribute alongside oil sector revenues and then improve the non-oil sectors' investments in order to eliminate the oil and macro-financial linkage that causes any changes in the oil price to impact the whole macroeconomic and financial system of the country. In this context, this research selected the most important macroeconomic factors such as GDP growth, inflation rate, exchange rate, global financial crisis period (2008/2009), oil price fluctuation, and political instability within the period from 2005 to 2020, which covers many economic and political events. Design/methodology/approach: We used panel cointegration analysis, starting with a panel unit root test and including PFMOLS and PDOLS estimations. Additionally, FGLS estimation was used due to the existence of heteroskedasticity and auto-correlation in the sample. Findings: The findings suggest that there is an adverse relationship between the inflation rate, global financial crisis (2008/2009) and oil price changes, and the financial stability of GCC Islamic and conventional banks. However, the Islamic bank is less adversely affected by a financial crisis, oil price changes, inflation rate and political instability. Originality/value: This proposed model provided better knowledge for regulators and policymakers about the external impacts on GCC banks' stability, to commit an appropriate economic policy to help in reforming the economic and financial imbalances.

Keywords: banks' financial stability; macroeconomic variables; banking system (Islamic and conventional banks); GCC countries



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1. Introduction

Financial institutions are considered the lifeblood of the economy and the banking sector is the most vital institution for growth and economic development. Banks called financial intermediaries are the key sources of funding businesses, enhance economic growth, and contribute to financial stability against the shocks of financial crises as the main role of banks as institutions of financial intermediation is to allocate deposits as a surplus fund from lenders as a surplus unit and to support the deficit in units, borrowers or investors effectively and efficiently [1]. In this regard, the banking system plays meaningful and useful functions that mostly deal with wealth and capital. These functions are especially related to monetary activities and include economic scarcity eradication, capital mobilization, and allocation of municipal funding, etc. [2–4]. Likewise, the banking system also plays an essential role in connecting economic units and individuals through stocks and bonds in the financial markets, which are highly sensitive to fluctuations in interest rates. Besides the significant role that banks play in financial intermediation, banks also

run the wheels of overall economic relations using the wealth that is created through the process of financial intermediation [5].

Moreover, banks have a crucial role in ensuring financial stability and financing businesses in the real economy. Hence, a sound and productive banking sector contributes to growth, economic development and financial stability. On the contrary, a decline in banking stability or performance has an adverse impact on economic development and growth [1,6]. In this context, the strength of the banking system in a country is an essential condition to ensure continued economic growth and financial stability [7]. Thus, it could be said that the profitability of banks enables economies to withstand the risks of external financial shocks [8].

The banking industry in the Gulf Cooperation Council (GCC) countries can be divided into two main banking systems: Islamic and conventional banking systems. Many countries, including the GCC, adopt a dual banking system where Islamic banks operate alongside conventional banks [3,4]. In fact, this classification into Islamic and conventional banks is based on the operations of the main intermediation functions of the bank, that is collection of deposits and granting loans on the one hand, and on the other hand, paying (charging) of interest or returns [2,9]. Islamic finance must fulfill *Sharia* (Islamic law) requirements by producing *Muamalat* or products and services that comply with *Sharia* principles and implement the Profit-Loss Sharing (PLS) modes, which essentially prohibit any financial transaction that gives or receives interest or *riba* [10]. In addition, [11] argued that Islamic banks' modes of financing would increase the overall profitability and then increase the resilience capability of Islamic banks to protect the economy by absorbing losses during financial crises. Meanwhile, interest is the major driver of the financial intermediation processes of conventional banking and is also considered the prime source of income and cost of financing in conventional banks [12].

Bank Financial Stability in GCC Countries

Banking financial stability became a main concern during and after the global financial crisis (GFC) (2008–2009). However, only a few studies have focused on banks' stability and its important link to macroeconomic indicator risks, and the majority of these studies are presented in the literature part of the research. The general concept of financial stability arose in the last decade to signify the main function of financial authorities led by central banks [13]. GCC countries are located in the Arabic peninsula and they are considered the central block of the MENA region. Furthermore, GCC countries have achieved better economic performance, have larger infrastructure projects and are more developed than some other MENA countries. Thus, it makes the financial position of banks of the GCC stronger as they are well-capitalized and more profitable than other banks in MENA countries.

However, currently, GCC countries face many challenges that started with the decline of oil prices since the GFC [14], followed by political instability (PI) events (known as the Arab Spring) that started in the MENA region at the end of 2010 in Tunisia, permeating quickly to Egypt, Yemen, Libya, and Syria, as well as the outbreak of the Yemeni war and the political crisis between Qatar on one side and Saudi Arabia, UAE, and Bahrain on the other and finally ending in the outbreak of the Coronavirus pandemic at the end of 2019 (known as COVID-19). These challenges, among others, have influenced the economic performance and growth rates in GCC countries. However, the main economic challenge essentially is the dependency on the revenue of oil as a dominant sector. Hence, this research selects, besides the common macroeconomic variables such as Gross Domestic Product Growth (GDP_G), inflation rate (INF_R), exchange rate (EXR) and GFC period, other macroeconomic variables related to GCC economies such as oil price changes (OPC) and PI as considered new variables to be linked with banks' financial stability.

GCC countries have similar economies and the same social characteristics, and all of these countries depend on oil revenue as the single primary commodity [15]. That makes them face many challenges due to volatility in oil prices, as there is no economic

diversification to adjust the impact of volatility in oil prices. They are far behind other countries that have diversified their economies, especially the Group of Seven (G7) countries (the group of seven includes countries as follows: The United Kingdom, Canada, Italy, France, Germany, Japan, and the United States), which have more enormous oil wealth reserves. Nevertheless, G7 has diversified economies, unlike the GCC economies that depend on oil sector revenue, which in turn increases the exposure to risks due to the decline in oil prices [16,17]. Financial stability reports of banking systems and banks are prepared annually by central banks of GCC countries and focus on the continued soundness and stability of financial institutions and banking systems. In fact, the GCC financial sector suffered some deceleration in growth, whereas equity markets reached a low level at the beginning of 2016, which was during the lowest decline in oil prices (USD 30 per barrel). Then, the recovery in oil prices enhanced equity prices to remain stable.

Therefore, dependency on oil revenues as a dominant sector creates the oil–macro financial linkage, and challenges would be faced since oil revenue decreases due to oil price decline which leads to risk exposure in the financial system through the deterioration of liquidity and asset quality [18]. Most notably the financial systems of GCC countries are reliant more on the banking system compared to the United States, which is more reliant on non-bank financial institutions. As shown in Table 1—which was prepared by IMF at the end of 2018—the GCC financial systems rely on 80 percent of banks’ total assets instead of 20 percent for non-bank financial institutions. While according to Table 1 figures, the rates are 43 and 57 percent for the same sectors in the United States, respectively [19,20]), meaning that more dependency on banking system than non-banking institutions in the GCC region puts more importance on the stability of banks and the debt capital market in general (see Table 1). This, therefore, suggests that the debt capital market is still less well developed. Once the domestic capital market is more well-developed, fiscal and monetary policy will be improved and thus provide a more efficient allocation of capital and better risk-sharing. This will then enhance the increasing access to sources of financing for the private sector to launch strategic infrastructure projects effectively [19].

Table 1. Financial Institution Assets in GCC and USA, 2017.

	GCC	USA
	USD billions	
Financial Institutions	2855	50,886
Commercial Banks	2282	22,106
Non-bank Financial Institutions	573	28,781
	(Percent of total financial institutions assets)	
Commercial Banks	80	43
Non-bank Financial Institutions	20	57
	(Percent of GDP) *	
Financial Institutions	196	273
Commercial Banks	156	119
Non-bank Financial Institutions	39	155
Private Sector Credit	72	53

Source: IMF staff calculations, (2018). * Percent of GDP figures are simple averages (IMF, 2018).

This paper attempts to examine the impact of macroeconomic factors on GCC banks’ stability. Furthermore, one of the important factors that is discussed in this study is OPC, as one of the utilities of this research is to increase awareness of the financial diversifications in the GCC financial sectors to contribute alongside oil sector revenues and then improve the non-oil sector’s investments. This would eliminate the oil and macro-financial linkage that causes any changes in oil prices to impact the whole macroeconomic and financial system of the country [21]. In this context, non-oil sector investments will be contributed to by the GCC banks. These investments will open new options for the GCC banks and thus achieve

financial and economic stability. Additionally, the contribution in these sectors' investments would increase employment among GCC people. However, the dependency on oil revenues has increased over time as reflected by the percentage of the total fiscal revenues evidenced in Table 2. Thus, the financial sector will be under systemic vulnerabilities that build up the interactions between asset prices and credit. These systemic vulnerabilities have a significant adverse impact on the GCC's real economy.

Table 2. Fiscal oil revenues as a percent of total fiscal revenue.

State	2000–2005	2006–2011	2011–2015
Bahrain	71.7	82.2	87.2
Kuwait	72.7	79.2	83.6
Qatar	90.5	88.3	90.7
Saudi Arabia	82.8	88.3	90.3
UAE	60.2	65.1	69.9

Source: IMF staff calculations [22].

2. Literature Review

2.1. Financial Stability Definition

There is no consensus in the literature about the definition of bank financial stability. Nevertheless, financial stability is related to financial problems that appear to be volatile in financial institutions but not in non-financial institutions [23]. Based on that, [24] defined financial stability as the ability of financial institutions to resist economic shocks, absorb the impacts of financial crises, and assess and manage risks. According to [13], the best method to define financial stability is to describe the characteristics of financial instability. Therefore, banks' financial stability is defined as a period of the absence of instability of banks. Similarly, financial stability is the capability of the financial system—which is comprised of banks and other financial intermediaries, markets, and market infrastructure—to withstand shocks and financial crises [25].

2.2. Macroeconomic Variables

Both macroeconomic and financial imbalances are considered the main factors that play a role in triggering banking distress, which occurs due to an interaction between financial and macroeconomic factors, and also banks' structural weaknesses. Macroeconomic key factors affect banks through several adverse conditions, such as high rates of inflation and banking interest, and levels of negative growth and high level of unemployment [26]. Studies have indicated that some finance and banking variables are influenced by macroeconomic variables. For example, bank profitability [8,27,28]; liquidity and Capital Adequacy Ratio (CAR) [29]; credit risk [26,30]; bank efficiency [31,32]; and financial crises [33]. It is also recorded in the literature that macroeconomic factors affect the financial stability of banks differently [34–38]. This paper also selected important macroeconomic key factors such as; GDP_G, INF_R, EXR, GFC (2008/2009), and PI to be regressed with the financial stability of individual banks.

2.2.1. GDP Growth

Most financial stability studies have provided evidence that there is a significantly positive relationship between real GDP_G and bank financial stability [1,2,6–12,14–26, 28–30,33,35–38,38–65,65–74,74–81,81–90]. Some studies have shown that GDP impact is positive but insignificantly related to bank stability or bank performance [77,91]. Other studies have found that GDP_G is negatively related to bank financial stability [51,62]; and also have found no clear linear dependence on bank stability [47]. On the contrary, [37] found that the real GDP_G variable is significantly and negatively related to the financial stability of conventional banks, but insignificantly and negatively related to Islamic bank stability. However, [92] and [36] found no impact of GDP_G on bank financial stability. In addition, a nonsignificant impact in the MENA region was found [93]. Ref. [94] found that

GDP_G in GCC countries has a significant positive relationship with the stability of Islamic banks and is nonsignificant when related to conventional banks. Therefore, real GDP_G, on average, is expected to be positively related to the financial stability of banks, although it looks negatively related to stability in the aftermath of a financial crisis [48]. Ref. [90] found that GDP_G very significantly and positively affected insolvency risk (as measured by the indicator of Z-score). Generally, the hypothesis of the GDP_G variable is stated as follows:

Hypothesis 1 (H1). *There is a significant and positive relationship between GDP_G and the financial stability of GCC banks.*

2.2.2. Inflation Rate

Inflation is an important macroeconomic variable and is used to provide information about Consumer Price Index (CPI) and the GDP deflator. Thus, a higher INF_R of a country leads the banking system to be more vulnerable to risk [81], which is expected to have an impact on bank financial stability, as some studies believe. Most studies on financial stability have stated that INF_R is significantly and negatively related to bank financial stability [39,60,65,69,89,90]. Although [74] found that the impact of INF_R is different in Islamic and conventional banks, where it is negatively related to the stability of conventional banks but positively related to Islamic banks' stability. As well as this, [94] found the same difference in impact between Islamic and conventional banks related to banks' stability. On the other hand, for Southeast Asian banks, it was found that the impact of INF_R is negative and significant on a large bank's stability. At the same time, it was positive and significant for the stability of small banks [38] and also positive and significant for the performance of conventional banks [95]. However, [36] and [92] found no impact of INF_R on bank financial stability since the relationship between INF_R and bank profits appears to be negatively correlated to all measures of bank profitability [86]. As well as this, [96] argued that in the long run, INF_R tends to have a positive and significant impact at the Non-Performing Loans (NPLs) level. Thus, increases in INF_R lead to increases in NPLs or credit risk levels, which have an adverse impact on a bank's performance. Hence, generally, the hypothesis of the INF_R variable is stated as follows:

Hypothesis 2 (H2). *There is a significant and negative relationship between INF_R and the financial stability of GCC banks.*

2.2.3. Exchange Rate

Financial crises may be led by an exchange rate crisis, which results from local currency devaluation subsequently causing large losses in the international reserves of a country as banks may be impacted by this crisis and be prone to risk because of changes in foreign exchange rates [53]. Thus, it is expected that the stability of the exchange rate would be positively and significantly related to bank stability. It is supported by the literature on bank stability that the impact of movements in the exchange rate on bank financial stability is significant and positive [36,89,90]. On the contrary, [38] and [95] found that the exchange rate has a significant and negative association with bank performance in Tanzania and the financial stability of large banks in Southeast Asian countries, respectively. However, it is insignificantly and negatively related to the financial stability of banks in MENA countries. The impact of changes in the exchange rate on the profit of banks has obviously been noted as a determinant for bank profits via the common measures of bank profitability (return on asset (ROA) and return on equity (ROE)). [90] found that the official exchange rate affects profitability very significantly and positively as measured by ROE, while this impact is negative and very significant for profitability measured by ROA. At the same time, the instability of the exchange rate increases risk in bank activity, and losses may occur in transactions of the foreign exchange rate [97]. However, it was found—recently—that EXR has a negative and insignificant impact on NPL levels and such an indicator has an adverse

influence on bank performance [96]. The hypothesis of the EXR variable is generally stated as follows:

Hypothesis 3 (H3). *There is a significant and negative relationship between EXR and the financial stability of GCC banks.*

2.2.4. Global Financial Crisis

The effects of the GFC were witnessed during 2007–2009 for conventional banks, while for Islamic banks during 2008–2009. Generally, both types of banks faced many challenges during these periods, which had a severe impact on bank profitability and performance. Net losses were reported due to the rising requirement for impairment and provisions [98]. However, the impact of the crisis was different between Islamic and conventional banks. A dummy variable was used by [15,99] to express the year(s) of a crisis as a dummy variable that takes one for the year of the crisis (which was 2008/2009) and zero otherwise.

It was found that Islamic banks were more profitable than conventional banks during the GFC (2008–2009), while in the post-crisis period, they became less efficient and less profitable and more prone to credit risk than conventional banks [80]. Ref. [56] suggested that Islamic banks were differently affected from conventional banks through two features related to Islamic banks. First, the PLS modes adopted by Islamic banks helped limit the adverse effects on profitability. Additionally, the PLS modes made Islamic banks more resilient against the GFC [100] and second, the weakness of some Islamic banks in implementing risk management practices caused a decline in profitability compared to conventional banks. However, they found that the credit and asset growth of Islamic banks were better and contributed more to economic and financial stability than conventional banks during the crisis. Refs. [23,44] indicated that Islamic banks, during the period of GFC (2007–2009), were better capitalized and more cost-effective with higher asset quality ratios. As well as this, ref. [72] argued that Islamic banks are more resilient and stable during financial crises than their conventional counterparts. Nonetheless, an important variation was observed between large and small Islamic banks in terms of financial performance during the crisis [44]. Therefore, the hypothesis of the GFC variable is stated as follows:

Hypothesis 4 (H4). *There is a significant and negative relationship between the GFC and the financial stability of GCC banks.*

2.2.5. Oil Price Changes

OPC have an effect on oil dependency economies, such as GCC economies. As observed, oil prices witnessed a substantial decline during the GFC of 2007/2009. Such a decline also impacted bank profitability in GCC countries [101]. In light of the impact of OPC on bank profitability, two ways that bank performance was affected in oil-exporting MENA countries are presented: direct impact through OPC and indirect impact through key macroeconomic factors [58]. Moreover, OPC negatively affected the majority of financial subsectors, while non-financial subsectors were positively affected by OPC [88]. Furthermore, there was a significant and negative relationship between OPC and conventional banks' credit risk as proxied by NPLs. Moreover, large banks were more influenced by the adverse effects of oil prices and negative changes had more effects on bank NPLs than positive changes in oil prices [102]. The hypothesis of the OPC variable is stated as follows:

Hypothesis 5 (H5). *There is a significant and negative relationship between OPC and the financial stability of GCC banks.*

2.2.6. Political Instability

The political stability variable is one of the important variables for a country's economic growth because there is a significant role of political stability in economic growth, as a

stable political environment indeed supports building and sustaining economic growth [87]. Political instability events adversely affected the financial and economic systems through heightened security concerns and increased geopolitical tension [93]. Ref. [103] suggested that political stability is a very important variable and is a significant predictor of domestic and foreign investments, as well as other key macroeconomic factors, such as GDP_G and INF_R. If investor protection via rules and regulations does not function well due to an unstable political environment, it will not be able to protect investors, institutions and properties. In addition, it was found that bank efficiency is affected positively by political stability as one of the categories of the world governance indices among the six indices presented by Kaufmann [63]. In this category, political stability is alongside other indicators, such as government effectiveness, regulatory quality, the rule of law, voice and accountability, and control of corruption [43]. As well as this, a significant and positive impact between political stability and banking stability in the MENA region was found [93]. In general, political events impact economic activities, which successively have effects on the banking system. Hence, PI is one of the macroeconomic factors that has an impact on bank performance [78]. Thus, the hypothesis of the PI variable is stated as follows:

Hypothesis 6 (H6). *There is a significant and negative relationship between PI and the financial stability of GCC banks.*

3. Methodology

3.1. Theoretical Framework and Measurements

To measure the financial stability of individual banks, many studies use the same measure of insolvency risk. According to [92], there are different ways in the literature to measure banks' financial stability by using available data to calculate some accounting ratios, such as bank profitability, leverage ratio and liquidity. However, using these ways, which represent bank risk and accounting ratios, suffers from an endogeneity problem. Therefore, to reduce this problem, the common measure Z-score index (ZSCI) is used in the literature. This indicator was used by many studies on a bank's financial stability in various options in order to obtain a precise result [45,46,49,50,66,70,92,104]. According to [41], the ZSCI is a single measure that considers the proxy of the financial stability of banks as profitability, returns volatility and leverage. The ZSCI formula is formed as follows: ROA plus the capital ratio (or total equity (TE) over total asset (TA)), and this expression is divided by the standard deviation (σ) of ROA. This is the common formula employed by [57], which is as follows:

$$ZSCI = \frac{ROA + TE/TA}{\sigma ROA} \quad (1)$$

Hence, from Formula (1), the ZSCI provides information about the number of units of standard deviation that profitability would fall before running out of bank capitalization.

As mentioned above, this research has selected GDP_G, INF_R, EXR, GFC (2008/2009) OPC and PI as the macroeconomic key factors. These factors will be regressed in order to test their variability whether positively or negatively relative to the financial stability of Islamic and conventional banks. Therefore, the macroeconomic key factors of GCC countries that may have an impact on banks' financial stability are selected based on previous studies in this area. Most of these studies collected data on GDP_G, INF_R, EXR and PI from the World Bank (WB) and IMF websites. In addition, the variable which is mostly related to GCC economies, such as risk exposure to changes in oil prices, was generally collected from the Organization of the Petroleum Exporting Countries (OPEC) dataset (see Appendix A). Data of the ZSCI were collected from Data-Stream (Eikon). For analysis processes, two pieces of software or programs were utilized, STATA and E-Views.

This paper presents a conceptual framework that clarifies the relationship between macroeconomic variables and banks' financial stability, as shown in Figure 1.

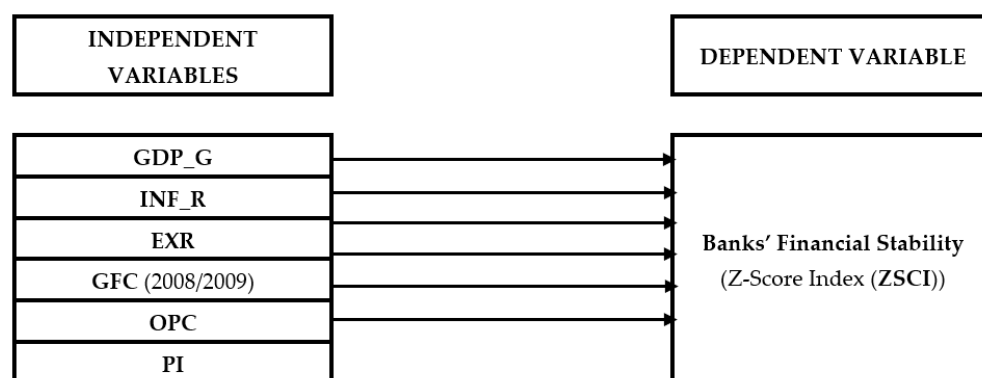


Figure 1. Conceptual Framework.

Thus, function 2 shows the relationship between macroeconomic variables (IVs) and financial stability or ZSCI (DV):

$$ZSCI = f(GDP_G, INF_R, EXR, GFC, OPC, PI) \quad (2)$$

Then, the panel model shows the regression equation as follows:

$$ZSCI_{it} = \beta_{0i} + \beta_{1i}GDP_{G_{it}} + \beta_{2i}INF_{R_{it}} + \beta_{3i}EXR_{it} + \beta_{4i}GFC_{it} + \beta_{5i}OPC_{it} + \beta_{6i}PI_{it} + \varepsilon_{it} \quad (3)$$

where:

$ZSCI_{it}$ is Z-score index for the bank (i) (whether Islamic or conventional bank) in year (t);

β_{0i} : Constant coefficient;

β_{ni} = The slope coefficient and $1 \dots n$: number of the variable;

$GDP_{G_{it}}$: Gross domestic product growth for the country that operates bank (i) in year (t);

$INF_{R_{it}}$: Inflation rate for the country that operates bank (i) in year (t);

EXR_{it} : Exchange rate for the country that operates bank (i) in year (t);

GFC_{it} : Global financial crisis period for the country that operates bank (i) in year (t);

OPC_{it} : Oil prices risk exposure for the country that operates bank (i) in year (t);

PI_{it} : Political instability for the country that operates bank (i) in year (t);

ε_{it} : Term of the random error.

The model in Equation (3) is divided into two sets of analysis; the first model used conventional bank data and the second model used data from Islamic banks.

3.2. The Panel Unit Root Test

The analysis should test the presence of stationarity in the data (panel unit root) of the dependent variable (DV) and each independent variable (IV) in time series data. It is necessary to test the presence of the panel unit root in the series. Once this condition is fulfilled, an appropriate panel model will be conducted as expressed in 3, [76]. However, there are many tests for data stationarity but some important tests usually employed for this function are from [59,67,68]. Hence, this research employed the most important tests such as [59,68] that could be used to assume homogeneity. These two recent tests of panel unit root were considered [40]. Ref. [76] reported that the hypothesis of the panel unit root as determined in the LLC test is as reported in Equation (4).

$$\Delta Y_t = \alpha + \lambda t + \gamma Y_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

The variable Y_t represents each variable (DV and IVs) included in this study. Moreover, the importance of examining the presence of stationarity in the data or panel unit root, to run Pedroni's panel cointegration, which is also effective to explain the heterogeneity issues and the bias of country size would be in control [105]. In order to examine data stationarity

using the panel unit root tests, the above tests (IPS and LLC) will be implemented using 5% as a level of confidence to test the two hypotheses (null and alternative) for the panel unit root at level $I(0)$, and first difference $I(1)$ as follows:

Null Hypothesis (H0): *There is a unit root (or data are non-stationary).*

Alternative Hypothesis (H1): *There is no unit root (or data are stationary).*

3.3. The Panel Cointegration Test

This paper expressed two groups of panel cointegration tests that were recommended by [83,85]. The first group is dimension based and presents four statistics of panel tests, which basically pool the beta coefficients (β_n) of autoregressive and reflect the problem of heterogeneity across the two types of banks. The second group of tests is based on the approach between dimension, which comprise three statistics of panel tests, which are based on the averages of individual auto-regressive coefficients related to the tests of unit root (data stationarity) of the residuals for each unit (or bank) across the panel of time series. [106] argued that Johansen's test is useful in employing individual cointegration tests, to treat as homogeneous across members, but it does not deal with the panel setting of the cointegration test, thus suggested the methodology proposed by [82–85]. Pedroni's studies proved that cointegration vector can vary among individual and different units of the panel and tested the endogeneity bias in the estimation of Ordinary Least Squares (OLS) using the fully modified OLS (FM-OLS). In addition, Pedroni's test authorizes the effects of heterogeneity in the error terms over the groups to be taken into consideration.

According to [106], Pedroni's seven tests of panel cointegration are based on the residuals as they are estimated in the long-run model (5) and are shown as follows:

$$\begin{aligned} y_{it} &= \alpha_i + \sum_{j=1}^m \beta_{ji} x_{jit} + \varepsilon_{it} \\ \varepsilon_{it} &= \rho_i \varepsilon_{i(t-1)} + w_{it} \end{aligned} \quad (5)$$

where are the estimated residuals from the panel regression. Therefore, Pedroni's panel cointegration [83,85] will be used by this study to include its heterogeneity test, which allows for cross-section influences of individual banks with heterogeneous slopes (coefficients) and also an intercept (alphas) of the cointegration equation to be estimated. However, Pedroni's cointegration test does not provide a coefficient estimation of whether the long-run relationship is positive or negative. Therefore, to estimate these relationships of long-run cointegration coefficients, this paper used the techniques of panel Dynamic OLS (PDOLS) and panel Fully-Modified OLS (PFMOLS) estimators for the next step.

3.4. The Panel Cointegration Estimators

Panel cointegration analysis is a more recent time series analysis to estimate long-run cointegrating relationships. Hence, this research considers various forms of the residual-based panel such as PFMOLS and PDOLS estimations. PFMOLS/PDOLS techniques are required to deal with heterogeneity issues and to conduct plausible tests. These tests are conducted to corroborate the estimation of long-run relationships between the categories of financial risks and financial stability for both individual Ibs and CBs. Finally, PFMOLS and PDOLS estimators were developed by [61,85,89]. This paper employs both PFMOLS and PDOLS estimators for the macroeconomic key factors and financial stability of Islamic and conventional banks separately in GCC countries.

3.4.1. Panel Fully-Modified OLS Estimator

Therefore, PFMOLS in panel cointegration analysis was suggested by [82,84] to handle the heterogeneity problem, and the general form of this regression was also considered by some related studies such as [64], which is stated in Equation (6):

$$Y_{it} = \alpha_i + \delta_t + \beta_i X_{it} + \varepsilon_{it} \quad i = 1, 2, 3 \dots N, \quad t = 1, 2, 3 \dots T. \quad (6)$$

Equation (6) allows for heterogeneity, where α_i : the fixed effect coefficient; δ_t : individual determinant trend; and β_i as the slope coefficient of heterogeneity. Y_{it} represents the DV which is ZSCI, as this current study uses the financial stability of Islamic banks (ZSCI_Ibs) and conventional banks (ZSCI_CBs). Instead, X_{it} denotes the IVs which contained the macroeconomic key factors. Then, according to Equation (7), PFMOLS estimators are stated for parameters β as follows:

$$\hat{\beta}_{NT} = N^{-1} \sum_{i=1}^N \left[\sum_{t=1}^T (X_{it} - X_i)^2 \right]^{-1} \times \left[\sum_{t=1}^T (X_{it} - X_i)^2 Y_{it}^* - T \hat{\tau}_i \right] \quad (7)$$

where $Y_{it}^* = (Y_{it} - Y_i) - \frac{\hat{L}_{21i}}{\hat{L}_{22i}} \Delta X_{it}$,

As well as this, in 3.18; $\hat{\tau}_i = \hat{\Gamma}_{21i} + \Omega_{21i}^0 - \frac{\hat{L}_{21i}}{\hat{L}_{22i}} (\hat{\Gamma}_{22i} - \Omega_{22i}^0)$, where $\Omega_i = \Omega_i^0 + \Gamma_i + \Gamma_i'$ shows the matrix of long-run covariance, if Ω_i^0 represents contemporaneous covariance and L_i is the lower triangle in the matrix decomposition, and Γ_i is a weighted sum of covariances [107].

3.4.2. Panel Dynamic OLS Estimator

The panel PDOLS estimation, as another technique of panel cointegration analysis, uses the future and past values of ΔX_{it} as an additional IV added to Equation (6), [61] and can be written as in Equation (8):

$$Y_{it} = \alpha_i + \delta_t + \beta_i X_{it} + \sum_{k=-Ki}^{Ki} \gamma_{ik} \Delta X_{i,t-k} + \varepsilon_{it} \quad (8)$$

PDOLS estimator has an additional advantage which is the correction of endogeneity in the regressors, furthermore, controlling the endogeneity in the model [75]. Therefore, the results of the PDOLS estimator will be taken first into consideration, as it performs better than the PFMOLS estimator. In addition, the PDOLS approach eliminates the serial correlation and endogeneity present in the OLS by augmenting the panel cointegrating equation with cross-section-specific lags and leads of the first differenced regressors [61,79]; Othman and Masih, 2015). PDOLS estimators that Betas (β_i^*) obtained as coefficients in this method can be formed as follows in Equation (9):

$$\beta_i^* = N^{-1} \sum_{i=1}^N \left[\sum_{t=1}^T (Z_{it} Z_{it}') \right]^{-1} \times \left[\sum_{t=1}^T Z_{it} Y_{it}^* \right] \quad (9)$$

where $Z_{it} = (X_{it} - X_i, \Delta X_{it-p}, \dots, \Delta X_{it+p})$, which represents the vector of regressions in the $2(p+1) \times 1$ dimension [107].

3.5. The Feasible Generalized Least Squares (FGLS)

This paper used an additional analysis for the coefficients' estimation, which is the feasible generalized least squares (FGLS) analysis. The FGLS proposed is to test the relationships; to solve problems of heteroskedasticity and serial correlation, furthermore, such estimation is considered an effective and more powerful test and FGLS results are more efficient and accurate than OLS [12,14,15,24,26,29,33,35–37,42–55,73]

4. Results

4.1. Panel Unit Root Tests

As mentioned above, it is important to test for the presence of panel unit root in the data. We employed the two common tests LLC and IPS [40]. Firstly, we started by running the tests at a level, as reported in Table 3, for conventional banks, and also, in Table 4, for

Islamic banks. The data stationarity test is represented by panel unit root tests at level $I(0)$ for all variables of conventional banks and Islamic banks. EXR has a unit root or non-stationary variable, as well as the GFC seems to show an inconclusive decision with no unit root. Therefore, panel unit root tests at the first difference $I(1)$ were performed to examine the panel unit root, which is a prerequisite for running the panel cointegration analysis. It was found that when using the tests for the first difference $I(1)$, variables EXR and GFC became stationary.

Table 3. Panel unit root tests (at level $I(0)$) for conventional banks.

H_0 Variable Is Non-Stationary or It Has a Unit Root						
Variables	LLC			IPS		Decision
	(1)	(2)	(3)	(1)	(2)	
ZSCI	−3.70743 [0.0001] ***	−4.75624 [0.0000] ***	−0.91161 [0.181]	−3.53354 [0.0002] ***	−4.18444 [0.0000] ***	Reject H_0
GDP_G	−3.56352 [0.0002] ***	−9.57044 [0.0000] ***	−10.87 [0.0000] ***	−3.0669 [0.0011] ***	−6.42035 [0.0000] ***	Reject H_0
INF_R	−2.69863 [0.0035] **	−5.63581 [0.0000] ***	−8.07672 [0.0000] ***	−1.64646 [0.0498] **	−6.02264 [0.0000] ***	Reject H_0
EXR	5.15455 [1.0000]	−6.30222 [0.0000] ***	7.66462 [1.0000]	8.92766 [1.0000]	1.01922 [0.8460]	Do not reject H_0
GFC	No result	−19.6938 [0.0000] ***	No result	No result	−9.13918 [0.0000] ***	Inconclusive
OPC	−35.4411 [0.0000] ***	−33.1706 [0.0000] ***	−35.8689 [0.0000] ***	−27.9471 [0.0000] ***	−25.2446 [0.0000] ***	Reject H_0
PI	−1.51662 [0.0647] *	−7.39574 [0.0000] ***	−5.1581 [0.0000] ***	1.60412 [0.9457]	−5.01757 [0.0000] ***	Reject H_0

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: ***, ** and * indicate the significance levels at 1%, 5%, and 10%, respectively. (1), (2), and (3) indicate the exogenous variables: individual effects, both individual effects and individual linear trends, and none, respectively.

The results showed that all variables have no unit root once we examined variables at the first difference $I(1)$. As is reported in Tables 5 and 6, the results of the unit root tests at the first difference $I(1)$ for all banks' variables are significant at the 1% significance level, which is to reject the null hypothesis of non-stationary and accept the alternative hypothesis of the stationary variable, which has no unit root. Hence, Pedroni's panel cointegration tests are appropriate to be employed to examine the presence of a long-run relationship between mentioned macroeconomic variables as IVs and the financial stability of conventional and Islamic banks as DV.

4.2. Panel Cointegration Test Results

There are two different results represented by the two models: ZSCI_CBs and ZSCI_Ibs regarding I cointegration tests. Table 7 presents the results for Pedroni's specifications for individual intercept, intercept and trend, and no intercept and trend for the conventional bank model. The results in Table 7 show the absence of cointegration as the null hypothesis of no cointegration (at usually 0.05 significance level) is not rejected. Hence, the variables are not cointegrated as there is no long-run relationship among macroeconomic variables.

Table 4. Panel unit root tests (at level $I(0)$) for Islamic banks.

H_0 Variable Is Non-Stationary or It Has a Unit Root						
Variables	LLC			IPS		Decision
	(1)	(2)	(3)	(1)	(2)	
ZSCI	−2.83989 [0.0023] ***	−7.11066 [0.0000] ***	−0.48972 [0.3122]	−1.02771 [0.152]	−4.26535 [0.0000] ***	Reject H_0
GDP_G	−0.9138 [0.1804]	−7.70032 [0.0000] ***	−6.84802 [0.0000] ***	−0.71892 [0.2361]	−5.10613 [0.0000] ***	Reject H_0
INF_R	−1.59515 [0.0553] *	−3.69815 [0.0001] ***	−5.73546 [0.0000] ***	−1.13464 [0.1283]	−3.47263 [0.0003] ***	Reject H_0
EXR	3.92041 [1.0000]	−4.37406 [0.0000] ***	4.7847 [1.0000]	6.46603 [1.0000]	0.95573 [0.8304]	Do not reject H_0
GFC	No result	−13.7547 [0.0000] ***	No result	No result	−6.38308 [0.0000] ***	Inconclusive
OPC	−24.7531 [0.0000] ***	−23.1674 [0.0000] ***	−25.0519 [0.0000] ***	−19.5191 [0.0000] ***	−17.6316 [0.0000] ***	Reject H_0
PI	−1.65292 [0.0492] **	−2.37815 [0.0087] ***	−3.49986 [0.0002] ***	0.61827 [0.7318]	−0.79507 [0.2133]	Reject H_0

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: ***, ** and * indicate the significance levels at 1%, 5%, and 10%, respectively. (1), (2), and (3) indicate the exogenous variables: individual effects, both individual effects and individual linear trends, and none, respectively.

Table 5. Panel unit root tests (at first difference $I(1)$) for conventional banks.

H_0 Variable Is Non-Stationary or It Has a Unit Root						
Variables	LLC			IPS		Decision
	(1)	(2)	(3)	(1)	(2)	
ZSCI	−10.9732 [0.0000] ***	−7.09136 [0.0000] ***	−21.5064 [0.0000] ***	−12.8564 [0.0000] ***	−7.73562 [0.0000] ***	Reject H_0
GDP_G	−16.1827 [0.0000] ***	−13.9901 [0.0000] ***	−29.325 [0.0000] ***	−18.6199 [0.0000] ***	−13.7017 [0.0000] ***	Reject H_0
INF_R	−23.1137 [0.0000] ***	−19.1983 [0.0000] ***	−26.7014 [0.0000] ***	−17.9143 [0.0000] ***	−10.7291 [0.0000] ***	Reject H_0
EXR	−12.0722 [0.0000] ***	−7.24604 [0.0002] ***	−12.5375 [0.0000] ***	−8.33237 [0.0000] ***	−2.85408 [0.0000] ***	Reject H_0
GFC	−21.8269 [0.0000] ***	−18.4874 [0.0000] ***	−27.0112 [0.0000] ***	−14.4493 [0.0000] ***	−9.5399 [0.0000] ***	Reject H_0
OPC	−9.86139 [0.0000] ***	−11.8722 [0.0000] ***	−32.4407 [0.0000] ***	−19.4476 [0.0000] ***	−14.0701 [0.0000] ***	Reject H_0
PI	−26.6312 [0.0000] ***	−20.3925 [0.0000] ***	−35.7505 [0.0000] ***	−27.3722 [0.0000] ***	−20.1614 [0.0000] ***	Reject H_0

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: *** indicate the significance levels at 1%, 5%, and 10%, respectively. (1), (2), and (3) indicate the exogenous variables: individual effects, both individual effects and individual linear trends, and none, respectively.

Table 6. Panel unit root tests (at first difference I(1)) for Islamic banks.

H_0 Variable Is Non-Stationary or It Has a Unit Root						
Variables	LLC			IPS		Decision
	(1)	(2)	(3)	(1)	(2)	
ZSCI	−7.6564 [0.0001] ***	−6.5104 [0.0000] ***	−16.8317 [0.0000] ***	−9.88279 [0.0000] ***	−7.77917 [0.0000] ***	Reject H_0
GDP_G	−9.68694 [0.0000] ***	−8.97612 [0.0000] ***	−20.5326 [0.0000] ***	−12.4424 [0.0000] ***	−9.15081 [0.0000] ***	Reject H_0
INF_R	−15.9538 [0.0000] ***	−13.8266 [0.0000] ***	−18.6926 [0.0000] ***	−12.3725 [0.0000] ***	−8.01617 [0.0000] ***	Reject H_0
EXR	−8.95342 [0.0000] ***	−7.35922 [0.0002] ***	−10.2232 [0.0000] ***	−6.13385 [0.0000] ***	−3.60302 [0.0000] ***	Reject H_0
GFC	−15.2445 [0.0000] ***	−12.9122 [0.0000] ***	−18.8654 [0.0000] ***	−10.0919 [0.0000] ***	−6.66296 [0.0000] ***	Reject H_0
OPC	−6.88749 [0.0000] ***	−8.29192 [0.0000] ***	−22.6576 [0.0000] ***	−13.5828 [0.0000] ***	−9.82697 [0.0000] ***	Reject H_0
PI	−17.7191 [0.0000] ***	−12.3816 [0.0000] ***	−23.2518 [0.0000] ***	−17.1877 [0.0000] ***	−11.3747 [0.0000] ***	Reject H_0

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: *** indicate the significance levels at 1%, 5%, and 10%, respectively. (1), (2), and (3) indicate the exogenous variables: individual effects, both individual effects and individual linear trends, and none, respectively.

Table 7. Pedroni's panel cointegration tests for conventional banks.

	Intercept		Intercept + Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
Panel v-Statistic	−3.6625	−5.8106	−5.5949	−7.74579	−3.1257	−5.3007
Panel rho-Statistic	8.0513	7.9572	9.639	9.414091	6.8808	6.7386
Panel PP-Statistic	2.5641	−1.1492	3.0864	−3.6 ***	2.4048	1.3502
Panel ADF-Statistic	−0.4514	−2.515 ***	1.3211	−2.351 ***	−1.2146	−1.309 *
Group rho-Statistic	10.8424		11.8602		9.8854	
Group PP-Statistic	−3.1528 ***		−5.127 ***		0.3559	
Group ADF-Statistic	−3.0468 ***		−0.5601		−2.824 ***	

Note: *** and * significant at 1, 5 and 10 percent significance levels, respectively.

For Islamic banks model results, which are presented in Table 8, the results further suggest that the alternative hypothesis of the presence of cointegration is accepted; instead, the null hypothesis of no cointegration is rejected for ZsCI_IBs as a DV for the specifications of intercept, intercept and trend and no intercept and trend. Thus, there is a long-run relationship among macroeconomic variables as they are cointegrated variables. However, we proceed to PDOLS and PFMOLS to further examine the long-run relationship and impacts of macroeconomic variables on the ZSCI_CBs and ZsCI_IBs (see Table 9).

Table 8. Pedroni's panel cointegration tests for Islamic banks.

	Intercept		Intercept + Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
Panel v-Statistic	−2.05114	−3.8778	−2.7898	−5.0244	−2.5138	−3.9112
Panel rho-Statistic	4.383498	5.309	6.0475	6.5765	3.960804	4.3893
Panel PP-Statistic	−7.0594 ***	−4.418 ***	−8.872 ***	−6.586 ***	−1.811 **	0.3751
Panel ADF-Statistic	−6.7016 ***	−3.73 ***	−5.926 ***	−2.712 ***	−2.485 ***	−0.5988
Group rho-Statistic	7.191183		8.2694		6.3894	
Group PP-Statistic	−8.5662 ***		−11.84 ***		−2.658 ***	
Group ADF-Statistic	−5.602 ***		−3.716 ***		−3.426 ***	

Note: *** and ** significant at 1, 5 and 10 percent significance levels, respectively.

Table 9. Estimation of Cointegrating Relationships for GCC Islamic and conventional Banks.

Bank Type	Conventional Banks		Islamic Banks	
DV: ZSCI	PFMOLS	PDOLS	PFMOLS	PDOLS
GDP_G	−0.0253 (0.0417)	0.0097 (0.0087)	−0.0677 (0.058)	−0.0355 *** (0.0129)
INF_R	−0.1084 ** (0.0437)	−0.0306 * (0.016)	−0.182 *** (0.0644)	−0.0477 * (0.026)
EXR	0.0202 *** (0.0034)	0.0104 *** (0.0008)	0.0213 *** (0.0049)	0.0061 *** (0.0015)
GFC	−0.0807 ** (0.0346)	−0.1949 (0.1698)	−0.264 *** (0.0484)	−0.7185 ** (0.2881)
OPC	−0.0428 ** (0.0171)	−1.0579 *** 0.2705	−0.112 *** (0.0242)	−0.6582 (0.41)
PI	0.0047 (0.0069)	−0.0009 (0.0016)	0.0147 (0.0104)	−0.013 *** (0.003)
R-squared	39.32%		50.6%	

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: ***, ** and * indicate the significance levels at 1%, 5%, and 10%, respectively.

4.3. Estimations of Panel Cointegrating Relationships Using PFMOLS and PDOLS Results

The results for PFMOLS of Islamic and conventional banks' stability are presented in Table 9 and are almost similar to the results of PDOLS in terms of the sign and values of the statistical significance level. However, the differences are just for the variables that have an insignificant impact on banks' financial stability such as GDP_G and PI, which became significant for the Islamic banks model for PDOLS, and OPC also appeared insignificant. Furthermore, [36,92] found an insignificant impact of GDP_G on banks' financial stability. INF, GFC, and OPC have the same impact; a negative relationship related to ZSCI. It was also found that INF_R and GFC have the same results in the literature as they have an adverse impact on banks' profits [39,56,65,90].

However, if we rely on the PDOLS result, which is presented in Table 9, GDP_G is negatively and significantly related to ZsCI_IBs, which is in the line with some studies

such as [37,51,62] INF_R and EXR have similar results for both ZsCI_IBs and ZSCI_CBs. EXR in GCC countries supports banks' financial stability, which is because EXR in GCC states remained fairly stable for the whole research period (2005–2020). For GFC, OPC and PI have a different influence on the stability of Islamic and conventional banks in GCC countries. OPC has an adverse influence on the financial stability of GCC banks. However, this adverse impact significantly impacts on ZsCI_IBs. As stated in a part of the literature that Islamic banks are less efficient than their conventional peers, [44] argued that Islamic banks have significantly greater overhead costs than conventional banks, and a similar explanation was stated by [47,89]. Accordingly, the relevant hypotheses H1 and H3 are not supported, while H2, H4 and H5 for INF_R, GFC and OPC are supported. As well as this, PI hypothesis H6 is supported only for the Islamic bank model.

This research suggested testing heteroskedasticity and serial correlation existence and the results, shown in Tables 10 and 11, confirmed that there is evidence that there is a heteroskedastic and auto-correlation problem in the data of Islamic and conventional banks.

Table 10. Heteroskedasticity Test–ZSCI of Islamic and Conventional Banks.

Dependent Variable		F-Statistic	Obs R-Squared
Conventional Bank	ZSCI	15.41	81.82
		Prob. F(6649) 0.0000 ***	Prob. Chi-square(6) 0.0000 ***
Islamic Banks	ZSCI	4.87	27.32
		Prob. F(6313) 0.0001 ***	Prob. Chi-square(6) 0.0001 ***

ZSCI: Z-Score index, Levels of significance: *** indicate the level of significance at 1%.

Table 11. Serial Correlation Test–ZSCI of Islamic and Conventional Banks.

Dependent Variable		F-Statistic	Obs R-Squared
Conventional Bank	ZSCI	151.95	209.66
		Prob. F(2647) 0.0000 ***	Prob. Chi-square(2) 0.0000 ***
Islamic Banks	ZSCI	69.384	98.73
		Prob. F(2, 311) 0.0000 ***	Prob. Chi-square(2) 0.0000 ***

ZSCI: Z-Score index, Levels of significance: *** indicate the levels of significance at 1%.

4.4. Heteroscedasticity and Serial Correlation Tests

The heteroskedasticity test is presented in Table 10, and according to [108]), the null hypothesis of heteroskedasticity is rejected, which means that the problem of heteroskedasticity is present in the data of Islamic and conventional banks. As well as this, the null hypothesis is rejected, hence, there is no serial correlation according to [54], as shown in Table 11. Thus, a serial correlation problem is present in the data of Islamic and conventional banks.

Therefore, by employing the estimation of FGLS to examine the relationship between IVs represented by macroeconomic key factors and ZSCI of Islamic and conventional banks, FGLS estimation is considered to solve the problems of serial correlation and heteroskedasticity presence in the data [42,55,73]

4.5. Results of FGLS Estimator

It is shown in Table 12 that the result of the FGLS estimator is more reliable to clarify the differences between conventional and Islamic banks regarding the influence of the macroeconomic variables on the financial stability of GCC banks. The result of the FGLS estimator showed that GDP_G is positive and significant (at a 10% significance level) related to ZSCI_CBs. Such a result supports the study of [91]), which argued that higher GDP

will lead to reduced risk-taking by banks, and then increase banks' stability, as banks from faster-growing countries such as the GCC have a lower portion of impairment loans and are therefore less risky, which encourages banks to participate in financing investments and trusting investors. Similarly, PI has the same effects as the GDP_G impact on GCC banks.

Table 12. Estimation of FGLS for GCC Banks Using ZSC as a DV.

Bank Type	Conventional Banks	Islamic Banks
GDP_G	0.0111 * (0.006)	−0.0102 (0.0088)
INF_R	−0.033 *** (0.0082)	−0.0108 (0.0124)
EXR	0.0044 (0.0028)	0.0261 *** (0.0044)
GFC	−0.2412 *** (0.0789)	−0.2257 * (0.1236)
OPC	−0.1528 ** (0.0646)	−0.1860 * (0.1016)
PI	0.0072 * (0.0039)	−0.0062 (0.00625)

ZSCI: Z-Score index, GDP_G: gross domestic product growth, INF_R: inflation rate, EXR: exchange rate, GFC: global financial crisis period, OPC: oil price change, PI: political instability. Note: ***, ** and * indicate the significance levels at 1%, 5%, and 10%, respectively.

INF_R has a significant and negative impact on ZSCI_CBs, while it has a positive and insignificant impact on ZsCI_IBs. Similarly to PDOLS and PFMOLS estimators, EXR has a significant and positive influence on ZsCI_IBs; however, it is insignificant for ZSCI_CBs. Islamic banks' stability was supported by the stability of EXR in the GCC, as it was observed that no serious change occurred during the research period. As well as this, the Islamic finance system is more related to the real economy of the GCC countries. Hence, Islamic banks were less affected by the GFC during the period 2008–2009 (see Table 12), while conventional banks were more influenced by the crisis, as many conventional banks went bankrupt and not even one Islamic bank was declared bankrupt [52,53]. As well as this, the petroleum industry in GCC countries impacts their whole economy and financial system. However, Islamic banks' stability tends to be less affected by OPC than its counterpart of conventional banks. Hence, the relevant hypotheses H3 and H6 are not supported, while H4 and H5 for GFC and OPC are supported. Additionally, hypotheses H1 and H2 are supported but only in the conventional bank model.

5. Conclusions

This research attempts to examine the effects of macroeconomic key factors on bank financial stability by forming a suitable framework for the macroeconomic determinants of banks' financial stability in GCC countries. Based on the literature, this paper selected six macroeconomic variables such as GDP_G, INF_R, EXR, GFC, OPC and PI, which are considered the variables mostly related to GCC countries and the challenges that face their economies, and influence GCC banks' stability. The findings of this research could produce some identifications for policymakers and Central Bank regulators in order for them to make appropriate economic and financial policies. Government interference is required by firstly, enhancing the economic growth of the country and focusing wisely on the GDP of the non-oil sector to diversify the co'ntry's revenues, avoiding the risk exposure which stems from macroeconomic factors that have a significant relationship related to increases in the volatility of bank's earnings [71]. Thus, policy implications for macroeconomic variables, as an external influence, need government interference in the GCC countries and need control of the banking sector, starting with Central Banks and other financial authorities.

The findings of this research provide some strategies that enable bank management to create good investment decisions. Hence, increasing awareness of the financial diversifications in the GCC financial sectors to contribute alongside oil sector revenues and then improving non-oil sector investments. This would eliminate the oil and macro-financial linkage, which causes any changes in oil prices to impact the whole macroeconomic and financial system of the country. In this context, non-oil sector investments will be contributed to by the GCC banks in order to withstand the adverse impacts of macroeconomic key

factors during the vulnerabilities of macroeconomic factors. Thus, increasing the financial stability of the GCC banks and ensuring that confidence in the whole GCC banking system will be enhanced. As well as this, this research provides the investment policymakers in GCC banks with an understanding to develop new financial strategic plans to enhance investment awareness, raising the level of financial and investment culture among various segments of society, which is consistent with the plans and programs in the GCC future visions such as the Saudi Arabia Vision 2030. Thus, this will contribute to strengthening the investment market in all GCC countries and also create new real jobs and investment opportunities for interested businessmen and businesswomen. As well as this, it will increase the level of financial and investment culture among the gulf society, and open new opportunities for youth to join the labor market, including the oil and non-oil sectors.

The limitations of this research can be summarized in two sentences. First, this paper ignored non-banking institutions, as it focused on banking institutions (conventional and Islamic banks), therefore the results of this research will not be applicable to non-banking institutions. Second, this paper excluded Sultanate Oman, a country member in the GCC region, because it started its Islamic banking industry in around 2012.

The recommendation for future studies is to incorporate more macroeconomic variables relevant to GCC economies that influence banks' financial stability. Moreover, future research may take into consideration specific bank variables such as all financial risks; liquidity risk, credit risk, interest rate risk and CAR. There is also a need to differentiate between the GCC region and other regions such as southeast Asia in terms of banks' financial stability.

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Appendix A

Summary of The Measurements of Variables			
Dependent Variable: Financial stability of individual banks	$ZSCI = \frac{ROA + TE/TA}{\sigma_{ROA}}$ Where: ZSCI: Z-score index, ROA: Return on Assets, TE: Total Equity, TA: Total Assets, σ_{ROA} : Standard Deviation of ROA	Data stream (Eikon) and author calculations.	[36,41,44], and others.
Macroeconomic variables: Gross Domestic Product Growth (GDP_G)	Rate of the real GDP growth of a country.	World Bank (WB) and international monetary fund (IMF).	[92].
Inflation Rate (INF_R)	The consumer price index (CPI).	World Bank (WB) and international monetary fund (IMF).	[39,47]

Summary of The Measurements of Variables			
Exchange Rate (EXR)	Historical data provided by the WB and IMF websites	World Bank (WB) and International Monetary Fund (IMF).	[53,90]
Period of Global Financial Crisis (GFC)	Dummy variable which uses one for 2008–2009 and zero otherwise.	-	[99]
Oil Prices Changes (OPC)	Historical data provided by the West OPEC (Organization of the Petroleum Exporting Countries. (changes %)	OPEC	[102]
Political Instability (PI)	Historical data of political stability index. (Taken in negative numbers to express for political instability).	World Bank (WB) and Worldwide Governance Indicators (WGI)	[93]

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